ENVIRONMENT & HISTORIC RESOURCES STRATEGY

An Exploration of Environmental and Historic
Resources in the City of Lethbridge

CITY OF
Lethbridge

Acknowledgement Statement

The City of Lethbridge acknowledges that the place we now call Lethbridge has for many generations had another name given to it by the Siksikaitsitapi, the Blackfoot peoples. The name is Sikóóhkotok, a reference to the black rocks found in the area.

The City of Lethbridge is located in the traditional territory of the Blackfoot Peoples, and within Treaty 7 lands. The City of Lethbridge is also home to the Metis Nation of Alberta, Region III. We pay respect to all Indigenous peoples past, present and future, by recognizing and respecting their cultural heritage, beliefs, inherent rights and relationship to the land.

Acknowledgement

The City of Lethbridge would like to thank the members of the Environment and Historic Resources Strategy Technical Working Group and Community Liaison Group for their time and assistance in preparing this report.

Executive Summary

In 2014, the Province of Alberta adopted the South Saskatchewan Regional Plan (SSRP). The SSRP sets the stage for strong and sustained growth, vibrant communities and a healthy environment within the region over the next 50 years. With that long-term horizon in mind, the SSRP identifies strategic directions for the region over the next 10 years, focusing on eight broad outcome areas, including: economy, air, biodiversity, water, efficient land use, outdoor recreation and historic resources, aboriginal peoples, and community development. The City of Lethbridge and the other municipalities within the region are required by the Province of Alberta to be in compliance with the SSRP by August 31, 2019.

In order to demonstrate compliance with the SSRP, the City of Lethbridge is undertaking a series of comprehensive data gathering projects under the umbrella of the **SSRP Compliance Initiative.** The Initiative is composed of four separate comprehensive data gathering strategies that seek to understand our legislative requirements, assess our baseline, and recommend implementation strategies towards achieving one or more of the SSRP outcomes. The four strategies within the SSRP Compliance Initiative include:

i)   Efficient Land Use Strategy (ELUS)
ii)   Environment and Historic Resources Strategy (EnvS)
iii)   Economy and Tourism Inventory (ETI)
iv)   Relationships Inventory (RelI)

The SSRP Compliance Initiative itself does not demonstrate SSRP compliance. Upon completion however, the Initiative will provide a thorough background report and baseline understanding of our community, and will be used to review and update the Integrated Community Sustainability Plan/Municipal Development Plan (ICSP/MDP) which was last updated in 2010.

The Environment and Historic Resources Strategy is at its core, a baseline data collection project that looks at the state of the environment and heritage in our City. The purpose of the baseline is to help us better understand the inventory of resources that exist in the City, their current condition, and the threats and pressures they face.

The Environment and Historic Resources Strategy (EnvS) report begins with a discussion of the context of this project, the Alberta Land-use Framework and the SSRP, as well as the high-level trends and pressures that inform the context of the study—such as climate change and Reconciliation. Chapter 2 focuses on

defining some key terminology and discussing the relationship between development and the environment and historic resources. Chapter 3 then reviews the municipal policy and management framework to indicate the current ways in which the environment and heritage are managed by the City.

Chapter 4 presents a broad overview of the baseline data collected for this study, organized around a set of environmental (air, water, biodiversity and ecosystems, waste, energy and social) and historic resource indicators (management, financial resources, social). As this is the first comprehensive baseline data collection exercise that the City has prepared, there are inherently some data gaps and over time and through subsequent work these gaps will be addressed.

Chapter 5 presents an overview of the commissioned studies and related reports that are aligned with this report: the Ecological Inventory and Environmental Land Use Best Practices Policy Report; Ambient Air Quality Analysis, State of the Environment Report (Environment Lethbridge); the Traditional Knowledge and Use Assessment; Heritage Survey; and, the City of Lethbridge and Lethbridge Indigenous Sharing Network Reconciliation Implementation Plan. Chapter 5 also reviews the considerations presented by each of these studies and reports to the City. The presentation of these considerations does not mean they have been approved by the City of Lethbridge or that they will necessarily be implemented, however the spirit and intent of the considerations were incorporated into the final EnvS recommendations presented in Chapter 7, for consideration during review of the ICSP/MDP.

Chapter 6 reviews the community engagement work that took place throughout the entirety of this project, including the collection of several thousands of individual pieces of input from the community at-large and specific stakeholder groups.

Finally, Chapter 7, as mentioned above, presents a list of 54 recommendations. These recommendations have not been approved by Lethbridge City Council. Their purpose is to be used as an input into the review and update of the ICSP/MDP between 2018 and 2019, among other projects and initiatives. These recommendations were generated through the collection of baseline data, the commissioned studies and related reports, and interpreted with the help of the input from community members and stakeholders. Ultimately the recommendations were reviewed by City Staff and the project team for consistency with the data presented in this and related reports, and the SSRP. The inclusion of a recommendation in this report does not suggest or guarantee its ultimate or future incorporation into the ISCP/MDP (or other projects or initiatives) nor that it has been endorsed by City Council.

The following table presents the final recommendations of the EnvS. Greater detail on the recommendations, including a discussion on the rationale and implementation mechanisms, is found in Chapter 7 of this report.

Environment Considerations

General	*Continue to reduce the Community's environmental footprint by: establishing key footprint measures and baseline years; setting targets; and, committing to regular reporting.*
	Continue to reduce our Corporate environmental footprint through the implementation of the Corporate Environmental Sustainability Initiative (CESI) Action Plan(s).
	Continue to build relationships at a regional level to support environmental outcomes locally.
	Include a discussion in the MDP about the place of humans within ecosystems, rather than distinct from them.
	Include a discussion in the MDP about the importance and role of Indigenous Traditional Ecological Knowledge.
	Include the "Ecosystem Services Wheel Diagram" in the MDP as a tool for presenting the multiple goods and services provided by the environment to our community.
	Support data accessibility by publishing baseline environmental data, where possible.
	Publish a regular "State of our City" report (or similar) to review our social, economic and environmental position.
	Create a climate adaptation plan (or similar) for the community.
Air	*The City should take an active role in regional conversations about ambient air quality outcomes.*
	Support the strategies to reduce our corporate air quality and greenhouse gas footprint found in the Corporate Environmental Sustainability Initiative Action Plan(s).
Water	*Include a discussion in the MDP about water security as an emerging issue in our community and region.*
	Support the enhancement of our stormwater management facilities through the use of appropriate Low Impact Development techniques and improved resident education and awareness in our parks.
	Establish policies and guidelines around stormwater management in older neighbourhoods.
	Support the strategies to reduce our corporate water footprint found in the Corporate Environmental Sustainability Initiative Action Plan(s).
Biodiversity & Ecosystems	*Explore the implications of the Alberta Wetland Policy and possible opportunities for the City of Lethbridge to take a more active role in protecting wetlands locally.*
	Create a Natural Spaces Policy to address development in the vicinity of key environmental features.
	Include the Hierarchy of Disturbance Framework in the MDP as a tool for evaluating land use applications, community plans and infrastructure projects in relation to natural spaces.
	Limit the expansion of the City's urban footprint within the Oldman River Valley by minimizing future development on public lands.
	Establish a baseline year for tree canopy coverage and set a benchmark for year-over-year coverage expansion.
	Explore resourcing to fund further restoration and enhancement of natural spaces in the City, particularly within and adjacent to the Oldman River Valley.
	Put in place guidelines for landscaping for public facilities as well as commercial, industrial, and high-density residential developments.
	Update the City's design standards to enhance landscaping on public lands, including road rights of way and community entrances.
	Ensure landscaping guidelines adequately address FireSmart principles for areas with heightened risk of wildfire.
	Ensure that there is adequate resourcing to support the environmental recommendations proposed in this report.
	Explore the use of Best Environmental Practices on City-initiated construction and infrastructure projects.
	Support the strategies to reduce our corporate environmental footprint and maximize our contribution to biodiversity and ecosystems found in the Corporate Environmental Sustainability Initiative Action Plan(s).
Waste	*Continue to support City Council's Environment Policy by emphasizing the importance of resources maximization and conservation in the area of waste.*
	Continue to reduce the community's waste footprint through the implementation of the Waste Reduction Policy.
	Support the strategies to reduce our corporate waste footprint found in the Corporate Environmental Sustainability Initiative Action Plan(s).
Energy	*Continue to identify opportunities to optimize and increase the efficiency of the electrical distribution system to reduce the community's greenhouse gas footprint.*
	Continue to identify ways to minimize the expansion of the electrical distribution system's footprint.
	Provide programming and education to residents and businesses to assist them in being smart energy consumers.

	Continue to support the current ICSP/MDP policies which prioritize active transportation through a transportation modality hierarchy.
	Support the vision and goals of the Cycling Master Plan.
Social	*Commit to continue the expansion of park and open spaces in the City, including the natural connections between them.*
	Future parks and open spaces should be aligned with Natural Spaces, as identified in the Natural Spaces Policy.
	Continue to identify opportunities through land use and parks planning to consider community gardens and food security in new and existing neighbourhoods.
	Continue to support resourcing for environmental education and awareness provided by City Departments.

Historic Resources Considerations

General	*Include a discussion in the MDP about reconciliation as a way of framing policies that address the protection of Indigenous heritage sites.*
	Include the "Heritage Services Wheel Diagram" in the MDP as a tool for presenting the multiple goods and services provided by heritage to the community.
Management	*Update the Heritage Management Plan and the Historic Places Advisory Committee to: reflect the Reconciliation Implementation Plan recommendations; include a landscape/district level approach to heritage identification and protection; identify a protocol for engaging with the Blackfoot Nations for Indigenous heritage sites found in the City; and, describe the need to identify more diverse heritage stories.*
	Explore the use of infill design guidelines (at various scales) to protect the heritage quality of identified areas through ARPs.
	Work with partners to explore the protection of historic resources within and beyond the City.
	Update administrative processes to clearly articulate the requirements to undertake Traditional Knowledge and Land Use Studies (or similar) during statutory and non-statutory planning.
	Explore the municipal designation of cultural landscapes within the Oldman River Valley.
	Update administrative processes to protect Indigenous heritage sites.
	In consultation with relevant stakeholders, consider updates to the Parks Bylaw to address the exercise of Aboriginal and Treaty Rights within the City's park system.
	Partner with the Blackfoot Nations around Indigenous heritage in the City.
	In consultation with relevant stakeholders, create Site Management Plans to inform Parks Operations for identified Traditional Land Use Sites.
Financial Resources	*Explore incentive programs to increase municipal designations in the City and the investment by private property owners into already designated sites.*
	Explore ways to increase investment by the City of Lethbridge into strategic heritage sites and areas.
	Ensure that there is adequate resourcing for heritage identification, management, preservation and interpretation through City Departments and Committees of Council.
Social	*Continue to support resourcing for heritage education and awareness provided by City Departments and Committees of Council.*
	Continue to support the use of heritage as a tool for place-making through its incorporation into land use and parks planning.

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Chapter 1: Background and Introduction

INTRODUCTION

In 2014, the Province of Alberta adopted the South Saskatchewan Regional Plan (SSRP), the second Regional Plan in the Province (the Lower Athabasca Regional Plan was adopted in 2012). The SSRP sets the stage for strong and sustained growth, vibrant communities and a healthy environment within the region over the next 50 years. With that long-term horizon in mind, the SSRP identifies strategic directions for the region over the next 10 years and focuses on eight broad outcome areas and introduces a series of strategies to achieve them. The eight outcome areas include: economy, air, biodiversity, water, efficient land use, outdoor recreation and historic resources, aboriginal peoples, and community development. The City of Lethbridge and the other municipalities within the region are required by the Province of Alberta (Land Use Secretariat) to be in compliance with the SSRP by August, 2019.

In order to demonstrate compliance with the SSRP, the City of Lethbridge is undertaking a comprehensive data gathering project called the **SSRP Compliance Initiative.** The Initiative is composed of four separate comprehensive data gathering strategies that seek to understand our legislative requirements, assess our baseline, and recommend implementation strategies towards achieving one or more of the SSRP outcomes. The four strategies within the SSRP Compliance Initiative include:

> *The Environment and Historic Resources Strategy or EnvS is focused on compiling a baseline understanding of the environmental and historic resources in Lethbridge. This information will be used to update our Integrated Community Sustainability Plan / Municipal Development Plan before August, 2019, in line the City's obligations under the Alberta Land Stewardship Act.*
>
> *The intent of EnvS is to ensure that growth and development continue to occur in a manner that reflects our reliance on biodiversity and ecosystem function to sustain human health and community resiliency, our environmental and historic connection to our neighbours, residents' values, and the vital role that both the environment and history play in the evolving narrative of this place we call Lethbridge.*

i)   Efficient Land Use Strategy (ELUS)
ii)   Environment and Historic Resources Strategy (EnvS)
iii) Economy and Tourism Inventory (ETI)
iv)   Relationships Inventory (RelI)

The SSRP Compliance Initiative itself does not demonstrate SSRP compliance, however upon completion, the Initiative will provide a thorough background report and baseline understanding of our community, and will be used to review and update the Integrated Community Sustainability Plan/Municipal Development Plan (ICSP/MDP) which was last updated in 2010.

Box 1: Environment and Historic Resources Strategy Intent

The ICSP/MDP is a statutory plan, prepared and adopted by bylaw, in accordance with the *Municipal Government Act*, and provides a framework through which future development-related decisions within

the municipality are made. By completing an update of the ICSP/MDP based on the requirements of the SSRP, it will ensure that all decisions within the municipality going forward are informed by a statutory plan that is itself compliant with the SSRP.

1.1   LEGISLATIVE FRAMEWORK

This section of the Report provides an outline of the existing planning legislation and policy framework that directly impacts the preparation of the EnvS. The legislation is multi-layered, and includes provincial land use plans as well as municipal statutory and non-statutory plans, bylaws and guidelines.

Community planning in Lethbridge is conducted and administered within a series of plans and bylaws. These include the SSRP, ICSP/MDP, Secondary Plans (Area Structure Plans and Area Redevelopment Plans), Outline Plans, and the Land Use Bylaw.

The imperative for the SSRP Compliance Initiative and the EnvS comes from the SSRP, and specifically the City of Lethbridge's legal requirement to be in compliance with the SSRP by August 31, 2019. Within the hierarchy of plans and the direction of the *Municipal Government Act* (MGA), the ICSP/MDP must conform to the SSRP while all other Plans and Bylaws must conform to the ICSP/MDP.

Land Use Framework	Provincial Vision
Alberta Land Stewardship Act	Provincial Tool
South Saskatchewan Regional Plan	Regional Vision
Municipal Government Act	Provincial Tool
Intermunicipal Collaboration Framework / Intermunicipal Development Plan	Sub-regional Vision
Municipal Development Plan	City Vision
Area Structure Plan & Area Redevelopment Plan	City Vision
Land Use Bylaw, Outline Plan, Master Plan, Guideline	City Tool

Figure 1: Planning Legislation Hierarchy

Therefore, the purpose of the SSRP Compliance Initiative and the EnvS is to inform an update of the ICSP/MDP, which will ultimately ensure all other plans and bylaws are in conformity with the SSRP. The following sections describe the legislative hierarchy from a top-down perspective. This list is not exhaustive, however provides a general landscape within which to situate the EnvS.

1.1.1   Alberta Land-use Framework and Alberta Land Stewardship Act

The Land-use Framework (LUF, 2008) is a policy and visioning document that sets out a management framework for land use in Alberta. The LUF's operating premise is that there exist significant and often multiple and competing interest for our finite land base, including "oil and gas, forestry and mining, agriculture and recreation, housing and infrastructure." Competing demands on the limited supply and

quality of land, air and water in the province pose a significant environmental, social and economic challenge that must be addressed through effective planning and management.

LUF Vision Statement: Albertans work together to respect and care for the land as the foundation of our economic, environmental and social well-being.

The LUF envisions the creation of regional planning areas throughout the province, generally based on watershed boundaries, to enable the achievement of the stated outcomes in such a way that respects local landscapes, values and realities. The LUF also describes the creation of a dedicated Land Use Secretariat to oversee the creation of seven Regional Plans and to manage their ongoing implementation.

The *Alberta Land Stewardship Act* (ALSA, 2009) is the implementing legislation for the LUF. ALSA creates the legislative authority for the province to undertake the creation of Regional Plans through the Land Use Secretariat. The LUF also replaces the previous provincial Land Use Principles within a region, once a regional plan for that area is completed.

All municipal bylaws, and many pieces of provincial legislation are now required to be in compliance with the ALSA and Regional Plans, including the MMGA and Municipal Development Plans.

1.1.2 South Saskatchewan Regional Plan

Figure 2: Regional Planning Areas
Source: Land Use Secretariat

The South Saskatchewan Regional Plan (SSRP, 2014) is the second Regional Plan to be adopted by the province, and came into effect on September 1, 2014. Municipalities in the region have five years within which to submit a Statutory Declaration indicating compliance with the SSRP. At the end of those five years, by August 2019, all municipal plans, bylaws, policies and regulations must be in compliance with SSRP.

Within our watershed, the SSRP is the vehicle for implementing the vision and outcomes of the LUF. The South Saskatchewan Region contains 15 municipal districts, one specialized municipality, five cities, 29 towns, 23 villages, two summer villages, and seven First Nations—covering an area of over 84,000 square kilometers. At the time the document was written, there were nearly two million people living in the Region.

Figure 3: South Saskatchewan Regional Plan Area (source: Alberta Land Use Secretariat)

The SSRP document is divided into three main parts: Strategic Plan, Implementation Plan, and Regulatory Details. The Strategic Plan discusses the regional baseline, and outlines a high-level vision for the area (in line with the LUF vision statement). The Implementation Plan introduces eight broad thematic outcomes and a series of strategies to achieve them. The Implementation Plan also identifies indicators and /or timelines for each of outcomes. Finally, the Regulatory Details contain the binding legislation within the SSRP, including key triggers for certain environmental outcomes. While the Regulatory Details part of the SSRP is the only one of the three parts to be explicitly "binding" on municipalities, Section 4(1) of the Regulatory Details states that local government bodies and decision-makers shall consider the Strategic Plan and Implementation Plan when exercising their duties. In that way, municipalities and their designated authorities (such as City Councils, subdivision and development authorities, planning commissions, and subdivision and development appeal boards) are obliged to consider the Strategic and Implementation Plans when exercising their duties.

The eight outcome areas within the Implementation Plan, along with their stated outcomes include:

ECONOMY	The region's economy is growing and diversified.
AIR	Air quality is managed to support healthy ecosystems and human needs through shared stewardship.
BIODIVERSITY AND ECOSYSTEMS	Biodiversity and ecosystem function are sustained with shared stewardship.
WATER	Watersheds are managed to support healthy ecosystems and human needs through shared stewardship.
EFFICIENT USE OF LAND	Lands are efficiently used to minimize the amount of area taken up by the built environment.
OUTDOOR RECREATION AND HISTORIC RESOURCES	The quality of life of residents is enhanced through increased opportunities for outdoor recreation and the preservation and promotion of the region's unique cultural and natural heritage.
ABORIGINAL PEOPLES	Aboriginal peoples are included in land-use planning.
COMMUNITY DEVELOPMENT	Community development needs are anticipated and accommodated.

The vision of the SSRP is as follows:

"Southern Alberta is a diverse, healthy, vibrant and prosperous region where the natural beauty of the region is managed so that citizens feel connected to the land and its history. Albertans, industry, governments and aboriginal peoples work together to share responsibility for stewardship of the land and resources in a way that ensures current needs are met without compromising opportunities for future generations. Aboriginal peoples, through their traditional knowledge, share their intimate understanding of the region's natural environment and ecosystems.

The South Saskatchewan Region supports a diverse and growing population. Economic diversification supports employment and contributes to a prosperous

future. Agriculture is a significant renewable resource industry demonstrating
environmental stewardship while pursuing growth and diversification opportunities.
There are continued opportunities for oil and natural gas production and renewable
energy production and renewable energy will become increasingly significant. Forests
are managed with watershed management and headwaters protection as the highest
priority and healthy forests continue to contribute to the province's timber supply.
The region has unique landscapes that form the basis of a popular tourism and
recreation destination which continues to grow.

Air, water, land and biodiversity are sustained with healthy functioning ecosystems.
The headwaters in the region supply vital regional fresh water quality. Conservation
strategies help many species at risk in the South Saskatchewan Region recover, while
also preserving the diversity and splendor of Alberta's natural regions with various
parks and conservation areas providing Albertans with improved health and
inspiration to value nature."

The EnvS is the second in a series of four strategies that will comprise the SSRP Compliance Initiative.
Each of the Strategy projects will align with one or more of the SSRP outcomes. The EnvS project is
designed to address objectives (secondary to the eight outcome areas) found within seven of the eight
outcome areas.

1.1.3 Integrated Community Sustainability Plan / Municipal Development Plan

The Integrated Community Sustainability Plan/Municipal Development Plan (ICSP/MDP, 2010) is a
statutory plan which outlines the City of Lethbridge's long-term objectives and policies that will guide
future growth and development within Lethbridge.

The plan does not include detailed analysis, actions, or targets, however is founded in strong community
engagement and visioning. The plan was written with broad content to provide policy direction. The plan
identifies 19 outcomes for land use planning in Lethbridge, which reflect the vision, and the requirements
of the MGA. Each outcome contains a statement of intent, policies, and example actions to guide towards
the achievement of the vision.

The plan provides a framework for the creation of a safe, healthy, vibrant, prosperous, economically
viable place where all people can fully participate in community life. Within this context the City is
committed to creating a sustainable community through the promotion of six objectives. The objectives

and the related outcomes are listed below. Those objectives with the closest alignment to the EnvS are highlighted.

1. A Prosperous City
     i) Good Place to Open and Operate a Business
     ii) Financially Viable City
2. A Healthy and Diverse City
     i) Range of Housing that Meets Everyone's Needs
     ii) Welcoming and Diverse City
     iii) Opportunities for Personal Development and Social Well-being
     iv) Safe City
3. A Culturally Vibrant City
     i) Respects and Celebrates its History
     ii) Celebrates Arts and Culture
     iii) Supports Active Living
4. A Well Designed City
     i) Compact City
     ii) Efficient and Effective Integrated Transportation Network
     iii) Walkable, Bicycle Friendly City
     iv) Expanding in a Responsible Manner
     v) Planned City that Exhibits Quality Urban Design
     vi) Diverse Parks and Open Space System
     vii) Strong and Vibrant Downtown
5. An Environmentally Responsible City
     i) River Valley is the Primary Open Space System
     ii) Conserves Natural Resources
6. A City that Supports the Region
     i) Strong Relationship with Neighboring Communities

The ICSP/MDP includes many important objectives and outcomes that touch on the different aspects of what makes a community. Many of these outcomes are inter-related and dependent on one or more others to come to fruition. However, for the purposes of the EnvS the focus will be on aspects of: Objective 3 – A Culturally Vibrant City (*Lethbridge respects and celebrates its history*), Objective 4 – A Well Designed City (*Lethbridge is Expanding in a Responsible Manner; Lethbridge has a Strong and Vibrant Downtown*), and Objective 5 – An Environmentally Responsible City (*Lethbridge's River Valley is the Primary Open Space System; Lethbridge Conserves Natural Resources*). The remaining outcomes will be focused on to varying degrees by the remaining Strategies that make up the SSRP Compliance Initiative

(Efficient Land Use Strategy, Economy and Tourism Inventory and Relationship Strategy) as well as other City of Lethbridge initiatives and plans that will come together to inform the next update of the ICSP/MDP.

1.2 ENVIRONMENT AND HISTORIC RESOURCES STRATEGY OVERVIEW

The EnvS provides a baseline for environmental and historic resources within the City of Lethbridge. The EnvS draws its focus from within the eight Outcome areas of the SSRP and certain policies of the ICSP/MDP—discussed previously.

The EnvS has two high-level focus areas. The first area is the relationship between development and our environment, which for data collection purposes was divided into: air, land and water. This three-part separation also parallels the Blackfoot ecological worldview that is comprised of Sky Beings (*Sspommitapiiksi*), Land Beings (*Ksaahkomiitapiiski*) and Water Beings (*Soyiitapiiksi*). The second area is the relationship between development and historic resources. This focus area is similarly divided into two areas: First Nation Traditional Knowledge and Use Sites (also referred to as First Nation Historic Resources) and historic resources from the post-settlement period, such as buildings and landmarks (also referred to as Post-settlement Historic Resources). It is important to note that the ideological separation of environmental and historic resources into distinct pieces is simply a tool that was used to collect and analyze information. In reality, the environment and heritage don't always fall neatly into either-or categories.

The exploration of environmental and historic resources incorporates other "lenses" or concepts to situate our understanding of the resources within larger, often global trends and challenges (discussed in greater detail in later sections). For environmental resources, the discussion will be enhanced by incorporating the following supplementary topics: climate change, adaptation and resiliency, ecosystem services and biodiversity, and cumulative effects. The review of historic resources will be enhanced by the concept of reconciliation.

The EnvS is the first comprehensive baseline environmental or historical project that has been undertaken by the City of Lethbridge. While other projects have focused on understanding individual aspects of our local environment (e.g., stormwater quality, riparian health, river valley health), or particular types of historic resources (e.g., such as the Heritage Survey and Inventory process outlined in the Heritage Management Plan), or even particular locations where historic resources may be found (typically based on requirements set out in the *Historical Resources Act*), these multiple, complex layers of analysis have never been brought together in a way that can strategically influence positive environmental and historic resource identification and protection outcomes at a City-wide level.

This work is instigated not only because of new obligations under the *Alberta Land Stewardship Act*, which directs municipalities to comply with regional planning, but it is also in response to the rapidly changing nature of our climate and heritage landscapes, as well as emerging national discourses. Global, national and local environmental, social and economic forces are shifting, requiring a coordinated response on the part of the City of Lethbridge and its community and regional partners to take deliberate, forward thinking and strategic action to protect our resources for the benefit of future generations.

One of the main outcomes of the EnvS is to provide the necessary background information, baseline data, and strategic direction to ensure that the ICSP/MDP update includes tangible and measurable goals and targets. Targets will support the full, effective and coordinated implementation of the community's environmental and historic resources vision, on-going transparency, as well as timely monitoring and evaluation to support continued action going forward.

The intent of the EnvS is to ensure that growth and development occur in a manner that reflects our reliance on biodiversity and ecosystem function to sustain human health and community resiliency, our environmental and historic connection to our neighbours, residents' values, and the vital role that both the environment and history play in the evolving narrative of this place we call Lethbridge.

The EnvS report is structured as followed:

The remainder of Chapter 1 focuses on high-level trends and challenges that influence environmental and historic resources in the City. This context, plus the legislative changes discussed above, provide the overall justification for why it is important to think about these resources comprehensively. Chapter 2 defines our main terminology—environmental resources and historic resources—and discusses their relationship to land use and development.

Chapter 3 provides a brief overview of the current management framework for environmental and historic resources at the municipal level—describing the main plans and frameworks used to manage them directly and indirectly. Chapter 4 is the Current State Analysis—this is a broad overview of what is currently known about environmental and historic resources in the City. This chapter organizes and presents data in six key environmental areas (Air, Water, Biodiversity and Ecosystems, Waste, Energy and Social) and three key heritage areas (Management, Financial Resources and Social). Chapter 4 helps us better understand where we currently sit in relation to these key outcomes. The data used to generate the Current State Analysis includes City and other government data, and data from commissioned studies.

Chapter 5 summarizes the scope and findings of the commissioned studies used to generate the Current State Analysis, as well as two related reports that provide additional context. The considerations that form part of the commissioned studies and related reports are replicated in this report verbatim as a way of being transparent, however none of the considerations is necessarily endorsed by the City of Lethbridge—they were instead used to generate conversation and lead to the development of the final EnvS recommendations.

Chapter 6 reviews the findings of community and stakeholder engagement that took place throughout the project. This chapter summarizes dozens of project team meetings, community engagement activities and thousands of survey responses and presents high-level ideas that try to capture the general pulse of the community with respect to environmental and historic resources.

The final chapter provides the EnvS recommendations which will serve as an input in to the review and update of the ICSP/MDP. In total 54 recommendations are made. The recommendations are grounded in the high-level trends and challenges introduced in Chapter 1, as well as the changing legislative environment. The recommendations are informed by the Current State Analysis, including the baseline data, and the commissioned and related reports summarized in Chapter 5. The recommendations are also interpreted through community values, gathered through thousands of individual pieces of feedback received during the project.

1.3   TRENDS AND CHALLENGES

The EnvS brings together two larger conversations about environmental and historic resources. To fully understand these resources as they appear in Lethbridge, including the current health of those resources, it is important that we situate those conversations within larger, often national or global trends and challenges. To do so, this section introduces five topics that are used as lenses through which to gather and analyze data. They include: climate change, adaptation and resiliency, ecosystem services and biodiversity, cumulative effects, and reconciliation. It is important to acknowledge that interconnections exist between these topics, and they should not be seen as just impacting "the environment" (in the case of the first four topics) or "humans" (in the case of the fifth)—humans exist as part of the natural world, not distinct from it.

Climate Change[1]
Climate Change is one of the defining challenges facing current and future generations. While it is true that the global climate experiences natural variability over time, over the 200 years since the Industrial

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[1] Sources:
Climate Action Network Canada, "What is Climate Change," www.climateactionnetwork.ca, (February 8, 2018).

Revolution, it has undergone rapid change caused by human (anthropogenic) activity. Human activity, such as the burning of fossil fuels like coal, gas and oil, rapid deforestation, and our current food production and transportation paradigms (i.e. the dominance of the priv ate automobile), have dramatically altered the composition of the atmosphere.

Gases such as carbon dioxide (CO_2), methane, and nitrous dioxide are naturally occurring, and are essential for life to thrive on the planet. Human activities however, have caused these

Figure 4: The Greenhouse Effect (Public Domain Image)

gases to accumulate in our atmosphere in extremely high levels. For example, the atmosphere currently contains 42% more CO_2 then it did before the industrial era. The high concentrations of these gases exacerbate what is called the Greenhouse Effect.

The greenhouse effect is the process that traps solar radiation within the planet's atmosphere, and is the same process that allows plants to stay warm and thrive within your backyard greenhouse during the winter. The warmer air also carries more moisture, which is one of the reasons why in many places in the world, climate change will lead to larger and more frequent precipitation events such as flooding and hurricanes.

The rapid pace of climate change stresses natural processes (such as the Hydrologic (Water) Cycle), ecosystems and traditional ecological knowledge that have emerged, evolved and adapted over millennia. Without immediate and significant action taken to reduce those human activities which increase the greenhouse effect and contribute to climate change, and a shift towards a more reciprocal relationship with the natural world, there is great risk of significant biodiversity and ecosystem function loss, sea level rise and desertification, among other major long-term consequences.

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The Pew Charitable Trust, "Warming Oceans are Reshaping Fisheries, www.pewtrusts.org/en/research-and-analysis/fact-sheets/2013/05/15/warming-oceans-are-reshaping-fisheries, (February 8, 2018).
United Nations, "Climate change and indigenous peoples, www.un.org/en/events/indigenousday/pdf/Backgrounder_ClimateChange_FINAL.pdf, (February 8, 2018).

For all cities and local governments, climate change poses challenges on a number of fronts. Changes in the hydrological cycle can place added pressures on stormwater infrastructure that may have been designed to handle less intense *normal* storm events. Most stormwater systems were designed with some threshold in mind—such as being able to manage a 1-in-5 year event (which means an event that has a 20% chance of occurring in any given year). In many locations, climate change is causing us to redefine what is *normal*¸ including the severity, frequency and duration of precipitation events (both floods and droughts). For example, when a stormwater system is not designed to handle more severe and frequent heavy rainfall events, the system may be stressed and deteriorate faster, leading to added infrastructure upgrade and maintenance costs borne by taxpayers.
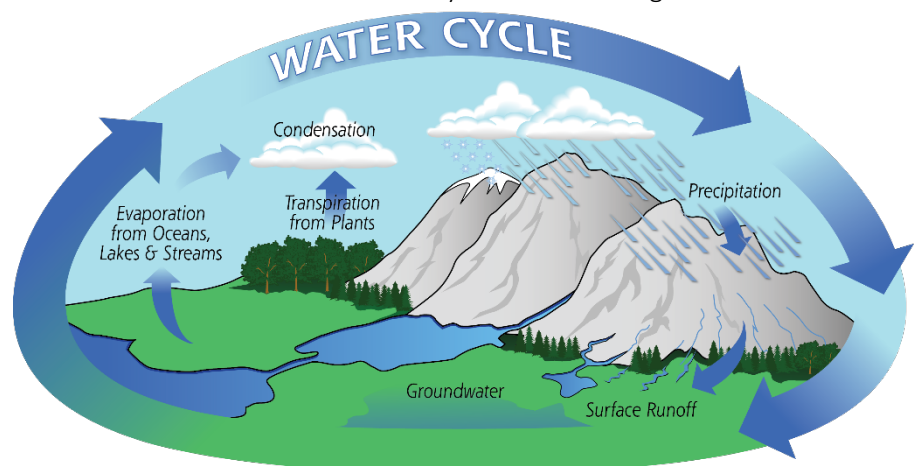
Figure 5: The Water Cycle (source: NASA)

Climate change and shifting ecosystems can also result in the spread of invasive species and added pressure and competition with native plant and animal species. As certain regions in the northern hemisphere warm over time, plants and animals will migrate in search of suitable habitats and food. In many places this will lead to competition with native species. For local governments, they may be faced with added costs for controlling invasive species and perhaps even pressures from animals venturing into urban areas in search of food. While at a global scale this is predominantly seen as negative, it is important to note that through climate changes new opportunities may arise at the local level within the agriculture and agri-processing sectors.

Changing climate patterns, including more frequent and severe weather events can also threaten historic resources, including those resources located in floodplains which are experiencing greater or more frequent flooding events and erosion, or in more northerly locations, sites that are becoming exposed due to melting permafrost.

At an individual or family level, climate change can result in added anxiety about personal and family safety particularly in locations where more frequent and severe weather events such as floods, forest fires, grass fires, early sea ice melt, and hurricanes are anticipated (or currently experienced). Climate changes may also impact human health as a result of changes to traditional diets and increased likelihood

of pulmonary and cardiovascular diseases (i.e., both are linked to the presence of fine particular matter, such as smoke caused by forest fires). Access to potable water can also impacted by extreme precipitation events such as severe flooding and draught.

The changing natural world is and will increasingly challenge individuals, families and communities because we are all intimately connected to natural resources and processes (whether those connections are recognized or not). For example, communities that are directly tied economically and culturally to forestry and agriculture with face added pressures. Indigenous communities that rely on hunting, gathering and fishing for their nourishment, spiritual and medicinal needs are threatened by changes in ecosystem function and biodiversity. This may include the arrival of invasive species, declines in native plant and animal species, or changes to ecological cycles that have traditionally served as natural indicators for traditional land use activities and ceremony. Other communities, such as those tied to agriculture may experience both negative and positive consequences from climate change, such as: access to irrigation water (which may be stressed if annual headwaters snowpack accumulation declines) or the potential to grow new crops because of shifting climate patterns.

Adaptation and Resiliency[2]

Adaptation and Resiliency are concepts that are typically used within conversations about climate change. ICLEI defines adaptation as "undertaking any initiative or action as a response to actual or projected climatic changes and which reduce the effects of climate change on built, natural, and social systems." The Gaia Foundation states, resiliency "comes from having the capacity to mitigate (diminish impacts) or adapt (respond to change). It signifies the capacity of a system to absorb disturbances and surprises… Resilience is an inherent quality of all healthy living systems. It is a state of dynamic equilibrium which enables systems to grow and evolve while keeping their coherence."

Adaptation is a more reactionary state that involves shifting to meet an experienced or anticipated external force. Climate change is undoubtedly such an external force, but the concept can also be applied to economic, cultural, demographic and technological changes, including anything from commodity market changes and immigration, to aging communities, or the app-based crowd-sourcing economy (e.g. ridesharing companies). The system, or in the case of our present conversation a City or community, adapts to a change once it is has arrived, or at the very least once it is already visible on the horizon.

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[2]Sources:
ICLEI Canada, "Finding the Nexus: Exploring Climate Change Adaptation and Biodiversity", www.icleicanada.org/resources/item/189-adaptationbiodiversitynexus, (February 8, 2018).
The Gaia Foundation, "Food, Seed and Climate Change Resilience", www.gaiafoundation.org/what-we-do/food-seed-and-climate-change-resilience/, (February 8, 2018).
ACCCRN, Various, www.acccrn.net, (February 8, 2018).

Resiliency on the other hand is about creating a position of readiness where external forces and their impacts can be readily *absorbed* into a system (City or community) without resulting in fundamental changes to the nature of the system (City or community). Resiliency in the context of the examples presented above may emerge as:

- Commodity market changes: Before commodity markets decline provide support, on-going economic diversification and skills development.
- Immigration: Creating welcoming and inclusive communities that thrive on diversity and social interaction.
- Aging communities: Planning for and creating structures that allow for aging in place and enhance services to older-aged residents.
- The sharing economy: Creating regulatory structures to encourage, manage and benefit from new technologies and marketplaces.

Within the context of climate change, adaptation can refer to actions like increasing the capacity of pipes and berms to handle larger storm events, prohibiting vehicle traffic on heavy smog days, and creating emergency response plans to handle disease outbreaks and environmental emergencies. As is suggested subsequently (see Awareness and Integration), these adaptive actions are strengthened when made more resilient, such as through their grounding and integration within local environmental or social contexts.

Resiliency is often harder to connect back to specific actions. Instead it is a state, condition and attitude, and is hardwired into processes, systems and organizational (including community) culture. The Rockefeller Foundation[3] describes five characteristics of what it calls "resilient cities". These descriptions are supplemented with additional detail where necessary, given the focus of the EnvS.

AWARENESS   "Awareness means knowing what your strengths and assets are, what liabilities and vulnerabilities you have, and what threats and risks you face. Being aware is not a static condition; it's the ability to constantly assess, take in new information, reassess and adjust your understanding of the most critical and relevant strengths and weaknesses and other factors on the fly…"

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[3] The Rockefeller Foundation, "Urban Climate Change Resilience in Action: Lessons from Projects in 10 ACCCRN Cities," www.rockefellerfoundation.org/report/urban-climate-change-resilience-in-action-lessons-from-projects-in-10-acccrn-cities/, (February 8, 2018).

The EnvS expands the concept of awareness to also include an "Awareness of Place." Strong awareness of place, or Relevancy, relates to an intimate understanding of the current state of environmental (e.g., biodiversity, water quality), social (e.g., demographics, community values), infrastructure (e.g., design capacities), economic (e.g., market place) phenomena, as well as an understanding of external stimuli on the horizon. Through a strong understanding of local context and an awareness of non-local pressures, resources, systems, structures and attitudes can be made to be more resilient in a way that makes sense contextually.

DIVERSITY

"Diversity implies that a person or system has surplus capacity such that it can successfully operate under a diverse set of circumstances, beyond what is needed for every-day functioning or relying on only one element for a given purpose. Diversity includes the notion of redundancy, alternatives, and back-ups, so it can call up reserves during a disruption or switch over to an alternative functioning mode. Being diverse also means that the system possesses or can draw upon a range of capabilities, information sources, technical elements, people or groups…"

EnvS also contemplates diversity within an ecological context, such as biodiversity. As discussed below, biodiversity is a foundational element within healthy, functioning landscapes and ecosystems. Strong and abundant biological diversity creates more resilient ecological, economic and social systems that can withstand the impacts of external forces such as climate change.

SELF-REGULATING

"Self-regulating means elements within a system behave and interact in such a way as to continue functioning to the system's purpose, which means it can deal with anomalous situations and interference without extreme malfunction, catastrophic collapse, or cascading disruptions. This is sometimes called 'islanding' or 'de-networking'…A self-regulating system is more likely to withstand disruption, less likely to exacerbate the effects of a crisis if it fails, and is more likely to return to function (or be replaced) more quickly once the crisis has passed…"

Self-regulating parallels the concept of ecosystem services and biodiversity, discussed later. When biodiversity is present and strong in an ecosystem, ecological, economic and social systems are more capable of withstanding shocks and can more readily return to their normal operating states.

INTEGRATED

"Being integrated means that individuals, groups, organizations and other entities have the ability to bring together disparate thoughts and elements into cohesive solutions and actions. Integration involves sharing information across entities, the collaborative development of ideas and solutions, and transparent communication with people and entities that are involved or affected."

Integration also refers to the idea of blending various structural, systems and ideological approaches to find resilient actions that are grounded in context (relating back to the idea awareness of place or relevancy). An example is the ecological design of infrastructure.

ADAPTIVE

Being adaptive is "the capacity to adjust to changing circumstances during a disruption by developing new plans, taking new actions, or modifying behaviours so that you are better able to withstand or recover from a disruption, particularly when it is not possible or wise to go back to the way things were before. Adaptability also suggests flexibility...It also implies that people and institutions (government, businesses and civil society) in the city systematically learn from experience, with an adaptive planning mindset that is accepting of unpredictable outcomes..."

Ecosystem Services and Biodiversity[4]

Ecosystem Services are the benefits provided by healthy, well-functioning ecosystems and landscapes to the broader environment, including humans and our communities. Ecosystem services come in a variety of forms and flow across the landscape irrespective of political boundaries. They also tend to accumulate over time.

The four main types of ecosystem services are presented below:

SUPPORTING SERVICES

The services that maintain the conditions for life on Earth. Supporting services such as biodiversity and photosynthesis are necessary for the provision of all other ecosystem services.

PROVISIONING SERVICES

Ecosystem services that describe the material "products" or energy outputs from ecosystems, including food, fibre, fuel, water and other resources.

> *An ecosystem is defined as a complete community of living organisms and the non-living materials occurring in their surroundings. An ecosystem is not just a simple inventory of living species and non-living things, it includes all of the interactions between these things, as well as the processes that act upon and within them.*
>
> *Ecosystems exist at a microscopic scale, like a natural community that lives in the narrow region of soil that is directly influenced by plant root secretions. A large ecosystem would be the Grassland Biome in which Lethbridge is found, which stretches the length of the North American continent.*
>
> *Regardless of size, the important concept to consider is that organisms (including humans) are continually engaged in a set of relationships with every other element that makes up the environment in which they exist. It is important to remember that humans are just as integrated into ecosystems as other organisms.*
>
> *Source: Helen Schuler Nature Centre*

Box 2: What is an Ecosystem?

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[4] Sources:
ICLEI Canada, Various, www.icleicanada.org, (February 8, 2018).
The Economics of Ecosystems & Biodiversity, "Ecosystem Services," www.teebweb.org/resources/ecosystem-services/, (February 8, 2018).

CULTURAL SERVICES — The cultural, recreational, spiritual, educational and aesthetic values of an ecosystem.

REGULATING SERVICES — The services that ecosystems provide by acting as regulators, such as regulating the quality of air and soil or by providing flood and disease control.

Within cities, we see many examples of ecosystem services. In some instances we also see attempts to design infrastructure and park spaces to mimic or protect natural ecosystems and landscapes as efforts to create or safeguard ecosystem services. For example:

- Urban tree canopies regulate temperatures, filter pollution and provide wildlife habitat.

- Stormwater management facilities mimic natural wetland complexes and serve to regulate water supply and in some cases levels of sedimentation.

- Park systems create opportunities for outdoor recreation as well as providing habitat, aesthetic and culture value in urban areas.

- The protection of native grasslands and forests can protect against the incursion of non-native species, as well as limiting the need to apply pesticides, fertilizers and in some cases treated water.

- Planting certain species in areas susceptible to erosion can stabilize slopes and reduce the effects of erosion.

SUPPORTING — Services that maintain the conditions for life

PROVISIONING — Services that result in material products or energy outputs

CULTURAL — Services that link to human values

REGULATING — Services that regulate and control quality and acceptable ranges

Ecosystem Services
What Nature Provides Us For Free

Soil Formation & Nutrient Cycling
Clean Water & Air
Photosynthesis
Food
Biodiversity
Wood & Fiber Products
Habitat
Medicinal Resources
Cultural Identity
Pollination
Stewardship
Erosion & Flood Control
Aesthetic
Purify Water
Recreation & Tourism
Store Carbon
Education
Disease Control

Figure 6: Ecosystem Services Wheel Diagram
Source: Helen Schuler Nature Centre

A related concept to ecosystem services is biodiversity. Biodiversity is one key aspect of an ecosystem—its living parts. The concept literally translates to biological diversity, or the variety of life. It describes complex interactions and communities and is seen at different scales (just like the ecosystems within which biodiversity exists).

Biodiversity exists at a micro-scale with complex communities of microorganisms. For example, in some grasslands, billions of organisms can be found in one teaspoon of soil. Biodiversity also happens at the genetic level. A local example are the snow-white spring blooms of moss phlox. A visit to the upper coulees of Alexander Wilderness Park and one gets to see a pink bloom variety of the same species.

The simplest understanding of biodiversity is the number of species. Within a 20 minute drive of Lethbridge, we can expect to see over 300 different bird species throughout the year and well over 400 different blooming plants.

Biodiversity is also expressed at a larger habitat or even landscape level. We see biodiversity increase in a phenomenon known as the edge effect. This is the intersecting point or boundary between two distinct habitats, where biodiversity is higher than either habitat experiences on its own. The connection point between the coulees and the cottonwood forests or at the banks of the Oldman River are examples of this.

Biodiversity has many benefits, including many of the ecosystem services that we benefit from. The importance of preserving and promoting biodiversity is now recognized from local to international levels, in particular its ability to stabilize (or make more resilient) ecosystems. As the variation in living forms increases, ecosystem and their services become more likely to continue in a functioning, healthy state. With high biodiversity, the ability of the ecosystem to return to its original state following some form of disturbance is improved (see concept of Self-regulating above).

Cumulative Effects[5]

The Land-use Framework (2008) defines Cumulative Effects as "The combined effects of past, present and reasonable foreseeable land-use activities, over time, on the environment." Cumulative effects speaks to the fact that land use activities that impact the land, water and air are not constrained by man-made municipal, First Nation, provincial, or even national borders.

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[5] Sources:
Land Use Framework (Government of Alberta, 2008).
A Citizen's Guide to Cumulative Effects (Indian and Northern Affairs Canada, 2007).
A Costly Diagnosis: Subsidizing coal power with Albertan's health? (Asthma Society of Canada, Canadian Association of Physicians for the Environment, The Lung Association of Alberta & NWT, and the Pembina Institute, 2013).

Indigenous and Northern Affairs Canada (2007) offers a guide to help citizens understand cumulative effects, mostly in the context of industrial development. Cumulative effects, it describes, are caused by "natural events such as forest fires, or by human activities such as mining… Cumulative effects on the land might be seen as changes to the number of wildlife or birds, increases in non-native plants, or the melting of permafrost. The cumulative effects of development on people might be seen in areas such as employment rate, availability of housing or traditional activities like hunting or trapping."

Within cities, cumulative effects helps us contemplate a number of phenomena. We can think about cumulative effects in terms of the activities that occur upstream and their cumulative impact on downstream ecosystem services and infrastructure. For example, rapid deforestation in headwater regions or human recreation activities directly on the banks of rivers can both lead to increased sedimentation and downstream pollution. These impacts can have downstream pressures on riverine ecosystem health, water quality and water treatment plant infrastructure. Or, certain mining activities or the combustion of carbon-based fuels can lead to increased fine particulate matter levels and subsequently impact human health outcomes within an airshed and beyond.

While cumulative effects are most strongly associated with environmental and health impacts and outcomes, we must not lose sight of related economic and social implications. Indeed added pressure on water treatment plants to manage higher pollutant and sedimentation levels can have financial implications for a municipality or First Nation community. Meanwhile, negative health outcomes can lead to increased health care costs for service providers, and added stress for families caring for sick family members. A 2013 report by the Asthma Society of Canada links, for example, emissions related to coal production to the exacerbation of asthma, declines in lung development in children, and cardiac disease.

Cumulative environmental impacts also have socio-cultural implications for Indigenous communities that rely on natural resources for subsistence, medicinal and ceremonial use. For example, species loss through climate change can cumulatively impact language and ceremony where certain plants are no longer found, or where ecosystem process that were once predictable are now unpredictable or altogether absent (such as the presence of sea ice, the arrival of fisheries, or the flowering of certain plants).

Reconciliation[6]
2015 marked a potential turning point in Canada with the release of the Final Report from the Truth and Reconciliation Commission of Canada. While the Report was explicitly focused on documenting the

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[6] Sources:
Truth and Reconciliation Commission of Canada, "Final Report", www.trc.ca, (February 8, 2018).

historic and current trauma experienced by residential school survivors, the accompanying Calls to Action have instigated a national conversation about the need to heal the relationship between Indigenous and non-Indigenous Canadians, and how that might happen. One of the key concepts that the report introduces is the idea of Reconciliation, which the Commission approaches as: "establishing and maintaining a mutually respectful relationship between Aboriginal and non-Aboriginal peoples in this country. In order for that to happen, there has to be awareness of the past, acknowledgement of the harm that has been inflicted, atonement for the causes, and action to change behaviour."

The Calls to Action report lists 94 recommendations to advance the process of reconciliation in Canada. A number of these Actions either directly or indirectly implicate "local governments". Two Calls to Action that are particularly relevant to the scope of the EnvS are:

43.   We call upon federal, provincial, territorial, and municipal governments to fully adopt and implement the *United Nations Declaration on the Rights of Indigenous Peoples* as a framework for reconciliation.

47.   We call upon federal, provincial, territorial and municipal governments to repudiate concepts used to justify European sovereignty over Indigenous peoples and lands, such as the Doctrine of Discovery and *terra nullius*, and to reform those, laws, government policies, and litigation strategies that continue to rely on such concepts.

Responding to these two Calls to Action requires a comprehensive and inclusive recounting of history, which in many places, as suggested by the Doctrine of Discovery, has historically been conceived of as beginning when European settlers arrived to the "New World."

Local governments have an intimate connection with their lands and the recounting of their histories. Within the context of the EnvS, they are therefore ideally placed to advance the notion of reconciliation by supporting Indigenous peoples with the

In 2016 Lethbridge City Council endorsed a joint City and community (through the Lethbridge Indigenous Sharing Network) Reconciliation Implementation Plan.

The Plan identifies key areas within the TRC Calls to Action where the City of Lethbridge and community can play leading roles. This Implementation Plan will guide the considerations presented by this project in latter chapters.

The concept of the Reconciliation Lethbridge logo is based on Dr. Leroy Little Bear's notion of two jagged worlds colliding. Reconciliation Lethbridge honours this notion, but interprets the worlds coming together in collaboration, reciprocity and reconciliation.
Source: Reconciliation Implementation Plan (2017-2027).

Box 3: Reconciliation Lethbridge

Truth and Reconciliation Commission of Canada, "Calls to Action", www.trc.ca, (February 8, 2018).

identification, preservation and ongoing access to their traditional sites, as well as the telling of more fulsome and accurate histories.

In light of recent court cases and growing national dialogue around reconciliation we might frame this type of work as ensuring consideration for and protecting Aboriginal Rights and Title. Local governments can also support reconciliation by acknowledging the "host" First Nations whose traditional territories they are found within, as many cities in Canada are beginning to do.

Chapter 2: The Relationship between Development and Environmental and Historic Resources

2.1   WHAT ARE ENVIRONMENTAL RESOURCES?

To define Environmental Resources, EnvS adapts the definition of natural resources found in the Land-use Framework[7]. Here, we define environmental resources as *resources that occur naturally (renewable and non-renewable) or that are derived from human interventions that provide or result in the provision of ecosystem services*. The rationale behind including both natural and human-derived resources is that both are capable of providing ecosystem services, even where the provision of those services may not have been fully intended or anticipated. For example, in the case of a stormwater management facility, while it provides a utility function of managing stormwater, it may also provide habitat for amphibians, refuge for migrating birds and recreational value to residents. Without losing sight of its utility function, it is important to recognize the broader ecological, economic and social value it can provide.

Resources are often imagined in isolation—such as a timber stand along a mountain edge, a gravel seam under a river bed, or a stretch of native grassland on a coulee ridge. However environmental resources need to be seen cumulatively to fully appreciate their function and value and the potential impact of land use and other disturbances. The concept of cumulative effects presented in Chapter 1, gets us to think about how land use activities impact our landscapes, biodiversity and resources over time, how impacts flow across landscapes (irrespective of political boundaries) and how impacts tend to accumulate.
For example, dams and water diversion impact the seasonal movements of fish species, as well as impacting downstream ecosystems (e.g., riparian plant communities) from decreased water quantities. Extracting gravel along a river can compromise the integrity of the riparian area and result in habitat loss, and the recreation along the edge of a river can lead to pollution and increased sedimentation downstream. Conversely, protecting and restoring native grasslands can create new habitat and result in more stabilized slopes and decreased downstream sedimentation.

It is not the contention of the EnvS that resource use and extraction should halt. Rather that we must

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[7] The Land-use Framework defines natural resources as: "Resources that occur in nature, including non-renewable resources, such as timber, fish, wildlife, soil, water, oil sands, coal and minerals." (p. 52)

seek an appropriate balance that recognizes more holistically, the full value of environmental resources to our communities and region. The purpose of the EnvS is to begin the process of understanding the location and value of key environmental resources within Lethbridge to inform future land use planning and decision-making in line with the guidance of the SSRP.

2.2 DEVELOPMENT AND ENVIRONMENTAL RESOURCES

What is the Blackfoot perspective on Environmental Resources?

The Blackfoot perspective recognizes a three-part ecological framework of sky, land and water beings.
The Blackfoot way of life is taught by the animals and the beings who have lived within these natural boundaries and borders for longer than humans. It is a way of life that emerged from, is shaped by, and is rooted in this Place (the life-world of Kitaowahsinnoon, Blackfoot Territory). Kitaowahsinnoon, what feeds us, what nourishes us, what shapes us. The extent of this place is defined by the waters of the upper Missouri and the upper Saskatchewan River Basins. It includes the land within and between these rivers systems, as well as the skies above.
The traditional Blackfoot view of community incorporates Sspommitapiiksi (Sky Beings), Ksaahkomiitapiiksi (Land Beings), and Soyiitapiiksi (Underwater Beings). These include plants, animals, rivers, mountains, Thunder, the Sun, the Moon, and the stars. All who cast shadows, male and female, are part of the living world, surviving together through cycles of day and night, summer and winter.

Source: Ryan Heavy Head and Kainai Studies program students for Helen Schuler Nature Centre exhibits

Box 4: Blackfoot Perspective on Environmental Resources

The *Municipal Government Act* (Section 616b) defines Development as:

- An excavation or stockpile and the creation of either of them;
- A building or an addition to or replacement or repair of a building and the construction or placing of any of them on, in, over or under land;
- A change of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the use of the land or building; or,
- A change in the intensity of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the intensity of use of the land or building.

Development impacts environmental resources in a number of ways. The process of developing something implies the use or accumulation of resources that constitute the development itself. For example, building a house requires water, sand, rocks and other minerals to build the foundation, wood to build the frame, petroleum derived products and copper to make pipes etc. Development also results in a footprint, that is the area of land that is taken up by the development that can no longer be used for other purposes—essentially the ground (or wetland) underneath the development (e.g., building, pipeline, stock pile). However, the footprint of some forms of development can extend beyond an immediate physical building envelope. These are the cumulative impacts. The impact on some environmental resources are tangible and visible, for example filling in a wetland or cutting down a forest, while others are less obvious and are therefore not

as easy to pinpoint or identify (such as water or air pollution, or the release of sequestered carbon and greenhouse gases).

It is also important to note that some types of development can potentially have a positive relationship with environmental resources. For example, stormwater management facilities can create wildlife habitat and refuge and water filtration functions; parks can provide wildlife habitat, carbon sequestration, and sustainable timber harvests; and in the case of redevelopment, indirect positive environmental impacts can come by reusing existing materials and previously developed lands.

The greenest building is the one that already exists.

While all development impacts environmental resources in one way or another, there is increasing pressure to use tools and practices to help limit the extent of those impacts. For example, the SSRP includes six Efficient Use of Land Principles[8] that support greater consideration for among other things, the scarcity of land and environmental resources, and the cumulative nature of growth and development on those resources. The Principles (found in Appendix I of the SSRP), include:

1. Reduce the rate at which land is converted from an undeveloped state into permanent, built environment.
2. Utilize the minimum amount of land necessary for new development and build at a higher density than current practice.
3. Increase the proportion of new development that takes place within already developed or disturbed lands either through infill, redevelopment and/or shared use, relative to new development that takes place on previously undeveloped lands.
4. Plan, design and locate new development in a manner that best utilizes existing infrastructure and minimizes the need for new or expanded infrastructure.
5. Reclaim and/or convert previously developed lands that are no longer required in a progressive and timely manner.
6. Provide decision-makers, land-users and individuals the information they need to make decisions and choices that support efficient land use.

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[8] The Efficient Land Use Strategy further applies the Efficient Use of Land Principles on the history and future of growth and development in Lethbridge.

2.3 WHAT ARE HISTORIC RESOURCES?

In Alberta, the *Historical Resources Act* defines Historic Resources as "any work of nature or of humans that is primarily of value for its paleontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest including, but not limited to, a paleontological, archaeological, prehistoric, historic or natural site, structure or object." Within that definition, we capture everything from dinosaur fossils, to pre-contact stone tools, to Sundance sites, to heritage buildings and landmarks. The value in working within such a broad definition is that it allows resources that are meaningful at multiple scales and to various groups to be recognized as such.

For the purposes of the EnvS, we further define two broad categories of historic resources: First Nation historic resources and post-settlement historic resources. Identifying these two categories of historic resources is not meant to replace the definition found in the *Historical Resources Act*, as that is the legislative context within which the City of Lethbridge operates, nor is it meant to suggest a preference among different types of historic resources. The differentiation is simply a working tool to allow us to separate resources that relate to the occupation and presence of Indigenous peoples from resources that appear after the settlement of the City of Lethbridge. The latter is already being managed quite successfully within the framework of the Heritage Management Plan, while the former is being contemplated in a comprehensive manner for the first time through the EnvS, with the collaboration of the Blackfoot Confederacy Nations.

ENVIRONMENTAL

Services that reduce ecological footprints and maximize resource use

IDENTITY

Services that contribute to pride and place-making

ECONOMIC

Services that contribute to a strong local economy

AWARENESS

Services that contribute to engaged and informed citizens and communities

Reuse & Reinvent

Resource Efficiency

Waste Diversion

Land Maximization

Recreation & Tourism

Skilled Labour & Employment

Infrastructure Maximization

Citizenship

Engagement & Dialogue

Stewardship

Education

Traditional Knowledge

Spirituality

Aesthetic

Quality of life

Heritage Services

What Heritage Preservation Provides Us

Figure 7: Heritage Services Wheel Diagram
Source: City of Lethbridge

2.4 DEVELOPMENT AND HISTORIC RESOURCES

Historic resources are meaningful parts of the physical and narrative landscape of our communities, providing, as the SSRP states, a "tangible" connection to our shared past. Historic resources are also powerful because of the symbolic role they can play in a community's collective recounting of its history; they tell us who we are and where we come from.

One of the reasons why it is important to differentiate First Nation and post-settlement historic resources is because each has historically had a different type of relationship with development. As well, the role that each resource has played in community consciousness and narrative has differed.

Post-settlement resources have long been looked at through a conservation and preservation lens, and are increasingly seen as opportunities for redevelopment and adaptive reuse. For example, the Heritage Management Plan indicates that "heritage is best protected when it is used" (p. 3). Meanwhile, *and speaking very generally*, First Nation historic resources have historically been seen as impediments to development (often facing destruction and removal). Moreover, our collective knowledge of the location and value of First Nation historic resources has been severely degraded through the repression of Indigenous cultures in Canada including through the Residential School System and the *Indian Act*. Working collaboratively with Indigenous peoples—as envisioned by the Land-use Framework, the Truth and Reconciliation Commission of Canada Calls to Action, and as implemented by the technical work of the EnvS—will help identify and protect First Nation historic resources and do much to restore lost knowledge and Indigenous ways of knowing in our region.

In much the same way that development can impact environmental resources, so too does it impact historic resources. The accumulation or extraction of resources required to create the development itself (e.g., mining, forestry, and other resources extraction), the immediate footprint of development and the cumulative impacts of development beyond an immediate physical envelope, can all impact historic resources.

First Nation historic resources (including sites of traditional use and occupancy) and cultural landscapes are more likely than built structures to be impacted by activities such as resource accumulation and extraction and the cumulative effects of development because they are often tied directly into and derive

meaning from their natural context. For example, mining can negatively impact traditional fishing, hunting and collecting areas, while urban growth can threaten cultural landscapes such cottonwood tree stands.

Post-settlement historic buildings are more likely than landscape-based resources to be impacted by redevelopment because they are built structures (this relates to the "footprint" of development). When redevelopment happens in an area before a baseline analysis of historic potential can be completed (in Lethbridge's Heritage Management Plan this process is called a Historic

Figure 8: Blackfoot Traditional Territory (source: www.siksikanation.com)

Survey), there is a chance that buildings (homes, commercial and institutional buildings) will be modified or altogether destroyed and as a result lose all or some of their heritage value and place-making potential.

