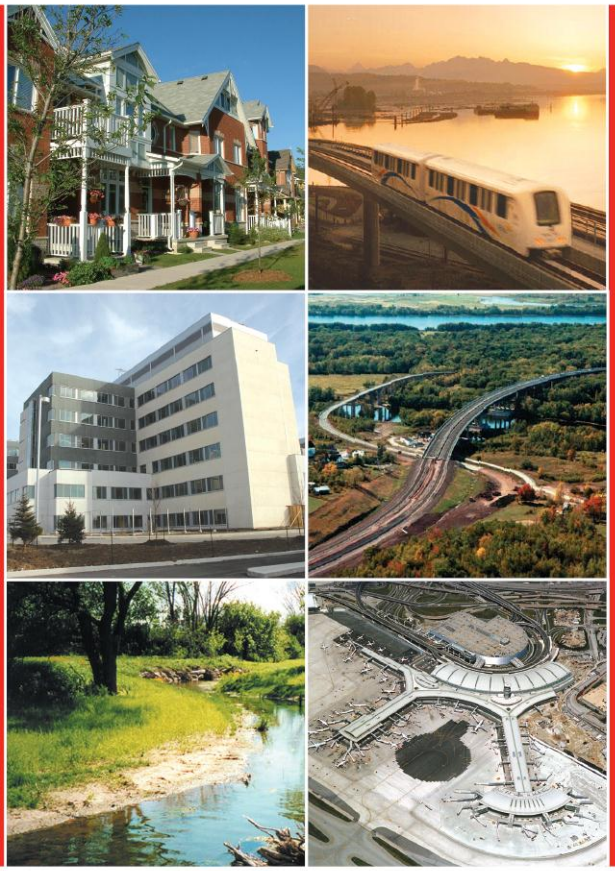
MMM Group Limited



Land Demand Analysis

City of Lethbridge
5212008-000-MDA

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE

MMM GROUP

September 2012

STANDARD LIMITATIONS

This report was prepared by MMM Group Limited (MMM) for the City of Lethbridge (the Client). The disclosure of any information contained in this report is the sole responsibility of the Client, The City of Lethbridge. The material in this report reflects MMM's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. MMM accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

EXECUTIVE SUMMARY

This report details the results of a Land Demand Analysis that MMM Group Limited undertook as part of a consultant team led by O2 Planning and Design on behalf of the City of Lethbridge and the County of Lethbridge, in support of their Integrated Growth Management Strategy (IGMS). The Study Area for this analysis matches the IGMS boundary, consisting of the entire City of Lethbridge and the south-central portion of the County of Lethbridge (including, the Town of Coalhurst).

To best utilize the background data available, a larger area, defined on the basis of the transportation zones encompassing the Study Area was also reviewed. This larger, transportation zone-based boundary is referred to as the Transportation Zone Area (TZA) in the report. The TZA includes the Town of Coaldale and additional County lands, which is beneficial as there is a significant amount of cross-boundary commuting occurring with the City in this area.

While the Land Demand Analysis includes a review of data for the entire TZA, its findings and recommendations are limited to the Study Area only. The portion of the TZA within the City of Lethbridge is referred to as the City TZA, whereas the portion in the County (which includes both the Towns of Coalhurst and Coaldale) is referred to as the County & Towns TZA.

The purpose of this Land Demand Analysis is to estimate current and future employment and residential land demand in the Study Area at a level of detail sufficient for the IGMS to prepare policies and strategies to ensure an adequate amount of residential, industrial and commercial land in the Study Area to support growth over the 100-year period between 2012 and 2112, with the understanding that the validity of the various underlying assumptions for the projections decreases significantly as the projection timeframe is extended. As the analysis relied heavily on municipal tax assessment information, land demand units in the projection are provided as net hectare figures based on categorized parcels (i.e., roads and non-buildable parcels are excluded).

The baseline land demands for the County appear noticeably greater than those for the City as the baseline scenario assumes that development will continue along existing rural rather than urban density norms (i.e. a land user in the County tends to use more land than one in the City since there is simply more of it available to develop). The question of how to position the supply of land in the Study Area to accommodate this magnitude of demand is the subject of the overall IGMS study that this study is intended to feed into.

The total land requirements for the City TZA and County & Towns TZA in the baseline scenario (i.e. a scenario based on historic and stable recent economic and demographic trends) are projected to evolve as per the table below, between 2012 and 2112.

	City TZA					County & Towns TZA				
	2012	2032	2062	2087	2112	2012	2032	2062	2087	2112
Total Residential Land Area Requirements (Ha.)	3,967	4,375	4,977	5,478	5,980	24,462	24,690	25,161	25,554	25,947
Total Employment Land Area Requirements (Ha.)	9,333	9,716	10,345	10,870	11,394	33,048	33,998	35,511	36,773	38,035

Under the baseline scenario, annual residential land demand is expected to remain very stable in the City (adding approximately 20 hectares each year) over the foreseeable future, while the County & Towns TZA is expected to add about 5 hectares each year before 2020, and just less than 16 hectares each year after 2020. The increased demand after 2020 in the County & Towns TZA is due to assumptions made within the Transportation Master Plan (TMP) projection model that are beyond the scope of this Study. Except for the modelling limitation at 2020 in the County & Towns TZA, annual residential demand in the entire TZA is expected to remain stable, largely due to the fact that Lethbridge is not subject to the same exploration and extraction activities that drive residential demand, and therefore volatility, in other parts of Alberta.

With respect to employment demand, the entire TZA is dominated by the Commercial / Institutional sector, particularly in the City. This dynamic generally correlates to lower land demand since businesses in this sector tend to have higher employment densities. When considered with stakeholder input from municipal staff and Economic Development Lethbridge, which speaks to low traffic congestion and constrained labour rather than land supply, it is likely that growth in this sector will manifest along the highway corridors on both sides of the City limit.

Employment development along the highway corridors in the County & Towns TZA is likely to be lower density Industrial in nature. As a result, a large injection of employment in the TZA, is unlikely to translate into significant land demand. For example, Manufacturing uses generally range from 15-30 jobs per net hectare and wholesale trade can frequently be found at 10 jobs per net hectare. Assuming a sudden influx of 200 wholesale trade jobs at 15 jobs / hectare would only yield a requirement of roughly 13 net hectares. In addition, any gains in the economic development priority sectors in the Study Area, namely high tech, agri-food, transportation, oil and gas and manufacturing, are not likely to manifest as lower density employment land users than those already present in the Study Area.

The baseline results have also been augmented through scenario analysis to account for the effects that likely contextual changes or policy actions may have. Based on our background review and stakeholder consultation with municipal staff and Economic Development Lethbridge, the key elements internal to the TZA that are likely to affect the baseline include: the TZA's constrained labour supply; the City's status as the TZAs primary infrastructure and municipal services provider; and the status of Government / Public Sector as the largest employer. Economic Development Lethbridge has furthermore indicated that it is focusing its economic development efforts on attracting high tech, agri-food, transportation, oil and gas and manufacturing businesses. Additionally, the development density metrics used for the analysis was informed by contemporary standards and norms in other Canadian jurisdictions and from staff input from the City and County.

Our scenarios therefore estimate the potential effect on land demand of the following:

- More compact residential development;
- Broader dwelling mix towards more intensive types;
- A higher rate of Industrial employment growth;
- A higher rate of Office employment growth in the City; and
- Increased Commercial / Institutional employment densities in the County.

Using the scenario parameters described above, the results indicate that:

- Compact residential development could reduce the residential land requirement by 108 hectares for the City and 159 hectares for the County & Towns TZA by 2032, and up to 534 hectares in the City and 1,015 hectares in the County & Towns TZA over the next 100 years;
- An enhanced dwelling mix could reduce residential land demand by 44 hectares in the City and 15 hectares in the County & Towns TZA by 2032, and up to 214 hectares in the City and 99 hectares in the County & Towns TZA over the next 100 years;
- A 25% increase in the 2020 and 2040 Industrial employment projections provided by the TMP could increase employment land demand by 221 hectares in the City and 71 hectares in the County by 2031, and up to 253 hectares in the City and 81 hectares in the County over the next 100 years;
- A 25% increase in the 2020 and 2040 Office employment projections provided by the TMP could increase employment land demand by 11 hectares in the City by 2032, and up to 34 hectares over the next 100 years; and,
- Increasing Commercial / Institutional employment density could reduce associated land demand by 717 hectares in the County by 2032, and up to 3,540 hectares over the next 100 years.

TABLE OF CONTENTS

1 INTRODUCTION

The City of Lethbridge and the County of Lethbridge jointly engaged a consultant team led by O2 Planning and Design (O2), which included the MMM Group Limited (MMM), to prepare the City's Integrated Growth Management Strategy (IGMS) between March and September 2012. This report prepared by MMM presents the findings from the Land Demand Analysis, one of the components of the IGMS.

The location of the City of Lethbridge is shown in Exhibit 1 on the following page. The City is approximately 122.36 km^2 and straddles the Oldman River in southern Alberta. The County of Lethbridge is the municipal district that surrounds the City. The County, along with the two towns – Coaldale and Coalhurst, measure a total of approximately 2,838 km^2. The Study Area for the IGMS is also the Study Area for the Land Demand Analysis. However, due to data availability and in order to reflect City commuting flows (Appendix D), a larger area defined on the basis of the transportation zones that encompass the Study Area was reviewed and analyzed. As a result, the boundary formed by these transportation zones is defined as the Transportation Zone Area (TZA) (Exhibit 2). Although the Land Demand Analysis includes a review of data for the entire TZA, its findings and recommendations are limited to the Study Area only.

The Study Area (shown within the yellow boundary in Exhibit 2), consists of the entire City of Lethbridge and the south-central portion of the County of Lethbridge (including, the Town of Coalhurst). The TZA is larger (shown within the brown boundaries in Exhibit 2), adding the Town of Coaldale and additional County lands to the area under review. For organizational purposes and clarity, the portion of the TZA in the City of Lethbridge is referred to as the City TZA, whereas the portion in the County is referred to as the County & Towns TZA, and includes both the Towns of Coalhurst and Coaldale.

The purpose of the Land Demand Analysis is to provide an estimate of current and future employment and residential land demand in the Study Area at a level of detail sufficient to inform the IGMS. Using input from this study, the IGMS will prepare policies and strategies to address how the supply of land in the Study Area should be positioned and how the absorption of that land will be regulated to ensure that an adequate amount of residential and employment land is available to support growth between 2012 and 2112.

Although the Land Demand Analysis provides projections up to the 100-year horizon, only projections up to 2032 should be used to inform detailed planning initiatives. Projections beyond 2032 are intended to be used for long-term visioning purposes, understanding that the validity of the various underlying assumptions for the projections decrease significantly as the projection timeframe is extended.

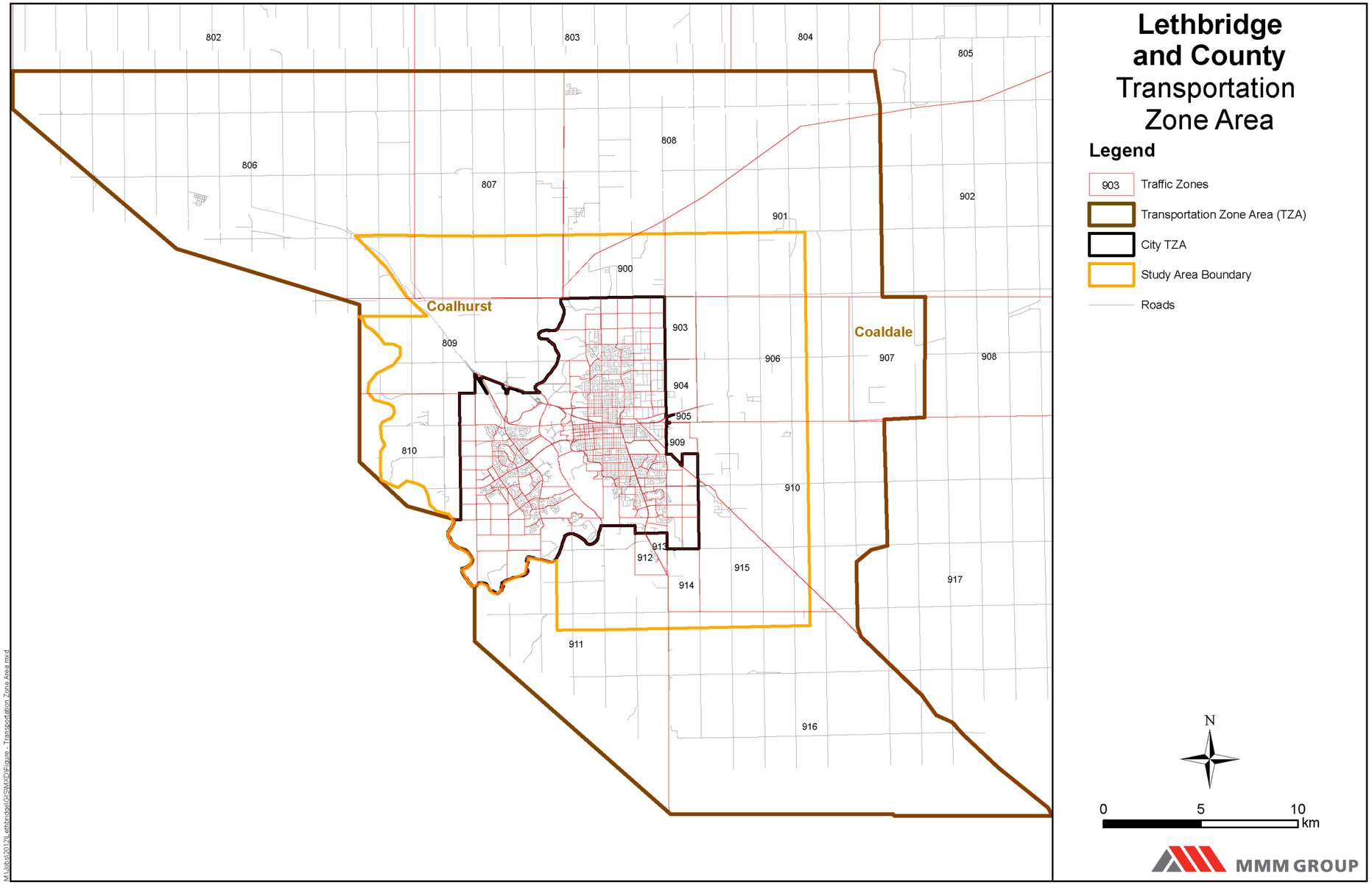
In essence, the objective of the Land Demand Analysis is to address the question of how much demand is likely to exist for land in the Study Area, whereas the IGMS is focused on the supply side of the equation.

Therefore, the approach of the Land Demand Analysis is to:

- Review population forecasts for the TZA and extend them on the basis of historical trends to 2032, 2062 and 2112, since population is the fundamental driver for residential development and serves as the labour pool for employment;
- Review current employment levels for each industry sector to understand sectoral cluster characteristics in the TZA, to provide an understanding of location characteristics by sector and a distinction between different levels of employment density based on industry sector;
- Review employment forecasts for the TZA and extend them on the basis of historical trends to 2032, 2062 and 2112, taking into account the different economic conditions and growth rates by sector;
- Identify where residential and employment uses are currently located, identifying the preferences and location factors for the two uses;
- Estimate the amount of land currently used to accommodate residents and employees in the TZA, and calculate resident and job densities in terms of the number of people or employees per hectare. This will be used to inform baseline assumptions as to how much land will be needed in the future;
- Project the amount of land that is likely to be needed to accommodate the estimated residential and employment growth to 2112 in the TZA; and,
- Identify factors that could influence the projected amount up to 2032, illustrating a range of potential scenarios for planning purposes.

Exhibit 1 –Lethbridge IGMS Study Area Context Map

Exhibit 2 – Lethbridge IGMS / Land Demand Analysis Study Area & Land Demand Analysis Transportation Zone Area



2 DEMOGRAPHIC & SOCIO-ECONOMIC TRENDS

This Section outlines trends in relation to demographics and housing, economic sectors, employment, and sectoral land consumption in the TZA. This review enhances our understanding of changes in the Study Area to-date and provides a starting point for designing the baseline land demand scenario in Section 3, which assumes that certain historic and recent trends will continue.

2.1 DEMOGRAPHICS & HOUSING

This section discusses relevant demographic in the TZA based on 1996, 2001, 2006, 2011 Federal Census results, and 2012 Municipal Census population counts. Please note that Federal Census results, which are more consistent, have generally been used for comparison purposes.

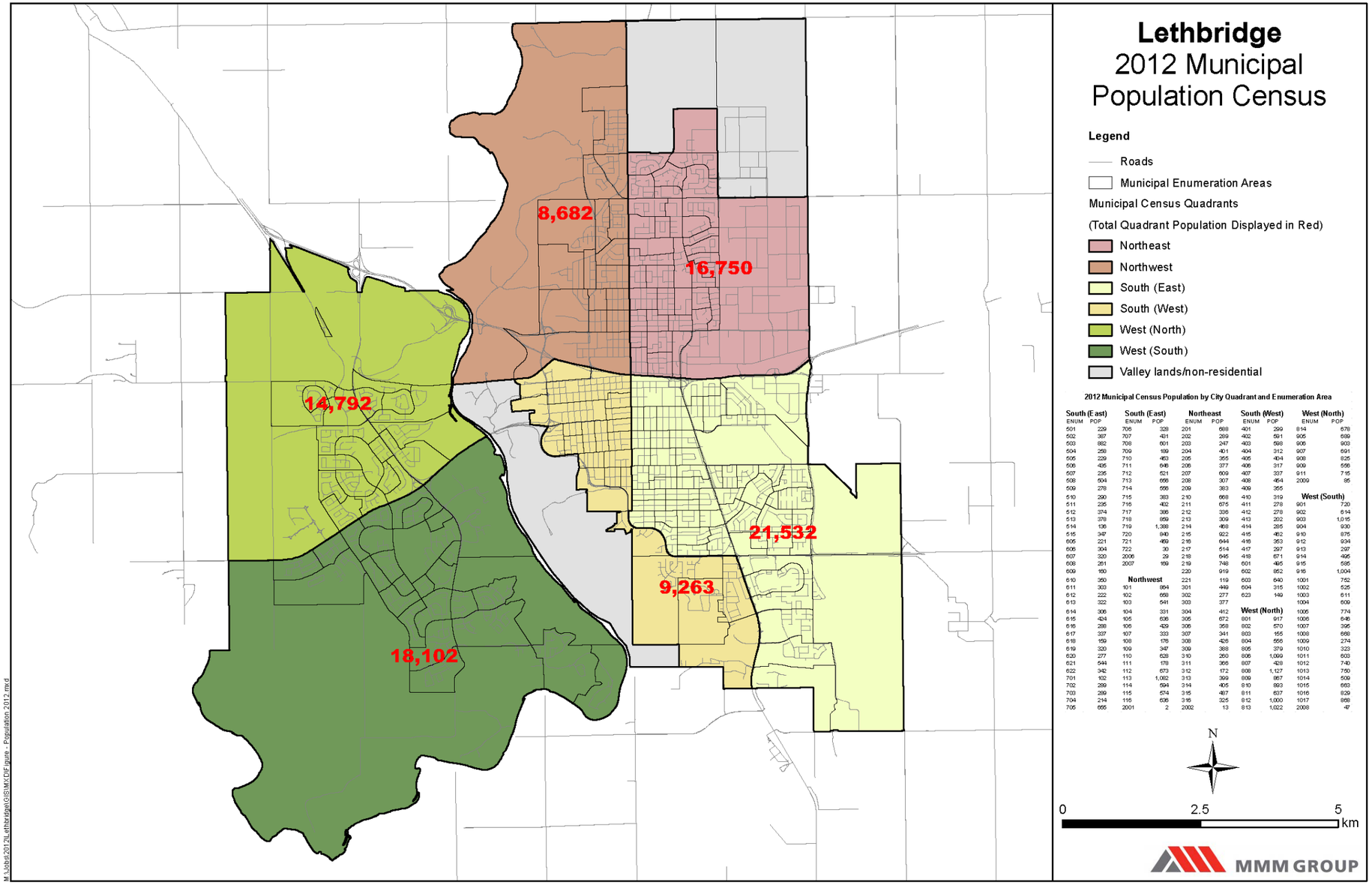
2.1.1 GEOGRAPHIC POPULATION GROWTH

The 2012 municipal Census reported the City of Lethbridge's population at 89,120. Exhibit 3 illustrates the distribution of this population using Lethbridge municipal Census tracts. The overall population of the City grew by about 24.0% between 2001 and 2011, which is slightly more rapid than the provincial increase of 22.5% over the same period. The City's population also grew more rapidly between 2006 and 2012 (11.9%), than it did between 2001 and 2006 (10.8%). Exhibit 4 illustrates population growth rates within Lethbridge between the 2001 and 2011 Federal Censuses. The easternmost Federal Census Tracts have grown most rapidly, whereas the inner City tracts (including Downtown) are shrinking. This trend supports stakeholder comments regarding a residential market preference for newer, lower density housing.

The 2011 Federal Census reported the County of Lethbridge's population at 10,061 (of which approximately 5,140, or 51.1%, reside in the TZA). Given that the 2011 Federal Census reported the Towns of Coalhurst and Coaldale populations to be 1,963 and 7,493, respectively, the total population within the County & Towns TZA is approximately 14,596. While the County & Towns TZA's total population grew by about 12.8% from 2001 to 2011, Coalhurst (33.0%) and Coaldale (24.7%) grew much more rapidly compared to the County itself (1.3%). This trend is even more apparent between 2006 and 2011, during which Coalhurst's and Coaldale's population increased by about 28.9% and 21.3%, respectively, relative to the County population which shrank by 1.9%.

The combined population of the entire TZA was approximately 103,716 (County population from 2011 Federal Census + 2012 City population from municipal Census). Data regarding migration between the City and surrounding municipalities specifically was unavailable, however, employment commuting flows (Appendix D) and input from Economic Development Lethbridge other stakeholders indicate that the City is the centre of employment, services and amenities for the surrounding area. The socio-economic and environmental health of the City and surrounding municipalities is therefore deeply intertwined.

