Drumheller
Municipal Development Plan

DRAFT v3.1 – Third Reading Version 2020-12-03

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ACKNOWLEDGEMENT
The lands on which the Town of Drumheller is situated are on Treaty 7 territory and within Métis Nation of Alberta Region 3.

PART I
Vision and Context

1 INTRODUCTION

Drumheller provides an experience unlike any other. Located along the banks of the Red Deer and Rosebud Rivers in southern Alberta, the town captivates with its breathtaking badlands landscape, unique neighbourhoods, and vast layers of natural and human history. Drumheller is home to 8,000 residents and draws nearly 500,000 visitors each year.

The intent of this Municipal Development Plan is to protect, enhance, and leverage Drumheller's assets to harness its full potential as a place of resilience, growth, and discovery.

1.1 PURPOSE

The Municipal Development Plan sets the vision and direction for the growth of The Town of Drumheller over the next 30 years. Its policies set out priorities for the future land use, infrastructure, community services, and the physical development of the town.

The Plan weaves together the unique elements that form the Drumheller experience, ensuring protection and support for these elements while also enabling continued growth, adaptation, and change. Most importantly, this MDP redefines Drumheller's relationship to its rivers, directing the creation of new and improved protective flood mitigation infrastructure and an accompanying land use planning framework that ensures all future development is resilient and responsive to a changing climate.

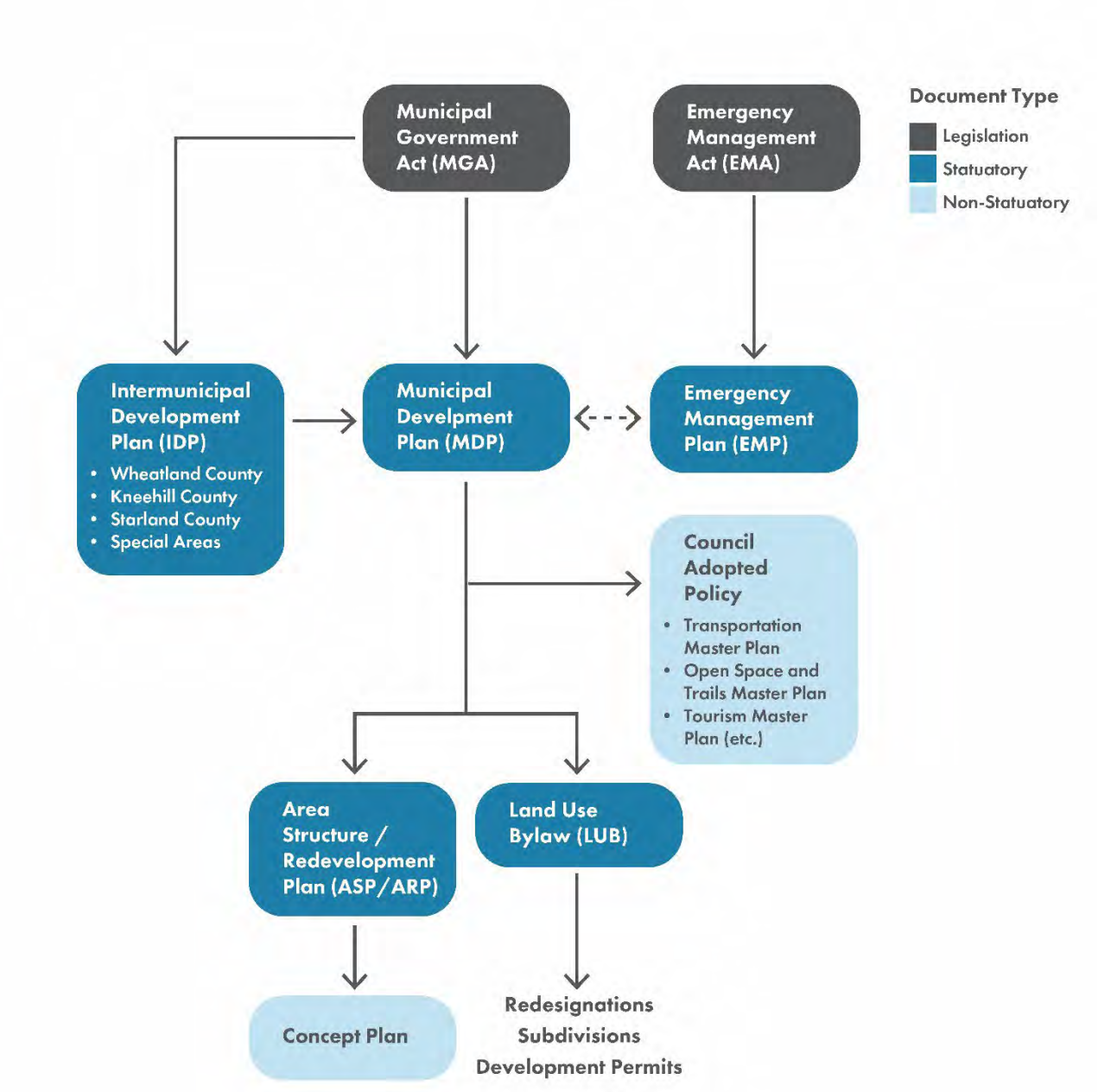
1.2 AUTHORITY

The authority of this Municipal Development Plan (MDP) is provided by the Municipal Government Act. The following section provides an overview of the legislative context and planning framework for all of Alberta, as well as guidance for interpreting the policies within the MDP.

1.2.1 PLANNING FRAMEWORK

The Planning Framework, as shown in Figure 1 Planning Framework, outlines the authority and hierarchy of legislation, regulation, and other planning documents that guide both land use planning and emergency management in the Province of Alberta.

FIGURE 1 PLANNING FRAMEWORK



MUNICIPAL GOVERNMENT ACT

The Municipal Government Act (MGA) provides the legislative framework under which all municipalities must operate. The MGA states that the purpose of a municipality is to:

- provide good government;
- foster the well-being of the environment;
- provide services, facilities or other things that, in the opinion of Council, are necessary or desirable for all or a part of the municipality;
- develop and maintain safe and viable communities; and
- work collaboratively with neighbouring municipalities to plan, deliver, and fund intermunicipal services.

Part 17 of the Municipal Government Act regulates planning and development and empowers municipalities to prepare plans:

- To achieve the orderly, economical and beneficial development, use of land and patterns of human settlement; and
- To maintain and improve the quality of the physical environment within which patterns of human settlement are situated in Alberta, without infringing on the rights of individuals for any public interest except to the extent that is necessary for the overall greater public interest.

The MGA requires all municipalities to adopt and maintain a Municipal Development Plan. This Municipal Development Plan must be consistent with all Intermunicipal Development Plans established between the municipality and the municipalities adjacent to it.

INTERMUNICIPAL DEVELOPMENT PLANS

Intermunicipal Development Plans (IDP) provide coordinating policies to guide land use and growth management between the Town and the municipalities it shares a border with. These plans may include how the two municipalities will work together, develop joint lands, and/or co-ordinate parks, open space, recreation, transportation, water, utilities, and other municipal services across boundaries. IDPs must be approved by Council in both partnering municipalities.

The Town has approved or draft IDPs with Wheatland County, Kneehill County, Starland County, and Special Areas.

MUNICIPAL DEVELOPMENT PLAN

The Municipal Development Plan (MDP) directs all other Town Plans and Strategies. The Municipal Development Plan directs future growth, priorities, and management of the Town of Drumheller. It must be consistent with all IDPs, and provide policy direction for the following key items:

- Future land use within the town and how it is intended to be developed;
- Coordination of land use, growth, and infrastructure with adjoining municipalities;
- Policies regarding provision of transportation systems and municipal servicing;
- Guidance on land-use compatibility and regulation near sour gas facilities;
- Policies regarding municipal and school reserve; and
- Policies respecting the protection of agricultural operations.

Municipal Development Plans may additionally address environmental matters, development constraints, financing of municipal infrastructure, municipal programs, financial resources, economic development, conservation reserve, and other programs or matters relating to the physical, social, or economic development of the municipality. Though not required by the MGA, this MDP also provides a link to the municipal Emergency Management Plan to ensure that proactive disaster preparedness and mitigation are integrated and foundational to all planning within the Valley.

This MDP replaces the 2008 MDP and shall be cited as the 2020 Drumheller Municipal Development Plan.

AREA STRUCTURE PLANS AND AREA REDEVELOPMENT PLANS

As part of the municipal planning process, the Town may develop more specific Area Structure Plans (ASP) and Area Redevelopment Plans (ARP) to provide detailed direction for smaller areas within the town. ASPs and ARPs contain maps, goals, and policies that set out general locations for major land uses, major roadways, utility servicing, recreation areas, and development phasing. These ASPs and ARPs are subsidiary to the MDP and must be consistent with its policies.

LAND USE BYLAW

The Land Use Bylaw is a regulatory bylaw of the Town, required by the MGA, that implements the land use direction provided in the Municipal Development Plan. Every parcel of land in the Town has a land use district, which specifies which uses are permitted and discretionary and how buildings and land can be developed in the Town.

CONCEPT PLAN

A Concept Plan is a non-statutory plan, subordinate to an ASP, and may be adopted by bylaw or resolution. Concept Plans provide detailed land use direction, subdivision design, and development guidance to Council, administration, and the public. Concept Plans are meant to be developed within the framework of an ASP.

EMERGENCY MANAGEMENT ACT

The Emergency Management Act (EMA) provides the legislative framework for local and provincial management of emergencies and disasters. Through the powers granted by the EMA, the Local Authority Emergency Management Regulation provides direction on emergency

management roles and responsibilities and the requirements for municipal Emergency Management Plans.

EMERGENCY MANAGEMENT PLANS

A local Emergency Management Plan provides details on a municipality's emergency management program, including preparedness, response, and recovery activities. It must be based on a hazard risk assessment and clearly indicate who is responsible for what in an emergency or disaster. Emergency Management Plans must also identify internal training plans and communication strategies to ensure that staff and the public are prepared.

1.2.2 PLAN INTERPRETATION

The MDP's vision, goals, and objectives will be achieved by implementation of the policies within this Plan. The policies provide direction for decision making within the Valley and how it will grow and develop over the next 30 years.

The following language is used to determine interpretation of the plan:

Shall/will: Shall/will means that a policy is mandatory and must be complied with, without discretion, by administration, developers, Council, Municipal Planning Commission, and any other authority involved in land use and development approvals.

Should: Should is used when a policy is considered best practice that is only waived if there is a significant rationale for an exception being made.

May: May is discretionary, indicating that the Town could enforce the policy given specific circumstances.

1.3 PLANNING PROCESS

In August 2020, a Master Engineering Design and Assessment of Planning Impact was prepared as part of the Drumheller Flood Mitigation and Climate Adaptation System (DFMCAS) project. The assessment identified the need for modernization of the Town's two key planning documents: the Municipal Development Plan (MDP) and the Land Use Bylaw (LUB). The assessment determined that the existing plans were out of date, not aligned with the Town's flood resilience priorities, and lacked a clear vision for the future of Drumheller. To address these concerns, Town Council initiated the modernization of the MDP and LUB from summer to winter 2020.

Modernization of the MDP and LUB involved engagement with the public as well as internal and external stakeholders. The project team was guided by a Technical Advisory Committee, made up of community experts, Council representatives, Flood Resiliency and Mitigation Office Representatives, and Town staff. To ensure the new planning documents reflected community aspirations, the project team conducted eight public neighbourhood information sessions, and six targeted stakeholder meetings in fall 2020. Feedback was collected on the first reading draft planning documents and the public hearing was held on October 26, 2020. Additional comments were received by the Town throughout November, and were incorporated into the third reading version of the documents. In total, the project team heard from over 500 people.