As mentioned previously within the context of environmental resources, the relationship between development and historic resources need not always be seen as negative. In fact, development, redevelopment, and adaptive reuse can all support the preservation of Post-settlement historic structures. For example, new development in proximity to heritage resources or which incorporates heritage resources within the development can add character and value by connecting new development to the past and tapping into an existing sense of place. Redevelopment and adaptive reuse can breathe new life into heritage sites and ensure their on-going, albeit adapted, use.

For First Nation historic resources, recent examples in Lethbridge have shown how traditional knowledge and land use can be incorporated and protected within new developments. The Southeast Area Structure Plan in Lethbridge attempted to strategically locate park space and incorporate Blackfoot Cultural Heritage into future urban developments. This innovative project moved beyond strictly avoiding impacts to First Nation historic resources by trying to actively showcase them *in situ* through narrative (street and

park names) and design (symbols). This was only made possible through the active participation of Indigenous peoples within the early stages of the planning process.

For more information on traditional knowledge and land use as it pertains to Lethbridge and region, please refer to the Traditional Knowledge and Use Assessment.

Chapter 3: Existing Municipal Policy and Management Framework

The Intermunicipal Development Plan (IDP) and the Integrated Community Sustainability Plan / Municipal Development Plan (MDP) are the two principal policy tools within which our intermunicipal and City (respectively) vision and broad policy direction is set. From there, subsequent plans and policies provide additional refinement and shift towards implementation and management.

Sections 3.1 and 3.2 provide a brief overview of the main policies and management frameworks that touch on environmental and historic resources at the City of Lethbridge. While this is not a comprehensive listing, it does highlight the most important policy and management tools and links them back to specific environmental and historic resources outcomes envisioned at the level of the IDP and ICSP/MDP.

Land Use Framework	Provincial Vision
Alberta Land Stewardship Act	Provincial Tool
South Saskatchewan Regional Plan	Regional Vision
Municipal Government Act	Provincial Tool
Intermunicipal Collaboration Framework / Intermunicipal Development Plan	Sub-regional Vision
Municipal Development Plan	City Vision
Area Structure Plan & Area Redevelopment Plan	City Vision
Land Use Bylaw, Outline Plan, Master Plan, Guideline	City Tool

Figure 9: Planning Legislation Hierarchy

3.1 ENVIRONMENTAL RESOURCES IN LETHBRIDGE

3.1.1 Intermunicipal Development Plan

The Intermunicipal Development Plan (or IDP, 2016) is the City of Lethbridge's highest order statutory plan (along with the ICSP/MDP), and is prepared under the authority and direction of the *Municipal Government Act*. The purpose of the IDP is to allow for "collaborative, cooperative long range planning for lands of mutual interest, to minimize conflicts across municipal borders, provide opportunities for collaboration and communication, and outline processes for the resolution of issues that may arise".

Chapter 4 of the IDP addresses the environment, open spaces and water generally, providing polices designed to: minimize the impact of development on river valleys and ravines (such as the Oldman River Valley and Six Mile Coulee; 4.1); address the dedication of environmental and other reserves at the time of subdivision and implications for future urban expansion (4.2); protect water quality (4.3); as well as ensure effective stormwater management and drainage (4.4).

The policies of the IDP in turn influence land use planning, infrastructure and servicing decisions made by both the City of Lethbridge and Lethbridge County, particularly within the IDP plan area.

3.1.2 Integrated Community Sustainability Plan / Municipal Development Plan

The Integrated Community Sustainability Plan / Municipal Development Plan (or ICSP/MDP, 2010) is the City of Lethbridge's highest order statutory plan (along with the IDP), and is prepared under the authority and direction of the *Municipal Government Act*. The purpose of the ICSP/MDP is to provide a framework for Council and the community to guide future development within Lethbridge over the next 40 years. The ICSP/MDP is structured to ensure the "sustainable integrity" of the community through the adoption of broad policies which guide future planning and decision-making.

The ICSP/MDP references the protection of environmental resources in two main sections: 6.5.1 Lethbridge's River Valley is the Primary Open Space System and 6.5.2 Lethbridge Conserves it's Natural Resources. There are other ICSP/MDP sections that link to environmental outcomes less directly, but which are nonetheless important to note: 6.4.1 Lethbridge is a Compact City; 6.4.2 Lethbridge has an Efficient and Effective Integrated Transportation Network; 6.4.3 Lethbridge is a Walkable, Bicycle Friendly City; 6.4.4 Lethbridge is Expanding in a Responsible Manner; and 6.4.6 Lethbridge has a Diverse Parks and Open Space System. Sections 6.4.1 through 6.4.4 are more closely considered in the ELUS.

Section 6.5.1 Lethbridge's River Valley is the Primary Open Space System seeks to retain and enhance the biodiversity and overall health of the Oldman River Valley, while maintaining its role as a primary recreational and park space within the City. Section 6.5.2 Lethbridge Conserves its Natural Resources is divided into different natural resources categories: water, air, waste and energy. The policies in this section provide general direction to minimize the community's ecological footprint including through the reduction in Greenhouse Gas emissions. Neither of these sections in the current ICSP/MDP provide detailed baseline data or targets to support implementation, monitoring and evaluation.

3.1.3 Master and Management Plans

The City of Lethbridge maintains a number of master and management plans that either directly or indirectly impact environmental resources within the City. The following table provides a listing of some of the most relevant master and management plans and the direction and implications they have for environmental resources.

MASTER PLAN

**RIVER VALLEY PARKS
MASTER PLAN
(RVPMP)**

Description, Direction and Implications

The RVPMP (2017) provides a "long-term strategy for the River Valley…minimizing fragmentation from future development and enabling the River Valley to realize its recreation and conservation potential." The River Valley Parks Master plan provides "an understanding of the current uses and future demands placed on the River Valley."

As stated in the ICSP/MDP the River Valley is Lethbridge's primary open space system. It is also home to the largest concentration of biodiversity and ecosystem services in the City. The purpose of the RVPMP is to operationalize the vision of the ICSP/MDP to balance varying and potentially competing land use demands (e.g., recreation, conservation, commercial activity and resource extraction). It achieves this through the creation of different parks classifications ("Land Use Typologies") that identify and place varying limits on activities and development throughout the River Valley. Classes include: Environmental Preservation, Natural Recreation, Intensive Recreation, Commercial Recreation (private), Urban Services / Infrastructure, Interim Resource Extraction and Heritage Protection.

The key environmental outcome of the RVPMP is the conservation of priority ecological areas and the balancing of multiple and potentially competing land uses in the River Valley.

**TRANSPORTATION
MASTER PLAN (TMP)**

The purpose of the TMP (2013) is to "provide a comprehensive long-range plan that integrates land use policies with the transportation infrastructure requirements for the 100,000 and 130,000 population horizons" in line with the vision of the ICSP/MDP.

The key environmental outcome of the TMP, following the policy direction of the ICSP/MDP, is the consideration for all modes of transportation (pedestrian, cyclist, public transit and private vehicle) and the potential long-term implications this has for air quality and Greenhouse Gas emissions reductions.

The direction of the TMP is echoed in other more recent master plans including the: Transit Master Plan (in progress) and the Cycling Master Plan (2017), which further operationalize the recommendations of the ICSP/MDP and TMP.

PARKS MASTER PLAN

The PMP (2007) provides a framework to guide "future park development, protect natural assets, increase accessibility and re-develop to meet current and future needs." The PMP is implemented by informing the preparation of Area Structure Plans, acquiring new park lands, upgrading existing parks, creating special use areas, and through the preservation of natural parks and heritage features.

The PMP was a key input in the creation of the RVPMP, identifying key areas for "habitat, park connectivity and strategic land acquisitions for future parks development," thus guiding the continued use and protection of our City's greatest natural feature, the Oldman River Valley.

The key environmental outcomes of the PMP is to inform future park development and the expansion of the urban parks system, as well as the identification of areas for conservation and possible restoration.

HENDERSON LAKE ECOSYSTEM MANAGEMENT PLAN (HLEMP)

The purpose of the HLEMP (2006) is to guide the "long-term management and use of Henderson Lake, in the best interests of the City and enhancement of natural values of the lake." Henderson Lake plays an important role in the ecological and cultural heritage of the City, and has specific land use and management challenges due to adjacent land uses.

The key environmental outcome of the HLEMP is the strategic planning and management direction provided around water quality for this particular area of the City, in line with the broad direction of the ICSP/MDP.

URBAN FORESTRY MANAGEMENT PLAN (UFMP)

The UFMP (1991) was created to manage the care of all trees under the City's control, including trees within road rights-of-way, parks and the River Valley. Trees play an important role in delivering ecosystem services.

The key environmental outcomes of the UFMP are the connection drawn between our urban forest and ecosystem services, and the need to undertake effective management and planning to ensure its health.

WASTE REDUCTION MASTER PLAN (WRMP)

The WRMP (2008) was created to guide future waste diversion and waste prevention activities within the City of Lethbridge. Waste management is specifically highlighted in the ICSP/MDP as a key piece of reducing the City's ecological footprint.

The key environmental outcome of the WRMP is the direction it provides from broad policy vision in the ICSP/MDP towards implementation by identifying opportunities to increase waste diversion and prevention.

3.2   HISTORIC RESOURCES IN LETHBRIDGE

3.2.1 Intermunicipal Development Plan

The Intermunicipal Development Plan (2016) does not contain any policies in relation to the identification or preservation of heritage sites, however all planning and development on lands considered by the IDP must be consistent with other heritage legislation, including the *Historic Resources Act*.

3.2.2 Integrated Community Sustainability Plan / Municipal Development Plan

The ICSP/MDP references the protection of historic resources in two main sections: 6.3.1 Lethbridge Respects and Celebrates its History, and 6.4.7 Lethbridge has a Strong and Vibrant Downtown.

Section 6.3.1 addresses the social and cultural values that come from identifying and protecting historic resources, however only from the perspective of post-settlement resources. The policies included in 6.3.1 direct the City to: identify and designate City-owned resources and to ensure their conservation and maintenance; work with private landowners to conserve and maintain resources, including through adaptive reuse; to preserve and share Lethbridge's stories; and, to incorporate significant archaeological, historical and cultural sites into the urban fabric. Section 6.4.7 refers to the recognition and conservation of historic resources in downtown. Neither of these sections in the current ICSP/MDP provide detailed baseline data or targets to support implementation, monitoring and evaluation.

3.2.3 Heritage Management Plan

The framework the City of Lethbridge uses to identify and protect historic resources, thus implementing the policies of the ICSP/MDP, is the Heritage Management Plan (HMP, 2007). It is important to note that the HMP does not differentiate between what we call here First Nation and post-settlement resources. All heritage resources as defined by the *Historical Resources Act* are theoretically addressed by the HMP. In practice, however, only post-settlement resources are included in the Survey, Inventory and Roster (discussed below).

Figure 10: Heritage Management Process; figure adapted from Government of Alberta (2016). "Creating a Future: Part 1 - Identifying Historic Places. Pg. 7.
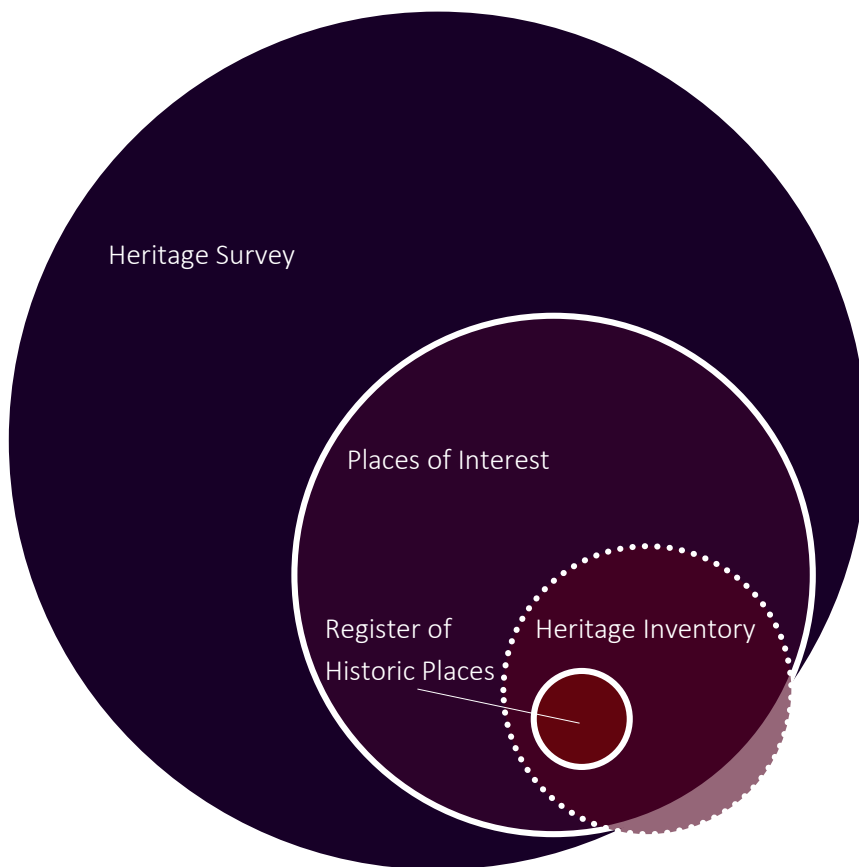
The goal of the HMP is to "protect the built heritage and cultural landscapes of Lethbridge, and to promote an awareness of Lethbridge's rich heritage in order to ensure that the stewardship of our heritage, past, present and future, is at the heart of the development of our City."

According to the HMP, the guiding philosophy behind heritage management in Lethbridge is: "heritage is best protected when it is used." The idea being that when buildings are adapted to new uses, they retain their "heritage character and their overall contribution to Lethbridge's sense of place," while contributing to sustainable community economic development[9].

Following the direction of the HMP, the City of Lethbridge, through the Planning and Development Services Department, Historic Places Advisory Committee (HPAC) and City Council, uses a number of tools to identify and protect historic resources. The primary tools for heritage protection are:

HERITAGE SURVEY   The Heritage Survey is the comprehensive recording and documenting of all potential historic places within the City of Lethbridge. Typically, all resources included in the Survey are over 50 years of age and are documented and researched for information such as date of construction, original and early owners of the site etc. The Heritage Survey is the basis for future heritage research before inclusion on the Heritage Inventory.

PLACES OF INTEREST   Places of interest are resources the Heritage Survey has identified as having the potential to be placed on the Municipal Heritage Inventory.

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[9] This guiding philosophy has worked well for post-settlement historic sites, but has yet to be tested for First Nations heritage resources or cultural landscapes.

HERITAGE INVENTORY

The Heritage Inventory is the list of heritage resources that are recognized locally as historic places. The sites that comprise the Inventory have been evaluated according to established criteria and have demonstrated that they are significant to the history of the local area, and retain integrity as a site, building or landscape etc. Once a site is chosen to be placed on the Inventory, a Statement of Significance is then prepared. The Heritage Inventory is the basis for future municipal designation. The Heritage Inventory is comprised mainly of Places of Interest identified through the Heritage Survey, but may also include resources that were overlooked during the survey and then nominated for consideration later on, for example, by a new landowner.

REGISTER OF HISTORIC PLACES

The Register is the list of historic places that have been designated by Lethbridge City Council. The Heritage Register is linked with provincial and federal registers, and affords a stronger level of protection than sites listed on either the Survey or Inventory.

Chapter 4: Current State Analysis

4.1   ENVIRONMENTAL RESOURCES

EnvS defines Environmental Resources as resources that occur naturally (renewable and non-renewable) or that are derived from human interventions that provide or result in the provision of ecosystem services. This definition is adapted from the definition of natural resources found in the Land-use Framework.

When seen through the lens of Ecosystem Services, environmental resources protection is more than just a way of "protecting the environment," but as a way of protecting and enhancing our quality of life as a community. Environmental resources contribute to our economic, environmental and social well-being.

The City of Lethbridge, through the ALSA and the SSRP, is required to consider the impacts of land use planning and decision-making on the environment (air, water, biodiversity and ecosystems). In order for the City to do that, we must understand the state of local environmental resource.

Figure 11: Ecosystem Services Wheel Diagram (source: Helen Schuler Nature Centre)

Chapter 4 provides a broad overview, what we call a Current State Analysis, of environmental resources in the City of Lethbridge. This analysis focuses on eight Resource Themes. The themes were selected with the help of the EnvS Technical Working Group, Environment Lethbridge and the Helen Schuler Nature Centre, and are meant, in whole, to describe the most significant components of a healthy, functioning urban environment. Resource themes were chosen based on the policy categories of the City of Lethbridge's ICSP/MDP and SSRP, while others highlight key aspects of Ecosystem Services. Each Resource

Theme is comprised of a series of Issue Areas. The Environmental Resource Themes include: Air, Water, Biodiversity & Ecosystems, Waste, Energy, Economy, Social and Climate Change.

Data used to create the Environmental Resource Current State Analysis come from a variety of sources, including: City of Lethbridge data, publically accessible data from the provincial and federal governments, data from supporting agencies (e.g., Oldman Watershed Council), the Environment Lethbridge State of the Environment Report (2017), and data from commissioned studies (e.g., Ambient Air Quality Assessment, Ecological Inventory and Environmental Land Use Best Practices Policy Report).

As this is the first comprehensive environmental baseline conducted by the City, there will undoubtedly be data gaps. These gaps will help point us in directions where further research and understanding is needed.

The data presented in this chapter is not meant to be comprehensive or prescriptive, nor should any individual piece of data be analyzed out of context or in isolation. The intention of presenting the following data is to show our current baseline environmental position, and frame subsequent policy discussion. It is hoped that data will be used objectively, however data can be subjective and relative, as such policy decisions will be additionally informed by the values of our community. The Environmental Resource Current State Analysis will inform recommendations to update aspects of the City's ICSP/MDP, and potentially other high-level municipal and regional land use planning and policy discussions.

4.1.1 Air

The *Air* resource theme focuses specifically on one issue area: Ambient Air Quality. Air quality describes the state of the air around us. Good air quality refers to clean, unpolluted air, while poor air quality occurs when pollutants reach concentrations that are high enough to endanger environmental health, including humans. Poor air quality is the result of a number of different factors, some of which are natural while others are human-caused.[10] Ambient air quality defines the state of outside air. This includes any portion of the atmosphere to which the general public is exposed to that is not confined by walls and a roof (such as your home, school and many peoples' place of work).[11]

Pollution is one of the greatest contributing factors to poor air quality. Air pollution can affect human health, environment functioning, building structures and the economy. It creates problems such as smog and acid rain, which are the result of various air pollutants being released into the atmosphere through natural processes and human activities. Some natural sources of air pollution include forest fires, volcanoes and emissions of volatile organic compounds (VOCs) from vegetation. Human-caused sources include transportation, electrical energy generation (from sources such as coal), intensive feedlot operations, food processing and oil and gas production. Some of the key drivers for pollution are humidity, quantity and proximity to air pollutants and the wind (speed and direction) that carries the pollution.

In Lethbridge there is one permanent air quality monitoring station. It is located within the Churchill Industrial Park (NE quadrant of the City). The station is operated by the Government of Alberta, and used to monitor ambient air quality in the City.

Box 5: Lethbridge Air Quality Monitoring Station

In Canada over the past two decades, overall emissions of air pollution have decreased. Reductions in emissions have been due to implementation of regulations and technological improvements for transportation vehicles and industrial processes. Emission reductions are also the result of off-shoring energy-intensive and polluting industrial activities (e.g., through out-sourcing or the relocation of industrial activities). Air pollution can have significant impacts on human health. It can irritate lungs and reduce lung function, as well as increase susceptibility to allergies, increase rates of asthma, cause throat

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[10] Province of British Columbia, "Air," www.bcairquality.ca/101/what-is-air-quality.html, (February 8, 2018).

[11] *South Saskatchewan Region Air Quality Framework* (Government of Alberta, 2014), 2.

irritation, shortness of breath and exacerbate respiratory conditions. Our growing knowledge of these conditions has helped to increase awareness and create regulatory changes that have resulted in improvements to air quality, generally speaking.

One of the key regulatory challenges that we find with air, is that air quality outcomes (whether good or poor), are pan-jurisdictional. Meaning that one jurisdiction, be it a municipality, province, state or country, cannot regulate air quality in isolation of others. Air quality outcomes flow across landscapes to such an extent that collaboration and in some cases harmonization is required to ensure strong air quality outcomes for broader regions.

Reflecting the inter-jurisdictional nature of air quality, it is an important policy issue for the federal and provincial governments. Over the past 30 years, there have been significant improvements to overall air quality in Canada, because of increased awareness of the harmful effects that poor air quality can have on the environment and economy. Policy shifts by federal and provincial governments have helped to create technological advancement in industrial sectors, which have decreased the amount of pollutants in the air. While there have been improvements to air quality, further actions are still required as air quality targets continue to be exceeded (in part because targets continue to be strengthened).

In some regions, local actors including industry, municipalities, and environmental non-governmental organizations have formed air shed zones or management bodies to tie local data collection, education, policy and industry together, in hopes of achieving positive regional air quality outcomes within an ever-more stringent regulatory environment.

The targets for air pollution guidelines are called the National Air Quality Management System (NAQMS), which include the Canadian Ambient Air Quality Standards (CAAQS). CAAQS are standards for ambient air quality across Canada. Targets and management levels are created for several different pollutants, including Fine Particulate Matter ($PM_{2.5}$), Nitrogen dioxide (NO_2) and Ozone (O_3). (See Table 1 for the CAAQS standards for $PM_{2.5}$, O_3 and NO_2.) CAAQS also includes the Base-level Industrial Emission Requirements (BLIER), which set a base level of performance for major industries in Canada. These policies mandate air quality requirements and put into place management procedures that help reduce pollutants in the air.

The Alberta government has implemented its own policies and targets. The *Clearing the Air Alberta's Renewed Clean Air Strategy* was created in 2012 to develop and implement policies and management tools for ambient air quality at the regional level. Regional targets and management processes are currently being put into place. The Government of Alberta has made a commitment to cumulative effects management, which is an approach that starts by identifying key indicators of health (in this case air quality health) and then creating triggers. Triggers act as thresholds, that when met, result in (trigger) a

management response which is coordinated by the government in collaboration with local partners (e.g., industry, municipalities etc.). Monitoring and modelling will be ongoing to assess the quality and/or quantity of indicator pollutants (such as $PM_{2.5}$ and O_3) in the air. From there, mitigative actions are planned and will be taken, as needed, in response to triggers and limits.[12] The Strategy also creates the framework for airshed zones or management bodies to be created.

Table 1: Air Quality Objectives and Standards

Substance	Averaging Time	Current Objective	Standard
O_3	One-hour daily max.	160 µg/m³ (82 ppb)	AAAQO
	Eight-hour daily max.[13]	63 ppb (62 ppb by 2020)	CAAQS
$PM_{2.5}$	24-hour average[14]	30 µg/m³ (27 µg/m³ by 2020)	AAAQO (current) / CAAQS (2020)
	Annual average[15]	10 µg/m³ (8.8 µg/m³ by 2020)	CAAQS
NO_2	One Hour	300 µg/m³ (159 ppb)	AAAQO
	One Hour	Under review	NAAQO
	Annual	45 µg/m³ (24 ppb)	AAAQO
	Annual	Under review	NAAQO

As part of the South Saskatchewan Regional Plan, the *South Saskatchewan Region Air Quality Management Framework*, was created to focus on the ambient air quality of the region. The *Framework* sets triggers and limits for O_3, $PM_{2.5}$ and NO_2. These include national and provincial triggers and limits (see Table 1).[16] In this report, air quality reporting is calculated in two different ways. One is measured by the concentrations of gaseous pollutants, which has been calculated in parts per billion (ppb). It is also calculated as micrograms of gaseous pollutants per cubic meter of ambient air (µg/m³).

For this report, Ozone, Fine Particulate Matter and Nitrogen dioxide have been chosen as indicators of environmental health in Lethbridge. These three are selected because they were highlighted as "substances of concern" in the South Saskatchewan Region Air Quality Management Framework.

Ozone (O_3)

Ozone in the upper atmosphere (10 to 50 kilometres above the Earth's surface) protects the Earth from the sun's harmful ultraviolet radiation. In the lower part of the atmosphere, it is harmful to human-health. Ground-level Ozone is a colourless gas that forms just above the Earth's surface. It is produced when Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOCs) react to sunlight and stagnant air.

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[12] *South Saskatchewan Region Air Quality Framework* (Government of Alberta, 2014), 7.
[13] Based on the 4th highest measurement annually, averaged over three consecutive years.
[14] Based on the 98th percentile annual value, averaged over three consecutive years.
[15] Based on the three-year average of the annual average concentrations.
[16] *South Saskatchewan Region Air Quality Framework* (Government of Alberta, 2014), 17.

95% of NO$_x$ is emitted by human activities, such as the burning of coal, gasoline and oil in motor vehicles, emissions from homes, industries and power plants. VOCs from human activity come mainly from gasoline combustion, upstream oil and gas production, residential wood combustion and the evaporation of liquid fuels and solvents. Significant quantities of VOCs are also produced naturally in coniferous forests.
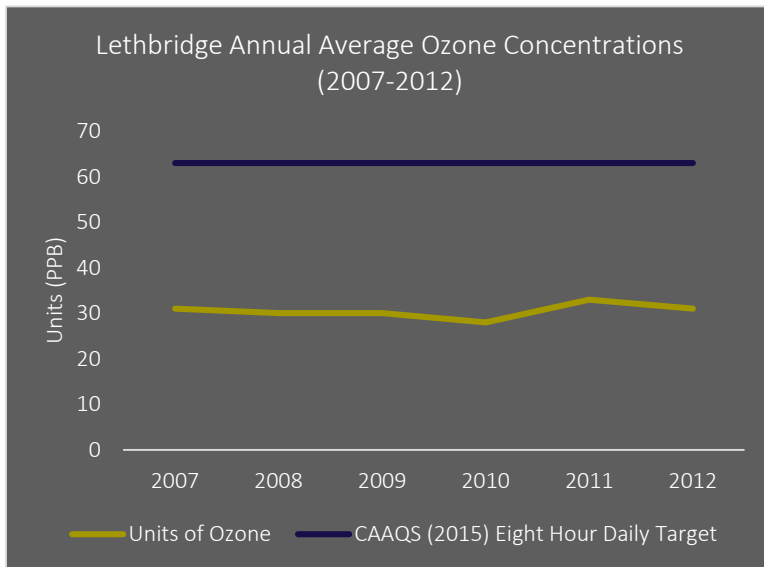
Figure 12: Lethbridge Annual Average ozone Concentrations (2007-2012)

Ozone is a major component of smog, and exposure to ozone has been associated with eye, nose and throat irritations, shortness of breath, exacerbation of respiratory conditions, chronic obstructive pulmonary disease and asthma, exacerbation of allergies and increased risk of cardiovascular disease. In Canada, since 1990, approximately 5% of cardio-pulmonary mortalities have been attributed to exposure to ozone. Ozone can also have a significant impact on vegetation and may decrease the productivity of some crops, where in plants that are more resistant to ozone will spread while less resistant plants will decline.[17]

Data from Alberta Health Services shows that ozone levels in Lethbridge have surpassed AAAQO levels once in the past ten years[18]. In Figure 12, the annual average concentration of Ozone from Lethbridge has been analyzed between 2007 and 2012, indicating that the average is well below AAAQO targets. However, this is only an annual average it does not show hours where the hourly AAAQO targets may have been exceeded. No hourly or daily disaggregated data relating to ozone was available at the time of writing.

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[17] Environment and Climate Change Canada, "Common air pollutants: ground –level ozone," www.canada.ca/en/environment-climate-change/services/air-pollution/pollutants/common-contaminants/ground-level-ozone.html, (February 8, 2018).
[18] Insufficient data is available from Alberta Health Services to determine precisely when this occurred.

Fine Particulate Matter (PM$_{2.5}$)

Fine Particulate Matter are particles that are found in the air, including dust, dirt, soot, smoke and liquid droplets. PM$_{2.5}$ is made up of particles that are less than 2.5 micrometers in diameter. Particles can be emitted directly or formed in the atmosphere by the transformation of gaseous emissions into secondary sources. PM$_{2.5}$ can be caused by road construction, transportation, agricultural operations, combustion activities, power plants, industrial processes, dust, mining activities and forest and grassland fires. Natural sources of PM$_{2.5}$ include forest fires. Lethbridge often hits maximum levels of PM$_{2.5}$ during the summer months.

PM$_{2.5}$ lodges deeply into the lungs. When inhaled, even small amounts of PM$_{2.5}$ can cause serious health problems, including cardiovascular and respiratory diseases. It has also been associated with eye, nose and throat irritation, shortness of breath, asthma, and the exacerbation of allergies, premature death and many other health issues. The young, elderly and those with acute illnesses are at the greatest risk. When PM$_{2.5}$ is taken up by plants from the soil it can reduce plant growth and productivity and can cause physical damage to plant surfaces via abrasion. PM$_{2.5}$ is one of the main components of smog, which can reduce the growth of crops, plants and trees. Fine particulate matter also impacts our built environment by accelerating the discolouration, fading and tarnishing of materials.
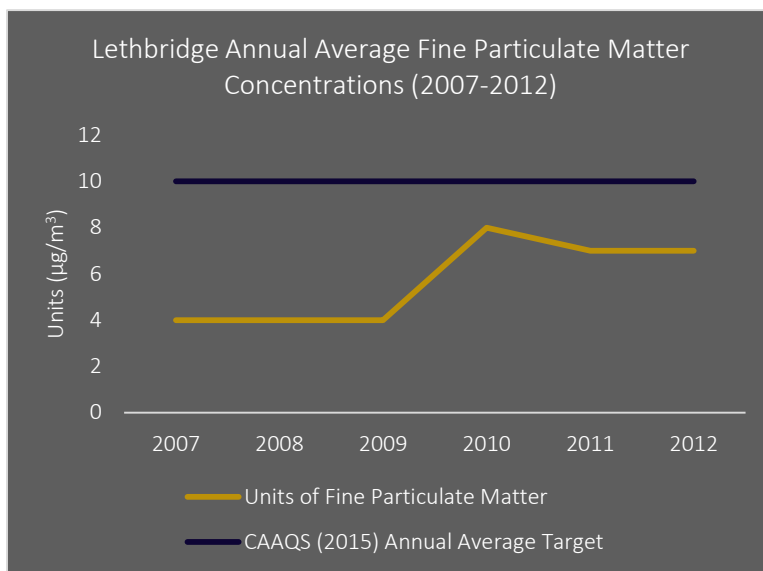
Figure 13: Lethbridge Annual Average Fine Particulate Matter Concentrations (2007-2012)

Figure 13 demonstrates the annual average concentration of PM$_{2.5}$ for Lethbridge as reported by Alberta Health Services. The data indicate that fine particulate matter had the highest instances of exceeding AAAQO objectives. The AAAQO objectives for a 24-hour period were surpassed 18 times between August 2006 and August 2016. No hourly or daily disaggregated data relating to fine particulate matter was available at the time of writing and so it is difficult to determine the source(s) of exceedances.

The *2011-2013 Canadian Ambient Air Quality Standards Reporting South Saskatchewan Air Zone* report classified the Lethbridge area at the "orange" management level for PM$_{2.5}$. The "orange" management level means that actions for preventing CAAQS exceedances must be taken. These actions are determined

by provincial and local authorities on a case by case basis. The management responses may vary depending on the situation but will begin by verifying if ambient air quality triggers or limits have been exceeded. Depending on the findings of air assessments and investigations carried out as part of the management response, determinations are made about contributing sources and the need for appropriate management actions. Management actions are place-based, and are designed to avoid future exceedances with a focus on maintaining or improving air quality.[19]

Nitrogen Dioxide (NO₂)

Nitrogen dioxide (NO_2) belongs to the group of Nitrogen Oxides (NO_x) that are emitted to the atmosphere from high-temperature combustion processes such as car engines, power plants and industrial processes. The main source of NO_x emissions is Nitric Oxide (NO) which, when it reacts with VOCs and O_3, forms NO_2. Major sources include on-road and off-road vehicles, oil and gas industry, electricity generation and heating. NO_2 is a precursor to $PM_{2.5}$ and contributes to acid deposition and eutrophication.

NO_2 has adverse health effects including irritation of the lungs, decreased lung function and increased susceptibility to allergies for people with asthma. It can also cause the acceleration of corrosion and degradation of building materials. NO_x/NO_2 is a major contributor of acid rain, which affects soils, bodies of water, vegetation, animals and can be harmful to building materials.

Figure 14: Lethbridge Annual Average Nitrogen Dioxide Concentrations (2007-2012)

In Lethbridge, the annual average concentration for NO_2 has been well below AAAQO guidelines. As stated above, this is only an average, but at present NO_2 in the air is not a major area of concern for Lethbridge. Data collected by Alberta Health Services shows that between August 2006 and August 2016, NO_2 guidelines were not exceeded.

Air quality is an important aspect of healthy functioning ecosystems, including the health of humans. As discussed in this section, air quality also impacts our economy, for example through agricultural and

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[19] *South Saskatchewan Region Air Quality Framework* (Government of Alberta, 2014), 30.

ecosystem functionality and productivity, and by increasing the burden of tax payers to fund health care costs associated with poor air quality. As has also been mentioned, because air quality outcomes (good and poor) flow across large landscapes and jurisdictions, the responsibility for regulating air quality outcomes and placing targets is shared across multiple jurisdictions and actors, including: national, provincial and state level governments, industry, local communities and community stakeholders / organizations more broadly (e.g., air shed societies).

Generally, we find that air quality in Lethbridge is good. All three main indicators highlighted in this report and by the SSRP (O_3, $PM_{2.5}$ and NO_2) have annual averages below applicable targets. However, more research is needed to better understand the shorter time-period threshold exceedances—particularly for Fine Particulate Matter—both in terms of contributing sources and possible preventative measures.

As the effects of climate change and continued urban expansion continue we expect to see our relative overall air quality decline. Climate change will bring with it added risk of forest and grassland fires not only in our backyard, but in other regions near and far, that will impact our air quality locally. Urban expansion coupled with population growth will impact air quality by adding more vehicles on the road, and through the construction of roads, homes and other facilities, all of which will increase the impacts of fine particulate matter, ozone and nitrogen dioxide, among other air pollutants.

However, the story is not so pessimistic. As will be shown in subsequent sections of this report, we have a strong intact urban canopy and native cottonwood forests that help to regulate air quality within the City. Ensuring long-term air quality in Lethbridge requires planning for and minimizing impacts to these community strengths. Another way to promote air quality is through the creation of an organization tasked with collecting, monitoring, reporting and providing education around air quality outcomes. These organizations are typically called air shed societies.

At the time of writing, there is no air shed society operating in southwest Alberta. This is not necessarily an indication that air quality outcomes in the region are good, nor is it necessarily a problem. However, it does mean that the only body tasked with the responsibility of managing air quality is the province of Alberta (through Alberta Health Services and Alberta Environment and Parks).

Like many of the other environmental and historic resources baseline data presented in this Chapter, the information presented here is a place to begin the conversation about future management and action on the part of the City. The creation of a local air shed society and the role society, and the possible role of the City of Lethbridge within that process will be discussed in the next chapter.

4.1.2 Water

The *Water* resource theme focuses on four issue areas: water use, water quality, water loss, and water management (flooding and drought). As the population and economy of Lethbridge continue to grow, and as our region experiences the impacts of climate change, it is essential that we ensure there is enough clean, safe water for everyone to support our shared environmental, social and economic needs.

Water is essential for every organism and ecosystem on our planet to survive and thrive. Humans, as components of ecosystems, are dependent upon water to satisfy our basic needs. However, unlike most other organisms, humans have the ability to leverage water resources for more complex activities such as economic development and recreation, and to grow food and other crops in landscapes not naturally or consistently (i.e., during periods of drought) conducive to such intensive cultivation; this is particularly the case in our prairie region. However, as we are part of larger ecosystems and networks of dependency, our reliance on water and our ability to alter hydrology for those more complex activities, impacts not only other organisms that rely on water, but also other humans and communities up and down stream.

Nearly 70% of the Earth's surface is covered in water and approximately half of all plant and animal species live in water. Water is often classified as being either surface water or ground water. Surface water refers to water found above ground, including water in rivers, lakes and wetlands. Surface water is principally renewed by precipitation, but also by groundwater, snowpack and glaciers. Ground water is found beneath the Earth's surface in gaps and porous spaces between materials such as gravel, sand or sandstone. These underground water bearing materials are called aquifers.[20] Aquifers are recharged when surface water percolates into the ground.

Alberta contains approximately 2.2% of Canada's fresh water.[21] More than 80% of Alberta's water supply is found in the northern part of the province, while 80% of the demand is in the south. Governed by Alberta's *Water Act*, the province is divided into seven major river basins. Citizens, communities, industry and government all share in the responsibility for water management. The Government of Alberta's guiding water policy document—Water for Life—includes three broad goals[22]:

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[20] *Facts about Water in Alberta* (Government of Alberta, 2010).
[21] *Facts about Water in Alberta* (Government of Alberta, 2010).
[22] Alberta Environment and Parks, "Water for Life", www.aep.alberta.ca/water/programs-and-services/water-for-life/default.aspx, (February 8, 2018).

SAFE, SECURE DRINKING WATER SUPPLY

HEALTHY AQUATIC SYSTEM

RELIABLE, QUALITY WATER SUPPLIES FOR A SUSTAINABLE ECONOMY

The South Saskatchewan Region is a vast area nearly 84,000 km^2 in size (12.6% of the entire province), and in 2014 was home to more than 2 million people. The South Saskatchewan River Basin, from which is derived the name of the Regional Plan, is divided into four smaller basins including the Bow, Oldman, South Saskatchewan and Red Deer River basins (see Figure 15). Lethbridge is a part of the Oldman River basin. The South Saskatchewan River Basin also includes all of the province's 13 irrigation districts.

Water in the South Saskatchewan Region is a crucial factor for the future sustainability of population and economic growth.[23] As the region continues to grow, matching water demand with water supply will continue to be a challenge and key issue. However, the sustainability of our water supply-use relationship, what we might call water security, is not a new issue. Since August 2007, the Oldman, Bow and South Saskatchewan Rivers have been closed to new surface water allocations and no new licenses are being issued, suggesting that water security in our region is threatened or may be in the future.

Water Security is defined by the United Nations as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related diseases, and for preserving ecosystems in a climate of peace and political stability. (UN-Water, 2013)

Box 6: What is Water Security?

To understand the challenges and issues of water in Lethbridge, we have to begin by looking at the watershed as a whole. The source of our water in Lethbridge is the Oldman River and its tributaries. The Oldman watershed basin covers approximately 23,000 km^2 in south-western Alberta and 2,100 km^2 in northern Montana.[24] Precipitation in the mountains on the western edge of the watersheds feeds the headwaters of the Oldman River and its tributaries. 36% of the watershed is comprised of water from the upper Oldman River and tributaries, 32% comes from the Belly and Waterton Rivers, 25% is contributed by the St. Mary River and 7% comes from other tributaries, which include Pincher Creek, Willow Creek and Little Bow River.[25]

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[23] *South Saskatchewan Regional Plan* (Government of Alberta, 2014), 64.
[24] Oldman Watershed Council, "State of the Watershed," www.oldmanwatershed.ca/publications-list/state-of-the-watershed, (February 8, 2018).
[25] Oldman Watershed Council, "State of the Watershed," www.oldmanwatershed.ca/publications-list/state-of-the-watershed, (February 8, 2018).

Figure 15: Map of the Oldman River Basin and Sub-Basins (source: Oldman River Watershed Council)
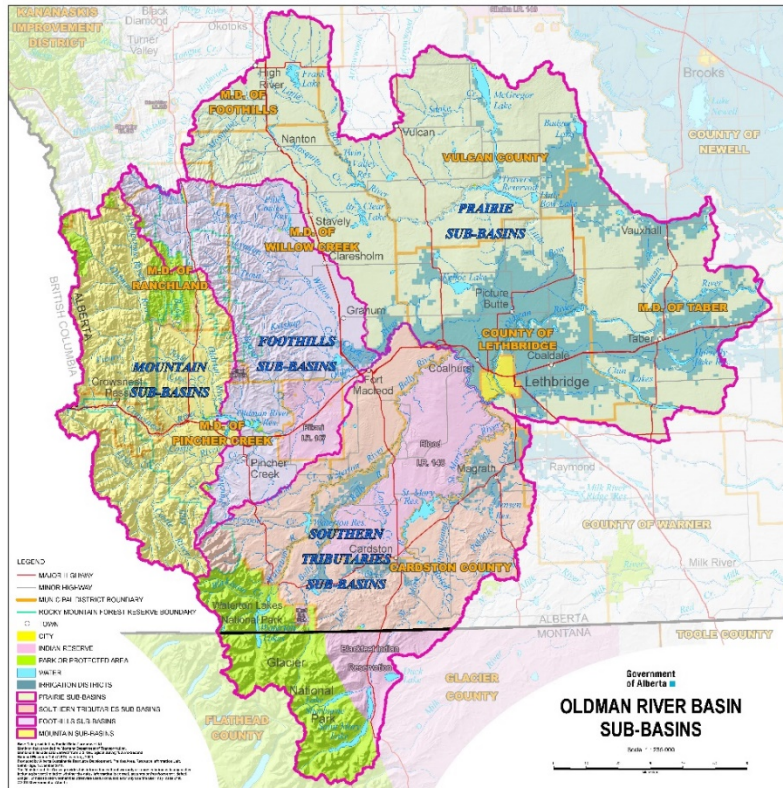
The Oldman Watershed covers a large area that includes vast changes in vegetation. There are mountains and the foothills which support coniferous and deciduous forests, while the plains support grassland and prairie vegetation.

The Oldman Watershed is divided into four sub-basins based on geological features: the mountain sub-basin, foothills sub-basin, southern tributaries sub-basin and prairie sub-basin.

Lethbridge is located in the prairie sub-basin. This sub-basin has a long history of alteration to support irrigation, so recorded flows are significantly altered from natural flows.[26] In the prairie sub-basin 60% of land is devoted to agriculture. Water in the sub-basin is managed partially with the use of dams, including the Oldman River Dam which has a reservoir of 490,000 dam³. The Oldman River dam has become an integral part of water management in the Oldman Watershed as it provides water for municipal, domestic, irrigation, industrial, recreation and other needs. The Oldman River Dam has operational flexibility which allows it meet the needs of riparian and aquatic environments (for example, spring discharges that mimic natural flooding cycles which support the health of Cottonwood forests in places like Lethbridge).[27]

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[26] Oldman Watershed Council, "State of the Watershed," www.oldmanwatershed.ca/publications-list/state-of-the-watershed, (February 8, 2018).

[27] Oldman Watershed Council, "State of the Watershed," www.oldmanwatershed.ca/publications-list/state-of-the-watershed, (February 8, 2018).

Water License Allocations in the Oldman River Watershed (2006)

Irrigation 90%
Stockwater 2%
Commercial 1%
Municipal 1%
Other 5%
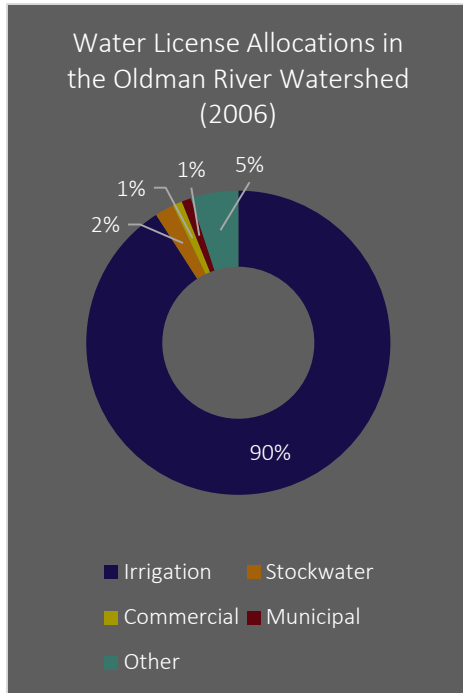
Figure 16: Water License Allocations in the Oldman River Watershed (2006)

In its natural state, the Oldman River is characterized by high spring flows from mountain snowmelt and runoff. In the late summer, fall and winter it is characterized by low flow as the water source is reduced to groundwater base flow and precipitation inputs.

The Oldman Watershed contains 40% of the irrigated land in Alberta. Licensed water allocations and water use are dominated by irrigation. Nearly every river in the watershed is part of an extensive network of storage reservoirs, canals and pipelines that store spring runoff and deliver water for irrigation during the growing season. Other users of water in the region are industry, water for communities, recreation facilities, waterfowl habitat, livestock and hydropower facilities. [28] The Figure 16 shows the major water users in the watershed (based on water license allocations).

Water Use

All of the water used by the City of Lethbridge comes from the Oldman River. Water from the Oldman River is processed through the water treatment plant into our drinking water. On average the water treatment plant processes 53 million litres of river water into high quality drinking water on a daily basis.[29]

The City of Lethbridge water distribution system consists of 570 km of water mains and six reservoirs with pump stations. The water mains and pump stations deliver water to residences, businesses and institutions throughout the City and in some cases, neighbouring communities. The water treatment plant is capable of treating approximately 150 million litres of water per day.[30]

Water consumption in North America is significantly higher than other parts of the world. The average North American person uses an average of 400 litres per day (compared to 200 in Europe and 10 to 20

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[28] Oldman Watershed Council, "State of the Watershed," www.oldmanwatershed.ca/publications-list/state-of-the-watershed, (February 8, 2018).

[29] City of Lethbridge, "Water," www.lethbridge.ca/living-here/water-wastewater/Pages/Water.aspx, (February 8, 2018).

[30] City of Lethbridge, "Water," www.lethbridge.ca/living-here/water-wastewater/Pages/Water.aspx, (February 8, 2018).

litres per day in Sub-Saharan Africa[31]). This is perhaps due to the relative ease with which many North Americans access fresh, clean water and because we use potable water in all aspects of our everyday life.

Daily per Capita Water Use in Select Alberta Cities (2010-2015)
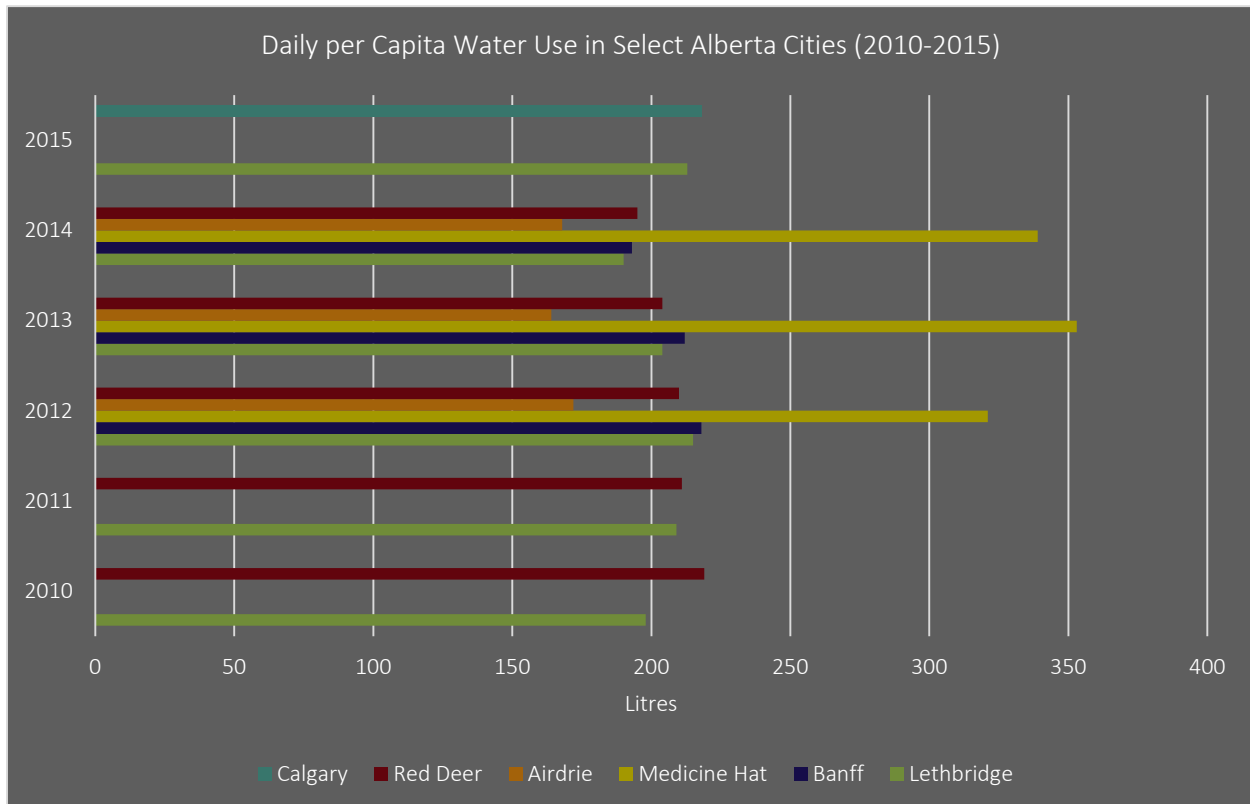
Figure 17: Daily per Capita Water Use in Select Alberta Cities (2010-2015)

One notable deviation from the North American norm may be First Nations communities in Canada, many of which continue to experience substandard or threatened access to clean drinking water.

In 2015, the average Lethbridge resident consumed 213 litres of water a day, which equates to roughly 77,764 litres per year. Monthly averages remain fairly consistent throughout most of the year, with the exception of the summer when water use increases as people use more water for outdoor uses.

Per capita water usage in Lethbridge and other cities in Alberta is relatively similar (Figure 17). In Alberta, average daily water consumption is 169 litres per capita (2013). That same year, average daily per capita water use in Lethbridge was 203 litres. Figure 18, indicates per capita water usage changes in Lethbridge between 2010 and 2015.

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[31] World Water Council, "The Use of Water Today," www.worldwatercouncil.org/fileadmin/wwc/Library/WWVision/Chapter2.pdf, (February 8, 2018).
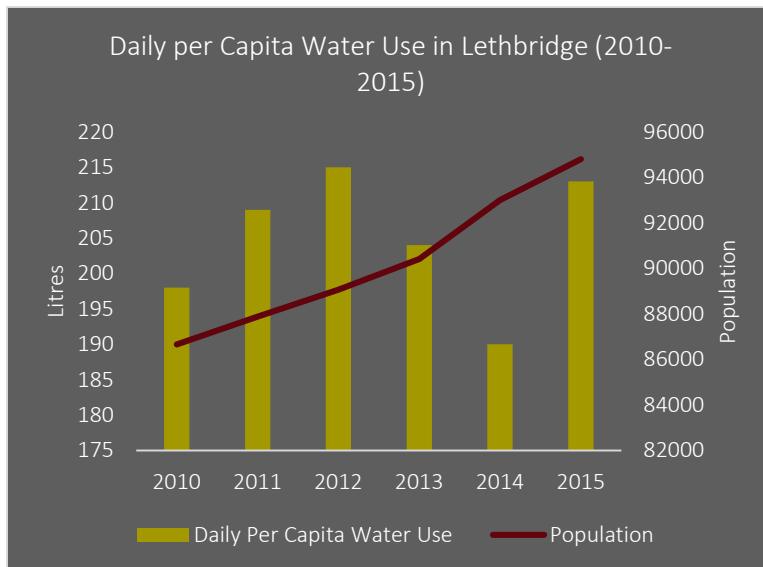
Figure 18: Daily per Capita Water Use in Lethbridge (2010-2015)

After water has been used, it enters into the wastewater system, through a series of lift stations and gravity-feed pipes which transport it to the wastewater treatment plant (WWTP) in North Lethbridge. The WWTP treats on average 40 million litres of water each day, however during severe rain events that number can increase substantially (two to three times as much). The WWTP treats wastewater in a chemical tree process that includes mechanical separation (e.g., filtration and settling), the use of anaerobic organisms to remove pollutants and the application of UV lights. The biofuel produced through that process are fed into a co-generation system that powers a significant portion of the WWTP's operations. Wastewater then leaves the WWTP and re-enters the Oldman River. Periodic water sampling indicates that the water discharged by the WWTP is cleaner than water entering the water treatment plant further upstream in south Lethbridge. At the time of writing the WWTP is currently planning for upgrades that will significantly increase its water treatment capacity (including its capacity to handle large rain events), as well as to decrease the environmental footprint of the flaring that takes place as part of the co-generation process.

Storm water refers to water that accumulates on the surface of the City through precipitation, but which does not soak into the ground. Storm water flows down rooftops, over paved areas like driveways and roads, bare soil and lawns. As it flows, storm water runoff collects plant debris (like leaves and seeds), animal waste, litter, salt, pesticides, fertilizers, oils and greases, soil and other potential pollutants. In Lethbridge, as in many other municipalities, storm water joins with surface water untreated (such as the Oldman River, a wetland or a human-made storm pond).

The introduction of contaminated water can have a large impact on water quality.

Box 7: What is Storm Water?

Water Quality

Water quality takes into account two main water sources: surface water and storm water; each having varying contributing factors that affect water quality. Water quality testing is undertaken by many different stakeholders including the federal, provincial and municipal governments, facilities that hold government approvals or licenses, and academic research initiatives[32]. The frequency of testing is dependent on what is being tested for and who is doing the testing. For example, bacteria and nutrient indicators are tested for monthly, metals

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[32] *South Saskatchewan Region Surface Water Quality Management Framework* (Government of Alberta, 2014), 12.

and pesticides are tested on a quarterly basis, and certain industrial water users have their wastewater sampled each day.[33] The Alberta River Water Quality Index[34] summarizes complex data that is received from monitoring stations into a simple descriptor of water quality and provides a snapshot of annual water quality conditions. These include:

EXCELLENT   Guidelines are almost always met.

GOOD   Guidelines are occasionally exceeded, but usually by small amounts. Threat to quality is minimal.

FAIR   Guidelines are sometimes exceeded by moderate amounts. Quality occasionally departs from desirable levels.

MARGINAL   Guidelines are often exceeded, sometimes by large amounts. Quality is threatened and often departs from desirable levels.

POOR   Guidelines are almost always exceeded by large amounts. Quality is significantly impaired and is well below desirable levels. This is considered the "worst" water quality.

There are many factors that influence water quality. A major factor is the fluctuation between river flow in the spring and summer when water flow is high due to snow melt and spring rains, before decreasing into the fall and winter. This can impact the amount of total suspended solids and turbidity in the water during the spring and summer. Other factors that influence water quality include land-use activities such as logging, the use of off road vehicles, modification in river flow caused by water diversion, reservoir operations, irrigation district return flow and stormwater runoff from streets and driveways.

Water quality data was gathered from the *South Saskatchewan Regional Plan Surface Water Quality Management Framework* and *Storm Water Outfalls Monitoring Studying*. The *South Saskatchewan Regional Plan Surface Water Quality Management Framework* establishes the indicators, triggers and limits for surface water quality in our region, and evaluates two sites that are of high relevance to the City. The first is upstream of Lethbridge, where the Oldman watershed transitions into a prairie landscape and receives inflow from the Belly River and the St. Mary River. In this area, agriculture is the major land use and irrigation diversion affects river flow during the summer months. The Water Quality Index rates

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[33] *South Saskatchewan Region Surface Water Quality Management Framework* (Government of Alberta, 2014), 12.
[34] Alberta Environment and Parks, "Alberta River Water Quality Index," www.aep.alberta.ca/water/reports-data/alberta-river-water-quality-index.aspx, (February 8, 2018).

water quality as "good" in this area (with exceptions during years with high water runoff).[35] Long-term water quality studies for data collected between 1996 and 2005 find that water quality has remained the same or improved, particularly for some nutrients and fecal coliform bacteria.[36]

The other site that the *South Saskatchewan Regional Plan Surface Water Quality Management Framework* evaluated is downstream of Highway 3 before the confluence of the Bow River reach. This is the lower-most reach of the Oldman River and is the most influenced from the cumulative impacts of upstream activities and modifications on the river (e.g., dams and reservoirs). These activities include: surrounding agricultural activities, municipal wastewater and stormwater discharges, and industrial activity. The Water Quality Index results rate the water quality as "good" in most years, but only "fair" in high flow years.[37] Nutrient levels are a frequent reason for reduction in index values, with bacteria and occasionally pesticides impacting water quality.

The *Storm Water Outfalls Monitoring Studying* was commissioned by the Oldman Watershed Council and the City of Lethbridge to evaluate the quality of the storm water that is entering the Oldman River and the impacts it is having on water quality. Samples were taken from storm water outfalls between 2012 and 2014. These samples were taken once a month from April to September 2012 through to 2014. Additional testing was done during major rainfall events. The study focused on measurements on turbidity and analysis of thermophilic fecal coliforms (Escherichia coli), pesticides and nutrients at eight outfalls and catchment areas, as well as three Oldman River Sites and one creek site at Six Mile Coulee Creek. All sites are within City limits.

Some key observations of the *Storm Water Outfalls Monitoring Studying* are presented in the following table:

TURBIDITY	Turbidity, or cloudiness, of the water is determined by the presence of suspended particles such as clay, silt, organic matter and living organisms. High turbidity may reduce light transmission, and therefore reduce photosynthesis of aquatic plants.[38]
	Turbidity levels are highest in river water. With the exception of samples obtained during or after rainfall events, turbidity values in storm water were low and within guidelines for turbidity in the Alberta Surface Water Quality Guidelines for

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[35] *South Saskatchewan Region Surface Water Quality Management Framework* (Government of Alberta, 2014), 19.
[36] *South Saskatchewan Region Surface Water Quality Management Framework* (Government of Alberta, 2014), 19.
[37] *South Saskatchewan Region Surface Water Quality Management Framework* (Government of Alberta, 2014), 19.
[38] Alberta Environment and Parks, "FAQs and Glossary," www.aep.alberta.ca/water/programs-and-services/surface-water-quality-program/faqs-and-glossary.aspx, (February 8, 2018).

Recreational Waters. Overall, turbidity levels are not a major concern for water quality in Lethbridge.

Turbidity of the Oldman River was generally higher than observed in storm water. The turbidity of river water was highest in the spring and decreased over the summer.

MICROBIOLOGY   Coliform bacteria are microorganisms that primarily originate in the intestines of warm-blooded animals. Thermophilic coliforms represents an important indicator that measures the presence of fecal matter in the water: if coliform is present, fecal coliform may also be present.

Thermophilic coliforms were present at varying densities along the river upstream of Lethbridge. This likely has multiple sources, including human beings, livestock and wildlife.[39] Higher densities of thermophilic coliforms were present downstream as compared to upstream of Lethbridge. Levels of thermophilic coliforms in river water remain within guidelines.

PESTICIDES   Pesticides are chemical compounds used to control unwanted species that attack crops. This diverse group of chemicals (organic and inorganic) includes herbicides, fungicides and insecticides.[40] Pesticides can impact water quality for irrigation, recreation, drinking and livestock watering. Presently, most pesticides do not have guidelines and the most persistent upward trends in their use can be linked to human influences, such as the use of pesticides on lawns and gardens.

More pesticides were detected downstream of Lethbridge than upstream.[41] Pesticides in water obtained from upstream of the waste water treatment plant were comparable to those observed in river water collected upstream of Lethbridge. This suggests that while pesticide concentrations are high in storm water, once storm water mixes with the Oldman River, concentrations are much lower.[42]

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[39] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[40] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[41] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[42] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).

WATER CHEMISTRY AND NUTRIENT ANALYSIS

Nutrients in water are necessary for ecosystems to thrive and remain healthy. However, in too large of quantities they can have detrimental effects. These can include undesirable algae and plant growth impairing aesthetic and recreational values and reductions in oxygen levels and biodiversity.[43] Some or all of these effects can reduce the quality of water in our rivers and overall ecosystem function.

Over the three years that the *Storm Water Outfalls Monitoring Study* tested water quality, there was a consistent trend that nutrient levels are increasing in the storm water and that they have been going well-above guidelines and acceptable water quality standards.

Ammonia is a nutrient frequently present in water and concentrations vary seasonally and regionally. Ammonia levels have steadily risen in the Oldman River. In 2013, the river was 36% above guidelines. In 2014, it jumped to 61% above guideline recommendations. This upward trend is likely due to increased human activity.

Nitrate levels were below the Canadian Water Quality Guidelines for the Protection of Aquatic Life, which is 3.0 mg/l. Most samples tested below 1 mg/l.

Total nitrogen (TN) constitutes ammonia, nitrite, nitrate and organic nitrogen. The median level of TN that in river water was 3 mg/l. This is much lower than median levels in storm water.[44]

Dissolved phosphorus (DP) concentrations tend to be higher in late summer (July to September). The average median DP concentrations from all storm drain discharges was approximately 3 times greater than that of river water (0.32 mg/L as compared to 0.10 mg/L).[45]

Total Phosphorus (TP) guidelines are currently under review. There have been notable increases is TP in the Oldman River, and levels in river water are higher than storm water.[46]

[43] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[44] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[45] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).
[46] *Lethbridge Storm Water Outfalls Monitoring Study* (Oldman Watershed Council, 2016).

STORM PONDS

Stormwater ponds (also known as stormwater management facilities) are used to store excess storm water during heavy precipitation events. Stormwater ponds are designed to allow storm water to enter during events and control the release of excess water afterwards to prevent flooding.