Exhibit 3- City of Lethbridge Population by Municipal Census Tract (2012 Municipal Census)



Lethbridge
2012 Municipal Population Census

Legend

- Roads
- Municipal Enumeration Areas

Municipal Census Quadrants

(Total Quadrant Population Displayed in Red)

- Northeast
- Northwest
- South (East)
- South (West)
- West (North)
- West (South)
- Valley lands/non-residential

2012 Municipal Census Population by City Quadrant and Enumeration Area

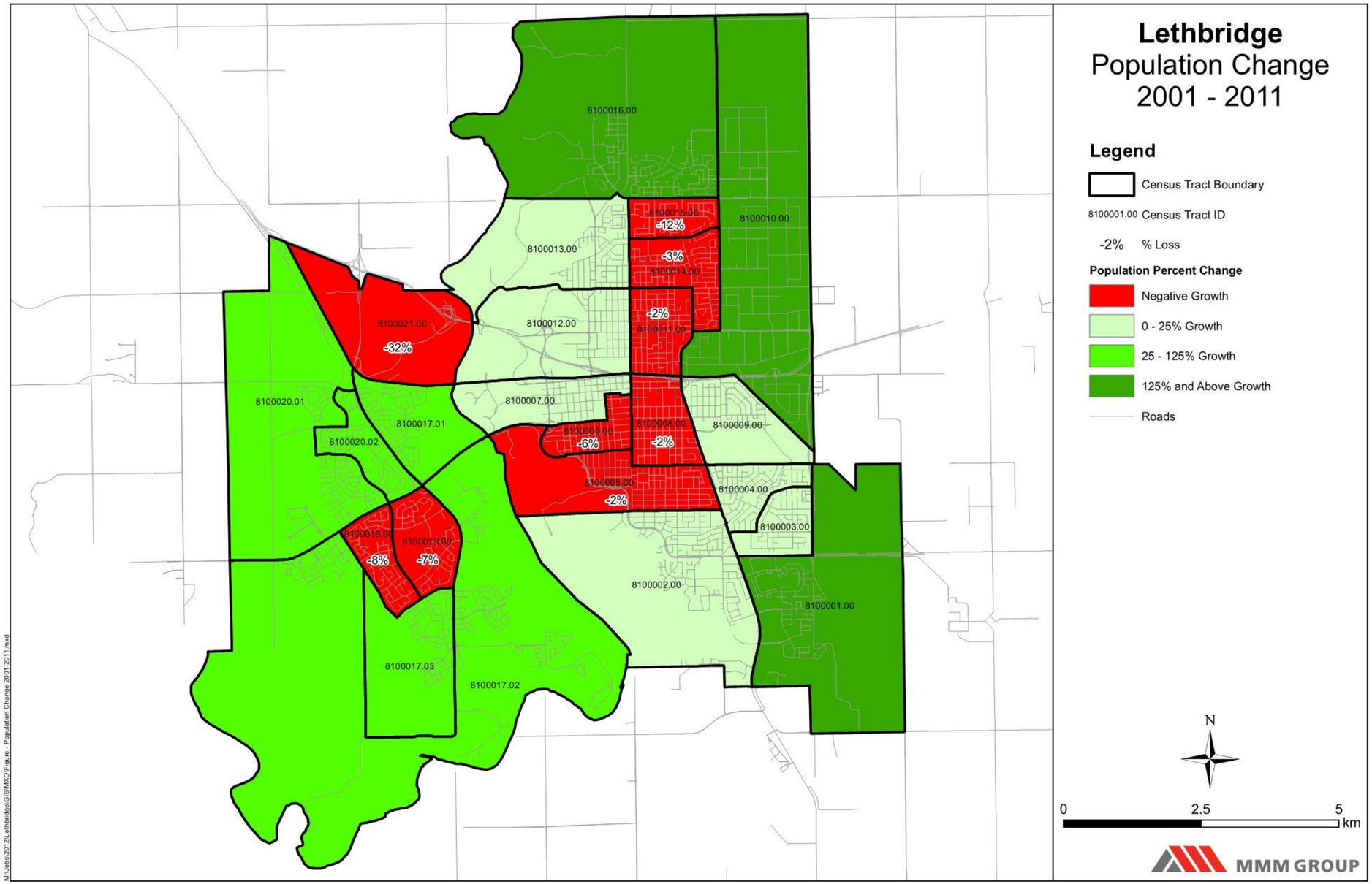
South (East)		South (East)		Northeast		South (West)		West (North)	
ENUM	POP	ENUM	POP	ENUM	POP	ENUM	POP	ENUM	POP
501	229	706	328	201	668	401	299	814	678
502	367	707	481	202	289	402	591	905	689
503	882	708	601	203	247	403	588	906	903
504	258	709	189	204	401	404	312	907	691
505	229	710	463	205	355	405	404	908	625
506	495	711	648	206	377	406	317	909	556
507	235	712	521	207	609	407	337	911	715
508	504	713	666	208	307	408	464	2009	85
509	278	714	566	209	383	409	355		
510	290	715	383	210	668	410	319	**West (South)**	
511	235	716	402	211	675	411	278	901	720
512	374	717	386	212	336	412	278	902	614
513	378	718	859	213	309	413	202	903	1,015
514	136	719	1,388	214	468	414	285	904	930
515	347	720	940	215	922	415	462	910	875
605	221	721	469	216	644	416	353	912	934
606	304	722	30	217	514	417	297	913	297
607	320	2006	29	218	645	418	671	914	495
608	261	2007	169	219	748	601	495	915	585
609	160			220	919	602	552	916	1,004
610	360	**Northwest**		221	119	603	640	1001	752
611	303	101	864	301	449	604	315	1002	525
612	222	102	668	302	277	623	149	1003	611
613	322	103	541	303	377			1004	609
614	306	104	331	304	412	**West (North)**		1005	774
615	424	105	636	305	672	801	917	1006	646
616	288	106	429	306	359	802	570	1007	395
617	337	107	333	307	341	803	155	1008	668
618	159	108	176	308	426	804	556	1009	274
619	320	109	347	309	388	805	379	1010	323
620	277	110	528	310	250	806	1,099	1011	603
621	544	111	178	311	366	807	428	1012	740
622	342	112	673	312	172	808	1,127	1013	760
701	102	113	1,062	313	399	809	867	1014	509
702	289	114	594	314	405	810	863	1015	663
703	289	115	574	315	487	811	637	1016	829
704	214	116	636	316	325	812	1,000	1017	868
705	655	2001	2	2002	13	813	1,022	2008	47

N

0 2.5 5 km

MMM GROUP

Exhibit 4 – Population Change in the City of Lethbridge (2001-2011 Federal Census Results)



2.1.2 POPULATION AGE DISTRIBUTION

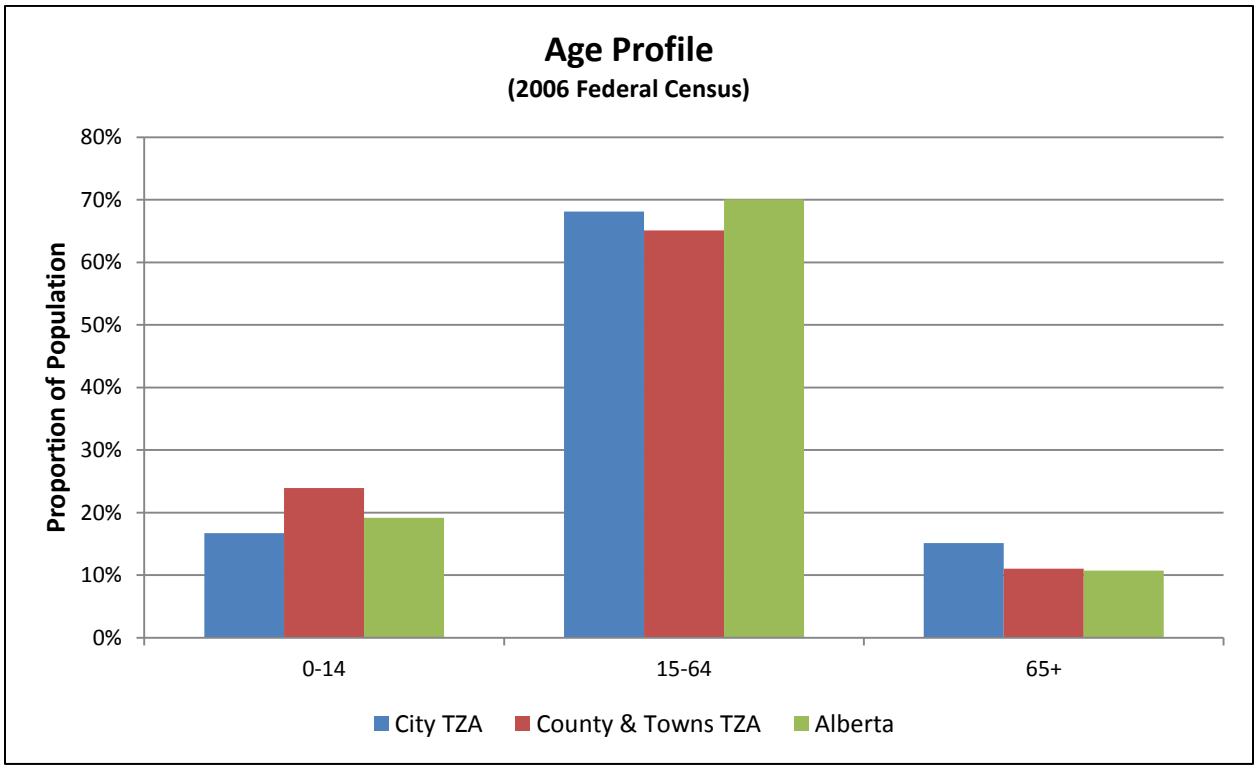
The size of the TZA's labour-age population is an important indicator of the size of the overall labour force, and this has a bearing on employment growth, density and land demand. This section describes the age characteristics and structure of the TZA's population based on Federal Census results from 1996, 2001 and 2006. 2011 Federal Census data for this variable has not been released at the time of this report.

The City of Lethbridge has an older population than the rest of Alberta (Exhibit 5). According to 2006 Federal Census data, the City has a higher proportion of seniors (i.e., people 65 years or older) (15.2%) than Alberta (10.7%), and a lower proportion of working age population (i.e., people between the ages of 15 and 64) (68.1%) and youth (i.e., people 14 years and younger) (16.7%), compared to Alberta (70.1% and 19.2%, respectively). Between 1996 and 2006, the City's senior population grew at a faster rate (23.3%) than the working age (22.8%) and youth (0.2%) populations.

Conversely, the County & Towns TZA has a younger population compared to both the City of Lethbridge and Alberta as a whole (Exhibit 5). According to 2006 Federal Census data, the County & Towns TZA has a higher proportion of youth (23.9%) and a lower proportion of working age (65.1%) population. The proportion of seniors in the County & Towns TZA (11.0%) is lower than that found in the City of Lethbridge (15.2%) but slightly higher than in Alberta as a whole (10.7%). Notably, the senior (65+) population in the County & Towns TZA grew by 34.6% between 1996 and 2006, a much faster rate of growth than the working age population (12.2%). In fact, the youth population (14 and under) declined by 7.5% over the same period. Growth of the senior population in Coalhurst between 1996 and 2006 was especially rapid at 155.6%

These trends are indicative of an aging population and shrinking labour pool relative to the rest of the Province. A constrained labour supply generally translates to lower employment land demand as continued economic growth would require increased productivity to compensate. Input from Economic Development Lethbridge supports this scenario, noting in particular that the Lethbridge has the second lowest unemployment rate amongst comparable municipalities at 5.4% at the end of 2011. Economic Development Lethbridge has also noted that Lethbridge's employment participation rate is the lowest amongst comparable municipalities, which further exacerbates the labour supply issue.

Exhibit 5 – TZA Age Distribution (2006 Federal Census)



2.1.3 POPULATION MOBILITY

Since a sufficient level of in-migration has the potential to alter both the demographic structure of the Study Area, and the labour supply situation described in the previous section, this section reviews migration patterns for the TZA between the 2001 and 2006 Federal Censuses (2011 Federal Census data for this variable has not been released at the time of this report). At the same time, a high-level of out-migration would threaten the employment situation by exacerbating any labour shortages.

The Federal Census records mobility in terms of whether the individual has lived at the same location over the past five years. A higher percentage of people having lived in the same location for less than five years indicate higher mobility. As population continues to age, mobility in the form of in-migration is beneficial for replacing retiring workers.

The 2001 and 2006 Federal Censuses reported stable levels of 5-year mobility in the City at around 23% of the total population, which is comparable to the Provincial trend. Approximately 7.5% of movers in Lethbridge moved into their current address from outside of Alberta and foreign immigration accounted for roughly 11.8%.

The 2006 Federal Census reported the 5-year mobility level in the County & Towns TZA at around 22%, which was slightly lower than the 2001 level of 24%. The 5-year mobility in Coalhurst, at around 34% is higher than that in Coaldale (26%) and the County (14%). Approximately 5.0% of movers in the County &

Towns TZA moved into their current address from outside of Alberta while foreign immigration accounted for around 10.5%.

The vast majority of movers to the TZA are Albertans themselves as opposed to out-of-province residents. While mobility trends are generally stable, comparison with the population age structure of the TZA indicates that in-migration is not sufficiently replacing retirees, or the current and future supply of labour-age residents. This may pose some concern as Canadian productivity has generally not increased at a rate sufficient to compensate for a shrinking labour pool, particularly in Alberta, which had an average annual labour productivity growth rate of 0.6% in the business sector, compared to an average of 1.3% for Canada as a whole[i]. As a result of a shrinking labour supply and below-average increases in productivity, overall economic growth may be hampered.

Based on stakeholder input and employment commuting flows (see Appendix D), it is evident that the City's labour supply extends far beyond the City limits. More precise migration trends speaking to movement between the City and surrounding municipalities is unavailable, however, employees living outside of the City, and indeed the Study Area will undoubtedly assist the City to some extent to compensate for the shrinking labour supply.

2.1.4 DWELLINGS AND HOUSEHOLDS

This section provides an overview of selected dwelling and household characteristics, which is required in order to estimate the baseline land demand for residential uses under the assumption that the present dwelling type mix and average household sizes will persist for some time into the future.

Exhibit 6 presents the dwelling type breakdown in the TZA and the Province as found in the 2006 Federal Census. Single-detached houses are the predominant dwelling type in both the City (63.5%) and the County & Towns TZA (86.9%), while apartments represent 23.3% of all dwellings in the City compared to only 3.5% in the County & Towns TZA. For comparison, the dwelling mix in the City is comparable to that of the Province of 63.4% single-detached and 21.7% apartment.

Exhibit 6 – Dwelling Type Mix (2006 Federal Census)

Dwelling Type	City TZA	County & Towns TZA	Alberta
Single-detached house	63.5%	86.9%	63.4%
Semi-detached house	6.1%	2.8%	4.8%
Row house	4.8%	2.1%	7.0%
Apartment, duplex	6.3%	0.8%	2.6%
Apartment, 5+ storeys	2.2%	0.0%	4.4%
Apartment, <5 storeys	14.9%	2.7%	14.7%
Other single-attached house	0.0%	0.2%	3.1%
Movable Dwelling	2.3%	4.6%	

The 2006 Federal Census reported that the average household size in the City TZA was 2.4, compared to approximately 3.1 in the County & Towns TZA, and 2.6 in Alberta as a whole. The dwelling mix proportion and average household sizes for the City TZA are similar to the Provincial averages. The dwelling mix proportion and average household sizes for the County & Towns TZA are, however, expectedly more characteristic of a lower density rural area. A detailed description of how average lot sizes were calculated is provided in Appendix B. Exhibit 8 and Exhibit 9 are provided on the following pages to illustrate the average dwelling lot sizes for detached and semi-detached dwellings in the City.

Based on a land use analysis, average net lot sizes per unit were calculated for residential dwellings in the City TZA and the County & Towns TZA[ii] (Exhibit 7). It is important to note that the average lot sizes in the County & Towns TZA are significantly larger than those in the City owing to the historically rural character of most of the County, and the fact that the County land area makes up the vast majority of the County & Towns TZA.

Exhibit 7 - Average Net Residential Lot Sizes

Area	Dwelling Type	Average Lot Size Per Unit (m^2)	Average Lot Size Per Unit (Ha.)
City TZA	Single-detached house (urban)	599	0.06
	Single-detached (rural)	275,265	27.53
	Semi-detached	368	0.04
	Apartment or Townhouse	148	0.01
	Movable Dwelling	526	0.05
County & Towns TZA	Single-detached house (urban)	1,927	0.19
	Single-detached (rural)	225,661	22.57
	Semi-detached	368	0.04
	Apartment or Townhouse	148	0.01

These results support stakeholder statements of a general preference for lower density housing types, and the relative affordability / availability of residential land in the Study Area. Economic Development Lethbridge has also noted that the housing market in the area is relatively stable, lacking the oil and gas sector residential demand drivers present in other parts of Alberta.

Exhibit 8– Average Single Detached Dwelling Lot Size in the City (2011 City Tax Assessment Data)

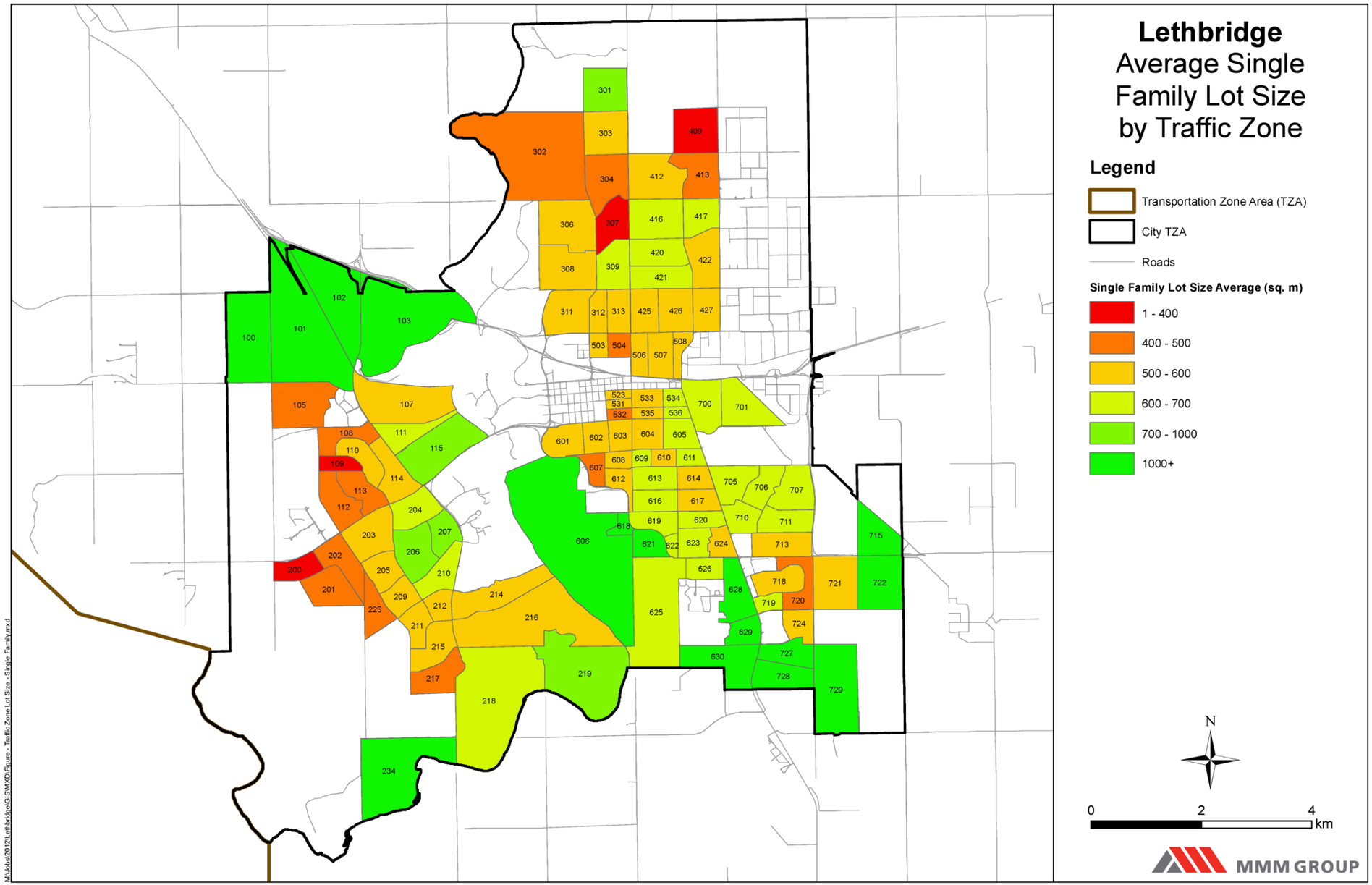
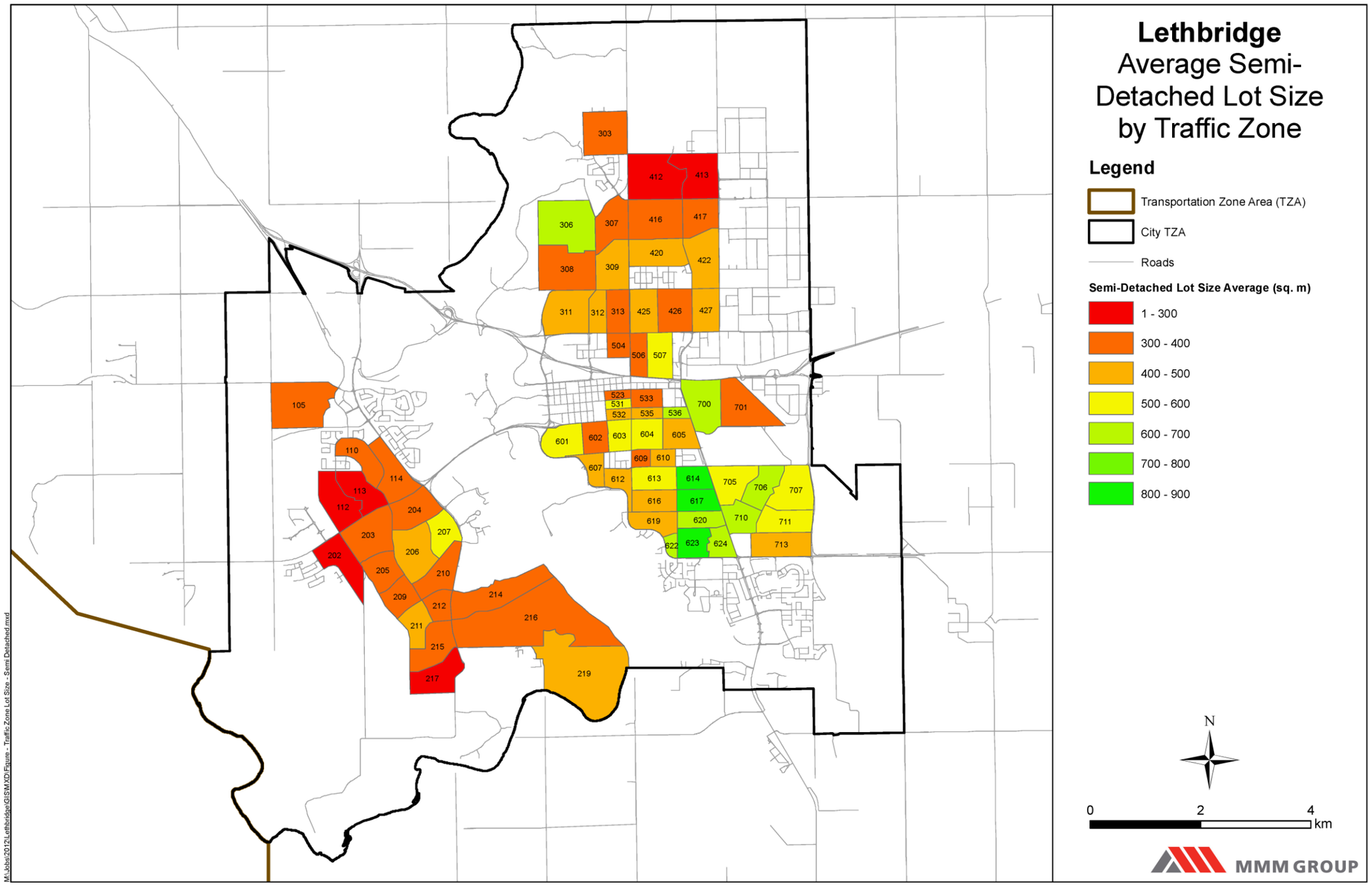


Exhibit 9– Average Semi-detached Dwelling Lot Size in the City (2011 City Tax Assessment Data)



2.2 EMPLOYMENT SECTORS

This section reviews the current economic structure and employment characteristics of the entire TZA using information from the City's 2010 employment estimates and business locations data from a verified database of over 4,500 businesses' in the TZA, as of 2011. The City's employment projections by transportation zone are also evaluated to identify where job growth is expected in the TZA. The findings of the current economic structure serve as the foundation of the baseline scenario, in which the economic structure is assumed to continue into the future.