1.4 HOW TO USE THE MUNICIPAL DEVELOPMENT PLAN

The Drumheller Municipal Development Plan is made up of two main parts:

Part I – Vison and Context provides the overall introduction, vision, and context for the Valley. It describes the current understanding of our community, where we have come from, and **where we want to be** in 30 years.

Part II- Policies contains the statutory policies of the MDP. It directs municipal priorities relating to flood mitigation, open space, land use, transportation, servicing, and other important Town functions. These policies describe how the Town will **achieve the vision for the Valley.**

FIGURE 2 VIEW SOUTHEAST OF RAYMOND HILL, AUGUST 2020

2 DRUMHELLER'S VISION

The vision sets out the aspirations for future growth and development in Drumheller. All other goals, objectives, and policies work towards achieving this vision.

The future of Drumheller's will be shaped by four key forces: rivers, badlands, existing neighbourhoods, and new growth. By understanding, respecting, and purposefully shaping these forces, the Drumheller's Valley's next chapter will be more prosperous, connected, and resilient.

THE RIVERS

Drumheller owes its existence to its rivers — the Red Deer and the Rosebud — which have been carving the badlands deep into the prairie for thousands of years. These rivers have no intention of giving up their sculptural project — to this day they continue to flow, slowly forming and reforming the Drumheller Valley. The rivers sit at the heart of this Plan, giving shape to its ideas, maps, and policies—they regain their status as the prime authors of the Drumheller Valley. The rivers draw lines that guide infrastructure, recreation, open space, and new development, directing the future of Drumheller and the form of its inhabitation.

THE BADLANDS

At Drumheller, the rivers have crafted a place unlike any other. The badlands, with their dramatic descent from the prairie, their pockets of solitude, and their sun-blasted cliffs, offer a striking and immersive landscape. Drumheller ability to capture the badlands feeling—the sense of losing oneself in time and history—is its signature experience. The future of Drumheller depends critically on maintaining the integrity of the badlands landscape and its vistas — and the experiential quality it provides.

DRUMHELLER'S NEIGHBOURHOODS

Over time, this landscape has been the setting for a rich history of inhabitation. From the earliest Indigenous encampments, to colonial settlement and the age of coal, the resource-rich Valley has been both a protector and a provider. Today, the Town of Drumheller encompasses seven unique neighbourhoods that represent diverse paths through Drumheller's history. These neighbourhoods now must become the anchors of Drumheller's future: grounded in their histories and open to the next chapter of opportunity.

THE OPPORTUNITY

Equipped with its rivers, landscapes, and neighbourhoods, Drumheller is embarking on a bold new chapter in its story. This future will be characterized by: (i) a new river-centric approach; (ii) reduced vulnerability of people, property, environment, and economy; (iii) increased confidence and investment; (iv) improved climate adaptation, and; (v) a renewed recognition that Drumheller is an unmissable and unforgettable part of the Alberta experience.

2.1 VISION

Drumheller is a place to grow and a place to discover.

A PLACE TO GROW

Drumheller will draw new residents, enterprise, and investment, enriching the region and unearthing its remarkable potential. Securing investment at a foundational level, the Valley will be equipped with a purposeful flood protection system and flood-smart growth, ensuring that new and existing development is attractive, financeable, and insurable. At the same time, the river will take on a renewed focus as a key regional amenity, unlocking new recreational opportunities and value. Drumheller's river, landscape, and unique neighbourhoods will anchor future growth, providing a wide range of choices and ensuring Drumheller retains a dynamic connection to its history.

A PLACE TO DISCOVER

Drumheller will leverage its dramatic river landscape, deep history, and unique neighbourhoods to become an unmissable part of the Albertan Experience. The rivers, at the heart of Drumheller, will anchor a regional network of pathways and trails that weave together Drumheller's amenities, prompting exploration and unlocking a world of unscripted adventure. Trails, gathering places, and bridges will articulate this network, providing functional loops, opportunities for storytelling, and virtually endless exploration potential. Visitors will be drawn to the immersive badlands landscape to explore, exercise, play, create, shop, and relax.

2.2 GOALS AND OBJECTIVES

The goals and objectives provide further direction on how the MDP will achieve the vision of being a place to grow and a place to discover. There are six MDP goals which set out at a high level priorities for the life of this Plan. The objectives provide further detail on how to achieve each of the Plan goals. The goals and objectives informed the development of the policies provided in Part 2 of the Plan.

1. Implement a comprehensive and adaptive flood mitigation strategy.

Drumheller's neighbourhoods remain vulnerable to flooding. Without adequate emergency response, structural measures, and regulatory action, people and property will remain at risk of catastrophic damage. A comprehensive and adaptive mitigation strategy will help Drumheller remain insurable, financeable, and attractive to investment.

A. Create an adaptive system of structural measures to protect critical Town assets and development and respond to a changing climate.

B. Implement a flood overlay system within the Land Use Bylaw to ensure all new development is resilient and responsive to Drumheller's rivers.

C. Plan the retreat of development in areas with an unacceptably high level of flood hazard risk.

2. Develop a world-class open space and trails system throughout Drumheller that links landscapes, neighbourhoods, amenities, and major destinations, setting the stage for unscripted adventure.

Drumheller is rich in amenity but lacking in connective tissue. A comprehensive, well-connected trail system will unlock a new world of opportunity for both residents and visitors, providing new destinations, enriching growth, and supporting a new sector of enterprise.

A. Promote the Red Deer River as the primary pathway through Drumheller.

B. Identify, protect, and restore the function of the rivers, riparian land, and areas with high ecological and cultural value.

C. Expand and connect a network of recreational opportunities and valley-wide network of trails that align with key destinations, contribute to environmental protection priorities, and leverage flood mitigation infrastructure.

D. Comprehensively program the Drumheller Badlands Parks Trail System to celebrate the diverse history and stories of Drumheller and create a cohesive Drumheller experience that educates locals and visitors in flood mitigation and climate adaptation.

3. Support the growth of complete, sustainable neighbourhoods that enhance the diversity and livability of Drumheller.

There are growing demands for neighbourhoods and homes that are sustainable, affordable, and support a wide range of residents. Drumheller has a strong opportunity to provide innovative responses to these demands that stand out from conventional approaches.

A. Direct infill growth within existing/established neighbourhoods, in alignment with flood protection priorities.

B. Support a diverse mix of housing forms and compatible commercial and employment uses within all neighbourhoods.

C. Ensure the fiscally responsible provision and expansion of municipal services and minimize infrastructure life-cycle costs.

4. Conserve and enhance the uniqueness of neighbourhoods in Drumheller as an integral part of Drumheller experience.

Drumheller Valley's unique neighbourhoods are a tremendous asset. They have the capacity to provide a network of diverse options, experiences, and histories.

A. Enhance Downtown Drumheller's role as the centre of public life and visitor experience in Drumheller.

B. Enable unique form and uses within neighbourhoods through the implementation of specific Land Use Bylaw overlay regulations.

C. Establish mechanisms for the conservation and celebration of historic resources.

D. Showcase the unique character of neighbourhoods through the design and programming of public spaces and the Drumheller Badlands Parks Trail System.

5. Enhance Valley-wide transportation systems to expand the reach and diversity of mobility options, providing a range of robust options for travelling within Drumheller.

Few places can rival Drumheller's dramatic sense of arrival. The descent from the prairie into the badlands provides a memorable experience of anticipation, immersion, and departure. This experience should be protected and celebrated among a broad range of modes, including better regional links.

A. Enhance and protect the experience of a sense of arrival upon entering Drumheller at key road access points.

B. Increase the modal share of active and alternative transportation.

C. Support the development of regional transportation connections to Drumheller.

6. Leverage Drumheller's tourism and recreation industries and local talent to grow and diversify the economy.

Drumheller already hosts an enviable collection of attractions that draw a tremendous number of visitors every year. There is a strong opportunity to better leverage this profile to the benefit of Drumheller's residents and enterprise.

A. Curate the overall visitor experience of Drumheller through coordinated branding, wayfinding, and storytelling.

B. Support the continued growth of tourism, recreation, and entertainment industries.

C. Foster local business retention and expansion by creating incentives and reducing barriers to business development.

D. Diversify the economy by supporting the expansion of specialized manufacturing, high-tech, and other industries.

3 THE RIVERS

The Red Deer River is the primary architect of the Drumheller Valley. Its waters, and all those flowing toward it, have etched the valley deep into the open prairies over thousands of years. Each year, water and weather continue to erode and carve the gullies, coulees, and hoodoos that make up the extraordinary landscapes of the Drumheller badlands. This weathering and carving also uncovers many layers of natural and human history present here. From the times when dinosaurs walked the earth, to when the first peoples discovered the lush valley below the plains, the river has provided a place to grow and thrive. Today, it continues to serve this role, feeding the many natural and human systems within the valley and the stories that make Drumheller the incredible place it is today.

As the creator of the valley landscape, the river also has an integral part to play in our way of life today and growth of our community. Because the river is the source of water, food, and transportation, its riverbanks have historically been an attractive place to settle and an immense aesthetic and recreational asset. However, throughout the year, the flow rate and level of the Red Deer River changes significantly, often within a very short period of time. In the past, this has caused the river to flood its banks. Flooding has had devastating impacts on our neighbourhoods and infrastructure. With a changing climate and increasingly severe weather events, flooding will continue to be a critical piece of Drumheller's identity, and a critical variable to which all future development must respond and adapt.

Drumheller is a flood community. This MDP acknowledges this fundamental premise, and the need to change the channel on how we plan for and respond to flood risk. A healthy respect for the river and its tributaries means making room for the river, balancing the growth of existing communities, and leveraging new opportunities for growth.