At the time of writing, there were 26 storm ponds that are located through the City. It is estimated that 46.6% (or approximately 1600 hectares) of the City's total developed areas are serviced by stormwater ponds.

Stormwater quality in Lethbridge and all municipalities faces many challenges. The growing presence of *E. Coli* and other thermophilic coliforms, the increase in pesticide concentrations year-over-year and the growing concern that nutrient levels are above guidelines create continued concerns and challenges. Challenges include: the accumulation of pesticides, fertilizers, pet waste and the dumping of other chemicals. Once these pollutants enter the Oldman River they have the ability to impact water quality downstream from Lethbridge.

Water Loss

Water loss is "unaccounted for" water from the City of Lethbridge's water utility that is also referred to as "non-revenue water". It has been produced (treated and ready for consumption) and is "lost" before it reaches the customer. Losses can be real losses or apparent losses. Real losses are when water escapes the water distribution system including leakage and storage overflows. Apparent losses occur due to meter inaccuracies, billing system data errors, watering City parks and unauthorized consumption. Both types of loss result in a waste of large amounts of treated, drinkable water, which has a direct cost to the municipality (and ultimately tax payers).

Municipal water loss varies across Canada. Alberta's municipal sector has a volume of "unaccounted for" water at 10% of total water use, among the lowest of any region in Canada.[47] Figure 19 shows a comparison of municipal water loss by region[48].

In Lethbridge, water loss by utilities is very low. The City of Lethbridge has been proactive about water loss by determining how healthy the aging pipes and systems are, resulting in a general decline in water main breaks over the past 40 years. Fixing these issues before it turns into a significant problem has been a priority for the City.
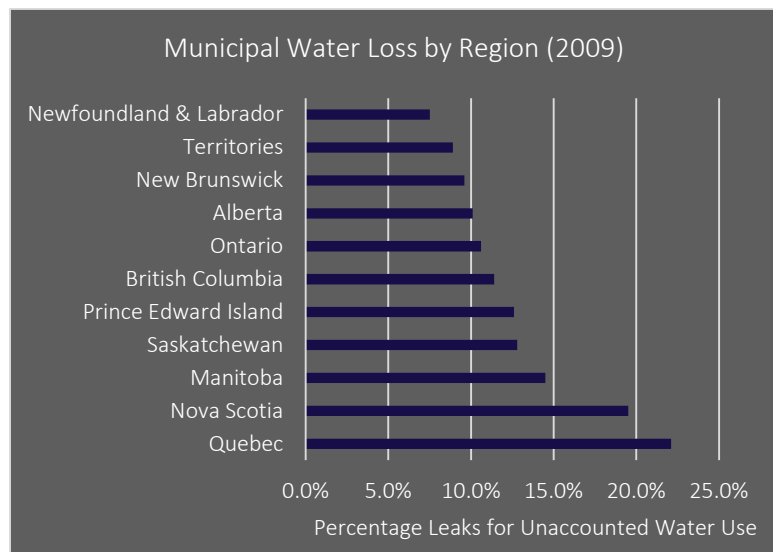
Figure 19: Municipal Water Loss by Region (2009)

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[47] City of Lethbridge, "Water," www.lethbridge.ca/living-here/water-wastewater/Pages/Water.aspx, (February 8, 2018).

[48] Environment and Climate Change Canada, "Municipal Water and Wastewater Survey," www.ec.gc.ca/eau-water/default.asp?lang=En&n=ED7C2D33-31.
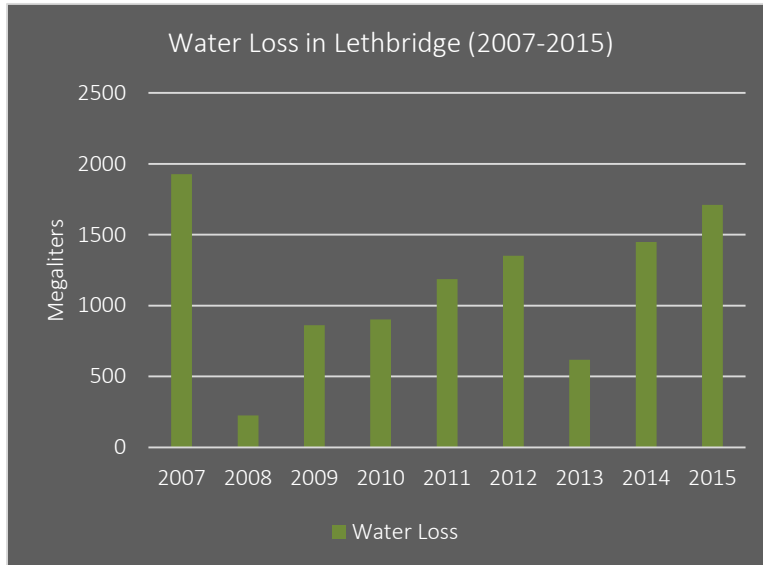
Figure 20: Water Loss in Lethbridge (2007-2015)
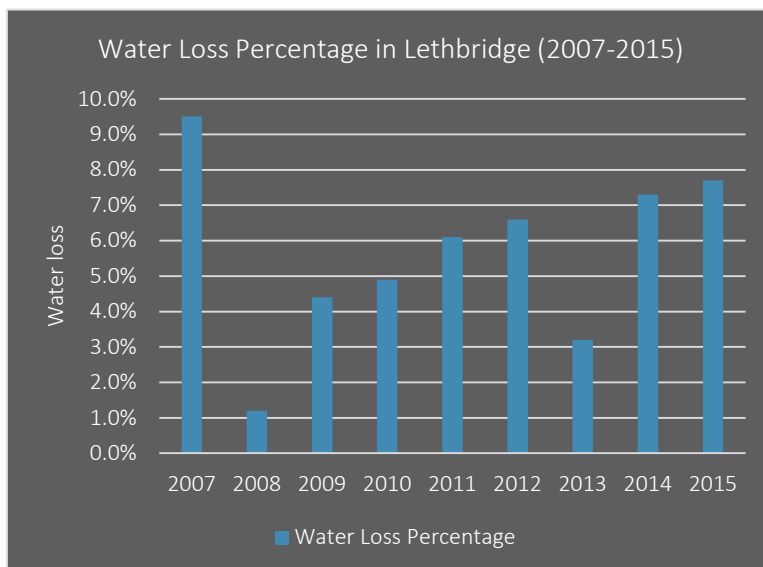
Figure 21: Water Loss Percentage in Lethbridge (2007-2015)

20 demonstrates that in Lethbridge there are limited amounts of water loss (as a percentage of the total amount of water produced in Lethbridge). There is a small fluctuation but, for the most part, these numbers have stayed similar over the past nine years. Water loss averaged 5.6% since 2007, approximately half of the Alberta average.

Limiting water loss is important so that large amounts of water are not wasted and to maintain well-functioning infrastructure.

Water Management

Water management speaks to our ability as a municipality to manage extreme water events: including both flooding and drought conditions.

Overland flooding is a major concern for many towns and cities across Canada, as urban development has often occurred in areas prone to flooding. Major flooding events can be devastating to residents, threatening their safety, properties and the quality of drinking water. Flooding can also impact businesses when it disrupts the economy or harms critical infrastructure such as bridges and highways needed to transport goods, or telecommunications infrastructure. While flooding is potentially damaging to a community, it is important to remember that floods are naturally occurring events and the functioning of certain aspects of our ecosystem depend on natural floods (e.g., such as our Cottonwood forests).

Figure 22: Image showing severe flooding in June 1908 (Source: Galt Museum & Archives)

Historically, Lethbridge has responded to flooding by moving settlements out of harm's way, and developing above the flood plain. Over the past several decades, Lethbridge has also been successful at creating policy to limit development within the Oldman River valley, thereby minimizing impacts to crucial riparian areas which are necessary to support water management during floods. Much of this work has been in reaction to large flooding events. Within the developed areas of the City, flooding periodically occurs due to large rainfall events, and when it does, it can significantly impact residents' homes and businesses (e.g., basement flooding). Overland flooding is of particular concern in many of our City's older neighbourhoods because of many different factors, including topography and the limited stormwater management infrastructure that is in place (often due to the age of neighbourhoods). As discussed above, the City has historically maintained and replaced water infrastructure with success, as well as incorporating water management facilities (e.g., storm ponds) in newer neighbourhoods to handle large overland events. At the time of writing, the planned upgrades to the WWTP will in turn increase the capacity and resiliency of the facility during times of significant rainfall events.

What does Climate Change look like in our region when it comes to water?

Alberta Climate Records is a digital data repository run by the Kienzle Hydrology Lab at the University of Lethbridge. It contains a dataset of nearly 5 million observed climate records between 1950 and 2010. The database documents changes to the Alberta climate in that period. Key messages as they related to water during the period 1950-2010, include:

- Annual average temperatures have increased 1-2°C in Southern Alberta, with winters showing the strongest warming.
- The number of very cold days (when minimum temperature falls below -10°C) has about halved across Alberta.
- With the exception of high elevation areas, snowfall is being replaced by rainfall.
- The growing season has lengthened by between 2 and 5 weeks per year.

This data points to changes in the hydrological cycle where there is less snowpack accumulating in the headwaters due to warmer winters and less snowfall. This means that there is potentially less water available later in the year. At the same time our populations in the region are growing, and so too is the length of our agricultural season, both of which will place added demand on water.

Taken together, this suggests added stress and competition for water resources in our region.

Source: Alberta Climate Records (www.abrecords.cfapps.io/)

Box 8: Anticipated Climate Change Impacts in Lethbridge

On the other end of the water management spectrum, is drought. With continued population, agricultural and industrial growth within the broader watershed region, water resources will be sustained pressure in the future. As well, the impacts of climate change, which include significant and unpredictable precipitation events, means that proactive management is necessary.

In 2016 the City of Lethbridge amended the Water Services Bylaw (Bylaw 5995) to add in a new Water Rationing Action Plan that can be implemented, on an as needed basis. The Water Rationing Action Plan includes the ability to restrict the days and times when residential watering can be done, discouraging car washing and limiting non-essential municipal water uses (e.g., spray parks). This bylaw has not yet been enforced, but has been created to be proactive in educating the community in the case that water rationing is required in the future.

 The City of Lethbridge also provides more general education to the community on water conservation. Programs such as Yellow Fish Road and Adopt-a-Storm Drain educate the community on stormwater awareness (which includes both water conservation and water quality outcomes). Stormwater flows directly to the Oldman River, untreated. The education provided through these programs helps make residents aware that what happens in your own yard, also affects water quality and cumulative water use in our community. By being water conscious, we can reduce water consumption and water contamination.

The City of Lethbridge also encourages residents to conserve water within their households too. Education around general water use within households, such as shower lengths, or running tap water, as well as how to check for water leaks, is provided on an on-going basis to the community.

4.1.3 Biodiversity and Ecosystems

The City of Lethbridge recognizes the importance of maintaining a healthy environment, which includes healthy ecosystems and strong biological diversity (biodiversity). Residents are concerned with the degradation of ecosystems and the loss of animal and plant species which have resulted from human activity across the watershed. Because ecosystems perform functions that are essential to human existence, as represented in the ecosystem services wheel presented in this report (Figure 6), protecting them is akin to protecting the social, economic and environmental integrity of our entire community.

Biodiversity refers to the variety of life; that is, the variety of species and ecosystems on Earth and the ecological process of which they are a part. There are three components to biodiversity: ecosystems, species, and genetic diversity.[49]

Ecosystems are a biological community of interacting organisms and their physical environments. Biodiversity is a key factor in the health of an ecosystem. As an ecosystem service, biodiversity enhances the ability of ecosystems to provide benefits that flow across our landscapes and support the environment. Ecosystems interact with each other, and their success or degradation is dependent on each other and on the functioning of the constituent pieces of each ecosystem (which includes humans). Disturbing and altering an ecosystem can reduce biodiversity, which can change the way that organisms interact with each other and with physical and chemical environments.[50]

Like all aspects of the environment, biodiversity and ecosystems are not bound by lines drawn on maps. They flow across landscapes and are subject to natural constraints, processes and features. However, as human impacts on the landscape have impacted natural constraints, processes and features, additional human intervention (for better or worse), in the form of management, has become necessary.

Biodiversity is managed by all levels of government, who have focused on conservation and protection of ecosystems and the biodiversity within these ecosystems. Due to this, we must look at biodiversity in Canada, Alberta, the South Saskatchewan Region and within Lethbridge as they all need to work together to maintain and protect biodiversity.

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[49] Government of Canada, "Canadian Biodiversity Strategy," www.biodivcanada.ca/default.asp?lang=En&n=560ED58E-1, (February 8, 2018).
[50] World Health Organization, "Climate change and human health", www.who.int/globalchange/ecosystems/biodiversity/en, (February 8, 2018).

Biodiversity in Canada

As protecting and preserving biodiversity in Canada has been seen as a priority, the Government of Canada (with the support of provincial and territorial governments) signed and ratified the United Nations Convention on Biological Diversity in 1992. This document is a global and national instrument for promoting and guiding efforts to conserve biodiversity. From this, *the Canadian Biodiversity Strategy* (CBS) was developed. The responsibility of the CBS is shared among the federal, provincial/territorial and municipal governments. The CBS includes five goals:[51]

1   Conserve biodiversity and use biological resources in a sustainable manner

2   Improve our understanding of ecosystems and increase our resource management capability

3   Promote an understanding of the need to conserve biodiversity and use biological resources in a sustainable manner

4   Maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources

5   Work with other countries to conserve biodiversity, use biological resources in a sustainable manner and share equitably the benefits that arise from the utilization of genetic resources

The CBS also serves as a guide for local and regional governments, business and industry, conservation groups, educational and scientific intuitions and interested individuals. Over the past two decades, federal, provincial and territorial governments have developed and implemented a wide range of laws, policies and programs that support the five goals listed above so as to conserve biodiversity in Canada.[52]

Figure 23: Natural Regions of Alberta (source: Royal Alberta Museum)

Biodiversity in Alberta

Alberta is home to thousands of species of which the majority are arthropods, fungi and algae. Less than 2% are fish and wildlife.[53] Roughly 4% of Alberta's biodiversity have been

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[51] Government of Canada, "Canadian Biodiversity Strategy," www.biodivcanada.ca/default.asp?lang=En&n=560ED58E-1, (February 8, 2018).

[52] Government of Canada, "Canadian Biodiversity Strategy," www.biodivcanada.ca/default.asp?lang=En&n=560ED58E-1, (February 8, 2018).

[53] *Profile of the South Saskatchewan Region* (Alberta Environment and Parks, 2009).

described and named.[54] There are still plenty of species left to be discovered. Canadian Parks and Wilderness Society (CPAWS) have created a list of the approximate number of species in Alberta (Table 3).

Table 2: Species in Alberta

Taxonomic Group	Approx. Number of Species in Alberta
Birds	330
Mammals	100
Armoured Mite (<300 um)	351
Vascular Plants	1500
Mosses and Liverworts	640
Lichen	580
Aquatic Macro Invertebrates	1600

Protecting biodiversity is an important role of the provincial government. Linked to the maintenance of biodiversity is the conservation of landscapes. Conserving a range of landscapes that are representative of Alberta's natural diversity provides for habitat that will support and maintain species and aspects of biodiversity. In Alberta there are six major Natural Regions:

BOREAL NATURAL REGION

CANADIAN SHIELD NATURAL REGION

FOOTHILLS NATURAL REGION

GRASSLAND NATURAL REGION

PARKLAND NATURAL REGION

ROCKY MOUNTAIN NATURAL REGION

The Grassland Natural Region occupies approximately 96,000 km^2, or 14% of Alberta stretching from the Rocky Mountains and foothills east to the Saskatchewan border, and south to the Montana border. The Grassland Natural Regional has four sub-regions: dry mixedgrass, mixedgrass, northern fescue and foothills fescue. Lethbridge is a part of the Mixedgrass Natural Sub-region, an area characterized by native prairies. It is an expanse of level and gently undulating semi-arid prairie broken in places by coulees and valleys. The warm, dry climate supports grasses, shrubs and herbs that are adapted to summer drought. It is an intensely cultivated area with scattered remnant prairies, urban development and resource extraction and distribution.

Habitat conservation is an important component of supporting biodiversity. The Government of Alberta has created Alberta's Natural Regions Landscape Classification Framework that identifies natural landscapes found in the province. Connectivity of wildlife habitat across landscapes, within the region and across regions (including across municipal, provincial and national boundaries), is also an important factor in maintaining biodiversity.

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[54] Canadian Parks and Wilderness Society, "South Saskatchewan Regional Plan Strategies Biodiversity Management Framework, www.cpaws-southernalberta.org/upload/SSR_Phase2_BMF_Preworkshop_Package_March_11_2015.pdf, (February 8, 2018).

The Alberta Biodiversity Monitoring Institute (ABMI), the *Wildlife Act* and the *Protection of Species of Risk Act* all act as tools to monitor biodiversity in Alberta. They work together to monitor current environmental conditions and management processes for recovering ecosystems and species at risk. The planning and management processes that have been put into place by the Government of Alberta are then further developed and implemented at regional and municipal levels.

Biodiversity in the South Saskatchewan Region

The South Saskatchewan Watershed basin, as one of those regions, has a wealth of biodiversity. It provides an important connection for wildlife movement between Alberta, British Columbia, Montana and Saskatchewan. The region spans four of Alberta's six Natural Regions—Grassland, Parkland, Foothills and Rocky Mountains—and eleven of Alberta's 21 Natural Sub-regions (five of which are only found in the South Saskatchewan Region). The region provides habitat, food and breeding grounds for 17 sport fish species, over 700 vascular plants, and numerous birds and mammal species.[55] Its vegetation supplies an important food source for numerous wildlife species, and supports a substantial invertebrate community which in turn fertilizes many plants and feeds birds and amphibians. This region is also an important traditional source of food, medicine, cultural identity and spirituality for Indigenous peoples.

The SSRP includes a Biodiversity Management Framework (BMF). The BMF includes biodiversity objectives for the planning of the region and provides context for managing the cumulative effects of competing land use interests on the landscape.

The BMF seeks to conserve and maintain the benefits of biodiversity in the South Saskatchewan Region, however does not endeavor to restore historical levels of biodiversity present before the arrival of European settlers. Once implemented, the BMF will monitor biodiversity indicators, representing species and habitats from terrestrial and aquatic ecosystems against trigger values. Triggers are a type of threshold that have been defined in the *Alberta Land Stewardship Act* as "a limit, target, trigger, range, measure, index or unit of measurement." Triggers are the quantitative basis for evaluating biodiversity conditions and assessing whether the framework objectives are being achieved.[56] The outcome of the BMF is that biodiversity and ecosystems function are sustained with shared stewardship. Specific objects for biodiversity outlined in the BMF are:

- Terrestrial and aquatic biodiversity are maintained;
- Long-term ecosystem health and resiliency is maintained;
- Species at risk are recovered and no new species at risk are designated; and

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[55] *South Saskatchewan Region Biodiversity Management Framework* DRAFT (Government of Alberta, 2015), 9.
[56] *South Saskatchewan Region Biodiversity Management Framework* DRAFT (Government of Alberta, 2015), 35.

- Biodiversity and healthy, functioning ecosystems continue to provide a range of benefits to communities in the region and all Albertans, and there is sustainable use of Alberta's biodiversity resources.

The BMF builds upon the foundation of legislation, policy and management practices that currently support biodiversity in Alberta and Canada and seeks to improve land use practices so that the biodiversity we see today will be maintained into the future.

Biodiversity in Lethbridge

Lethbridge is endowed with a rich natural landscape. Grasslands, coulees, wetlands and the river floodplain each have their own distinct ecosystem and species. Within a short walk of their homes, residents can see everything from lush cottonwood forests to dry, cacti-covered coulee slopes. Lethbridge is surrounded by grassland and cultivated farmland with the Rocky Mountains just off in the distance. The City of Lethbridge is fortunate to be home to one of the largest urban park systems in North America, at over 1600 ha.

The wide range of flora and fauna contribute to the river valley's biodiversity. The Oldman River Valley has a diverse landscape and provides the community with all of the major ecosystem services: supporting (e.g., habitat and soil formation), provisioning (e.g., food and medicinal resources), regulating (e.g., water purification and carbon storage) and cultural (e.g., cultural identity and recreation and tourism). The river valley's landscape of grasses, shrubs and trees are an important wildlife habitat that provides an important migratory corridor through the heart of the City.

Map 1 indicates the important wildlife connectivity areas in the City. As Map 1 shows, they are almost exclusively found within the Oldman River Valley, including tributary areas like Six Mile Coulee in the south east part of the City. These important connectivity areas do not exist in isolation, as they are part of a much larger system of wildlife and ecosystem interconnections found in other municipalities, regions, provinces and countries.
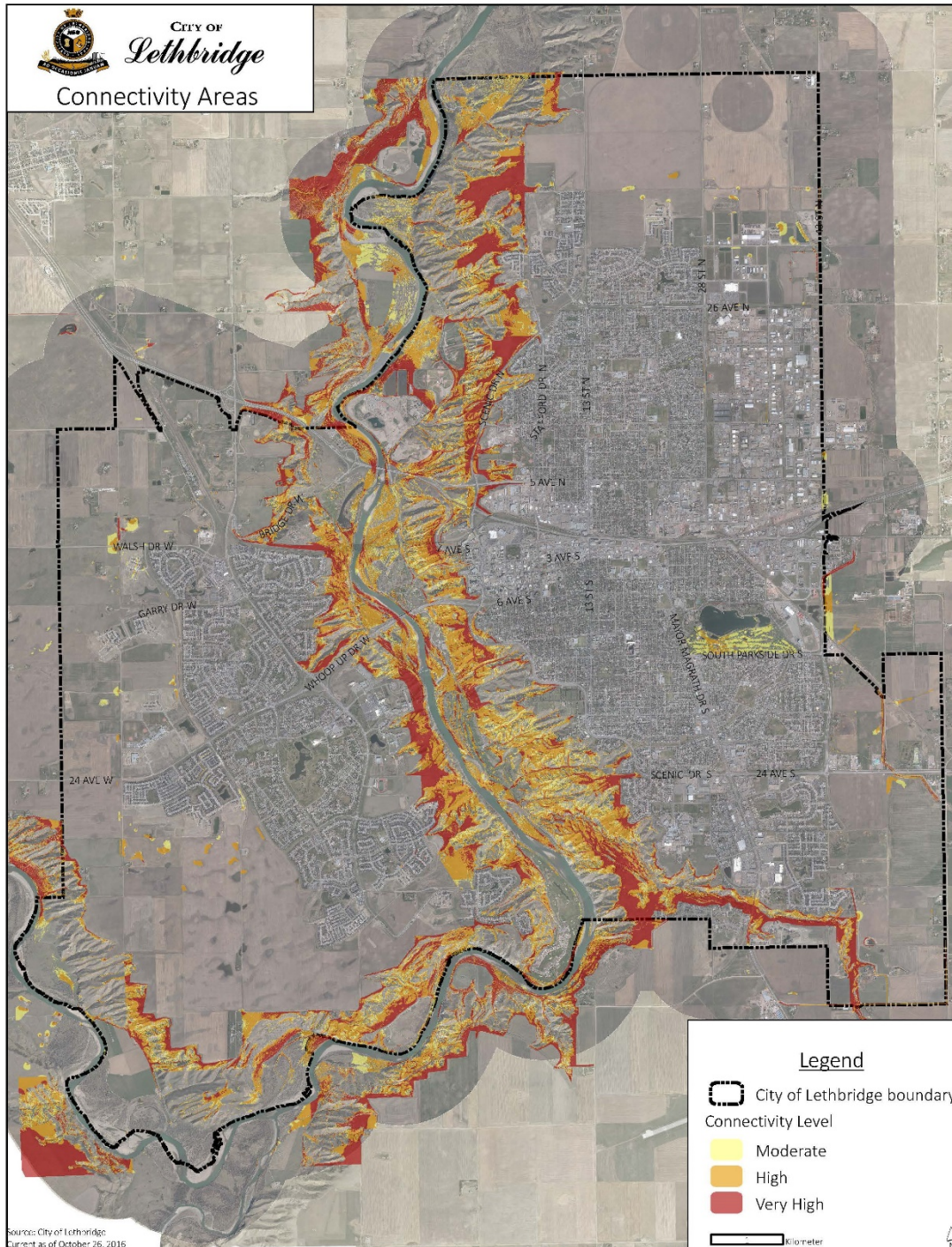
Map 1: Connectivity Areas

The river valley's diverse vegetation and landforms are home to a large assortment of mammals, birds, amphibians, reptiles, fish, invertebrates and a number of species at risk (including the Prairie Rattlesnake and the Western Painted Turtle).[57] Some of the common species found in the river valley are the Nuttall's cottontail and white-tailed prairie hares, porcupines, ground squirrels, striped skunks, beavers, badgers and mule and white-tailed deer. There are many other species that have been spotted all over the City, including over 230 species of birds which have been recorded in Lethbridge, with the greatest diversity found in the river valley.

The *Biodiversity and Ecosystems* resource theme focuses on seven issue areas: Wetlands, Riparian Areas, Natural Grasslands, Invasive Species, Conservation Management, Tree Canopy and Food Security. When taken together, these seven areas paint a picture of the state of biodiversity and ecosystems found in Lethbridge, including their location and health, and interconnections amongst them.

Wetlands

The Government of Alberta defines wetlands as "land saturated with water long enough to promote the formation of water altered soils, growth of water tolerant vegetation, and various kinds of biological activity that are adapted to the wet environment."[58] Approximately 20% of Alberta's surface area is covered by wetlands.[59]

Over time, wetlands have been significantly altered or destroyed by human activities such as urban development, expanding agriculture, the construction of roads, and resource extraction and transmission lines. Approximately 64% of wetlands in Southern Alberta have disappeared since the beginning of European settlement[60]. The Government of Alberta has implemented policies that recognize the value and need for protection of wetlands, including the updated Alberta Wetland Policy (2013).

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[57] *Ecological Inventory and Environmental Land Use Best Practices Report* (City of Lethbridge, 2016).
[58] *Alberta Wetland Policy* (Government of Alberta, 2013).
[59] *Alberta Wetland Policy* (Government of Alberta, 2013).
[60] *South Saskatchewan Regional Plan* (Government of Alberta, 2014), 80.

There are 134.6 ha of wetlands in Lethbridge.[61] These wetlands are classified into four different types: ephemeral, seasonal, semi-permanent and permanent. Ephemeral wetlands are wetlands that hold free surface water for only a short period of time. Some may fill up with water after a precipitation event but will not contain water long enough to support wetland vegetation. They may include sedges, fine-stemmed grasses or forbs. Ephemeral wetlands are the most common type of wetland in Lethbridge, accounting for 53% of total wetland area in Lethbridge. Seasonal wetlands are wetlands that hold water most years, but are dry in the summer or fall and contain permanent riparian vegetation such as emergent wetland grasses, sedges and rushes/cattails. Seasonal wetlands account for 23% of total wetland area in Lethbridge.

Semi-permanent wetlands are those that hold surface water year-round, but may occasionally become dry (in instances of very dry years). These wetlands usually include emergent and submergent vegetation such as cattails, bulrushes and pondweeds. Semi-permanent wetlands account for 14% of total wetland area in Lethbridge. Finally, permanent wetlands are wetlands that hold water year round, over multiple years and include an open water zone that is devoid of vegetation and perimeter with riparian vegetation. Permanent wetlands account for 10% of total wetland area in Lethbridge.

Map 2 indicates the location of wetlands across the City of Lethbridge. It shows that the majority of remaining wetlands are clustered in west Lethbridge, largely because these areas have not undergone permanent conversion through urban development. Many of the wetlands in the far west of Lethbridge have been impacted by agricultural land use, however the resiliency of wetlands means that many of the impacted sites can be restored and their functioning returned through careful intervention (or the removal of interventions) and management.
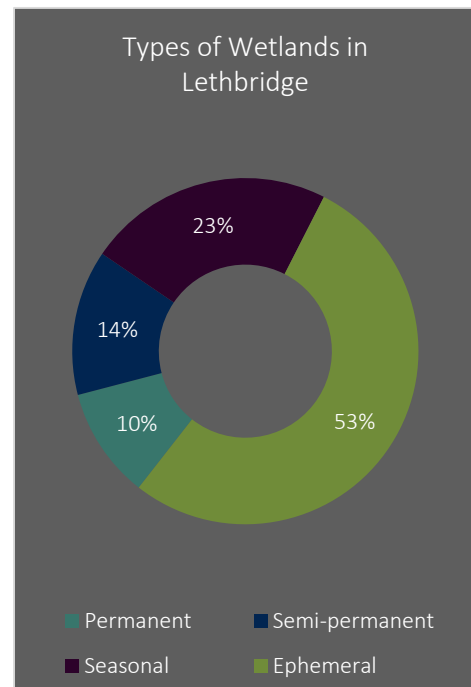
Figure 24: Types of Wetlands in Lethbridge

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[61] *Ecological Inventory and Environmental Land Use Best Practices Report* (City of Lethbridge, 2016).
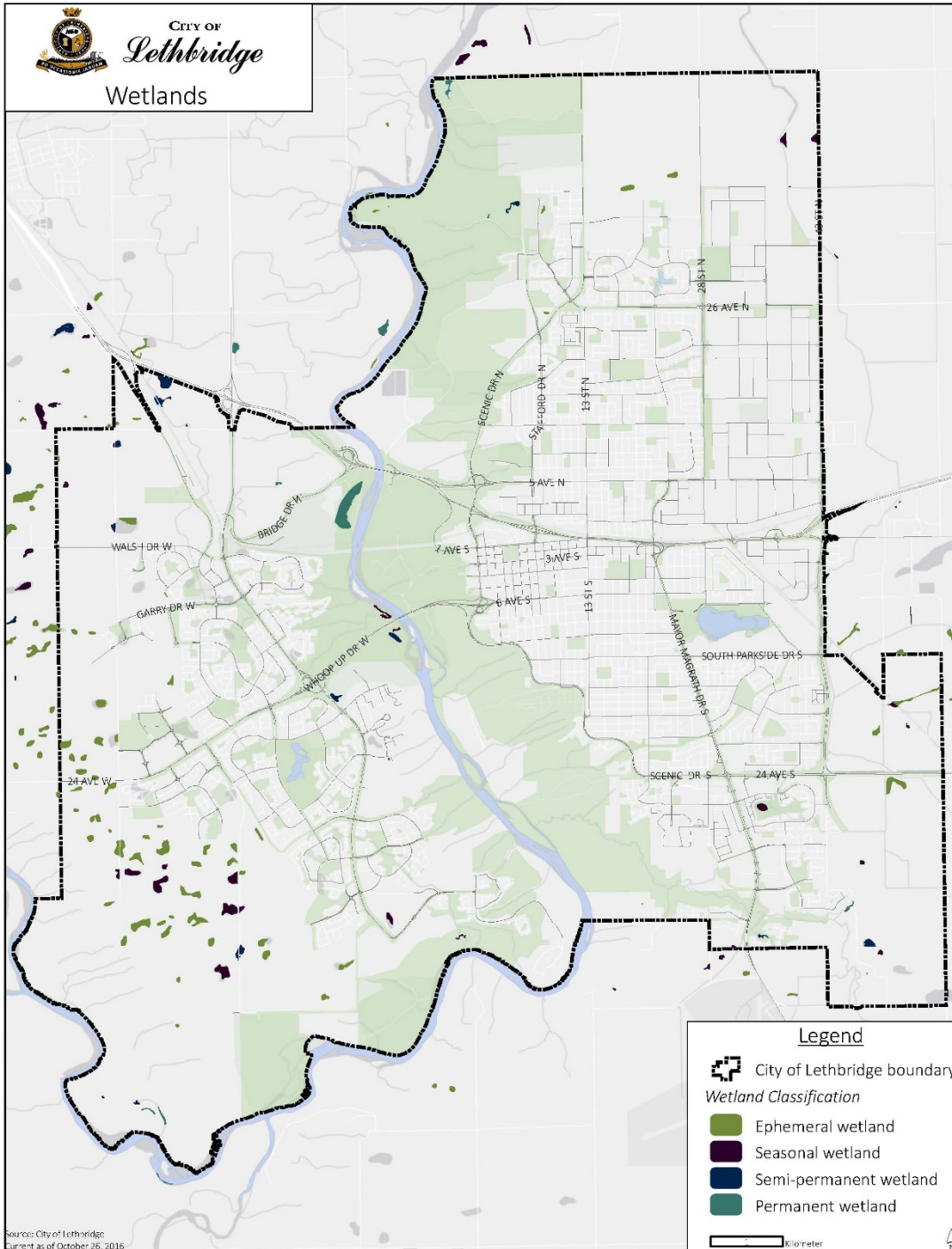
Map 2: Wetlands

Wetlands in Lethbridge provide a variety of ecosystem services to the community, including water management and filtration, biodiversity and habitat. For example, at the Elizabeth Hall Wetlands in the river valley, over 120 species of birds have been observed, as have Western Painted Turtles, muskrats and beavers. With these benefits in mind, it is important that we continue to protect these areas for the benefit of future generations.

Riparian Areas

Riparian areas are the portion of the landscape strongly influenced by water and are recognized by water-loving vegetation along rivers, streams, lakes, springs and ponds. They have been described as green zones around lakes and wetlands and bordering rivers and streams.[62] Riparian areas are one of the most ecologically diverse ecosystems in the world. They sustain fish and wildlife populations, improve water quality, provide stable water supplies and support people on the landscape. There are approximately 514.2 ha of riparian area in Lethbridge, or 4% of the total City land base, a deceivingly small area given its overall importance to our community.[63]

Map 3 indicates the location of riparian areas within the City of Lethbridge. As might be expected, the riparian corridor in Lethbridge straddles the Oldman River as it flows through the City.

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[62] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).
[63] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).
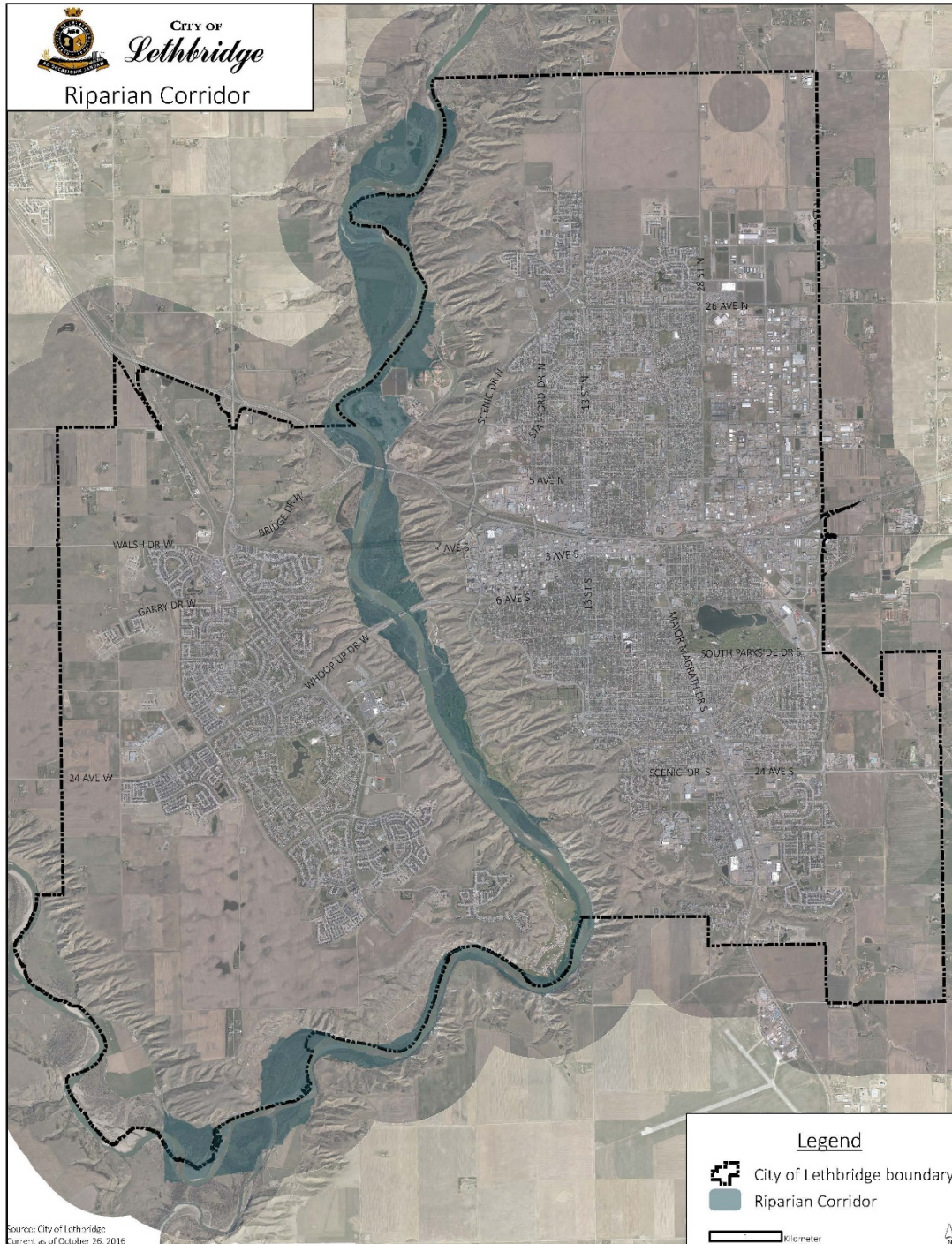
Map 3: Riparian Corridor

As urban development and other land uses increase in the vicinity of riparian areas, they come under pressure. Some of the main health issues that riparian areas face in response to added development pressure include: lack of root mass protection, invasive species, removal of water from systems (e.g., draining or diverting wetlands) and changes to the natural flooding cycles (e.g., because of dams and other human-caused changes to water systems).

Alberta's Riparian Habitat Management Society (aka Cows and Fish) evaluated the health of riparian areas in Lethbridge in 2011, and assessed riparian health with three descriptive categories:[64]

HEALTHY	LITTLE TO NO IMPAIRMENT TO ANY RIPARIAN FUNCTIONS
HEALTHY, BUT WITH PROBLEMS	SOME IMPAIRMENT TO RIPARIAN DUE TO MANAGEMENT OR NATURAL CAUSES
UNHEALTHY	SEVERE IMPAIRMENT TO RIPARIAN FUNCTIONS DUE TO MANAGEMENT OR NATURAL CAUSES

The overall health assessment for Lethbridge's riparian areas was 64.6%, or "healthy, but with problems". 10 out of the 15 sites (67%) were ranked in this category. One site (7%) rated healthy and the other four sites (27%) rated unhealthy. Table 4 details the health status of each of the riparian areas in Lethbridge. [65]

Table 3: Riparian Health Assessment

SITE NAME	CHANNEL LENGTH/SIZE OF RIPARIAN AREA	VEGETATION HEALTH RATING	SOIL & HYDROLOGY HEALTH RATING	OVERALL HEALTH RATING
PAVAN PARK	0.6 KM	61%	63%	62%
ALEXANDER WILDERNESS PARK	2.4 KM	69%	75%	73%
PEENAQUIM PARK	1.3 KM	53%	58%	56%
HELEN SCHULER NATURE CENTRE	1.0 KM	61%	67%	64%
EAST OF ELIZABETH HALL WETLANDS	1.2 KM	67%	63%	64%
INDIAN BATTLE PARK	1.2 KM	69%	63%	65%
BOTTERILL BOTTOM PARK	0.9 KM	74%	63%	68%
BULL TRAIL PARK	0.9 KM	67%	75%	71%
LETHBRIDGE COUNTRY CLUB	2.1 KM	62%	38%	48%
ISLAND SITE	1.1 KM	69%	71%	70%
SIX MILE COULEE	1.4 KM	77%	90%	83%
NORTH PARADISE CANYON GOLF COURSE	1.1 KM	61%	46%	52%
SOUTH PARADISE CANYON GOLF COURSE	1.2 KM	67%	50%	57%
POPSON PARK	1.0 KM	75%	67%	70%
COTTONWOOD PARK	1.7 KM	67%	70%	69%
AVERAGE		**66.5%**	**63.1%**	**64.6%**

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[64] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).
[65] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).

When riparian health degrades, it typically means that one or more of the components (e.g., channel length/size, vegetation, soil or hydrology) has been impacted by natural or human-caused disturbances such as development, recreation, grazing, flooding or fire. As the rate and intensity of disturbances increases, the severity of health degradation can reach a point where the riparian area fails to perform its functions. Management actions need to be taken to ensure the health and restoration of these areas.

The primary health issues with the riparian areas in Lethbridge include:[66]

- Invasive plant species occur on every site. The most prevalent invasive species are leafy spurge and Canada thistle.
- Disturbance-caused plant species dominate the understory and open areas of most sites. Some of the common species are smooth brome, Kentucky bluegrass and crested wheat grass.
- Root mass protection is lacking along portions of the riverbank of the Oldman River. These deep-rooted, riparian vegetation (such as native trees and shrubs) are important for maintaining bank stability.
- Removal of water from the system has restricted the supply of water available for supporting riparian ecosystems in the City.
- Control of flood/peak timing by upstream dams has affected the long-term sustainability potential of cottonwood forests and other natural plant communities.

Natural Grasslands

Lethbridge is a part of the Grassland Natural Region, which occupies approximately 96,000 km^2, or 14% of Alberta. It is estimated that the Mixed Grass Sub-region (which Lethbridge and its surrounding area are a part of) would have covered more than 8.7 million hectares of land in Alberta prior to the arrival of European settlers and the resulting footprint of development. Over the last century and a half, most of the native prairie land in the South Saskatchewan Region has been transformed into farmland or fragmented because of oil and gas development, roads, energy transmission and urban growth. Today only about 40% of the grassland area is in native cover and much of it is managed for livestock grazing.[67] The conversion of native grasslands and the fragmentation of ecosystems and landscapes has a large impact on biodiversity.[68] There are 2058 ha of grasslands within the City, accounting for nearly 17% of the entire land base of Lethbridge. The location of natural grasslands is indicated on Map 4[69].

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[66] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).
[67] *South Saskatchewan Regional Plan* (Government of Alberta, 2014), 78.
[68] *South Saskatchewan Regional Plan* (Government of Alberta, 2014), 79.
[69] The Ecological Inventory and Environmental Land Use Best Practices Report differentiated natural grasslands as distinct from other natural vegetation types: agricultural grasslands, grasses, shrubs and tree canopy. The report also differentiated these and other natural landscape features (e.g., water bodies) from non-natural land uses (e.g., residential development, roads). The report used aerial imagery to identify natural grasslands however was not able to specifically identify "native grasslands".

Map 4: Natural Grassland
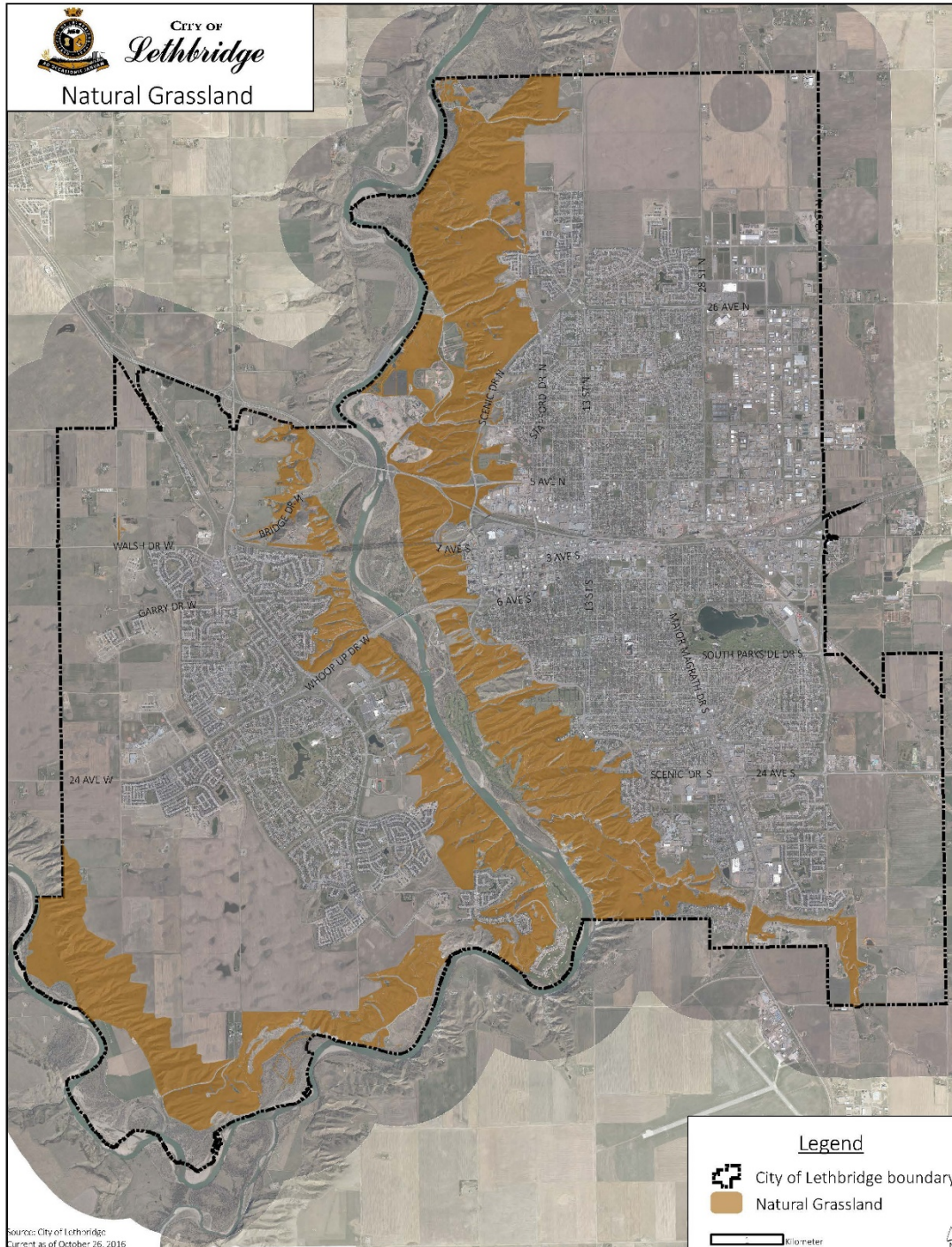
These grasslands are diverse and the vegetation that is able to grow is dependent on soil and climatic conditions. The natural grasslands in the river valley are mostly intact on the steep south-facing slopes. The prevailing native grasses are the wheatgrass needle-and-thread june grass community. On the plateau and gently rolling range areas in Lethbridge, approximately 16% of the area is native while 51% is considered disturbed native grasslands and the other 33% is permanently modified or severely disturbed grassland. These modified grasslands have more than 70% cover from non-native species. This is mainly due to the historical conversion of native grassland to agricultural lands.[70]

It is rare to find undisturbed native grasslands in Lethbridge. These remaining patches of native grassland must be preserved. Sites that are disturbed native grasslands often require significant intervention and management to restore native species and to ensure the health of these regions does not worsen. Natural grasslands are rapidly declining and there need to be processes put into place so that the remaining areas are persevered.

Invasive Species

An invasive species is a species that has invaded or is intentionally brought into a natural habitat. They can be introduced from other countries or ecosystems and threaten the sustainability of local ecosystems and biodiversity. Weeds are invasive plants that adapt quickly and aggressively to their introduced landscape and can cause lasting damage. The Alberta government takes a key role in controlling invasive species, including by developing education materials, working with local stakeholders to coordinate control efforts, and enhancing legislation, regulations and tools for assessment.

In Lethbridge, there are many invasive species that are cause for concern. The most common invasive species that are found in Lethbridge are leafy spurge, Canada thistle and spotted knapweed. In the Cows and Fish assessment of riparian areas, leafy spurge was found at every site. Nine of the 15 sites that were evaluated have more than 50% of the riparian area covered in disturbance-caused herbaceous species. The more prevalent species are smooth brome, Kentucky bluegrass and crested wheatgrass. In total, 63 different introduced herbaceous species were found.[71]

Lethbridge has successfully implemented education awareness programs on invasive species. The Helen Schuler Nature Centre has educational materials on invasive species and how to prevent further spread. They also host many weed pulls throughout the spring and summer to help stop the spread of invasive species in the coulee and river valley. Despite this great work by the City, there is currently no detailed inventory of invasive species that are in Lethbridge and where they are located.

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[70] *River Valley Parks Master Plan* (City of Lethbridge, 2017).
[71] *River Valley Management Plan: Phase 1: Riparian Health* (City of Lethbridge, 2011).

Invasive species are not only plants. Quagga and zebra mussels are a threat to ecosystems and the economy as they are nearly impossible to eradicate. Invasive mussels are filter feeders that strain suspended matter and food particles out of the water, disrupting natural food chains and leading to depleted fisheries as fish do not have enough food. These invasive species are able to attach themselves to boats and other recreational equipment meaning they are easily transported from lake to lake. Adult mussels can also survive out of water for 30 days. The Alberta government has implemented an aggressive campaign to stop the spread of invasive mussels by having people clean and drain their boats. They also have dogs trained to sniff out invasive mussels. These dogs are used at various check points through the province.

Invasive species continue to threaten the biodiversity and health of our ecosystems. Increased numbers of invasive animals and plants force out and destroy local species. They can change habitats and ecosystems, which can have a huge impact on the local environment, economy and social well-being. Invasive species threaten the sustainability of biodiversity and without proper management can cause severe damage to ecosystems in Alberta.

Conservation Management

Conservation management is a procedure for maintaining a species or habitat in a particular region. There are several different components to conservation management including protection of natural habitats, amount of park and open space available (including the provision of contiguous and large natural landscape patches), and protection of species.

> Invasive species don't just have "environmental" impacts. They can have social and cultural consequences too, especially when they impact ecosystems and landscapes that support cultural identity, spirituality and recreation, and provide medicinal and food resources to Indigenous and non-Indigenous peoples.
>
> "The Nitsitapi (Blackfoot) exploited vegetation including wood for lodges, root vegetables, berries (for pemmican and other foods), and other plants for economic and ceremonial use."
>
> Plants such as Otahkoottsis (Prickly Pear Cactus), Mi'kotíípiiyis (Red Willow) and Ah-pu-tu-yis (Sage) are all native to the Lethbridge region and continue to be used by the Blackfoot people. The arrival of invasive species threatens the continuation of such cultural practices as well as the linguistic and oral history traditions that rely on their presence.
>
> Source: City of Lethbridge Traditional Knowledge and Use Assessment (2017).

Box 9: Impacts of Invasive Species

Parks and open spaces are an important aspect of conservation management. Natural spaces connect people to nature, preserve and enhance the ecological diversity of an area, and provide citizens with a place to recreate. Conserving these natural landscapes supports natural ecological functions and assist in the maintenance of biodiversity. As well, the provision of large contiguous natural spaces and transition areas allow for the greater movement of species across the landscape.

Different species rely on different natural patch sizes.[72] Some larger wide-ranging mammals and area-sensitive birds require patch sizes over 500 ha in size, while smaller mammals and grassland birds can manage with smaller patches (50-500 ha). Butterflies, seed-eating birds and most invertebrate species require much smaller minimum patch sizes, in the range of 2 to 5 ha. Moreover, connections between natural areas need to be present to allow species to move across the landscape.

Map 5 indicates the distribution of contiguous natural spaces across the City, while Map 1 shows major connectivity areas.

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[72] *Ecological Inventory and Environmental Land Use Best Practices Report* (City of Lethbridge, 2016).
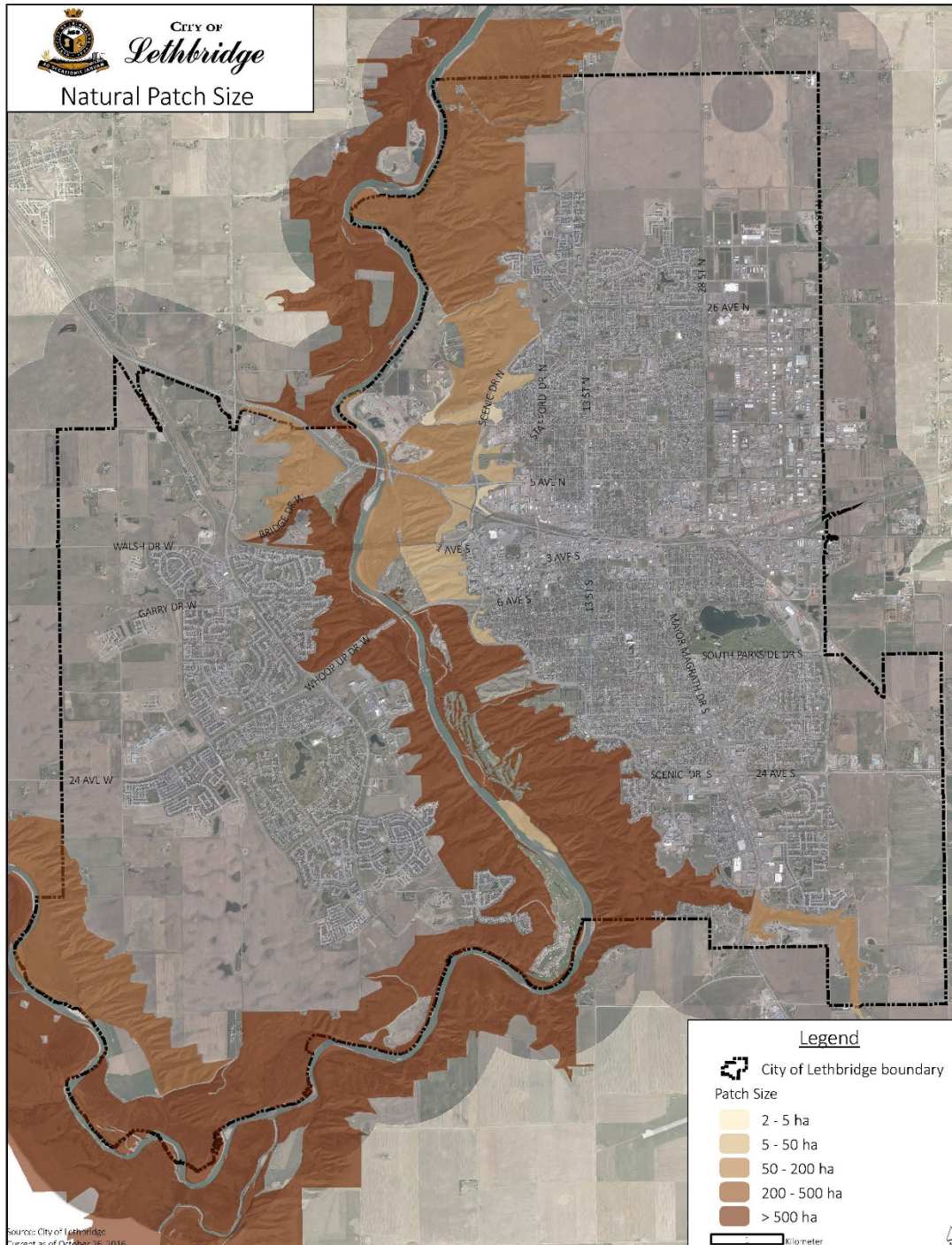
Map 5: Natural Patch Size

The City of Lethbridge is committed to taking a responsible leadership role in the efficient use of resources and land.[73] The City of Lethbridge has over 3800 ha of park and open space within City limits.[74] The average amount of park and open space per capita is 0.039 ha (390 m^2). In comparison to other cities in Alberta, such as Calgary and Red Deer, we have a large amount of park and open space per capita. The per capita amount of park and open space in Calgary is 0.007 ha[75] (70 m^2) and 0.018 ha[76] (180 m^2) n Red Deer (see Table 4).

Table 4: Park and Open Space per Capita for Select Canadian Cities

City	Park and Open Space Per Capita (ha)[77]
Edmonton	0.003
Vancouver	0.003
Victoria	0.003
Calgary	0.007
Nanaimo	0.013
Red Deer	0.018
Lethbridge	0.039

Lethbridge's river valley is the primary open space system within the City. In comparison to many other cities, it is a very large open, park space that has been well protected. The river valley has limited development and the City of Lethbridge's *Park Master Plan* and *River Valley Park Master Plan* strive to conserve, enhance and where possible restore the biological diversity of the river valley and riparian areas within it.[78] Park and open spaces provide habitat to the majority of species within City limits. They are also the most common habitat for the majority of species of risk in Lethbridge. Parks and open spaces are also important to the vibrancy of the City, health of citizens and the local economy (e.g., through tourism).

Lethbridge's natural landscape has been significantly altered over time due to the pressures of population growth and economic development. This has had a significant impact on the landscape of the region. In the *Profile of the South Saskatchewan Region* it is estimated that "the South Saskatchewan Region has 80% of the province's species at risk."[79] These species include mammals, birds, amphibians, reptiles, fish, plants and invertebrates. Of these listed species, the ones that can be found in the Lethbridge area, include the prairie rattlesnake, northern pintail duck, sharptailed grouse, Sprague's pipit songbird and the lake sturgeon.[80] Some reasons for declines in these species are: disappearing, fragmented or degraded habitat, over-harvesting, pesticides, disease, human disturbances, introduction of exotic or invasive

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[73] *Integrated Community Sustainability Plan / Municipal Development Plan* (City of Lethbridge, 2010).

[74] This figure was last calculated on July 25, 2016. It includes the areas that have been identified as park and recreation or valley from our land use zoning code, or as identified as part of the Green Space layer maintained by the City of Lethbridge's Park Department. This total does not include roads.

[75] *State of the Environment Report* (City of Calgary, 2010).

[76] *Environmental Master Plan 2015 Annual Report* (City of Calgary, 2015).

[77] *State of the Environment Report* (Environment Lethbridge, 2017).

[78] *River Valley Parks Master Plan* (City of Lethbridge, 2017).

[79] *Profile of the South Saskatchewan Region* (Alberta Environment and Parks, 2009).

[80] *River Valley Parks Master Plan* (City of Lethbridge, 2017).

species or a combination of these factors.[81] There is limited information on species at risk as observations are rarely made public to protect the species and because of limited data on the species. Efforts are being made, on several levels, to protect the habitats and increase populations of these species.

Species at risk are regulated on many levels, including federal, provincial, regional and municipal governments. At the federal level, species are assessed by the Committee on the Status of Endangered Wildlife in Canada. At the provincial level, the Endangered Species Conservation Committee provides advice to the Minister of Environment and Parks about species at risk. This includes recommendations on legal designations and the implementation of recovery programs.[82] Alberta's approach to species at risk planning and recovery uses scientific expertise and input from land owners, land managers and users to determine the best approach for ensuring species-specific recovery plans are relevant and practical.[83]

In addition to the species listed above, at least 13 rare plants have been identified in the river valley based on rare plant surveys conducted in 1997, 1998 and 2004. Species at risk are the most vulnerable components of biodiversity and require special attention to maintain and recover their populations and habitats.

Tree Canopy
Trees help to purify the air, reduce storm water runoff and erosion, create wildlife habitat, store carbon dioxide, produce oxygen and save energy through shading and wind reduction. There are 91 different species of trees within the City of Lethbridge. The three most common species are the green ash, American elm and the white popular.[84] As the Lethbridge region is historically a grassland, aside from cottonwood species in the river valley, the majority of trees present in our urban and parks areas have been planted by hand in the last few generations and since the arrival of settlers.

One large tree can absorb as much as 150 kg of Carbon Dioxide (CO_2) per year and filter airborne pollutants like fine particulate matter. Trees improve air quality through the deposition of over 24,000 kg of other air particles and chemicals.[85] Pressures on urban forests include: invasive species, pests, disease, drought, climate change and urban development.

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[81] *River Valley Parks Master Plan* (City of Lethbridge, 2017).

[82] *Profile of the South Saskatchewan Region* (Alberta Environment and Parks, 2009).

[83] *Profile of the South Saskatchewan Region* (Alberta Environment and Parks, 2009).

[84] Community Foundation of Lethbridge and SW Alberta, "Vital Signs: Environment," www.cflsa.ca/admin/resources/files/environment-pdf-for-webstite.pdf, (February 8, 2018).

[85] City of Lethbridge, "Parks are Good for our environment,"www.lethbridge.ca/Things-To-Do/Parks/Documents/Parks%20Benefit%208.pdf, (February 8, 2018).

Tree canopy provides urban areas with a significant cooling effect and cool cities by between 2°C and 8°C.[86] This provides increased comfort to citizens and provides an energy cost savings. Trees on public lands in Lethbridge save an estimated 18,000+ GJ of electricity and 135,000+ GJ of natural gas annually.[87]

Trees, as components of natural areas, also play significant roles in helping to protect important City infrastructure, preventing erosion and reducing the stress on systems such as storm water management. Natural areas provide a buffer between development and urban bodies of water, such as the Oldman River and Henderson Lake. Trees also play in role in filtering and managing precipitation decreasing the amount of pollution that enters the water stream and slowing the flow during heavy rainfall events. On an annual basis, it is estimated that public trees in Lethbridge prevent over 331,000 m^3 of rainfall from entering the storm water system. [88]

In Lethbridge there are approximately 43,461 City -owned trees. Of these, 20,964 are street trees and 22,497 are in parks and open spaces.[89] In addition to City -owned trees, there are trees found on private property and on school and other institutions' grounds. In total, there are 631 ha of tree canopy in Lethbridge, or approximately 5.03% of our total land area.