2.2.1 EMPLOYMENT SECTORS

Using the City's 2010 employment estimates and employment projections, we estimate that there were 42,494 jobs in the City TZA in 2012. Exhibit 10 provides a more detailed breakdown of these estimates by sector.

Exhibit 10 – 2012 Employment Estimates for the City TZA

Sector	Number of Employees	Percentage Share
Agricultural	605	1.4%
Office	9,110	21.4%
Retail / Commercial	11,631	27.4%
Institutional	7,369	17.3%
Industrial	10,787	25.4%
Outdoor Recreation	205	0.5%
Other	2,787	6.6%
Total	**42,494**	**100.0%**

To summarize, the primary employment sectors in the City TZA are retail/commercial (27.4%), industrial (25.4%), office (21.4%) and institutional (17.3%). Please note, however, that the City defines "office" employment to include people working outside of dedicated office parcels. We have therefore adjusted the sectoral employment estimates to better reflect the actual type of land that employees work on. Our adjusted estimates likely over allocate health workers to the office sector, however, the overall adjustment has been verified against other City data, and appears reasonable.

The high degree of retail/commercial, office and institutional employment (66.1% combined) generally translates to lower land demand since these sectors tend to locate at higher employment densities (see the following section discussion employment density). This suggests that the preferred location of much of the expected land demand is likely to concentrate in Downtown Lethbridge and along highway corridors in the TZA. Input from Economic Development Lethbridge also indicates, however, that retail growth is more likely to locate along the highway corridors due contemporary preferences for large format retail. Economic Development Lethbridge has also stressed the importance of institutional / government employers to the local economy and the potential for expansion in the health sector in particular.

Using the same data, we estimated that there were 4,948 jobs in the County & Towns TZA in 2012. Limitations in the employment data available for the County prevented a more detailed analysis. As a result, employment in the County & Towns TZA was categorized into three sectors: agricultural, commercial/institutional and industrial. As shown in Exhibit 11, approximately 16% of all jobs are agricultural, 53% commercial / institutional and 31% industrial.

Exhibit 11 – 2012 Employment Estimates for the County & Towns TZA

Sector	Number of Employees	Percentage Share
Agricultural	780	15.8%
Commercial / Institutional	2,613	52.8%
Industrial	1,555	31.4%
Total	**4,948**	**100.0%**

Once again, the high degree of commercial / institutional uses suggests that the preferred location of much of the expected land demand is likely to concentrate near the already urbanized areas of the TZA (the City fringe) and along highway corridors, and to a lesser extent within the Towns in the County & Towns TZA. In contrast to the City, agricultural uses are a much larger employer by proportion in the County, which supports the fact that this sector remains quite vital to the County's employment picture, and indeed that of the entire TZA.

2.2.2 EMPLOYMENT DENSITIES

Employment density refers to the number of jobs per net hectare. The more land-efficient a sector, the higher the employment density and the lower the overall land demand. This section summarizes current employment densities in the City TZA and the County & Towns TZA based on the current data on occupied parcel calculated using the GIS process described in the Appendix B – Methodology.

Exhibit 12 and Exhibit 13 summarize employment density results for the City and the County & Towns TZA, respectively.

Exhibit 12 – City TZA Employment Parcel Densities (2010)

Sector	Land Area (Ha.)	Employees	Density (Jobs / Net Ha.)
Agricultural	3,804	608	0.16
Office	33	8,598	262.12
Retail / Commercial	624	11,055	17.71
Institutional	477	7,415	15.56
Industrial	587	10,406	17.72
Outdoor Recreation	2,334	205	0.09
Other	1,442	2,803	1.94
Total / Average	**9,300**	**41,090**	**4.42**

Exhibit 13 – County & Towns TZA Employment Parcel Densities (2010)

Sector	Land Area (Ha)	Employees	Density (Jobs / Net Ha.)
Agricultural	28,995	780	0.03
Commercial / Institutional	3,748	2,556	0.68
Industrial	220	1,543	7.03
Total / Average	**32,963**	**4,879**	**0.15**

Overall, the City has much higher employment density than the County. This largely reflects the type of sectors that predominate in the two respective areas and fact that the City is the primary infrastructure provider for the TZA. Office and retail / commercial densities in the City appear to be slightly denser and industrial density comparatively lower, than expected. It should be noted, however, that the City's 2010 employment estimates and Transportation Master Plan's employment projections were provided as combined employment (full + part-time) figures rather than full-time equivalents. As a result, the Study's calculated job densities are likely slightly overstated across all employment sectors. The Study's calculated office density figure for the City is also affected by having to use 2010 employment estimates, which were the latest available. Economic Development Lethbridge has reported that the City is currently experiencing a higher level of office vacancy which is accounted for in the land data provided to the study team, but not the 2010 employment estimates. Even so, the City's estimated employment density values are generally in-line with expectations for a municipality the size and nature of Lethbridge.

With respect to industrial land density, the City's net density figure of 17.72 jobs per hectare is lower than 30 jobs per net hectare, which is a standard typical in much of urban Alberta and often regarded as the minimum necessary to support bus transit services[iii, iv & v]. Industrial net job densities vary however depending on the type of industrial use, beginning with aggregate extraction operations at the low end (0-1 jobs per hectare) and reaching 5-15 jobs per hectare for most heavy industrial uses. Greenfield industrial areas in Calgary for instance can have net job densities as low as 3-5 jobs per hectare[iii].

With respect to the office figure, there is a total of approximately 145,249 sq. m. of gross office floor area in the City, or roughly 16.9 m^2 of built office space per office job. These measures are slightly higher than office space densities typically found in Australia and the United States, but less than typically found in the UK.

Specific density values for the urban areas of the County & Towns TZA are also consistent with expectations, as are the low employment densities for the remaining rural portions of the County & Towns TZA. The relatively low commercial / institutional figures shown in Exhibit 13 reflect the entire County & Towns TZA, including the few urban areas, such as the two Towns, and the vast rural spaces. As expected, commercial / institutional density in the County & Towns TZA, when development in the Towns is excluded, is even lower at 0.40 jobs per hectare. Commercial / institutional density in the Towns is roughly 3.29 jobs per hectare. Based on a high-level review of compiled sources, we estimate that actual commercial density is approximately 75 jobs per net hectare in Coalhurst, 45 in Coaldale and about 2 for the County TZA when both Town are excluded.

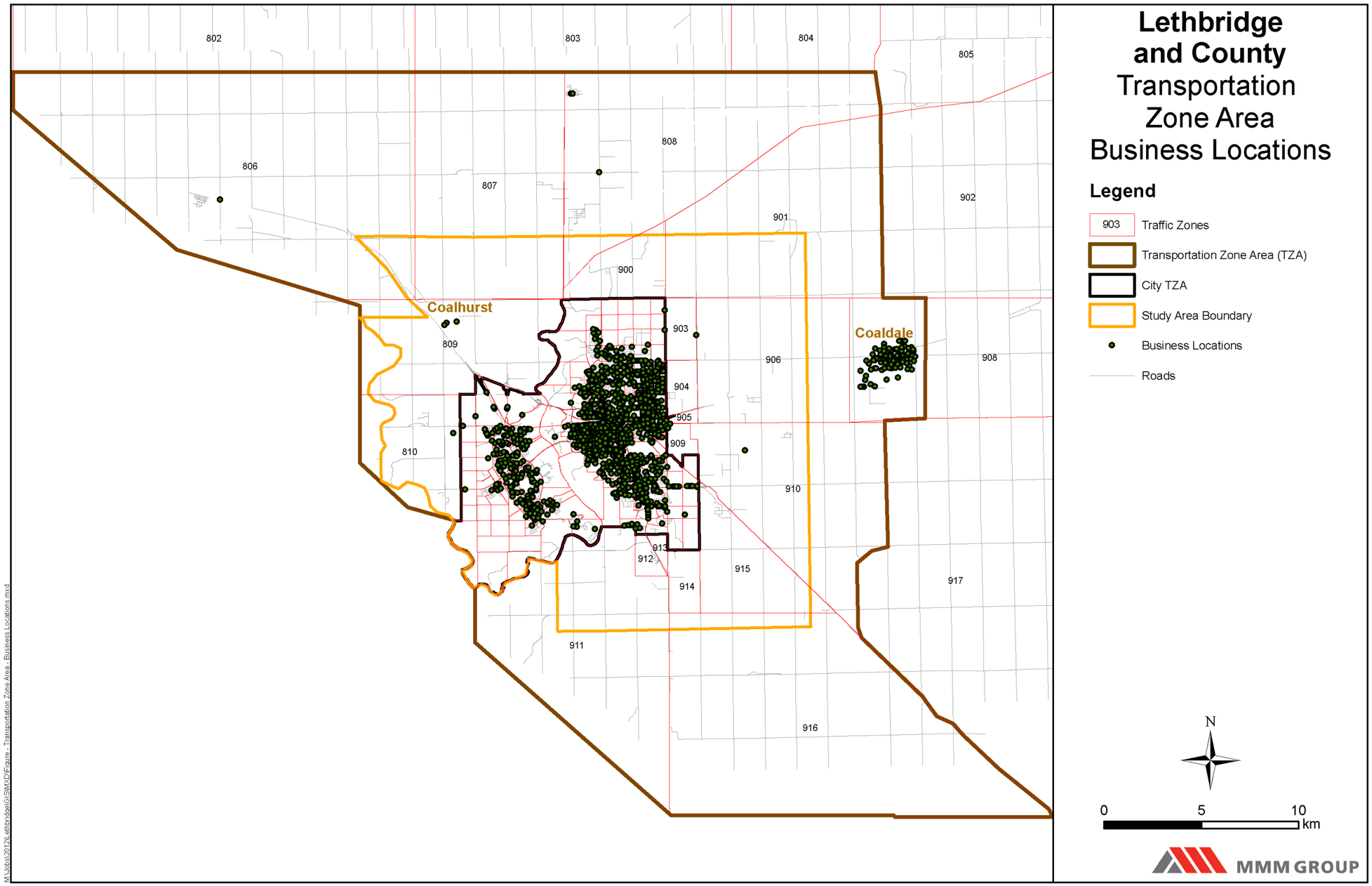
While agricultural density in the County & Towns TZA is already very low, it is also likely overstated. Due to shortcomings associated with the available tax assessment information, farm lots without any buildings on them could not be identified and included in the land total for agriculture. However, given that most of the County's lands capable of supporting agricultural production are already doing so, it is unlikely that job density in traditional agriculture will decrease in the County over the foreseeable future. Additionally, the types of agriculture and agriculture-related economic development that the County and Towns TZA are pursuing is increasingly sophisticated and innovation-dependant. Depending on the magnitude of success achieved with this goal, there will likely be an impact on raising the overall productivity, and by extension also the density of commercial / institutional and industrial uses related to agriculture in the County & Towns TZA over the longer term.

2.2.3 BUSINESS LOCATIONS

This section provides a high-level overview of the geographic distribution of businesses by sector in the TZA, and a detailed review of the businesses that are located within the Study Area. Exhibit 14 illustrates the approximate geographic location of TZA businesses as of 2011.

Please note that while the business locations data is fairly comprehensive for the City TZA, it is less complete in capturing all business locations in the County & Towns TZA. The Business Locations data was purchased from Environics Analytics and captures most advertised establishments. This data was used as complete and accurate business licensing information was unavailable for the TZA.

Exhibit 14 – TZA Business Locations (2011)



The distribution of businesses by sector in the entire TZA is summarized in Exhibit 15. The Environics dataset identifies a total of 4,113 businesses within the City, 63 in the Study Area just outside the City, and 314 outside the Study Area, but within the TZA. The vast majority of businesses, around 90% or more, are located in the City. However, one exception is Forestry & Fishing & Mining with 71% in the City and the remaining businesses in this sector located outside the City. A concentration of businesses in the Town of Coaldale is also included in the number of business located outside the Study Area boundaries but within the TZA.

Exhibit 15 – Distribution of Businesses by Sector in the entire TZA

Sector	Within City		Outside City, within IGMS		Outside IGMS, within TZA		Total	
Agriculture, Forestry & Fishing & Mining	42	71%	2	3%	15	25%	59	100%
Construction	458	87%	16	3%	50	10%	524	100%
Finance, Insurance & Real Estate	331	96%	2	1%	13	4%	346	100%
Manufacturing	175	88%	7	4%	18	9%	200	100%
Public Administration	135	94%	0	0%	9	6%	144	100%
Retail Trade	941	94%	10	1%	51	5%	1002	100%
Services	1626	92%	20	1%	124	7%	1770	100%
Transportation, Communications & Public Utilities	117	91%	1	1%	10	8%	128	100%
Wholesale Trade	208	89%	4	2%	21	9%	233	100%
Unclassified or Other	80	95%	1	1%	3	4%	84	100%
Total	4,113	92%	63	1%	314	7%	4,490	100%

Further analysis was carried out on businesses within the Study Area. These results were categorized into each of the City's municipal Census analysis quadrants. Exhibit 16 provides a breakdown of the proportion of all business in the Study Area by municipal Census quadrant (maps of the quadrants and the Downtown are provided as Exhibit 17 & Exhibit 18). The vast majority of businesses in the Study Area are located within the City, east of the Oldman River. The south (west) quadrant, generally corresponding with the Downtown, contains the largest proportion of businesses in the Study Area at about 36%, followed by the northeast and south (east) quadrants with about 20% each, and the northwest quadrant contains about 10% of all businesses. The remaining portions of the City account for just over 8.5% of all Study Area businesses. About 1.7% of Study Area businesses are located outside of the City itself.

Exhibit 16 – Study Area Business Establishments Share (Environics 2011)

Area	% of all Study Area Businesses
NORTHEAST	22.942%
NORTHWEST	10.439%
SOUTH (EAST)	20.230%
SOUTH (WEST)	36.117%
WEST (NORTH)	3.599%
WEST (SOUTH)	4.247%
VALLEY / NON-RESIDENTIAL	0.719%
NON MUNICIPAL CENSUS QUADRANT	1.703%

Exhibit 17 – Study Area Business Locations (Environics 2011)

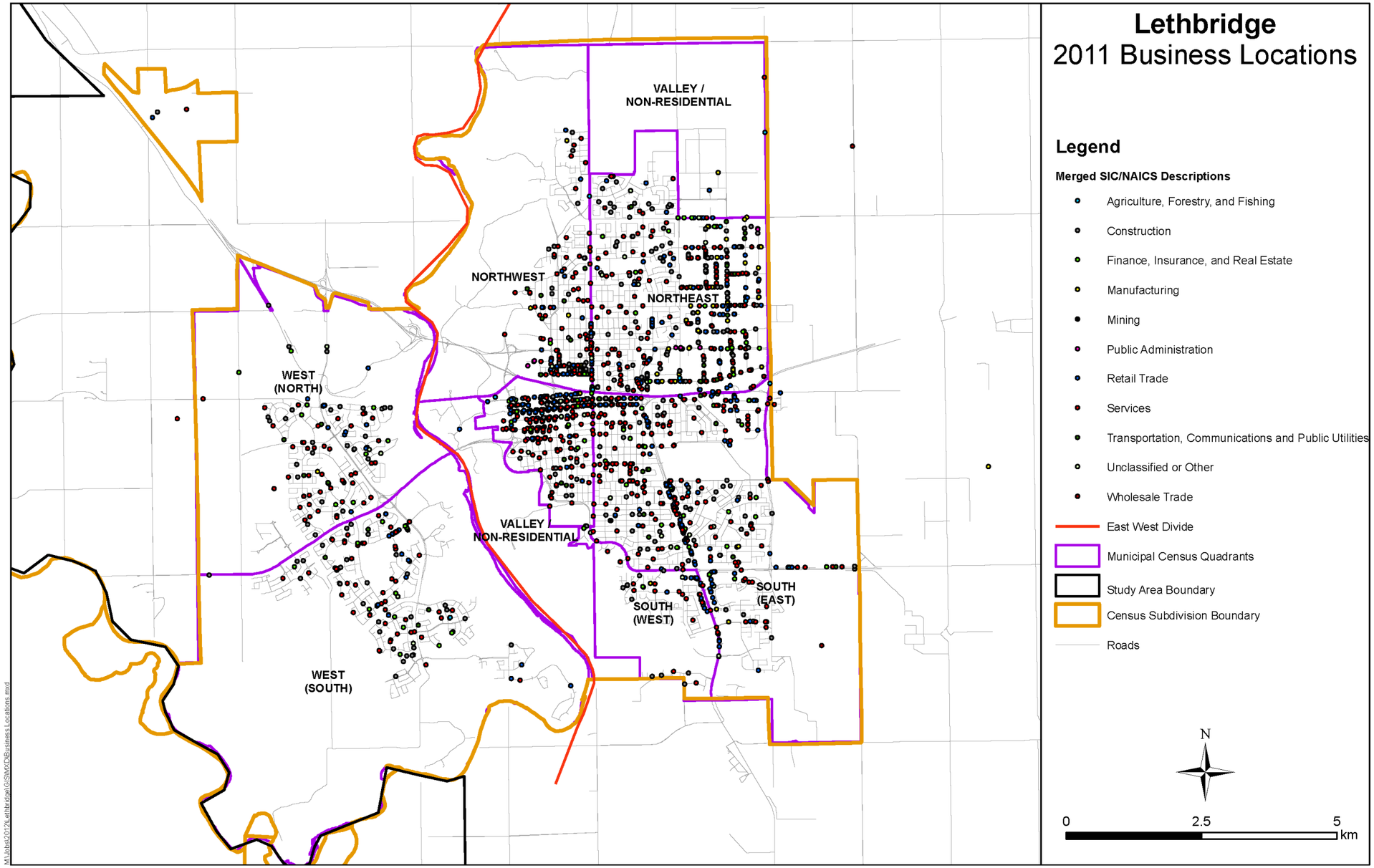


Exhibit 18 – Downtown Lethbridge Business Locations (Environics 2011)

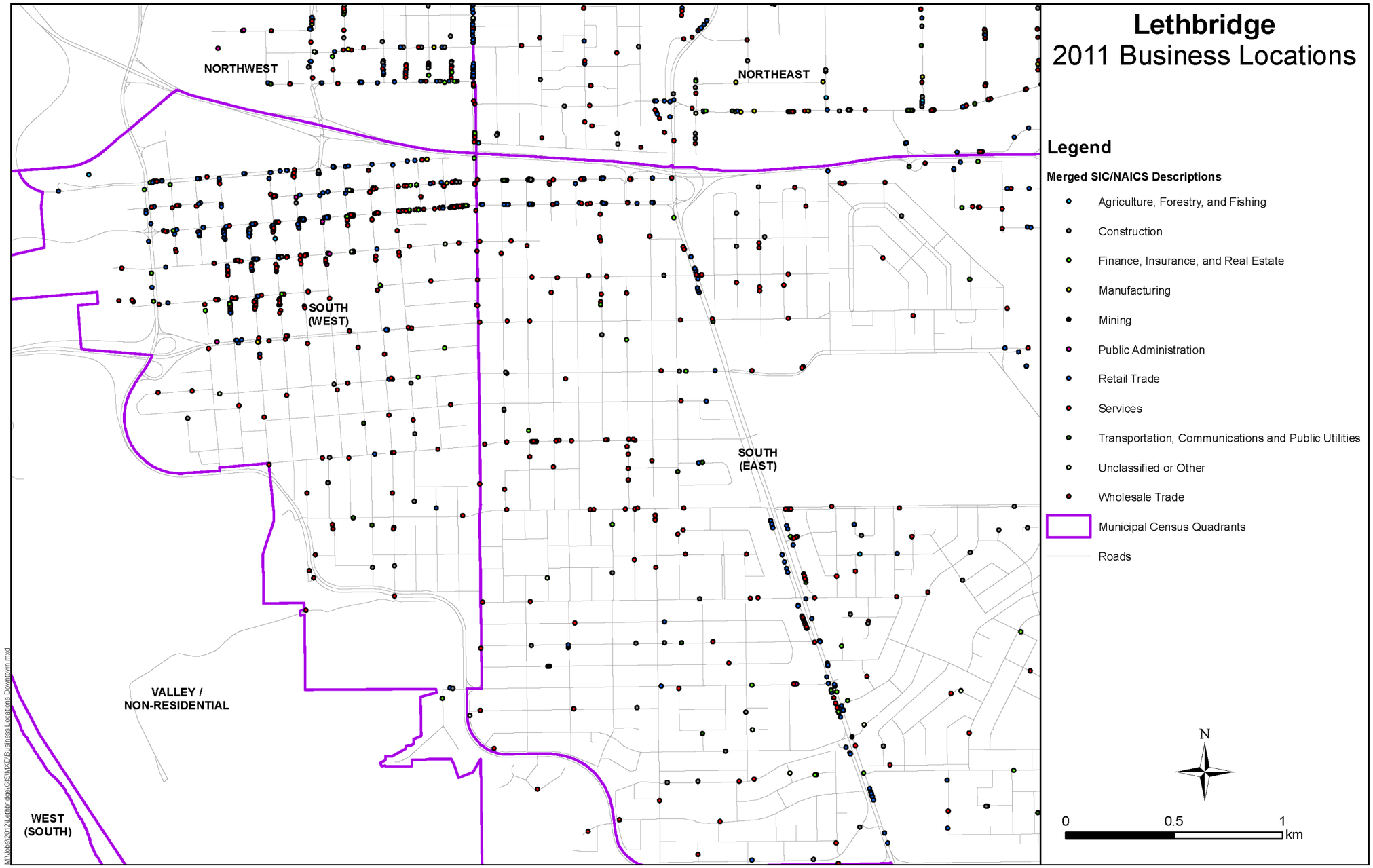


Exhibit 19 describes the observed industry sector clustering in the Study Area.