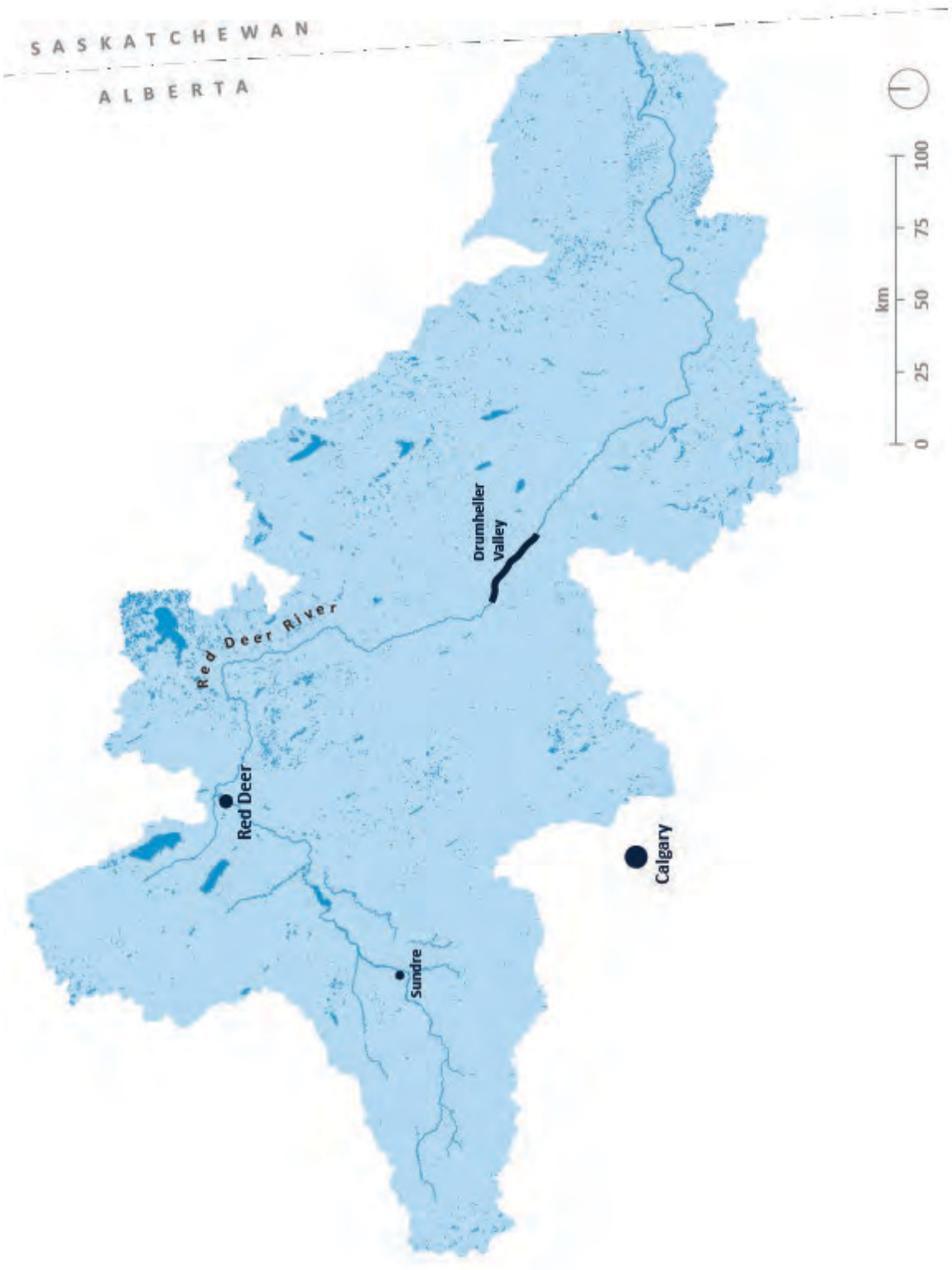
3.1 DRUMHELLER: A FLOOD COMMUNITY

Flood mitigation strategies must be based on a thorough understanding of the waterways that flow through the community. The following section discusses the current flood context of Drumheller, setting the stage for the next chapter of valley development that re-imagines the town's relationship to its rivers and embeds flood resiliency in the DNA of all Town decision making.

3.1.1 DRUMHELLER'S RIVERS

The Red Deer River is the primary waterway that flows through Drumheller. The river has many tributaries in the Drumheller region, including rivers, creeks and smaller drainage channels (Figure 3: Red Deer River Watershed). The stormwater system in Drumheller also discharges into the Red Deer River. This section provides an overview of the three waterways in Drumheller that cause the greatest flooding impact on the Town: the Red Deer River, the Rosebud River and Michichi Creek.

FIGURE 3: RED DEER RIVER WATERSHED



RED DEER RIVER

The Red Deer River is a major tributary of the South Saskatchewan River, which is part of the larger Saskatchewan-Nelson system that flows into the Hudson Bay. It originates on the eastern slopes of the Canadian Rockies and flows east, passing through the Foothills, Boreal Forest, Parkland and Grassland Natural Regions. The river supports a variety of natural systems, including vegetation and wildlife in the Northern Fescue Natural subregion in which Drumheller is situated.[1] The total length of the river is 724 km with an effective drainage area of 32,400 km2.[2] Characteristics of the basin vary significantly from the headwaters in the Rocky Mountains to the prairies in the west. Sub-basins of the Red Deer River Basin include: the Headwaters Red Deer Basin, Blindman Basin, Little Red Deer Basin, Tail Basin, Rosebud Basin, Michichi Basin, Bullpound Basin, Matzhiwin Basin, Berry Basin and the Blood Indian Basin.[3]

The Red Deer River flow regime can be described as a near natural condition through much of the basin because it is less developed than other rivers in the area.[4] The Red Deer River has an effective drainage area of 19,200 km2 at the Town of Drumheller and has its headwaters in the Rocky Mountains by the Drummond Glacier within Banff National Park.[5] The catchment area upstream of the Dickson Dam is 5,594 km2.[6] Over 50 percent of the total water yield in the Red Deer River originates in this area upstream of the Dickson Dam.[7] Given the size and water yield of the catchment area upstream of the Dickson Dam, the river is subject to rapid changes in flow upstream of the Dickson Dam.[8] The river flows in communities downstream of the Dam, including Drumheller, are more regulated. The river channel through Drumheller is confined by low terraces, alluvial fans, or valley walls and is relatively shallow. The river is sinuous with occasional islands and side bars and areas of fragmented shrub and forest growth.[9]

The character and flow of the river changes through the seasons and is highly dependent on climatic conditions. River flow is described here in terms of flow rates, which is measured in cubic metres per second (cms). This measures the volume of water (in cubic metres) passing through a specific location on the river in a one second time frame. In Drumheller, the flow rate that the Red Deer River channel can typically hold without overtopping the natural riverbank (the bankfull discharge) is about 1,000 cms.[10] In major storm events, the flow rate in Drumheller tends to increase above the 1,000 cms level, which results in localized flooding. An example of this is the 2005 flood, when the water reached 1450 cms. The Dickson Dam aids in regulating

[1] Alberta Parks (2015). Natural Regions and Subregions of Alberta: A Framework for Alberta's Parks. Alberta Tourism, Parks and Recreation. Edmonton, Alberta. 72pp.
[2] Stantec (2014). Red Deer River Basin Flood Mitigation Study.
[3] Ibid.
[4] Ibid.
[5] Matrix Solutions Inc (2007). Drumheller Flood Risk Mapping Study.
[6] Stantec (2014) supra note 2.
[7] Ibid.
[8] Ibid.
[9] Matrix Solutions Inc (2007). Drumheller Flood Risk Mapping Study.
[10] Ibid.

river flow during these events by storing water in a reservoir and releasing it over a longer time period, thereby reducing the peak flows.[11]

The largest floods in the Red Deer River Valley generally occur between May and August.[12] Discharge volumes peak in June and July, which is generally caused by the combination of snowmelt runoff with precipitation from major storms in the foothills region.[13] Heavy rainfall was a major contributor to both the 2005 and 2013 floods. In addition to snowmelt and precipitation, ice jams and debris have contributed to localized flooding throughout the basin, but to a lesser degree. Creeks carrying snowmelt have also been known to flood when freshet water flows on top of the frozen surface of the Red Deer River, resulting in a back-up of water into communities along the bank.[14]

ROSEBUD RIVER AND MICHICHI CREEK

The Rosebud River and Michichi Creek are two major tributaries that join the Red Deer River in Drumheller. They contribute to the flood story in Drumheller, but their character and flows are regulated by different factors and hydrological events than those affecting the Red Deer River, mainly due to their smaller catchment size and aspect.[15]

The Rosebud River flows from the west through a valley that is over 100 m deep. The river channel has a riffle and pool sequence with occasional rapids, and the area where the Rosebud meets the Red Deer River is densely vegetated with willows, grasses and shrubs.[16] The largest floods in the Rosebud River generally occur between late-March and early-April. Flooding in the Rosebud is typically a result of high amounts of snowmelt, with ice jams occasionally contributing to high water levels and velocities along the river.[17]

Michichi Creek flows south through Starland County and discharges into the Red Deer River northwest of Downtown Drumheller. Over one kilometre of the creek was channelized in 1951 near Highway 9, while the lower portion of the creek near its mouth was channelized in 2001 as part of the dike construction. For the most part, the dike slopes in this location are densely vegetated with grass and willows.[18]

3.1.2 A HISTORY OF FLOODING

The Red Deer River Basin has experienced flooding for thousands of years. The earliest recorded flood in the Drumheller area dates back to 1901[19], coinciding with early industrial and post-industrial development along the Red Deer River in the early 1900's. Table 1 identifies major flooding events on the Red Deer River that have occurred in the Drumheller region, presented in increasing order of severity.

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[11] Stantec (2014) supra note 2.
[12] Matrix Solutions Inc (2007). Drumheller Flood Risk Mapping Study.
[13] Ibid.
[14] Stantec (2014). Red Deer River Basin Flood Mitigation Study.
[15] Matrix Solutions Inc (2007) supra note 12.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.

TABLE 1 MAJOR RED DEER RIVER FLOODS IN DRUMHELLER SINCE 1900[20]

Year/ date	Maximum volume of flow in cms	Cause	Examples of Impacts
1928	1030 cms		
1923 - June 3	1,130 cms	Rainfall	No flood damage to most communities.
1932 - June 4	1,188 cms		
1929	1210 cms		
2013 June 21	1322 cms	Rain on snowmelt	State of Local Emergency was declared but due to Drumheller's proactive response and preparation very little damage occurred in the town.
1952 - June 25	approximately 1,360 cms	Heavy rainfall	Flooding in Midlandvale and Newcastle, 25 houses evacuated.
2005 - June 21	1,450 cms	Rain on snowmelt	3200 residents were evacuated. As a result of the permanent and temporary diking, only 85 homes were damaged. Some sewers were inoperable due to flooding of several lift station.
1948 - Apr 21	Water back up resulted in inconsistent data.	Recurring ice jams on the Red Deer River from Nacmine to East Coulee and on the Rosebud River and Michichi Creek	2,000 people evacuated in Wayne, Midlandvale, East Coulee, Star Mine, and Drumheller. 100 families were evacuated from North Drumheller. Residents remember that some people lost everything they owned in the 1948 flood. Water was estimated to be 21' above normal levels
1954 - Aug 27	approximately 1,530 cms	Rainfall.	Midlandvale and Newcastle flooded. Many families were evacuated in Drumheller including everyone from the lower flats.
1915 - June 28	approximately 2,020 cms	High rainfall	Midlandvale and Newcastle severely flooded; Nacmine, Drumheller, Rosedale and Cambria had minor flooding in the low-lying sections near the river.
1901	Measuring devices not in place.		Reported to be as large, or larger than, the 1915 flood.

[20] Source: Matrix Solutions Inc (2007). Drumheller Flood Risk Mapping Study.

Early development in Drumheller, which was supported by natural resource extraction and proximity to the river, among other factors, consisted of mining towns and residential neighbourhoods located along the Red Deer River and its tributaries. Because development has historically occurred in flood-prone areas, flood mitigation has been a consideration in the Drumheller Valley for over 100 years. When the railway entered the Valley in 1911, railway engineers referenced demarcations and debris in the landscape to ensure the rail line was constructed outside the area recently impacted by flooding. After the 1915 flood, much of the Town's infrastructure, including the rail line, roadways and bridges, were constructed on embankments or located outside the impacted flood areas. The historic stone flood wall located in Downtown Drumheller, much of which has now been removed, was also constructed after 1915.