Neighbourhood Types:

Central Areas: Downtown and adjacent neighbourhoods

Mature Areas: Neighbourhoods outside the central areas, generally completed prior to 1980

Established Areas: Neighbourhoods that were generally completed between 1981 and the present

Developing Areas: Neighbourhoods that are currently developing or for which significant planning as taken place (Outline Plan)

Box 10: Neighbourhood Types
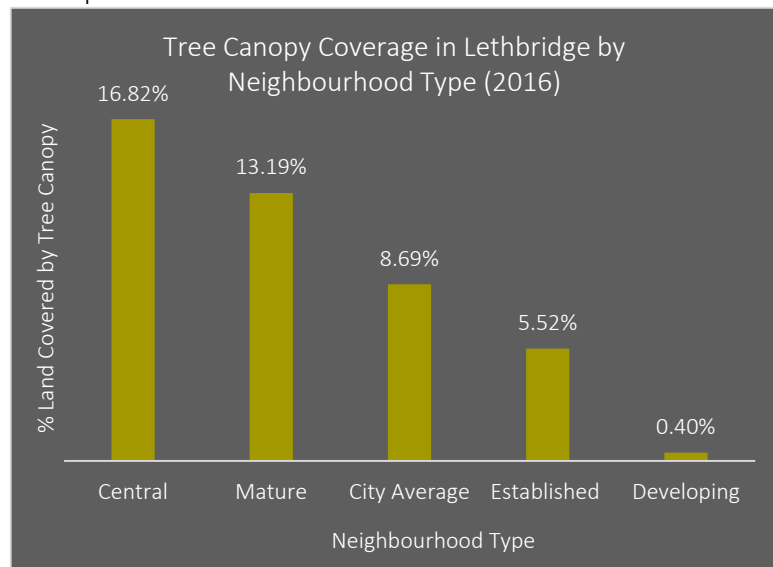
Figure 25: Tree Canopy Coverage in Lethbridge by Neighbourhood Type (2016)

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[86] *The importance of urban forests: why money really does grow on trees* (The Guardian, October 12, 2016).
[87] City of Lethbridge, "Parks are Good for our environment,"www.lethbridge.ca/Things-To-Do/Parks/Documents/Parks%20Benefit%208.pdf, (February 8, 2018).
[88] City of Lethbridge, "Parks are Good for our environment,"www.lethbridge.ca/Things-To-Do/Parks/Documents/Parks%20Benefit%208.pdf, (February 8, 2018).
[89] Community Foundation of Lethbridge and SW Alberta, "Vital Signs: Environment," www.cflsa.ca/admin/resources/files/environment-pdf-for-webstite.pdf, (February 8, 2018).

Central and mature neighbourhoods have the largest amount of tree coverage, while established and developing neighbourhoods have a smaller percentage of tree canopy coverage. This is largely because the tree canopy is still developing in newer neighbourhoods where trees are still very young. Figure 25 indicates the percentage of land covered by tree canopy based on neighbourhood type. Maps 6–9 also indicate the distribution of our tree canopy across the north, south and west sectors of our City.

CITY OF
Lethbridge

Tree Canopy

SCENIC DR N

26 AVE N

31 ST N

MC CONN...

5 AVE N

WALSH DR W

BRIDGE DR W

7 AVE S

13 AVE S

GARRY DR W

6 AVE S

43 ST S

WHOOP UP DR W

MAYOR MAGRATH DR S

SOUTH PARKS DE DR S

24 AVE W

SCENIC DR S

24 AVE S

Lethbridge
Airport

Source: City of Lethbridge
Current as of October 26, 2016

Legend

City of Lethbridge boundary

Tree Canopy

Kilometer
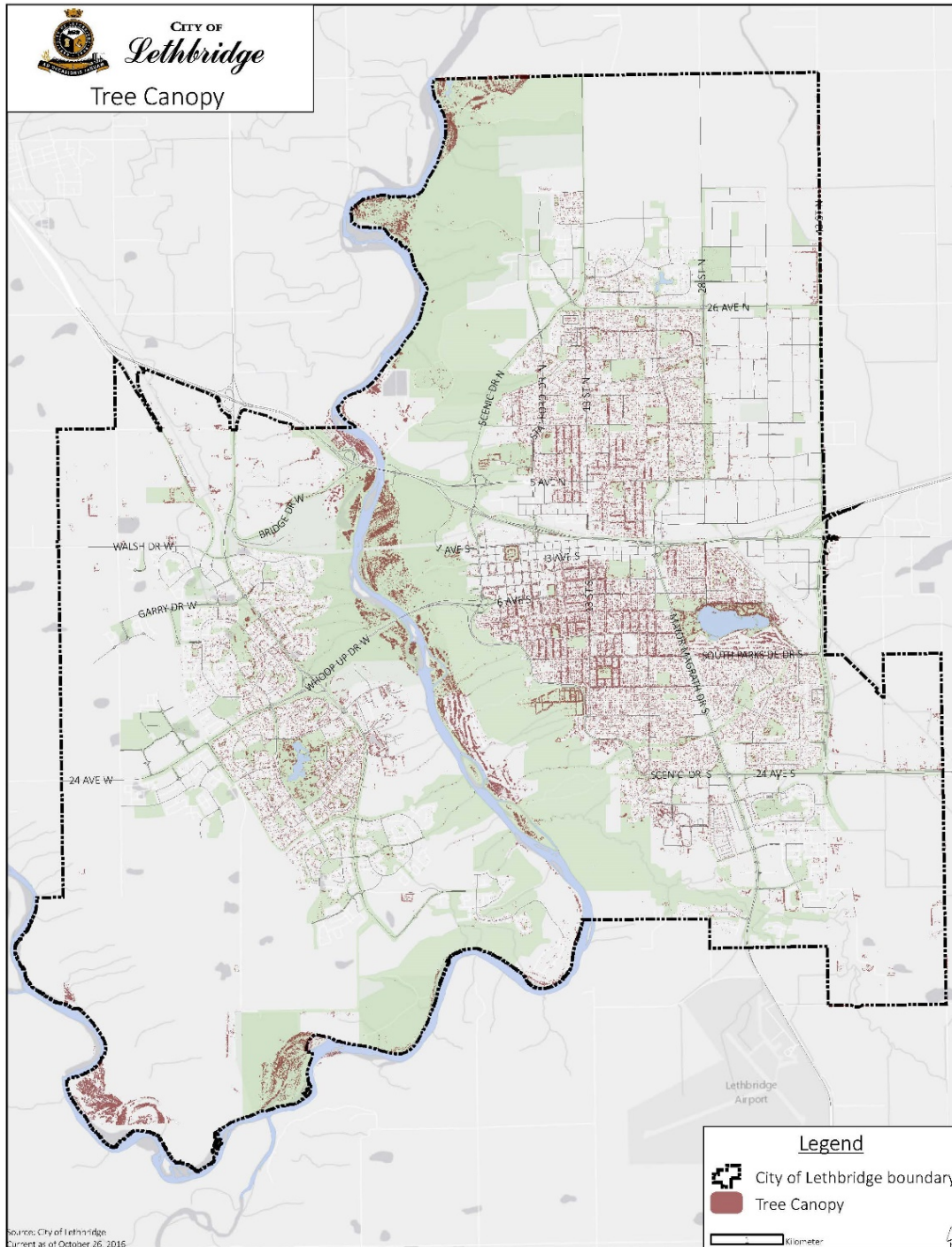
Map 6: Tree Canopy (Whole City)
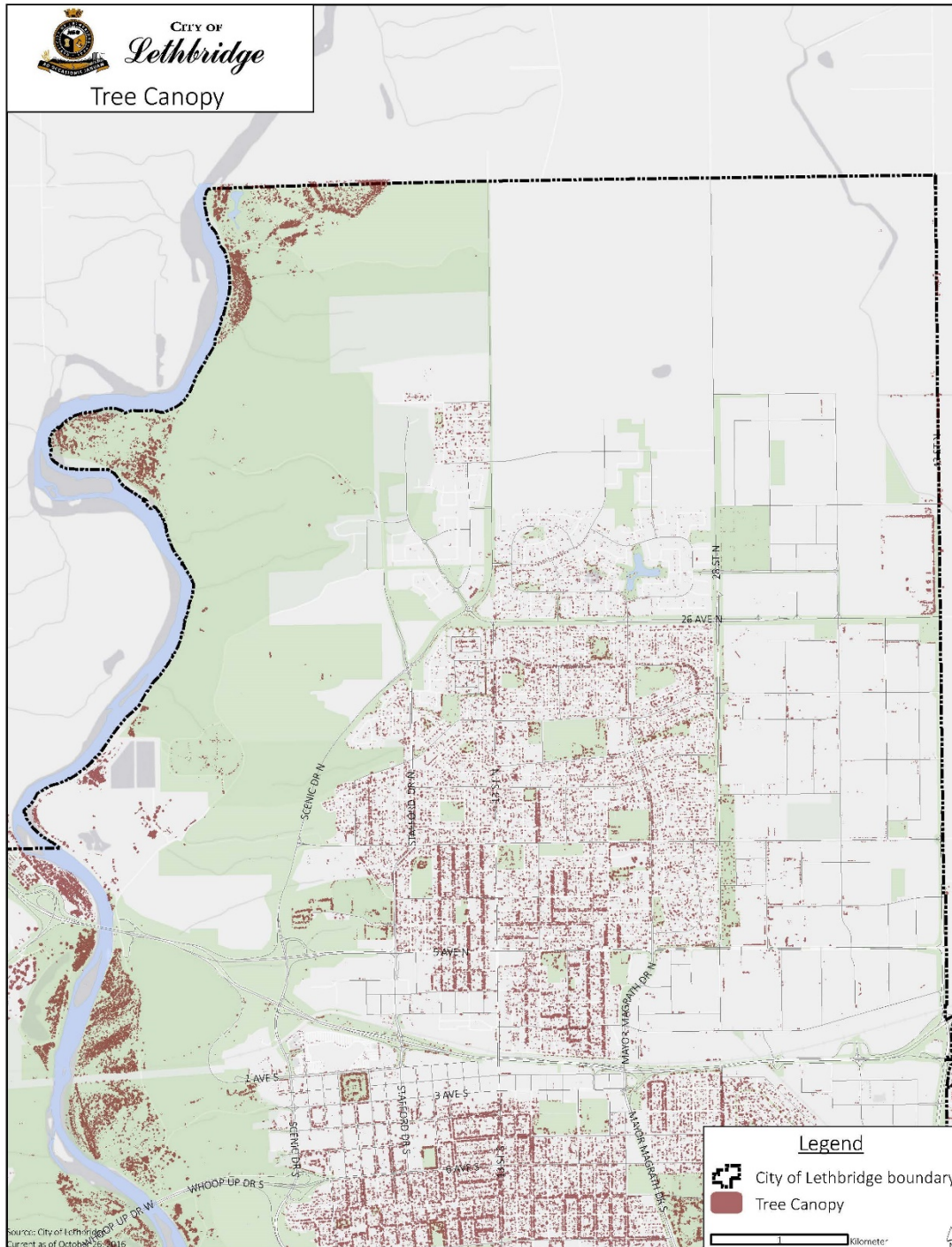
Map 7: Tree Canopy (North Lethbridge Detail)
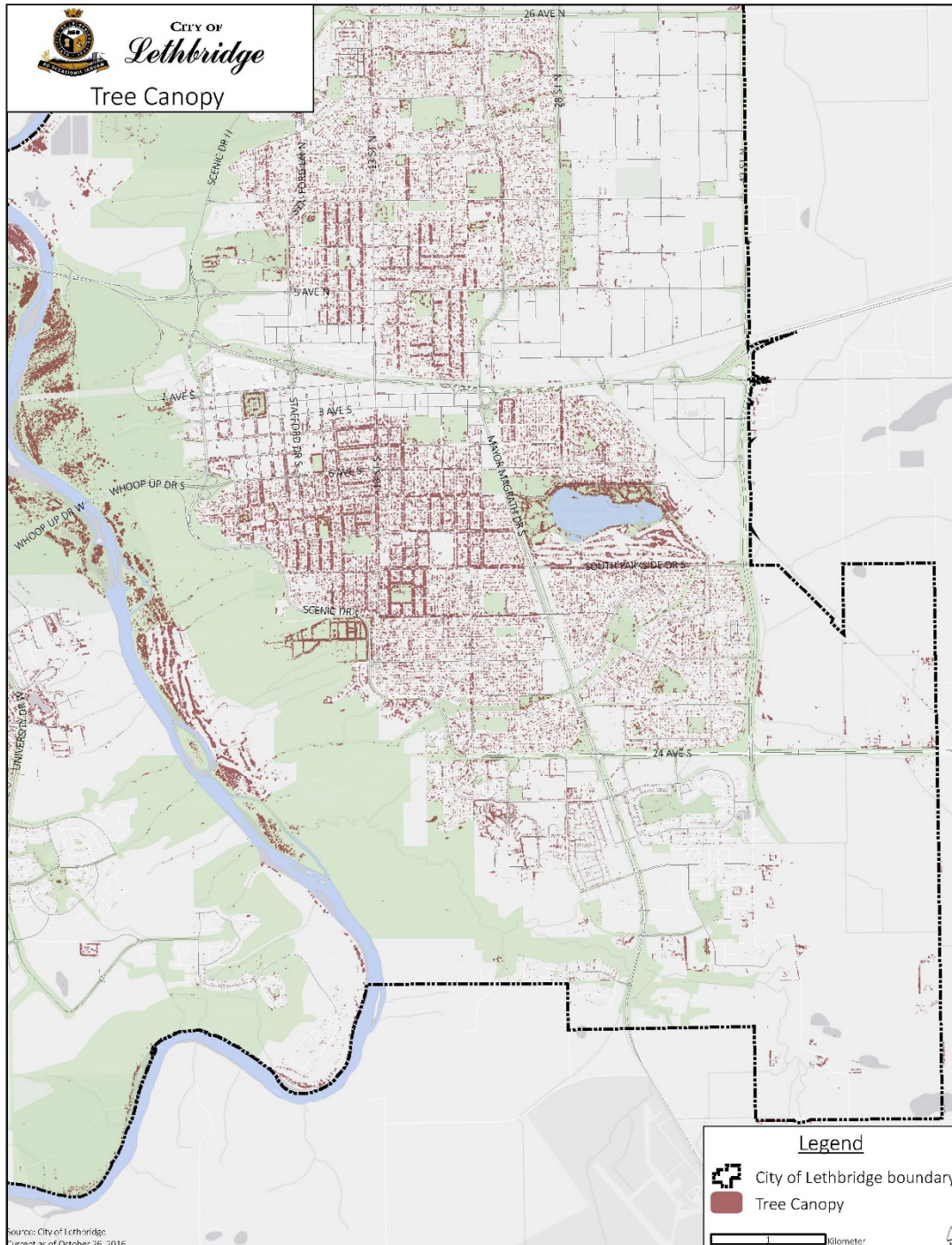
Map 8: Tree Canopy (South Lethbridge Detail)
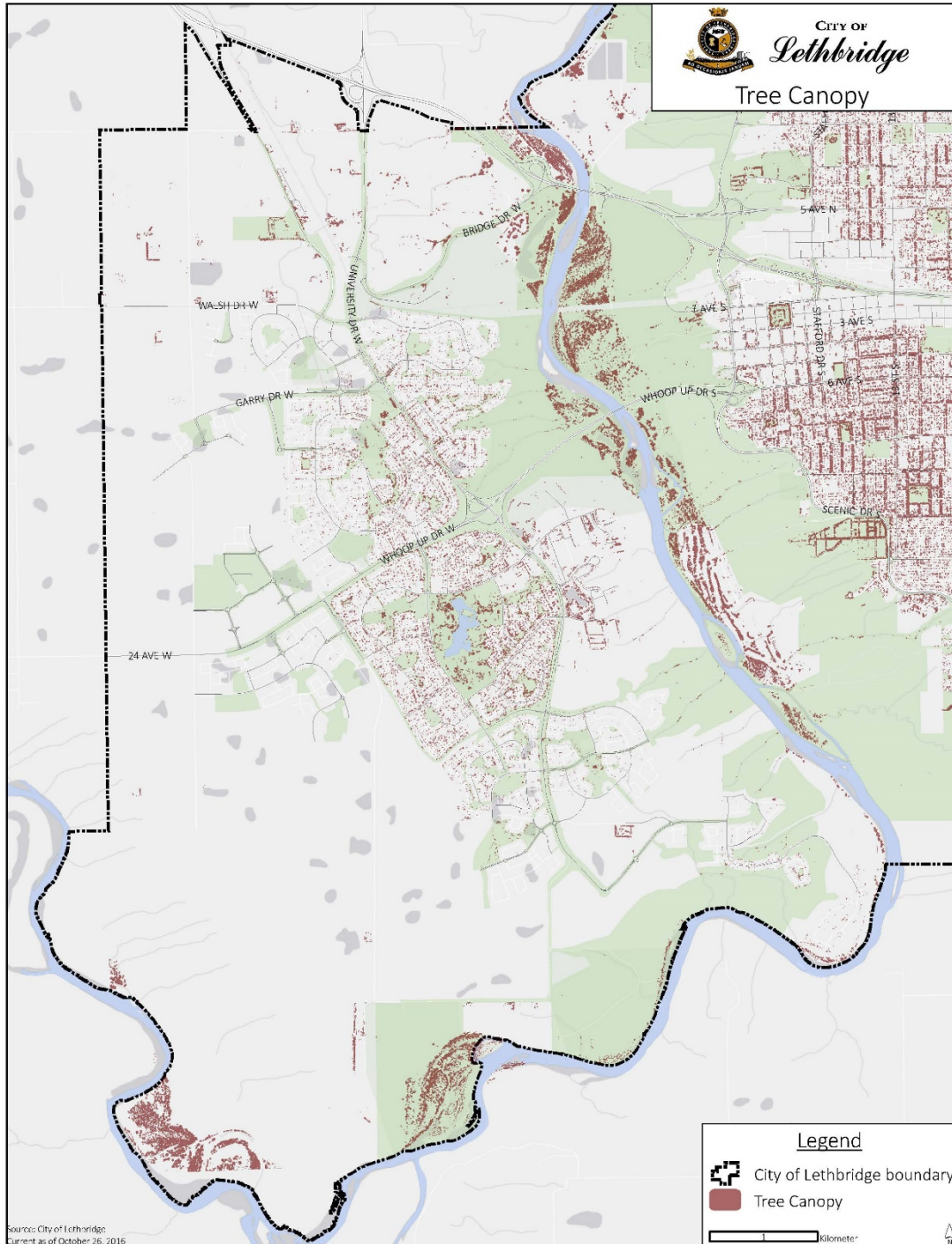
Map 9: Tree Canopy (West Lethbridge Detail)

Table 5: Tree Canopy Coverage for Select Canadian Cities

City (2007)	Tree Canopy Coverage %[90]
LETHBRIDGE (2016)	5
CALGARY	7
EDMONTON	10
KELOWNA	13
TORONTO	21
OTTAWA	27
OAKVILLE	29

If we compare Lethbridge's tree canopy to other cities in Alberta and around the country, we find that our tree canopy coverage appears to be relatively small. Cities such as Toronto and Ottawa in particular have urban forests that cover significant portions of their land base. This is largely the result of geography, climate, planning, management and policy. Cities like Edmonton, Oakville and Calgary, for example, have all created aggressive targets to expand their urban forests. The City of Lethbridge created a *Lethbridge Urban Forestry Plan* in 1991. At the time it was created, the intent of the plan was to protect and maintain the City's urban tree population. This plan however is quite old and in need of updating to reflect current urban forestry challenges and opportunities.

Food Security

Food security is defined as reliable access to affordable, healthy, culturally appropriate food in quantities that support a healthy lifestyle. Lethbridge and area is surrounded by agriculture, and agriculture is a central component of our regional economy and cultural heritage.

Linked to food security is the importance of local food, being food that is produced and consumed in what is determined to be close proximity (whether it be within a City, watershed region or 100-miles). Conversations about local food and food security, and the associated environmental, economic and social considerations, have in large part led to the renaissance of community gardening. At the time of writing there are five functional community gardens in the City, with many more in development. These gardens provide urban residents with a place to grow their own food and opportunities for social interaction and community-building. There has also been local economic growth in this area, as companies seek to leverage growing interest in local food and greater consumer consciousness about food. This comes in the form of farmers markets (there are three seasonal weekly farmers' markets in Lethbridge and at least one company doing share-cropping on participating homeowners' private property.

In Lethbridge, food security is a relatively new topic for policy makers. As the population grows there will be increasing focus on how food is grown, where it is grown and affordability. While the SSRP does not explicitly reference food security, it is an integral part of meeting sustainable community development outcomes, and also relates to our land use efficiency, air and water quality, biodiversity, and even heritage and culture.

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[90] *State of the Environment Report* (Environment Lethbridge, 2017).

While community gardens are important and often the most talked about tool in urban food security, in and of themselves, they cannot make entire neighbourhoods or a city food-secure. Food security also depends on healthy functioning ecosystems (producing ecosystem services like pollination, photosynthesis and air and water quality), as well as re-thinking urban growth and neighbourhood design. For example, a key component of food security is the ability to access food. Neighbourhood and transportation design influence how accessible food can be: this can be in terms of walkability, the efficiency/frequency of public transit, or even the density needed to support local or neighbourhood grocery stores. Moreover, the design of our neighbourhoods and our overall urban growth patterns influence how rapidly we convert agricultural lands into urban areas and our impact on biodiversity and ecosystems in sensitive ecological areas at our urban limits and beyond. Promoting and achieving food security requires systematic, cross-discipline thinking on the part of government, community members and community organizations like schools, daycares, restaurants and food banks.

Lethbridge has made many legacy policy and conservation management steps to protect the ecosystems and local species in the area. Large pieces of land, especially in the river valley, have been conserved to protect biodiversity, while also providing valuable recreational opportunities to residents. Additional steps are now needed to mitigate the effects that human activity has on riparian areas, wetlands and grasslands so that they may be better protected and restored for future generations. As well, emerging conversations around food security should be integrated into broader community development strategies and land use plans.

4.1.4 Waste

The *Waste* issue area focuses specifically on two indicators: Waste Disposal and Waste Diversion. When we look at both of these indicators together, they tell us how we are doing as a community at managing our waste. While the analysis focuses on waste disposal and diversion, we need to keep in mind that waste management is really a conversation about the lifecycle of the goods we consume and what happens to them once we are finished with them. All actors within this life cycle (including producers, distributors, consumers, and waste managers) need to work together to limit the negative environmental, social and economic externalities of our current consumption behaviours.

Consumption and waste are issues that challenge all levels of government, as there has been a significant increase in the amount of waste created over the past several decades at all levels of analysis (local, regional, national). As our global population continues to grow and as people urbanize, waste management will continue to be a challenge. According to the United Nations, cities are responsible for approximately 70% of global waste, despite only occupying 2% of the global land base, and accounting for 54% of the

> Waste Generation = Waste Disposal + Waste Diversion
>
> Waste Diversion = Recycling + Composting

Box 11: Key Waste Equations

global population (this is expected to rise to 66% by 2050)[91]. As waste generation continues to grow, waste management and reduction efforts will continue to play a vital role in reducing consumption and diverting materials that can be recycled, composted or otherwise transformed into other goods or energy sources.

In Lethbridge, because our population growth is relatively slow (approximately 2% per year), waste generation remained relatively stable between 2005 and 2015 (waste generation is measured as the amount of waste received at the Waste & Recycling Centre that is either then disposed of at the landfill, or diverted through Safe Disposal, recycling, or composting. Safe Disposal refers to the separation of materials that pose greater potential for human and environmental harm (e.g., household cleaners, gardening and pest control products, automotive products), and disposing of them using specialized processes. Over that same period, waste generation per capita (discussed below) slowly reduced. While the

> Examples of different materials:
>
> Waste: mixed solid waste and construction and demolition materials
>
> Special Waste: industrial processing materials, asbestos
>
> Soil Waste: contaminated soil
>
> Recyclables: paint, electronics, tires, batteries, propane tanks
>
> Organics: yard waste, wood pallets

Box 12: Waste Materials and Descriptions

pressure of population growth may not be as much of a challenge in Lethbridge as it is in other cities, we do face a number of challenges in the area of waste management, including: on-going demand to expand our community's landfill (located at the Waste and Recycling Centre) and the introduction of new

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[91] United Nations, "The New Urban Agenda," www.habitat3.org/the-new-urban-agenda, (February 8, 2018).

materials into the consumer realm (e.g., new types of plastics and electronics) that in the short-term we may not be able to recycle or convert.

There are also emerging opportunities in waste management, particularly when it comes to growing consumer consciousness. This has resulted in more understanding and calls for action around the environmental, social and economic impact of food waste and the introduction of extended producer responsibility legislation in certain jurisdictions (e.g., British Columbia). Extended producer responsibility legislation is an attempt to rebalance the burden for managing consumer waste back on producers and manufactures who create consumer products (that often result in waste), and away from municipalities who ultimately have to manage waste that is both disposed of and diverted.

The Waste Hierarchy

REDUCE

REUSE

RECYCLE

CONVERT

DISPOSE

Box 13: The Waste Hierarchy

Most of us are familiar with the waste hierarchy, the diagram that reminds us the first step in reducing waste is actually reducing consumption, and that disposing of goods is a last resort. We should constantly be striving to achieve the highest level possible in this hierarchy when making "waste" decisions (i.e., from what to buy to what to throw out).

Waste Disposal

Waste disposal[92] is the amount of material that residents, institutions and businesses in Lethbridge send to the landfill each year for disposal. The City of Lethbridge currently operates one landfill site—at the Waste & Recycling Centre—located just north of the City in Lethbridge County. In addition to the City of Lethbridge, the Centre also serves the needs of small towns and rural areas in the region, including Vulcan, Coaldale, Coalhurst and Lethbridge County. However, for the purposes of this analysis, only Waste Disposal data for waste generated in the City of Lethbridge is analyzed. As discussed above, the annual amount of waste that is disposed of in Lethbridge has remained fairly stable since at least 2005— moving from 82751 tonnes in 2005 to 96586 tonnes in 2015, or 1.07 tonnes per capita in 2005 to 1.02 in 2015. Over the same period (2005 to 2015), the population of the City of Lethbridge grew by over 17000 people, from 77202 to 94804.

The City of Lethbridge categorizes waste generation into three different sectors: residential; industrial, commercial and institutional (or ICI); and construction and demolition (or C&D). The ICI sector includes schools, offices, hospitals, retail and restaurants, while the C&D sector includes construction, demolition and renovation businesses. The City of Lethbridge is responsible for managing waste collection from the

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[92] The waste disposal data presented in this report includes all categories of waste, with the exception of soil waste, that come from the City of Lethbridge. Waste from other municipalities is not included.

residential sector[93], and does so through automated curbside collection. The City also collects approximately 5–10% of ICI waste (by weight). The remaining ICI and all C&D waste is managed by private companies. The majority of waste that is disposed of in the City, comes from the ICI sector, followed by C&D and residential sectors, as shown on Figure 26.

It is important to note that all residents have a tangible connection to each of these sectors, and so addressing the challenges of waste generation and disposal is our collective responsibility. While many of us may consider our impact on waste to be confined to our homes (Residential sector), our consumption practices, behaviours and influence, for example, at our places of work and study (ICI sector) or the choices we make as home owners and renters (C&D sector), are all interconnected and must be considered in holistically.

Despite the fact that both total and per capita waste disposal have slowed (which we should be proud of), as a City we still trail behind provincial and national averages. In 2012, the average Albertan created 1009 kg of waste, and the national average that same year was 710 kg[94]. In 2012 Lethbridge generated 1090 kg per capita.

Waste Sectors:

Residential—Where you / your family live

Industrial, Commercial and Institutional (ICI)—Where you work and study

Construction & Demolition (C&D)—Your home builder and contractor

City of Lethbridge Waste Streams (2012-2016 average)

Figure 26: Waste Disposal by Waste Stream

When we consider the residential waste stream[95], the City estimates that, by weight, 50% of the waste that ends up at the Waste & Recycling Centre is organics, 25% is recyclables, and only 25% is actual waste. Based on that, we understand that the amount of material that finds its way to the landfill could be substantially reduced if we diverted more organics and recyclables. The impacts of disposing materials that could otherwise be diverted are multiple, including: the release of additional Greenhouse Gases like methane through the breakdown of organic materials;

[93] For the purposes of waste collection, the City of Lethbridge defined buildings with more than six units as "apartments". Apartments may choose to contract private business to collect their waste instead of the City of Lethbridge.

[94] Conference Board of Canada, "Municipal Waste Generation," www.conferenceboard.ca/hcp/Details/Environment/municipal-waste-generation.aspx, (February 8, 2018).

[95] The reason why we focus on the Residential waste stream here is because it the most easy to generalize, in contrast to the ICI and C&D sectors which are much more diverse in nature.

the stranding of embodied energy within wasted materials that could otherwise be re-used or converted (to create energy); the shortening of the life of the landfill and the resulting need to acquire and convert additional lands; and, long-term financial and management obligations associated with decommissioned landfills to satisfy remediation requirements.

With Lethbridge City Council's recent approval (2016) of a residential waste strategy (which includes a pilot of a curbside recycling program in 2018), the hope is that the inclusion of recyclables within overall waste disposal will substantially reduce in the near term.
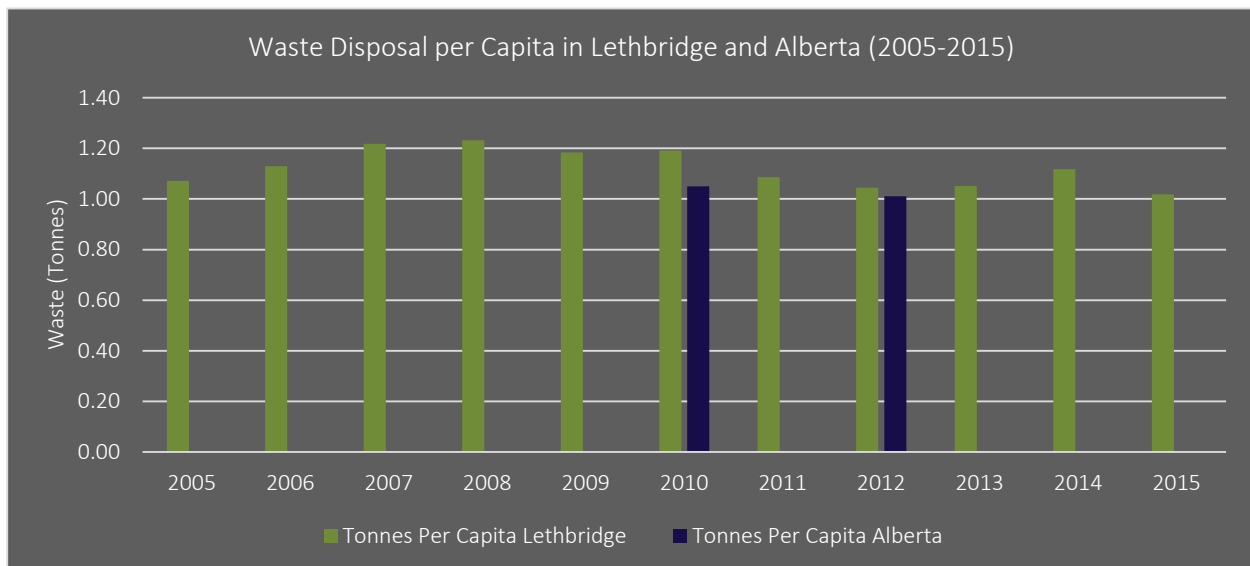
Figure 27: Waste Disposal per Capita in Lethbridge and Alberta (2005-2015)

Waste Diversion

Waste diversion refers to materials that are collected by the City of Lethbridge through its network of recycling and composting facilities, and which are otherwise prevented from going to the landfill. It does not include recycling or composting activities that residents, businesses or institutions contract to private firms or do themselves (e.g., recycling deposit containers at depots, or grass-cycling in your backyard).

At its heart, waste diversion is about preventing items from entering the landfill that still contain value which can be easily harnessed by other processes (e.g., reduce, reuse, recycle, composting and conversion into energy). To promote waste diversion, the City of Lethbridge manages a network of recycling stations (including three recycling stations located throughout the community, and more specialized sites for materials like organics and electronics located at the Waste & Recycling Centre). The City also collects yard waste at different times of the year (e.g., leaves and Christmas trees). In the coming

Figure 28: Total Waste Diversion per Year in Lethbridge (2005-2015)
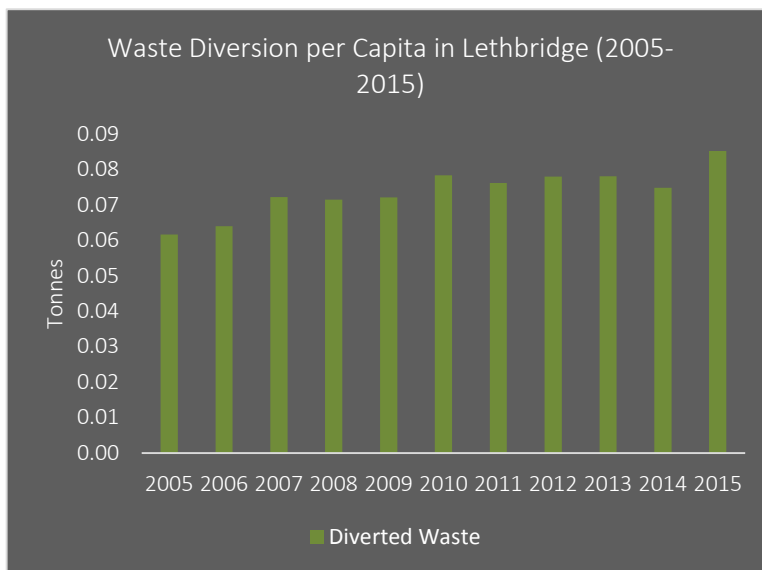
Figure 29: Waste Diversion per Capita in Lethbridge (2005-2015)

years, the City will also look to provide residential curbside recycling (a pilot will commence in 2018, with full implementation in 2019).

Currently in Lethbridge, 20% of waste is diverted[96], this compares to the 2012 Alberta average of 16%[97]. Leading municipalities from across Canada, such as Halifax and the Regional District of Nanaimo, have been able to increase waste diversion rates well above these marks to 59% and 64%, respectively. It is however important to note that each municipality will use its own methodology for calculating waste diversion and municipalities may not be easily comparable. Lethbridge's 20% diversion rate is split evenly between diversions taking place at the three City recycling depots, and diversion through other community programs (e.g., programs for recycling paint, used oil and electronics).

[96] Waste diversion data presented here does not include waste that is diverted of by people in their homes (e.g., backyard composting or grasscycling) or that is contracted to private firms.
[97] Conference Board of Canada, "Waste Generation," www.conferenceboard.ca/hcp/provincial/environment/waste.aspx, (February 8, 2018).

As of the end of 2016, Lethbridge City Council had approved waste diversion strategies for all three waste sectors: residential, ICI and C&D. In the coming years, we expect these programs to yield important benefits in our community, including increases in waste diversion.
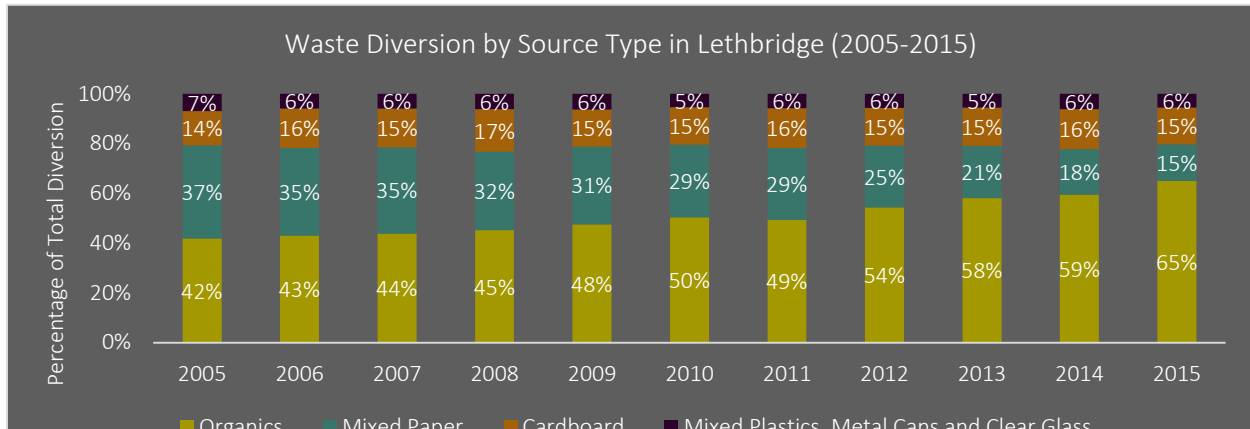
Figure 30: Waste Diversion by Source Type in Lethbridge (2005-2015)

Table 6 Mixed Plastics Diversion by Year

Year	Mixed Plastics Diverted by Year (Tonnes)
2011	182
2012	184
2013	199
2014	215
2015	237

Even without these programs, we have seen positive trends for organics and recyclables diversion both in absolute terms and per capita. Between 2005 and 2015, the amount of organics diverted from the landfill has increased by more than 260%, from nearly two million kilograms in 2005 to over five million kilograms in 2015. Per capita, waste diversion increased from 0.06 tonnes (approximately 62 kilograms) to 0.09 tonnes (nearly 90 kilograms).

In terms of specific materials, diversion of cardboard has increased since 2005, while diversion of mixed paper stayed relatively constant between 2005 and 2011, bsefore beginning a steady decline through 2015. The decline in mixed paper diversion in the last five years likely has less to do with people choosing not to recycle, and more to do with a broader reduction in mixed paper consumption (including the rise of electronic publishing) that has been noted across Canada.

Recycling of metal cans and clear glass have remained fairly consistent since 2005, while mixed plastics diversion has increased steadily. The increase in the diversion of plastics is likely due to increasing public awareness and increased capacity to recycle these products[98].

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[98] Waste diversion by source type data comes from the Waste & Recycling Center and from the three Recycling Stations located throughout the City. This data only includes what is collected by the City and does not include materials that are collected privately or managed in backyards for example.

It is important to acknowledge the large gains that have been made in increasing diversion, however when we are critical in our analysis, part of the reason why amounts have increased is because consumption has also increased. Importantly, managing waste generation and diversion begins with managing consumption.

4.1.5 Energy

Energy is a central component to our daily lives, but is often something that we take for granted. Particularly for those of us who live in urban areas, we are often quite disconnected from the sources of the energy we rely on to turn the lights on, light-up the barbeque, drive to the store and power on the computers, machines and vehicles at work.

Energy use is a key consideration when trying to understand the relationship between development and our environmental resources. Energy use requires the sourcing of input materials (e.g., coal, natural gas, wind, solar radiation), and their conversation into usable energy. The creation, transmission and use of energy also come with associated environmental impacts which differ based on the type of source material and the conversion process, and can include impacts to: air quality (e.g., particulate emissions from coal and other combustion-based energies), water quality and quantity (e.g., the use of water for hydrologic fracturing or fracking), habitat and migration routes (e.g., land required for transmission lines, and wind and solar farms), and greenhouse gas emissions (e.g., from the burning of carbon-based fuels).

The Energy resource theme focuses on three issue areas: Electricity Production; Electricity Consumption; and Transportation Network. The first two areas address electrical energy consumption and production, while the third specifically addresses our transportation network and modal preferences (the ways we get around) as a community. The Electricity Production analysis generally focuses on the Alberta grid due to the difficulties of separating Lethbridge out from the larger network of energy that is distributed across the province. The Electricity Consumption data analysis focuses on the City as a whole, including residential, commercial and industrial sectors, while also highlighting more generalized energy consumption trends at the residential level. When we analyze data from these three areas, we learn at a general level about our overall community energy footprint.

Electricity Production

The Electricity Production Issue Area focuses on the sources of the electricity that is consumed in Lethbridge. Because the electrical grid in the province is essentially an open ocean of energy, it is difficult to pinpoint the sources for each Watt of electricity consumed in our City. Instead, we rely on an analysis of electricity production at a provincial scale, and assume that it generally describes what happens locally. The only data that we can provide to round out the local context is about the production of electricity at micro-generation sites within the City. This information is provided later in this section.

In Alberta, the electrical grid is made of up two principal energy sources: natural gas and coal. Together they account for 82% of installed energy capacity (43% and 39% respectively),[99] and 90% of actual generation (39% and 51% respectively).[100] Wind and hydro energy production make up 15% of the remaining installed energy production capacity, but only 7% of actual production.

Table 7: Energy Sources and Generation in Alberta (at December, 2015)

SOURCE	MAXIMUM CAPACITY (MWH)[101]	PERCENTAGE OF TOTAL GRID	GENERATION (GWH)	PERCENTAGE OF GENERATION[102]
NATURAL GAS	6953	43%	32215	39%
COAL	6267	39%	41378	51%
WIND	1491	9%	3816	5%
HYDRO	902	6%	1745	2%
BIOMASS & OTHER	520	3%	318	3%
TOTAL	16133		81621	

Table 8: Median Emissions for Major Energy Sources

TECHNOLOGY	MEDIAN EMISSIONS (G CO_2 / KWH)[103]
HYDRO	4
WIND	12
NUCLEAR	16
BIOMASS	18
SOLAR THERMAL	22
GEOTHERMAL	45
SOLAR PV	46
NATURAL GAS	469
COAL	1001

The distinction between capacity and actual generation is an important one: capacity refers to our *ability* to produce energy from different source types (e.g., coal, natural gas, wind, hydro etc.), whereas generation refers to the actual amount of energy that is *created* and available for distribution and use within the system. We tend to find that renewable energy sources experience lower levels of production in relation to the capacity, partially due to the fact that generation is often dependent on external factors (e.g., wind, solar radiation, water flows), meaning that when energy is produced may not line up with when energy is in demand. Because of our current constraints to store energy for later consumption (these constraints are both technological and financial) we tend to rely more heavily on those sources of energy (typically non-renewable sources) that can be more easily stored and aligned with real-time demand (e.g., coal and natural gas).

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[99] Alberta Utilities Commission, "Annual electricity data collection," www.auc.ab.ca/market-oversight/Annual-Electricity-Data-Collection/Pages/default.aspx, (February 8, 2018).

[100] Source: Alberta Utilities Commission

[101] As of August, 2016. Alberta Utilities Commission, "Annual electricity data collection," www.auc.ab.ca/market-oversight/Annual-Electricity-Data-Collection/Pages/default.aspx, (February 8, 2018).

[102] As of December, 2015. Alberta Utilities Commission, "Annual electricity data collection," www.auc.ab.ca/market-oversight/Annual-Electricity-Data-Collection/Pages/default.aspx, (February 8, 2018).

[103] *Renewable Energy Sources and Climate Change Mitigation: Summary for policymakers and technical summary* (Intergovernmental Panel on Climate Change, 2012).
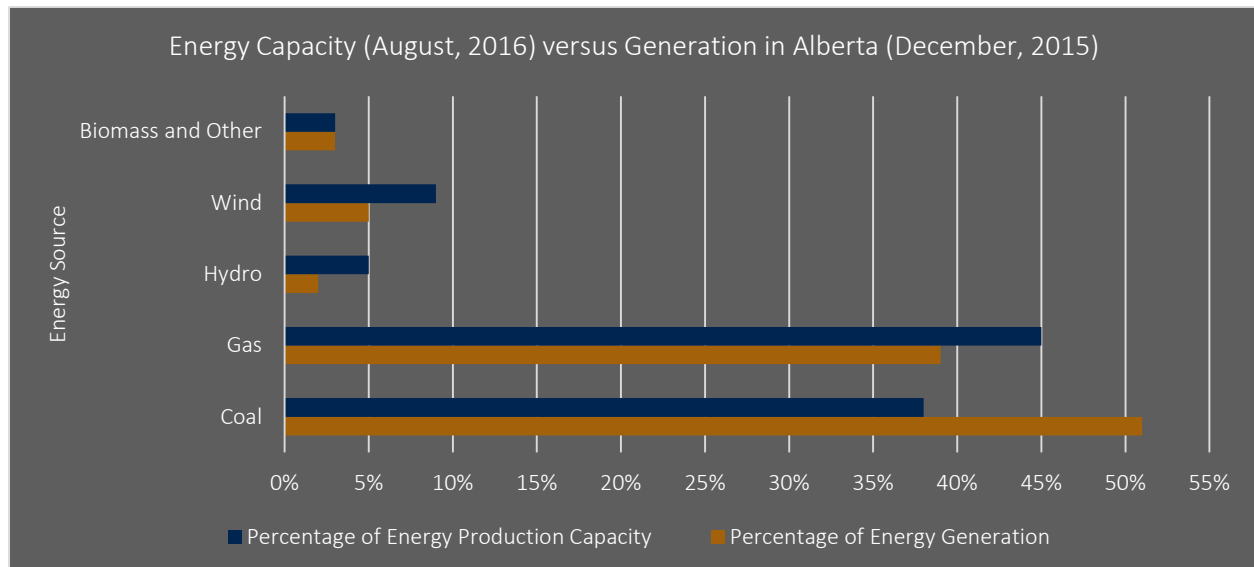
Figure 31: Energy Capacity (August, 2016) versus Generation in Alberta (December, 2015)

Once energy is converted into electricity, it is transferred to our City by way of Alberta's electrical grid using overhead transmission lines. Electricity is brought to substations located throughout the City, where is it then transformed to a lower voltage. Energy then leaves the substations via a distribution network on its way to homes, offices and streetlights. In older parts of the City, the distribution network is often located above ground, whereas in newer developed areas it is buried. Just prior to the power reaching your home or business it is then converted again to a lower voltage that can be used by standard appliances and electronics.

None of the energy sources that currently make up our electrical grid come with zero environmental impacts, however different energy production sources have smaller or larger "footprints" relative to one another. For example, electricity produced from coal has a substantially higher carbon footprint than renewable energy sources such as hydro, wind, solar and geothermal[104]. The quantification of that difference in terms of Greenhouse Gas Emissions is difficult to do, but has been attempted by the Intergovernmental Panel on Climate Change (IPCC) of the United Nations.[105]

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[104] *United Kingdom Parliamentary Office of Science and Technology,* www.parliament.uk/post, (February 8, 2018).
[105] While they are beyond the scope of the data presented in this report, it is also important to think about the broader footprint of different electrical energy sources beyond simply the emissions they create. For example, considering the sourcing of inputs (including rare earth metals and coal), the transportation of raw materials to production facilities (by road, rail and pipeline), the decommissioning of mines and other facilities at the end of their productive lives, and the impacts that may occur during production itself (e.g., impact to wildlife from obstructions like windmills and pipelines placed on the landscape).

In 2011, the IPCC conducted a literature review to determine the median CO_2 emissions per unit of electricity generated for different renewable and non-renewable energy production sources. It determined that by far, coal and natural gas have the largest impact, at 1001 and 469 grams of CO_2 per kWh of energy, respectively. This is in contrast to wind and hydro energy which produce 12 and 4 grams

According to the government of Alberta, micro-generation refers to the production of electricity at a very small scale, typically for domestic use, using environmentally friendly methods such as solar panels, small-scale hydro, wind, and biomass among other sources.

Box 15: Micro-generation in Alberta

of CO_2 per kWh, respectively. While these are indeed highly generalized results and only represent the median results of a large review of scientific literature, they do indicate the scale of difference in terms of potential environmental impacts for different electrical energy production.

This also demonstrates that the current make-up of Alberta's electrical grid is dominated by production sources that have the largest environmental impact. Coal as a source of energy in particular, has also been linked to negative human health outcomes through its contributions to poor air quality.

At a global scale, the contribution of renewable energy source towards our energy supply has increased greatly since particularly the mid-1990s / 2000s when the world saw the break out of renewable energy production sources like biofuels, solar photovoltaics and wind energy. That being said, renewables still only account for a small portion of overall production (an estimated 12.9% in 2008 according to the United Nations)[106]. In Alberta, the provincial government has set a target to add 5000 MW of renewable energy capacity by 2030 to replace coal-fired energy generation[107]; as of 2016, coal contributed over 6000 MW or nearly 40% of capacity in Alberta (see Table7).

Table 9: Micro-generation in Lethbridge (2010-2015)

YEAR	ENERGY SOLD BACK TO GRID (kWh)	PERCENTAGE CHANGE OVER PREVIOUS YEAR	PERCENTAGE OF TOTAL ENERGY CONSUMPTION
2010	1448		0.0002%
2011	1103	76%	0.0001%
2012	9010	817%	0.0012%
2013	16848	187%	0.0022%
2014	35122	208%	0.0045%
2015	67257	191%	0.0086%

In and around Lethbridge, we too have seen a growth in renewable energy production with the appearance of wind farms along the eastern slopes of the Rocky Mountains and in near-by municipalities (e.g., Pincher Creek and Vulcan County).

Within the City of Lethbridge, there are no large-scale energy producers, however there has been steady growth of energy micro-generators used to offset site-specific production[108]. This follows a similar trend

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[106] *Renewable Energy Sources and Climate Change Mitigation: Summary for policymakers and technical summary* (Intergovernmental Panel on Climate Change, 2012).

[107] Government of Alberta, "Renewable Electricity Program," www.alberta.ca/renewable-electricity-program.aspx, (February 8, 2018).

[108] Alberta Energy, "What is Micro-generation", www.energy.alberta.ca/electricity/microgen.asp, (February 8, 2018).

within Alberta, which has seen the combined capacity of micro-generation grow from 0.4 MW in 2010 to 6.6 MW in 2015 (growth of 1650%).

Table 9 shows the growth of micro-generation in Lethbridge since 2010. The data that is available is limited to showing the amount of energy that the relatively small amount of micro-generators sell back to the grid each year (purchased by the City of Lethbridge Electrical Utility). It does not show the amount of energy consumed at each site prior to a surplus being created. Since 2010, the purchase of local renewable energy by the local electrical utility has grown every year (and often by substantial margins), from 1448 kWh to well over 65000 kWh, a growth of over 4600%. As the installation of "smart meters" in Lethbridge continues in the coming years, more detailed (aggregated) data will become available.

Electricity Consumption

Electricity consumption refers to the amount of electrical energy that is used in Lethbridge. Generally speaking, the environmental impacts of electrical energy usage occur at multiple points along the production-use-disposal continuum, incluing the sourcing of materials for energy production, the transmission of energy, and the disposal of waste materials. However, the cumulative impact of the energy choices made by individual households, businesses and institutions is not always apparent, visible or readily understood. This is perhaps because with very few exceptions electical energy production does not occur in Lethbridge and because we try our best to remove the presence of electrical infrastructure (such as transmission lines) from the landscape for safety and aesthetic reasons.

The Electricity Consumption issue areas provides general background information on energy consumption in Alberta and energy use trends in Lethbridge.
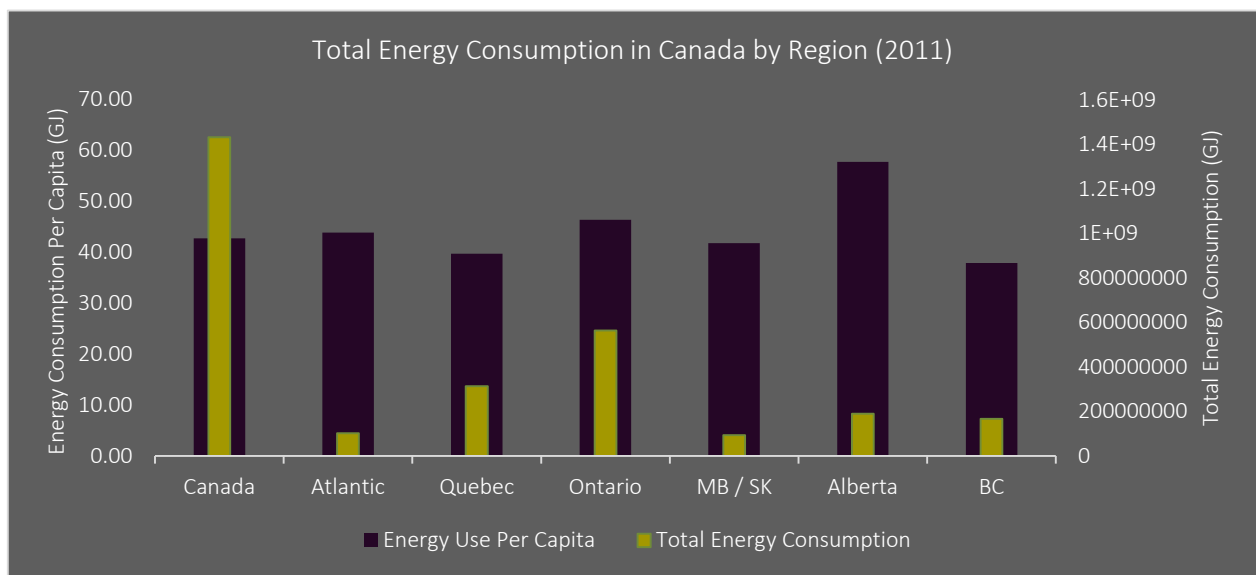
Figure 32: Total Energy Consumption in Canada by Region (2011)
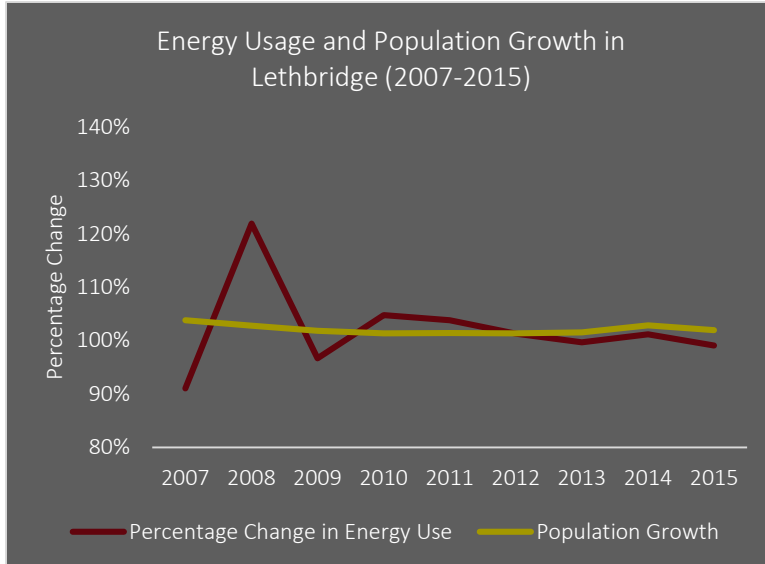
Figure 33: Total Yearly Energy Usage in Lethbridge (2006-2015)
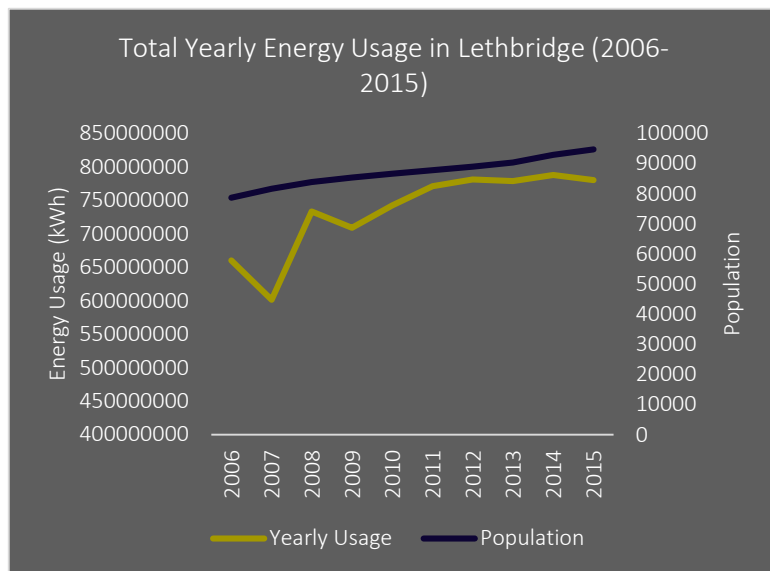
Figure 34: Energy Usage and Population Growth in Lethbridge (2007-2015)

In 2011, Alberta had the highest per capita total energy consumption of any region in Canada at 57 GJ per person [109], whle accounting for about 10% of the population. That same year, Lethbridge accounted for an estimated 1.5% of Alberta's total energy consumption, and approximatley 2.5% of the population of the province.

In Lethbridge, total energy usage has steadily grown over the past several years, reaching a maximum in 2014 at over 2.8 million GJ (or 788,218,976 kWh), before beginning what looks to be a trend towards reduced energy consumption. Only time will tell if this trend continues.

Per capita consumption in 2014 (our highest energy usage year) equated to roughly 30 GJ per person. Even at this maximum, Lethbridge is far below the provincial average of 57 GJ per person[110]. We might attribute this relatively low number to the absense of a large industrial base in Lethbridge (at least compared to our neighbours in Central and Northern Alberta) and our relatively mild climate compared to other regions of the province.

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[109] *Survey of Household Energy Use* (Natural Resources Canada, 2011).
[110] *Survey of Household Energy Use* (Natural Resources Canada, 2011).

Looking at year over year numbers, except for a 2008 spike, energy useage has remained faily constant with little growth since 2010. When compared to Lethbridges' population growth, energy consumption seems to align quite closely to the slow and steady growth that Lethbridge has experienced over the same period.

Table 10: Energy Usage and Population Growth in Lethbridge (2007-2015)

Year	Energy Usage Growth	Population Growth
2007	91%	104%
2008	122%	103%
2009	97%	102%
2010	105%	101%
2011	104%	101%
2012	101%	101%
2013	100%	102%
2014	101%	103%
2015	99%	102%

Energy usage as we know does not stay consistent all year long. In Lethbridge, as in other cities with similar climates, we draw greater amounts of energy during seasons that require additional building heating and cooling. Figure 35 and Table 11 compare average daily high temperature values with monthly energy usage data (averaged over a ten year period). The data show that energy consumption is directly related to climate extremes. The months where energy usage is the highest (January and February, August and September), are also the months when we see the coldest and warmest average daily temperatures. Whereas, the months with the lowest energy consumption have historically been March and May (months with more moderate average daily high temperatures).
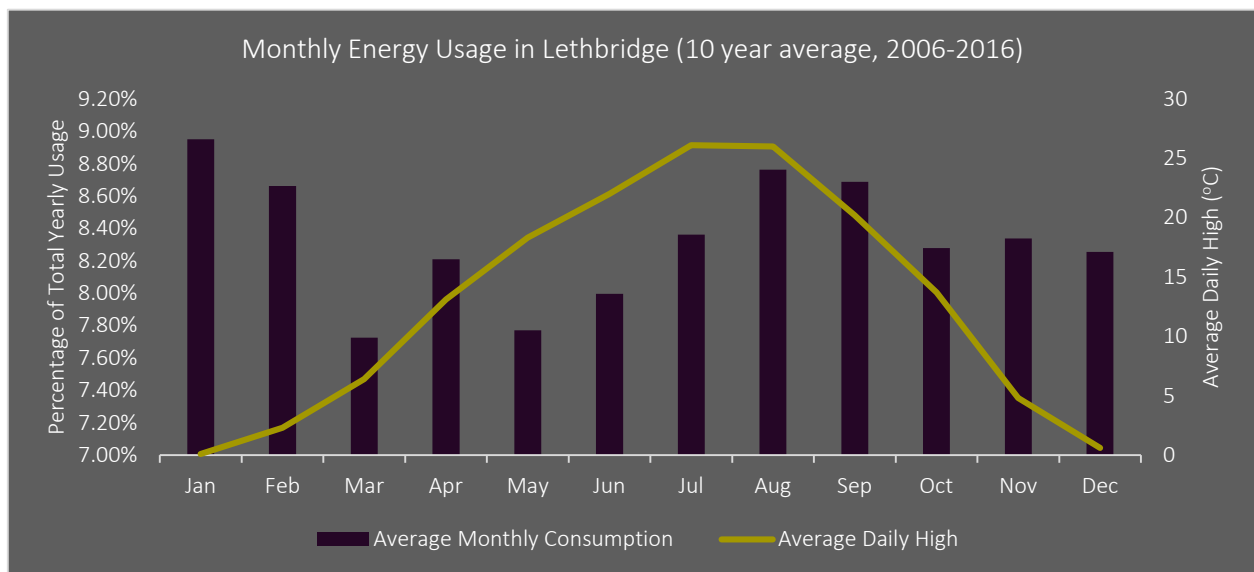
Figure 35: Monthly Energy Usage in Lethbridge (10 year average, 2006-2016)

Table 11: Average Monthly Energy Use in Lethbridge (2006-2016)

Month	Average Energy Usage (mWh)	Percentage of Average Yearly Usage
January	66,011	8.95%
February	63,888	8.66%
March	56,971	7.72%
April	60,550	8.21%
May	57,316	7.77%
June	58,976	8.00%
July	61,663	8.36%
August	64,628	8.76%
September	64,070	8.69%
October	61,054	8.28%
November	61,497	8.34%
December	60,873	8.25%
Total	737,502	100%

The preceeding paragraphs focused on electrical energy use at broader scales of analysis: globally, nationally, provincailly and within Lethbridge. However the level of anlaysis that perhaps resonates with most of us, is what takes place within our own homes. When we analyze residential electricity consumption, there are multiple factors that influence our energy footprints, including the types of buildings that we live in and their ages[111].