Exhibit 19 – Industry Clustering within the Study Area

Sector	Census Quadrant	Clustering
Agriculture, Forestry and Fishing and Mining	Very few locations in sample. Mining businesses are likely office locations within the City.	Relatively few businesses were present in the sample, however, those that were reported were predominantly located in the Northeast and South (East) census quadrants.
Construction	83% located east of the valley. 37% located in the Northeast quadrant.	Very few of these businesses were located on the west side of the valley.
Finance, Insurance and Real Estate	67% located in the South (East) and South (West) quadrants, with 30% located in the Downtown portion of the South (West) quadrant.	Clustering is occurring in the Downtown portion of the South (West) quadrant, and along Mayor Magrath Dr. S. and 3 Ave. S.
Manufacturing	53.6% located in the Northeast quadrant, 22.7% located in the Downtown portion of the South (West) quadrant.	Most clustering in the area bounded by 26th Ave N., the City limit, Hwy. 3 and 28 St. N. Another concentration present in the area around Ave. 3 and Stafford Dr.
Public Administration	100% contained East of the valley. 78.5% in the Downtown and 3rd Ave. / Stafford neighbourhoods of the South (West) quadrant.	Concentrated clustering occurring in the Downtown. Some clustering occurring in the Railway Relocation.
Retail Trade	92.1% located west of the valley. 62.2% in the South (West) and South (East) quadrants. 27.4% in the Downtown portion.	Significant clustering along Mayor Magrath, 13th Street and Centre Village Mall. Significant clustering is also occurring along 3 Ave. S. and 6 Ave. S. and in the area around 36 St. N.
Services	62% in South (West) and South (East) quadrants. 27.1% in Downtown portion of South (West) quadrant.	Spread fairly extensively across the City. Significant clustering is occurring in the Downtown, along Hwy. 3 and Hwy 4.
Transportation, Communications and Public Utilities	91.5% East of the valley with 39.8% located in the industrial areas of the Northeast quadrant. 19.5% located in Downtown.	Two significant clusters. One on 7 St. S in the Downtown portion of the South (West) quadrant, the other in the Churchill Industrial portion of the Northeast quadrant.
Wholesale Trade	96.2% East of the valley with 56.1% located in the industrial areas of the Northeast quadrant. 14.2% located in Downtown.	Two significant clusters. One surrounding 7 St. S in the Downtown portion of the South (West) quadrant, the other in the Churchill, Shackleford and Anderson Industrial portions of the Northeast quadrant.

3 PROJECTIONS

This section presents the baseline projections for population and employment which were derived from the City's Transportation Master Plan Update. The population and employment projections for the Study Area and the TZA formed the basis for estimating future land demand for residential and employment uses. Due to diminishing accuracy of projections over time, in-report projections are generally provided to 2032, supplemented by tables summarizing the results over 50, 75 and 100 timeframes (referred to as the long-term projections). Projections to the year 2112 are also provided in Appendix A – Summary Forecasts.

3.1 REVIEW OF POPULATION ESTIMATES AND PROJECTIONS

3.1.1 CITY OF LETHBRIDGE

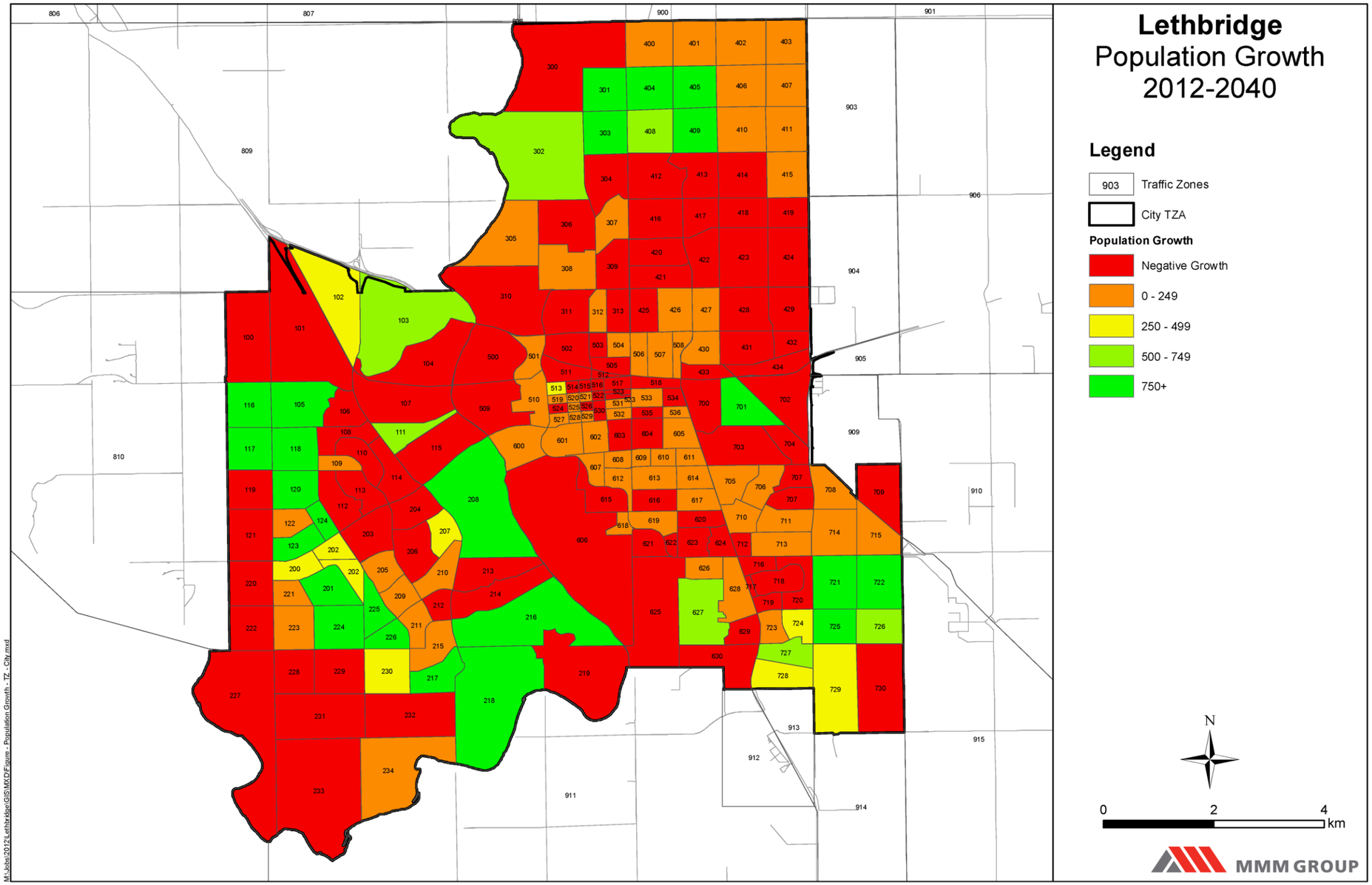
Population projections were generated as part of the City's Transportation Master Plan Update for the year 2020 and 2040 by individual transportation zone (see Appendix B). The Study Team has extended the Transportation Master Plan projection for the City TZA to 2112 based on linear projection. Because the TMP provided projected population snapshots for only the years 2020 and 2040, the Land Demand Analysis team assumed linear annual population change for the periods from before 2020 (1.7%), and after (1.3%). As shown in Exhibit 20, we therefore estimate that the City's population will increase from 89,120 in 2012, to 118,279 in 2032, and up to 233,019 by 2112.

Exhibit 20 - Long-Term Population Projection (City TZA)

	2012	2032	2062	2087	2112
City TZA Population	89,120	118,279	161,307	197,163	233,019

Exhibit 21 illustrates the geographic distribution of population change based on transportation zones between the latest municipal Census results (2012) and the farthest Transportation Master Plan projection that was provided to the study team (2040). The highest growth areas are located in the northeast end of the City around 44 Avenue North, the southeast end of the City south of South Parkside Drive, and on the west side of the valley surrounding University Drive, McMaster Boulevard and Jerry Potts Boulevard. Moderate growth is also expected on the north side of Highway 3 and along both sides of Highway 5.

Exhibit 21 – City TZA Projected Population Growth 2012 - 2040



3.1.2 COUNTY & TOWNS TZA

The same type of population projections were also generated by the City's Transportation Master Plan Update for transportation zones in the County & Towns TZA. Because the City's Transportation Master Plan projections were only provided for 2020 and 2040, the Land Demand Analysis team again extended the projection to 2112 on the basis of linear projection. Annual change rates from were therefore set at 0.6% before 2020, and 1.6% after.

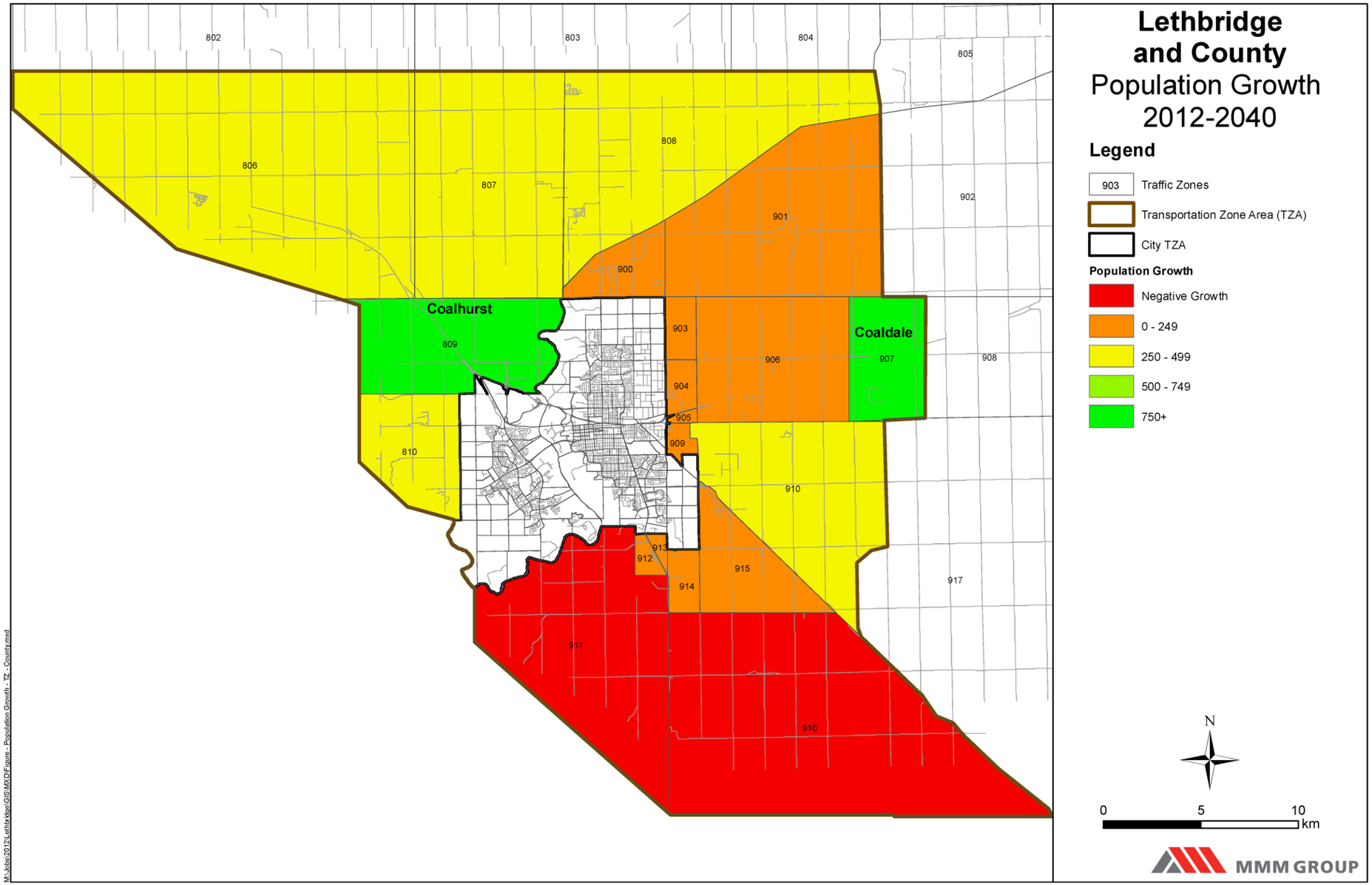
The long-term population projection for the County & Towns TZA is provided in Exhibit 22 below. The total population in the County & Towns TZA is projected to increase from 15,507 in 2012, to 19,543 in 2032, and up to 41,795 in 2112. While Coaldale is expected to continue as the largest population centre in the County & Towns TZA, its population is only projected to grow from 7,549 in 2012, to 8,622 in 2032, an increase of 14.7%. This compares to increases of 44.8% in Coalhurst (from 2,575 in 2012, to 3,730 in 2032) and 33.6% in the County-only portion of the TZA (from 5,382 in 2012, to 7,191 in 2032).

Exhibit 22 - Long-Term Population Projection (County & Towns TZA)

	2012	2032	2062	2087	2112
County & Towns TZA Population	15,507	19,543	27,887	34,841	41,795

Exhibit 23 illustrates the geographic distribution of population change based on transportation zones between the latest municipal Census results (2012) and the farthest Transportation Master Plan projection that was provided to the study team (2040). The highest amount of growth is expected in the Towns, along with moderate growth north and northeast of the City edge. Growth south of the City is expected to occur immediately adjacent to the City boundary, along Highways 4 and 5.

Exhibit 23 – County & Towns TZA Projected Population Growth 2010 - 2032



3.2 HOUSEHOLD PROJECTIONS BY DWELLING TYPE

Using average household sizes and dwelling type mixes from the 2006 Federal Census (see Section 2.1.4) the Land Demand Analysis projected the number of dwellings by type in the City TZA and the County & Towns TZA by year. As shown in Exhibit 24, the total number of dwellings in the City TZA is forecast to grow from 37,396 in 2012, to 49,631 in 2032 (and up to 97,778 in 2112), while the total number of dwellings in the County & Towns TZA is projected to rise from 5,174 in 2012, to 6,520 in 2032 (and up to 13,945 in 2112). In both the City TZA and the County & Towns TZA, urban single-detached houses are expected to remain the predominant dwelling type.

Exhibit 24 – Number of Dwellings by Type 2012-2112

Dwelling Type	City TZA					County & Towns TZA				
	2012	2032	2062	2087	2112	2012	2032	2062	2087	2112
Single-Detached House (Urban)	23,677	31,451	42,923	52,483	62,042	3,441	4,611	7,030	9,046	11,062
Single-Detached House (Farm)	83	83	83	83	83	1,054	1,054	1,054	1,054	1,054
Semi-Detached House	2,263	3,004	4,097	5,008	5,918	144	181	258	323	387
Apartment or Townhouse	10,510	13,948	19,023	23,251	27,480	290	365	521	651	781
Moveable Dwelling / Other	863	1,145	1,561	1,908	2,255	245	309	441	551	661
Total	**37,396**	**49,631**	**67,687**	**82,733**	**97,778**	**5,174**	**6,520**	**9,304**	**11,625**	**13,945**

3.3 EMPLOYMENT PROJECTIONS

3.3.1 CITY TZA

Using the employment projections generated as part of the City's Transportation Master Plan, the Land Demand Analysis team projected sectoral employment in the City TZA forward on a linear basis between 2012 and 2112. Exhibit 25 shows that two linear rates were applied, one for 2012-2020, and another for 2021-2112.

Exhibit 25 – Annual Employment Growth Rates by Sector in the City of Lethbridge

Sector	Annual Growth Rate	
	2012-2020	2021-2112
Agricultural	-0.23%	-0.20%
Office	2.60%	0.65%
Retail / Commercial	2.31%	1.13%
Institutional	-0.32%	0.60%
Industrial	1.68%	2.00%
Outdoor Recreation	0.00%	0.00%
Other	-0.29%	0.00%
Total	**1.58%**	**1.10%**

Exhibit 26 shows that total employment in the City TZA is expected to grow from 42,494 in 2012, to 54,920 in 2032 (and up to 100,286 in 2112). It is projected that industrial employment would grow at the fastest rate, rising from 10,787 employees in 2012, to 15,665 employees in 2032, an increase of 45.2%. Employment in the retail / commercial sector is projected to rise from 11,631 in 2012, to 15,961 in 2032, an increase of 37.2%, while employment in the office sector is projected to rise from 9,110 in 2012, to 12,062 in 2032, and increase of 32.4%. Employment in the agricultural sector is projected to drop from 605 in 2012, to 580 in 2032, a decline of 4.1%, while employment in the outdoor recreation sector is projected to remain stable.

Exhibit 26 also shows that while retail / commercial will remain the predominant employment sector in the City TZA up to 2032, industrial employment is projected to become the predominant employment sector within 50 years due to its higher projected growth rate.

Exhibit 26 – City TZA Sectoral Employment 2012-2112

Sector	Total Employment					% of Total Employment				
	2012	2032	2062	2087	2112	2012	2032	2062	2087	2112
Agricultural	605	580	544	514	484	1.4%	1.1%	0.8%	0.6%	0.5%
Office	9,110	12,062	14,321	16,204	18,087	21.4%	22.0%	19.9%	18.8%	18.0%
Retail / Commercial	11,631	15,961	21,024	25,243	29,462	27.4%	29.1%	29.2%	29.3%	29.4%
Institutional	7,369	7,723	9,072	10,196	11,319	17.3%	14.1%	12.6%	11.8%	11.3%
Industrial	10,787	15,665	24,043	31,024	38,005	25.4%	28.5%	33.4%	36.0%	37.9%
Outdoor Recreation	205	205	205	205	205	0.5%	0.4%	0.3%	0.2%	0.2%
Other	2,787	2,724	2,724	2,724	2,724	6.6%	5.0%	3.8%	3.2%	2.7%
Total	**42,494**	**54,920**	**71,933**	**86,110**	**100,286**	**100%**	**100%**	**100%**	**100%**	**100%**

Exhibit 27 through Exhibit 30 illustrate the distribution of employment growth by City transportation zone for major employment sectors between the latest Municipal estimates (2010), and the farthest Transportation Master Plan projections (2040). Please note that the Municipal estimates and Transportation Master Plan projections were adjusted in coordination City staff to account for the fact that the City defines “office” employment to include people working outside of dedicated office parcels and buildings (i.e. a person working in a cubicle in a factory is considered an “office” worker).