Even with early flood mitigation infrastructure in place, floods continued to impact neighbourhoods located near waterways in Drumheller. In the 1970s, flood mitigation options on the Red Deer River were studied by Alberta Environment's Planning Division. A 1977 study by the Alberta Environment Conservation Authority (AECA) emphasized the importance of zoning regulations to protect residents and infrastructure in the Red Deer River Valley.[21] In the same year, a study conceptualized a series of dikes throughout various Drumheller neighbourhoods in combination with upstream storage to reduce flooding impacts on the community.[22]

The construction of the Dickson Dam and the creation of Gleniffer Lake occurred between 1979 and 1984. The Dam was constructed in response to the accelerated development in the Red Deer River Basin in the 1950s and the need to regulate river flow in both dry seasons and high flow events. The operation of the Dam ensures minimum in-stream flow needs are maintained during drought conditions. During high flow events, the Dam also attenuates peak river flows by storing water in the reservoir. The operation of the Dickson Dam has significantly reduced peak flow rates, water levels and associated flood damage in the Town of Drumheller.[23]

The consolidation of the Municipal Government Act and the Planning Act in the early 1990's changed the subdivision and development approval process in Alberta, making it easier to develop in flood-prone areas.[24] However, the Provincial response during this time was to increase flood mitigation measures in Drumheller. More extensive dike systems were built in the 1980's and early 2000's to protect residential and industrial areas, especially in Midland, Newcastle, North Drumheller, Rosedale, East Coulee and Drumheller.

While recent flood impacts have been reduced by flow regulation at the Dickson Dam and proactive emergency response and preparation, flooding continues to impact neighbourhoods in Drumheller, resulting in social and financial hardships for the community. Work still needs to be done to protect existing neighbourhoods along the river and ensure safe, resilient development in the future.

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[21] Klohn Leonoff Consultants LTD. for the Environment Planning Division Alberta Environment (1977). Flood Protection in Drumheller Valley Dam at Site 6 Red Deer River.
[22] Alberta WaterSmart Water Management Solutions (2014). Red Deer River: Historical Flood and Drought Mitigation Solutions. Retrieved from:https://albertawater.com/historical-review-of-flood-detention-and-diversion-sites/red-deer-river-historical-report.
[23] Stantec (2014). Red Deer River Basin Flood Mitigation Study.
[24] Ibid.

3.1.3 A CHANGING CLIMATE

The hydrological network in and around Drumheller is a complex system, and flooding in the Red Deer River Basin is influenced by many factors. Our changing climate is one factor that presents several unknowns in relation to future flooding impacts. Studies and trends point to the likelihood of more intense rainfall events throughout Canada due to the changing climate.[25] While there is potential for an increased frequency of floods along the Red Deer River and its tributaries due to greater storm events, it is also likely that drought frequencies will increase in the prairies. Drumheller may see both increased water scarcity in the coming years as a result of rising temperatures and evapotranspiration and increase in flood frequency and severity.[26] The impacts of a changing climate on Drumheller cannot be fully known. For this reason, it is important to implement adaptive and proactive flood mitigation solutions that will protect existing neighbourhoods and create a more sustainable, resilient community in the future.

3.1.4 ADAPTIVE, MULTI-BARRIER APPROACH

The most effective approach to flood mitigation is an integrated multi-barrier approach. A multi-barrier approach involves using a combination of communications and engagement (to warn and educate residents), land use planning considerations and regulations, the provision of structural mitigation measures, and emergency management systems for response and recovery. Structural mitigation measures include dams, dikes and erosion protection. An effective multiple-barrier approach also involves cooperation and integration of various levels of government, and supports mitigation at scales from individual property owner preparedness to large municipal flood infrastructure projects.

A Provincial Flood Recovery Task Force was established in response to the 2013 floods which had a significant impact on many Alberta communities. The Task Force identifies the following key elements of flood mitigation that should be included in a multi-barrier approach:

- Overall watershed management;
- Flood modelling, prediction, and warning systems;
- Flood risk management policies;
- Water management and mitigation infrastructure;
- Erosion control;
- Local mitigation initiatives; and
- Individual mitigation measures for homes.

The right balance of structural and non-structural solutions as part of a multi-barrier approach reduces the risk of basin-wide flooding.

As indicated in the multi-barrier protection diagram (Figure 4 Adaptive, Multi-Barrier Approach), the adaptive system is the responsibility of the Municipality, bridging between the immediate

[25] Stantec (2014). Red Deer River Basin Flood Mitigation Study.
[26] Ibid.

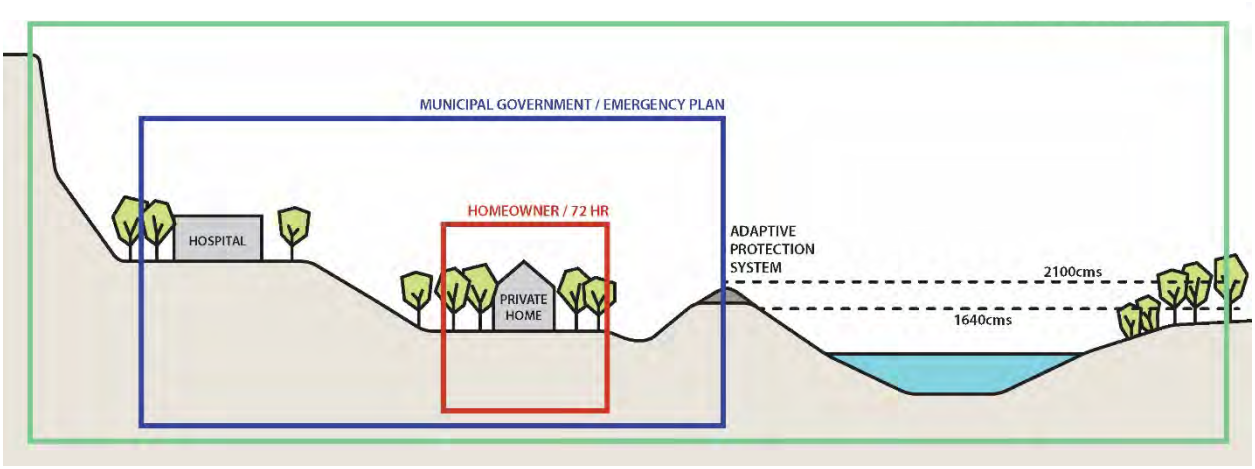
response of the homeowner, and the broader mitigation responsibilities of the Provincial and Federal governments.

An adaptive approach recognizes that floods are unpredictable. The most severe floods are also the most rare, which means that the most extensive and intrusive protective measures end up seeing the least use. The creation of an adaptive system avoids waste by constructing measures that can be quickly raised in response to given flow rates. This means that over the long periods where there is no flooding, measures are less expensive and less intrusive. When floods do occur, the adaptive system allows rapid deployment of temporary measures (e.g. piling dirt or sand bags on top of a smaller berm or next to a shorter flood wall). An adaptive system provides the best long-term protection and short-term cost and intrusion.

Making berms adaptable means they can typically be built to lower elevations. It also means that the berm tops need to be wider, so that they can accept sufficient material and be used as haul routes when the barrier is being raised.

Having flat, wide berm tops enables the adaptive system, but it also unlocks other potentials to leverage flood measures for public trails and open space. There is a strong synergy here between the first two goals of the MDP: protection and connection. By integrating new public connections on structural flood measures, Drumheller can realize two of its highest aspirations, and reinvent the way people relate to the river.

FIGURE 4 ADAPTIVE, MULTI-BARRIER APPROACH



3.1.5 PROVINCIAL FLOOD REGULATION

Flood mitigation in Alberta is a responsibility primarily shared between provincial and municipal governments, with the Province providing certain powers to municipalities for mitigation. The Emergency Management Act directs overall emergency management priorities and requirements in the Province, including a requirement for all municipalities to maintain an Emergency Management Plan. These plans primarily focus on emergency response and recovery. Greater preventative flood mitigation powers come from the Municipal Government

Act, which enables municipalities to create plans directing future growth and land use in the interest of public safety and wellbeing.

The Province currently provides mapping of the Provincial Floodway and Flood Fringe to help municipalities define and control development in the flood plain (Figure 5 - Provincial Floodway and Flood Fringe). It is recommended that no new development is allowed in the Floodway, and that development is restricted and subject to additional development conditions in the Flood Fringe. Significant areas of the Town of Drumheller's existing development are within the Provincial Floodway, requiring a more nuanced approach to flood mitigation that considers existing and forthcoming structural mitigation measures.

3.1.6 MUNICIPAL FLOOD PROGRAM

The Town of Drumheller recognizes that a multi-barrier, adaptive approach must be used at a municipal level of planning. In November 2019, the Drumheller Council approved Bylaw 15.19, which established the Drumheller Resiliency and Flood Mitigation Office to develop strategies to protect residents and properties from loss or injury resulting from flooding. A key component of the Flood Mitigation Office's approach is the establishment of an integrated Drumheller Flood Mitigation and Climate Adaptation System (DFMCAS). As a phased program that covers 100-km of riverbank, the DFMCAS mandate includes:

- making room for the river;
- reinforcing existing structural measures such as berms and dikes;
- building an adaptive system to protect the community into the 22nd century; and
- updating the municipal emergency plan.

This adaptive approach began with identifying the principles and targets that give priority and shape to the system. Drumheller has made the decision to depart from the return-period flood hazard model (i.e. 1:100 flood), in favour of an adaptive flow-rate model (i.e. 1850 and 2100 cubic metres/second). Instead of defining a single event intensity, an adaptive flow-rate model defines a range of potential flow rates. It then establishes responsive structural measures that allow the system to physically adapt to floods within this range. Among many advantages, this approach benefits Drumheller by reducing the intrusiveness of flood protection measures during non-flooding periods. The Town of Drumheller has identified two key flow rates for their system: 1850 and 2100 cms. These two flow rates capture a range of flooding scenarios, setting the adaptive system's extents. With the presence of the upstream Dickson Dam, Drumheller has the unique advantage of up to 3 days (72 hours) notice of impending flood flows (for the rain on alpine snow derived floods), providing time for the adaptive system to be deployed.