Table 12: Energy Consumption by Housing Type in Lethbridge

Housing Type	Average Energy Consumption (GJ/Unit)[112]	Number of Dwelling Units In Lethbridge[113]	Estimated Total Energy Consumption by Housing Type (GJ)
Single Detached Home	152.3 (Alberta Average)	19395 (63%)	2953859 (77%)
Double / Row House	109.4 (Alberta Average)	5240 (17%)	573256 (15%)
Low Rise Apartment	38.7 (Canada Average)	4625 (15%)	178988 (5%)
High Rise Apartment	42.3 (Canada Average)	690 (2%)	29187 (1%)
Mobile Home	111.7 (Canada Average)	685 (2%)	76515 (2%)

According to data from Natural Resources Canada, and as we might expect, not all housing units types have the same energy footprint[114]. Single detached homes along with double / row houses and mobile homes are the highest consumers per unit, likely due to the fact that they have the largest exposure to outside temperatures, while low-rise apartments are the lowest per-unit energy consumers. Their relatively low energy footprint is likely due to the "district" effect that low-rise apartment buildings can create with centralized control over things like heating and cooling. Human factors, such as electrical energy consumption behavious assocaited with individual home owners and renters are not considered here.

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[111] This analysis does not look at commercial or industrial energy consumption because there is not sufficient data to provide an analysis.

[112] *Survey of Household Energy Use* (Natural Resources Canada, 2011).

[113] *Census* (Statistics Canada, 2006).

[114] *Survey of Household Energy Use* (Natural Resources Canada, 2011).

In Lethbridge, nearly two-thids[115] (63%) of our housing stock is made up of single detached homes, followed by double / row houses (17%), low rise apartments 15%), high rise apartments (2%) and mobile homes (2%).Using data provided by Natural Resources Canada on electircal energy consumption by housing type, we find that single detached homes consume an estimated 77% of all residential electircal energy, double / row houses consume 15%, low rise apartments 5%, high rise apartments 1% and mobile homes 2%[116]. This data emphasizes the relatively large electircal energy footprint of single detached and double / row house (and to a lesser degree mobile homes), in contrast to low and high rise apartments, which on average per unit, consume far less electircal energy (low rise apartments consume a quarter of the energy per unit as single detached homes).
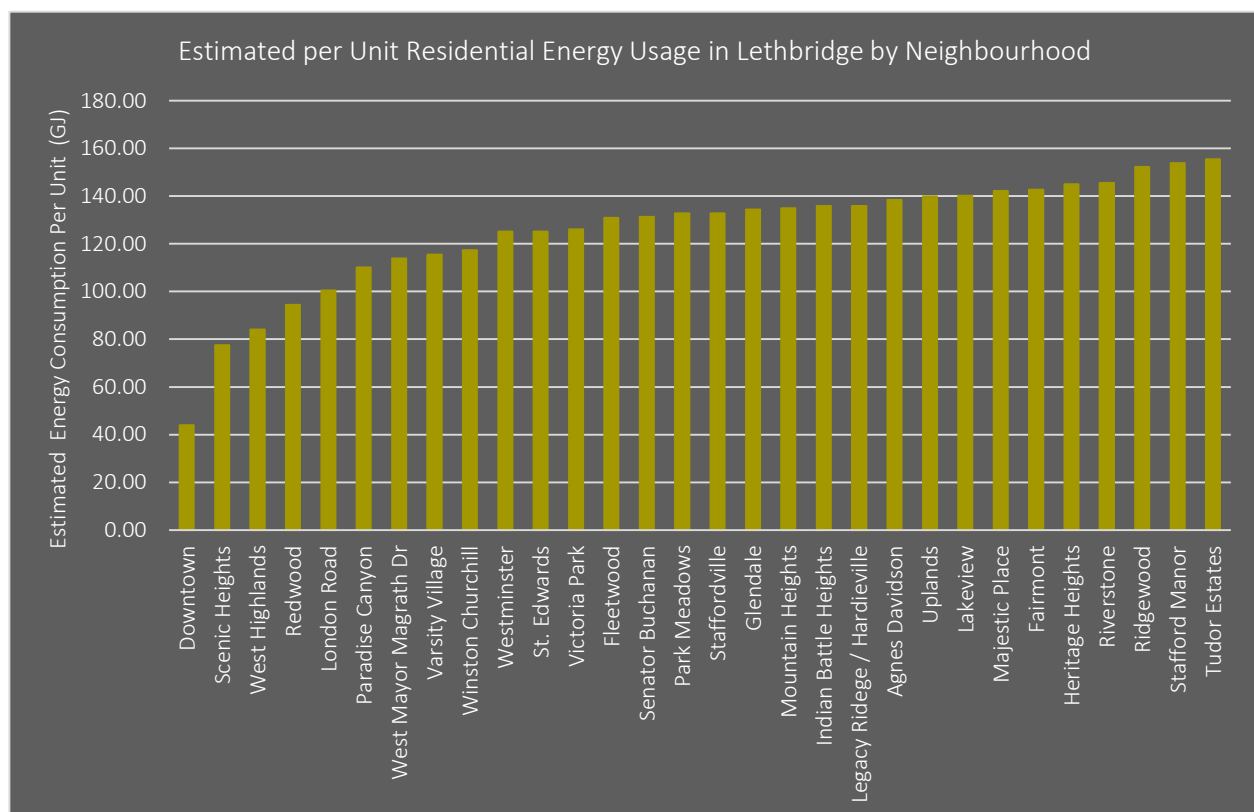
Figure 36: Estimated per Unit Residential Energy Usage in Lethbridge by Neighbourhood

Figures 36 and 37 shows how electrical energy use differs across Lethbridge at the neighbourhood level, considering our neighbourhood typology presented above (Central Areas, Mature Areas, Established Areas and Developing Areas). Strictly based on housing type, central areas (neighbourhood such as

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[115] *Census* (Statistics Canada, 2006).
[116] This is based on the household average energy consumption data provided by Natural Resource Canada. Where available, data is based on Alberta Averages, however where not available, the Canada Average was used.

Downtown, Fleetwood, London Road and Westminster) have relatively low electrical energy footprints, while our mature areas have relatively large footprints (neighbourhoods such as Anges Davidson, Lakeview, Park Meadows and Varsity Village).

Table 13: Estimated Energy Usage by Neighbourhood based on Building Type

NEIGHBOURHOOD TYPE	AVERAGE ENERGY CONSUMPTION (GJ/UNIT) [117]
CENTRAL AREAS	113.61
MATURE AREAS	130.73
ESTABLISHED AREAS	129.00
DEVELOPING AREAS	130.23
CITY AVERAGE	126.28

Another key factor in residential electircal energy use is age of construction. Similar to the data above that shows different energy footprints based on housing type, Natural Resources Canada provides data that shows the relative energy footprint of homes constructed during different time periods. Very generally, homes constructed before 1950 and after 1990 tend to consume more electrical energy than homes constructed between the period of 1950 and 1989. There are likely a number of factors that contribute to this difference, including different construction materials and building regulations. Again, human factors, such as electrical energy consumption behaviours assocaited with individual home owners and renters are not considered here.
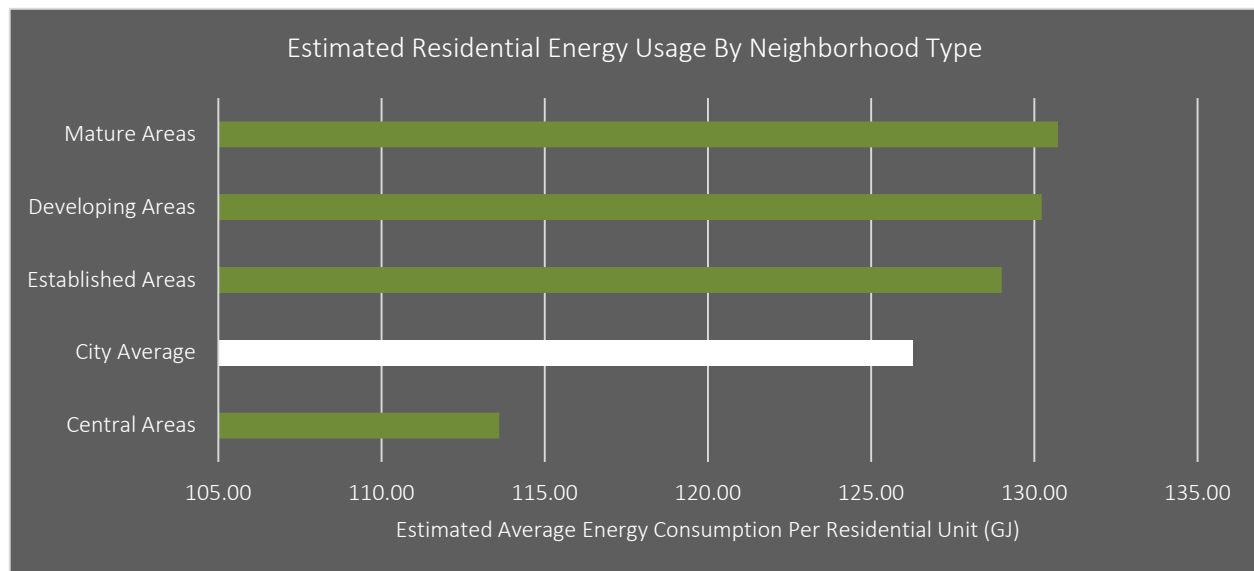
Figure 37: Estimated Residential Energy Usage by Neighbourhood Type

In Lethbridge 11% of our housing stock was constructed before 1950, 17% between 1950–1969, 20% between 1970–1979, 11% between 1980–1989, 13% between 1990–1999, and 28% between 2000 and

[117] *Survey of Household Energy Use* (Natural Resources Canada, 2011).

2011. Using Natural Resources Canada data (combined with aggregated City of Lethbridge data indicating the age of homes), we find that homes constructed between 2000–2011 account for the largest amount of total residential electircal energy consumed (29%), followed by those constructed between 1970–1979 (18%), 1950–1969 (16%), 1990–1999 (13%), pre–1950 (12%), and 1980–1989 (11%).

Table 14: Estimated Energy Usage by Construction Date

Construction Date	Avg. Energy Usage. (GJ/Unit)[118] Alberta	Avg. Energy Usage. (GJ/Unit) Canada	No. Dwelling Units In Lethbridge[119]	Est. Total Energy Consumption by Construction Date (GJ)
Pre 1950	145.6	121.8	3581 (11%)	521934 (12%)
1950-1969	125	106.5	5322 (17%)	702750 (16%)
1970-1979	124.9	107.3	6368 (20%)	795363 (18%)
1980-1989	129.4	99.3	3629 (11%)	469593 (11%)
1990-1999	136.8	94.8	4161 (13%)	569225 (13%)
2000-2011	136.6	107.5	9127 (28%)	1246748 (29%)

Table 15: Estimated Average Energy Usage by Neighbourhood Type and Construction Date

Neighbourhood Type	Avg. Energy Usage (GJ/Unit) by Construction Date[120]
Central Areas	137.37
Mature Areas	127.24
Established Areas	135.25
Developing Areas	136.38
City Average	133.19

Figures 38–40 show how electrical energy use differs across Lethbridge at the neighbourhood level, and when we consider this information using our neighbourhood typology. Strictly based on construction date, central areas (neighbourhood such as Downtown, Fleetwood, London Road and Westminster) have relatively high electrical energy footprints, while our mature areas have relatively low footprints (neighbourhoods such as Anges Davidson, Lakeview, Park Meadows and Varsity Village). This is the opposite of what we found above in our discussion of electrical energy footprints by housing type.

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[118] *Survey of Household Energy Use* (Natural Resources Canada, 2011).
[119] *Census* (City of Lethbridge, 2016).
[120] *Survey of Household Energy Use* (Natural Resources Canada, 2011).

Estimated per Unit Residential Energy Usage by Neighbourhood and Construction Date
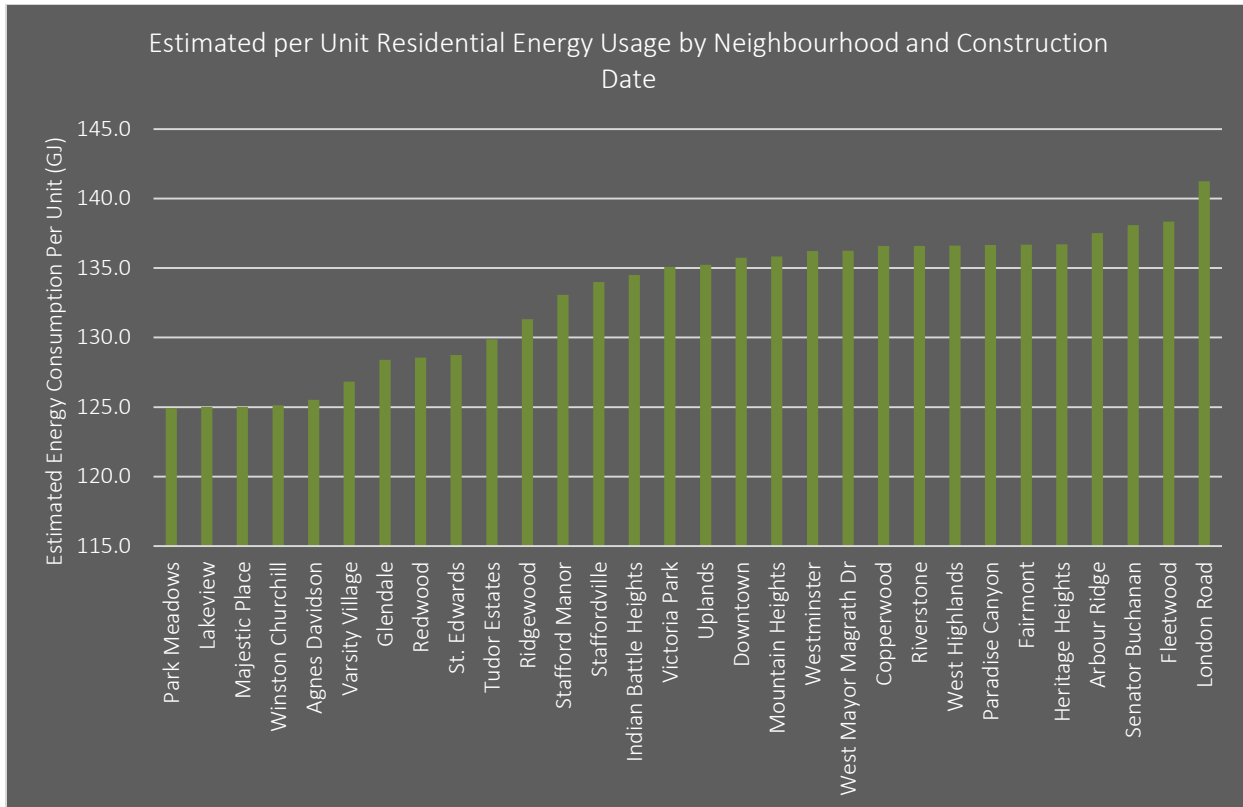
Figure 38: Estimated per Unit Residential Energy Usage by Neighbourhood and Construction Date

When we consider both building type and construction date (weighted equally), we find the following breakdown by neighbourhood type: with established areas such as Fairmont and Ridgewood having the lowest average electircal energy consumption by residential unit, and developing areas (such as Arbour Ridge and Country Meadows) with the highest.
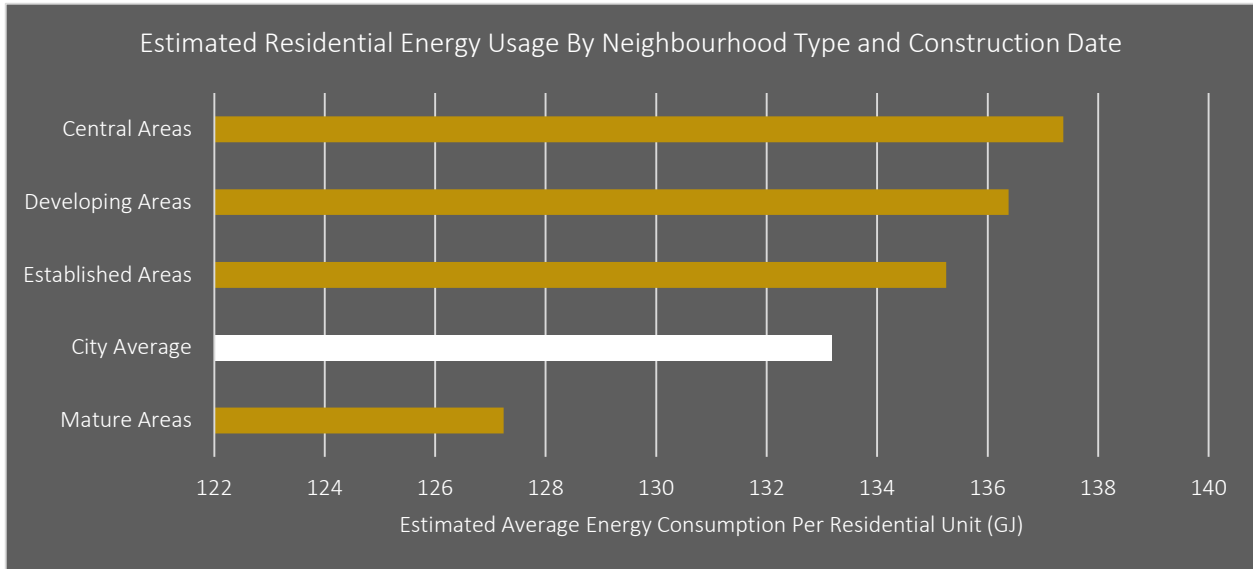
Figure 39: Estimated Residential Energy Usage by Neighbourhood Type and Construction Date
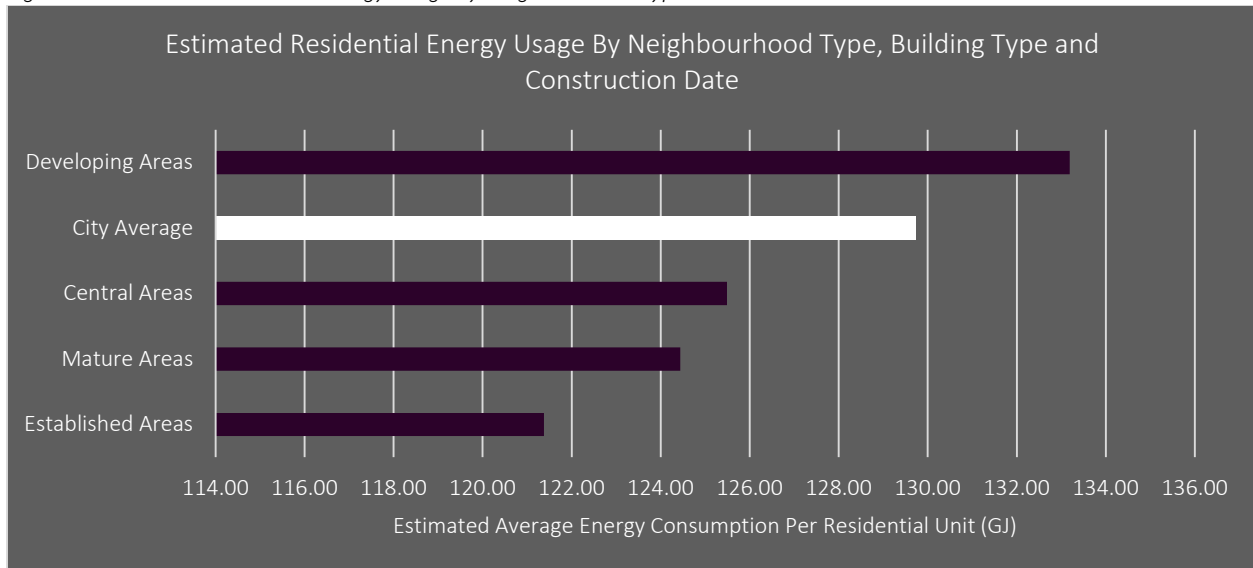
Figure 40: Estimated Residential Energy Usage by Neighbourhood Type, Building Type and Construction Date

Table 16: Average Energy Consumption by Construction Date and Building Type

NEIGHBOURHOOD TYPE	AVERAGE ENERGY CONSUMPTION (GJ/UNIT) BASED ON CONSTRUCTION DATE AND BUILDING TYPE
ESTABLISHED AREAS	121.37
MATURE AREAS	124.44
CENTRAL AREAS	125.49
CITY AVERAGE	129.73
DEVELOPING AREAS	133.19

Of course using either variable (electrical energy footprint by housing type or by construction date) in isolation only tells one part of the story. Our limited analysis does not account for important things like human behaviours, or changes that have been made to individual housing units (e.g., appliance or window upgrades) or even neighbourhood conditions like tree canopy coverage and wind and solar exposure, all of which have an impact on the energy footprint of a given residence or neighbourhood.

What our analysis does shed light on, is the fact that there are multiple variables at play when it comes to electrical energy consumption in Lethbridge, including the source energy type, ambient temperature, housing age and building type, all of which come together to determine our energy footprints (which are dynamic, not static).

Generally speaking, we find that our electrical energy footprint is highest when it comes from carbon intensive energy sources (e.g., coal), during periods of the year when temperatures are most extreme (e.g., January-February, August-September), that multi-unit homes (e.g., low-rise apartments) consume less than single-unit dwellings, and that homes built between the 1950s and late 1970s tend to consume less energy than homes that are both older (e.g., pre-1950) and newer (e.g., homes built after 1990).

As mentioned previously in this report, once "smart meters" are installed across the City we will be able to create a more accurate portrayal of energy use by neighbourhood type in Lethbridge. As well, we will be able to address energy consumption for commercial, industrial and institutional buildings, which are absent from this analysis.

Transportation Network

Urban design has always been in part (if not entirely) determined by the dominant form of transportation in any given era. The development of old European cities (often held up as shining examples of walkable, people-friendly cities) emerged the way they did because walking was the primary mode of transportation. In North America, cities formed alongside the evolution of transportation modalities: from pedestrians and horses at the time of European colonization, to the arrival of affordable private vehicles after World War Two, to mass public transportation later in the century. In the last several years many large North American cities have started to see growth in cycling and a call to return to pedestrian dominated urban design. In Lethbridge we see this sentiment reflected in the current ICSP/MDP which

states that for community planning purposes pedestrians should be the transportation priority[121] (this is reiterated in the City of Lethbridge's Transportation Master Plan). However, the deep and lasting impact that the private vehicle has left on our and many cities may prove a challenge to overcome.

In terms of its environmental, social and economic impacts, private vehicles have in many ways challenged the sustainability of our cities. Private vehicles have large environmental footprints in terms of emissions and air quality (e.g., fine particulate matter and sulphur dioxide) and the consumption of agricultural and other lands providing ecosystem services. They have large

Figure 41: Corner of 3rd Avenue and 5th Street South. (Source: Galt Museum & Archives)

economic impacts because of the burden they place on tax payers to construct and maintain roads and bridges increasingly far from urban cores, and collateral impacts in the form of potential revenue losses to municipalities due to the development of large parking lots and arterial roads where commercial, residential or industrial activity could be supporting the tax base. Private vehicles also have large social impacts in terms of the social isolation and loss of neighbourhood cohesion that results from people spending more time in their cars (going from garage to parking spot) and being drawn to car-centric destination commercial centres on the periphery of cities.

It is also true that private vehicles have had positive impacts, allowing us to access work, recreation and commercial areas with greater speed and comfort, however, and ironically, those very same destinations are increasingly far, simply because of the dominance of vehicles as the primary transportation mode for the past 70+ years: cars-centric development begets vehicle ownership begets greater car dependency.

While a fulsome discussion about the impacts of our transportation network includes a conversation about economic, environmental and social impacts, the scope of this report focuses our discussion on the footprint of transportation infrastructure[122] in Lethbridge, as well as the impact of our transportation choices. This section also tries to put information about transportation choices into context by comparing transportation statistics with other cities in Alberta and Canada. The relationship between transportation and air quality outcomes, another key environmental consideration, is discussed in the Air section.

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[121] *Integrated Community Sustainability Plan / Municipal Development Plan* (City of Lethbridge, 2010).
[122] The analysis of our transportation footprint is confined to the land used for roads, sidewalks / pathways and cycle networks, however does not include an analysis of a key related land, parking lots. This data was not available at the time of writing, however should be included in future baseline reports.
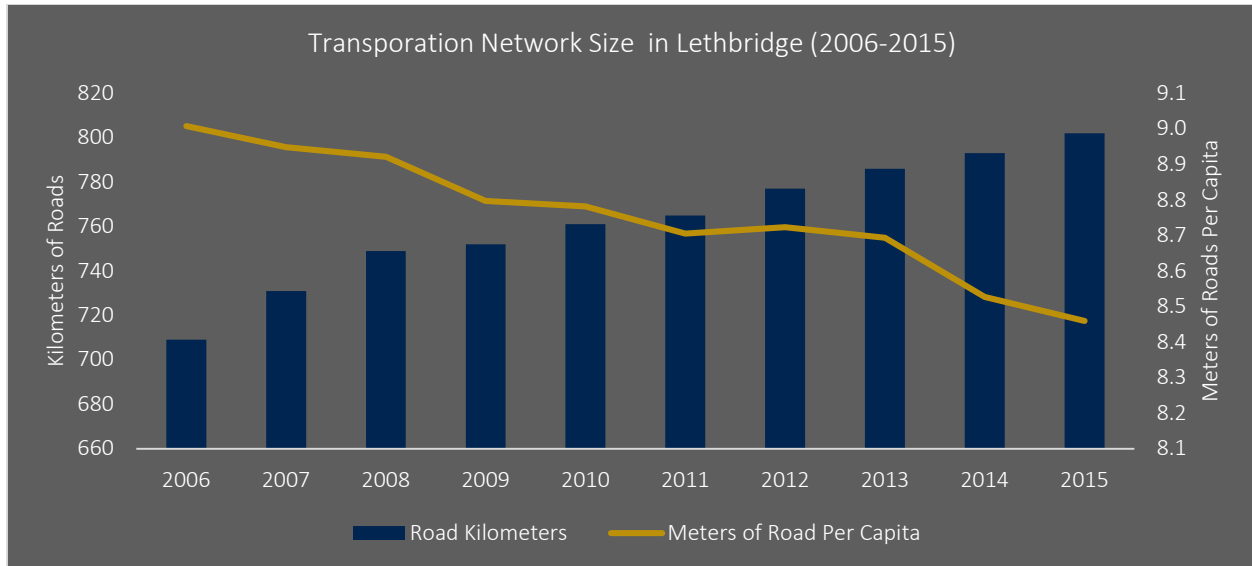
Figure 42: Transportation Network Size in Lethbridge (2006-2015)

Table 17: Transportation Infrastructure in Lethbridge

Infrastructure Type	Total Length	Total Area	Percentage of Total City Area [123]	Percentage of Total City Developed Area [124]
Roads (2015)	802 km	17.8 km^2 (est.)	14.3% (est.)	34% (est.)
Sidewalks / Pathways (2015)	810 km	1.3 km^2 (est.)	1% (est.)	2% (est.)
On-Street Cycling Facilities (2016)	1.6 km	0.005 km^2 (est.)	0.00004% (est.)	0.001% (est.)

One of the most visible environmental impacts of our transportation network is the consumption of land needed to construct infrastructure like roads, sidewalks, pathways and cycle tracks; land that could otherwise provide ecosystem services like habitat, carbon sequestration and agricultural production.

As of 2015, there were 802 km of roads (occupying a total area of approximately 17.8 km^2) and 810 km of sidewalks and pathways in Lethbridge including both paved pathways along roads and paved pathways in parks (occupying a total area of approximately 1.3 km^2).

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[123] Includes all lands within the borders of the City of Lethbridge. The Total City Area is 124 km^2.

[124] Includes all lands within the City of Lethbridge, except those zoned for park and open space (including the river valley), future development (FUD and certain Direct Control districts). This figure includes roads, but not sidewalks and pathways. The Total City Developed Area is 52.2 km^2.

Table 18: Modal Share in Lethbridge (2010)

Mode	Percentage of Trips
Auto Drive	69.2
Auto Passenger	19.9
Comm. Vehicle Driver	0.8
Transit Bus	1.4
School Bus	2.5
Bicycle	1.3
Walking	4.7
Taxi/Airport Shuttle	0.1
Motorcycle/Moped	0.2

As Figure 43 shows, Lethbridge has seen steady growth in the size of its transportation network since at least 2006. At the same time there has been steady decline in the amount of roadway per capita, possibly signaling that new growth has been coupled with increasingly efficient land use. As development becomes increasingly dense and as redevelopment in existing areas occurs, we would expect to see a decline in the amount of land (in terms of road kilometers) needed to move people around the City.

While this seems to suggest a positive trend in land use efficiency in terms the footprint of our roadways, this positivity may be limited. For example, there has been essentially zero growth in City's on-street cycling facilities, which at the time of writing is limited to 1.6 km along 13 Street North (occupying a total area of 0.005 km^2). The on-going implementation of the recently approved Cycling Master Plan by the City of Lethbridge will expand the network going forward, and will be reflected in the coming years. The growth of commuter cycling infrastructure is expected to have a small impact on private vehicle use in the short-term, however along with potential growth in other transportation modes (e.g., public transportation, walking) we may see larger reductions in the long-term.
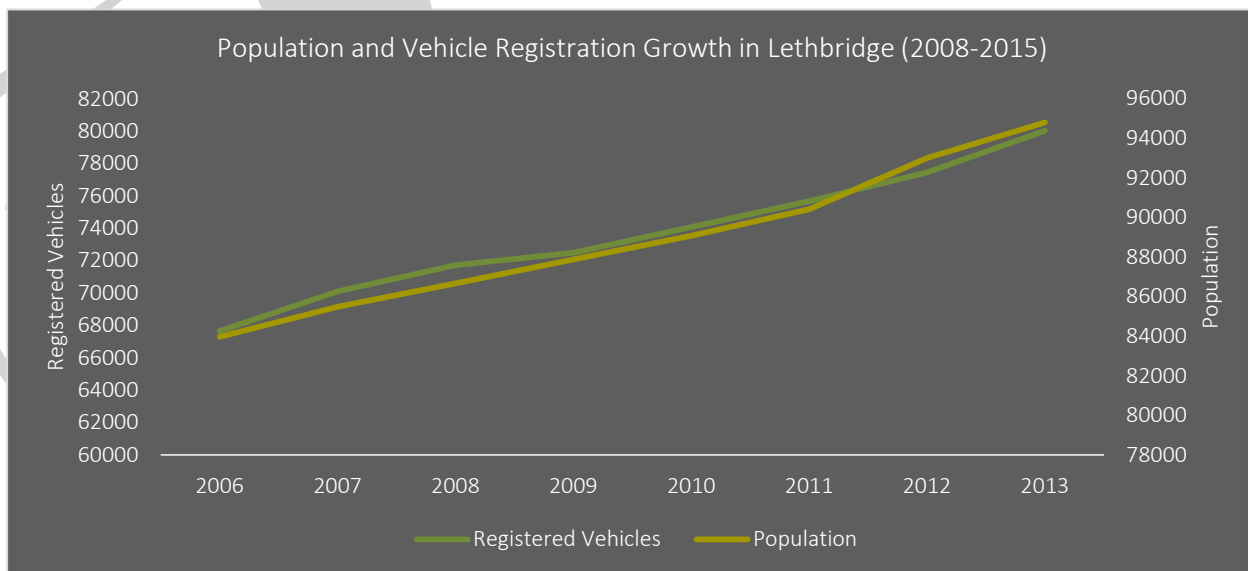
Figure 43: Population and Vehicle Registration Growth in Lethbridge (2008-2015)

Another trend that relates to our transportation network is the growth in network demand. In the case of our private vehicle dominated transportation paradigm, this is assumed to be most strongly influenced by vehicle ownership. Vehicle ownership (measured as the amount of vehicles registered in Lethbridge) has increased alongside our population growth over the past 10 years. Vehicle ownership has grown in

absolute terms, from 67,641 in 2008 to 80,013 in 2015, as well as in terms of vehicles per person, which has increased from 0.81 in 2008 to 0.84 in 2015. Despite this growth, Lethbridge still tends to have one of the lowest rates of vehicle ownership per capita of any city in Alberta.

Table 19: Population and Vehicle Registration in Lethbridge and Select Alberta Cities

Year	Lethbridge Population	Lethbridge Vehicle Registrations	Lethbridge Vehicles Per Capita	Vehicles Per Capita (Alberta City Average [125])
2008	83960	67641	0.81	1.01
2009	85482	70104	0.82	0.99
2010	86659	71726	0.83	0.99
2011	87882	72486	0.82	1.00
2012	89074	74064	0.83	1.00
2013	90417	75670	0.84	1.01
2014	93004	77446	0.83	1.01
2015	94804	80013	0.84	1.00

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[125] This includes data from the largest 17 cities in Alberta, for which data is available, including: Airdrie, Brooks, Calgary, Camrose, Cold Lake, Edmonton, Fort Saskatchewan, Grand Prairie, Lacombe, Leduc, Lethbridge, Lloydminster, Medicine Hat, Red Deer, Spruce Grove, St. Albert and Wetaskiwin.
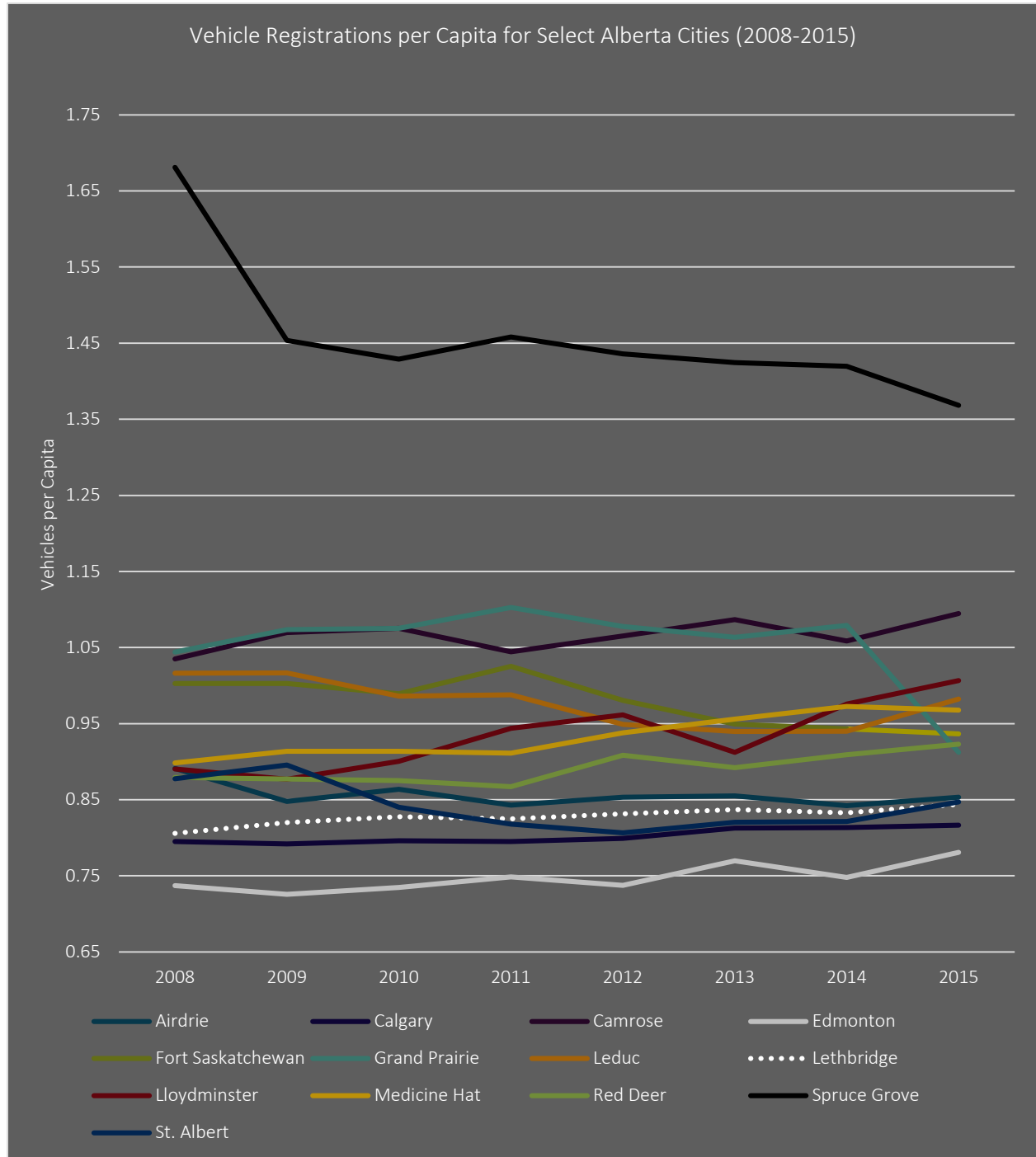
Figure 44: Vehicle Registrations per Capita for Select Alberta Cities (2008-2015)

Another key piece of information about our transportation network relates to the transportation choices that residents make. When we compare Lethbridge to the largest urban areas in Canada[126], we find that Lethbridge has among the highest rates of private vehicle use (referred to as mode share), and the lowest rates of active transportation and public transit use.

According to the 2011 National Household Survey, the private vehicle is by far the dominate mode of transportation in Lethbridge, accounting for 90.4% of all trips (either as drivers or passengers). Meanwhile, active transportation (walking and bicycling) accounts for just 5.2%, and public transportation is even lower at 3.3%.

In contrast, our neighbours in Calgary have a private vehicle mode share of 76.7%, active transportation share of 6.1%, and a public transportation share of 15.9%. In Edmonton, the private vehicle mode share is 82.2%, active transportation accounts for 5.2%, and public transportation is 11.3%.

A related point of comparison for our environmental baseline is commuting time, as it has a direct impact on environmental outcomes such as air quality and greenhouse gas emissions. While Lethbridge appears to have a relatively high rate of private vehicle use compared to other Canadian cities, the amount of time that Lethbridge residents spend in their cars is significantly less[127].

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[126] *National Household Survey* (Statistics Canada, 2011).
[127] *National Household Survey* (Statistics Canada, 2011).
Notes: Canadian, Edmonton and Calgary Averages are based on 2011 National Household Survey. Average Weekly Commute is based on a five day work week. Average Yearly Commute is based on 252 work days per year.
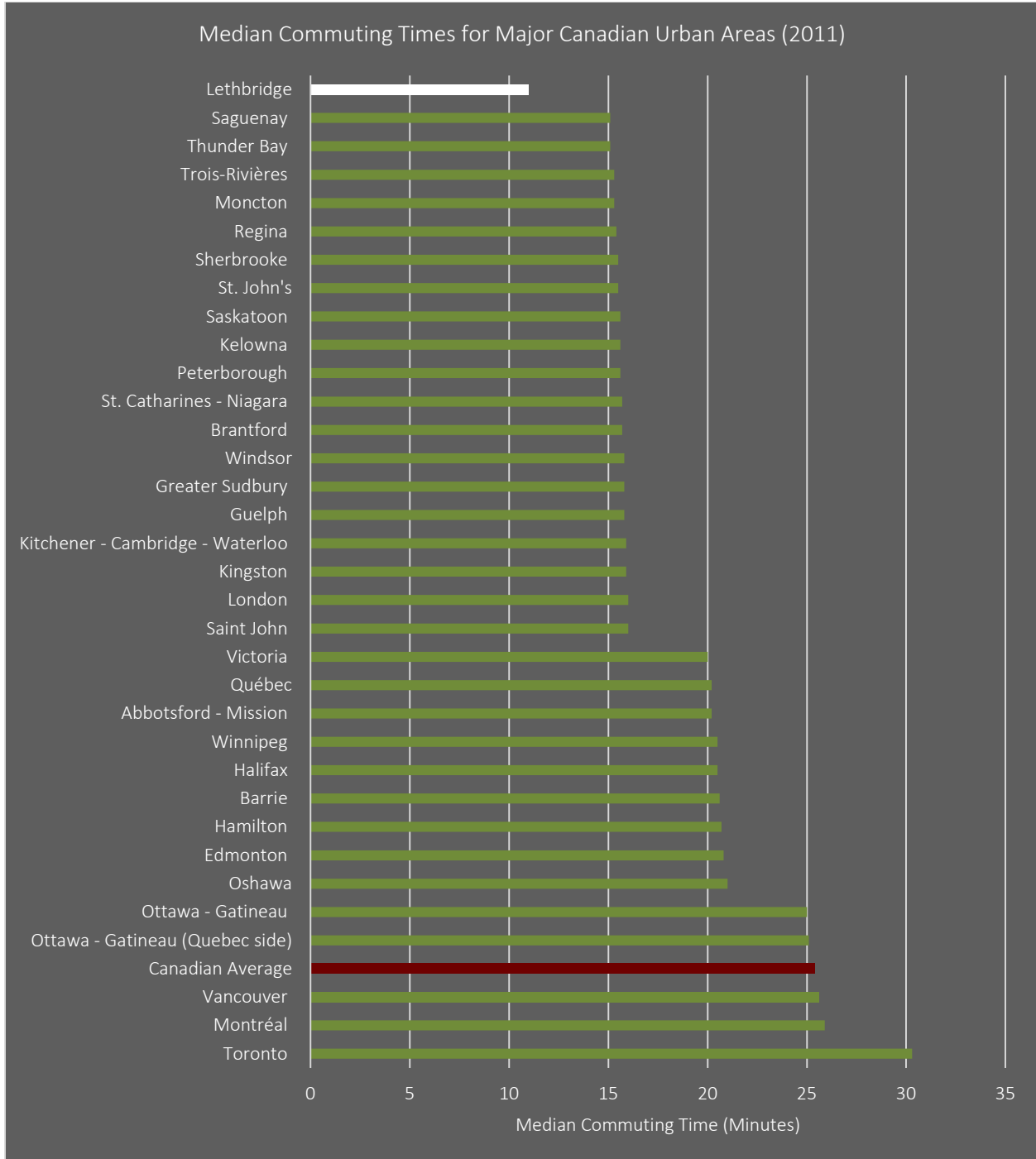
Figure 45: Median Commuting Times for Major Canadian Urban Areas (2011)

The chart titled "Median Commuting Times for Major Canadian Urban Areas (2011)" shows median commuting time in minutes (x-axis from 0 to 35) for the following urban areas (top to bottom):

- Lethbridge
- Saguenay
- Thunder Bay
- Trois-Rivières
- Moncton
- Regina
- Sherbrooke
- St. John's
- Saskatoon
- Kelowna
- Peterborough
- St. Catharines - Niagara
- Brantford
- Windsor
- Greater Sudbury
- Guelph
- Kitchener - Cambridge - Waterloo
- Kingston
- London
- Saint John
- Victoria
- Québec
- Abbotsford - Mission
- Winnipeg
- Halifax
- Barrie
- Hamilton
- Edmonton
- Oshawa
- Ottawa - Gatineau
- Ottawa - Gatineau (Quebec side)
- Canadian Average
- Vancouver
- Montréal
- Toronto

Table 20: Commuting Times in Lethbridge by Neighbourhood Type

AREA	AVG. DAILY COMMUTE (ONE-WAY TRIP; MINUTES)	AVG. WEEKLY COMMUTE (RETURN TRIPS; MINUTES)	AVG. YEARLY COMMUTE (RETURN TRIPS; HOURS)
LETHBRIDGE AVERAGE	12.5	125	105
CENTRAL AREAS	*10.8*	*108*	*91*
MATURE AREAS	*11.8*	*118*	*99*
ESTABLISHED AREAS	*13.6*	*136*	*114*
DEVELOPING AREAS	*14.6*	*146*	*123*

In Lethbridge the average resident has a 12.5 minute commute[128], compared to the national average of 25.4 minutes. Commute time is measured as the number of minutes it takes for a person to travel from home to work.

Within Lethbridge, we find, as might be expected, that residents living in older and more central neighbourhoods have shorter commuting times. The average (one-way) commute time in central neighbourhoods is 10.8 minutes, 11.8 in mature neighbourhoods, 13.6 in established neighbourhoods, and 14.6 in developing neighbourhoods. All of these values are well below the Canadian average (25.4 minutes).

There are likely two key reasons for the difference in commuting times between neighbourhood types in Lethbridge: proximity to employment clusters, and road network design. Central and Mature areas tend to be closer to the major employment hubs in Lethbridge (downtown, hospital, industrial areas on the City's eastern side). As well, these neighbourhoods tend to be constructed around a grid pattern road network, facilitating quicker movement in, out and within the neighbourhoods (in contrast to a curvilinear road network). At the same time, establishing and developing areas are further away from the main employment centers and tend to be designed with curvilinear road networks.

Interestingly, commute times is an integral part of Lethbridge's identity. A short commute times is one of the aspects of our City that many people enjoy and look to protect, and can potentially act as a draw for people living in other communities looking to move to Lethbridge.

When we look over a longer period of time, the average Lethbridge resident spends about 108 hours less time in their vehicle commuting each year than the average Canadian—*that's the same as 4 and a half days*.

And so while there may be more private vehicle use in Lethbridge than in other Canadian cities, the reduced time spent driving in those vehicles means that the relative environmental impact of private vehicle use per capita in Lethbridge may be perhaps less than assumed based strictly on transportation mode share data.

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[128] *National Household Survey* (Statistics Canada, 2011).
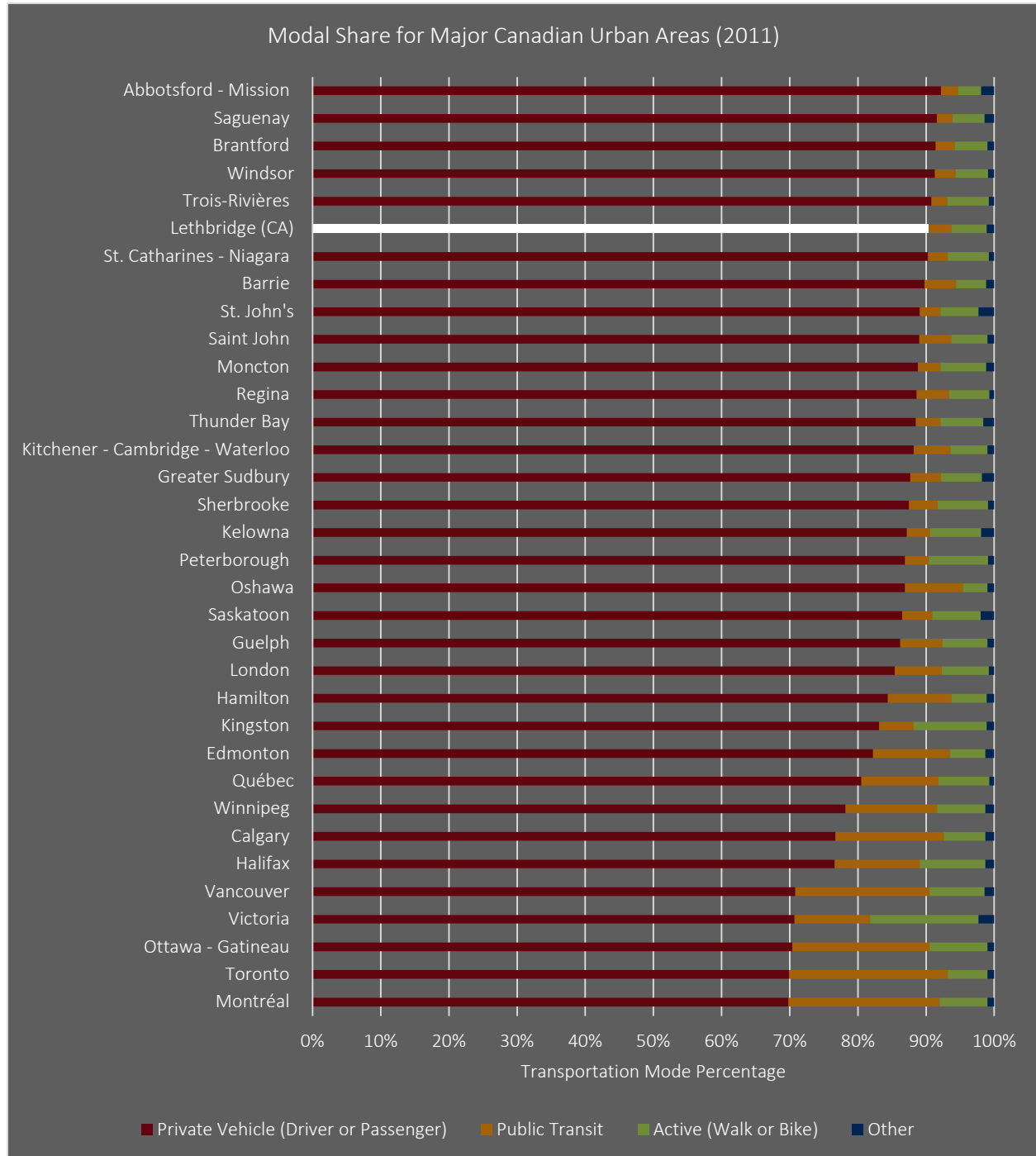
Figure 46: Modal Share for Major Canadian Urban Areas (2011)

As the City of Lethbridge continues to grow, understanding the relationship between growth, development and transportation requirements will continue to be important. This is especially relevant

given the direction being given through the SSRP to increase land use efficiency (including through increased density in new and existing urban areas). As efficiencies are found, added pressure may be placed on our transportation network to transport greater numbers of people, cars and bicycles on the same amount of space; in that case the need for viable alternative transportation options becomes important. As we think about transportation differently, large parking lots will also become a greater focus of attention in terms of their future usefulness and contributions to efficient use of land principles.

Two other future challenges that are relevant to both our transportation network and consumption of energy, is the much anticipated arrival of electric and self-driving vehicles. It is beyond the scope of this report to suggest what policy changes are needed to address these two challenges, but it is important to acknowledge that both have the potential to significantly transform our community, and not just in terms of our ecological footprint.

Electric vehicles are expected to make positive contributions to our energy footprint and as a result health outcomes—although this depends on the sources of future electrical energy production in Alberta (i.e., coal or other, less harmful sources). At the same time however, their arrival may also stress our energy distribution system, as large energy demands will be experienced at places like large commercial centers, recreational facilities, institutions like hospitals and universities, and in our neighbourhoods. The evolution and growing efficiency of charging technology over time may serve to mitigate that potential stress.

Self-driving cars have the potential to change our transportation paradigm to one where transportation infrastructure can be minimized (in terms of its footprint) and use can be maximized (either through automated public transportation, or privately owned autonomous vehicles). At the same time however their arrival poses potential social challenges. Self-driving vehicles may lead to even greater social distances between humans, and result in lengthened work days which transform commuting time into productive work hours.

4.1.6 Social

An important consideration for our environmental baseline is the way in which the community interacts with local environmental resources at a social level. The *Social* resource theme focuses on three issues areas: Park and Open Space (as an indicator of access to natural and naturalized spaces); Ecological Footprint; and Programming and Volunteerism.

Together, these three issues areas give us a sense of how residents interact with the larger environment on a daily basis passively (e.g., by enjoying parks and natural areas) or more actively (e.g., by taking part in a program or volunteering), as well as the cumulative impact of daily actions and behaviours measured as our Ecological Footprint. Aspects of the Social resource theme also offer a connection between environmental resources and the social value we place on them as a community.

Park and Open Space

Parks and Open Spaces take a variety of forms in our community, including: athletic parks, cemeteries, community core parks, linear parks, neighbourhood parks, regional parks and even school grounds. In Lethbridge we also have a unique environmental resource in our River Valley, providing an abundance of additional environmental, social and cultural ecosystem services (in addition to the heritage values that it offers our community). Our soon-to-be three regional parks in the City (Nicolas Sheran Park in west Lethbridge, Henderson Lake Park in south Lethbridge, and Legacy Park in north Lethbridge) also serve as destinations in their own rights that residents and visitors travel to for their recreational enjoyment.

Park and Open Spaces provide a number of ecosystem services to community residents and visitors, that don't strictly relate to environmental outcomes, including: cultural identity, stewardship, aesthetic, recreation & tourism, education and food. This specific Park and Open Space issue area focuses on access to these spaces, as a way of measuring more passive levels of accessibility to natural and naturalized spaces in Lethbridge. It is important to note that the benefits that parks and open spaces provide our community are not limited to public lands. Privately owned or communal open spaces (such as yard space at private residences, common areas at condominiums or even landscaped areas at private business and institutions) also offer many of these same benefits. However, for the purposes of this report, we only focus on public lands because they are open to the entire community.

Table 21 demonstrates the size of our Park and Open Space system in Lethbridge, as well as a few different ways of thinking about access to these spaces: in absolute terms (total area), area per capita, and area by neighbourhood type.

Table 21: Park and Open Space in Lethbridge by Neighbourhood Type and City Sector

Neighbourhood Type	Avg. Park and Open Space excl. River Valley (ha)	Avg. Park and Open Space per capita excl. River Valley (ha)	Avg. Park and Open Space incl. River Valley (ha)	Avg. Park and Open Space per capita incl. River Valley (ha)
Entire City	799.8 (total)	0.008	3816.1 (total)	0.039
Central Areas	12.8	0.011	16.4	0.013
Mature Areas	22.5	0.033	22.6	0.33
Established Areas	10.8	0.005	19.1	0.016
Developing Areas	15.9	0.086	16.0	0.087
North Lethbridge	235.7	0.009	1273.5	0.051
South Lethbridge	270.2	0.008	1212.8	0.039
West Lethbridge	293.9	0.008	1329.7	0.035

The data below indicates there are a number of factors that determine access to Park and Open Space, including: neighbourhood planning philosophy (e.g., the decision to have large regional parks in each City sector), neighbourhood population changes over time (e.g., neighbourhoods with populations in decline will have higher Park and Open Space per capita values), and geography (neighbourhoods that are adjacent to the River Valley or a regional park will naturally have higher per capita values).

Because there are so many factors that contribute to the Park and Open Space outcomes listed below, it is necessary to take a holistic view when attempting to interpret the data and to not use any one measure as representative of all neighbourhoods, or even a neighbourhood type, as many of the values below will change over time with changing neighbourhood populations.

Neighbourhood Types:

Central Areas: Downtown and adjacent neighbourhoods

Mature Areas: Neighbourhoods outside the central areas, generally completed prior to 1980

Established Areas: Neighbourhoods that were generally completed between 1981 and the present

Developing Areas: Neighbourhoods that are currently developing or for which significant planning as taken place (Outline Plan)

Box 16: Neighbourhood Types
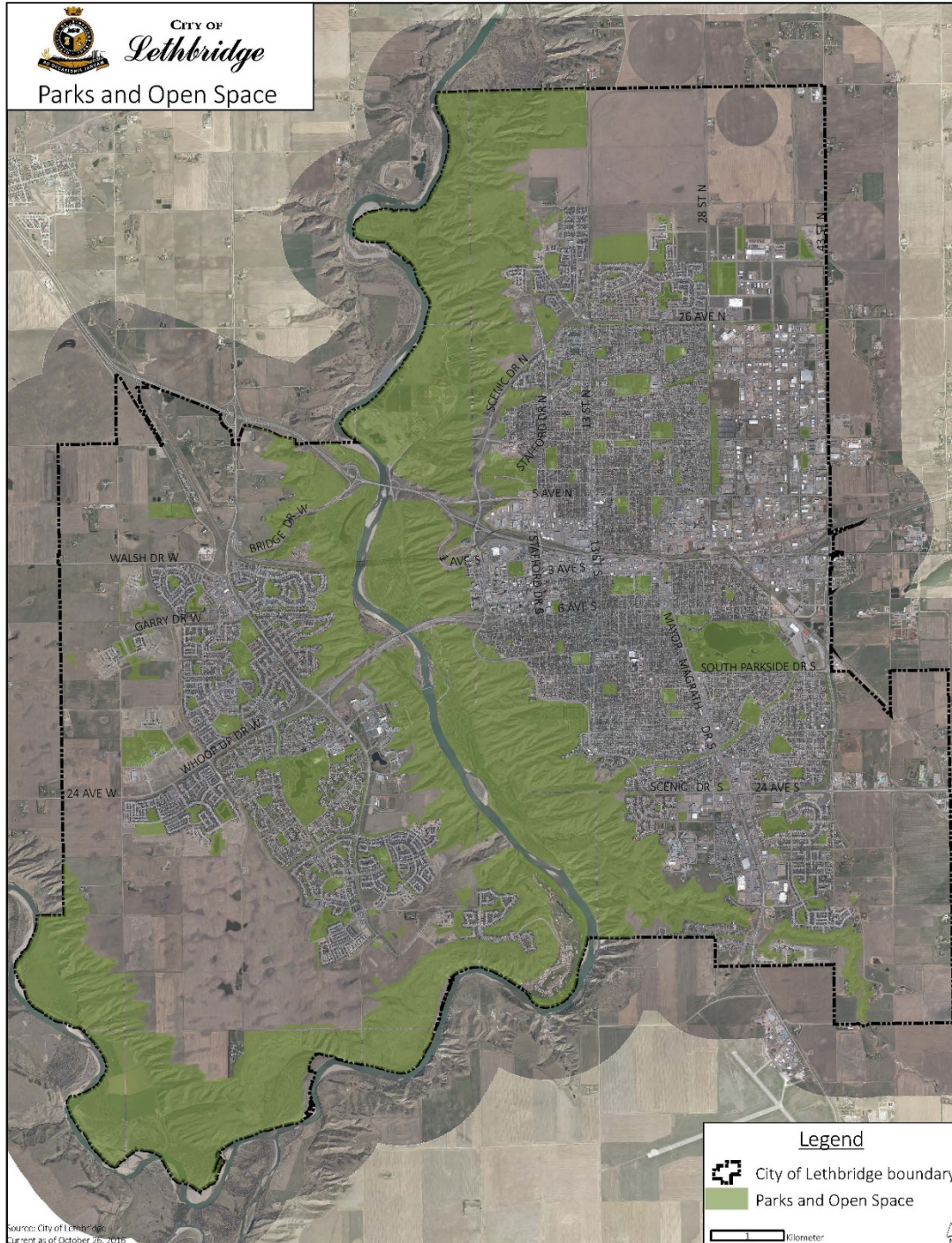
Map 10: Parks and Open Space (Whole City)
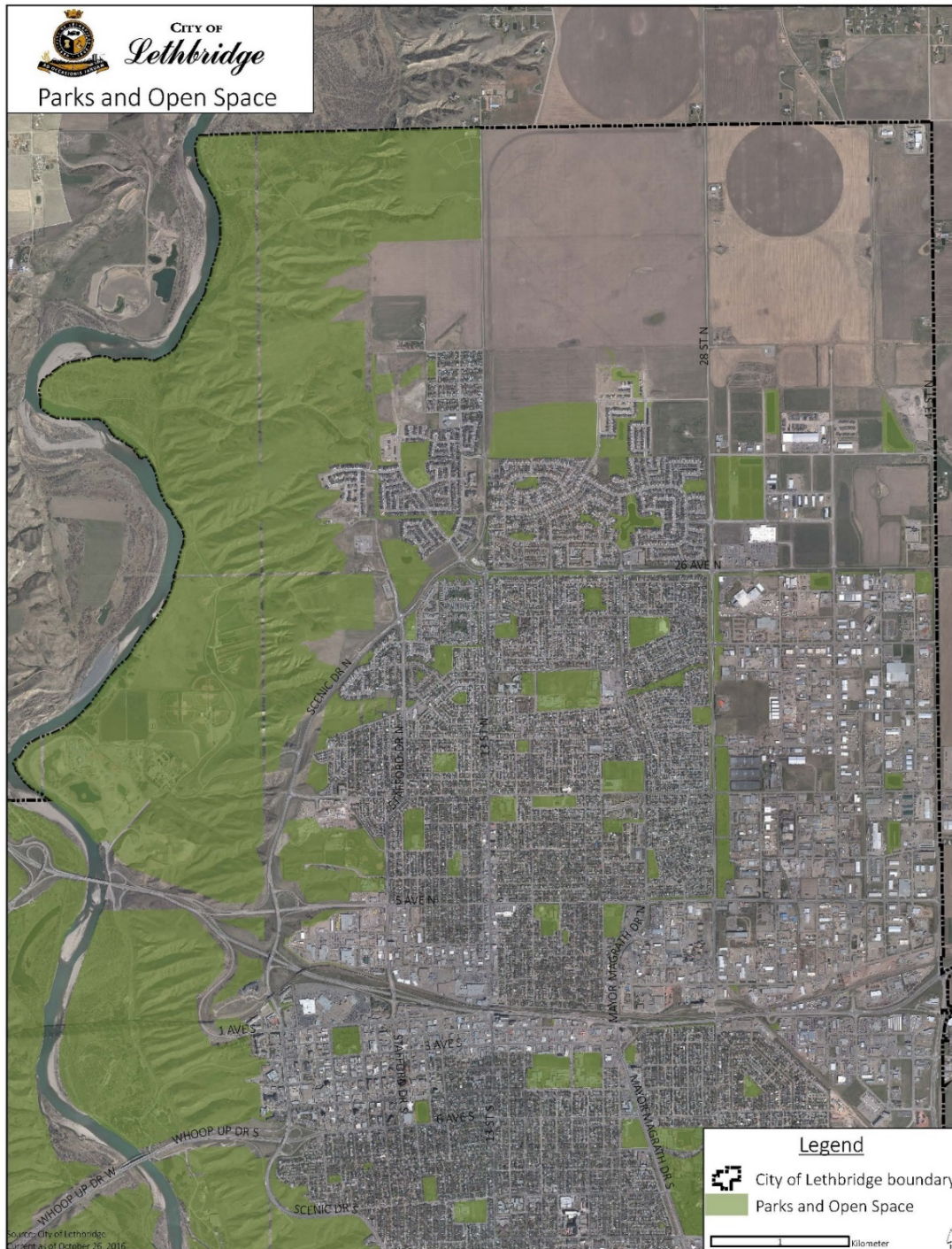
Map 11: Parks and Open Space (North Lethbridge Detail)
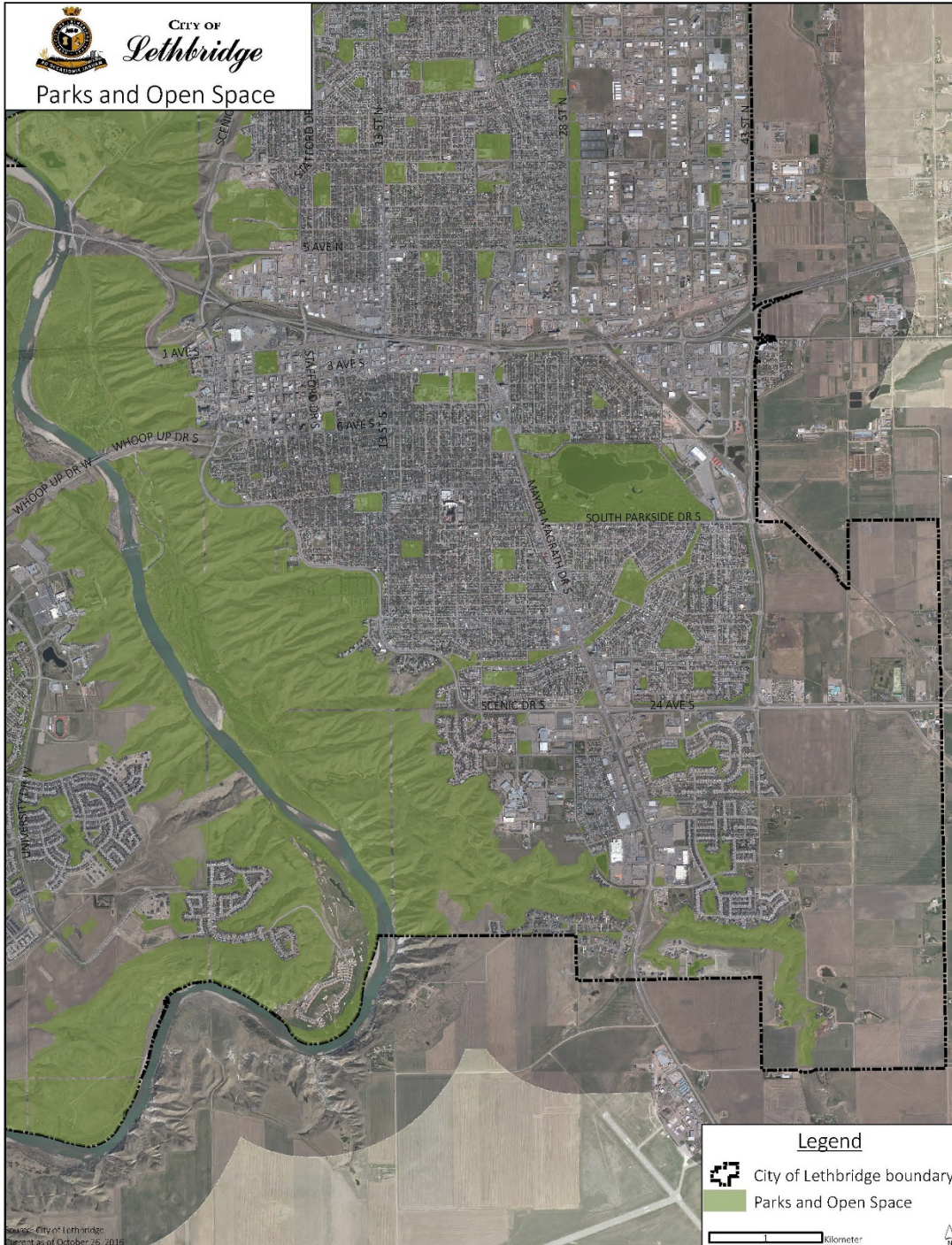
Map 12: Parks and Open Space (South Lethbridge Detail)

Map 13: Parks and Open Space (West Lethbridge Detail)

Ecological Footprint

Ecological Footprint (also known as Environmental Footprint) is a measurement of the environmental resources required to sustain a particular lifestyle. This measurement incorporates water and energy use, uses of land for buildings and infrastructure (such as roadways, utilities and waste management), agriculture, forests and all other forms of energy and material inputs that are required to produce and dispose of the goods and services that we use every day. An ecological footprint can be measured for an individual, household, city and even the entire planet.