Exhibit 27 – City TZA Projected Retail Employment Growth 2010-2032

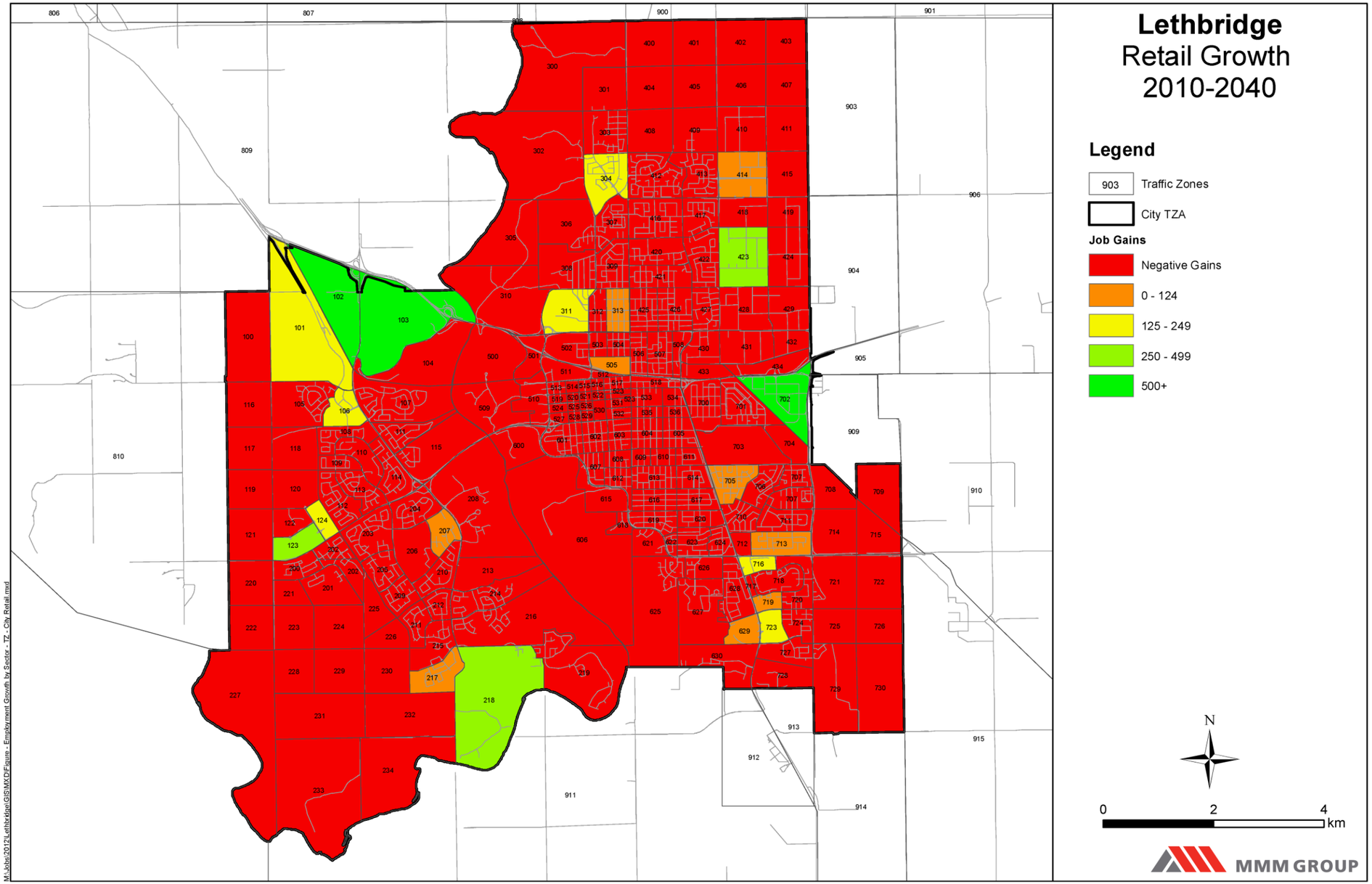


Exhibit 28 – City TZA Projected Office Employment Growth 2010 - 2040

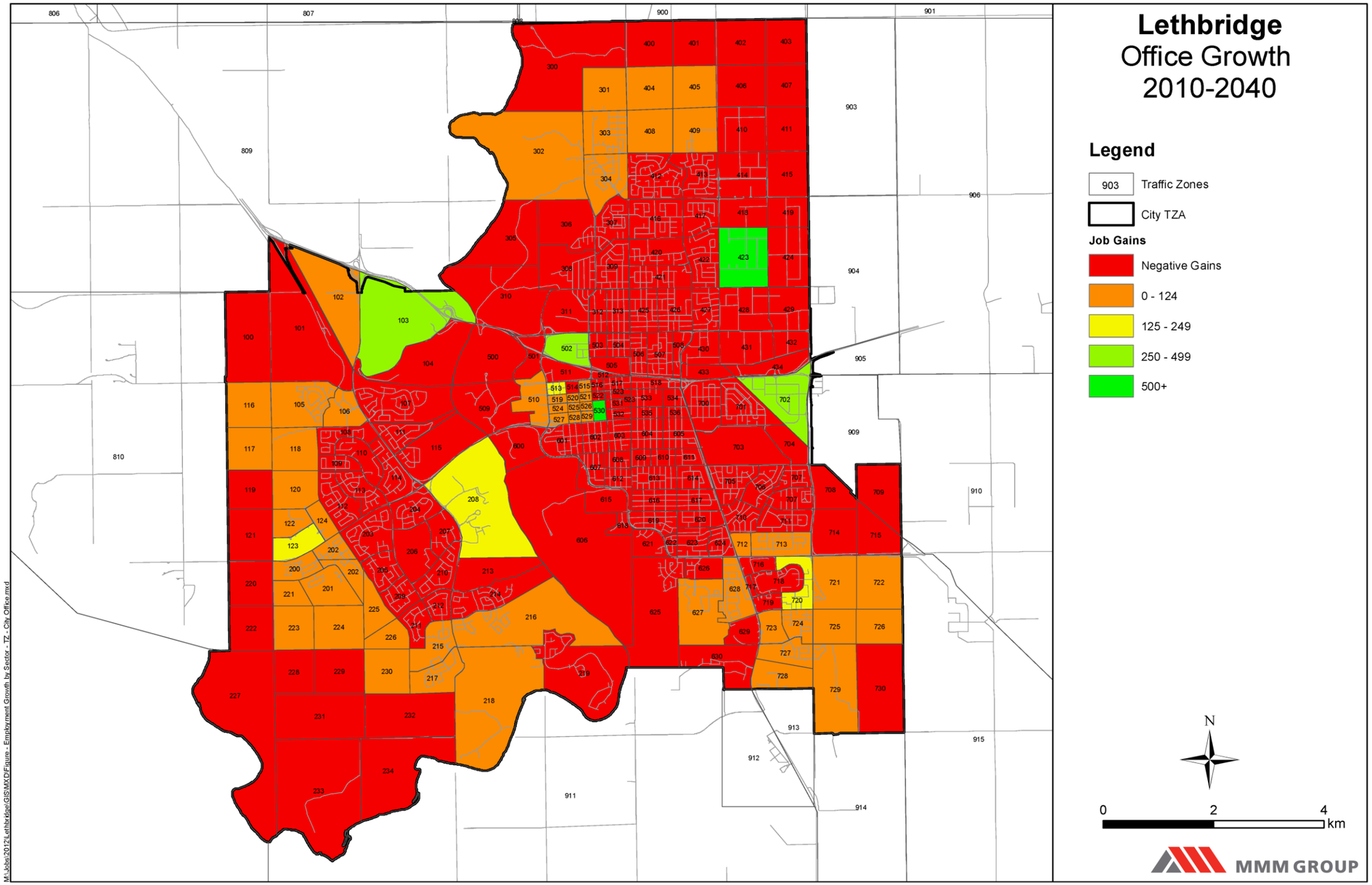


Exhibit 29 – City TZA Projected Institutional Employment Growth 2010 - 2040

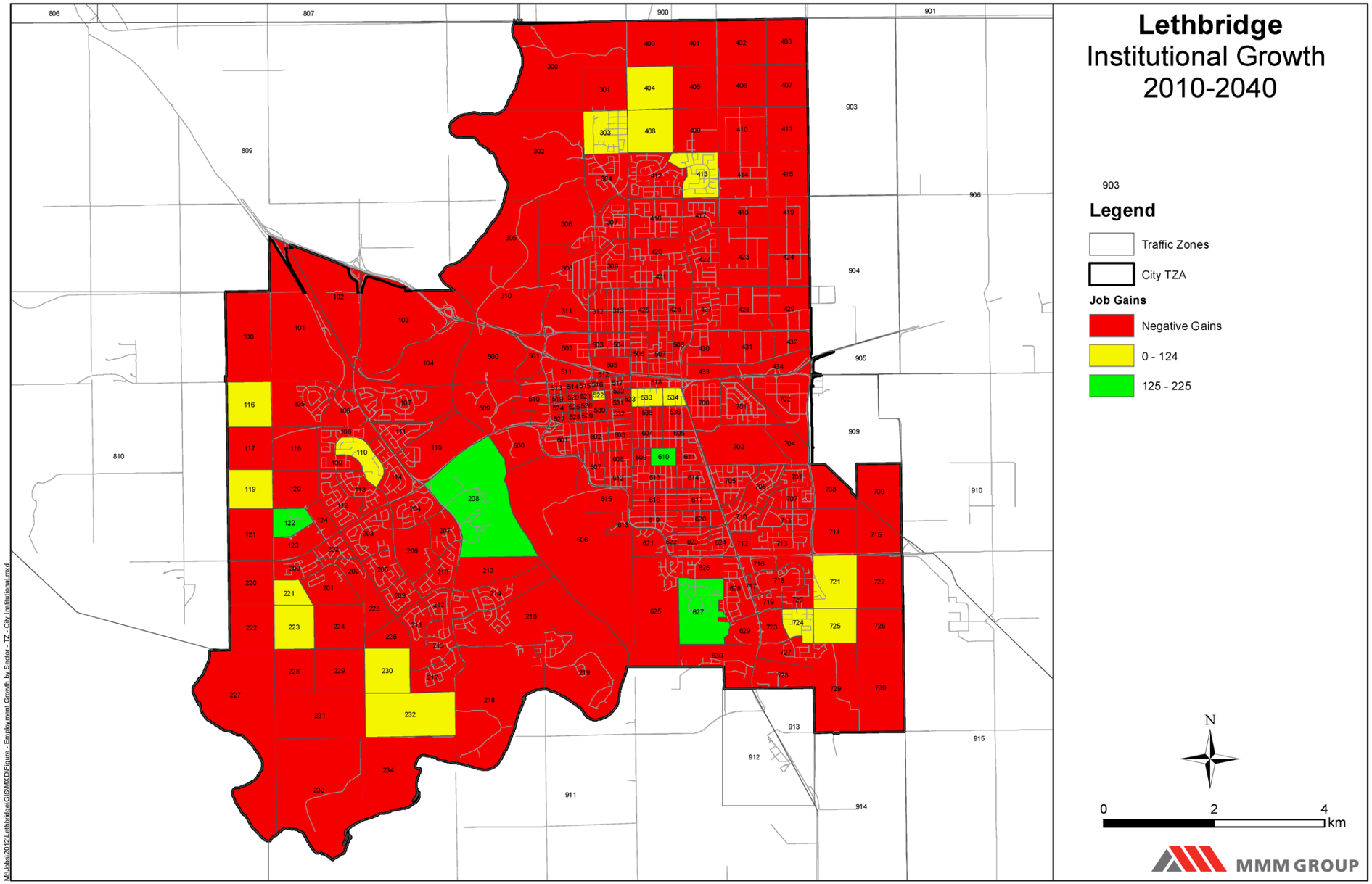
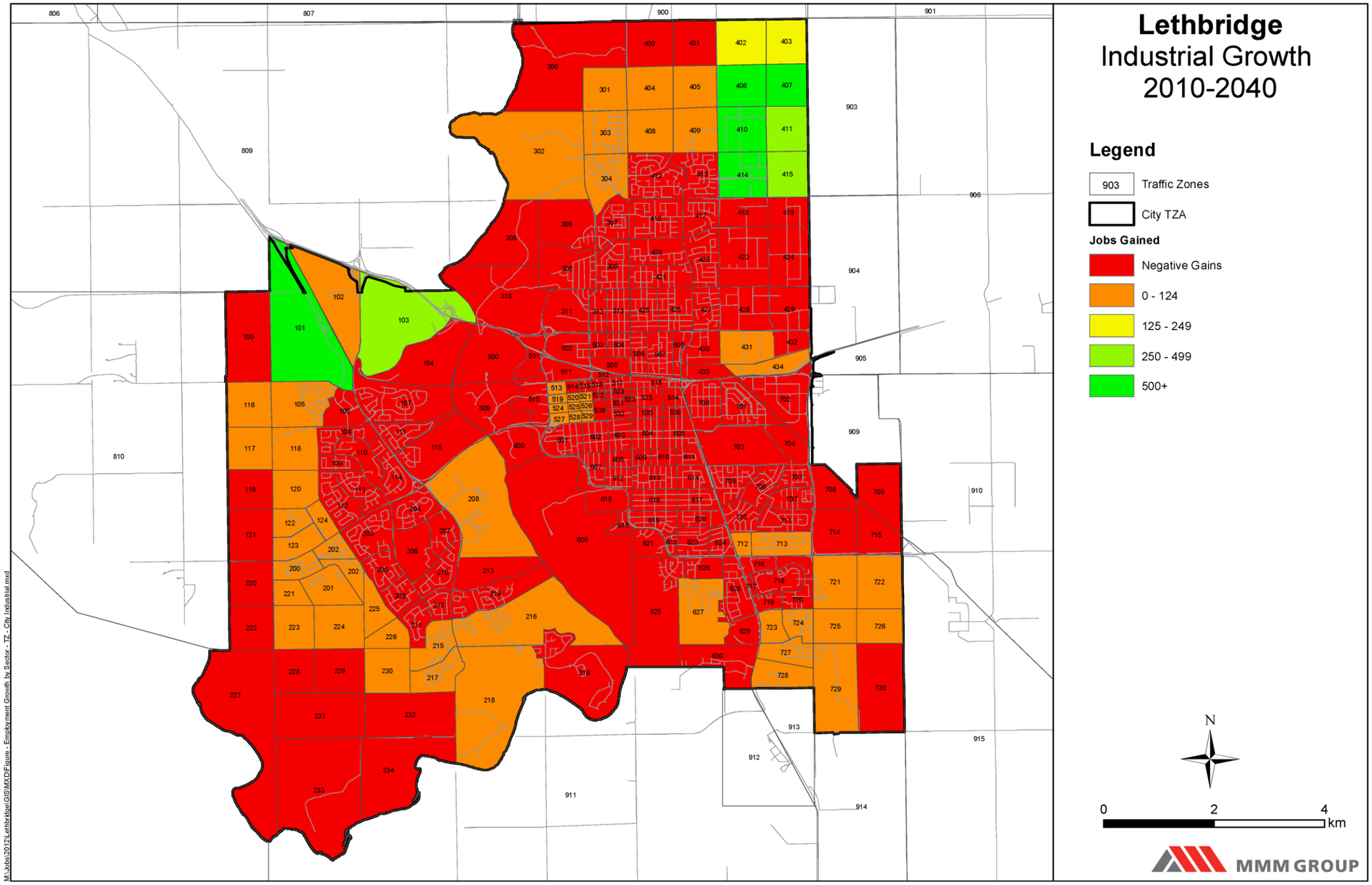


Exhibit 30 - City TZA Projected Industrial Employment Growth 2010 - 2040



3.3.2 COUNTY & TOWNS TZA

Using the employment projections estimated as part of the City's Transportation Master Plan, the Land Demand Analysis team projected sectoral employment in Lethbridge forward on a linear basis to 2112. Exhibit 31 shows that two linear rates were applied, one for 2012-2020, and another for 2021-2112.

Exhibit 31 – Annual Employment Growth Rates by Sector in County & Towns TZA

Sector	Annual Growth Rate	
	2012-2020	2021-2112
Agriculture	0.00%	0.00%
Commercial / Institutional	1.06%	1.03%
Industrial	0.37%	1.87%
Total	**0.68%**	**1.16%**

Industry sectors in the County & Towns TZA Land Demand Analysis have been aggregated into agricultural, commercial / institutional and industrial employment land use categories for the purposes of estimating employment land demand. Exhibit 32 shows that total employment in the County & Towns TZA is expected to grow from 4,948 in 2012 to 6,001 in 2032.

It is projected that industrial employment will grow at the fastest rate, rising from 1,555 employees in 2012 to 2,004 employees in 2032, an increase of 28.9%. Employment in the commercial / institutional sector is projected to rise from 2,613 in 2012 to 3,217 in 2032, an increase of 23.1%, while employment in the agricultural sector is projected to remain stable at 780.

Exhibit 32 also shows that commercial / institutional will remain the predominant employment sector in the County & Towns TZA up to 2032, with its share of total employment projected to increase from 52.8% in 2012 to 53.6% in 2032. The proportion of all employment in the County & Towns TZA related to the industrial sector is projected to increase from 31.4% in 2012, to 33.4% in 2032, while the proportion of employment related to agriculture is projected to decrease from 15.8% in 2012, to 13.0% in 2032. In the long-term, commercial / institutional is projected to remain the predominant employment sector, although the industrial employment sector's share of total employment will continue to rise.

Exhibit 32 – County & Towns TZA Sectoral Employment 2012-2112

Sector	Total Employment					% of Total Employment				
	2012	2032	2062	2087	2112	2012	2032	2062	2087	2112
Agriculture	780	780	780	780	780	15.8%	13.0%	9.8%	8.2%	7.0%
Commercial / Institutional	2,613	3,217	4,151	4,930	5,709	52.8%	53.6%	52.3%	51.5%	51.0%
Industrial	1,555	2,004	3,014	3,855	4,696	31.4%	33.4%	37.9%	40.3%	42.0%
Total	**4,948**	**6,001**	**7,945**	**9,565**	**11,185**	**100%**	**100%**	**100%**	**100%**	**100%**

Exhibit 33 and Exhibit 34 illustrate the distribution of employment growth by City transportation zone for major employment sectors between the latest Municipal estimates (2010), and the farthest Transportation Master Plan projections (2040). Employment in the County & Town TZA, is relatively modest compared to the City TZA. That said, Coalhurst and Coaldale are expected to absorb the most employment growth in the County & Towns TZA. Zones 904 and 905, located just beyond the City boundary at Highway 3, Zone 912 (the airport) along Highway 5 and Zone 810 just west of the City limit near Range Road 224 are also expected to experience moderate commercial / institutional growth by 2040. Industrial growth is expected to manifest mostly along the northwest edge of the City and around Coalhurst, around Highway 25 toward Diamond City and alongside Highways 3 and 4 near the City boundary.

We also note that agriculture and agriculture-related industries are a major focus of economic development in the County and Towns TZA. Given that this sector is increasingly sophisticated and innovation-dependant, it is likely that additional employment demand are manifesting or will manifest in the form of commercial / institutional and industrial uses related to traditional agriculture in the County & Towns TZA over the longer term. At the same time, the stability in the projection for traditional agricultural employment likely results from the high and growing labour efficiency associated with modern agriculture.

Exhibit 33 – County & Towns TZA Projected Commercial / Institutional Employment Growth 2010 - 2040

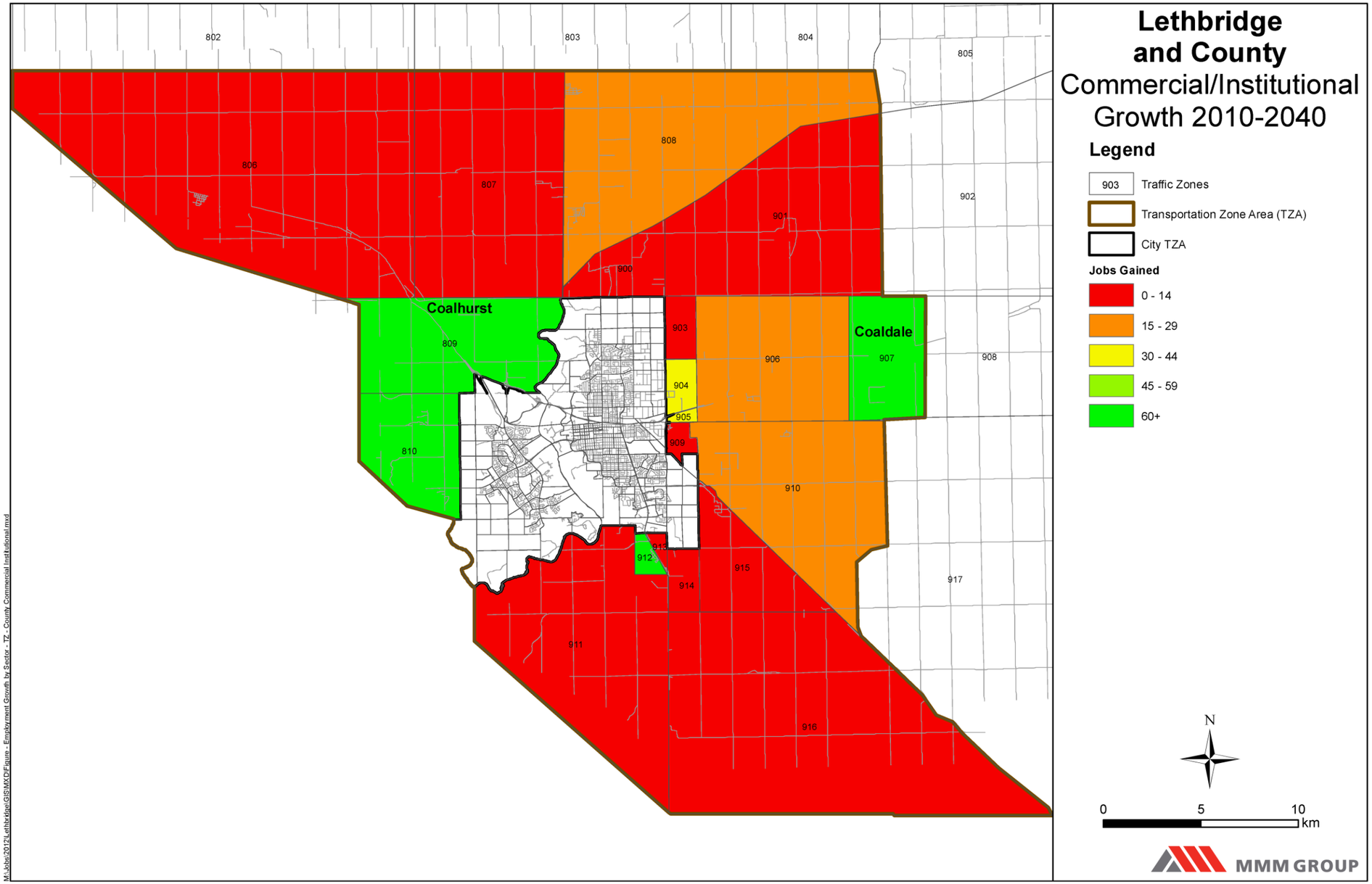
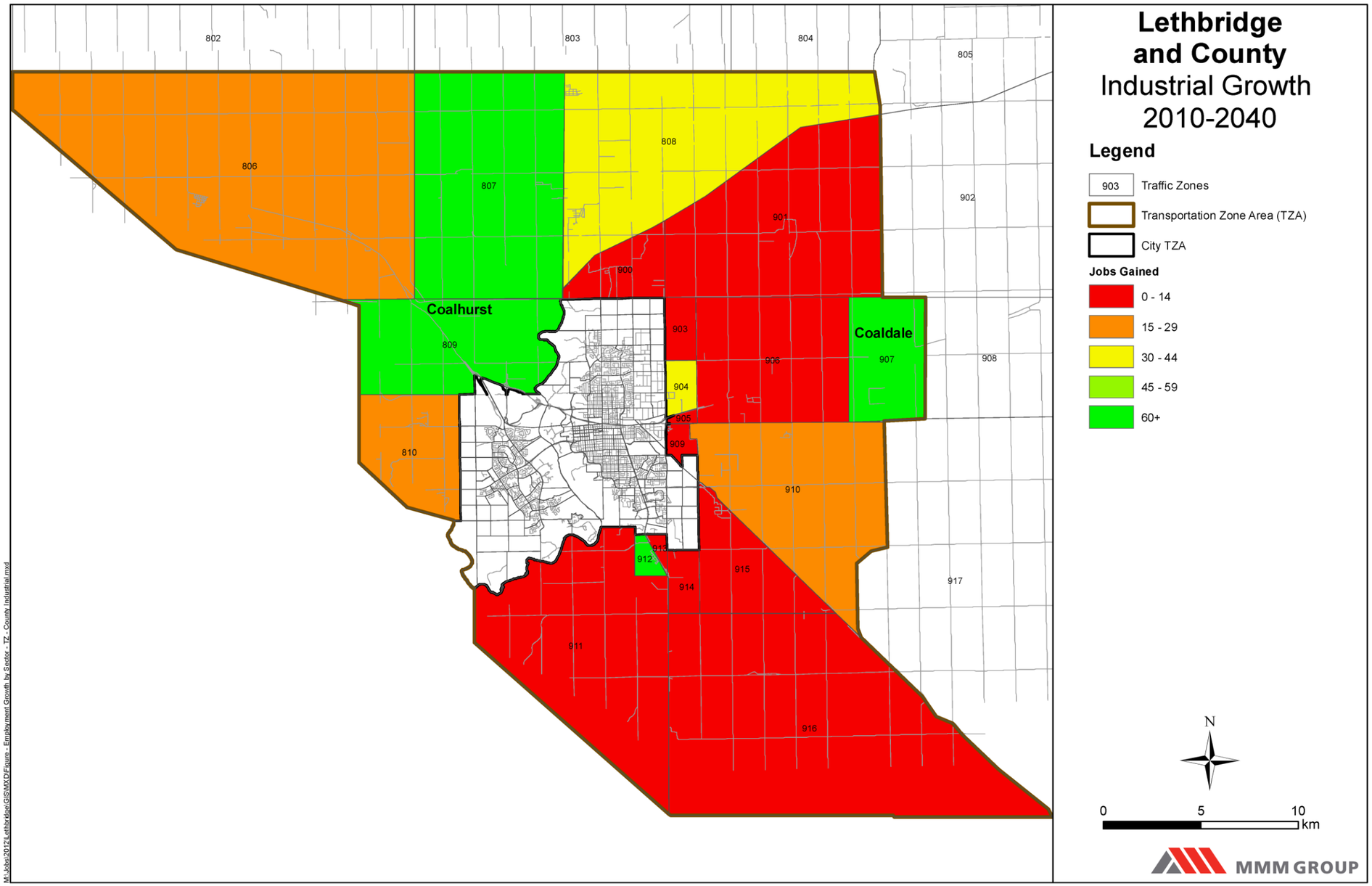


Exhibit 34 – County & Towns TZA Projected Industrial Employment Growth 2010-2040



4 LAND REQUIREMENTS

4.1 BASELINE RESIDENTIAL LAND DEMAND

This section summarizes the space and land requirements in the baseline scenario associated with the household projections outlined in Section 3.2 for the City and the County & Towns TZA. Land requirements in this section are projected to 2112, although the in-text discussions will primarily focus on the 2012 to 2032 time horizon. 100-year projection numbers can also be found in Appendix A.

While historical average residential lot sizes were outlined previously in Section 2.1.4, it is recognized that residential development in the City has been trending towards a more compact urban form for some time. Accordingly, two different sets of average residential lot sizes were applied to the projection model for the City TZA. Historical average lot sizes, outlined in Section 2.1.4, were used to estimate the current/baseline net residential land area, while average future lot sizes, shown in Exhibit 35 below, were provided by the City and applied to all projected residential development between 2013 and 2112. This control was not applied to the County & Towns TZA, as single-detached house (rural) lots are not expected to shrink significantly and the other categories are mainly limited to the Towns.