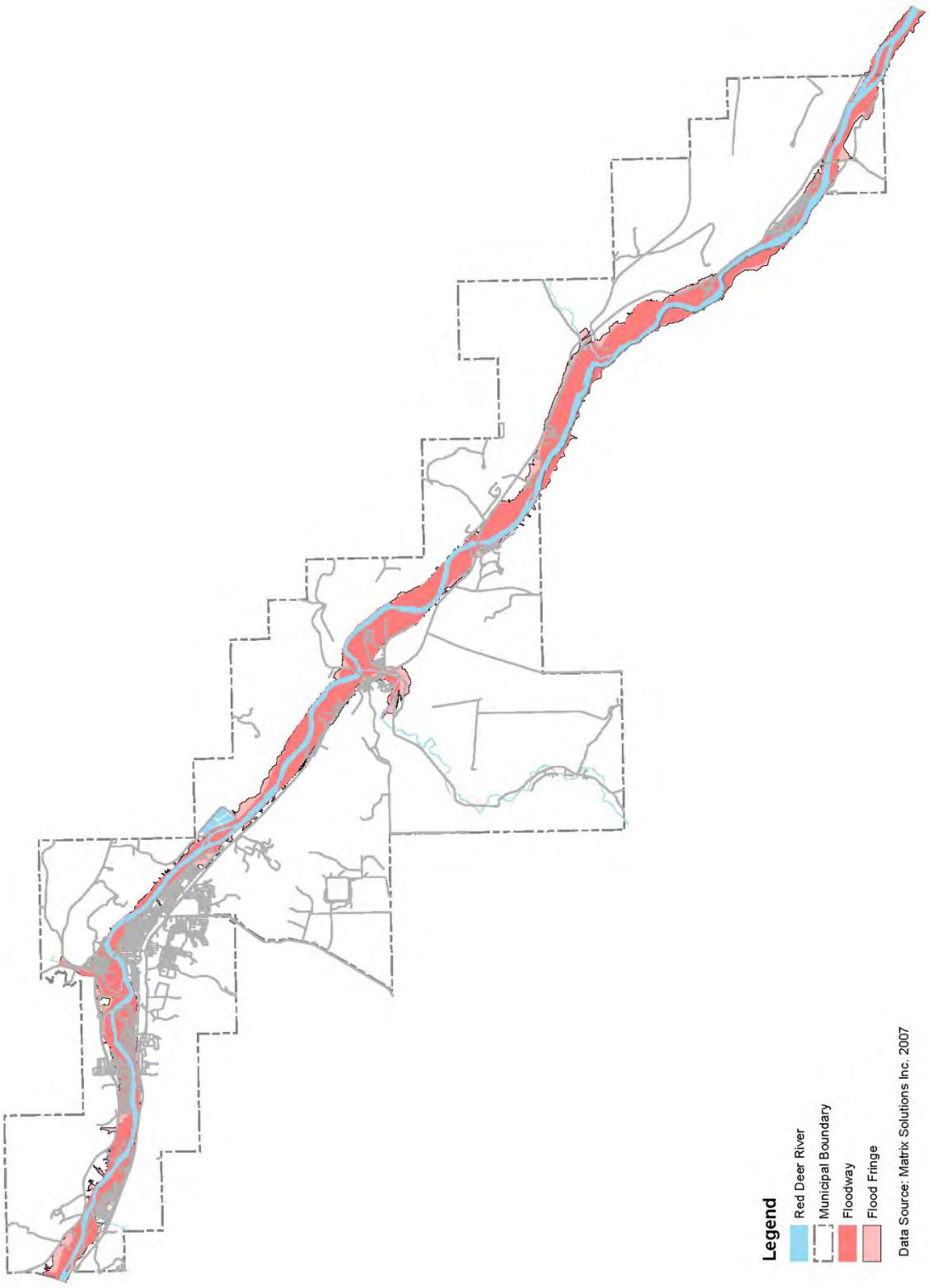
The typical dike cross section is planned to be at least 6 m wide (at the top), with 3:1 horizontal to vertical side slopes, built to a minimum of 1,640 cms, with an adaptable plan to have safe zones, strategic evacuations and rapidly increase dike heights on an emergency response basis for floods in excess of those up to 1850 cms.

Appropriate freeboard must be considered and included in the various flood levels and required dike heights. Freeboard is the additional height above the predicted flood level. An industry acceptable freeboard would typically be between 0.5 m and 1.0 m at the detailed engineering stage. For reference, The City of Calgary uses 0.5 m of freeboard, the Town of High River uses

1.0 m of freeboard, and the BC Dike Design and Construction Guide: Best Management Practices suggests 0.6 m of freeboard. The Town of Drumheller has selected 0.75 m as the minimum freeboard to be included in required dike heights. It is important to understand that this freeboard is provided to account for various uncertainties relative to actual ground elevations and digital elevation modelling, hydraulic modelling, flood forecasts, debris, localized river levels, dike settlements, and other uncertainties.

In coordination with local emergency planning and new development policy, the DFMCAS program will be carried out through 2024, helping to increase flood protection and resiliency in Drumheller.

FIGURE 5 - PROVINCIAL FLOODWAY AND FLOOD FRINGE



3.2 CHANGING THE CHANNEL

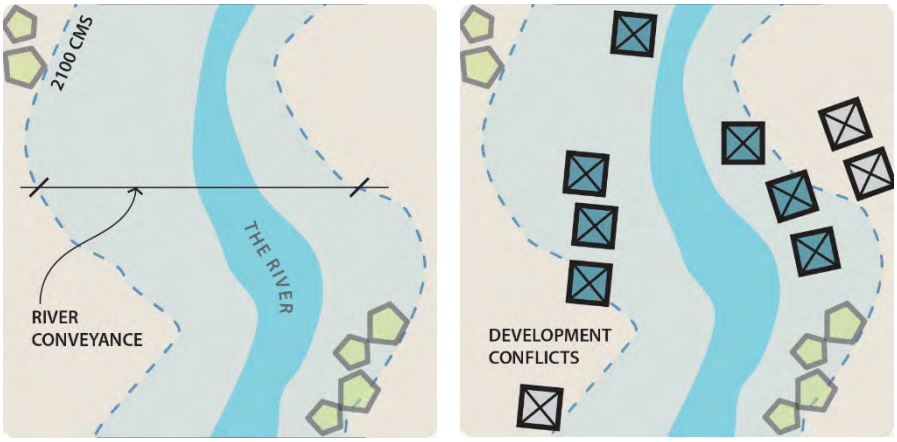
For Drumheller to change the channel and truly integrate into its DNA its identity as a flood community, the rivers must be placed at the very core of the Town's planning thinking. Integrating a robust engineering and design basis centred around channel conveyance capacity, adaptive structural measures, and smart growth areas into the MDP will ensure that this understanding of Drumheller's rivers is carried forward. All subsidiary plans and regulations, including the Land Use Bylaw, Transportation Master Plans, and Area Structure Plans, must align with this intent.

The MDP integrates the following flood mitigation priorities into the goals, objectives, and policies of this Plan:

- Define channel conveyance capacity – Know your flow
- Increase conveyance capacity – Make room for the river
- Reduce flood risk to existing property – Make existing development safer
- Direct growth to areas with lowest flood risk – Smart new growth
- Integrate flood mitigation with recreation priorities – Celebrate our relationship with the river

Embedding these flood mitigation priorities in the MDP will allow the Town to better protect current and future residents of Drumheller from the impacts of flooding, increasing the Town's overall flood resiliency and confidence for new growth and investment. The MDP also sets the groundwork for the development of a connective transportation and recreational network along the river and its tributaries, which will create opportunities for new investment, sustainable lifestyles, and unscripted adventure.

3.2.1 KNOW YOUR FLOW

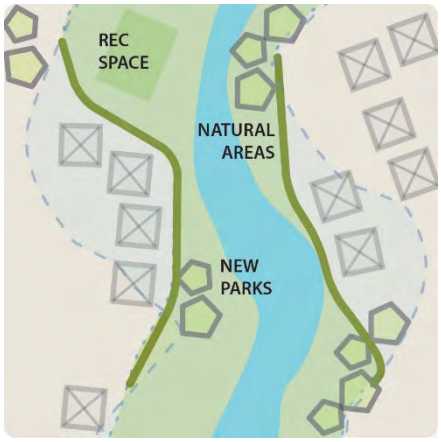


River conveyance capacity must be defined and incorporated into all flood mitigation decisions.

A river-centric approach begins with identifying and understanding the conveyance capacity of the river. Mapping river conveyance capacity identifies how much space the river will need during different flow rates or flood events. Figure 6 Red Deer River Conveyance (1850 CMS + 0.75 M Freeboard) shows the space the river needs when it flows at a 1850 cms flow rate (including 0.75 m of freeboard), a possible flood scenario.

As shown on Figure 7 Existing Development in conflict with river Conveyance (1850 cms) there are many existing properties within this conveyance area. These properties are most at-risk to a future flood event at this flow rate. Understanding the conveyance capacity needs of the river allows the Town to both determine where the river should be given more space to flow to reduce downstream impacts, and where existing development should be protected.

3.2.2 MAKE ROOM FOR THE RIVERS



The river and all water bodies must be given adequate room to flow and retain their natural functions and amenity. Conveyance capacity should not be encroached on by development, which will be defined by established flow rates.

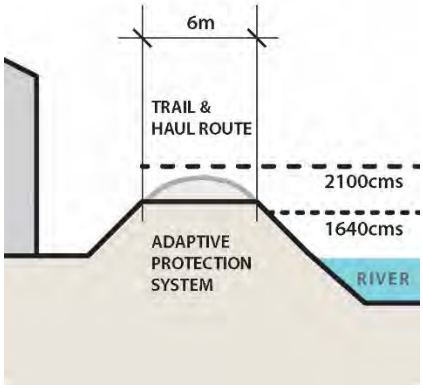
Once defined, conveyance capacity of the rivers should be protected whenever possible. Giving the river space reduces flood risk to development, provides ecological benefits, as well as increases amenity and recreational opportunity for Valley residents.

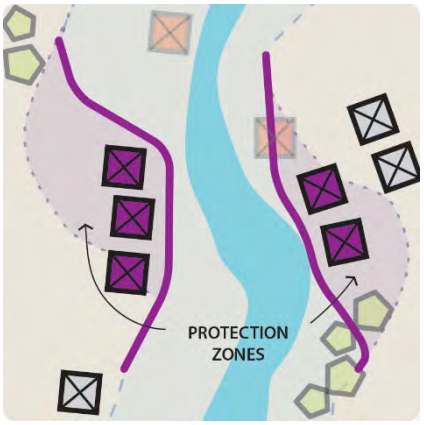
The conveyance zone is a critical component of the badlands ecology, providing movement and habitat for a wide range of plant and animal species. It also offers regulating functions, helping sequester carbon, filter and manage water, support pollinators, and produce micro-climates important to the region's biodiversity. It is a critical factor in the region's ability to adapt to a changing climate.

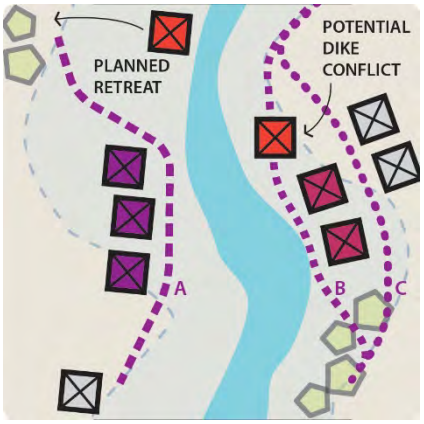
From a human perspective, the conveyance zone is a setting for recreation and a place to appreciate the river's natural beauty. For much of the time, the conveyance zones are not actively inundated with water, opening them up to a range of opportunities for low-impact use. For this reason, the conveyance zone forms the spine of the Drumheller Badlands Parks Trail System.

3.2.3 MAKE EXISTING DEVELOPMENT SAFER

Existing development must be made safer and more resilient to flooding through mitigation, including structural measures where feasible.







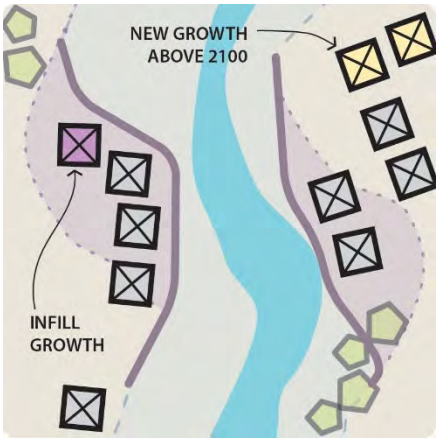
In places where there is conflict between flow and existing development, the Town can either increase resiliency of existing development through the provision of adaptive structural measures or remove development. These measures have the effect of increasing protection for existing development, effectively removing them from the conveyance zone of the river. Where these structural measures go is dependent on leaving enough room for the river conveyance, overall cost, viability, and other spatial requirements. Environmental factors and the protection of significant landscapes and cultural heritage should also be considered in the alignment, planning, and construction of structural measures.

Structural measures create a ‘Protected Zone’ between the river and System 2100, providing enhanced access to finance and insurance for existing properties as Drumheller gradually grows out of the river. Figure 8 - Proposed Structural Measures, shows at a high level where structural measures will be implemented in existing neighbourhoods. These structural measures will need to be built to protect to a minimum flow rate of 1,640 cms plus a freeboard of 0.75 metres to account for challenging topography or uncertainty. These structural measures must also have built in adaptability, to allow for deployment of temporary measures to raise the height of the structure during a large flood event. To enable this adaptibility, structural measures in Drumheller will need to be at least six metres wide at the top, to allow their use as a haul route for additional material. Creating an adaptive system ensures that structural measures are less intrusive and typically low-profile for the majority of the year, but are still able to provide an added layer of flood protection when needed.