Ecological footprint relates back to ecosystem services in that it describes the cumulative impact of our actions and behaviours as we seek to harness those same services—for example, the habitat we consume for the expansion of development or for agriculture or the amount of clean water we consume.

The EnvS provides a very basic assessment of our ecological footprint at three scales of analysis: individual, household and City. The analysis focuses on the following aspects: water, energy, land use, waste and biodiversity. An air footprint is not provided as there is not sufficient data available. To generate the estimated individual and household footprints, the data provided for each of the areas above was divided by the total City population (based on the Municipal Census of the given year) and then multiplied by 2.4 to equate to the average household size in Lethbridge (based on the 2016 Federal Census).

The water footprint is based on total water consumed in the City of Lethbridge in 2015 (but does not include water provided regionally), and was provided by City of Lethbridge Water, Wastewater, and Stormwater.

The energy footprint is based on the total energy consumed by all users classes in the City of Lethbridge in 2015, and was provided by the Lethbridge Electrical Utility.

The land footprints calculations are based on the data prepared by City of Lethbridge Planning and Development Services, and is current to 2016.

The waste footprint is based on total waste disposal and diversion amounts in the City of Lethbridge in 2015, and was provided by City of Lethbridge Waste and Recycling. This figure includes all waste that is generated in the City, except for contaminated soil.

Table 22: Ecological Footprint

Ecological Footprint Area	Per Capita	Per Household	City
Water			
Daily Water Usage (2015)	213 L	511 L	20 193 252 L
	0.213 m^3	0.511 m^3	20193 m^3
Energy			
Daily Electrical Energy Usage (2015)	0.08 GJ	0.2 GJ	7695 GJ
Land			
Total Developed Land (2016)	0.04 ha	0.09 ha	3445 ha
Roads (2016)	0.02 ha	0.04 ha	1782 ha
Park and Open Space (including River Valley)	0.04 ha	0.09 ha	3815 ha
Park and Open Space (not including River Valley)	0.01 ha	0.02ha	777 ha
Waste			
Daily Waste Disposal (2015)	3 kg	7 kg	292 000 kg
Daily Waste Diversion (2015)	0.2 kg	0.6 kg	22 146 kg

Programming and Volunteerism

We live in a community that is passionate about volunteerism, promoting healthy lifestyles and a healthy environment. As a result of that passion, there are dozens of organizations, community-groups, neighbourhood associations, and government agencies, among others, that provide a wide variety of programming, education and advocacy for our local environment.

Strong participation and commitment from the community and all stakeholders is necessary to ensure that we continue to benefit from the ecosystem services provided locally and regionally by the environment. Participation can take on a number of forms, from a more active role such as a leadership position in your local neighbourhood association or a society, or signing up for an education program at the Helen Schuler Nature Centre with your kids, volunteering your time for a community weed-pull, or just picking up a piece of garbage when you are at the park with your family.

There are organizations doing work that is more broadly focused (such as Environment Lethbridge or the Helen Schuler Nature Centre), or more targeted on specific aspects of our environment (e.g., Oldman Watershed Council, City of Lethbridge Waste and Recycling, City of Lethbridge Water, Waste Water and

Stormwater). Work is also happening at a number of "levels": from on-the-ground work to provide people with healthy food and resources (e.g., the Interfaith Food Bank, Campus Roots, Lethbridge Community Garden Committee), to advocacy (e.g., Southern Alberta Group for the Environment), research and collaboration (e.g., Chinook Food Connect), education and programming (e.g., Environment Lethbridge, the Helen Schuler Nature Centre), and policy guidance (e.g., Lethbridge City Council Environment Committee).

Because there are so many different organizations doing work in different spaces and at different levels of analysis, it is hard to quantify this aspect of our social environmental baseline. Instead of providing a detailed analytical baseline, this issue area is instead focuses on demonstrating the large array of work being done in our community, portrayed with Figure 48.

The organizations shown on Figure 48 are by no means exhaustive, nor is their selection meant to suggest which organizations are doing more or better work. Everyone working in this space has an important contribution to make. The figure is simply meant to demonstrate that there is a vast collection of organizations working in this space, highlighting the work that is done by a few of them.

As we learn more about our environmental baseline and formalize an integrated approach to promote a healthy environment in Lethbridge, we will undoubtedly be able to add more organizations and detail to this figure.

Organizations Working to Promote a Healthy Environment

Oldman Watershed Council

City of Lethbridge Parks

Lethbridge Naturalist Society

Chinook Food Connect

Lethbridge City Council Environment Committee

- Established 2010
- Average over 200 staff and committee hours each year

Southern Alberta Group for Environment

Helen Schuler Nature Centre

- Deliver over 900 programs annually
- Over 70,000 annual in person and on-line visits
- Host over 350 school trips and offer over 250 drop-in programs for children and families each year

Lethbridge Community Garden Committee

Interfaith Food Bank

City of Lethbridge Water, Waste Water, Storm Water

Environment Lethbridge

- Over 700 volunteer hours in 2015
- Reached over 2400 people in 2015 through events and programs

Lethbridge Sustainable Living / Urban Farmers Group

- Yellow Fish Road Program has been operating since 2006: reaching 200-300 people; painting 400-550 drains
- Other programs include: Adopt a Storm Drain, Gutter Buddy and Storm Drain Survival Kits

City of Lethbridge Waste and Recycling

- Programs reach tens of thousands of residents each year
- Pitch-in and Christmas Tree Collection programs have nearly 1000 volunteers each year
- Other programs include: Too Good to Waste, Journey to the Centre of the Landfill, Keen for Green Festival, and Pitch-in

Figure 47: Environmental Resources Social Web

4.2   HISTORIC RESOURCES

For the purposes of the EnvS we make use of the definition of Historic Resources found in the Historic Resources Act, being "any work of nature or of humans that is primarily of value for its paleontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest including, but not limited to, a paleontological, archaeological, prehistoric, historic or natural site, structure or object."

Similar to the perspective taken for Environmental Resources in relation to Ecosystem Services, we draw the connection between Historic Resources and what we call Heritage Services. These are the services provided to communities through the protection of Historic Resources. These benefits stretch beyond what many typically consider to be the social or cultural benefits of protecting historic sites, buildings and landscapes (such as pride and identity), and include: economic benefits like job creation and tourism development; and, environmental benefits like energy conservation and the reuse and reapplication of materials (otherwise known as embodied energy conservation) and buildings (otherwise known as adaptive reuse). When seen holistically through the lens of Heritage Services, we gain a better understanding and appreciation for the full bearing that historic resources preservation can have on our residents' quality of life, the economy and the environment.

Figure 48: Heritage Services Wheel (source: City of Lethbridge)

The City of Lethbridge, through the ALSA and the SSRP, is required to consider the impacts of land use planning and decision-making on historic resources. The City of Lethbridge takes this to mean both First Nation heritage and post-settlement resources (discussed in greater detail in Chapter 2). In order for the City to do that, we must understand the current state of local Historic Resources.

This report acknowledges that heritage is not simply embodied by buildings, landscapes and sites, but that it exists in any number of forms: art, language, sport, culture, traditions, craft etc. Heritage is captured in the community realm through public art and performance; plaques and other narrative commemorations; community events and festivals, and even in street, park and school naming. Despite that acknowledgment, this report does focus more attention on buildings and sites. Where possible however, attempts are made to quantify or describe these other characteristics of heritage preservation in the City of Lethbridge.

As this is the first comprehensive historic resources baseline conducted by the City there will undoubtedly be data gaps. These gaps will help point us in directions where further research and understanding is needed.

Heritage is also something that is dynamic, changing over time to reflect the evolving diversity, values and histories of the community and region. For example, as immigration patterns change, new Lethbridge residents bring with them their own heritage (expressed through art, language, cuisine, religion and traditions) that is then added to our local heritage tapestry. Moreover, as our community progresses down the path towards truth and reconciliation, our understanding and respect for Indigenous heritage grows and becomes more visible upon our shared landscapes and through place-making.

This section provides a broad overview, what we call a Current State Analysis of Historic Resources in the City of Lethbridge. This analysis focuses on three Resource Themes. The themes were selected with the help of the EnvS Technical Working Group and the Galt Museum & Archives, and are meant, in whole, to describe the most significant components of a strong heritage preservation system. The resource themes broadly reflect the policies of the SSRP, the ICSP/MDP and the City of Lethbridge's Heritage Management Plan. Each Resource Theme is comprised of a series of Issue Areas. The Historic Resource Themes include: Management, Financial Resources, and Social.

Data used to create the Historic Resource Current State Analysis come from a variety of sources, including: City of Lethbridge data, publically accessible data from the provincial and federal governments, and data from commissioned studies (e.g., Heritage Survey, Traditional Knowledge and Use Assessment). The summarized results of commissioned studies are provided in Chapter 5.

The City of Lethbridge has completed previous in-depth analyses of historic resources at the site level under the direction of the Heritage Management Plan, Planning and Development Services Staff, and City Council through the standing Historic Places Advisory Committee. This work includes various Heritage Surveys, updates to the Heritage Inventory, and Registry of Designated Sites. The analysis contained in

the EnvS builds on that work to include an overview of other key aspects that contribute to our baseline understanding of historic resources protection and management.

The data presented in this chapter is not meant to be comprehensive or prescriptive, nor should any individual piece of data be analyzed out of context or in isolation. The intention of presenting the following data is to show our current baseline historic resources position, and frame subsequent policy discussion. It is hoped that data will be used objectively, however data can be subjective and relative, as such policy decisions will be additionally informed by the values of our community. The Historic Resource Current State Analysis will inform recommendations to update aspects of the City's ICSP/MDP, and potentially other high-level municipal and regional land use planning and policy discussions.

4.2.1 Management

Effective management of historic resources is central to ensuring those resources continue to provide social, economic and environmental benefits (Heritage Services) to our community for generations to come. Resource management is an on-going effort by a whole host of actors, including various levels of government (municipal, provincial and federal, and in some cases through international bodies such as the United Nations Educational, Scientific and Cultural Organization , UNESCO), archives and museums (including the Galt Museum & Archives), non-profit organizations (such as the Lethbridge Historical Society, the Archaeology Society of Alberta, and the National Trust of Canada), private developers and land managers, owners and importantly, community residents.

The Management resource theme focuses on two issues areas: **Resource Identification** and **Resource Protection**. When we analyze these areas together we get a better sense of what actions we have taken and continue to take in our City to identify, protect and assess the impact to resources.

Resource Identification

There are a number of ways in which the City of Lethbridge actively identifies historical resources. As discussed in Chapter 3, the Heritage Survey is a comprehensive recording and documenting of all potential historic places within the City of Lethbridge. Typically, sites that are surveyed are over 50 years of age. The Heritage Survey currently has approximately 4500 sites listed (see Figure 50), however we know through an analysis of building and demolition permits that nearly 10% of sites may no longer exist.

Heritage Survey
Approx 4500 Sites

Places of Interest
Approx. 350 Sites

Register of Historic Places
24 Sites

Heritage Inventory
44 Sites
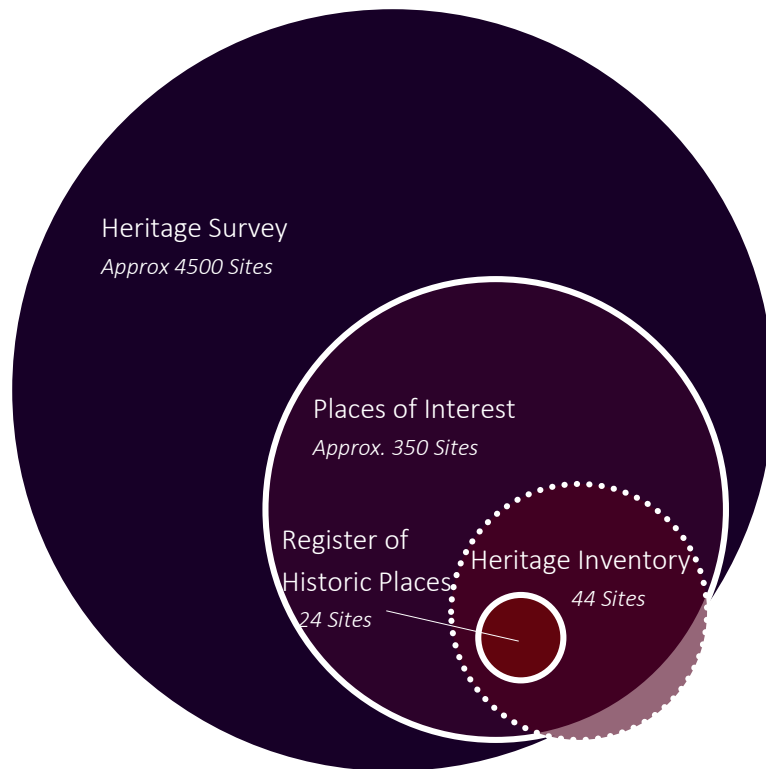
Figure 49: Heritage Management Process (with detail); figure adapted from Government of Alberta (2016). "Creating a Future: Part 1 - Identifying Historic Places. Pg. 7.

The Heritage Inventory is a filtered listing of resources that are recognized locally as historically significant[129]. Sites that are included on the Heritage Inventory have a completed Statement of Significance which explains their greater heritage value. The heritage value of a site can be defined in a number of ways, including the architectural value of a building or the connection between a building or site and a larger cultural or civic story. There are currently 44 sites listed on the Heritage Inventory (see Map 14).

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[129] The first Inventory was started in 2003 and completed in 2005, before the creation of the Heritage Management Plan. It was initiated by the Lethbridge Historical Society through a consultant, and facilitated by the City of Lethbridge.

Map 14: Heritage Inventory (Whole City)

See Map 15 for detail

CITY OF
Lethbridge
Historic Inventory

Legend

City of Lethbridge boundary

Hydrology

City Historic Inventory

Kilometer

Sourced from City of Lethbridge, information is current as of November 2017.

1. Alec Arms Hotel
2. Bank of Montreal/The Gate
3. Begin Block
4. Bentley Block
5. Castle Apartments
6. Cleary house
7. Dominion Fruit Company Warehouse
8. Downer Residence
9. Elton Residence
10. Former Royal Bank of Canada/ Esquires
11. Galt Gardens
12. General Stewart Residence
13. Green/Dolittle Residence
14. Greyhound Bus Depot
15. CPR High Level Bridge

16. Haig Residence
17. Henderson Residence
18. Hotel Dallas
19. Hudson's Bay/Trianon Ballroom Building
20. I.O.O.F. Hall
21. John Deere Implements Building
22. Galbraith Elementary School
23. Lanz Residence
24. Lyceum Theatre/Starland Hotel
25. Masonic Hall
26. Oliver Block
27. Paramount Theatre
28. Piche and Miron's Butcher Shop
29. Quong Sang Block
30. Safeway Building

31. Southminster United Church
32. St. Patrick's Roman Catholic Church
33. The Carnegie Library/SAAG
34. The Galt Gardens Park
35. The McFarland Block
36. The Whitney Block
37. Tongue N Groove/Taj
38. Union Bank of Canada/ Express Coffee
39. Van Haarlem Hospital
40. Watkin Residence
41. Wellington Duplex
42. Parry Farm
43. St. Aloysius Convent
44. St. Basils Education Centre

Map 15: Heritage Inventory (Downtown Detail)

CITY OF Lethbridge
Historic Inventory

Legend

City of Lethbridge boundary

Hydrology

City Historic Inventory

100 Meters

Sourced from City of Lethbridge, information is current as of November 2017.

Displayed locations of historic inventory are representations of actual locations and may not be entirely accurate.

1. Alec Arms Hotel
2. Bank of Montreal/The Gate
3. Begin Block
4. Bentley Block
5. Castle Apartments
6. Cleary house
7. Dominion Fruit Company Warehouse
8. Downer Residence
9. Elton Residence
10. Former Royal Bank of Canada/ Esquires
11. Galt Gardens
12. General Stewart Residence
13. Green/Dolittle Residence
14. Greyhound Bus Depot

16. Haig Residence
17. Henderson Residence
18. Hotel Dallas
19. Hudson's Bay/Trianon Ballroom Building
20. I.O.O.F. Hall
21. John Deere Implements Building
23. Lanz Residence
24. Lyceum Theatre/Starland Hotel
25. Masonic Hall
26. Oliver Block
27. Paramount Theatre
28. Piche and Miron's Butcher Shop
29. Quong Sang Block
30. Safeway Building

31. Southminster United Church
32. St. Patrick's Roman Catholic Church
33. The Carnegie Library/SAAG
34. The Galt Gardens Park
35. The McFarland Block
36. The Whitney Block
37. Tongue N Groove/Taj
38. Union Bank of Canada/ Express Coffee
39. Van Haarlem Hospital
40. Watkin Residence
41. Wellington Duplex

Once on the Inventory, site owners may choose to apply to the City for formal designation. HPAC receives the request, and if approved, provides a recommendation on the application to City Council. City Council then decides whether or not to designate. Designated sites are listed on the Register of Historic Places. Currently, there are 24 municipally designated sites listed on the Register. The Map below highlights all of the municipally, provincially and federally designated sites in the City.

Historic Events and Persons

Fort Whoop-Up Archaeological Site
   (Federal Historic Event)
Charles Alexander Magrath
   (National Historic Person)
First Air Crossing of the Canadian Rockies
   (National Historic Event)
Indian Battle of 1870
   (National Historic Event)
Origins of the Coal Industry in Alberta
   (National Historic Event)
Construction of the Lethbridge Viaduct
   (National Historic Event)

See Map 17 for detail

CITY OF Lethbridge
Designated Sites

1. Acadia Block
2. Annandale
3. Bell's Welding (Mocha Cabana)
4. Bow On Tong
5. Buchanan Residence
6. Burns Block
7. Chinese Free Masons Building
8. Church of Jesus Christ of
    Latter-Day Saints/Red Cross Building
9. Collier $7500 House
10. Coneybeare Residence

11. Dr. Arthur Haig Residence
12. E.B. Hill Residence
13. Hick-Sehl Building
14. J.D. Higinbotham Building
    (Post Office)
15. Knights of Pythias Block
16. Kresge Building
17. Lethbridge CPR Station
18. Lethbridge Fire Hall No. 1
19. Lethbridge Manual Training
    School/ "Bowman" Building
20. Major William b. Burnett home
21. Manie Opera Society Building
22. Mayor Magrath House/
    "Riverview"
23. Nourse Residence

24. Rylands (Croskery)
25. Shackleford Residence
26. Sir Alexander Galt Hospital
27. Spudnut Shop
28. Vendome Hotel (Alberta Rooms)
28. W.D.L. Hardie Residence
30. Watson Residence
31. Berte Grocery
32. Blackfoot Cree Indian Battle
    Site
33. David James Whitney House
34. Galt No. 6 Mine Site
35. Isolation Hospital
36. Nikka Yuko Centennial Garden
37. Southminster United Church

Legend

Designation Level

- ● Federal
- ● Provincial
- ● Municipal
- City of Lethbridge boundary
- Hydrology
- 1 Kilometer

Sourced from Alberta Culture and Tourism, information is current as of October 26, 2017.

Map 16: Designated Sites (Whole City)

Map 17: Designated Sites (Downtown Detail)

CITY OF Lethbridge
Designated Sites

1. Acadia Block
2. Annandale
3. Bell's Welding (Mocha Cabana)
4. Bow On Tong
5. Buchanan Residence
6. Burns Block
7. Chinese Free Masons Building
8. Church of Jesus Christ of Latter-Day Saints/Red Cross Building
9. Collier $7500 House
10. Coneybeare Residence
11. Dr. Arthur Haig Residence
12. E.B. Hill Residence
13. Hick-Sehl Building
14. J.D. Higinbotham Building (Post Office)
15. Knights of Pythias Block
16. Kresge Building
17. Lethbridge CPR Station
18. Lethbridge Fire Hall No. 1
19. Lethbridge Manual Training School/ "Bowman" Building
20. Major William b. Burnett home
21. Manie Opera Society Building
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24. Rylands (Croskery)
25. Shackleford Residence
26. Sir Alexander Galt Hospital
27. Spudnut Shop
28. Vendome Hotel (Alberta Rooms)
28. W.D.L. Hardie Residence
30. Watson Residence
37. Southminster United Church

Sourced from Alberta Culture and Tourism, information is current as of October 26, 2017.

Displayed locations of historic resources are representations of actual locations and may not be entirely accurate.

Legend

Designation Level

- Federal
- Provincial
- Municipal
- City of Lethbridge boundary
- Hydrology

Thus far, the sites that have been evaluated by the City of Lethbridge for inclusion on the Heritage Survey, Inventory and ultimately the Register of Historic Places are predominantly from the post-settlement period.

It is important to note that the process described here is the typical way the City identifies, evaluates and manages historical resources, however there are always unique circumstances that require the process to be flexible. For example, when individual landowners initiate the designation of properties that were not previously considered by a Heritage Survey. In these cases, buildings and sites are considered separately[130].

The Government of Alberta legislates and manages impacts to historic resources first through the *Historic Resources Act*, and second through its Listing of Historic Resources. The Government of Alberta produces mapping to facilitate local governments and development proponents with the review of proposed land use developments that indicate the Historic Resource Value (HRV) of already identified sites (or of sites presumed to have value).

HRV sites are broken down into five different classifications:

HRV 1   Designated under the Historic Resources Act as a Provincial Historic Resource

HRV 2   Designated under the Historic Resources Act as a Municipal or Registered Historic Resource

HRV 3   Contains a significant historic resource that will likely require avoidance

HRV 4   Contains a historic resource that may require avoidance

HRV 5   Believed to contain a historic resource

Each HRV site is also associated with a resource category that describes the type of resource it is. These categories include: archaeological, cultural, geological, historic period, natural and paleontological.

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[130] This is reflected in Figure 50 with the placement of the Heritage Inventory "circle" stretching beyond the boundaries of the Heritage Survey and Places of Interest "circles." Ultimately, however, all designated Historic Resources are found in the Register of Historic Resources regardless of whether the formal process was followed or if the designation was initiated by the property owner outside that process.
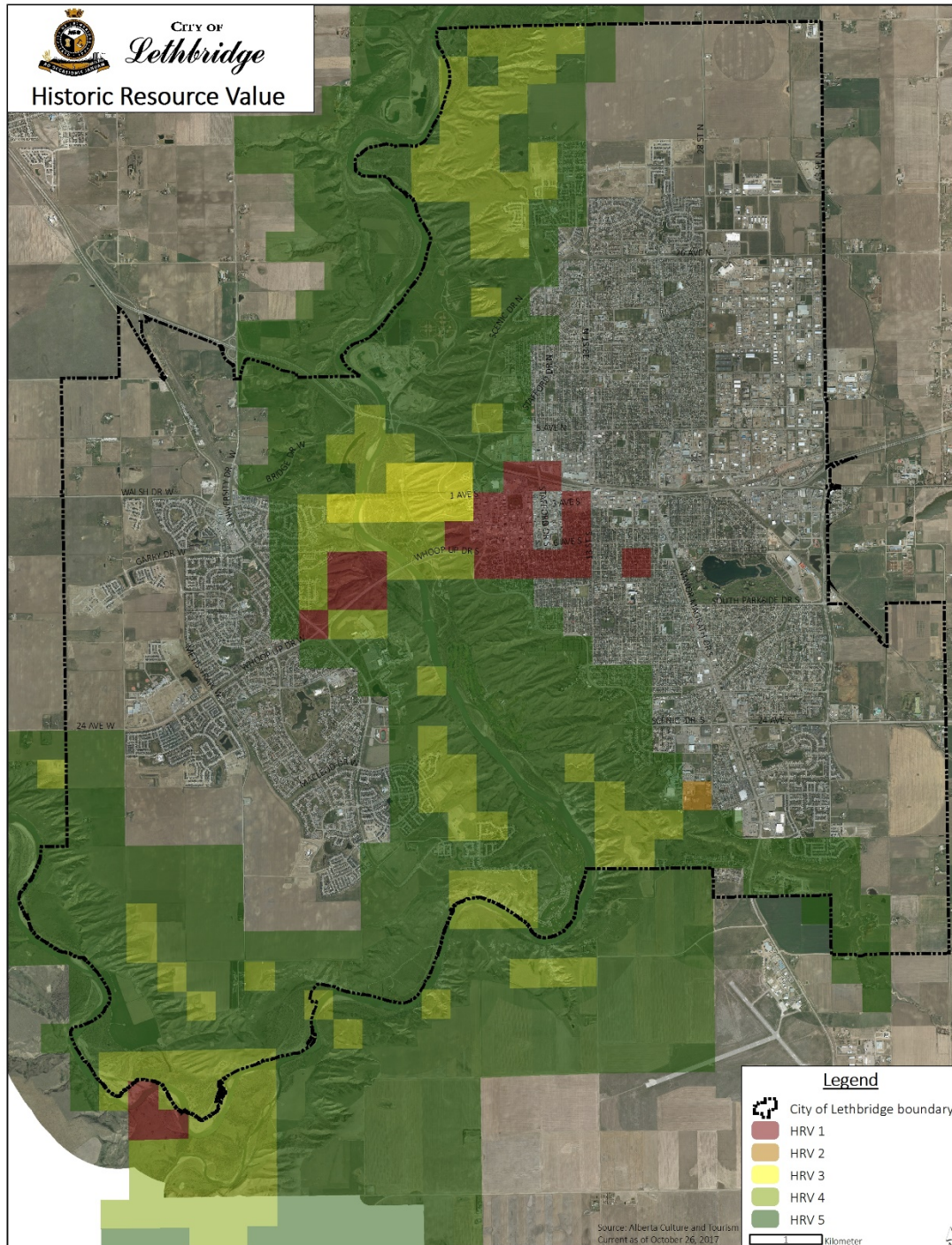
Map 18: Historic Resource Value
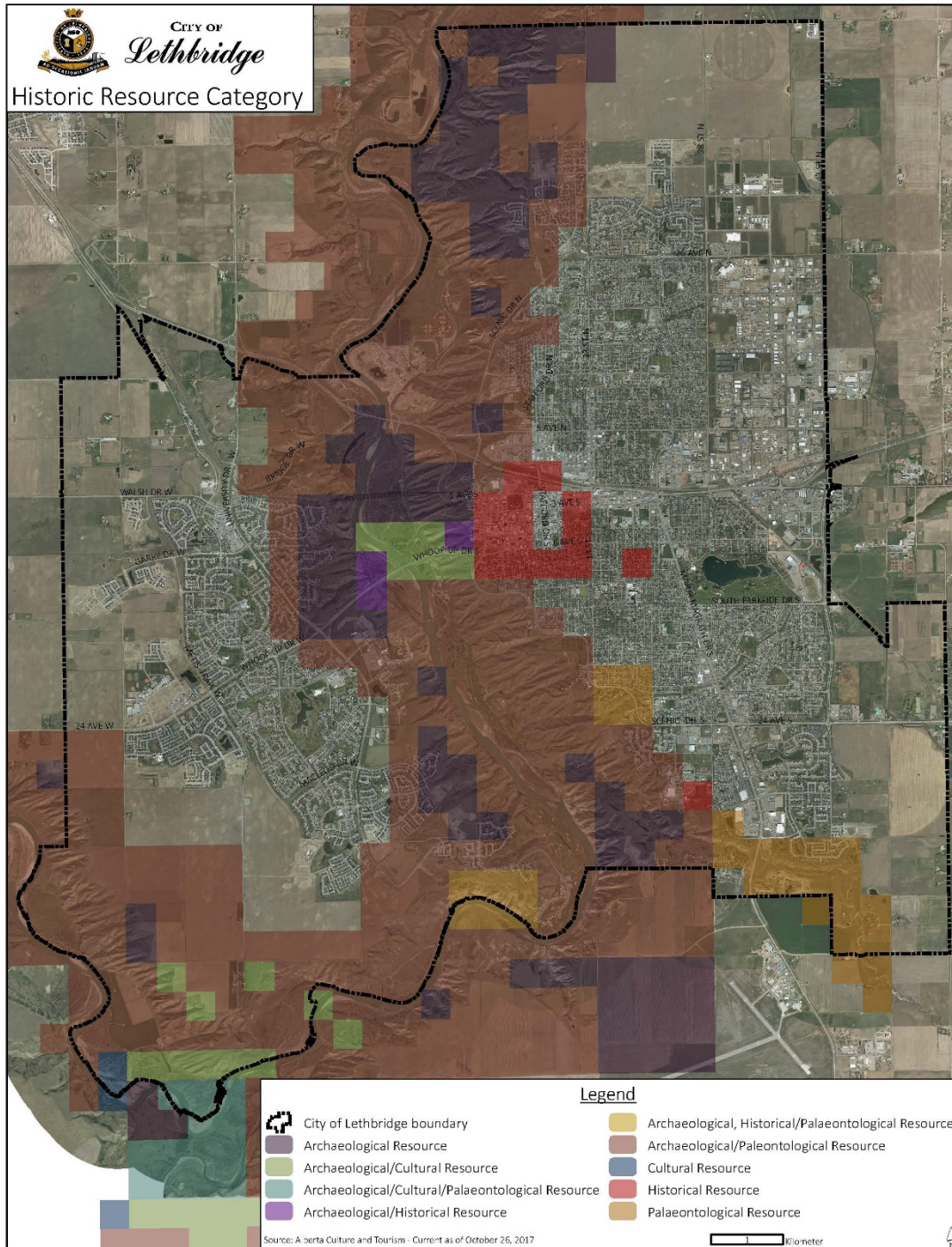
Map 19: Historic Resource Category

The majority of undeveloped lands in the City of Lethbridge—predominantly the lands within the Oldman River Valley and along the undeveloped top of bank lands—have an HRV value of 4 or 5. HRV 1 and 3 sites are also preset in central Lethbridge, as there are a number of municipally and provincially recognized and designated sites. Map 18 shows HRV sites within the City. Most of the HRV 4 and 5 sites are classified as archaeological and paleontological sites, while other areas are classified as Historical and Cultural sites. Map 19 shows the HRV categories for sites in the City. HRV is periodically updated by the Government of Alberta.

What does designation mean?

In Lethbridge, designation means that no person shall destroy, disturb, alter, restore, or repair a historic resources that has been designated without the written approval of Council or person appointed by Council.

Box 17: What does designation mean?

All land developers, including the City of Lethbridge, are required to go through a clearance process with the Government of Alberta where the provincial government determines the potential impact of planning and development on nearby HRV sites. In some cases, the government may require the proponent to carry out further impacts analysis in the form of a Historic Resources Impact Assessment (HRIA). In other cases, the federal, provincial or municipal government may mandate or request a development proponent complete an impact assessment from the perspective of Indigenous traditional land use and knowledge so as to better understand the historic context and use of lands under planning and development consideration, and mitigate potential impacts. It is important to note that a HRIA is separate and distinct from a Traditional Knowledge-type study and possibly an archaeological assessment. While the Government of Alberta may not require a proponent to undertake an HRIA, the need to conduct further site analysis from an archaeological perspective or that of Indigenous traditional knowledge and land use may still be required, requested and / or valuable.

Again, the locations of features shown on the above map are generalized, and do not necessarily reflect the actual presence of historical sites.

Since the adoption of the *Historic Resources Act* in 1973, more than 70 local projects[131] have been referred to the provincial government for review. Since 1978, 30 permits have been released in association with archaeological Historic Resource Impact Assessments (HRIAs). Project proponents include the City of Lethbridge, private land developers, the University of Lethbridge, energy and transmission companies, among others.

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[131] Alberta Culture and Tourism is only able to guarantee the accuracy of the data provided starting in 2004. The number of applications reviewed is likely to be much higher than the reported 73.

Resource Protection

The formal designation of a historic resource is a legislative tool that governments use to ensure the protection of resources (sites, buildings, landscapes etc.) for future generations. Formal designations can take place at all levels of government (municipal, provincial and federal). Municipal and provincial government designations tend to have stronger restrictions on site impacts than federal designations do, because they are controlled, in Alberta, through the *Historic Resources Act* and require the consent of property owners. Federal designations are generally more focused on site recognition and commemoration, and have less restrictions on what can occur to or on a site. For example, most federal designations only remain in place while a building is owned by the Federal government, and when that building is sold, the designation may be removed.

Particularly significant historic resources can also be designated at the international level by UNESCO. While there are no UNESCO designated sites within the City of Lethbridge, there are two designated World Heritage Sites in our "backyard": Waterton Glacier International Peace Park (listed as a "natural site") and Head-Smashed-in Buffalo Jump (listed as a "cultural site"). The presence of these and other sites in our region should be a source of immense pride to our community.

There are currently 37 separate sites in our City with either municipal, provincial and/or federal designation[132]. Map 16 shows the geographic distribution of these sites throughout

Officially designated sites in the City of Lethbridge (as of October, 2017):
Federally Designated Sites
  J.D. Higinbothom Building (Post Office)
Provincially Designated Sites
  Annandale Residence
  Blackfoot-Cree Indian Battle Site
  Chinese Free Masons Building
  Conybeare Residence
  Dr. Arthur Haig Residence
  E.B. Hill Residence
  Isolation Hospital
  Lethbridge C.P.R. Station
  Lethbridge Fire Hall No. 1
  Lethbridge Manual Training School / Bowman Building
  Mayor Magrath House/ "Riverview"
  Sir Alexander Galt Hospital
  W.D.L Hardie Residence
Municipally Designated Sites
  Acadia Block
  Annandale Residence
  Bell's Welding (Mocha Cabana)
  Berte Grocery
  Bow On Tong
  Church of Jesus Christ of LDS / Red Cross Building
  David James Whitney House
  Hick-Sehl Building
  J.D Higinbotham Building (Post Office)
  Manie Opera
  Nikka Yuko Centennial Garden
  Nourse Residence
  Rylands (Croskery)
  Shackleford Residence
  Spudnut Shop
  Vendome Hotel (Alberta Rooms)
  Southminster United Church
  Buchanan Residence
  Collier $7500 House
  Watson Residence
  Galt No. 6 Mine Site
  Burns Block
  Knights of Pythias Block
  Kresge Building

Box 18: Designated Sites in Lethbridge

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[132] The one federally designated site (the J.D. Higinbotham Building (Post Office) is currently owned by the Government of Canada. If at some point in the future the Canadian Government sells this building, it will lose its federal designation. This building is also designated at the municipal level. The municipal designation continues on, despite changes to ownership.

Also of note is the Major William B. Burnett Home. This site is listed by the Government of Alberta as a Registered Historic Resources (RHR), while the other sites included on the above list are Provincial Historic Resources (PHR). PHRs have a much higher level of protection (along with Municipal Historic Resources), than do RHRs.

our community. In addition to the one federally listed historic site there are additionally recognized historic events and persons, including: Charles Alexander Magrath (National Historic Person), the First Air Crossing of the Canadian Rockies (National Historic Event), the Indian Battle of 1870 (National Historic Event), the Origins of the Coal Industry in Alberta (National Historic Event) and the Construction of the Lethbridge Viaduct (National Historic Event). In addition to these sites, events and people that find some geographic grounding in Lethbridge, the original Fort Whoop-up Site is also listed as a National Historic Site, although it is located in Lethbridge County.

The designation of historic resources however does more than just ensure the on-going physical protection of sites, as it signals to the broader community (and visitors) those sites which speak to the identity, culture and story of a community. As shown in the Heritage Services diagram, the protection of historic resources nourishes a community's sense of identity and its awareness as a means of creating engaged and informed citizens.

The protection of historic resources is in many senses the protection of the physical manifestation of a community identity, and the sites that we as a community choose to designate or otherwise memorialize, indicate what and who are important to the people that live there. In Lethbridge, the predominant stories embodied within the sites that have been designated municipally and provincially relate to the early settlement of the City (e.g., Mayor Magrath House / "Riverview", Church of Jesus Christ of Latter-Day Saints / Red Cross Building, W.D.L. Hardie Residence), the arrival of the coal industry (e.g., Sir Alexander Galt Hospital, Isolation Hospital, Berte Grocery), the growth of commercial development (e.g., Vendome Hotel, Hick-Sehl Building), the arrival of European and other ethnic communities to the City (e.g., Berte Grocery, Bow on Tong, Chinese Free Masons Building, Nikka Yuko Centennial Garden) and the development of agriculture (e.g., David James Whitney House). While other sites highlight significant events (e.g., Blackfoot-Cree Indian Battle Site), or showcase important or rare building or architectural styles (e.g., Bells Welding Building, Dr. Arthur Haig Residence).

Historic sites, events and people have been formally designated by all levels of government since the early 1900s, beginning with the commemoration of the "Origins of the Coal Industry in Alberta" as a National Historic Event in 1926. Provincial designations in Lethbridge did not commence until the late 1970s, with the majority taking place between 1978 and 1987. Municipal designations did not begin until after the adoption of the Heritage Management Plan in 2007. Starting with the first municipal designations in 2008 (Spudnuts Shop and the Annandale Residence), designations have consistently taken place almost every year. Since 2015, municipal designations have increased in frequency, with multiple sites being recognized formally for their historic value by City Council each year (three in 2015, and five in 2016).
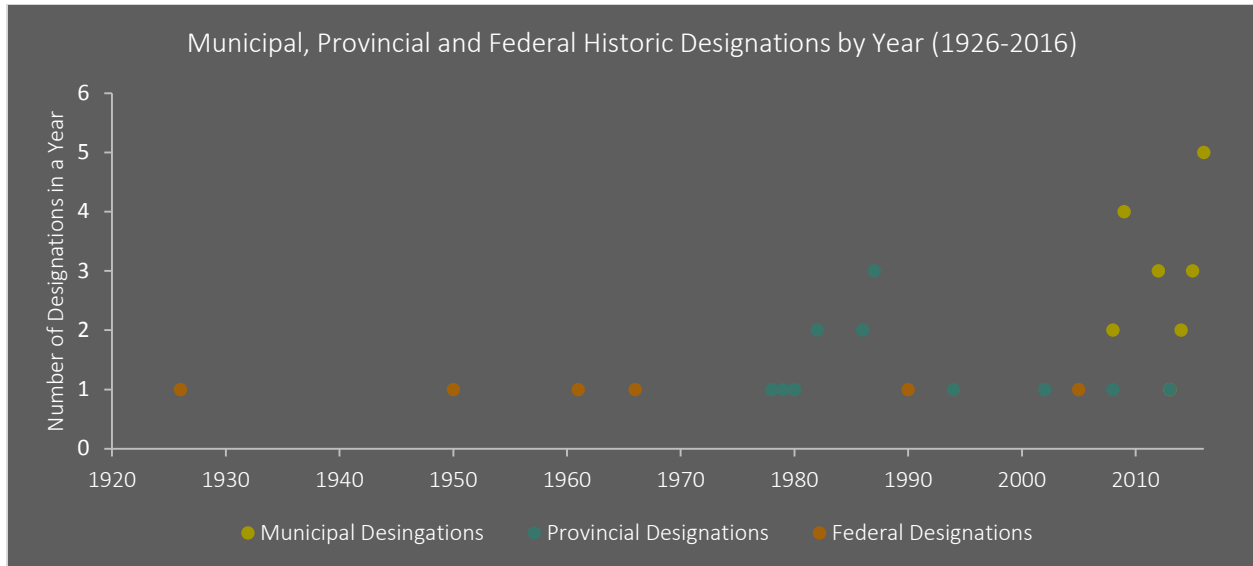
Figure 50: Municipal, Provincial and Federal Historic Designations by Year (1926-2016)

4.2.2 Financial Resources

The amount of financial resources that we as a community invest in our historic resources is one indicator of how much we value them. Investing, rather than spending, is the correct word to use in this case because of the breadth of Heritage Benefits that accrue within the community through resources protection. Similar to the management of historic resources discussed in Section 4.2.1, there are different actors who participate in investing in the resources found in Lethbridge, including: the provincial government, municipal government, non-profit organizations and private landowners.

The main way that the provincial government supports the protection of historic resources is by providing grants to the various organizations and individuals doing the work of heritage conservation—whether operations and programming, building or site restoration, education and awareness, operation or research and studies. The City of Lethbridge invests in historic resources by maintaining and enhancing City-owned designated sites, providing funding for resource management (e.g., Historic Places Advisory Committee of City Council), delivering front-line programming (e.g., through the Galt Museum & Archives), as well as commemoration of sites (e.g., plaques). Non-profit organizations such as the Archaeological Society of Alberta and the Lethbridge Historical Society support this work by contributing to our knowledge base through research, by advocating for the protection of resources, and assisting other actors. Private landowners also play an important role in historic resources preservation through direct investments made in building and site maintenance and upgrades, as well as by pursuing grants through provincial (e.g., the Alberta Historic Resources Foundation) and municipal funding sources (e.g., the Heart of our City Housing Incentive Program).

The Financial Resources theme focuses on three issues areas: **Grants**, **Funding** and **Resource Intervention**. Together, these three issue areas describe at a very general level the breadth and variety of investments made in our community into historic resources by a whole host of different actors, all with the aim of ensuring our local heritage is present and used by generations to come.

Grants

The Grants issue area focuses on the financial resources received from the Government of Alberta by the City of Lethbridge, non-profit organizations, and individuals and businesses in Lethbridge in support of historic resources preservation. The main source of provincial funding for historic resources preservation in Lethbridge is from the Alberta Historical Resources Foundation[133]. Since 1998, nearly $1.5 million

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[133] There are other sources of funding flowing into the City of Lethbridge for education, management and operations of historical programming, including through Canadian Heritage (federal government). The EnvS focuses specifically on grants from the Alberta Historical Resources Foundation as the recipient projects have the most direct impact on land use planning and decision-making. The analysis of funding also does not focus specifically on
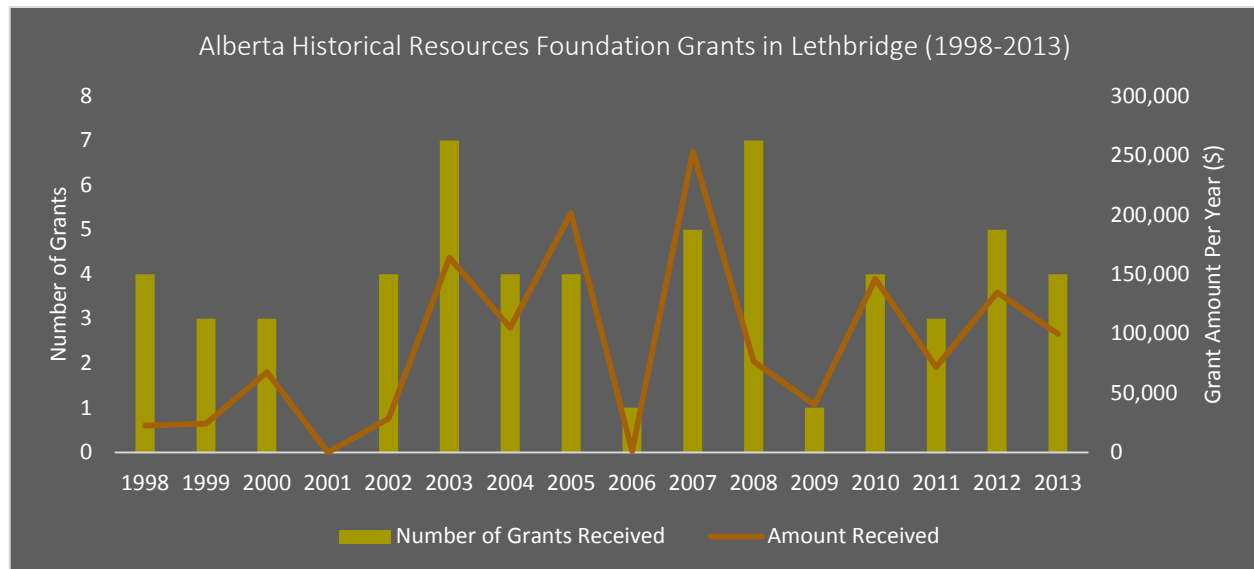
Figure 51: Alberta Historical Resources Foundation Grants in Lethbridge (1998-2013)

dollars has flowed into the City from the provincial government through these funds, contributing to operational funding, building conservation and restoration, education and research and study.

Table 23: Alberta Historical Resources Foundation Grants for Select Alberta Cities (1998-2013)

City	Total Funding (1998-2013)	Funding Per Capita (2013)
Airdrie	$23,915	$0.5 / PP
Calgary	$17,889,816	$15.6 / PP
Camrose	$479,380	$27.7 / PP
Edmonton	$10,922,869	$13.4 / PP
Fort Saskatchewan	$103,450	$ 4.7 / PP
Grand Prairie	$302,950	$5.5 / PP
Leduc	$288,190	$10.6 / PP
Lethbridge	$1,435,805	$15.9 / PP
Medicine Hat	$2,166,562	$35.4 / PP
Red Deer	$411,365	$4.2 / PP
St. Albert	$478,900	$7.8 / PP

Figure 53 and Table 23 show the grant funding received in Lethbridge from the Foundation between 1998 and 2013, as well as a breakdown by type of activities being funded and grant recipient.

When measured in absolute terms (amount of grants received) or in funding per capita (funding received per resident), Lethbridge residents, organizations and the City itself, have received a large proportion of funding that has been made available through the Foundation since 1998. While it is hard to infer much from that data, on the surface it does suggest that there has been, and continues to be, a relatively high amount of

gifts in-kind or monetary donations, which all of organization that take part in heritage resources preservation benefit from in one form or another.

interest in protecting historic resources in Lethbridge, even before the adoption of the current Heritage Management Plan in 2007.
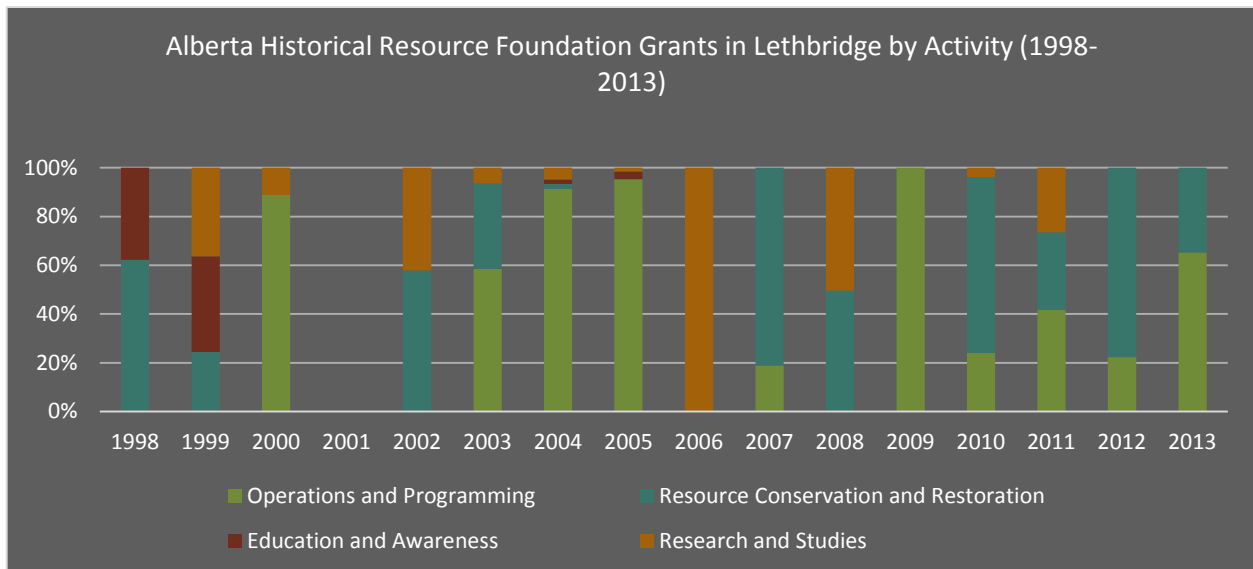
Figure 52: Alberta Historical Resource Foundation Grants in Lethbridge by Activity (1998-2013) A
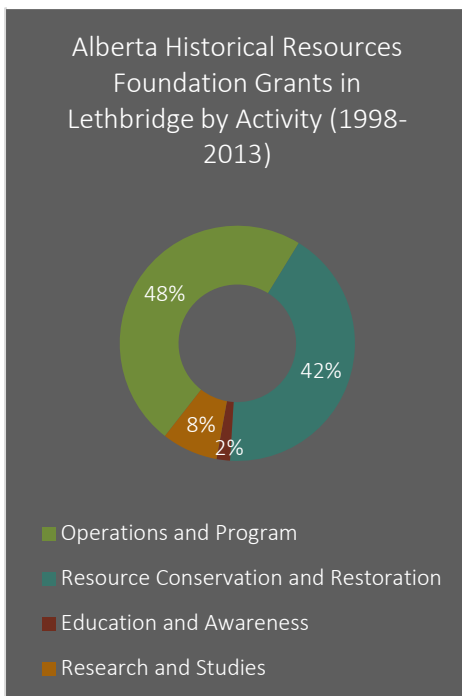
Figure 53: Alberta Historical Resource Foundation Grants in Lethbridge by Activity (1998-2013) B

Information provided by the Alberta Historical Research Foundation shows that between 1998 and 2013, approximately $692,000 have been received for operations and programming (including funding for the Main Street Programme), $606,490 for building conservation and restoration (including for designated sites like the Hick-Sehl Building, Haig Residence and Acadia Block), $26,500 education and awareness (including for commemorative plaques), and $110,815 for research and studies (including researching specific heritage stories like the Okinawan immigration experience and coal miners stories, and for past Heritage Surveys and Inventories). Funding for operations and programming and for building conservation and restoration are consistently the most funded activities through this grant in Lethbridge, accounting for 90% of all funds received through 2013.
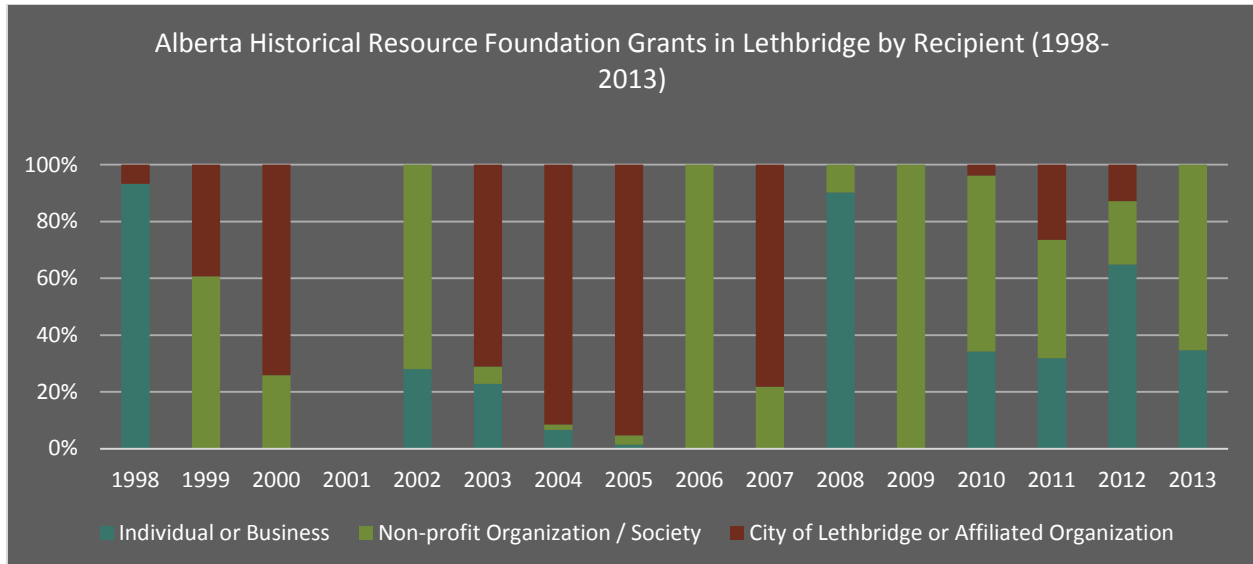
Figure 54: Alberta Historical Resources Foundation Grants in Lethbridge by Recipient (1998-2013) A

Between 1998 and 2013, $340,275 has been received by individuals and business towards the preservation of heritage resources (including the owners of properties), $390,310 has been received by non-profit organizations and societies (including the Lethbridge Firefighters Charities Association, the Archaeological Society of Alberta, the Galt #8 Historic Site Society and the Lethbridge Historical Society), and $705,220 has been received by the City of Lethbridge and affiliated organizations[134]. The City of Lethbridge and affiliated organizations have been the beneficiary for nearly half of all grant dollars received in Lethbridge from the Foundation since 1998.

Funding

The Funding issue area presents a picture of financial resources that are committed by the City of Lethbridge specifically for historic resources, including through: the Historic Places Advisory Committee, the Heart of our City Committee, the Galt
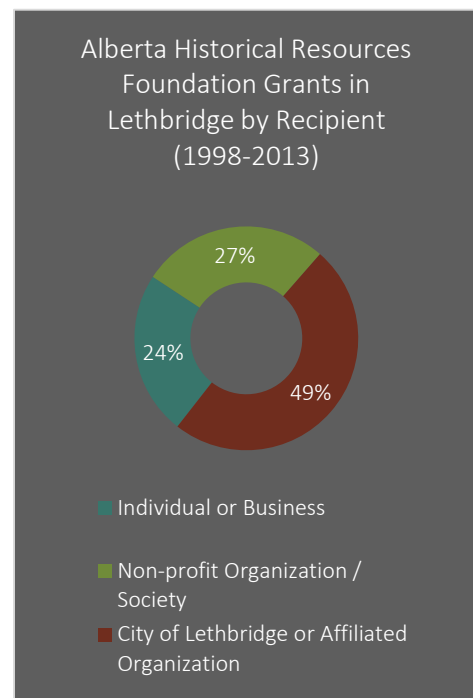
Figure 55: Alberta Historical Resources Foundation Grants in Lethbridge by Recipient (1998-2013) B

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[134] In this case "affiliated organization" refers to the Galt Museum & Archives, which operates similar to other Boards and Commissions of the City of Lethbridge with community oversight appointed by City Council.

Museum & Archives and Facility Services. This is not a comprehensive accounting of all financial resources committed by the City, but it does provide a general overview.[135]

Historic Places Advisory Committee

The Historic Places Advisory Committee (HPAC) is a standing committee of Lethbridge City Council, and has been in existence since 2007. The mandate of the Committee is to advocate and advise City Council, Committees and Administration on matters relating to locally important historic sites, thus playing a central role in the management, study and protection of historic resources in our City. HPAC assists in the coordination of research and studies (e.g., Heritage Surveys and Heritage Inventories), in the designation process by making recommendations to City Council, and also contributes financial resources towards the purchases of plaques for sites (both designated and non-designated). Since 2008, the City of Lethbridge, through the Historic Places Advisory Committee (and through Planning and Development Services, which provides administrative support to HPAC), has allocated nearly $140,000 to the historic resources preservation work (approximately $30,000 for the operations of the Committee and the purchase of plaques, and nearly $110,000 for studies such as Heritage Inventories and Surveys)[136]. HPAC funds plaques for all municipally designated sites outside of the Downtown[137]. Designated sites in the Downtown are funded in partnership between HPAC, the Heart of our City Committee and the Lethbridge Historical Society.

Plaques funded in whole or part by The Heart of our City Committee (2004–2016)

Canadian Pacific Telegraph Office
Acadia Block
Henderson & Downer Block / Metcalf Block
Firehall No.1
Bell's Welding Building
Lethbridge City Police Station
The Lethbridge Herald / Buchanan Building
S.S. Kresge Co. Building / Balmoral Block
Vendome Hotel / Alberta Rooms
Lethbridge Public Library
Canadian Pacific Railway Union Station
Union Bank of Canada
Pat Burns Block
I.O.O.F. Lethbridge Lodge No. 2
"The Point"—Lethbridge's Red Light District
History of Chinatown
R. Nakagama Co. Building
Manie Opera Society
Bow on Tong Co. Building
Sang Mang Sang Co. Building
Chinese Freemasons Building
Chinese National League Building
Paramount Theatre
Hick-Sehl Hardware
St. Patrick's Church & Rectory
Bank of Montreal
Whitney Block
Trianon Ballroom
McFarland Block
Hotel Dallas / Coalbanks Inn
Lethbridge Hotel
Burns Block
Cleary House
Manual Training School / Bowman Building
Lotus Inn
Castle Hotel / Byng Hotel
Wallace Block
Black & Walker Men's Shop
Canada Safeway
The Lethbridge Daily Herald
Ott Block / Yale Block
Carson Saddlery & Leather Goods Co. Ltd.
Army, Navy & Air Force Veterans Association
Greyhound Bus Depot
J.D. Higinbothom Building

Box 19: Heart of our City Committee Plaques (2004-2016)

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[135] For example, that Galt Museum & Archives contributes significantly towards many of the Heritage Benefits described in this report by acting as a heritage gateway and repository for members of the public, businesses and institutions to learn about and from our past. The Galt Museum & Archives is a City-owned facility and receives operational funding from the City of Lethbridge.