Exhibit 35 - Future Average Residential Lot Sizes in the City TZA

Area	Dwelling Type	Average Lot Size Per Unit (m^2)	Average Lot Size Per Unit (Ha.)
City TZA	Single-detached house (urban)	418	0.06
	Single-detached (rural)	275,265	27.53
	Semi-detached	232	0.02
	Apartment or Townhouse	148	0.01
	Movable Dwelling	526	0.05

Using the average residential lot sizes outlined in Section 2.1.4 and Exhibit 35, the projected residential land requirements in the TZA up to 2112 were calculated. As shown in Exhibit 36, total residential land requirements in the City are forecast to increase from 3,967 hectares in 2012, to 4,375 hectares in 2032 (and up to 5,980 hectares in 2112). Exhibit 36 also shows that total residential land requirements in the County & Towns TZA are forecast to grow from 24,462 hectares in 2012, to 24,690 hectares in 2032 (and up to 25,947 hectares in 2112).

Exhibit 36 – Baseline Residential Land Demand Forecast 2012-2112

	City TZA					County & Towns TZA				
	2012	2032	2062	2087	2112	2012	2032	2062	2087	2112
Total Residential Land Area Requirements (Ha.)	3,967	4,375	4,977	5,478	5,980	24,462	24,690	25,161	25,554	25,947
Change (Ha.)		408	602	501	502		228	471	393	393

The City of Lethbridge is projected to require approximately 21 hectares of additional land per year between 2012 and 2020 and approximately 20 hectares of additional land per year beyond 2020. The County & Towns TZA is projected to require approximately 5 hectares of additional land per year between 2012 and 2020 and approximately 16 hectares of additional land per year beyond 2020. The differing requirements for additional land between the periods 2012-2020 and 2021-2112 are products of the different linear growth rates applied to each period as a result of the Transportation Master Plan forecasts which were provided for 2020 and 2040 (see Section 3.1).

It should be noted that while the residential land requirements described for the County & Towns TZA above are large, this does not signify that this much residential land will actually need to be developed; it is simply a result of the much lower rural residential densities that have historically manifested in the County & Towns TZA, which in turn translates to a larger overall land requirement. In other words, the County & Towns TZA will only require more land to accommodate projected growth if they continue to build according to historic norms. The question of whether the County should develop according to historic norms (i.e. lower densities) will be addressed by the IGMS study that this report is intended to inform.

4.2 BASELINE EMPLOYMENT LAND DEMAND

This section summarizes the space and land requirements in the baseline scenario associated with the employment projections outlined in Section 3.3.

While historical employment densities were outlined previously in Section 2.2.2, it is recognized that large employment land users (those greater than 50 hectares, such as golf courses and universities) are unlikely to expand in the City until major population or employment thresholds trigger them in the long-term. Accordingly, two different sets of employment densities were applied to the projection model for the City TZA. The historical employment densities outlined in Section 2.2.2, were used to estimate the current/baseline employment land area, while the employment densities shown in Exhibit 37 below were used for all projected future employment land development. No changes from historical employment densities were applied to future employment land development in the County & Towns TZA.

Exhibit 37 - Future Employment Densities in City TZA (2010)[vi]

Sector	Land Area (Ha.)	Employees	Density (Jobs / Net Ha.)
Agricultural	1,981	608	0.31
Office	33	8,598	262.12
Retail / Commercial	485	11,055	22.80
Institutional	238	7,415	31.20
Industrial	587	10,406	17.72
Outdoor Recreation	1,548	205	0.13
Other	964	2,803	2.91
Total	**5,835**	**41,090**	**7.04**

Using the employment densities outlined in Section 2.2.2 and Exhibit 37, the projected employment land requirements in the TZA were calculated up to 2112. As shown in Exhibit 38, total employment land requirements in the City TZA are forecast to increase from 9,333 hectares in 2012 to 9,716 hectares in 2032 (and up to 11,394 hectares in 2112). Land requirements related to industrial employment are projected to grow from 609 hectares in 2012, to 884 hectares in 2032, an increase of 45.2%. Land requirements related to office employment are projected to rise from 35 hectares in 2012, to 46 hectares in 2032, an increase of 32.4%. Land requirements related to retail / commercial employment are projected to increase from 650 hectares in 2012, to 839 hectares in 2032, an increase of 29.2%. Due to the expected decline in Agricultural employment in the City, land requirements related to agricultural employment is projected to decline from 3,795 hectares in 2012, to 3,711 hectares in 2032, a decrease of 4.1%. This would effectively free up approximately 84 hectares of agricultural employment land for other uses over the next 20 years. Similarly, the projected decline in other employment would add up to approximately 22 hectares of employment land for other uses over the next 20 years.

Assuming that City industries will continue to build at the rather low density of 17.72 jobs per net hectare, the baseline City projection indicates that this sector will be under the greatest pressure over the long term owing to strong industrial employment demand.

Exhibit 38 – City TZA Employment Land Requirements (2011-2112)

Employment Sector	Employment Land Requirements (Ha.)				
	2012	2032	2062	2087	2112
Agricultural	3,795	3,711	3,594	3,496	3,399
Office	35	46	55	62	69
Retail / Commercial	650	839	1,061	1,247	1,432
Institutional	475	487	530	566	602
Industrial	609	884	1,357	1,751	2,145
Outdoor Recreational	2,334	2,334	2,334	2,334	2,334
Other	1,436	1,414	1,414	1,414	1,414
Total	9,333	9,716	10,345	10,870	11,394

Employment Sector	Change in Employment Land Requirements (Ha.)			
	2012 - 2032	2032 -2062	2062-2087	2087-2112
Agricultural	-84	-117	-98	-97
Office	11	9	7	7
Retail / Commercial	189	222	186	185
Institutional	12	43	36	36
Industrial	275	473	394	394
Outdoor Recreational	0	0	0	0
Other	-22	0	0	0
Total	383	629	525	524

Exhibit 39 shows that total employment land requirements in the County & Towns TZA are forecast to increase from 33,048 hectares in 2012, to 33,998 hectares in 2032. Land requirements related to commercial / institutional employment is projected to grow from 3,832 hectares in 2012, to 4,718 hectares in 2032, an increase of 23.1%, while land requirements related to industrial employment is projected to rise from 221 hectares in 2012, to 285 hectares in 2032, an increase of 28.9%. As agricultural employment is projected to remain stable at 780 employees, land requirements related to agricultural employment is projected to remain constant at 28,995 hectares. Of the commercial / institutional figure, we estimate that the Commercial only portion will grow from 459 hectares in 2012, to 595 hectares by 2032, an increase of 29.2%.

Exhibit 39 – County & Towns TZA Employment Land Requirements (2011-2112)

Employment Sector	Employment Land Requirements (Ha.)				
	2012	2032	2062	2087	2112
Agricultural	28,995	28,995	28,995	28,995	28,995
Commercial / Institutional	3,832	4,718	6,087	7,230	8,372
(Commercial Only Estimate)	459	595	806	982	1,157
Industrial	221	285	429	549	668
Total	33,048	33,998	35,511	36,773	38,035

It should be noted that while the employment land requirements described for the County & Towns TZA above are much larger than those for the City TZA, this does not signify that more commercial, institutional or industrial land will actually need to be developed relative to the City; it is simply a result of the much lower rural employment densities that have historically manifested in the County & Towns TZA, which in turn translates to a larger overall employment land requirement. In other words, the County & Towns will only require more land to accommodate projected growth than the City if they continue to build according to historic rural norms. The question of whether the County & Towns TZA should develop according to historic rural norms (i.e. extremely low employment densities) will be addressed by the IGMS study that this report is intended to inform.

Further to the topic of increasing employment density in the County and Towns TZA, we reiterate that the agriculture and agriculture-related economic development that the County and Towns TZA are pursuing is increasingly sophisticated and innovation-dependant. As stated in Section 2.2.2, this may raise overall labour productivity, and by extension the density of commercial / institutional and industrial uses related to agriculture in the County & Towns TZA over the longer term.

As the baseline scenario assumes that historically higher density urban building trends than those found in the County and Town TZA will persist in the City TZA, the projection expects that less additional employment land will be required per year than the baseline scenario for the County & Towns TZA. The baseline projection indicates that employment growth in the City will require approximately 16 hectares of additional employment land per year to the year 2020 and approximately 21 hectares of additional employment land per year beyond 2020. Employment growth in the County & Towns TZA is projected to require between 42-52 hectares of additional land per year based on historical employment densities.

4.3 SCENARIOS

This section outlines scenarios that were developed to inform the baseline land demand projections. Scenarios are needed to provide information regarding recent or probable trends because the baseline projections are largely based on historic trends, including those which might not reasonably be expected to continue into the future. In order to develop useful scenarios to inform the baseline projection, discussions were held with Economic Development Lethbridge, and City and County staff. Exhibit 40 provides a description of the scenarios that were developed from those sessions, and a summary of the baseline projection variables that have been altered to model their likely effects on land demand.

Exhibit 40 - Description of Scenarios

Scenario	Description	City TZA	County & Towns TZA
Compact Residential Development	► Based on input from municipal staff and trends in comparable municipalities, this scenario explores the effect of smaller residential lot sizes.	► Scenario lot size norms are based on past development experience in Alberta and Ontario ► 300 m^2 per urban detached unit ► 200 m^2 per semi-detached unit ► 130 m^2 per apartment unit ► 250 m^2 per moveable dwelling unit	► Scenario lot size norms are based on historical City norms in Lethbridge ► 599 m^2 per urban detached unit ► 368 m^2 per semi-detached unit ► 148 m^2 per apartment unit
Enhanced Dwelling Mix	► Based on input from municipal staff and trends in comparable municipalities, this scenario explores the effect of a shift toward more intensive residential dwelling types.	► Future dwelling mix proportions for the entire City TZA are partially based on those of Calgary and Edmonton (from 2006 Census) ► Assumes no new additional farm houses, movable dwellings or other single-attached houses are constructed ► 54% of all new units are single-detached ► 5% of all new units are semi-detached ► 41% of all new units are apartments or townhouses	► Future dwelling mix proportions for the entire County & Towns TZA are partially based on those of Coaldale (from 2006 Census) ► Assumes no new additional farm houses, movable dwellings or other single-attached houses are constructed ► 80% of all new units are single-detached ► 4% of all new units are semi-detached ► 16% of all new units are apartments or townhouses
Higher Rate of Industrial Growth	► Based on input from EDL, this scenario explores the effect of an increase in industrial employment above the baseline projections (due to growth in oil and gas exploration, agri-foods and transportation activities).	► Assumes a 25% increase in the 2020 and 2040 Industrial employment projections provided by the TMP ► Industrial sector employment growth assumed to return to baseline levels after 2040	► Assumes a 25% increase in the 2020 and 2040 Industrial employment projections provided by the TMP ► Industrial sector employment growth assumed to return to baseline levels after 2040
Higher Rate of Office Growth	► Based on input from EDL, this scenario explores the effect of an increase in office employment above the baseline projections (due to growth in oil and gas exploration, institutional and high-tech activities).	► Assumes a 25% increase in the 2020 and 2040 office employment projections provided by the TMP ► Office sector employment growth assumed to return to baseline levels after 2040	► N/A (due to data limitations)
Increased Commercial Employment Density	► This scenario explores the effect of increased commercial employment density.	► N/A (based on feedback received from EDL)	► Based on contemporary commercial densities in Coalhurst and Coaldale only ► 3 jobs/hectare for all new commercial employment

The results of modeling each scenario are summarized in Exhibit 41 (to 2032), Exhibit 42 (to 2072) and Exhibit 43 (to 2112).

Decreasing residential lot sizes to match contemporary compact development in other parts of Canada reduce City residential land demand by a total of 108 hectares in the City and 159 hectares in the County by 2032, and up to 534 hectares in the City and 1,015 hectares in the County over the next 100 years.

Halting growth in the share of detached units and diversifying the housing mix could save up to 44 hectares in the City and 15 hectares in the County by 2032, and up to 214 hectares in the City and 99 hectares in the County over the next 100 years.

A 25% increase in the 2020 and 2040 industrial employment projections provided by the TMP could increase employment land demand by 221 hectares in the City and 71 hectares in the County by 2031, and up to 253 hectares in the City and 81 hectares in the County over the next 100 years.

A 25% increase in the 2020 and 2040 office employment projections provided by the TMP could increase employment land demand by 11 hectares in the City by 2032, and up to 12 hectares over the next 100 years.

The last scenario, which postulates increased commercial job density in the County, is based on new commercial development occurring mainly at Town densities, which is consistent with the fact that most County & Towns TZA employment in this sector is located on the City fringe or in the Towns. Under these assumptions, the last scenario could save up to 717 hectares in the County & Towns TZA by 2032, and up to 3,540 hectares over the next 100 years.

Exhibit 41 - Summary of Scenario Results (2032)

		Baseline	Compact Residential Development	Enhanced Dwelling Mix	Higher Rate of Industrial Growth	Higher Rate of Office Growth	Increased Commercial Employment Density
Residential Land Requirements in 2032 (Ha.)	City TZA	4,375	4,267 (-108)	4,331 (-44)	N/A	N/A	N/A
	County & Towns TZA	24,690	24,531 (-159)	24,675 (-15)	N/A	N/A	N/A
Employment Land Requirements in 2032 (Ha.)	City TZA	9,716	N/A	N/A	9.937 (221)	9,727 (11)	N/A
	County & Towns TZA	33,998	N/A	N/A	34,069 (71)	N/A	33,281 (-717)

Exhibit 42 – Summary of Scenario Results (2072)

		Baseline	Compact Residential Development	Enhanced Dwelling Mix	Higher Rate of Industrial Growth	Higher Rate of Office Growth	Increased Commercial Employment Density
Residential Land Requirements in 2072 (Ha.)	City TZA	5,177	4,857 (-320)	5,049 (-68)	N/A	N/A	N/A
	County & Towns TZA	25,319	24,731 (-588)	25,261 (-58)	N/A	N/A	N/A
Employment Land Requirements in 2072 (Ha.)	City TZA	10,555	N/A	N/A	10,807 (252)	10,567 (12)	N/A
	County & Towns TZA	36,016	N/A	N/A	36,097 (81)	N/A	33,888 (-2,128)

Exhibit 43 - Summary of Scenario Results (2112)

		Baseline	Compact Residential Development	Enhanced Dwelling Mix	Higher Rate of Industrial Growth	Higher Rate of Office Growth	Increased Commercial Employment Density
Residential Land Requirements in 2112 (Ha.)	City TZA	5,980	5,446 (-534)	5,766 (-214)	N/A	N/A	N/A
	County & Towns TZA	25,947	24,932 (-1,015)	25,848 (-99)	N/A	N/A	N/A
Employment Land Requirements in 2112 (Ha.)	City TZA	11,394	N/A	N/A	11,647 (253)	11,406 (12)	N/A
	County & Towns TZA	38,035	N/A	N/A	38,116 (81)	N/A	34,495 (-3,540)

APPENDIX A – SUMMARY FORECASTS

Exhibit 44 - City TZA 100 Year Projections

City TZA		2012	2020	2032	2062	2087	2112
Population		89,120	101,068	118,279	161,307	197,163	233,019
Number of Dwellings	Single-detached house (urban)	23,677	26,863	31,451	42,923	52,483	62,042
	Single-detached (rural)	83	83	83	83	83	83
	Semi-detached	2,263	2,567	3,004	4,097	5,008	5,918
	Apartment or Townhouse	10,510	11,919	13,948	19,023	23,251	27,480
	Moveable Dwelling	863	978	1,145	1,561	1,908	2,255
	Total	**37,396**	**42,410**	**49,631**	**67,687**	**82,733**	**97,778**
Total Residential Land Requirements (Ha.)		3,967	4,134	4,375	4,977	5,478	5,980
Employment by Sector	Agricultural	605	594	580	544	514	484
	Office	9,110	11,158	12,062	14,321	16,204	18,087
	Retail / Commercial	11,631	13,936	15,961	21,024	25,243	29,462
	Institutional	7,369	7,184	7,723	9,072	10,196	11,319
	Industrial	10,787	12,314	15,665	24,043	31,024	38,005
	Outdoor Recreational	205	205	205	205	205	205
	Other	2,787	2,724	2,724	2,724	2,724	2,724
	Total	**42,494**	**48,115**	**54,920**	**71,933**	**86,110**	**100,286**
Employment Land Requirements (Ha.)	Agricultural	3,795	3,758	3,711	3,594	3,496	3,399
	Office	35	43	46	55	62	69
	Retail / Commercial	650	751	839	1,061	1,247	1,432
	Institutional	475	469	487	530	566	602
	Industrial	609	695	884	1,357	1,751	2,145
	Outdoor Recreational	2,334	2,334	2,334	2,334	2,334	2,334
	Other	1,436	1,414	1,414	1,414	1,414	1,414
	Total	**9,333**	**9,464**	**9,716**	**10,345**	**10,870**	**11,394**

Exhibit 45 - County & Towns TZA 100 Year Projections

County & Towns TZA		2012	2020	2032	2062	2087	2112
Population		15,507	16,205	19,543	27,887	34,841	41,795
Number of Dwellings	Single-detached house (urban)	3,441	3,644	4,611	7,030	9,046	11,062
	Single-detached (rural)	1,054	1,054	1,054	1,054	1,054	1,054
	Semi-detached	144	150	181	258	323	387
	Apartment or Townhouse	290	303	365	521	651	781
	Other	245	256	309	441	551	661
	Total	**5,174**	**5,407**	**6,520**	**9,304**	**11,625**	**13,945**
Total Residential Land Requirements (Hectares)		24,462	24,502	24,690	25,161	25,554	25,947
Aggregated Employment by Sector	Agricultural	780	780	780	780	780	780
	Commercial / Institutional	2,613	2,843	3,217	4,151	4,930	5,709
	Industrial	1,555	1,601	2,004	3,014	3,855	4,696
	Total	**4,948**	**5,224**	**6,001**	**7,945**	**9,565**	**11,185**
Employment Land Requirements (Ha.)	Agricultural	28,995	28,995	28,995	28,995	28,995	28,995
	Commercial / Institutional	3,832	4,169	4,718	6,087	7,230	8,372
	Commercial Only Estimate	459	511	595	805	982	1157
	Industrial	221	228	285	429	549	668
	Total	**33,048**	**33,392**	**33,998**	**35,511**	**36,773**	**38,035**

APPENDIX B – BACKGROUND & CONTEXT

This Appendix discusses the economic drivers in the Study Area through a high-level review of the relevant economic forces and trends affecting the Study Area; and summarizes the current economic development framework and efforts.

Economic Trends & Forces

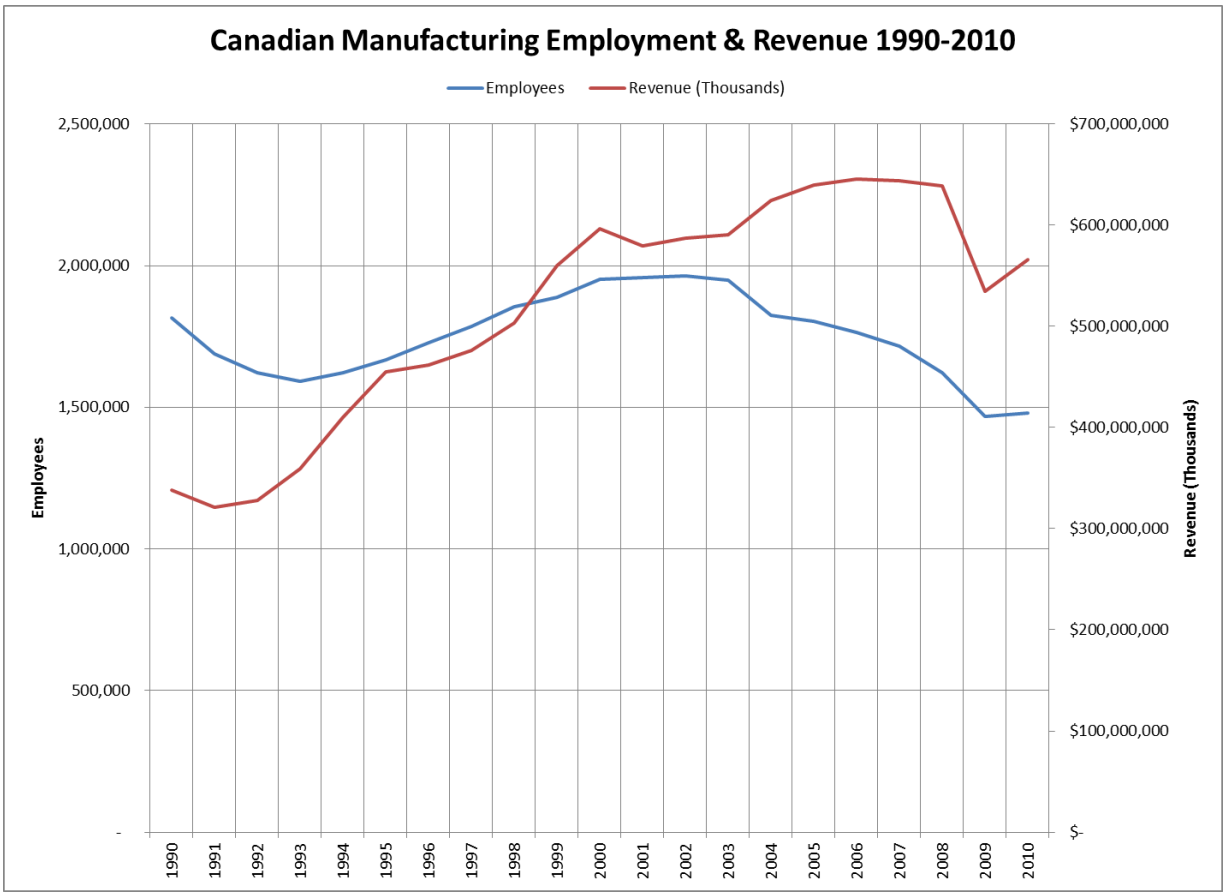
The economic future of the Study Area is influenced by local and regional economic forces, as well as the effects of global and national economic trends. Globalization and trade liberalization over the last two decades, for instance, have created a new environment for businesses in advanced economies where significant economic restructuring has extended to the regional and municipal levels. This has resulted in widespread de-industrialization in both Europe and North America, particularly within urban cores. Mature, routine, primarily manufacturing activities have been replaced by lower-cost, offshore competitors or relocated to lower-cost jurisdictions.

For cities in advanced economies such as Lethbridge, this has also often meant a fundamental shift from low-cost and high-volume to high-value specialized production. Where previously enterprises had sought to increase the scale of production to reduce costs for competitiveness, the aim now is to produce high quality, innovative and customized products, which translate to competition on value rather than cost.