Adjusting the conveyance capacity of the rivers through structural measures can have impacts on the form and flow of the river, which can in turn affect flood levels. Constraining or hardening of the riverbanks can lead to the river altering or adjusting its natural course and this can lead to altering flood levels and associated dike heights. Localized impacts of restricting channel conveyance include increased water levels locally and upstream, increased velocities, and potential re-direction of river flows. Taking into account these interactions for anticipating river behaviour in a flood event and long-term stability is an important consideration when planning and designing structural measures.

The protection zone is only suitable for limited infill growth that requires additional construction and elevation considerations. Structural measures add a level of protection, but a level of risk remains even for the protected areas. This is why future growth will be focused in growth areas outside of the river conveyance zone, beyond System 2100.

3.2.4 SMART NEW GROWTH



All new growth must be focused in areas that are safest from flooding and other hazards. Promoting safe new growth areas will help to invite new investment and build confidence for those wishing to develop in Drumheller.

Drumheller will grow in two key ways: through minor infill in protected areas, and in new growth areas. Infill growth is an important part of the evolution of existing neighbourhoods, but it has limited capability to achieve a long-term flood-safe vision. Although protected by structural measures, these areas remain at higher risk for flooding.

Drumheller's best opportunity for new growth and development is tucked between the badland slopes, above the conveyance zone of the river. These areas provide serviceable, attractive zones for new development. They will be the start of a new chapter of growth for Drumheller.

Figure 9 Potential Growth Areas (above 2100 cms) indicates a selection of growth areas, shown in the context of the conveyance and protection zones.

FIGURE 6 RED DEER RIVER CONVEYANCE (1850 CMS + 0.75 M FREEBOARD)

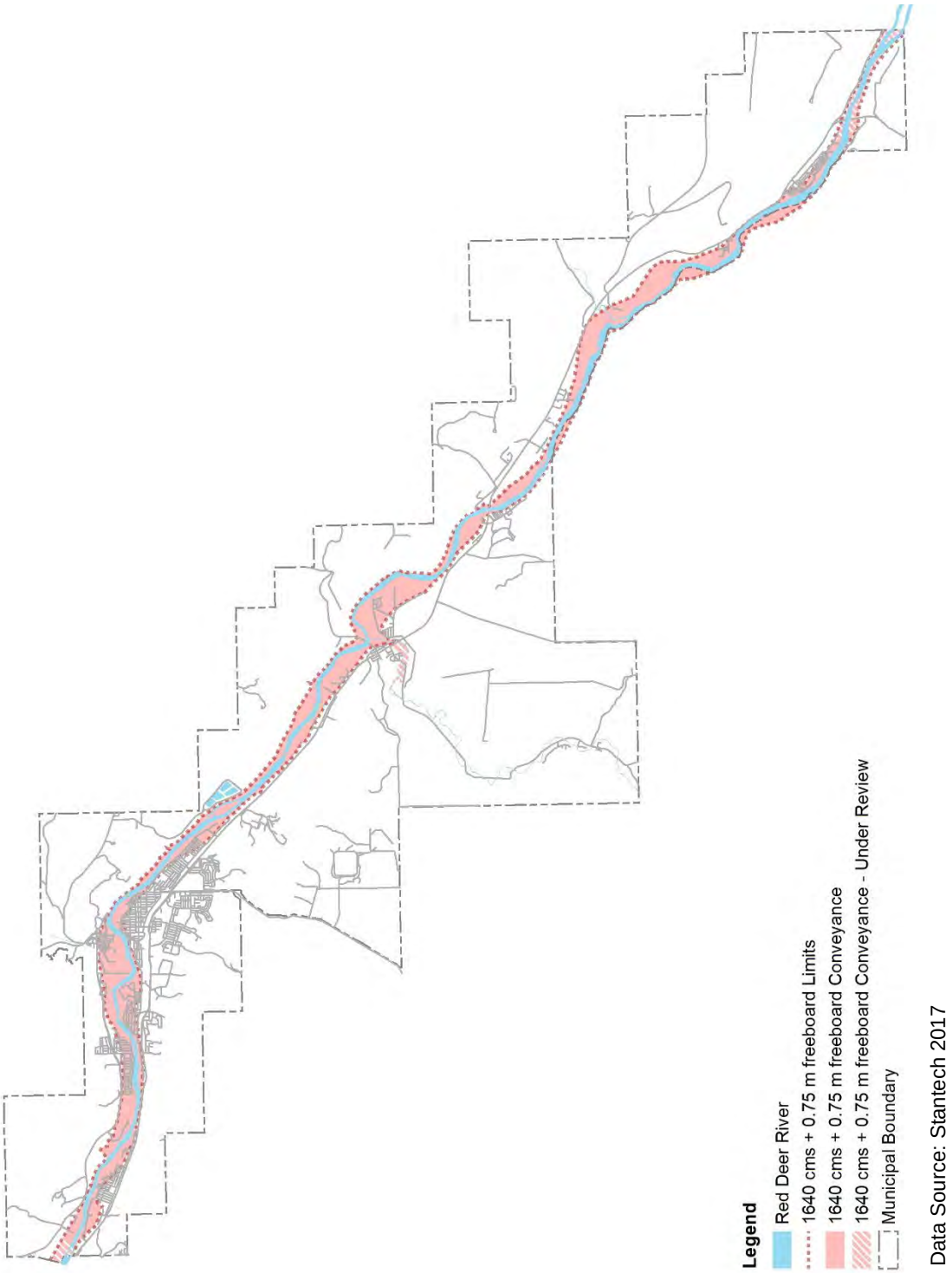


FIGURE 7 EXISTING DEVELOPMENT IN CONFLICT WITH RIVER CONVEYANCE (1850 CMS)