[136] This total does not include staff time or grants received by the Committee for Heritage Inventories or Surveys from provincial funding sources.

[137] In partnership with the Lethbridge Historical Society.

In addition to the plaques and markers that are funded by the Heart of Our City Committee and the Historic Places Advisory Committee, the Lethbridge Historical Society funds and places markers celebrating the history of Lethbridge and Southern Alberta.

Since the 1960s, the Society, in partnership with the City of Lethbridge, have placed over 70 plaques and markers in and around the City, including those listed above that were funded in part by the Heart of our City Committee.

Box 20: Lethbridge Historical Society Plaques

Heart of our City Committee

The Heart of our City Committee (HOC) is a Committee of Lethbridge City Council. The mandate of HOC is to champion the revitalization of Downtown Lethbridge and provide strategic leadership through the implementation of the Heart of our City Master Plan. HOC in its current form was created in 2009 (prior to 2013 it was referred to as the Heart of Our City Revitalization Committee), replacing the former Downtown Redevelopment Steering Committee (2003–2008). HOC recognizes that as many of our City's historic resources are located within the Downtown neighbourhood (both designated and undesignated sites), supporting the preservation and use of historic buildings and sites is a central part of the area's revitalization and the identity of the City.

A small part of the Committee's budget is allocated to placing historic plaques throughout the Downtown, work that is done in partnership with the Lethbridge Historical Society. Since 2004, the City of Lethbridge through the former Downtown Redevelopment Steering Committee and now through the Heart of Our City Committee, have contributed over $40,000 towards the placement of 45 plaques and markers throughout the Downtown. Box 19 lists the buildings and sites in the Downtown that have received plaques and markers.

HOC also funds the Main Street Program, a façade rejuvenation program that supports private investment by property owners with public funds to positively transform and maintain the built form of Downtown, which include heritage buildings. The Main Street Program is administered by the Downtown Business Revitalization Zone on behalf of the Committee.

Galt Museum & Archives

In May of 1998, the Galt Museum & Archives was restructured to be one of the three Boards and Commissions of City Council. Lethbridge City Council mandates the Galt to provide educational and community services to the City and surrounding area through the preservation of artifacts and information and by making the stories available through various enterprises. The Galt Museum & Archives is under the management of a volunteer Board of Directors, appointed by City Council in accordance with

City bylaws. The Galt Museum & Archives and Fort Whoop-up is operated by City employees and community volunteers.

The Galt Museum & Archives preserves 20,000 artifacts, 600,000 photos, and 1 million pieces of paper material. The museum collects materials and stories from local citizens in an on-going way.

The Galt teaches and engages thousands of visitors in the history of this region every year including school children and youth, seniors, families and tourists. The Galt teaches curriculum to children from kindergarten to Grade 12, and post-secondary students from Lethbridge College and the University of Lethbridge. Community programming takes place in our parks, cemeteries, downtown streets, Fort replica and on tour buses throughout the region. Lectures, workshops, films, walking tours, story-telling, publications, plaques and other formats are used routinely to share the history of the area. Multiple exhibits on local history are produced every year using research completed with the community. The archives also support hundreds of local researchers.

The Board of Directors raised $8.9 million for the 2006 expansion, and in 2011 with the help of a grant, completed a conservation plan on the 1910 Galt Hospital building. The City continues to work with the Galt on conservation initiatives.

Facility Services

The City of Lethbridge continues to support the vision of the Heritage Management Plan, which states that history is best preserved when it is used. It does this by continuing to invest in City-owned designated buildings, through the Facility Services business unit. Of the 37 municipally, provincially and federally designated sites in Lethbridge, four are owned by the City of Lethbridge, including: the Lethbridge Manual Training School / Bowman Building (provincially designated), the Sir Alexander Galt Hospital & Museum[138] (provincially designated) and Nikka Yuko Centennial Garden (municipally designated). The fourth is the site of the Blackfoot Cree battle which has no buildings or physical structures. Since 2004, nearly $11 million[139] has been invested into the conservation and renovation of these City-owned resources through one-time capital improvements[140], contributing to their longevity and continued use in our community. While these investments are supervised by Facility Services, funds are often generated by other entities. Some of the more notable investments include: $8.9 million in

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[138] The Sir Alexander Galt Hospital & Museum is managed in partnership between the City of Lethbridge Facility Services Business Unit and the Galt Museum & Archives Board of Directors and management.

[139] This includes funds and grants received from the provincial and federal governments, community donations, borrowing and City of Lethbridge operating budget.

[140] This does not include financial resources for the regular operations and maintenance of designated City-owned buildings.

renovation to the Sir Alexander Galt Hospital and Museum building ($8,052,000 in 2004 and $950,000 in 2014; funds raised by the Galt Museum & Archives Board of Directors), and a $1.8 million renovation of the Bowman Building in 2016.

Facility Services also invests on a more regular basis through on-going maintenance, refurbishments and other building costs. Since 2008, these investments have been greater than $1.3 million, equating to an average of $25,000 per year in the Lethbridge Manual Training School / Bowman Building, $40,000 per year in the Nikka Yuko Centennial Garden, and $100,000 per year in the Sir Alexander Galt Hospital & Museum.

All told, since 2004, Facility Services (in partnership with the respective operating entities such as the Galt Museum & Archives) has supervised the investment of well over $12 million just into these three historically significant facilities.

Resource Interventions

The third issue area concerns interventions made by property owners on designated sites. In Lethbridge, interventions are generally works that are focused on preservation, rehabilitation and/or restoration, with the intent of: conserving the heritage value of a property; improving the functionality of a property; and/or to enable the adaptive re-use of a property (that is, its conversion to another use to enable its continued use; e.g., from house to business, or church to residences).

Table 24: Interventions into Designated Sites

	FEDERALLY DESIGNATED	PROVINCIALLY DESIGNATED	MUNICIPALLY DESIGNATED	TOTAL
DESIGNATED SITES	1	14	23	38 [141]
DESIGNATED SITES WITH INTERVENTIONS	1	6	5	11
TOTAL INTERVENTIONS	2	11	8	19
VALUE OF INTERVENTIONS	$549,000	$1,865,000	$130,500	$2,544.500

The purpose of this issue area is to demonstrate the significant financial contributions that have been made by local residents and businesses to historic resources that benefit the entire community. While Lethbridge is home to dozens of buildings and sites with documented historical significance, the resource intervention issue area only focuses on sites that have received formal federal, provincial or municipal designation.

The one federally designated building (the J.D. Higginbotham Building) in Lethbridge has seen two interventions since it was designated, worth a combined $549,000. Six of the fourteen provincially

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[141] There are actually only 37 designated sites, but because the J.D. Higginbotham Building is designed both municipally and federally it is counted in this table twice.

designated historic sites in Lethbridge have seen interventions[142] since their formal designation, totaling 11 different interventions worth a combined $1,850,000. Five of the 23 municipally designated historic sites in Lethbridge have seen interventions since they were formally designated, totaling eight different interventions with a combined value of $130,500.[143]

When we compare resource interventions by ownership type, we see that City-owned and non-City-owned designated sites have seen similar amounts of dollars invested ($1,312,000 and $1,232,500, respectively). However, when we look at the numbers of interventions, we see that there have been far more interventions on non-City-owned sites than City-owned sites (17 and 4, respectively).

Apart from the specific financial resources that our community invests in heritage, as shown on the Heritage Services diagram, historical resources provide broader economic benefits back to their host communities. A report[144] prepared by the Government of Saskatchewan identifies six key ways that the preservation of historical resources benefits local and regional economies. Table 25 highlights some of the key messages from the referenced report.

Designated Historic Resource Interventions by Ownership (dollars spent)

48% Non-City-Owned   52% City-Owned

■ Non-City-Owned   ■ City-Owned
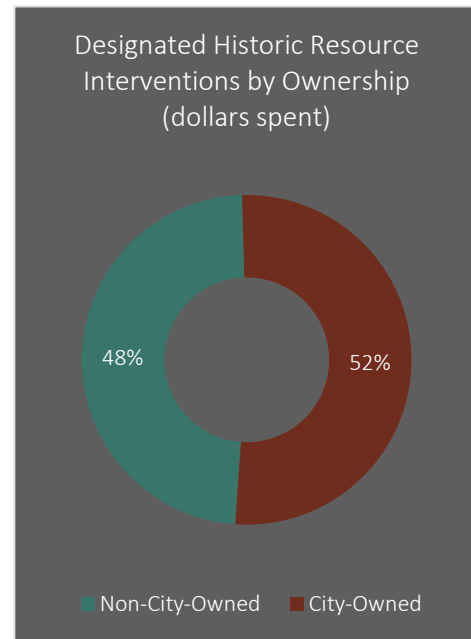
Figure 56: Designated Historic Resource Interventions by Ownership (dollars spent)

Designated Historic Resource Interventions by Ownership (number of interventions)

81% Non-City-Owned   19% City-Owned

■ Non-City-Owned   ■ City-Owned
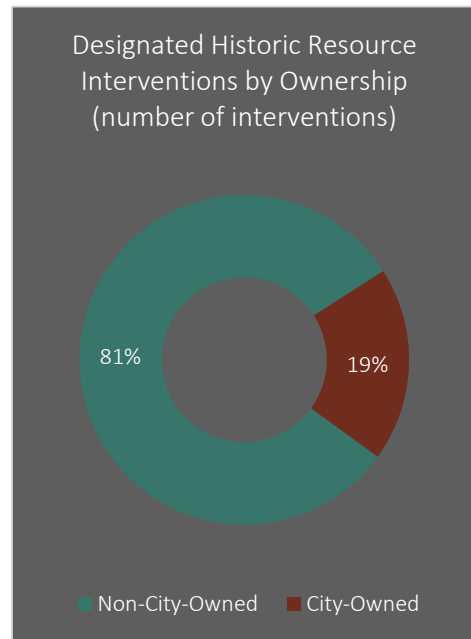
Figure 57: Designated Historic Resource Interventions by Ownership (number of interventions)

Table 25: Economic Benefits of Historic Resources

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[142] To calculate a Resource Intervention, building permit data was collected for each of the designated sites. Each building permit issued is considered one intervention.

[143] The J.D Higginbotham Building has both federal and municipal designation. The data presented here indicates that the site had two interventions after it was federally designated in 1990, but has had none since it was municipally designated in 2015.

[144] Parks, Culture and Sport Saskatchewan, "Economic Benefits of Heritage Conservation," www.pcs.gov.sk.ca/econbenefits, (February 8, 2018).

INVESTMENT

- Investing in heritage preservation benefits individuals: higher property values and more employment
- Investing in heritage preservation benefits whole communities: increased property taxes, neighbourhood revitalization, economic growth and community pride
- Heritage preservation also limits the need to develop on "greenfield" sites, encouraging re-investment into "brownfield" sites[145]
- Investing in the restoration of heritage buildings and materials also reduces the demand in our landfills, which are a major municipal investment[146]

JOB CREATION

- Heritage conservation creates opportunities for skilled, high-paying jobs (e.g., trades, traditional craft/artisan labour, engineering, architecture, archaeology)
- Compared to new construction, heritage conservation is more labour intensive, thus creates more jobs per dollar invested

BUSINESS GROWTH

- Revitalizing heritage buildings and districts bring life back to neighbourhoods and can increate business activity and the tax base
- Heritage buildings often possess unique characteristics that are well-suited to a variety of retailers, commanding a range of rents

REGIONAL DEVELOPMENT

- Heritage conservation can stimulate local and regional economies.
- Heritage restoration often has a greater economic impact than new construction (often because of the specialty or technical skills required in design and rehabilitation)

HIGHER PROPERTY VALUES

- Generally speaking, research shows that heritage restoration and designation often has a positive effect on property values

ENHANCED TOURISM

- Historic tourism is a large part of the overall Canadian tourism economy
- Research shows that heritage tourists tend to stay longer at destinations and spend more than other travelers

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[145] This point, not found in the original Government of Saskatchewan document, was determined to important to the Lethbridge context and was added

[146] This point, not found in the original Government of Saskatchewan document, was determined to important to the Lethbridge context and was added

While many of these benefits are applicable generally, others, such as the positive impact of heritage designation on property values, require local ground-truthing to be validated in Lethbridge. The clear message here is that historic resource preservation can be a real catalyst for local and regional economies. And it's not just the preservation of the actual buildings themselves that creates economic value, the promotion of heritage from an arts and culture perspective can also drive economic growth, particularly in terms of tourism.

4.2.3 Social

"Historic resource" is a label that we attach to buildings, landscapes, events or even people that hold a special place in our collective and individual identities, origin stories and narratives of place. As such, there is a deep and inherent social connection to the preservation of historic resources. Without the input of social capital to historic resources they would cease to exist—either crumbling to the ground over time, being torn down to make way for new development, or fading from our community memory from neglect.

The two previous resource themes have focused on historic resources from the perspective of how we identify, assess and protect them (Management) and the monetary resources we invest in them (Financial Resources)—and to a lesser degree the general economic impact of historic resource preservation locally and regionally. The Social resource theme looks at the human investment into historic resources in our City.

As we know from the Heritage Services wheel diagram, historic resources contribute greatly to the *social well-being* of our community, in terms of aesthetics, spirituality, citizenship and engagement, among others. However the input of social capital is also required to sustain those same historic resources.

The Social resource theme focuses on one issue area: **Programming and Volunteerism**. This issue area presents an overview of types and extent of our community's social investment into heritage resources. Because of the nature of social data, much of the information presented here is narrative and anecdotal as opposed to the more quantitative data presented in the two previous resource themes.

Programming and Volunteerism

As mentioned in the Environmental Resource Social Resource Theme, Lethbridge is a community that is passionate about volunteerism, and that passion reaches into the preservation of our local and regional heritage. The commitment of volunteers and of the general public in sharing our stories and protecting significant sites ensures that sites will be around for generations.

There are many different organizations in the City (including the City of Lethbridge itself) delivering programs that promote heritage awareness and preservation, and the EnvS focuses on the work of four key organizations: the Galt Museum & Archives[147], the Lethbridge Historical Society[148], the Archaeological

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[147] The Galt Museum & Archives is run by a Board of Directors that is appointed by the City of Lethbridge, in that way it is responsible to City Council but operates under its own management structure.

[148] The Lethbridge Historical Society is a Chapter of the Historical Society and has a mandate that stretches beyond just the City of Lethbridge, including all of southern Alberta.

Society and the Historic Place Advisory Committee. These four organizations are quite varied, and represent different entry-points in our presentation of the Social resource theme.

The Galt Museum & Archives is an arm of the City of Lethbridge, as such it represents a public investment into heritage awareness, education and preservation. The Lethbridge Historical Society and the Archaeological Society of Alberta (Lethbridge Centre Chapter) are two long-standing non-profit organizations based in Lethbridge. While these three organizations are based in Lethbridge, their work extends beyond telling just the story of our City, instead they work to narrate the history of southern Alberta. The Historic Places Advisory Committee is a standing committee of Lethbridge City Council, and is focused primarily on heritage identification and management within the City of Lethbridge.

Similar to environmental resources, there are organizations throughout Lethbridge doing work that is broadly focused, or more targeted to specific disciplines (the Historical and Archaeological societies). There are also organizations that are devoted to specific stories or narratives (such as the Lethbridge Firefighters Charities Association, the Galt #8 Mine Historic Site Society and the Lethbridge and District Japanese Association). Work is also happening at a number of "levels": from on-the-ground work to install plaques (e.g., Lethbridge Historical Society, Heart of our City Committee), research and collaboration (e.g., City of Lethbridge Planning and Development Services Department), education, awareness and programming (e.g., Galt Museum & Archives, Jane's Walk, Downtown Lethbridge Business Revitalization Zone), publishing (e.g., Lethbridge Historical Society and the Archaeological Society of Alberta— Lethbridge Centre Chapter), and policy guidance (e.g., Historic Places Advisory Committee).

Because there are organizations working at different levels and with different focuses, it is hard to quantify this aspect of our historical baseline. Instead of providing a detailed analytical baseline, this issue area instead focuses on demonstrating the large array of work being done in our community, portrayed in Figure 60. As we learn more about our historic resources baseline and continue to evolve our integrated approach to promote heritage preservation in Lethbridge, we will undoubtedly be able to add more organizations and detail to this figure.

City of Lethbridge Planning and Development

- Established by-law in 1998 by Lethbridge City Council, and run by a City Council appointed Board of Directors
- Has benefited from over 800 volunteers and 36,000 volunteer hours since 2012

- The Society was first established in the late 1880s and has had an intermittent presence in Lethbridge ever since
- The Society has averaged over 4000 volunteer hours annually over the last 10 years

Galt Museum & Archives

Heart of our City Committee

Organizations Working to Promote Historic Resources

Lethbridge Historical Society

Lethbridge Genealogy Society

Archaeological Society of Alberta

Downtown Business Revitalization Zone

Galt #8 Mine Historic Site Society

Alberta Historical Resources Foundation

- The Archaeological Society of Alberta – Lethbridge Centre was first established in 1968
- The Society relies on a dedicated core of 15 volunteers and has averaged over 2500 volunteers hours each year since 2009

Historic Places Advisory Committee

- The Historic Places Advisory Committee was established in 2007
- The Committee relies on over 150 volunteer hours per year plus City of Lethbridge Staff time

Lethbridge Sport Council

Lethbridge Sports Hall of Fame

Figure 58: Historic Resources Social Web

Chapter 5: Summary of Commissioned Studies and Related Reports

Chapter 5 summarizes the scope and findings of the four commissioned studies used to generate the Current State Analysis: Ambient Air Quality Analysis; Ecological Inventory and Environmental Land Use Best Practices Policy Report; Traditional Knowledge and Use Assessment; Heritage Survey. Chapter 5 also includes a summary of two reports that were prepared by closely related initiatives that provide additional context to the EnvS, and whose outcomes feed into the EnvS recommendations found in Chapter 7.

The considerations that emerge from the commissioned studies and related reports are replicated in this report verbatim as a way of being transparent, however none of the studies or reports' considerations are necessarily endorsed by the City of Lethbridge. Instead, the considerations were used to generate conversation and lead to the development of the final EnvS recommendations.

5.1   ENVIRONMENTAL RESOURCES COMMISSIONED AND OTHER STUDIES

5.1.1 Ambient Air Quality Analysis

Summary

In 2016, the City of Lethbridge engaged the support of Alberta Environment and Parks' Airshed Sciences Division (formerly Alberta Environmental Monitoring, Evaluation and Reporting Agency or AEMERA) to better understand the current state of ambient air quality in the City. Over a period of 12 months, Alberta Environment and Parks staff conducted ambient air quality monitoring at six locations throughout the City. The study was conducted in four sessions—approximately every 3 months—in November (2016), March (2017), July (2017) and October (2017).

The findings of the study were not completed in time to be included in this report, however will be used as technical background information for the update of the MDP.

5.1.2 Ecological Inventory and Environmental Land Use Best Practices Policy Report

Summary

In 2016, the City of Lethbridge Planning and Development Services Department contracted O2 Planning and Design to prepare an Ecological Inventory for lands within the City. The purpose of this study was to identify and better understand Priority Ecological Areas (PEAs) within the City. PEAs are identified as hotspots of natural features, ranked based on their potential to provide ecosystem goods and services. Key criteria used to identify PEAs included the presence of:

- Species of conservation concern
- Rare or unique landforms
- Large intact patches of natural vegetation
- Nature corridors and connecting areas
- Riparian areas and shorelines
- Major river valley systems
- Wetlands
- Areas important for maintaining groundwater and surface water quality and quantity

The identification of these sites will assist in future land use planning and decision-making. In total 17 PEAs were identified throughout the City. These sites are clustered within and adjacent to the river valley. These sites, starting with the sites with the highest PEA value, include:

- Cottonwood Park
- Cottonwood Island
- Elizabeth Hall Wetlands
- Northwest Riparian Area
- Bridgeview RV Resort Riparian Area
- Cottonwood Park Slopes
- Alexander Wilderness Park Riparian Area
- Bull Trail Park North and South Riparian Areas
- Popson Park Slopes
- Pavan Park Riparian Area
- Northwest Slopes
- Helen Schuler and Indian Battle Park Riparian Area
- East Slopes Riparian Islands and Areas

- Six Mile Coulee
- University Slopes
- Alexander Wilderness Park Toplands and Slopes
- Six Mile Coulee Eastern Handle

In addition to the PEAs, the Ecological Inventory also identified 9 wetlands/wetland complexes in the City. Further information on each of these sites can be found in the study.

Considerations

The Survey presented a list of considerations for future work and areas of focus, organized around central themes. **The considerations presented below have not been endorsed by City Staff or City Council, and are strictly the opinions of the Consultant.** Considerations include:

- *Watersheds and Aquatic Resources*
  - *Rivers and streams*
    - *Establish more appropriate setbacks for watercourses (both intermittent and perennial) based on the 1:100 floodplain, escarpments and meander belt widths.*
    - *Avoid development of impervious surfaces within a 100m buffer adjacent to the Oldman River, a minimum 60m buffer around permanent streams, and a 30m buffer around ephemeral water courses. Ensure that existing impervious surfaces within these buffers are adequately maintained, and that maintenance activities do not introduce non-native species into the area.*
  - *Catchment naturalization*
    - *Identify watershed which have little impervious human footprint, and preferentially avoid development in these areas.*
    - *Implementing low-impact development practices to reduce stormwater runoff volumes.*
  - *Riparian corridors, floodway, and flood prone areas*
    - *Restrict the development of impervious surfaces and other permanent structures in riparian areas.*
    - *Restore native riparian vegetation along the river's edge.*
    - *River put-ins and bridges should be low-impact and seasonally removable.*
    - *Continue to discourage off-trail use along the riverbanks.*
    - *Limit paved pathways in the riparian area.*
  - *Wetland complexes and surrounding habitat*
    - *No net loss of wetlands, after attempting to avoid impact from development.*
    - *Conserve all existing wetlands that have not been severely altered.*
    - *Restore wetlands that have been tilled, drained, or bisected by roads.*
    - *Maintain natural drainage patterns between wetlands.*
    - *Maintain a minimum buffer of 60m around permanent wetlands.*

- *Natural and Semi-Natural Land Cover*
  - *Grasslands*
    - *Undisturbed native grassland is rare in the region, and the remaining patches of native cover must be preserved.*
    - *Planting following disturbances should be done with native species where ever possible, coupled with active removal of non-native species in the area. These efforts must be followed with monitoring and maintenance to ensure that intended re-establishment occurs.*
  - *Trees*
    - *Monitor and protect undisturbed cottonwood stands and recruitment habitats.*
    - *Avoid planting ornamental introduced species in public areas.*
    - *Encourage planting of native species on private lands.*
    - *Monitor beaver populations in recruitment areas, to ensure that cottonwood saplings and seedlings are allowed to reach maturity. Protect the bases of mature trees from beaver by wrapping with wire mesh. In areas with low recruitment, maintain beaver populations to ensure clonal growth.*
  - *Grasses and shrubs*
    - *Control populations of invasive weeds near wet areas or native habitats using biocontrols.*
    - *Identify and eradicate small expanding weed infestations (using appropriate techniques).*
    - *Use grazing to control weeds and maintain ecosystem health and biodiversity.*
  - *Natural contiguous habitat patches*
    - *Preferentially avoid disturbing large patches of native vegetation.*
    - *Developments should occur from the edge into natural land cover, and not from the centre.*
    - *Bundle disturbances together to reduce perforation and fragmentation of natural land cover.*
- *Landforms*
    - *Developments or degradation of steep slopes should be avoided, and water management in the areas above these steep slopes should ensure that runoff and ground saturation is prevented. Slumping is a critical concern in these areas.*
    - *Slumping areas should be well signed, and managed to ensure that non-native vegetation does not become established.*
    - *Northern aspects of steep slopes should be preferentially avoided.*
    - *Clean up debris dumped in coulees to discourage further dumping and install signs prohibiting dumping.*
    - *Ensure an adequate set-back from the valley edge, appropriate for soil conditions and expected hydrological regimes.*
- *Wildlife Connectivity*
    - *The loss of remaining natural land cover should be preferentially avoided where possible, building new developments within existing disturbances. If the development of remaining native habitats cannot be avoided, ensure that important wildlife corridors are retained,*

and that high intensity disturbances (e.g., loud noises, bright lights, active transportation routes) are located on the interior of developed areas.

- *Maintain a "Dark Sky" policy for the river valley and the surrounding valley setback region.*
- *An assessment of potential gap crossing is recommended to capture the movement of species of concern that disperse by flight, and identify important stepping stones (e.g., stop-over locations) that provide connectivity for local movements and migration routes.*
- *Conduct further studies on wildlife movement using local, field and/or available datasets.*

- *Biodiversity*

  - *Map and protect rare plants, lichens, and rare ecological communities.*
  - *Monitor species of special concern or potential conflict.*
  - *Develop long-term monitoring program in conjunction with University researchers, provincial rare species experts, and community monitoring groups.*
  - *Identify and mitigate environmental impacts prior to any development activities, therefore ensuring an opportunity to address actions which might impair ecological function and negatively impact biodiversity.*

5.1.3 Environment Lethbridge State of the Environment, 2017

Summary

In 2017 Environment Lethbridge published its first "State of the Environment" report. The purpose of the report is to establish a baseline environmental position which allows us to track progress in reducing our ecological footprint for years to come. The report is organized around a set of seven indicators:

- Biodiversity
- Local Food
- Water
- Air
- Waste
- Energy
- Climate Change

Similar to the EnvS, the Environment Lethbridge report has identified a number of data gaps. Flagging these gaps, building new partnerships and working to develop new data collection regimes will be crucial actions going forward. The report contains a summary of indicator trends, meant to suggest the current status or trending direction of a number of key environmental indicators. The summary describes riparian areas, invasive species, the health of pollinators, food waste, water flow, ozone, fine particulate matter, modal share, cycle and pathways and ambient temperature as the areas of greatest concern in our City. It also highlights areas where important data is missing and where analysis cannot be fully done, including:

wetlands, native grasslands, species-at-risk, water temperature (river), stormwater quality, nitrogen dioxide, and vehicle emissions.

Considerations

The State of the Environment Report presented a list of considerations for future work and areas of focus, organized around central themes. **The considerations presented below have not been endorsed by City Staff or City Council, and are strictly the opinions of Environment Lethbridge.** Considerations include:

- *Improve the condition of riparian areas along the Oldman River.*
- *Control invasive species, particularly in areas of native grassland, wetland and riparian habitat.*
- *Support native pollinators by encouraging the planning of pollinator friendly species and the preservation of remaining native habitat.*
- *Reduce the amount of food waste that enters the landfill.*
- *Monitor and plan for decreasing water flows in the Oldman River.*
- *Work with regional and provincial representatives to develop regional strategies to improve air quality.*
- *Encourage increased use of green transportation options such as transit, cycling and walking.*
- *Develop cycle-friendly pathways and commuter options through the Cycling Master Plan.*
- *Plan for and adapt to changes that will be caused by climate change.*
- *Gather data regarding the condition of wetland and grassland habitats within the City.*
- *Support the collection of species-at-risk sightings and habitat use within the City limits.*
- *Conduct additional and regular water temperature monitoring to determine if water temperatures are changing over time.*
- *Following the confirmation of air quality standards for NO_2, review existing data to determine if this is impacting Lethbridge's air quality.*
- *Gather data related to vehicle emissions in Lethbridge to determine the local impact of climate change.*

5.2 HISTORIC RESOURCES COMMISSIONED AND OTHER STUDIES

5.2.1 Traditional Knowledge and Use Assessment

Summary

In 2016, the City of Lethbridge Planning and Development Services Department contracted the Traditional Use Consultation Departments of three Blackfoot Confederacy Nations (Blood Tribe, Piikani First Nation and Siksika First Nation) and Arrow Archaeology to prepare a Traditional Knowledge and Use Assessment. The purpose of this study was to produce a comprehensive traditional knowledge and land use report that describe Blackfoot historical and continue use and occupancy in this region, as well as a

database of sites and areas within the City of Lethbridge deemed to be of particular importance. Traditional sites and areas are defined as:

- *Places where naturally occurring animals are harvested for food, clothing, medicines, tools and other purposes;*
- *Places where naturally occurring plants are harvested for food, clothing, medicines, tools, shelter and fuel;*
- *Places where rocks, minerals, and soils are collected for making tools, conducting ceremonies and other purposes;*
- *Ecological knowledge of habitats and sites critical to the survival of important animal and plant populations;*
- *Corridors and areas where animals used to migrate, feed, mate, calve and winter;*
- *Habitation and economic practice sites, such as settlements, trading areas, travel and trade routes;*
- *Spiritual, religious and sacred places such as ceremonial sites, rock paintings and burial locations; and,*
- *Special places of history, legend, myth and other accounts about specific places.*

This report is innovative in that the Nations themselves are both the consultants and primary informants, and offered an opportunity for knowledge-keepers to directly inform project methodology, analysis, reporting, protocol and final recommendations. Moreover, the project was informed by the Truth and Reconciliation Commission's Calls to Action and the United Nations Declaration on the Rights of Indigenous Peoples. The identification of traditional use sites and areas will assist in future land use planning and decision-making, and support on-going reconciliation efforts by the City.

The report identified a number of significant historical / cultural sites and ecological sites throughout the river valley system in Lethbridge, including former Sundance grounds, possible burial sites and the locations of traditionally important plants (including Prairie Turnip, Saskatoon, Chokecherry and Willow). The study also re-examined previously known / documented sites—such as the Belly River Battle Site (also known as the Blackfoot–Cree Battle Site, a provincially designated Historical Resource), Medicine Rock and the West Lethbridge Turtle Effigy—offering additional or new interpretation and meaning for these sites. The study also identified previously undocumented sites in and adjacent to the river valley, including cairns. The approximate locations of these sites have been shared with the City of Lethbridge and will be used to inform future land use planning and decision-making at the City, including the collaborative management of identified sites (to be explored going-forward).

Considerations

The Traditional Knowledge and Use Assessment presented a list of 14 considerations for future work and areas of focus. **The considerations presented below have not been endorsed by City Staff or City Council, and are strictly the opinions of the Consultant.** Considerations include:

- *We recommend that the City establish a committee of Blackfoot experts that can serve a consultative function with regard to traditional Blackfoot resources in the City, as well as the impacts of development thereon, and other elements and aspects of First Nation historical and cultural interest in the City. We do not prescribe the exact role of the committee; however, we suggest its mandate be to provide input and expertise with regard to the management and protection of traditional resources and cultural matters, including elements that arise from the recommendations in this report, and general matters regarding development in the City, particularly with respect to Parks and current natural areas. This committee could include current Blackfoot advisors and experts at the City, but at a minimum should include one member from each of the Blackfoot Nations in Southern Alberta.*

- *We recommend that the current river valley system in the City, including Six Mile Coulee, be recognized as an area of significance to the Blackfoot people. The exact spatial boundaries are not definitely delineated in this report however, but, the area should include the river valley below the commonly defined break of slope to the valley and should include undevelopable geotechnical setback areas from the valley slope that are owned by the City. We do not recommend the inclusion of any non-City owned lands, but we would urge the City to communicate with the University of Lethbridge and the Lethbridge College and ask them to endeavor to protect at least some native terrain on their respective campuses from future development and consult with the Blackfoot confederacy through the above recommended committee to determine whether areas on campuses could or should be recognized as Blackfoot traditional areas. [See Figure indicating] areas that we believe warrant inclusion in this areas. We have attempted to develop these mapped polygons using TKUA results and considering City owned lands. The maps as noted above should not be regarded as definite, but are used here to indicate these areas.*

- *We recommend the on-going management and protection of recorded First Nations sites in the City by the City. These are sites that are recorded under the Alberta Historical Resources Act and afforded protection under that act. However in some cases, sites considered significant to First Nations are not considered equally significantly by First Nations people and, by and large, provincial ranking and significance of sites does not consider a site's traditional significance. Since the City has the authority over most kinds of new development within its boundaries, we recommend that the City maintain a record of these sites, particularly where they are located and what they consist of, so that City development decisions can consider these sites. If sites cannot be avoided and must be impacted by development, we recommend that the City seek input from a committee of Blackfoot experts and, if applicable, archaeologists to help determine appropriate mitigations.*

- *We recommend that the remaining areas of naturally-occurring vegetation and undisturbed landscapes both within and outside of designated parks should be protected and preserved where possible and practical. Those sites that contain important traditional medicinal, ceremonial, or dietary plants should receive higher priority for protection. Where possible, and in the event of unavoidable disturbance, we recommend the City allow the pre-development harvest of traditional plants. We further suggest that the City consider allowing First Nations to conduct limited and sustainable harvests of important medicinal and ceremonial plants that occur on City owned land in the river valley. We further recommend that if this consideration is put into effect that First Nations Elders and plant experts consult fully and completely with City biologists, environmental experts and planners to ensure any harvest is sustainable.*

- *We recommend that the City develop and maintain a list of Blackfoot words and names for the purpose of naming streets, roads, neighbourhoods, and other features within Lethbridge. We recommend that the list be developed by, or in cooperation with, the above-recommended committee or members of this consulting group. As is the case with all languages, Blackfoot words and names that could be used for naming features are context specific, we therefore recommend that the above-recommended Blackfoot committee, or an equivalent, be consulted prior to the approval/designation of any Blackfoot word or name for its contextual appropriateness for the specific feature to be named.*

- *There are two highly significant features in Pavan Park and/or the adjacent Alexander Wilderness Park. These sites are a former Sundance grounds and the burial of an important Blackfoot Chief and leader. The approximate location of both features are known by Blackfoot Elders, but the exact locations, if they are determinable, are not known. It is not known if any material remains or indications of these significant locations can be identified or determined. However, we recommend that the City and the aforementioned Blackfoot committee, or equivalent, consider this problem and decide if the locations can be or should be determined, and whether or not they are, develop signage for placement in Pavan that explains the sites and their significance. If the site locations can be determined with confidence, we would recommend additional measures to ensure their protection and the possibility of reincorporating these sites into the body of known traditional sties and areas in Lethbridge.*

- *Several previously unrecorded sites that have archaeological elements and are considered traditionally significant were recorded during the fieldwork associated with this study. These sites should be included as part of the City of Lethbridge's Site and Traditional Area Database. We also recommend that each of these sites be named by the Blackfoot Elders based on their inferred use/role in traditional culture and history. We do not recommend any invasive archaeological investigative work that would impact the sites.*

- *The site commonly known as the West Lethbridge Turtle Effigy was visited and examined during this TKUA. However, the current condition and form of the physical feature is difficult to determine due to the high grass at the feature. We recommend that the City of Lethbridge establish a plan with the Blackfoot Confederacy members of the TKUA, and if appropriate the Band Councils of the three Blackfoot Nations, to mow/cut the grass and have the site revisited by Elders who can examine it closely, consider it's form and the level of disturbance that has occurred at the site, and provide a coherent interpretation and discussion of the site and what function and meaning it has to Blackfoot people and culture. If appropriate, we further recommend interpretive signage at the site that briefly explains its significance to the visitors to the site. However, this recommendation for signage is not agreed upon by all of the Elders. We further recommend that a plan be developed that will permit the long term protection of this site and that the site be maintained and that First Nations be permitted to perform ceremonies at the site.*

- *We recommend the development and placement of interpretive signage in and near the river valley that offers basic information about the First Nation culture and history of the area. The exact nature and extent of signs should be developed to summarize how First Nations people used the area. We recommend signage, in both English and Blackfoot, illustrating and briefly discussing extant native plants in the valley and describing their use in Blackfoot culture, subsistence and/or medicine and other basic culture history data.*

- *The site of the late 19th Century battle between the Blackfoot and Cree is an important historical event to the Blackfoot people. There is an interpretive sign above the main battle coulee in West Lethbridge, but the sign is relatively minor. We recommend improved and increased signage that better discusses the battle, the causes and the outcome. We also recommend that signage be placed in a more publically accessible location, for example, west of the Galt Museum where visitors could get an overview of the main battle area. The base of the coulee where the main battle area is, is also being used for causal recreation and there are signs of significant erosional disturbance from this activity. We recommend the City take steps to reduce the erosion in order to preserve the site area.*

- *The City of Lethbridge is in the heart of traditional Blackfoot territory and it is a large center in relative proximity to the three Canadian Blackfoot Nations. Many members of all three Nations work, live, and attend primary, secondary and post-secondary education institutions within the City. However, it is our general view that the majority of citizens of Lethbridge, while aware of Blackfoot Nations, are generally not fully aware of the rich culture and history of the Blackfoot people, and thus we recommend that the City of Lethbridge consider designating an annual Blackfoot Heritage Day. We further recommend that consideration be given to designating October 25 as Blackfoot Heritage Day, as that is the day of the Blackfoot-Cree battle. While we do not here recommend specific activities, general suggestions for recognition of the day would be presentations on Blackfoot history and culture in schools, public lectures, and other activities such as demonstrations of Blackfoot art, historical practices, and the similar.*

- *Given the above, we also recommend consideration be given to establishing a permanent Blackfoot culture and heritage center in the City, either in a stand-alone facility or as part of an existing facility. We do not comment further here on the nature of such a center, rather the intent is to make the recommendation and have it considered for the future.*

- *The Fort Whoop-Up Interpretive Centre is currently being operated by the Galt Museum, which we applaud; however, when the present contact comes up for renewal, we would ask that the Blackfoot Confederacy be invited to provide a proposal to run the centre or join with the Galt Museum in an operating consortium.*

5.2.2 Heritage Survey

Summary

In 2016, the City of Lethbridge Planning and Development Services Department contracted Donald Luxton and Associates to update the City's Heritage Survey. The Survey was focused on 11 neighbourhood throughout the City, and one specific site—the University of Lethbridge campus. The 11 neighbourhoods include: Anges Davisdon, Downtown, Fleetwood, Glendale, Lakeview, London Road, Senator Buchanan, Staffordville, Upper Eastside, Victoria Park and Westminster. The 11 surveyed neighbourhoods had over 4200 sites listed on the City's Heritage Survey. Through a series of site visits, 154 additional sites were added to the Survey. The criteria established to review and select sites, included:

- Representative sampling between neighbourhoods
- Entire streets not previously surveyed

- Legibility of original building style
- Intactness of form, scale and massing
- Intactness of original windows (at least on main floor)
- Intactness of original detailing
- Intactness or removability of cladding
- Reversibility of changes
- Unique example or material
- Rarity in the City
- Representativeness of a particular style
- Representativeness of a time period

> *Number of Sites Added to Heritage Survey by Neighbourhood*
>
> *Anges Davisdon 26 sites*
> *Downtown 1 site*
> *Fleetwood 14 sites*
> *Glendale 25 sites*
> *Lakeview 19 sites*
> *London Road 1 site*
> *Senator Buchanan 19 sites*
> *Staffordville 8 sites*
> *Upper Eastside 3 sites*
> *Victoria Park 19 sites*
> *Westminster sites*

Box 21: Sites Added to Heritage Survey by Neighbourhood

In addition to identifying new Survey sites, the study created neighbourhood profiles for the 11 surveyed neighbourhoods, which will assist in preparing future Statements of Significance and in larger heritage management.

Considerations

The Survey presented a list of 10 considerations for future work and areas of focus. **The considerations presented below have not been endorsed by City Staff or City Council, and are strictly the opinions of the Consultant.** Considerations include:

- *Continue with subsequent phases of the Lethbridge Heritage Management Program including a Heritage Inventory program to add sites from the Places of Interest List (POIL) generated from this Heritage Survey.*
- *Update the Heritage Management Plan (current plan was developed in 2007)*
- *Explore development of Heritage Districts or Conservation Areas in neighbourhoods or streets within neighbourhoods. Areas and/or streets can be identified as part of an update to the Heritage Management Plan.*
- *Develop support, resources (websites or printed materials) and policies for conservation for specific resources designated as Municipal or Provincial Historic Resources. Can be developed as part of an update to the Heritage Management Plan.*
- *Explore development of municipal-based incentive program to complement the Provincial grant program. Can be developed as part of an update to the Heritage Management Plan.*
- *Develop Design Guidelines for new buildings/houses in conservation areas of heritage districts that help to preserve the character of an historic area.*
- *Develop policies to promote preservation of clusters of historic buildings along main corridors in the City.*
- *Continue process to expand networks between communities that have established heritage management programs to work towards more regionally based cultural tourism and granting initiatives (Medicine Hat, Raymond, Crowsnest Pass, Vulcan County).*
- *Explore developing continuing education in heritage for the public/POIL owners.*

5.2.3 City of Lethbridge & Lethbridge Indigenous Sharing Network Reconciliation Implementation Plan, 2017-2027

Summary

In 2017, the City of Lethbridge in partnership with the Lethbridge Indigenous Sharing Network (LISN) culminated a community-based process to prepare an Implementation Plan in response to the TRC Calls to Action. The Implementation Plan focuses specifically on those outcomes at the community and municipal government level. The Reconciliation Implementation Plan is guided by a set of five principles:

- Active Participation: The City of Lethbridge will seek the advice, consult and participation of the Urban Indigenous Community on issues of mutual interest in the community and to promote working collaboratively on these issues between the City of Lethbridge and the Urban Indigenous Community.
- Communication & Active Participation: The City of Lethbridge will promote its support for reconciliation as a method of raising awareness for the community, endorse educational opportunities and create an understanding of the reconciliation process.
- Service Provision: The City of Lethbridge supports providing relevant services to the Urban Indigenous population that minimizes any disadvantage encountered by Indigenous people and where the responsibility to do so resets with the City of Lethbridge. The City of Lethbridge will advocate to provincial and federal governments for enhanced services where it is recommended.
- Cultural Identity & Heritage: The City of Lethbridge acknowledges that continued cultural and spiritual connection that the Blackfoot people have to their lands and will seek opportunities to recognize Blackfoot heritage through physical structures like public art or monuments and by supporting community cultural activities.
- Commemoration: The City of Lethbridge will work with the Kainai Nation, the Piikani Nation and the LISN to assist with recognizing Indigenous history in the City that represent and reflect the past, present and future contributions of Indigenous people to the City of Lethbridge.

Considerations

The Reconciliation Implementation Plan identifies 18 separate Calls to Action and lists Potential Actions by either the City of Lethbridge or the broader community. The Implementation Plan was endorsed by Lethbridge City Council on June 19, 2017 as a first step down the road towards reconciliation. The following Potential City Actions are considered to be the most relevant to the EnvS:

CALL TO ACTION

43. WE CALL UPON THE FEDERAL, PROVINCIAL, TERRITORIAL AND MUNICIPAL GOVERNMENTS TO FULLY ADOPT AND IMPLEMENT THE UNITED NATIONS DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES AS A FRAMEWORK FOR RECONCILIATION.

47. WE CALL UPON FEDERAL, PROVINCIAL, TERRITORIAL AND MUNICIPAL GOVERNMENTS TO REPUDIATE CONCEPTS USED TO JUSTIFY EUROPEAN SOVEREIGNTY OVER INDIGENOUS PEOPLES AND LANDS, SUCH AS THE DOCTRINE OF DISCOVERY AND TERRA NULLIUS, AND TO REFORM THOSE LAWS, GOVERNMENT POLICIES, AND LITIGATION STRATEGIES THAT CONTINUE TO RELY ON SUCH CONCEPTS.

POTENTIAL CITY ACTION

- Review the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and prepare for potential City adoption and implementation implications.

- Look for leadership on UNDRIP from the Federal and Provincial Governments.

- Explore, in partnership with the respective City departments and interested Blackfoot Nations, the legal context and practical implications for the exercise of Treaty and inherent rights within the City of Lethbridge, including locations where these activities can safely take place.

- Update the Heritage Management Pan (HMP) to incorporate policy language that specifically address Indigenous Heritage in Lethbridge, including:
  1) Guiding principles (or similar) and protocol for identification, assessment, preservation, interpretation and commemoration of Indigenous heritage sites (including cultural landscapes), as well as provisions that address continued access and use of designated sites by Indigenous peoples; and,
  2) Proper protocol for municipal designations that include Indigenous heritage sites (including cultural landscapes).

- Update the HMP Terms of Reference for the Historic Places Advisory Committee to include representation from an Indigenous person as well as a qualified registered Archaeologist or Traditional Indigenous Land Use Expert.

- Explore partnerships with respective City departments, Lethbridge County, and interested Blackfoot Nations, for the protection and restoration of significant sites found within and near the City of Lethbridge, including applying for grants to conduct this work.

- Require all statutory plans prepared by the City of Lethbridge to include an acknowledgement of Blackfoot Traditional Territory (that will be previously approved by City Council). Statutory Plans include: Municipal Development Plan, Area Structure Plans, and Area Redevelopment Plans. Work with the

Development Industry to incorporate similar statements in developer initiated plans.

- Work with our partners in Lethbridge County to explore the incorporation of an acknowledgement of Blackfoot Traditional Territory into the Intermunicipal Development Plan the next time it is reviewed.

- Require all new Area Structure Plans prepared by the City of Lethbridge to conduct a Traditional Knowledge and Land Use Study (or similar) at the outset of the project. This does not apply to amendments to existing Area Structure Plans. Work with the Development Industry to explore the completion of similar studies in developer initiated plans.

- Require all new Area Redevelopment Plans prepared by the City of Lethbridge with plan boundaries that include or border undeveloped top-of-bank lands to conduct a Traditional Knowledge and Land Use Study (or similar). This does not apply to operational amendments to existing Area Redevelopment Plans (e.g., land use reclassifications), but does apply to Area Redevelopment Plan that are undergoing significant updates.

- Encourage all new Outline Plans prepared by the City of Lethbridge under Area Structure Plans for which there was no Traditional Knowledge and Land Use Study (or similar), to prepare such a study. Work with the Development Industry to explore the completion of similar studies in developer initiated plans.

Chapter 6: Summary of Community Input

Chapter 6 summarizes input received by the project team through work with the EnvS Technical Working Group, Community Liaison Group and from the public at-large. Over the course of the project, a number of opportunities were given for the project team and for the community to provide input into the outcomes of the EnvS. Engagement took on a variety of forms, including surveys, open houses, facilitated meetings, community events and "Kitchen Table Conversations". There were also less formal opportunities given to provide feedback, including a project email address, and a community Chalkboard that was placed in various locations around the City during the project. Much of this engagement was carried out under the banner of 100K+ Conversations, as a way of prompting community residents, staff and organizations in the City to think about the future of Lethbridge and what that future means for themselves, their families and organizations, their work, their neighbourhood, for us as a City, and our region.

Between November 2015 and January 2017, 100K+ Conversations affiliated engagement activities generated more than 32,000 individual pieces of input data, much of which specifically pertains to environmental and heritage outcomes in our City. Chapter 6 highlights three specific types of engagements that took place during the EnvS project and summarizes the feedback received in relation to Environmental and Historic Resources. The three engagement activities include: Kitchen Table Conversations, 100K+ Surveys, and Technical Working Group/Community Liaison Group Meetings.

Kitchen Table Conversations
Kitchen Table Conversations (KTC)s were imagined as a way of sparking conversations between community members about the future, similar to the way many families talk around the dinner table, or colleagues around a boardroom table. City staff created a simple-to-use toolkit to allow community members and organizations to lead their own conversations, or where desired, have a member of City Staff help provide facilitation. In all, 29 separate KTCs were held between September 2016 and February 2017, including the participation of over 500 people. Conversations took many forms—from a temporary art installation at the Helen Schuler Nature Centre, workshops with elementary school students, walking conversations led by local environmental experts, to facilitated meetings with local organizations like

Economic Development Lethbridge, the Chamber of Commerce and Lethbridge Public Library. Each KTC was documented and summarized and is available to review on the City's website[149].

100K+ Conversations Surveys 1 and 2

Between March and December, 2016, two broad community surveys were used to gather community feedback. The first survey asked respondents to state their level of agreement with each of the current City's ICSP/MDP policies as a way of generating feedback to inform the SSRP Compliance Initiative and subsequent review of the ICSP/MDP. In total there were 604 responses. Survey two was designed to take a deeper look at specific themes highlighted in Survey 1, specifically focusing in on Environmental and Historic Resources and Efficient use of Land. In total there were 575 responses. Summary reports for both surveys are available on the City's website[150].

Technical Working Group and Community Liaison Group Comments

Between November, 2015 and January, 2017, 19 meetings were held with the TWG and 3 with the CLG. The focus of these meetings began with providing background information on the SSRP and planning policy in Lethbridge, and then shifted into gathering specific feedback from staff, stakeholders and community residents about environmental and historic resources in the City. During these meetings feedback was collected to inform the EnvS and the recommendations made towards the MDP review process (see Chapter 7).

The sections below provide a glimpse of the feedback provided through these three key methods. More information on 100K+ Conversations and Kitchen Table Conversations, including summary reports, can be found on the City's website[151].

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[149] Available at www.lethbridge.ca/100K+
[150] Available at www.lethbridge.ca/100K+
[151] Available at www.lethbridge.ca/100K+

Kitchen Table Conversation Participants

Alberta Health Services (x3)

Martha's House Resident Council (x2)

City of Lethbridge Planning and Development Services Department (x3)

EnvS Task Force

Canadian Home Builders Association Lethbridge Region

Economic Development Lethbridge

Chinook Food Connect and Healthy Lethbridge

Volunteer Lethbridge

Lethbridge Evangelical Ministerial Association

City of Lethbridge Waste and Recycling Services Department

Lethbridge Chamber of Commerce

Southern Alberta Group for the Environment

Invasion Art Show (Exhibit at Helen Schuler Nature Centre)

Dr. Gerald B. Probe School

Lethbridge Public Library

South Saskatchewan Regional Plan First Nation Sub-table

Institute of Transportation Engineers (Lethbridge Chapter)

Lakeview Elementary School

City of Lethbridge Youth Advisory Council

Lethbridge College Ecosystem Management Students

Father Leonard Van Tighem School (x2)

Ecole Agnes Davidson School

Box 22: Kitchen Table Conversation Participants

6.1 ENVIRONMENTAL RESOURCES COMMUNITY FEEDBACK

Kitchen Table Conversations

Below is a summary of some of the key themes raised by Kitchen Table Conversation participants that relate to Environmental Resources:

As a community…

1. *We have historically seen ourselves as distinct or separate from the environment. Going forward we need to see ourselves as part of it.*

2. *We have made many important legacy decisions that have supported our environment, however it is time for renewed action.*

3. *We need to think more holistically about our ecological footprint. This includes considering the social and economic consequences of our environmental actions, as well as trying to maximize positive consequences and not just minimizing negative ones.*

4. *We need innovation and leadership on the part of the City of Lethbridge.*

5. *We need to support residents and businesses to do what they can to reduce our collective ecological footprint. This includes education, access to data and exploring financial incentives and penalties.*

6. *We need to anticipate and address current and future environmental challenges, including: water security, climate change, food security, air quality and an aging urban tree canopy.*

7. *We need to protect and restore sensitive ecological areas.*

100K+ Surveys

Below is a summary of the key points raised by respondents that relate to Environmental Resources:

Survey 1

100K+ Conversations Survey 1 went through each of the policy areas of the ICSP/MDP (2010). For each policy it asked respondents to state whether they "Agree", "Disagree" or "Neither". The intention was to highlight key areas of community interest (based on strong agreement or disagreement) that could be analyzed in further detail in a subsequent survey. The following table lists the policy areas that relate to environmental resources and respondent's agreement/disagreement with the policy statement.

Table 26: 100K+ Conversations Survey 1 Environmental Resources Policy Questions

POLICY 6.4.5 LETHBRIDGE IS A PLANNED CITY THAT EXHIBITS QUALITY URBAN DESIGN	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
LETHBRIDGE MAINTAINS AND EXPANDS THE URBAN FOREST	58.8%	16.2%	25%
POLICY 6.4.6 LETHBRIDGE HAS A DIVERSE PARKS AND OPEN SPACE SYSTEM	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
LETHBRIDGE HAS A DIVERSE PARKS AND OPEN SPACE SYSTEM THAT MEETS THE NEEDS OF CURRENT AND FUTURE GENERATIONS.	56.3%	21.2%	22.5%
LETHBRIDGE'S PARKS AND OPEN SPACES ARE CONNECTED.	51.3%	33.8%	15%
LETHBRIDGE'S PARKS AND OPEN SPACES ARE ACCESSIBLE.	58.8%	16.2%	25%
POLICY 6.5.1 LETHBRIDGE'S RIVER VALLEY IS THE PRIMARY OPEN SPACE SYSTEM	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
THE OLDMAN RIVER VALLEY IS CONSERVED AND ENHANCED FOR CURRENT AND FUTURE GENERATIONS.	79%	13%	9%
LETHBRIDGE ENHANCES AND RESTORES BIOLOGICAL DIVERSITY IN THE RIVER VALLEY.	77%	6%	17%
LETHBRIDGE INCORPORATES COMPATIBLE DEVELOPMENT IN THE RIVER VALLEY.	58%	13%	24%
LETHBRIDGE ENSURES THE RIVER VALLEY IS ACCESSIBLE TO ALL RESIDENTS.	76%	15%	9%
LETHBRIDGE INCORPORATES VIEW CORRIDORS ADJACENT TO THE RIVER VALLEY.	71%	9%	20%
POLICY 6.5.2 LETHBRIDGE CONSERVES ITS NATURAL RESOURCES	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
LETHBRIDGE CONSERVES ITS NATURAL RESOURCES AND MINIMIZES ITS ECOLOGICAL FOOTPRINT.	47%	32%	22%
LETHBRIDGE ENCOURAGES BEST PRACTICES FOR WATER CONSERVATION AND QUALITY.	48%	33%	19%
LETHBRIDGE ENCOURAGES THE USE AND PROTECTION OF NATIVE PLANT SPECIES.	56%	22%	23%

LETHBRIDGE REDUCES THE GENERATION OF GREENHOUSE GASES AND AIR POLLUTANTS.	23%	30%	47%
LETHBRIDGE EFFICIENTLY MANAGES AND REDUCES WASTE.	28%	61%	11%
LETHBRIDGE EFFICIENTLY MANAGES AND PROMOTES THE REUSE AND RECYCLING OF PRODUCTS CURRENTLY IDENTIFIED AS WASTE.	24%	65%	11%
LETHBRIDGE ENCOURAGES ENERGY-EFFICIENCY AND THE USE OF ALTERNATIVE ENERGY SOURCES.	25%	41%	34%

The summary presented here is not exhaustive, but does highlight areas where additional attention is needed, including with respect to how we manage our natural resources (e.g., water, native plants, energy), and our ecological footprint as a City. The survey further affirms something that most Lethbridge residents can agree on, which is the special place that the Oldman River Valley holds in our collective community identity. Moreover, the need to ensure its protection, accessibility and the compatibility of land uses.

The full Survey 1 summary is available on the City's website[152].

Survey 2

100K+ Conversations Survey 2 took a deeper look at certain aspects of environmental resources that were highlighted by feedback received in Survey 1. The survey also asked future focused questions around environmental policy to help guide the EnvS and upcoming ICSP/MDP review.

Survey 2 was focused on five main environmental resource themes: Environmental Footprint, Greenhouse Gases and Air Pollution, Native Plant Species, Water Conservation, and Water Quality. For each area, respondents were asked about how important that particular area is to their family and for us as a community. Respondents were also asked *why* the particular area is so important (does it support

Water Quality Survey Questions:

1. *How important is it to you and your family to protect water quality? (Respondents answer on a scale of 1 to 10)*
2. *How important is it for us as a community to protect water quality? (Respondents answer on a scale of 1 to 10)*
3. *Why is it important for us as a community to protect water quality? (Respondents choose among multiple answers)*
4. *There are many actions that individuals and families can take to protect water quality. For each of the example actions below, please select if these are actions you are 1) currently doing; 2) not currently doing but would like to; 3) do not want to do. (Respondents provided an answer for each example action).*
5. *Are there other actions you and your family take to protect water quality that are not listed? (Open-ended)*
6. *Do you have any other comments about protecting water quality? (Open-ended)*

Box 23: 100K+ Conversations Survey 2 Example Question Set

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[152] Available at www.lethbridge.ca/100K+

economic well-being, environmental well-being, social well-being, or perhaps it is not important). Respondents were then asked about the actions they currently take to contribute to that particular area and why; and for areas where they weren't currently contributing, why not. Box 23 provides an example of the question set for Water Quality.

Table 27: 100K+ Conversations Survey 2 Environmental Resource Importance

THEME	HOW IMPORTANT TO YOUR FAMILY[153]	HOW IMPORTANT TO THE COMMUNITY
ENVIRONMENTAL FOOTPRINT	88.6%	93.8%
GREENHOUSE GASES & AIR POLLUTION	85.7%	91.4%
NATIVE PLANTS	83.6%	93.4%
WATER CONSERVATION	89.2%	95.9%
WATER QUALITY	100%	98.6%

Water quality and conservation were the environmental resource themes that respondents felt most strongly about in terms of their impact on families and the community. Most themes also showed more importance at a community level than family level, suggesting perhaps that respondents feel there is greater collective rather than individual responsibility over these areas.

When asked to indicate the actions they currently take to contribute positively toward environmental outcomes, the respondents' most common actions include:

- Conserving energy at home
- Using appliances (like washing machines, dryers, dishwashers) with only full loads
- Disposing of chemicals at designated facilities
- Watering plants/lawns in the morning or evening
- Changing daily behaviours to reduce energy and water use
- Directing downspouts to lawns or gardens
- Purposefully reducing household consumption
- Controlling invasive species at home
- Purchasing "green" energy from utility companies
- Cleaning vehicle/boat at designated facilities

Environment and Natural Resources Policy Areas of ICSP/MDP (2010)

The Oldman River Valley System

The Use and Protection of Native Plant Species

Water Conservation and Quality

Air Quality and Greenhouse Gas Emissions

Waste Management and Recycling

Energy Conservation and Alternative Energy

Box 24: Environment and Natural Resources Policy Areas of ICSP/MDP (2010)

The most common actions that respondents are not currently doing, but would like to include:

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[153] Respondents were asked to answer out of 10, where 10 is "Very Important" and 1 is "Not Important at All". The percentages presented represent the amount of respondents who answered at least 5 out of 10.

- Purchasing "green" energy from utility companies
- Driving hybrid vehicles
- Capturing and using rainwater
- "Adopting" a storm drain (through the City of Lethbridge's Yellow Fish Road program)
- Xeriscaping yards
- Walking, biking, carpooling or taking public transit
- Cleaning vehicle/boat at designated facilities

Table 26 summarizes the most common actions currently taken by respondents and their motivators (e.g., economic, environmental), and the actions they would most like to be doing, and the main barrier (e.g., economic, availability). The Survey 2 summary report, available on the City's website[154], provides additional information on respondents' motivators and barriers to action.

Table 28: 100K+ Conversations Survey 2 Environmental Actions, Motivators and Barriers

THEME	TOP CURRENT ACTIONS	CURRENT ACTIONS MOTIVATORS	TOP "WOULD LIKE TO BE DOING" ACTIONS	"WOULD LIKE TO BE DOING" BARRIERS
ENVIRONMENTAL FOOTPRINT	A. Change behaviours B. Reduce Consumption	A. Save money B. Protects env.	A. Purchase "Green" energy B. Drive hybrid	A. Too expensive B. Too expensive
GREENHOUSE GASES & AIR POLLUTION	A. Conserve Energy B. Use "green" appliances	A. Saves money B. Saves money	A. Purchase "Green" energy B. Walk, Bike, Carpool, Transit	A. Too expensive B. Not avail./accessible
NATIVE PLANTS	A. Control weeds @ home B. Clean vehicles/boat	A. Protects env. B. Protects env.	A. Native plants landscaping B. Volunteering in community	A. Too expensive B. Too busy
WATER CONSERVATION	A. Use full appliances B. Water plants morning / night	A. Saves money B. Protects env.	A. Capture and use rainwater B. Drought resistant landscaping	A. Don't know B. Too expensive
WATER QUALITY	A. Properly dispose of chemicals B. Direct downspout to garden or lawn	A. Protects env. B. Protects env.	A. Adopt a storm drain B. Wash vehicle at car wash facility	A. Don't know B. Too expensive

The final section of Survey 2 collected feedback from respondents around future policy directions for the upcoming review of the ICSP/MDP. This section listed the current environmental and natural resources policy areas of the ICSP/MDP (see Box 23) and asked respondents which (if any) additional policy areas should be considered during the ICSP/MDP review. The four future policy areas that received the most

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[154] Available at www.lethbridge.ca/100K+

interest from respondents were: Invasive Species Management; Protection of Wetlands and Riparian Areas; Environmental Leadership in Municipal Operations; and, Environmental Remediation, Restoration and Enhancement.