National & Provincial Trends

The shift from low-cost and high-volume to high-value production is evident in national employment and revenue trends in the manufacturing sector over the last two decades (Exhibit 46). The trend also highlights the fact that the manufacturing sector remains focused on improving productivity rather than increasing labour (i.e., jobless growth).[vii] On the other hand, employment in the service sectors has seen steady growth from 1987 to 2007.[viii] In the Canadian context, this has meant that our economy is gradually shifting from goods-producing to service-oriented, knowledge sectors.

Exhibit 46 – Canadian Manufacturing Employment & Revenue 1990-2010[ix] [x]



This national trend is relevant even in traditionally resource-based and export-oriented parts of Canada such as Alberta and Lethbridge. As such, it is critical that this analysis include a clear understanding of higher-level economic shifts that may have strong regional and/or local impacts.

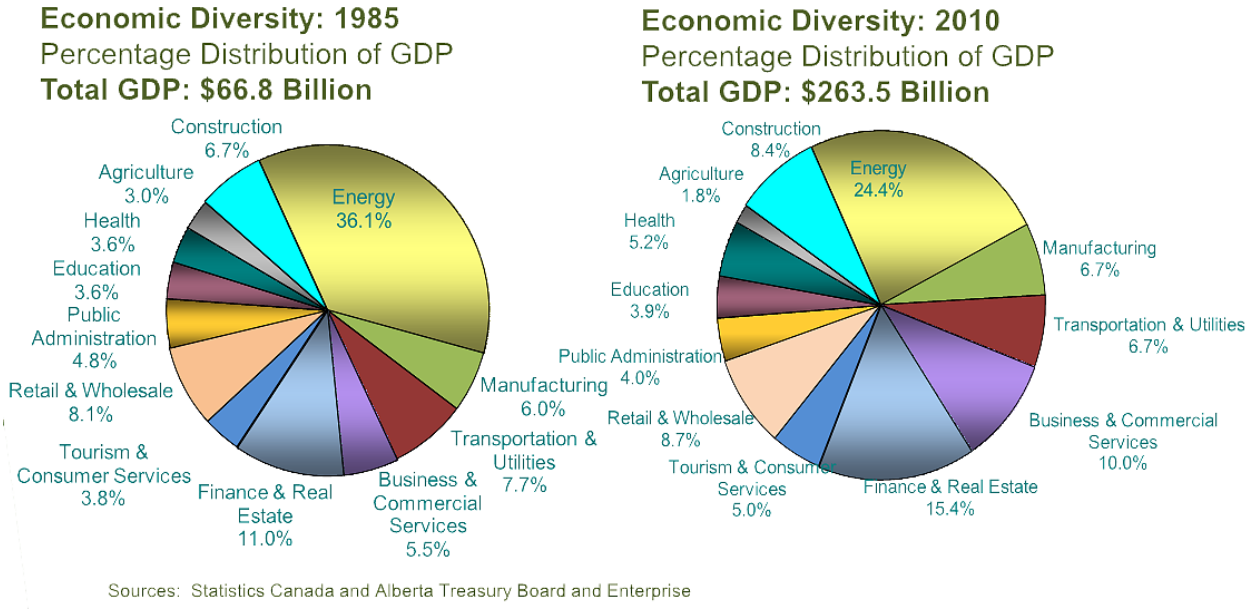
More presently relevant to the national economy is the European sovereign debt crisis, followed closely by the progress of the slow economic recovery from the most recent recession (which began in about 2008) and the resulting lagging export demand in the U.S. and other advanced economies.[xi] The International Monetary Fund's World Economic Outlook Update for April 2012 estimates that the GDP growth rate for advanced economies (which includes Canada) will increase by only about 1.5% in 2012 and 2% in 2013, and emerging and developing economies are also expected to slow from 2011's 6.25% in real GDP growth to 5.75% in 2012, before recovering to about 6% in 2013.[xii]

Although Canada's GDP has returned to a pre-crisis level, the Canadian Chamber of Commerce Economic Outlook for 2012-2013 estimates that "modest economic growth in the U.S. and a still-strong currency are expected to hold back the performance of Canada's export sector, as will cooling demand in emerging-market economies". Canada's GDP grew by 2.6% between 2010 and 2011, and is forecast to grow by only 2.0% in 2012, before returning to a 2.6% growth in 2013. National employment level has been stagnant since the end of 2011, although the March 2012 Labour Force Survey Results reported an increase of 82,000 over February 2012, bringing the national unemployment rate down to 7.2%.

Canada's resource-driven Provinces (including Alberta) continue to lead the way in terms of economic expansion, as evident in Alberta's GDP growth at 5.2% from 2010 to 2011[xiii]. Alberta gained 64,900 jobs since March 2011, according to the March 2012 Seasonally Adjusted Labour Force Survey; the strongest performance among all the Canadian Provinces at 3.1%. Alberta's unemployment rate decreased by 0.4% from March 2011 to the same month in 2012 to 5.3%.

While the energy sector continues to dominate Alberta's GDP, a significant level of diversification is taking place as well. Most notably, the Finance and Real Estate and Business and Commercial Services sectors have grown from 16.5% of the Province's GDP in 1985 to 25.4% in 2010 (as shown in Exhibit 47).

Exhibit 47 – Percentage Distribution of Alberta's GDP 1985 and 2010[xiv]



Sources: Statistics Canada and Alberta Treasury Board and Enterprise

Economic Development Policy Framework

In addition to global and regional economic trends, the City and the County also influence the directions of economic development through their policy documents which provide a framework for developing Lethbridge's economy and strengthening employment. This section provides a high-level review of relevant municipal policy documents as they pertain to the Land Demand Analysis.

City of Lethbridge Integrated Community Sustainability Plan / Municipal Development Plan

The City's Integrated Community Sustainability Plan (ICSP) / Municipal Development Plan (MDP), adopted by City Council on July 5, 2010, defines the City's planning vision and framework to the year 2050. The document addresses "social, cultural, economic, built and natural environment, and governance dimensions of sustainability" in relation to the City's immediate needs and establishes long-term goals to guide future growth. It sets goals, expectations and policies regarding land use, transportation and infrastructure decisions and is intended to assist in the coordination of municipal by-laws, policies, programs and investment within the City's control or influence.

Sections 6.1, 6.2, 6.4 and 6.6 of the Plan establish policies of relevance to the Land Demand Analysis and the IGMS. Section 6.1 speaks to economic development and business environment policy objectives, including:

- Encouraging new and supporting existing businesses (6.1.1.1);
- Ensuring a sufficient supply of serviced land to accommodate business growth (6.1.1.2);
- Making Lethbridge competitive with respect to core input costs and stream-lined regulatory processes (6.1.1.3);
- Ensuring that municipal infrastructure and facilities investments are made in accordance with long-term financial plans and adopted financial policies (6.1.2.2); and,
- Maintaining financial flexibility in relation to adapting to local and regional economic conditions (6.1.2.5).

Section 6.2 of the Plan provides relevant housing policy objectives, which includes encouraging and facilitating the adequate supply of housing for all income groups (6.2.1.3);

Section 6.4 of the Plan provides relevant land use policy objectives, such as:

- Encouraging residential densities in future neighbourhoods in relation to existing built up-areas and residential development at and near to the University and College, and in the Downtown (6.4.1.1 & 6.4.1.2);
- Increasing commercial densities in existing areas, including the promotion of multi-level and mixed use developments in commercial areas and encouraging and supporting the redevelopment and adaptive reuse of underutilized commercial sites and buildings (6.4.1.3);
- Increasing industrial densities in existing areas (6.4.1.4);
- Targeting Downtown as a primary location for mixed-use redevelopment (6.4.1.5);
- Targeting the 3rd Avenue South and 13th Street North corridors as secondary locations for mixed use redevelopment (6.4.1.6);
- Encouraging and promoting an adequate supply of land that is planned and available for servicing to meet market demand (6.4.4.4);

- Encouraging and promoting growth patterns that maximize the use of existing infrastructure and services in order to avoid or delay the construction of new infrastructure (6.4.4.5);
- Supporting a range of choice of new expansion areas for commercial and industrial development (6.4.4.6);
- Encouraging the development of commercial, institutional and transit services that support a downtown residential community (6.4.7.3).

County of Lethbridge Municipal Development Plan

The County of Lethbridge's Municipal Development Plan (MDP) was adopted in January 20, 2010 to provide a planning framework to 2031. Section 3.4 of the Plan indicates that the document is intended to provide Council with a sound set of decision-making policies which will address how the County will:

- accommodate growth and change in the County in a manner that reflects good land use planning;
- facilitate safe and liveable residential development;
- stimulate logical and orderly business development to support the local economy;
- protect the CANAMEX trade corridor from overdevelopment;
- coordinate transportation and utility infrastructure within the County; and,
- facilitate communication and cooperation between the County and neighbouring municipalities.

Section 4.1, furthermore, states that the County seeks to maximize economic opportunity that benefits the County and its constituents and recognizes the need to diversify the regional economy. It is also the County's objective to provide basic standards for development, and ensure that approval authorities have sufficient information to make informed decisions to direct land development to areas that are best suited to prospective uses (Section 6.1.2).

Section 6.4 speaks to the County's policies for designated Commercial and Industrial lands. In particular, the section notes that "Further growth within commercial and industrial development in the County is dependent upon the extension of municipal water and sewage services, especially regarding development along existing transportation routes as well as the proposed CANAMEX trade corridor". It is the County's objective to support diversified commercial and industrial development. The following policies in Section 6.4.3 of the Plan are of particular relevance to the Land Demand Analysis:

- The County will direct industrial development towards established industrial parks with adequate infrastructure servicing unless if extraordinary circumstance exist;
- The County supports the development of private enterprise;
- The County will develop soundly engineered industrial and commercial developments in consultation with Provincial Authorities in relation to the CANAMEX Trade Corridor and will consider completing a Highway Commercial Nodes study following the completion of the Corridor;
- The County may consider industrial and commercial development on high quality agricultural land where adjacent to major transportation corridors with available infrastructure or servicing;

- Where compatible with neighbouring land uses, the County will consider industrial and/or commercial uses related to agriculture, non-labour intensive industries requiring relatively large areas of land with minimal services and amenities, extractive uses.

Section 6.12 contains the County's economic development and growth policies. The County's objective on this topic is to promote sustainable growth and economic diversification. Polices relate to:

- Economically balancing agricultural, residential, industrial and commercial employment nodes and services;
- Encouraging clean and sustainable economic development initiatives
- Cooperating with Economic Development Lethbridge to create a growth and development conducive environment, facilitate appropriate business locations and pursue suitable business development initiatives; and,
- Working with the SouthGrow Regional initiative on economic development.

Town of Coalhurst Municipal Development Plan

The Town of Coalhurst's Municipal Development Plan was adopted in September 2000 and includes the following provisions that are of relevance to the Land Demand Analysis:

- Section 6.3 of the Plan states that it is the Town's objective to provide a variety and mix of housing and determine an estimated amount of land to be available for housing in the future.
- Section 7.1 of the Plan states that the Town will develop strategies for promoting commercial and industrial growth, create a central commercial area or prepare for dispersed commercial uses, provide land for future needs and accommodate less-desirable effects of industry.
- Section 14.3 of the Plan states that it is the Town's objective to work toward the adoption of an intermunicipal development plan and allow for intermunicipal partnerships. In particular, Policy 14.4.4 states that, where possible, the Town should take part in cooperative efforts with other municipalities to take advantage of savings or efficiencies in service provision.

Other Economic Development Sectors

There are a variety of independent organizations supporting economic development in the Study Area. Exhibit 48 provides a list of the largest of these organizations and brief description of their role and the services that they provide.

Exhibit 48 – Independent Economic Development Organizations

Organization	Description
Economic Development Lethbridge	EDL is an independent, non-profit that was originally started by the City. It undertakes a wide array of promotion and coordination functions to attract business and investment to the City and the Region as well as recruitment and retention of labour. In addition to organizing marketing campaigns and compiling and publishing a variety of economic and business location-criteria related information, EDL also works actively to attract conventions and events, and provides lifestyle and livability information for prospective migrants.
SouthGrow Regional Initiative	SouthGrow represents twenty-two south central Alberta communities committed to regional economic development. Its mission is to foster a shared vision for regional economic development, creates economic development opportunities, foster shared services, and provide unified representation for the Region. SouthGrow generates economic development policy and provides training, marketing and information, in addition to research and studies. It should be noted that the City of Lethbridge is not a member of SouthGrow.
Alberta SouthWest Regional Alliance	The Alberta SouthWest Regional Alliance is regional economic development alliance of 15 communities in southwest Alberta.
Southern Alberta Alternative Energy Partnership	SAAEP is a partnership sponsored by the Alberta SouthWest Regional Alliance, EDL and SouthGrow to facilitate solar, wind and bio-energy projects. The organization has created a Green Growth Plan for the region, and contributes to information sharing, marketing and lobbying efforts. It should be noted that the City of Lethbridge is not a member of SAAEP.
Tecconnect	Tecconnect is a data centre facility in Lethbridge that is being marketed to attract, incubate and develop technology companies through commercialization of products and services. EDL has facilitated the project with partners to provide employment and entrepreneurship opportunities, adding to the educational and economic anchors in the region. The Centre will have an Information & Communication Technologies (ICT) focus with a specific emphasis in geospatial imaging.
Community Futures Lethbridge Region	Community Futures Lethbridge Region is the local branch of the Federal Community Futures program. The Community Futures program supports a network of organizations comprised of volunteers and staff to develop and implement community-based economic development strategies with a focus on rural economic diversification. The network provides small business loans (up to $150,000) and training.

CANAMEX / North-South Trade Corridor

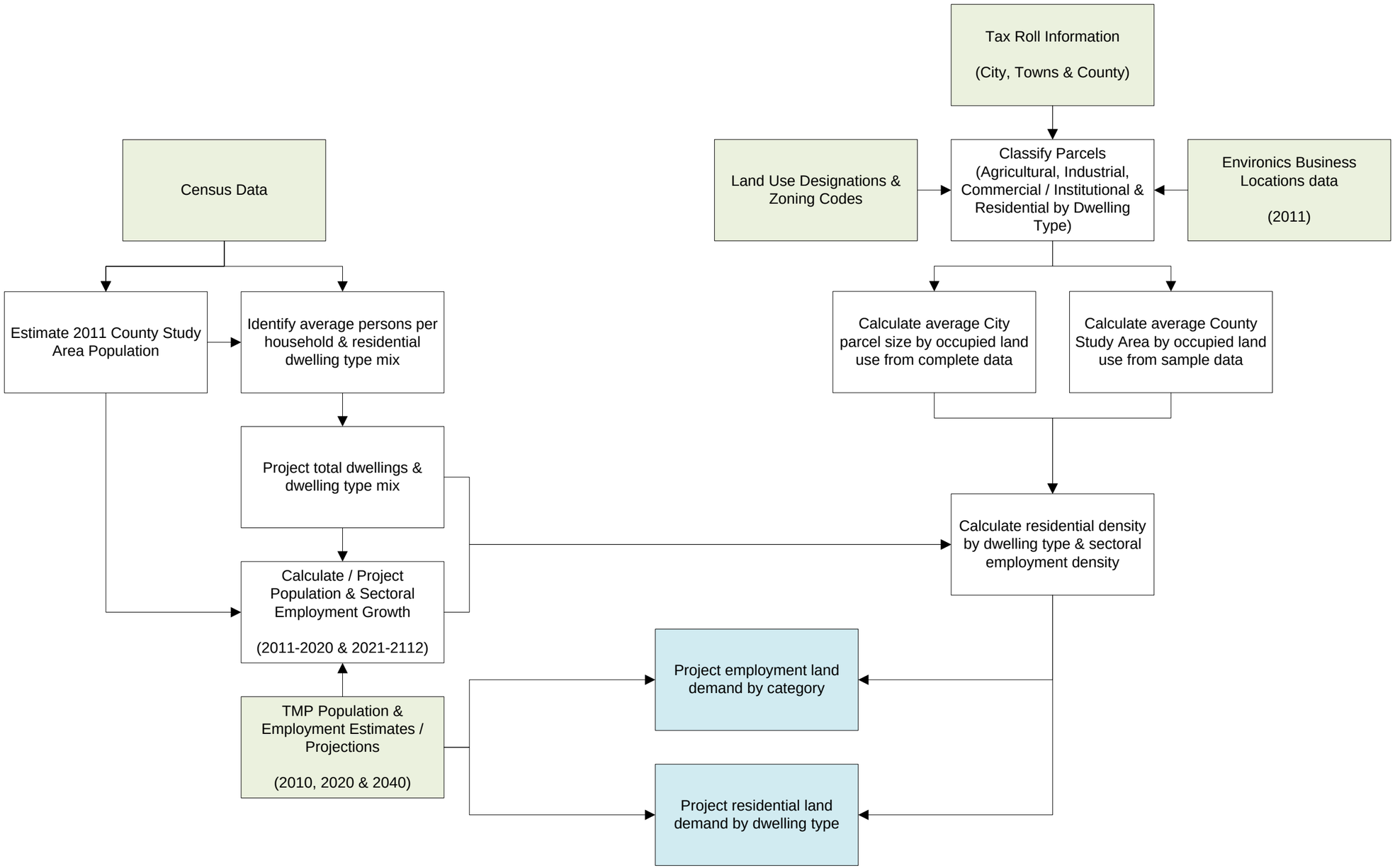
The CANAMEX project is a transportation corridor that was established under the North American Free Trade Agreement to link Canada, the United States and Mexico. The initial components of the corridor have been completed as a series of expressways; however, the overall project is proposed to include additional roadway upgrades as well as other major linear infrastructure such as railroads, pipelines, and communications plant. The majority of the Canadian portion of the project is located in Alberta, including segments which pass through Lethbridge.

- This portion of the CANAMEX in Alberta is referred to as the North-South Trade Corridor (NSTC), which extends from the Canada-U.S. border at Coutts to the B.C. border west of Grande Prairie. The NSTC in Alberta is approximately 1,170 kilometres long. As of 2010, more than 92% of the NSTC has been completed as a 4-laned roadway. Highways 3 and 4, will be realigned as part of this project, and this will be implemented through future highway network planning for the Lethbridge area.

APPENDIX C – METHODOLOGY

This Section presents an overview of the study approach, methods and tools to complete the analysis, as well as associated assumptions and limitations. Exhibit 49 provides a summary of the methodology used for the Land Demand Analysis, which is explained in further detail below.

Exhibit 49 – Summary of Methodology



Census Data

To aid in understanding the geographic distribution of trends and characteristics for the Land Demand Analysis, the study team reviewed available place-of-residence Federal and municipal Census data applying to the TZA. This review was used to identify the socio-economic structure of the Study Area and employment and growth trends.

Where possible and applicable, Census geographies (i.e., Dissemination Block, Tract, Subdivision and Division) were converted to Transportation Zones using GIS for consistency since the population and employment estimates and projections had been provided by the City for the entire TZA. Complete Federal Census characteristics were reviewed for 1996, 2001 and 2006, Federal Census population and dwelling totals for 2011 and municipal Census population totals for 2012. At the time of this assignment in June 2012, the only data available from Census 2011 were population and dwelling totals.

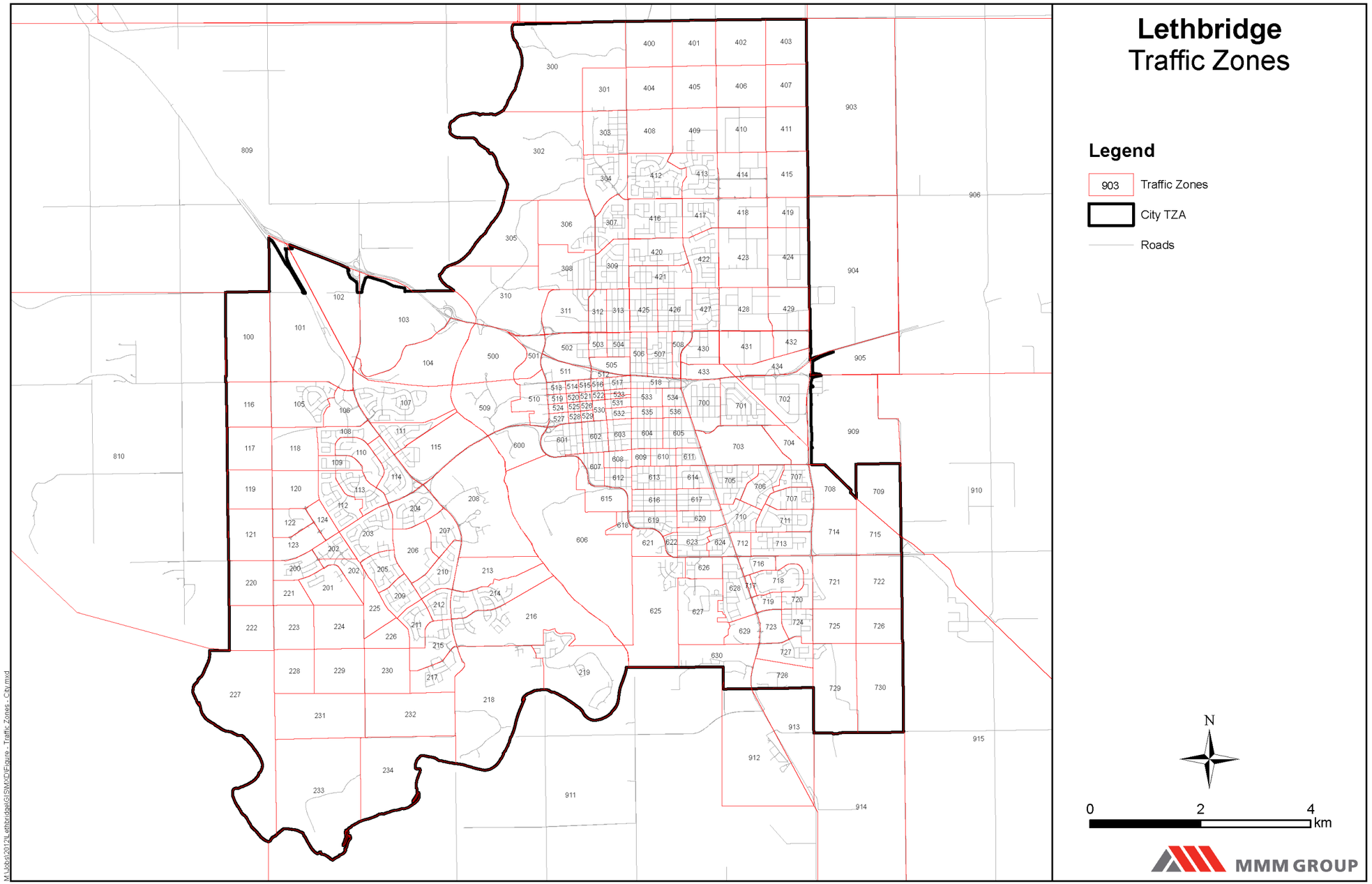
Census-based findings are identified and discussed in the Demographic and Socio-economic Trends Section. Because the County & Towns TZA doesn't conform to standard Census geographies, the Study Team used 2011 Census residential population counts by dissemination block to estimate the residential population within this area. These figures were then used to estimate the historical and projected trends for the County & Towns TZA for 1996, 2001 and 2006, under the assumption that the County & Towns TZA is likely to continue to include the entire population of both Towns of Coalhurst and Coaldale and roughly half the total population of the County.