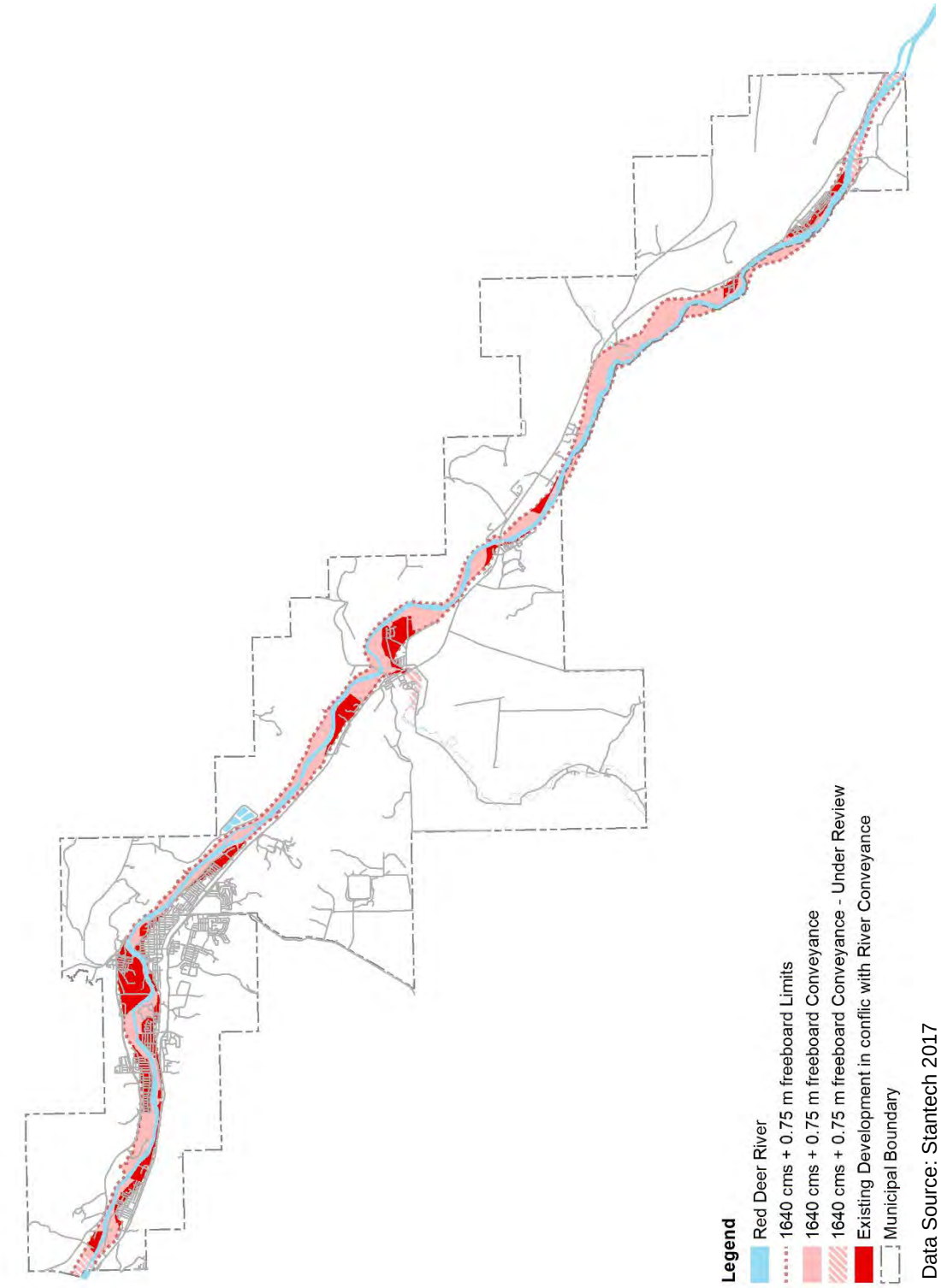


FIGURE 8 - PROPOSED STRUCTURAL MEASURES

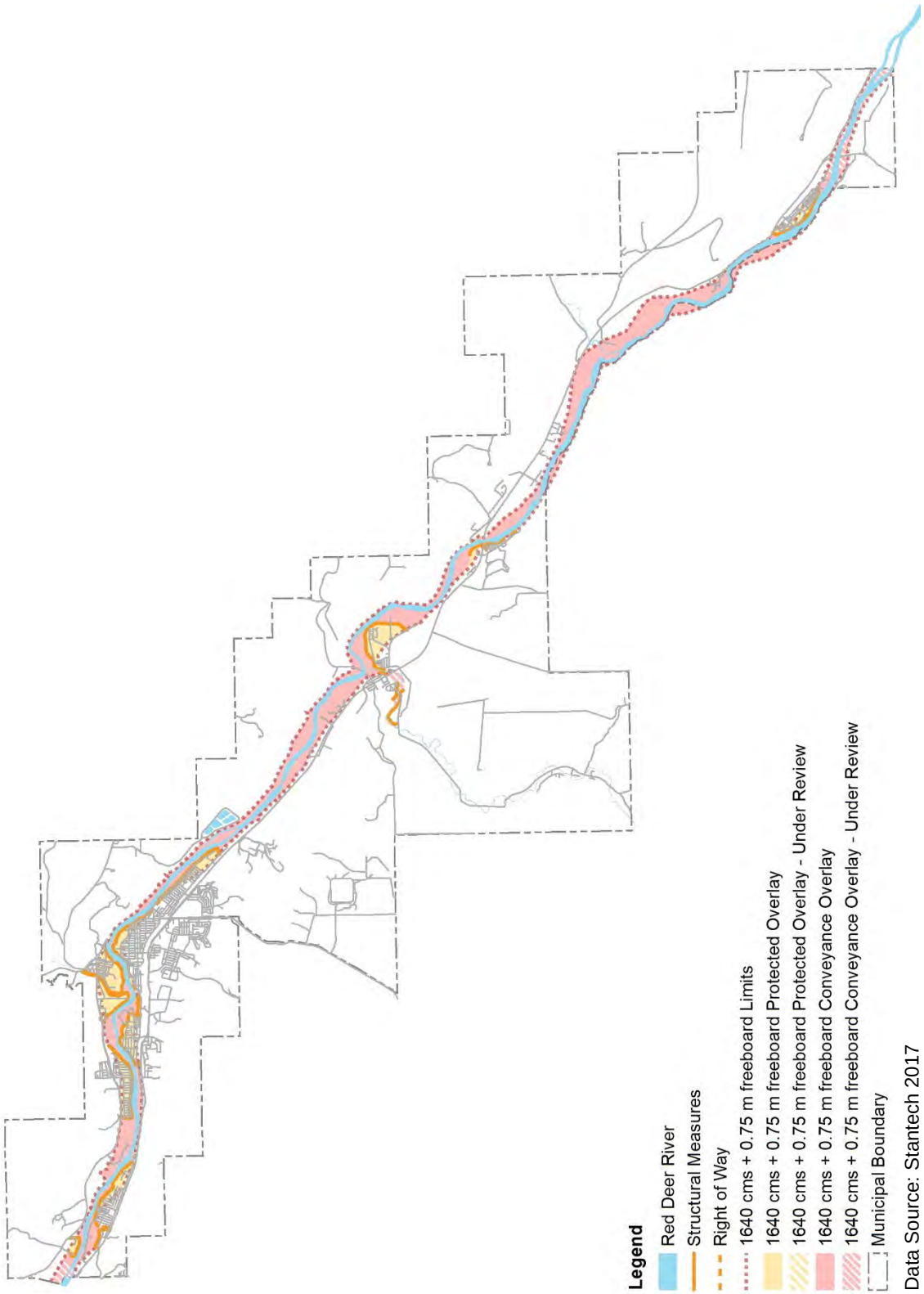
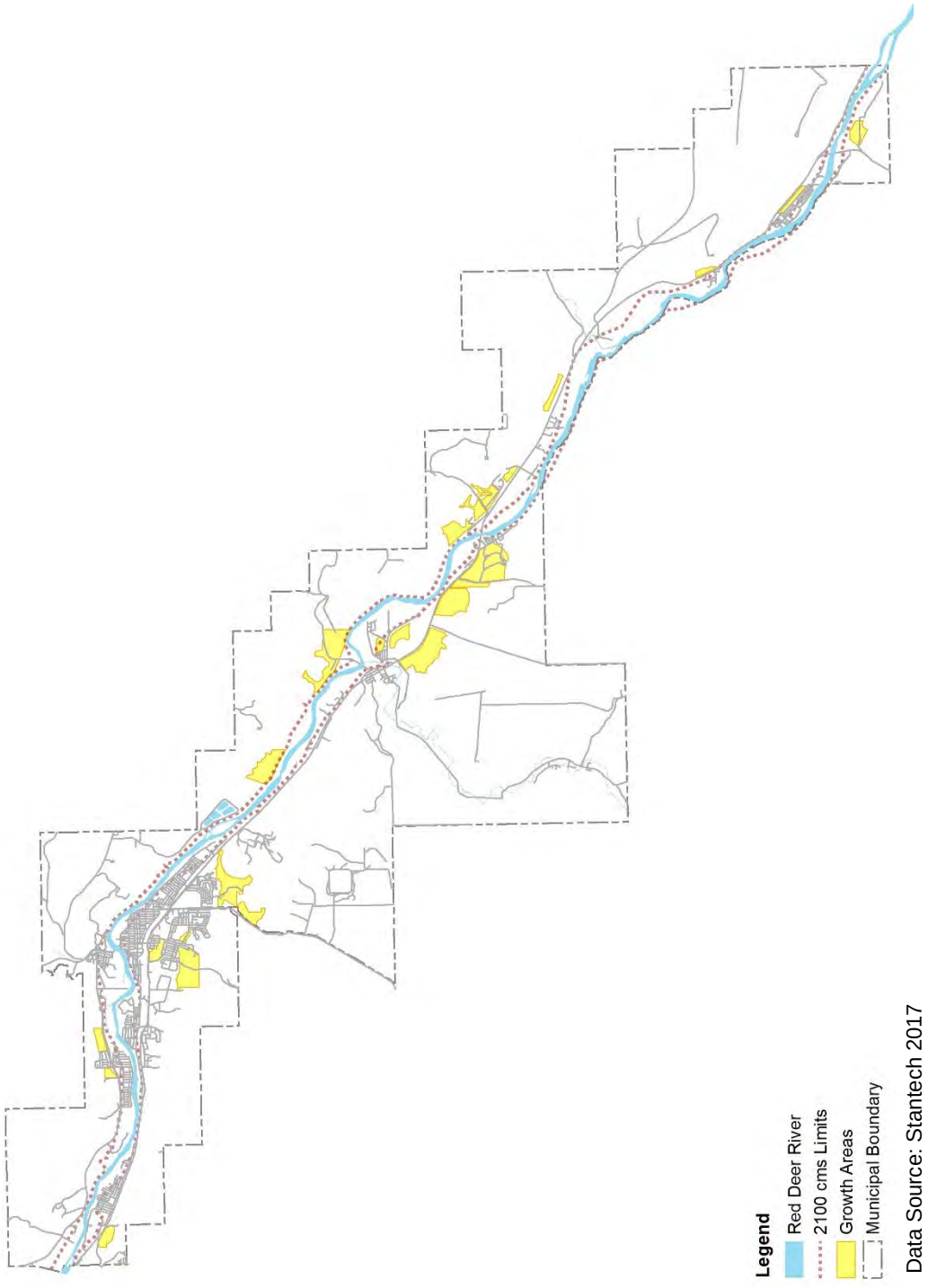
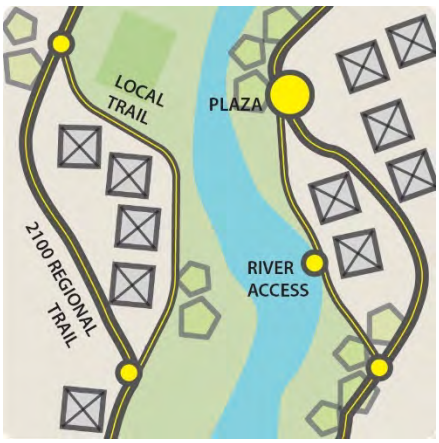


FIGURE 9 POTENTIAL GROWTH AREAS (ABOVE 2100 CMS)



3.2.5 CELEBRATE OUR RELATIONSHIP WITH THE RIVER



There is a re-imagined relationship between people and the river, through recreation, trails, and open spaces systems that are integrated with and leverage flood mitigation priorities and infrastructure. Through these systems, the Town will celebrate its identity as a flood community.

Trails and open space are the final stop on the river-first journey, but they are central to fulfilling the MDP's vision for Drumheller. They emerge from a combination of three critical outputs from the river-centric model (Figure 10 Trail Hierarchy)

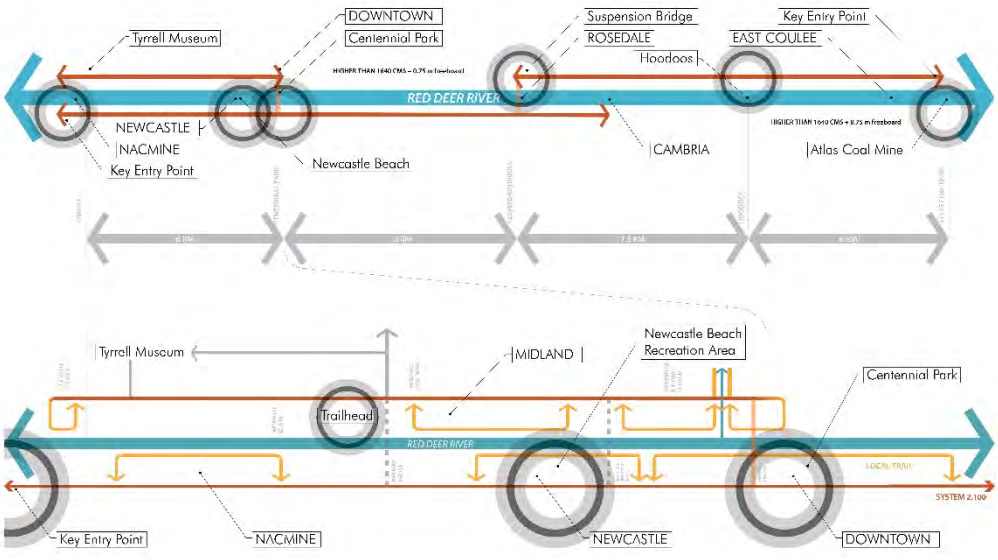
1. The System 2100 is a new regional trail alignment through Drumheller that follows the 2100 cubic metres per second river flow rate along existing roadways and abandoned rail lines,

2. Structural measures, which use the adaptive protection measures to provide berm-top local pathways that tie into the System 2100 and link Drumheller's neighbourhoods; and,

3. The conveyance zone, which, with the river at its core, forms an open space spine through Drumheller.

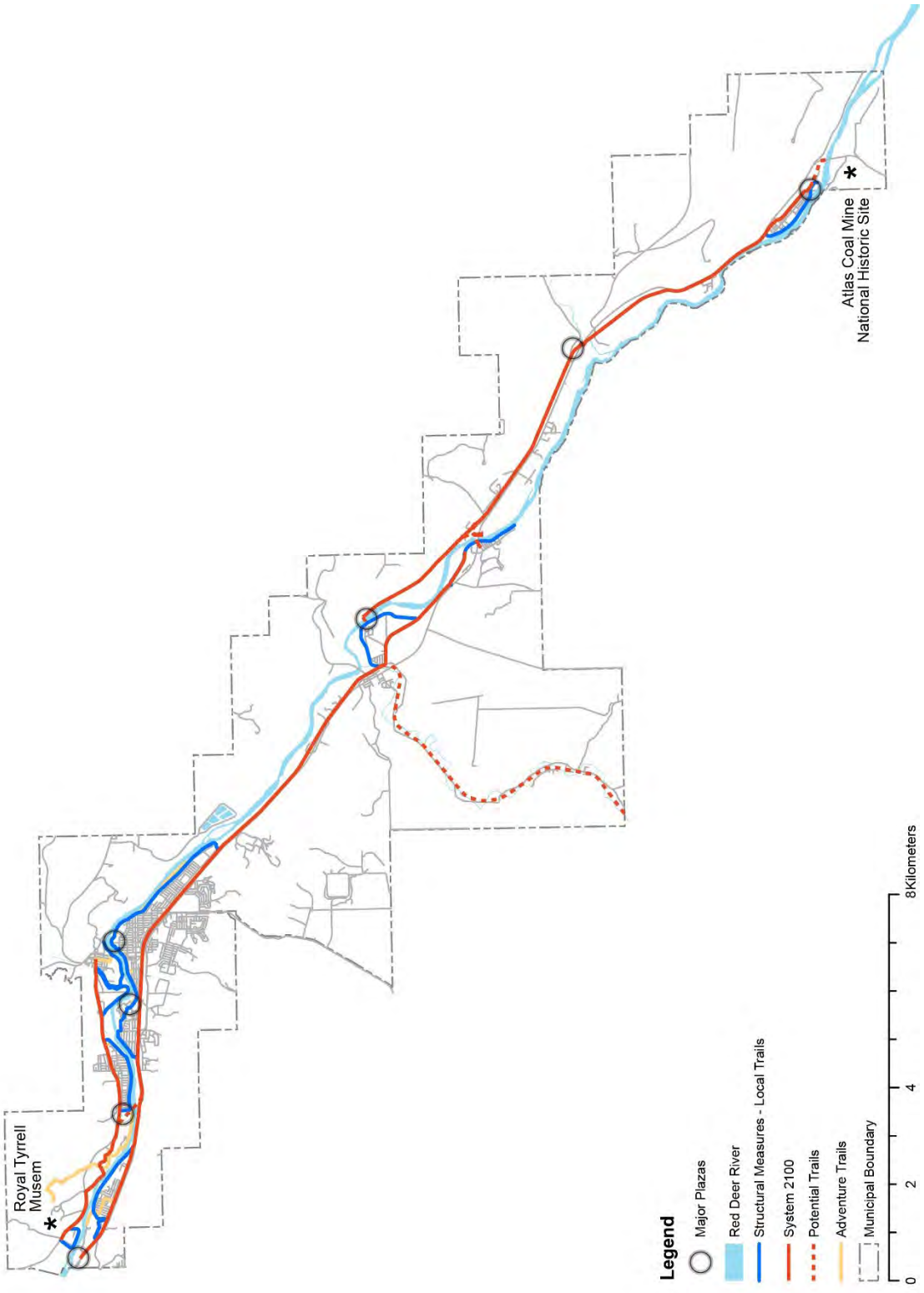
This open space and trails network (Figure 11 Trails and Pathways Network) is a central and critical ingredient that will enhance Drumheller experience by connecting the residents and visitors to the river and help unlock the potential of Drumheller.