Technical Working Group and Community Liaison Group Comments
At the June 20, 2016 EnvS Open House a "What we've heard so far" poster was presented to the public. The contents of that poster were confirmed by members of the TWG and CLG and community members were given the chance to provide feedback. The 7 key "What we've heard so far" messages for the environment include:

As a community…

1. *Our River Valley and broader environment are central to our quality of life. We need to ensure that resources are protected for the use and benefit of future generations.*

2. *We need to think more holistically. Open and park spaces need to be designed and considered as multi-functional, containing recreation, utility (e.g., water management), habitat, food production, community gathering, and cultural values etc.*

3. *We need to protect the significant resources that we still have (e.g., native grasslands, wetlands, cottonwood forests, boulevard trees).*

4. *We need more education on environmental resources and our collective environmental impact.*

5. *We need to be resilient in the face of climate change.*

6. *We need our municipal government to lead by example.*

7. *We have made many important decisions in the past about protecting our River Valley and local environment, however we have fallen behind other communities and need renewed momentum.*

6.2 HISTORIC RESOURCES COMMUNITY FEEDBACK

Kitchen Table Conversations

Below is a summary of some of the key themes raised by Kitchen Table Conversation participants that relate to Historical Resources:

As a community…

1. *We have done a great job to protect heritage sites, particularly over the past 10 years. There is however, more and new work to be done.*

2. *Heritage preservation and the stories we celebrate inform our identity as a City. We need to ensure that the histories we tell and the resources we protect are accurate and inclusive.*

3. *We need to work collaboratively with the Indigenous community to protect heritage resources. Indigenous heritage is inseparable from identity, ecological well-being, respect and Rights.*

4. *We need to think more holistically about heritage preservation. This includes considering heritage from economic and environmental perspectives, in addition to social and cultural outcomes, and thinking about landscapes and districts rather than individuals sites.*

5. *We are seeing growing interest in learning about our shared history. We need to support this interest through education, awareness and information.*

100K+ Conversations Surveys

Below is a summary of the key points raised by respondents that relate to Historic Resources:

Survey 1

100K+ Conversations Survey 1 went through each of the policy areas of the ICSP/MDP (2010). For each policy it asked respondents to state whether they "Agree", "Disagree" or "Neither". The intention was to highlight key areas of community interest (based on strong agreement or disagreement) that could be analyzed in further detail in a subsequent survey. The following table lists the policy areas that relate to historic resources and respondent's agreement/disagreement with the policy statement.

Table 29: 100K+ Conversations Survey 1 Historic Resources Policy Questions

POLICY 6.3.1 LETHBRIDGE RESPECTS AND CELEBRATES ITS HISTORY	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
LETHBRIDGE RESPECTS AND CELEBRATES ITS HISTORY FOR THE BENEFIT OF CURRENT AND FUTURE GENERATIONS.	72%	12%	17%
LETHBRIDGE IDENTIFIES AND DESIGNATES HISTORICAL RESOURCES.	73%	11%	17%
LETHBRIDGE COLLABORATES WITH OWNERS TO CONSERVE AND MAINTAIN HISTORICAL RESOURCES THROUGHOUT THE CITY.	57%	16%	27%
LETHBRIDGE SUPPORTS THE ADAPTIVE REUSE OF HISTORIC RESOURCES.	51%	14%	35%
LETHBRIDGE STRIVES TO PRESERVE AND SHARE OUR COLLECTIVE STORIES.	66%	7%	27%
LETHBRIDGE INCORPORATES SIGNIFICANT ARCHAEOLOGICAL, HISTORICAL AND CULTURAL SITES INTO THE URBAN FABRIC.	51%	19%	31%
POLICY 6.4.7 LETHBRIDGE HAS A STRONG AND VIBRANT DOWNTOWN	AGREE / STRONGLY AGREE	DISAGREE / STRONGLY DISAGREE	NEITHER
LETHBRIDGE RECOGNIZES AND CONSERVES THE SIGNIFICANT HISTORIC RESOURCES IN THE DOWNTOWN.	62.6%	18.8%	18.8%

The summary presented here is not exhaustive, but does highlight areas where additional attention is needed. It indicates that future focus is needed around adaptive reuse of heritage buildings, collaboration and information sharing with owners regarding historical resources conservation, storytelling, and around the incorporation of heritage into our urban fabric (including adaptive reuse).

The full Survey 1 summary is available on the City's website.

Survey 2

As described above, 100K+ Conversations Survey 2 took a deeper look at certain aspects of historic resources that were highlighted by feedback received in Survey 1. The survey also asked future focused questions around historic resources policy to help guide the EnvS and upcoming ICSP/MDP review.

Similar to the environmental resources questions, the historic resources questions were first focused on learning about how important protecting historic resources is at the household and community levels. Respondents were asked to answer on a scale of 1 to 10, where 10 is "Very Important" and 1 is "Not Important At All", how important historic resources protection is to 1) themselves and their families, and 2) to the entire community. For the first (important to you and your family), 90.3% of respondents ranked the importance at least 5 out of 10; the average rating was 8/10). For the second (important for us as a

community), 95.8% of respondents ranked the importance at least 5 out or 10 (the average rating was 9/10).

When asked a follow-up question about why protecting historic resources is important, 73.6% indicated that it contributes to social well-being; 11% indicated it contributes to environmental well-being; and 6.8% indicated it contributes to economic well-being.

The final question of the historic resources section collected feedback from respondents around future policy directions for the upcoming review of the ICSP/MDP. A list of statements was provided and respondents were asked to state if they "Agree", "Disagree", "Do not have enough information", or "Prefer not to answer". Table x summarizes the findings of this question.

Table 30: 100K+ Conversations Survey 2 Historic Resources Future Focus Areas

Statement	Agree	Disagree	Do Not Have Enough Information	Prefer Not To Answer
The City should designate more historic resources.	57.5%	8.2%	34.2%	0%
The City should provide better access to information on the designation process and what it means for owners of designated buildings / sites.	80.8%	6.8%	12.3%	0%
The City should provide better information on historic resources that have been designated.	78.1%	12.3%	9.6%	0%
The City should identify and protect Indigenous historic resources.	79.5%	13.7%	4.1%	2.7%
The City should identify and protect historic resources from a greater diversity of Lethbridge residents (e.g., groups within our community whose stories are not as prominently told).	67.1%	11%	17.8%	2.7%
The City should encourage more adaptive reuse of historic resources.	90.4%	5.5%	4.1%	0%
The City should showcase heritage more prominently and in innovative ways (e.g., more signage and exhibits; naming back-alleys).	79.5%	12.3%	8.2%	0%
The City should continue on without any changes.	8.2%	74%	15.1%	1.4%

The statements with the strongest agreement among respondents were focused on providing more information, and using heritage in new and innovative ways. Protecting Indigenous heritage also had strong support from respondents. There was little support for the City continuing on without exploring ways to enhance the work of heritage management.

Technical Working Group and Community Liaison Group Comments
At the June 20, 2016 EnvS Open House a "What we've heard so far" poster was presented to the public. The contents of that poster were confirmed by members of the TWG and CLG and community members were given the chance to provide feedback. The 7 key "What we've heard so far" messages for historic resources include:

As a community...

1. *We are taking more interest in our heritage.*

2. *We need to think beyond individual heritage sites, and imaging heritage in the context of multiple buildings on a block, entire districts and in the architecture of new buildings.*

3. *We have an amazing diversity of histories in Lethbridge. The history that we have chosen to celebrate however does not always reflect that diversity.*

4. *We share a rich Indigenous history. It needs to be better understood, celebrated and protected.*

5. *We need to encourage the preservation of more heritage sites, such as through incentives to promote adaptive reuse and reducing "red tape".*

6. *We need to provide more education on our historical resources to residents and landowners.*

7. *We have done a good job to identify and designate buildings in the downtown, but need to consider other parts of our City.*

Chapter 7: Environmental and Historic Resources Considerations

7.1 ENVIRONMENTAL RESOURCES CONSIDERATIONS

The recommendations presented below are meant to guide conversations during the update to the MDP. **Therefore none of the recommendations presented are binding nor will they necessarily be found in the updated MDP**. Final decision-making authority for the content of the MDP is with City Council.

7.1.1 General

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. CONTINUE TO REDUCE THE COMMUNITY'S ENVIRONMENTAL FOOTPRINT BY: • ESTABLISHING KEY FOOTPRINT MEASURES AND BASELINE YEARS; • SETTING TARGETS; AND, • COMMITTING TO REGULAR REPORTING.	AS ONE OF THE LARGEST URBAN CENTERS IN OUR WATERSHED, THE CITY ACKNOWLEDGES THE ENVIRONMENTAL FOOTPRINT OF OUR COMMUNITY. AS A LEADER IN THE REGION, THE CITY COMMITS TO CONTINUING THE WORK OF REDUCING OUR FOOTPRINT IN A NUMBER OF WAYS, INCLUDING NEIGHBOURHOOD AND TRANSPORTATION INFRASTRUCTURE DESIGN, PROGRAMMING AND OPERATIONAL EFFICIENCIES, COLLABORATION WITH OTHER PARTNERS, PROTECTING SIGNIFICANT NATURAL SPACES, AND PROVIDING LEADERSHIP AS A SUSTAINABLE CORPORATE CITIZEN.	MDP TO ESTABLISH DESIRE TO BE A LEADER. MDP MAY SET SPECIFIC TARGETS OR DIRECT THIS WORK TO OTHER DEPARTMENT LEVEL MASTER PLANS.
2. CONTINUE TO REDUCE OUR CORPORATE ENVIRONMENTAL FOOTPRINT THROUGH THE IMPLEMENTATION OF THE CORPORATE ENVIRONMENTAL SUSTAINABILITY INITIATIVE (CESI) ACTION PLAN(S).	AS A LEADER IN THE COMMUNITY, AND AS ONE OF THE LARGEST EMPLOYERS, THE CITY OF LETHBRIDGE WILL BUILD FROM THE WORK OF THE CORPORATE ENVIRONMENTAL SUSTAINABILITY INITIATIVE AND TAKE A LEADERSHIP ROLE IN REDUCING ITS ENVIRONMENTAL FOOTPRINT IN KEY AREAS.	MDP TO ESTABLISH DESIRE TO BE CORPORATE LEADER. CORPORATE TARGETS AND MEASURES WILL BE IMPLEMENTED THROUGH CESI.
3. CONTINUE TO BUILD RELATIONSHIPS AT A REGIONAL LEVEL TO SUPPORT ENVIRONMENTAL OUTCOMES LOCALLY.	ENVIRONMENTAL OUTCOMES ARE NOT CONSTRAINED BY MUNICIPAL BOUNDARIES. THEREFORE, GREATER COLLABORATION AND COORDINATION WITHIN OUR REGION IS REQUIRED TO ENSURE STRONGER LOCAL ENVIRONMENTAL OUTCOMES.	MDP TO CONTAIN POLICY THAT SUPPORTS GREATER

		REGIONAL COLLABORATION AROUND ENVIRONMENTAL OUTCOMES.
4. INCLUDE A DISCUSSION IN THE MDP ABOUT THE PLACE OF HUMANS WITHIN ECOSYSTEMS, RATHER THAN DISTINCT FROM THEM. 5. INCLUDE A DISCUSSION IN THE MDP ABOUT THE IMPORTANCE AND ROLE OF INDIGENOUS TRADITIONAL ECOLOGICAL KNOWLEDGE.	AN IMPORTANT PIECE IN MOVING FORWARD TOWARDS GREATER ENVIRONMENTAL ACTION ON THE PART OF THE COMMUNITY AND CORPORATION IS AWARENESS. GROUNDING ENVIRONMENTAL ACTION IN A MORE ROBUST UNDERSTANDING OF HOW HUMANS, COMMUNITIES AND ECOSYSTEMS INTERACT, AS WELL AS THE ROLE AND VALUE OF INDIGENOUS TRADITIONAL ECOLOGICAL KNOWLEDGE WILL SUPPORT SUBSEQUENT POLICIES AND TARGETS.	MDP TO INCLUDE BACKGROUND STATEMENTS TO SUPPORT POLICY DIRECTION.
6. INCLUDE THE "ECOSYSTEM SERVICES WHEEL DIAGRAM" IN THE MDP AS A TOOL FOR PRESENTING THE MULTIPLE GOODS AND SERVICES PROVIDED BY THE ENVIRONMENT TO OUR COMMUNITY.	THE ECOSYSTEM SERVICES WHEEL DIAGRAM VISUALLY DESCRIBES THE ECONOMIC, ENVIRONMENTAL AND SOCIAL GOODS AND SERVICES PROVIDED TO OUR COMMUNITY BY HEALTHY, FUNCTIONING ECOSYSTEMS. IT IS A USEFUL TOOL TO EXPLAIN THE MULTIPLE BENEFITS THAT ARE GENERATED BY ENVIRONMENTAL PRESERVATION AND ENHANCEMENT. ITS PRESENCE IN THE MDP IS SEEN A USEFUL WAY OF SITUATING FUTURE POLICIES.	MDP TO INCLUDE ECOSYSTEM SERVICES WHEEL DIAGRAM AS BACKGROUND INFORMATION.
7. SUPPORT DATA ACCESSIBILITY BY PUBLISHING BASELINE ENVIRONMENTAL DATA, WHERE POSSIBLE. 8. PUBLISH A REGULAR "STATE OF OUR CITY" REPORT (OR SIMILAR) TO REVIEW OUR SOCIAL, ECONOMIC AND ENVIRONMENTAL POSITION.	TO ENSURE THAT THE CITY CONTINUES TO MAKE PROGRESS TOWARDS ITS ENVIRONMENTAL (AND SOCIAL AND ECONOMIC) GOALS, OPEN DATA AND REGULAR REPORTING ARE NECESSARY. TO DO SO, THE CITY CAN PUBLISH DATA THROUGH THE OPEN DATA PORTAL AND ENSURE REGULAR REPORTING ON COMMUNITY AND CORPORATE OUTCOMES IN A STATE OF OUR CITY REPORT (OR SIMILAR).	MDP TO CONTAIN POLICY THAT DESCRIBES REGULAR ENVIRONMENTAL REPORTING AND DATA ACCESSIBILITY.
9. CREATE A CLIMATE ADAPTATION PLAN (OR SIMILAR) FOR THE COMMUNITY.	CLIMATE CHANGE POSES ADDITIONAL CHALLENGES FOR OUR COMMUNITY, INCLUDING WITH RESPECT TO WATER MANAGEMENT, INVASIVE SPECIES, EMERGENCY PREPAREDNESS, AIR QUALITY AND OVERALL-COMMUNITY AND NEIGHBOURHOOD RESILIENCY. TO ENSURE OUR COMMUNITY IS WELL-POSITIONED TO BE RESILIENT TO THESE CHALLENGES, THE CITY SHOULD PREPARE A CLIMATE ADAPTATION PLAN (OR SIMILAR) TO IDENTIFY POTENTIAL RISKS (SOCIAL, ECONOMIC, ENVIRONMENTAL AND INFRASTRUCTURAL) AND STRATEGIES FOR MITIGATION.	MDP TO DIRECT THE CREATION OF A CLIMATE ADAPTATION PLAN (OR SIMILAR).

7.1.2 Air

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. THE CITY SHOULD TAKE AN ACTIVE ROLE IN REGIONAL CONVERSATIONS ABOUT AMBIENT AIR QUALITY OUTCOMES.	AIR QUALITY IN OUR REGION IS IMPACTED BY ACTIONS AND EVENTS THAT TAKE PLACE BEYOND THE REGION, INCLUDING FOREST FIRES. THERE ARE ALSO CHALLENGES IN OUR REGION WITH A THE LACK OF ACCESSIBLE DATA AND THE LACK OF A COORDINATING MECHANISM BRINGING ALL THE PARTIES TOGETHER (SUCH AS AN AIR SHED SOCIETY). TO BEGIN THE WORK OF BETTER UNDERSTANDING AMBIENT AIR QUALITY OUTCOMES LOCALLY AND REGIONALLY, LETHBRIDGE CAN TAKE A MORE ACTIVE ROLE IN REGIONAL CONVERSATIONS WHERE THEY MAY BE HAPPENING. OR WHERE APPROPRIATE, INITIATE ENGAGEMENT WITH OTHER PARTIES TO SUPPORT IMPROVED AMBIENT AIR QUALITY OUTCOMES.	MDP TO CONTAIN POLICY THAT DESCRIBES A MORE ACTIVE ROLE FOR THE CITY IN REGIONAL AMBIENT AIR QUALITY CONVERSATIONS.
2. SUPPORT THE STRATEGIES TO REDUCE OUR CORPORATE AIR QUALITY AND GREENHOUSE GAS FOOTPRINT FOUND IN THE CESI ACTION PLAN.	THE CESI ACTION PLAN EXPLORES CORPORATE AIR QUALITY AND GREENHOUSE GAS TARGETS FOR THREE AREAS: FUEL, ENERGY, AND GREENHOUSE GASES AND AIR QUALITY. TO CONTINUE OUR CORPORATE LEADERSHIP IN THIS AREA, THE TARGETS ESTABLISHED THROUGH CESI SHOULD BE SUPPORTED AND FOLLOWED.	MDP TO SUPPORT CORPORATE EFFORTS TO MINIMIZE OUR AIR QUALITY AND GREENHOUSE GAS FOOTPRINT.

7.1.3 Water

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. INCLUDE A DISCUSSION IN THE MDP ABOUT WATER SECURITY AS AN EMERGING ISSUE IN OUR COMMUNITY AND REGION.	CLIMATE CHANGE WILL ALTER THE WATER CYCLE IN OUR REGION, LEADING TO GREATER UNCERTAINTY AS TO THE TIMING AND EXTENT OF PRECIPITATION EVENTS. WITH INCREASED WATER INSECURITY, GREATER PLANNING IS NEEDED TO ANTICIPATE LIKELY IMPACTS AND TO PUT THE NEEDED INFRASTRUCTURE AND RESOURCES IN PLACE. CONTEXTUALIZING OUR FUTURE IN TERMS OF WATER SECURITY PROVIDES GREATER CLARITY IN THIS AREA.	MDP TO INCLUDE BACKGROUND DISCUSSION OF WATER SECURITY.
2. SUPPORT THE ENHANCEMENT OF OUR STORMWATER MANAGEMENT FACILITIES THROUGH THE USE OF APPROPRIATE LOW IMPACT DEVELOPMENT TECHNIQUES AND IMPROVED RESIDENT EDUCATION AND AWARENESS IN OUR PARKS.	STORMWATER MANAGEMENT FACILITIES FACE CHALLENGES BECAUSE THEY ARE MAN-MADE FACILITIES THAT REPLICATE, TO A CERTAIN EXTENT, THE NATURAL PROCESSES OF WETLANDS AND RIPARIAN AREAS TO FILTER AND MANAGE WATER. HOWEVER, THESE FACILITIES FACE ADDED PRESSURES FROM URBAN RUNOFF AND CONTAMINATION, AS WELL AS COMMUNITY EXPECTATIONS AROUND PARK DESIGN AND MAINTENANCE. TO IMPROVE THE QUALITY OF THESE FACILITIES, THE CITY CAN ADOPT LOW IMPACT DEVELOPMENT TECHNIQUES THAT ARE APPROPRIATE TO OUR GEOGRAPHY	MDP TO DIRECT DEPARTMENT LEVEL MASTER PLANS AND GUIDELINES TO REVIEW AND INCORPORATE APPROPRIATE LOW IMPACT

	AND SOILS AS WELL AS EDUCATION AND AWARENESS PROGRAMS TARGETED AT NEIGHBOURHOOD RESIDENTS AND PARK USERS.	DEVELOPMENT TECHNIQUES ALONG WITH EDUCATION AND AWARENESS PROGRAMS THAT ADDRESS STORMWATER QUALITY AND QUANTITY.
3. ESTABLISH POLICIES AND GUIDELINES AROUND STORMWATER MANAGEMENT IN OLDER NEIGHBOURHOODS.	ONE OF THE CURRENT CHALLENGES WE FACE IN THE CITY IS AROUND STORMWATER QUALITY AND QUANTITY. THIS IS PARTICULARLY THE CASE IN OLDER NEIGHBOURHOODS WHERE WE ARE SEEING INCREASED DEMAND FROM RESIDENTS TO REDEVELOP AND INCREASE DENSITY. IN THESE OLDER AREAS, INFRASTRUCTURE WAS NOT DESIGNED TO HANDLE EXTREME AMOUNTS OF PRECIPITATION, PARTICULARLY WITH THE ANTICIPATED IMPACTS OF CLIMATE CHANGE. THROUGH THE CREATION OF INFRASTRUCTURE INFILL GUIDELINES AND REVIEW OF THE EXISTING REGULATIONS WE CAN BEGIN TO ADDRESS ISSUES SUCH AS ON-SITE STORMWATER RETENTION AND PERMEABLE SURFACE AREA WHEN REVIEWING INFILL AND REDEVELOPMENT. THIS WORK WILL HELP THE CITY BETTER RESPOND TO THE NEEDS OF CUSTOMERS, STREAMLINE PROCESSES, MITIGATE RISK AND IMPROVE OUTCOMES.	MDP TO DIRECT THE CREATION OF INFRASTRUCTURE INFILL GUIDELINES TO ADDRESS STORMWATER AND OTHER UTILITIES. THIS WILL ALSO INCLUDE THE REVIEW OF RELEVANT BYLAWS SUCH AS THE DRAINAGE BYLAW.
4. SUPPORT THE STRATEGIES TO REDUCE OUR CORPORATE WATER FOOTPRINT FOUND IN THE CESI ACTION PLAN.	THE SECOND PHASE OF THE CESI ACTION PLAN WILL INCLUDE CORPORATE WATER REDUCTION TARGETS. TO CONTINUE OUR CORPORATE LEADERSHIP IN THIS AREA, THE TARGETS ESTABLISHED THROUGH CESI SHOULD BE SUPPORTED AND FOLLOWED.	MDP TO SUPPORT CORPORATE EFFORTS TO MINIMIZE OUR WATER FOOTPRINT.

7.1.4 Biodiversity & Ecosystems

Consideration	Rationale	Implementation
1. Explore the implications of the Alberta Wetland Policy and possible opportunities for City of Lethbridge to take a more active role in protecting wetlands locally.	The new Alberta Wetland Policy provides an opportunity for the City of Lethbridge to take a more active role in protecting wetlands. This can include becoming a wetland restoration agency or building a stronger relationship with existing agencies to better ensure that the compensation paid through wetland disturbances remain in the municipality (or region) where the disturbance took place.	MDP to contain policy that describes a more active role for the City in wetland conservation and enhancement.
2. Create a "Natural Spaces Policy" to address development in the vicinity of key environmental features. The Natural Spaces Policy should contain: • Interpretation of what constitutes a Natural Space; • Minimum setbacks from identified natural spaces; • Description of available regulatory tools (e.g., Conservation Reserves, Land Use Bylaw); • Discussion of potential impacts on Development Industry; and, • Direction to follow the Hierarchy of Disturbance Framework (below).	Lethbridge's landscape is dominated by the sensitive ecological areas, including the Oldman River Valley, natural grasslands, wetlands, uplands, a riparian belt and tributaries, and native cottonwood forests. These and other natural features contribute greatly to the environmental, economic and social well-bring of our City. Creating a policy which considers these areas will help guarantee their continued ability to support our community for years to come.	MDP to direct creation of a Natural Spaces Policy.
3. Include the Hierarchy of Disturbance Framework in the MDP as a tool for evaluating land use applications, community plans and infrastructure projects in relation to natural spaces.	The MDP should include the Hierarchy of Disturbance Framework as a tool to inform subsequent land use, infrastructure and parks planning. The hierarchy begins with the most desirable outcome: to 1) Avoid all disturbances. Where avoidance is not possible, then development shall attempt to: 2) Maximize—to take advantage of ecosystem goods and services provided by the natural space AND restore and enhance those same goods and services on-site AND maximize the use of existing disturbances; 3) Minimize—to minimize the ecological footprint of development on-site; 4) Replace—to minimize the cumulative effects of lost ecosystem	MDP to direct the use of the Hierarchy of Disturbance framework in land use, infrastructure and parks planning.

	FUNCTIONING, BY REPLACING THEM OFF-SITE, AS NEAR TO THE ORIGINAL SITE AS POSSIBLE (E.G., WITHIN THE SAME SECTOR OF TOWN OR WITHIN THE CITY OF LETHBRIDGE). INCORPORATING THIS DECISION-MAKING FRAMEWORK WILL HELP THE CITY BEGIN TO SHIFT THE CONVERSATION FROM "SUSTAINABILITY"—HOW DO WE MAINTAIN OR SUSTAIN OUR CURRENT SYSTEMS OR STRUCTURES, BE THEY ENVIRONMENTAL OR OTHERWISE—TO "THRIVE-ABILITY"—HOW DO WE ENHANCE, MAXIMIZE OR GENERATE ADDITIONAL VALUE/UTILITY FROM CURRENT SYSTEMS OR STRUCTURES. BEFORE THIS HIERARCHY CAN BE EFFECTIVELY IMPLEMENTED, ADDITIONAL WORK MAY BE REQUIRED TO GIVE ADDITIONAL CLARITY AND EXAMPLES OF EACH OF THE LEVELS, AS WELL AS FURTHER DISCUSSION AS TO HOW IT WILL BE USED IN PRACTICE AND HOW IT WILL BE MONITORED.	
4. LIMIT THE EXPANSION OF THE CITY'S URBAN FOOTPRINT WITHIN THE OLDMAN RIVER VALLEY BY MINIMIZING FUTURE DEVELOPMENT ON PUBLIC LANDS.	THE OLDMAN RIVER VALLEY IS THE DEFINING ELEMENT OF OUR CITY. IT IS ALSO THE SOURCE OF IMMENSE ENVIRONMENTAL, SOCIAL AND ECONOMIC WEALTH. TO ENSURE THAT WEALTH IS AVAILABLE TO FUTURE GENERATIONS, THE CITY OF LETHBRIDGE SHOULD CONTINUE TO TAKE A LEADERSHIP ROLE AND MINIMIZE THE EXPANSION OF OUR URBAN FOOTPRINT **ON PUBLIC LANDS**. FUTURE EXPANSION OF DEVELOPMENT ON PUBLIC LANDS IN THE RIVER VALLEY SHOULD BE EVALUATED THROUGH THE LENS OF LOW-IMPACT DEVELOPMENT AND THE GUIDING PHILOSOPHY OF THE RIVER VALLEY PARKS MASTER PLAN. THIS RESTRICTION SHOULD NOT LIMIT DEVELOPMENT FOR RECREATION (INCLUDING COMMERCIAL RECREATION), UTILITIES AND OTHER INFRASTRUCTURE DEEMED NECESSARY BY THE CITY OF LETHBRIDGE.	MDP TO DIRECT REVIEW OF RIVER VALLEY REDEVELOPMENT PLAN AND LAND USE BYLAW, WHILE HAVING REGARD FOR THE RIVER VALLEY PARKS MASTER PLAN.
5. ESTABLISH A BASELINE YEAR FOR TREE CANOPY COVERAGE AND SET A BENCHMARK FOR YEAR-OVER-YEAR COVERAGE EXPANSION.	OUR URBAN FOREST IS A SOURCE OF IMMENSE COMMUNITY PRIDE AND ENVIRONMENTAL BENEFIT. TO PLAN FOR THE FUTURE AND ENSURE THAT OUR URBAN FOREST REMAIN VIBRANT, HEALTHY AND GROWING, A TARGET FOR YEAR-OVER-YEAR EXPANSION SHOULD BE ESTABLISHED.	MDP TO DIRECT URBAN FORESTRY MANAGEMENT PLAN TO SET BASELINE AND TARGETS.
6. EXPLORE RESOURCING TO FUND FURTHER RESTORATION AND ENHANCEMENT OF NATURAL SPACES IN THE CITY, PARTICULARLY WITHIN AND ADJACENT TO THE OLDMAN RIVER VALLEY.	PAST PLANS, POLICIES AND DECISIONS MADE BY THE CITY OF LETHBRIDGE TO PROTECT AND GROW THE SIZE OF THE RIVER VALLEY HAVE BEEN LARGELY SUCCESSFUL AND SUPPORTED BY THE COMMUNITY. TO BUILD UPON THIS LEGACY AND SUPPORT THE SPIRIT AND INTENT OF THE RIVER VALLEY PARKS MASTER PLAN, THE CITY SHOULD ENDEAVOR TO NOT ONLY MAINTAIN THE INTEGRITY OF THE RIVER VALLEY BUT RESTORE AND ENHANCE IT.	MDP POLICIES TO SUPPORT CIP AND OPERATING BUDGET EXPENDITURES TO RESTORE AND ENHANCE NATURAL SPACES

		IN THE OLDMAN RIVER VALLEY.
7. PUT IN PLACE GUIDELINES FOR LANDSCAPING FOR PUBLIC FACILITIES AS WELL AS COMMERCIAL, INDUSTRIAL, AND HIGH-DENSITY RESIDENTIAL DEVELOPMENTS. 8. UPDATE THE CITY'S DESIGN STANDARDS TO ENHANCE LANDSCAPING ON PUBLIC LANDS, INCLUDING ROAD RIGHTS OF WAY AND COMMUNITY ENTRANCES. 9. ENSURE LANDSCAPING GUIDELINES ADEQUATELY ADDRESS FIRESMART PRINCIPLES FOR AREAS WITH HEIGHTENED RISK OF WILDFIRE.	THE USE OF NATIVE, DROUGHT TOLERANT AND POLLINATOR FRIENDLY SPECIES IN LANDSCAPING IS A WAY OF MINIMIZING OUR ECOLOGICAL FOOTPRINT IN TERMS OF WATER USE, AND MAXIMIZING THE ECOSYSTEM GOODS AND SERVICES PROVIDED BY LANDSCAPING TO THE COMMUNITY. ENHANCED LANDSCAPING ALSO SUPPORTS CARBON SEQUESTRATION, BIODIVERSITY, AND IMPROVES THE QUALITY OF LIFE FOR RESIDENTS AND VISITOR. TO SUPPORT THESE OUTCOMES THE CITY SHOULD REVIEW ITS LANDSCAPING GUIDELINES IN THE LAND USE BYLAW AND RELEVANT INFRASTRUCTURE SERVICES DESIGN GUIDELINES TO ENSURE THE ADEQUATE INCORPORATION OF NATIVE, DROUGHT-RESISTANT, AND POLLINATOR-FRIENDLY PLANTS ON BOTH PUBLIC AND PRIVATELY-OWNED LANDS. GUIDELINES FOR PRIVATE PROPERTIES SHOULD BE LIMITED TO LARGER DEVELOPMENTS (E.G., INDUSTRIAL, COMMERCIAL AND HIGH-DENSITY RESIDENTIAL USES). GUIDELINES FOR PUBLIC LANDS SHOULD CONSIDER BOULEVARD TREES, COMMUNITY ENTRANCES AND ROAD RIGHTS-OF-WAY ADJACENT TO THE PRIVATE DEVELOPMENTS MENTIONED ABOVE. LANDSCAPING GUIDELINES SHOULD ALSO CONSIDER THE PRINCIPLES OF FIRESMART AND ENCOURAGE FIRESMART LANDSCAPING IN AREAS WHERE THERE IS HEIGHTENED RISK OF WILDFIRE.	MDP TO DIRECT REVIEW AND UPDATE TO LAND USE BYLAW AND REVIEW AND UPDATE OF RELEVANT INFRASTRUCTURE SERVICES DESIGN STANDARDS.
10. ENSURE THAT THERE IS ADEQUATE RESOURCING TO SUPPORT THE ENVIRONMENTAL RECOMMENDATIONS PROPOSED IN THIS REPORT.	TO ENSURE THE ENVIRONMENTAL RECOMMENDATIONS PROPOSED BY THIS REPORT CAN BE ADEQUATELY IMPLEMENTED, THE CITY SHOULD ENSURE THAT THERE ARE ADEQUATE RESOURCES IN PLACE.	MDP TO CONTAIN POLICY THAT ADDRESSES THE NEED TO ADEQUATELY RESOURCE WORK TOWARDS ENVIRONMENTAL OUTCOMES.
11. SUPPORT THE STRATEGIES TO REDUCE OUR CORPORATE ENVIRONMENTAL FOOTPRINT AND MAXIMIZE OUR CONTRIBUTIONS TO BIODIVERSITY AND ECOSYSTEMS FOUND IN THE CESI ACTION PLAN.	THE SECOND PHASE OF THE CESI ACTION PLAN WILL INCLUDE CORPORATE STRATEGIES TO REDUCE OUR CORPORATE ENVIRONMENTAL FOOTPRINT AND MAXIMIZE OUR CONTRIBUTIONS TO BIODIVERSITY AND ECOSYSTEMS. TO CONTINUE OUR CORPORATE LEADERSHIP IN THIS AREA, THE TARGETS ESTABLISHED THROUGH CESI SHOULD BE SUPPORTED AND FOLLOWED.	MDP TO SUPPORT CORPORATE EFFORTS TO REDUCE OUR CORPORATE ENVIRONMENTAL FOOTPRINT AND MAXIMIZE OUR

		CONTRIBUTIONS TO BIODIVERSITY AND ECOSYSTEMS

7.1.5 Waste

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. CONTINUE TO SUPPORT CITY COUNCIL'S ENVIRONMENT POLICY BY EMPHASIZING THE IMPORTANCE OF RESOURCES MAXIMIZATION AND CONSERVATION IN THE AREA OF WASTE.	WHILE THE MANAGEMENT OF WASTE IS IMPORTANT—AND ENSURING THAT THE UTILITY OF GOODS IS MAXIMIZED AS MUCH AS POSSIBLE BEFORE DISPOSAL (E.G., REDUCE, REUSE, RECYCLE, COMPOST, CONVERT TO ENERGY)—TO TRULY ADDRESS THE PROBLEM OF WASTE, GREATER EMPHASIS NEEDS TO BE PLACED ON CONSUMPTION. TACKLING CONSUMPTION THROUGH ENHANCED ENGAGEMENT, EDUCATION AND AWARENESS AND OTHER STEPS WHERE APPROPRIATE, SUPPORTS CITY COUNCIL'S ENVIRONMENT POLICY AND CAN ULTIMATELY REDUCE THE COMMUNITY'S ENVIRONMENTAL FOOTPRINT.	MDP TO SUPPORT COUNCIL'S ENVIRONMENT POLICY AS WELL AS EDUCATION AND AWARENESS EFFORTS TO REDUCE CONSUMPTION.
2. CONTINUE TO REDUCE THE COMMUNITY'S WASTE FOOTPRINT THROUGH THE IMPLEMENTATION OF THE WASTE REDUCTION POLICY.	THE CITY OF LETHBRIDGE'S WASTE REDUCTION POLICY ESTABLISHES TARGETS FOR REDUCING WASTE IN THREE KEY SECTORS: RESIDENTIAL; INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL; AND, CONSTRUCTION AND DEMOLITION. CONTINUING TO MAKE PROGRESS TOWARDS THESE TARGETS, WILL REDUCE THE WASTE GENERATED IN OUR COMMUNITY AND LIMIT THE NEED FOR EXPANDED OR NEW WASTE MANAGEMENT FACILITIES.	MDP TO SUPPORT CURRENT WASTE REDUCTION POLICY AND TARGETS.
3. SUPPORT THE STRATEGIES TO REDUCE OUR CORPORATE WASTE FOOTPRINT FOUND IN THE CESI ACTION PLAN.	THE CESI ACTION PLAN INCLUDES CORPORATE WASTE REDUCTION TARGETS FOR THREE AREAS: EDUCATION AND AWARENESS; WASTE GENERATION; AND WASTE DIVERSION. TO CONTINUE OUR CORPORATE LEADERSHIP IN THIS AREA, THE TARGETS ESTABLISHED THROUGH CESI SHOULD BE SUPPORTED AND FOLLOWED.	MDP TO SUPPORT CORPORATE EFFORTS TO MINIMIZE OUR WASTE FOOTPRINT.

7.1.6 Energy

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. CONTINUE TO IDENTIFY OPPORTUNITIES TO OPTIMIZE AND INCREASE THE EFFICIENCY OF THE ELECTRICAL DISTRIBUTION SYSTEM TO REDUCE THE COMMUNITY'S GREENHOUSE GAS FOOTPRINT.	THE CITY OF LETHBRIDGE AS THE OWNER OF THE ELECTRICAL DISTRIBUTION SYSTEM IS IN A POSITION TO BENEFIT FROM INCREASINGLY OPTIMIZED AND EFFICIENT SERVICE DELIVERY. SYSTEM ENHANCEMENTS ALSO BENEFIT THE BROADER COMMUNITY THROUGH POTENTIAL REDUCTIONS IN AGGREGATE GREENHOUSE GAS EMISSIONS AND IN SLOWING THE NEED TO BUILD AND UPGRADE INFRASTRUCTURE.	MDP TO DIRECT ELECTRIC UTILITY TO CONTINUE TO FIND WAYS TO OPTIMIZE AND DELIVER

		EFFICIENT SERVICE WITH THE AIM OF REDUCING COSTS AND GREENHOUSE GAS EMISSIONS.
2. CONTINUE TO IDENTIFY WAYS TO MINIMIZE THE EXPANSION OF THE ELECTRICAL DISTRIBUTION SYSTEM'S FOOTPRINT.	THE ELECTRICAL DISTRIBUTION SYSTEM IS AN ESSENTIAL UTILITY THAT ALL RESIDENCES, BUSINESSES AND INSTITUTIONS REQUIRE. WITH THAT NEED, COMES ON-GOING PRESSURE TO EXPAND THE SYSTEM AS THE COMMUNITY GROWS. THROUGH CAREFUL ALIGNMENT WITH INFRASTRUCTURE AND DEVELOPMENT PROJECTS, AS THE ELECTRICAL DISTRIBUTION SYSTEM GROWS TO MEET GROWING COMMUNITY DEMAND, WE CAN REDUCE THE CUMULATIVE IMPACT OF ITS FUTURE FOOTPRINT EXPANSION. THIS INCLUDES IDENTIFYING EXISTING AND PLANNED LINEAR CORRIDORS WITHIN WHICH TO INSTALL INFRASTRUCTURE, AND ENSURING ADEQUATE STUDY HAS BEEN DONE WHEN EXPANDING THROUGH GREENFIELD AREAS (PARTICULARLY IN AND NEAR TO THE RIVER VALLEY).	MDP TO DIRECT ELECTRIC UTILITY TO FOLLOW THE "HIERARCHY OF DISTURBANCE" FRAMEWORK.
3. PROVIDE PROGRAMMING AND EDUCATION TO RESIDENTS AND BUSINESSES TO ASSIST THEM IN BEING SMART ENERGY CONSUMERS.	OTHER CITY UTILITIES HAVE HISTORICALLY DELIVERED SUCCESSFUL EDUCATION AND AWARENESS PROGRAMMING TO RESIDENTS AND BUSINESSES. PROGRAMS ARE TARGETED AT RAISING CUSTOMERS' LEVEL OF AWARENESS OF THE IMPACTS OF DAILY ACTIONS AND SUGGESTING WAYS TO REDUCE THEIR FOOTPRINT AS CONSUMER. THE ELECTRICAL UTILITY HAS AN OPPORTUNITY TO PROVIDE SIMILAR TYPES OF PROGRAMMING AND EDUCATION TO ITS CONSUMERS.	MDP TO DIRECT ELECTRICAL UTILITY TO PROVIDE PROGRAMMING AND EDUCATION FOCUSED ON ENERGY CONSERVATION AND EFFICIENCY.
4. CONTINUE TO SUPPORT THE CURRENT ICSP/MDP POLICIES WHICH PRIORITIZE ACTIVE TRANSPORTATION THROUGH A TRANSPORTATION MODALITY HIERARCHY.	THE CURRENT ICSP/MDP AND TRANSPORTATION MASTER PLAN DESCRIBE A HIERARCHY OF TRANSPORTATION MODALITIES WHICH IS INTENDED TO BE A TOOL FOR CREATING TRANSPORTATION PRIORITIES. THE HIERARCHY IS: PEDESTRIANS AND PERSONAL MOBILITY DEVICES; CYCLISTS AND RECREATIONAL MOBILITY DEVICES; PUBLIC AND PRIVATE TRANSIT; COMMERCIAL VEHICLES; MULTIPLE OCCUPANCY VEHICLES; AND, SINGLE OCCUPANCY VEHICLES. THIS POLICY FRAMEWORK CONTINUES TO REFLECT COMMUNITY VALUES AND SUPPORTS POSITIVE ENVIRONMENTAL OUTCOMES, INCLUDING THROUGH POSSIBLE LONG-TERM REDUCTIONS IN VEHICLE EMISSIONS. THIS HIERARCHY SHOULD CONTINUE TO BE EMPHASIZED TO SUPPORT THESE AND OTHER OUTCOMES.	MDP TO CONTINUE TO INCLUDE THE TRANSPORTATION MODALITY HIERARCHY FOUND IN POLICY 6.4.2 OF THE ICSP/MDP.

| 5. | Support the vision and goals of the Cycling Master Plan. | In 2017, Lethbridge City Council adopted the Cycling Master Plan. The vision of the Master Plan is: "Lethbridge commits to make cycling a realistic transportation option for all ages and abilities, contributing to our sustainable future."

Commuter and recreational cycling contributes positively to the social health of our community, and can in the long-term support the reduction in vehicle emissions.

To ensure the cycling becomes a viable commuter and recreational option in our City, the MDP should support the vision and goals of the Master Plan, thereby supporting future investments by the City to grow the cycling network. | MDP to contain policy that supports the vision and goals of the Cycling Master Plan. |

7.1.7 Social

Consideration	Rationale	Implementation
1. Commit to continue the expansion of park and open spaces in the City, including the natural connections between them. 2. Future Parks and Open Spaces should be aligned with "Natural Spaces" identified in the "Natural Spaces" policy.	Parks and open spaces contribute to healthy ecosystems, including healthy people. intact natural areas, and the connections between them, have a number of benefits on our community. They support wildlife movement, help protect the overall integrity and functioning of natural spaces such as riparian areas and tree stands, and also support the social well-being of humans using the landscape for recreational or cultural purposes. To protect and enhance existing natural spaces in our City and to create new areas that contribute valuable ecosystem goods and services, the City should seek to find a balance between manicured spaces (i.e., highly managed, with introduced species) and more naturalized spaces (i.e., minimally managed, with more native species). Introducing and incorporating existing naturalized areas into the park and open space system has the potential to reduce management costs and costs borne by developers when park and open spaces are first constructed. This work will require education and awareness building for neighbourhoods residents and park users. An important considerations is the recognition that the amount of park and open space that the City takes through Municipal and Environmental Reserve is limited, meaning that maximizing the benefits of parks and open spaces is crucial.	MDP to set park and community planning vision in line with findings of the ELUS, Reli and EnvS.

	IT IS ALSO IMPORTANT FOR THE CITY TO INCORPORATE FIRESMART PRINCIPLES INTO THE DESIGN OF PARKS AND OPEN SPACES, PARTICULARLY IN AREAS THAT HAVE BEEN IDENTIFIED AS BEING AT A HEIGHTENED LEVEL OF RISK.	
3. CONTINUE TO IDENTIFY OPPORTUNITIES THROUGH LAND USE AND PARKS PLANNING TO CONSIDER COMMUNITY GARDENS AND FOOD SECURITY IN NEW AND EXISTING NEIGHBOURHOODS.	FOOD SECURITY AND COMMUNITY GARDENS CONTRIBUTE TO HEALTHY NEIGHBOURHOODS BY ENHANCING PLACE-MAKING, SOCIAL INTERACTION AMONG RESIDENTS AND BIODIVERSITY (E.G. POLLINATORS). THE CITY SHOULD CONTINUE TO SUPPORT THE INCORPORATION OF FOOD SECURITY AND COMMUNITY GARDENING INTO NEIGHBOURHOOD AND PARKS PLANNING.	MDP TO DIRECT LAND USE AND PARKS PLANS TO CONSIDER FOOD SECURITY AND COMMUNITY GARDENS. MDP TO DIRECT PARKS TO CREATE NEW PARKS CLASSIFICATIONS FOR COMMUNITY GARDENS.
4. CONTINUE TO SUPPORT RESOURCING FOR ENVIRONMENTAL EDUCATION AND AWARENESS PROVIDED BY CITY DEPARTMENTS.	EDUCATION AND AWARENESS ARE CENTRAL TO PROMOTING AND CREATING A HEALTHY, LIVABLE CITY. THE CITY HAS HISTORICALLY BEEN SUCCESSFUL AT DELIVERING ENVIRONMENTAL EDUCATION PROGRAMS THROUGH THE HELEN SCHULER NATURE CENTRE AND INFRASTRUCTURE SERVICES. THE CITY SHOULD CONTINUE THIS SUPPORT.	MDP TO SUPPORT ON-GOING EDUCATION AND AWARENESS RAISING THROUGH CITY PROGRAMS.

7.2   HISTORIC RESOURCES CONSIDERATIONS

The recommendations presented below are meant to guide conversations during the update to the MDP. **Therefore none of the recommendations presented are binding nor will they necessarily be found in the updated MDP**. Final decision-making authority for the content of the MDP is with City Council.

7.2.1 General

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. INCLUDE A DISCUSSION IN THE MDP ABOUT RECONCILIATION AS A WAY OF FRAMING POLICIES THAT ADDRESS THE PROTECTION OF INDIGENOUS HERITAGE SITES.	POTENTIAL NEW MDP POLICIES TO ADDRESS THE PROTECTION OF INDIGENOUS HERITAGE SHOULD BE GROUNDED IN THE CONTEXT OF RECONCILIATION. UNDERSTANDING RECONCILIATION AS THE "WHY" BEHIND THIS NEW STEP FOR THE CITY WILL HELP RESIDENTS, PROPERTY OWNERS AND POTENTIAL FUTURE PARTNERS UNDERSTAND THE SPIRIT AND INTENT BEHIND THE CITY'S ACTIONS. IT WILL ALSO ENCOURAGE A SPIRIT OF COLLABORATION WITH THE INDIGENOUS COMMUNITY.	MDP TO HAVE CONTEXTUALIZING STATEMENTS.
2. INCLUDE THE "HERITAGE SERVICES WHEEL DIAGRAM" IN THE MDP AS A TOOL FOR PRESENTING THE MULTIPLE GOODS AND SERVICES PROVIDED BY HERITAGE TO THE COMMUNITY.	THE HERITAGE SERVICES WHEEL DIAGRAM VISUALLY DESCRIBES THE ECONOMIC, ENVIRONMENTAL AND SOCIAL GOODS AND SERVICES PROVIDED TO THE COMMUNITY BY HISTORIC RESOURCES. IT IS A USEFUL TOOL TO EXPLAIN THE MULTIPLE BENEFITS THAT ACCRUE THROUGH PRESERVATION WORK. ITS PRESENCE IN THE MDP WILL HELP TO CONTEXTUALIZE POTENTIAL HERITAGE POLICIES.	MDP TO INCLUDE THE HERITAGE SERVICES WHEEL DIAGRAM AS BACKGROUND INFORMATION.

7.2.2 Management

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. UPDATE THE HERITAGE MANAGEMENT PLAN AND THE HISTORIC PLACES ADVISORY COMMITTEE TO: • REFLECT THE RECONCILIATION IMPLEMENTATION PLAN RECOMMENDATIONS; • INCLUDE A LANDSCAPE / DISTRICT LEVEL APPROACH TO HERITAGE IDENTIFICATION AND PROTECTION; • IDENTIFY A PROTOCOL FOR ENGAGING WITH THE BLACKFOOT NATIONS FOR INDIGENOUS HERITAGE SITES FOUND WITHIN THE CITY; AND, • DESCRIBE THE NEED TO IDENTIFY MORE DIVERSE HERITAGE STORIES.	THE HERITAGE MANAGEMENT PLAN WAS FIRST ADOPTED IN 2007, AND HAS NOT UNDERGONE A COMPREHENSIVE REVIEW OR UPDATE. WITH THE PLAN NEARING 10 YEARS AND THE CHANGING NATURE OF OUR COMMUNITY, THERE IS A NEED TO UPDATE OUR APPROACH TO HERITAGE MANAGEMENT. TWO CHANGES THAT WERE RECOMMENDED THROUGH THE ENVS TECHNICAL WORK AND VALIDATED BY COMMUNITY ENGAGEMENT WERE TO EXPAND THE CURRENT FOCUS OF THE HERITAGE MANAGEMENT PLAN TO INCLUDE A FOCUS ON INDIGENOUS HERITAGE RESOURCES, AND TO PLACE MORE EMPHASIS ON IDENTIFYING AND PROTECTING HERITAGE RESOURCES AT A DISTRICT OR LANDSCAPE SCALE.	UPDATE THE HPAC TERMS OF REFERENCE TO REFLECT THE RECOMMENDATIONS OF THE RECONCILIATION IMPLEMENTATION PLAN, PRIOR TO UPDATING THE HMP. MDP TO DIRECT UPDATE TO HMP.

2.	Explore the use of infill design guidelines (at various scales) to protect the heritage quality of identified areas through ARPs.	Heritage exists beyond specific designated sites, as many of our older neighbourhoods are rich in the heritage stories they tell. As the City sees more inward growth pressure and redevelopment, there is the risk that some of the character elements of our older neighbourhoods may be lost. The use of area or block-level design guidelines can be explored as a tool to incorporate broader heritage considerations into ARPs. This can be done by utilizing the data found in existing and future Heritage Surveys.	MDP to direct exploration of guidelines through ARPs
3.	Work with partners to explore the protection of historic resources within and beyond the City.	Heritage resources that contribute to our identity as a City are not necessarily all found within City limits (for example those pertaining to irrigation, the buffalo fur trade, the RCMP and coal mining). And at the same time, resources which contribute to our identity as a City may be found beyond City limits. The City should explore opportunities to collaborate with other parties to support heritage outcomes generally in our region.	MDP to support greater regional collaboration around heritage outcomes.
4.	Update administrative processes to clearly articulate the requirements to undertake Traditional Knowledge and Land Use Studies (or similar) during statutory and non-statutory planning.	In this era of greater interest in protecting and understanding Indigenous culture and heritage, the City of Lethbridge can take a leadership role and clearly articulate the requirements to undertake Traditional Knowledge Studies (or similar). The City can adopt the requirements as described in the Reconciliation Implementation Plan.	MDP to direct update to administrative processes to consider TK Studies in ASPs, ARPs and OPs.
5.	Explore the municipal designation of cultural landscapes within the Oldman River Valley.	UNESCO describes cultural landscapes as "combined works of nature and humankind [that] express a long and intimate relationship between peoples and their natural environments." The Oldman River Valley has been described repeatedly as a cultural landscape (or an area that is home to multiple cultural landscapes) because of this special human-nature relationship that existed with the Blackfoot people long before the founding of the City of Lethbridge, but which has grown through the development of the City. The Oldman River Valley seen as a cultural landscape contributes immense environmental, economic and social value to our City. To protect that value for future generations, the City should explore formal municipal heritage designations for individual cultural landscapes	Next update to the HMP should include an exploration of cultural landscapes in the City, including within the Oldman River Valley.

	WITHIN THE RIVER VALLEY. DOING SO WOULD PROVIDE MECHANISMS TO PROTECT AREAS AGAINST FUTURE LAND USE DEVELOPMENT. THE CITY SHOULD EXPLORE PARTNERSHIPS WITH THE UNIVERSITY OF LETHBRIDGE AND LETHBRIDGE COLLEGE TO PROTECT NATURAL LANDS FOUND ON THOSE CAMPUSES.	
6. UPDATE ADMINISTRATIVE PROCESS TO PROTECT INDIGENOUS HERITAGE SITES.	THE CITY SHOULD REVIEW AND UPDATE ITS ADMINISTRATIVE PROCESS TO ENSURE INDIGENOUS HERITAGE SITES ARE ADEQUATELY CONSIDERED AND PROTECTED.	MDP POLICY TO SUPPORT THE PROTECTION OF INDIGENOUS HERITAGE SITES. ADMINISTRATIVE REVIEW TO ENSURE INDIGENOUS HERITAGE IS ADEQUATELY CONSIDERED.
7. IN CONSULTATION WITH RELEVANT STAKEHOLDERS, CONSIDER UPDATES TO THE PARKS BYLAW TO ADDRESS THE EXERCISE OF ABORIGINAL AND TREATY RIGHTS WITHIN THE CITY'S PARK SYSTEM.	THE CITY OF LETHBRIDGE'S CURRENT PARK BYLAW PLACES RESTRICTIONS AROUND THE COLLECTION OF FLORA AND FAUNA, CAMPING AND LITTERING. THESE RESTRICTIONS ARE INTENDED TO HELP PROTECT THE ECOLOGICAL INTEGRITY OF OUR PARKS. HOWEVER, THESE RESTRICTIONS, MAY PLACE UNDUE RESTRICTIONS ON THE EXERCISE OF ABORIGINAL AND TREATY RIGHTS BY RIGHT-HOLDING INDIGENOUS CITY RESIDENTS AND VISITORS. THE CITY HAS AN OPPORTUNITY TO ENGAGE THESE COMMUNITIES AND EXPLORE WHETHER THERE ARE OPPORTUNITIES TO UPDATE THE BYLAW TO REFLECT INDIGENOUS PEOPLE'S RIGHTS.	MDP POLICY TO SUPPORT REVIEW OF PARKS BYLAW TO ACKNOWLEDGE AND PROTECT ABORIGINAL AND TREATY RIGHTS.
8. PARTNER WITH THE BLACKFOOT NATIONS AROUND INDIGENOUS HERITAGE IN THE CITY.	THE TKUA WAS THE FIRST TIME THE CITY UNDERTAKEN A COMPREHENSIVE REVIEW OF INDIGENOUS HERITAGE. THIS STUDY IDENTIFIES A NUMBER OF SIGNIFICANT INDIGENOUS HERITAGE SITES IN THE CITY THAT WOULD BENEFIT FROM CONTINUED PARTNERSHIP WITH THE BLACKFOOT NATIONS TO ENSURE SITES ARE ADEQUATELY CONSIDERED AND PROTECTED, WHERE POSSIBLE. FUTURE COLLABORATION COULD COME IN A NUMBER OF FORMS, INCLUDING FURTHER STUDY, SITE SPECIFIC MANAGEMENT PLANS, SITE INTERPRETATION, AND COLLABORATION WITH POST-SECONDARY INSTITUTIONS.	MDP POLICY TO SUPPORT ON-GOING COLLABORATION WITH BLACKFOOT NATIONS AROUND INDIGENOUS HERITAGE.
9. IN CONSULTATION WITH RELEVANT STAKEHOLDERS, CREATE SITE MANAGEMENT PLANS TO INFORM	THE TKUA IDENTIFIED SIGNIFICANT TRADITIONAL LAND USE SITES WITHIN THE CITY'S PARK SYSTEM. TO ENSURE THESE SITES ARE MANAGED PROPERLY, SITE MANAGEMENT PLANS SHOULD BE PREPARED.	MDP POLICY TO ENCOURAGE THE CREATION OF SITE

PARKS OPERATIONS FOR IDENTIFIED TRADITIONAL LAND USE SITES.	SITE MANAGEMENT PLANS WILL CONSIDER THINGS LIKE ALTERNATIVE OPERATIONAL TREATMENTS AND PROCESSES FOR STAFF SHOULD THEY ENCOUNTER ARCHAEOLOGICAL REMAINS.	MANAGEMENT PLANS FOR TKUA IDENTIFIED SITES, IN CONSULTATION WITH BLACKFOOT NATIONS.

7.2.3 Financial Resources

CONSIDERATION	RATIONALE	IMPLEMENTATION
1. EXPLORE INCENTIVE PROGRAMS TO INCREASE MUNICIPAL DESIGNATIONS IN THE CITY AND THE INVESTMENT BY PRIVATE PROPERTY OWNERS INTO ALREADY DESIGNATED SITES.	THERE ARE A NUMBER OF COMMUNITIES THAT PROVIDE FINANCIAL INCENTIVES TO PROPERTY OWNERS FOR INVESTING IN DESIGNATED SITES. INVESTMENT IN HERITAGE BUILDINGS BRING ECONOMIC, SOCIAL AND ENVIRONMENTAL BENEFITS TO COMMUNITIES. EXPLORING THE TOOLS THAT ARE AVAILABLE TO THE CITY, AND HOW THEY CAN BE ADOPTED IN THE LETHBRIDGE CONTEXT, MAY LEAD TO GREATER INTEREST AMONG PROPERTY OWNERS TO DESIGNATE THEIR BUILDINGS AND ULTIMATELY GREATER PRIVATE INVESTMENT.	NEXT UPDATE TO THE HMP TO INCLUDE EXPLORATION OF INCENTIVES.
2. EXPLORE WAYS TO INCREASE INVESTMENT BY THE CITY OF LETHBRIDGE INTO STRATEGIC HERITAGE SITES AND AREAS.	PROTECTING AND INVESTING IN HERITAGE SITES IN STRATEGIC LOCATIONS THROUGHOUT THE CITY CAN SUPPORT ECONOMIC AND TOURISM DEVELOPMENT, AS WELL AS BE THE CATALYST FOR ADDITIONAL (RE)DEVELOPMENT. STRATEGIC PUBLIC INVESTMENTS CAN ALSO STRENGTHEN PLACE-MAKING AND COMMUNITY ATTACHMENT WHEN THE CENTRAL FOCUS IS THE COMMUNITY OR NEIGHBOURHOOD'S WELL-BEING ITSELF. THE CITY IS UNIQUELY POSITIONED TO KEEP THAT AS THE CENTRAL FOCUS. TO SUPPORT THIS WORK, THE NEXT UPDATE TO THE HMP CAN INCLUDE CONSIDERATIONS, TOOLS AND APPROACHES TO ACHIEVE GREATER STRATEGIC PUBLIC INVESTMENT INTO HERITAGE SITES AND AREAS.	NEXT UPDATE TO THE HMP SHOULD INCLUDE EXPLORATION OF CONSIDERATIONS, TOOLS AND APPROACHES TO INCREASE STRATEGIC PUBLIC INVESTMENTS.
3. ENSURE THAT THERE IS ADEQUATE RESOURCING FOR HERITAGE IDENTIFICATION, MANAGEMENT, PRESERVATION AND INTERPRETATION THROUGH CITY DEPARTMENTS AND COMMITTEES OF COUNCIL.	THERE IS GROWING INTEREST IN OUR COMMUNITY IN HERITAGE RESOURCES. THE CITY SHOULD ENSURE ADEQUATE RESOURCES ARE ALLOCATED TO IDENTIFY, MANAGE, PRESERVE AND PROVIDE EDUCATION AROUND HERITAGE RESOURCES.	MDP TO DIRECT ADEQUATE RESOURCES TO HERITAGE PRESERVATION.

7.2.4 Social

CONSIDERATION	RATIONALE	IMPLEMENTATION

1. CONTINUE TO SUPPORT RESOURCING FOR HERITAGE EDUCATION AND AWARENESS PROVIDED BY CITY DEPARTMENTS AND COMMITTEES OF COUNCIL.	EDUCATION AND AWARENESS ARE CENTRAL TO PROMOTING AND CREATING A HEALTHY, LIVABLE CITY. THE CITY HAS HISTORICALLY BEEN SUCCESSFUL AT DELIVERING HERITAGE EDUCATION PROGRAMS THROUGH THE GALT MUSEUM & ARCHIVES, COUNCIL COMMITTEES (HISTORIC PLACES ADVISORY COMMITTEE AND HEART OF OUR CITY COMMITTEE) AND THE PLANNING AND DEVELOPMENT SERVICES DEPARTMENT. THE CITY SHOULD COMMIT TO CONTINUE THIS SUPPORT, PARTICULARLY AS OUR HERITAGE FOCUS EVOLVES TO BE MORE INCLUSIVE.	MDP TO SUPPORT ON-GOING EDUCATION AND AWARENESS RAISING THROUGH CITY PROGRAMS.
2. CONTINUE TO SUPPORT THE USE OF HERITAGE AS A TOOL FOR PLACE-MAKING THROUGH ITS INCORPORATION INTO LAND USE AND PARKS PLANNING.	UNDERSTANDING THE LAYERS OF STORIES, SYMBOLISM AND MEANING ATTACHED TO PLACES IN OUR COMMUNITY ENHANCES OUR IDENTITY AND SENSE OF PLACE. HERITAGE IDENTIFICATION, PLANNING AND MANAGEMENT CAN ENHANCE THE PLACE-MAKING POTENTIAL OF OUR NEIGHBOURHOODS AND PARKS IF IT IS EMBEDDED IN THE PLANNING PROCESS. THIS IS PARTICULARLY TRUE OF OLDER NEIGHBOURHOODS WHERE MEANING HAS BEEN CREATED OVER TIME BY GENERATIONS OF RESIDENTS AND VISITORS. TO SUPPORT THIS WORK, THE CITY CAN CONTINUE TO INCORPORATE HERITAGE AS A SIGNIFICANT INPUT INTO LAND USE AND PARKS PLANNING PROJECTS.	MDP TO SUPPORT THE CONTINUED USE OF HERITAGE AS A TOOL FOR ENHANCING PLACE-MAKING IN LAND USE AND PARKS PLANNING PROJECTS.