Population & Sectoral Employment Estimates & projections

City Council directed staff to initiate an update to the City's Transportation Master Plan (TMP) on June 7, 2010, which remains underway. The Transportation Master Plan is a statutory plan that the City is required to prepare under the *Highways Development and Protection Act*. This update to the Plan is intended to refine the City's vision for its transportation system, specifically to develop "an integrated multi-modal transportation system that will build upon the existing transportation infrastructure to promote economic vitality and improvement to the quality of life in the City of Lethbridge".[xv]

TMP population and sectoral employment projections by Transportation Zone for 2020 and 2040 were used as a basis for the Land Demand Analysis's land demand projections (See Exhibit 2 and Exhibit 50). These projections were provided in the form of total residential population and sectoral full-time equivalent jobs by sector.

Exhibit 50 – City Traffic Zones



Employment sectors provided in the TMP employment projections included:

- Airport
- Bank
- Church
- Daycare
- Farm
- Grade School
- Hospital
- Indoor Recreational
- Industrial
- Office
- Other
- Outdoor Recreational
- Post-Secondary; and,
- Store.

In order to work with this data, the study team applied straight-line interpolation to determine annual figures between the base year and the 2020 and 2040 projections, and straight-line extrapolation for the 2062 and 2112 projections. Population projections were then converted to estimate the total number of dwellings and sectoral employment projections to match the Land Demand Analysis land use categories. Dwelling type mix proportions from the 2006 Census and average persons per occupied dwelling figures from the 2011 Census were held constant for the baseline projections.

For reference, TMP transportation zones are geographic planning units that are designed to meaningfully capture how many trips originate or terminate in the area served by a transportation system (i.e. the road network for the City of Lethbridge and its surrounding municipalities). These zones collectively cover an area much larger than the TZA, actually including the City, the Towns and the entire County. Given the much greater population and employment density of the City over the surrounding area, transportation zones in the City are much smaller in order to precisely capture areas generating or attracting traffic. The availability of these estimates and projections by transportation zone has allowed the Land Demand Analysis to provide analysis for any single transportation zone, or combination of transportation zones, which has by extension allowed us to provide results for the entire TZA.

It should also be noted that the estimates and projections for transportation zones in the County & Towns TZA are of a significantly smaller magnitude than those in the City TZA, owing to the less intensively urban nature of these outskirts. County & Towns TZA businesses tend to employ more people per business, with fewer overall businesses than would be found in the City TZA. As a result, projection results in the County & Towns TZA will be more sensitive to change, since the opening or closure of a single business can result in large proportional changes to employment in a single transportation zone.

Land Uses

Municipal assessment roll data and mapping was primarily relied on to gain an approximate understanding of residential, agricultural, industrial and commercial/institutional land demand / consumption. To do this, the study team identified parcels hosting a residential, commercial, institutional, or industrial use based primarily on municipal tax classifications. Residential parcels were further categorized as detached, semi-detached, apartment or townhouse, or farm house. The identification of employment parcels was further augmented using business locations data.

Although most businesses in the City of Lethbridge require approval from the City's Development Services department before they can qualify for a business licenses, the City's license database did not appear to track very many business characteristics or be fully controlled for duplicates and/or closed / relocated businesses. In order to facilitate a more detailed and reliable analysis of business characteristics in the overall TZA, the Land Demand Analysis relied heavily on tax assessment and Environics Analytics' business locations data. The Environics dataset includes a verified list of over 4,100 businesses and establishments, including business name, coordinate location on street line, North American Industry Classification.

While the Land Demand Analysis captured nearly all known businesses in the TZA, it represents a large sample, and should not be considered to be 100 percent complete or accurate. The locations, for instance, include businesses that have been registered at a residential address, which may represent home-based and mobile businesses as well as small businesses that were registered with the owner's home address rather than their actual place of business. It was also noted that relatively few locations were captured in the Agriculture, Forestry and Fishing and Mining sectors. For these reasons, business locations data was used primarily to verify and enhance tax assessment roll information, and to develop a better understanding of the geographic distribution of business by sector and clustering patterns.

It should also be noted that the business locations provided by this product for the City are more comprehensive than those provided for the Town and the County. In particular, the product included few rural records, such as agricultural, farm-based businesses, and mining businesses relative to first-person and anecdotal observations. As a result, emergency services and land use permissions data was primarily relied on for categorizing occupied parcels in the County and the Towns (Exhibit 53).

This process allowed the study team to identify all residential and employment supporting parcels in the City (Exhibit 52), which was then combined with estimated dwelling and employment counts to derive dwelling and employment densities. The densities were then multiplied by projected dwelling and employment figures to estimate land demand. For the County, sample densities and rules of thumb were applied to the land projections, as not all parcels could be reliably identified due to a lack of useable data (See Exhibit 51).

Exhibit 51 – Density Sources for County & Towns TZA

County Land Use	Baseline Source	Sample Size
Single detached (Rural)	Calculated from sample	1,212
Single detached (Urban)	Calculated from sample	3880
Semi-detached	City average – applies to Towns only	N/A
Apartment or Townhouse	City average – applies to Towns only	N/A
Agricultural	Calculated from sample	44
Commercial / Institutional	Calculated from sample	891
Industrial	Calculated from sample	238

The Land Demand Analysis applied the following assumptions to the land demand projections:

- Density calculations for single detached dwellings were split into rural and urban lots. Rural lots are occupied farm lots with a residence. All other residential lots are considered urban. Tax assessment information was used to differentiate these parcels in the City. In the County, occupied residential lots were differentiated using emergency access information before applying a lot-size filter (4,500 sq. m.) using GIS;
- While the Land Demand Analysis calculated historic average detached and semi-detached lot sizes at 599 m^2 and 368 m^2, respectively, modified sizes were applied to the baseline residential land projection for the City to reflect input from City staff regarding typical contemporary lot size. The modified sizes apply figures of 418 m^2 per detached units and 232 m^2 per semi-detached unit after 2011 (See Exhibit 8 and Exhibit 9);
- Occupied farm-based residential lots in the entire TZA were identified as both residential and employment parcels;
- Large land uses (over 50 Ha. in size) were included in the total amount of City land up to 2012, but excluded from the growth projections between 2013 and 2112, to account for the fact that the City is unlikely to require uses of this magnitude (e.g. universities and golf courses) over the foreseeable future;
- Mobile home parks were included under the residential analysis for the City TZA. These uses were not identified in the County & Towns TZA as individual mobile home lots could not be identified with confidence to match with residential demand;
- Institutional land uses in the City TZA included schools, places of worship and emergency services (including hospital);

- Average agricultural density in the County & Towns TZA significantly under estimates land area as only occupied farm properties could be identified from the data available. Based on employment trends, however, it is expected that total agricultural land demand in the County will remain constant as the effects of increasing production efficiency are expected to be almost evenly balanced by increased sectoral output. Essentially, the projections indicate that no additional agricultural land will be needed in the County; and,
- The commercial / institutional category is highly aggregated in the County & Towns TZA to account for limited land use data. It includes large parcels such as the airport, outdoor recreational parcels and various institutional lands as well as parks, and utility lands. As a result, overall density for this category is under estimated. Where possible, the Land Demand Analysis team has identified the effect of large distinguishable parcels such as the airport on the land demand projections. We have also undertaken a high-level manual assignment of commercial uses using compiled sources to provide an estimate of commercial land consumption in the County & Towns TZA for comparison purposes. This estimate should not be considered as reliable as the other categories, however.

Exhibit 52- City Parcel Analysis (2011)

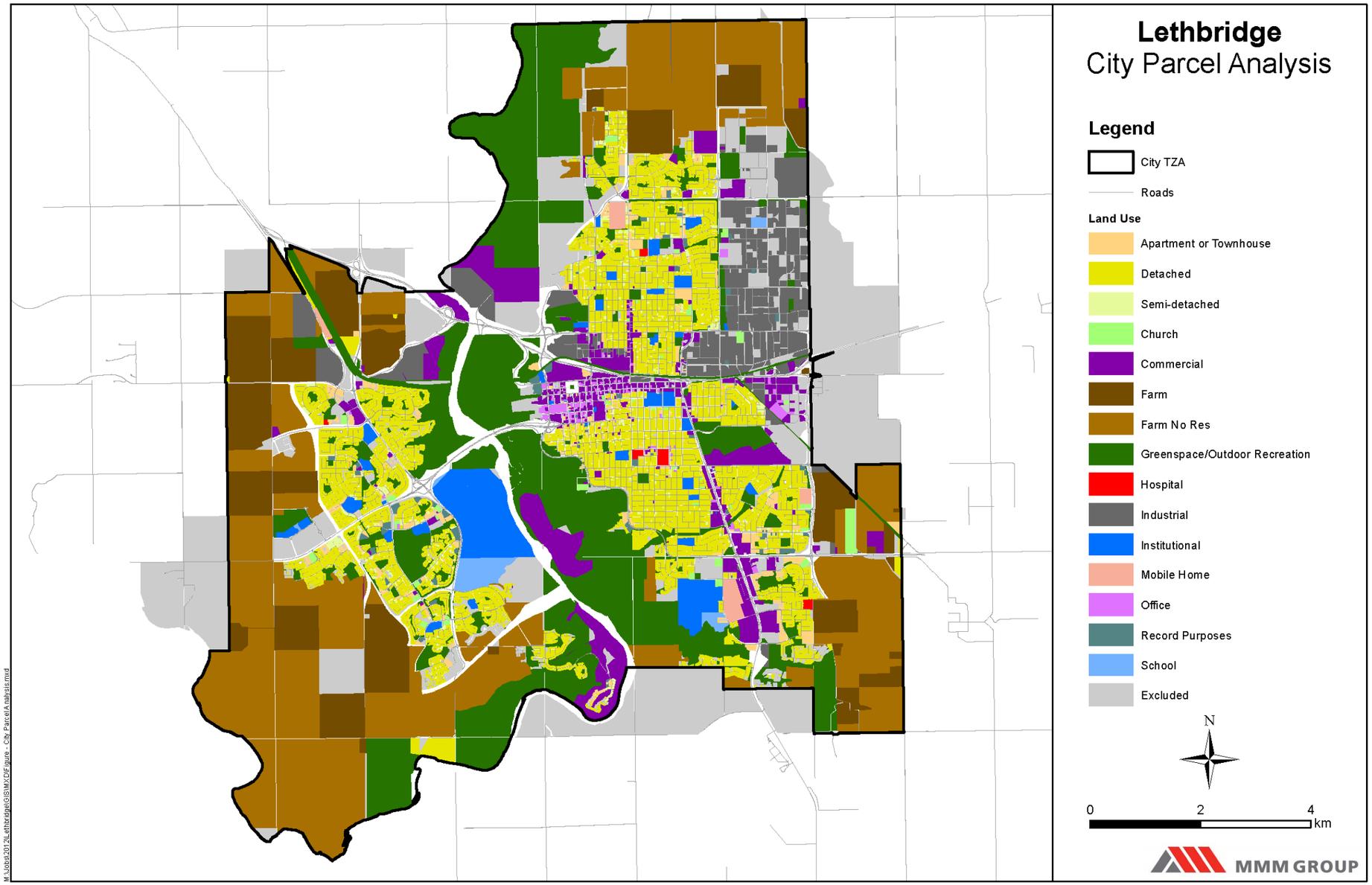
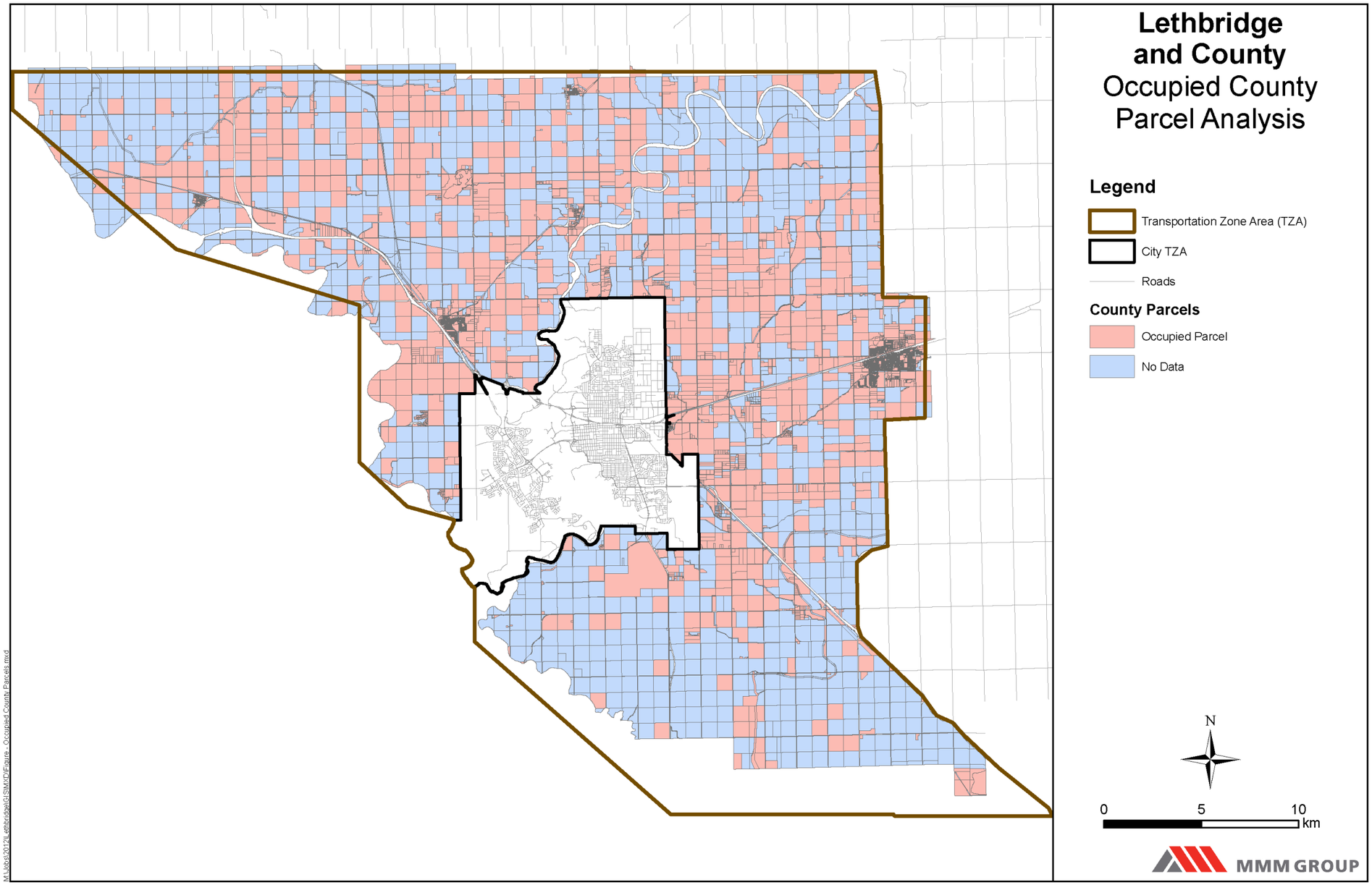


Exhibit 53 – Occupied and Categorized County & Towns TZA Parcels



Business Locations

Exhibit 54 identifies the sector categories used for this analysis, which are based on aggregations from the Standard Industrial Classification Establishments (SIC-E) 1980 system. The chart also provides comparable North American Industry Classification 1997 categories for generalized comparison purposes only[xvi].

Exhibit 54 – Employment Sectors in the TZA

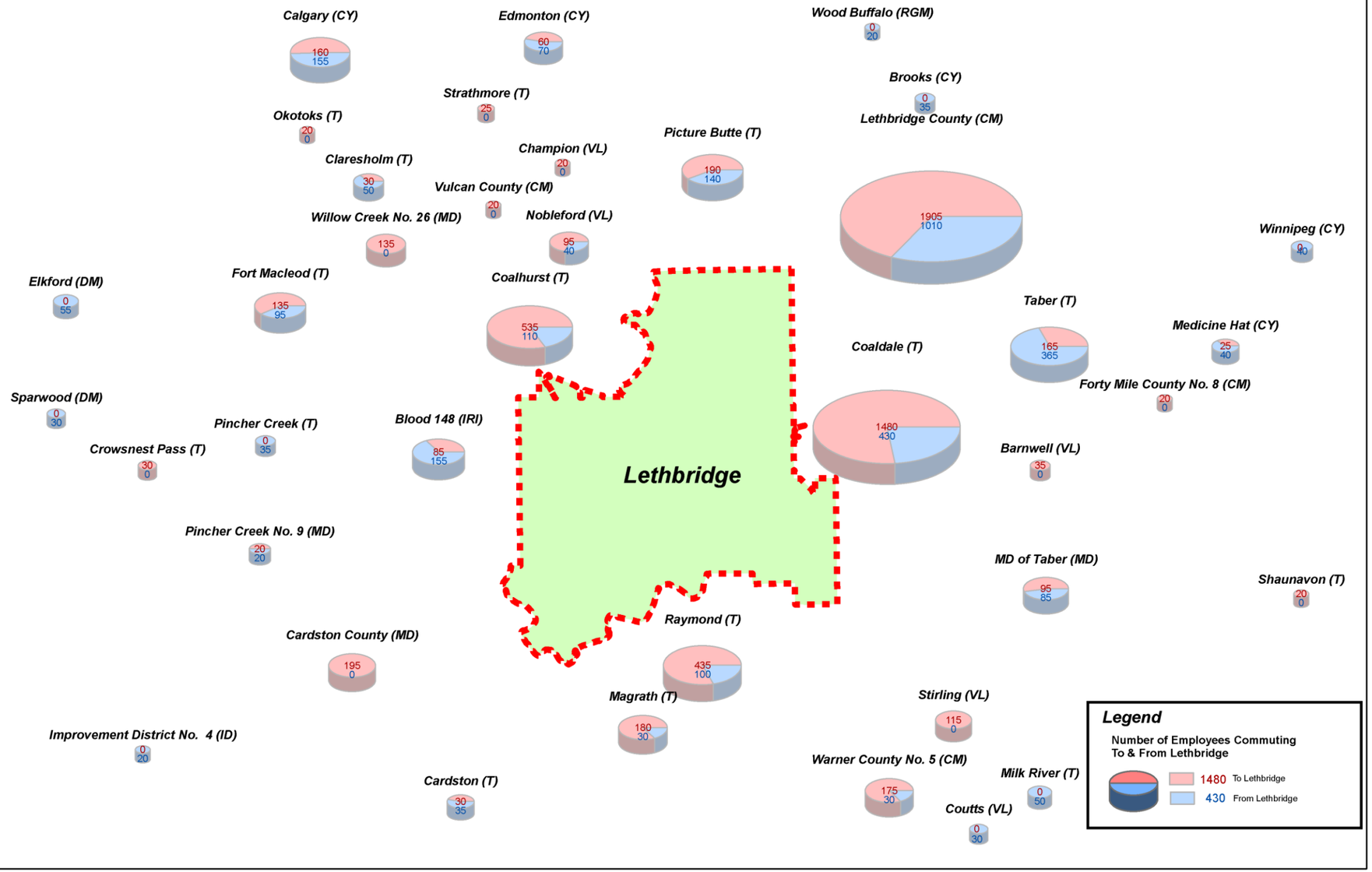
	Sector	NAICS Comparable	Notes
1	Agriculture, forestry & fishing	11	
2	Mining	21	
3	Construction	23	
4	Manufacturing	31-33	
5	Transportation, communications & public utilities	22 & 48-49	
6	Wholesale trade	41 & 42	
7	Retail trade	44-45 & 72	
8	Finance, insurance & real-estate	52 & 53	
9	Services	51, 54, 56, 61, 62, 71 & 81	Includes education & other institutional employment uses
10	Public administration	91-92	
11	Unclassified or Other	55 & 99	

Scenarios

Due to data limitations, the Land Demand Analysis team was unable to match individual businesses and residences to the specific land parcels that they occupy. This difficulty was particularly challenging with respect to the lands outside of the City. As a result, a significant level of data aggregation was applied in order to couple residential dwelling types and employment sectors to the land that they are currently consuming. The Land Demand Analysis team has therefore relied on an analysis of business clustering and scenario modelling to improve the precision and usefulness of the baseline Land Demand Analysis forecasts. Scenarios were devised with input from the City, the County and Economic Development Lethbridge to account for the fact that baseline projections are largely based on historic trends, including those which might not reasonably be expected to continue into the future.

APPENDIX D – 2006 CITY OF LETHBRIDGE COMMUTING FLOWS

Employees Commuting To & From Lethbridge By Municipality (2006)



ENDNOTES

[i] Statistics Canada. *Hours worked and labour productivity in the provinces and territories*. The Daily, Wednesday, January 27, 2010.

[ii] Data on the average lot sizes associated with semi-detached and apartment or townhouse units was not available for the TZA. It is assumed that the lot sizes of these dwelling types will be consistent with those of Lethbridge.

[iii] City of Calgary. *The Calgary Snapshots 2012*, June 2012.

[iv] Watson & Associates. *City of Edmonton Industrial Land Supply & Demand Analysis Study*. October 2011.

[v] Regional Municipality of Wood Buffalo. Commercial and Industrial Land Use Study (CILUS), January 2010.

[vi] Excludes all employment land uses over 50 hectares.

[vii] Statistics Canada. *Canadian Economic Observer*, January 2011; Section 1.

[viii] Statistics Canada. *The Canadian Labour Market at a Glance*, November 25, 2008; Section E – Changes in employment, by industry.

[ix] Statistics Canada. *Table 301-0006 - Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual (dollars unless otherwise noted),* CANSIM (database).

[x] Statistics Canada. *Table 301-0003 - Annual survey of manufactures (ASM), principal statistics by North American Industry Classification System (NAICS), incorporated businesses with employees having sales of manufactured goods greater than or equal to $30,000, annual (dollars unless otherwise noted),* CANSIM (database).

[xi] Canadian Chamber of Commerce. *2012-2013 Economic Outlook – Economy battles strong headwinds: modest growth ahead*. Economic Policy Series – December 2011.

[xii] International Monetary Fund. *World Economic Outlook, April 2012*.

[xiii] Statistics Canada. *Table 1 – Gross domestic product by industry, millions of chained (2002) dollars*. The Daily, Friday April 27, 2012.

[xiv] Alberta Treasury Board and Enterprise. *Highlights of the Alberta Economy 2012*. Retrieved from http://www.albertacanada.com/documents/SP-EH_highlightsABEconomyPresentation.pdf

[xv] City of Lethbridge. *Transportation Master Plan Update*. Retrieved from http://www.lethbridge.ca/living-here/getting-around/Streets-and-Roads/Documents/Transportation%20Master%20Plan%20Update.pdf.

[xvi] Although categories between SIC and NAICS are not fully concordant, the level of aggregation applied mitigates the magnitude of these discrepancies to a level that is sufficient for the purposes of this study.

Furthermore, SIC categories were chosen as the NAICS standard was introduced in 1997, after the 1996 Census.