FIGURE 10 TRAIL HIERARCHY



With the river at the forefront, the Drumheller Badlands Parks Trail System is woven together by the System 2100 and the local pathway network.

FIGURE 11 TRAILS AND PATHWAYS NETWORK



4 THE BADLANDS

The badlands are the secret ingredient of the Drumheller Valley. Formed over millions of years and carved over thousands of years, the majesty of the badlands landscapes is sought out by many. It serves as a backdrop to everyday life and recreational pursuits for residents, provides an out of world experience for visitor adventures, and stars in major media and film. The immersive experience of this landscape must be protected and celebrated so that they may be enjoyed now and in the future.

4.1.1 THE FORMATION OF THE BADLANDS

The badlands are a geological marvel, owing their existence primarily to the power of water. The layers of sedimentary rock exposed in the valley are only a fraction of the geological history that lies beneath. What we can see exposed of them today was formed during the upper part of the Cretaceous Period, 67 to 73 million years ago, when dinosaurs roamed the earth. Rivers and streams carried vast amounts of sediments east from erosion of newly formed mountains in the west. These sediments accumulated in layers, which over time were shaped by weather, water, and time to what today is know as the Horseshoe Canyon Formation.

Back then, the area looked much different from now with lush forests and green landscapes, and of course, dinosaurs. At times during the Cretaceous period, the area was partially covered by an inland sea. As this sea receded later in the Cretaceous period, the area became much drier and cooler. Then a catastrophic event took place when a large object, possibly an asteroid, impacted the earth. This led to significant cooling and the extinction of most larger organisms on earth. This included dinosaurs except for the Avian Dinosaurs that gave rise to birds. Evidence for this major event can be seen in rock layers upriver from Drumheller in the Dry Island Buffalo Jump area.

Ice was the next major force to scour the landscape. At the peak of this Ice Age (Pleistocene Epoch), huge ice sheets covered much of the northern hemisphere, and Alberta was covered by ice sheets up to a kilometre thick. These ice sheets advanced and retreated over Alberta at least four times. The retreating glaciers deposited sand, silt, mud and glacial till containing boulder-sized pieces of bedrock, that originated in northeastern Alberta and northern Saskatchewan and were carried here as the glaciers expanded.

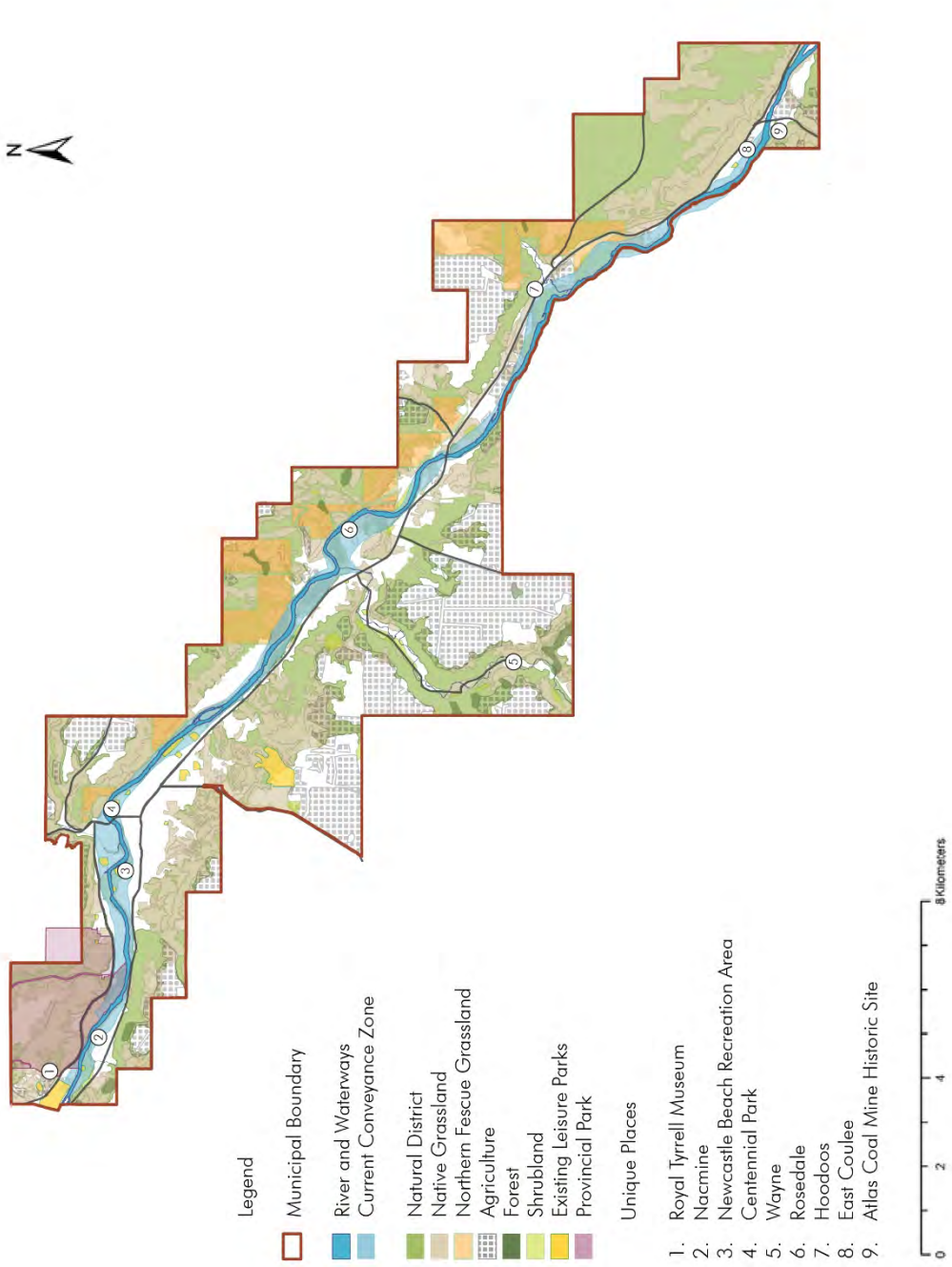
About 15,000 years ago, the last of the ice sheets began to melt. The releasing water caused major flooding and deposition of sediments. Some of the water released from the glaciers formed large glacial lakes. Near the top of the valley formations, the yellow-tan layers represent these glacial lake sediments. As the ice continued to melt, water form these large lakes was released as huge rivers, some of which rushed south and eastward. One of these vast torrents became the Red Deer River. The river, being much larger and wider at the time, is primarily responsible for the carving out of the Drumheller Valley and badlands formations. This cutting action of the river also served to expose the ancient layers of rock and the fossils they contain. Over 30 different kinds of dinosaurs have been discovered within the Red Deer River valley upstream and downstream of Drumheller.

Today, the banks and riparian areas flanking the river have an abundance of vegetation due to the rich floodplain soils, including several riparian forests. These are made up of cottonwood, poplar, willows and various species of shrubs. These areas provide habitat that is crucial to many birds, mammals, reptiles and amphibians in what is an otherwise dry area of the province. The dryer areas in the Drumheller Valley include mixed-grass prairie dominated by blue gama grass and June grass. Many slopes are also dominated by silver sagebrush, prickly pear cactus and various grasses and shrubs (Figure 13).

FIGURE 12 GEOLOGICAL TIMELINE

Dates (approximate)	**Text**
15,000 years ago	The last of the ice sheets began to melt. The releasing water caused major flooding and deposition of sediments. Some of the water released from the glaciers formed large glacial lakes. Near the top of the valley formations, the yellow-tan layers represent these glacial lake sediments. As the ice continued to melt, water form these large lakes was released as huge rivers, some of which rushed south and eastward. One of these became the Red Deer River, which over time has carved the Drumheller Valley badlands.
2 million years ago	Global temperatures were significantly colder than they are today, and huge ice sheets covered much of the northern hemisphere. Alberta was covered by ice sheets up to a kilometre thick.
55 million years ago	The Rocky Mountains were generally finished forming, and the Drumheller area was semi-tropical with swamps, ferns and water-tolerant trees. Invertebrates like clams and snails, fish, turtles, champsosaurs (an extinct long-snouted reptile), crocodiles and mammals have replaced the extinct dinosaurs.
67-73 million years ago	The layers of sedimentary rock exposed in the badlands along the Red Deer River were formed during the Cretaceous Period when the area was at times a shallow sea.
	Some areas were covered by lush forests and green landscapes inhabited by dinosaurs and other animals.

FIGURE 13 EXISTING LANDSCAPE CONDITIONS



4.2 SIGNIFICANCE OF THE BADLANDS

The badlands are the essence of the Drumheller Valley. The dynamic landscapes and many archaeological and palaeontological resources have ecological and human significance and are integral to future growth and discovery in Drumheller.

The Badlands are a critical element of Drumheller's tourism industry. People are drawn to the sense of isolation and immersion that being within the landscape provides. There is a marked change in the landscape when you descend into the Drumheller Valley, as though you are travelling back in time. This sense of arrival harkens to many adventurers, seeking unscripted exploration and discovery. What draws even more visitors is what can be found within the layers of the badlands. The Royal Tyrrell Museum of Palaeontology attracts nearly 500,000 people annually to Drumheller. Drumheller's association with dinosaurs and palaeontology is recognized world-wide. The expansion of the Drumheller Badlands Parks Trail System will serve to further integrate and increase access to the badlands, tying together points of interest through the landscape and encouraging visitors of the area's most popular destinations stay to enjoy all that Drumheller has to offer.

The natural grasslands, riparian areas, and river itself provide opportunities for adventurous outdoor pursuits, including hiking, biking, kayaking, fishing, and bird watching. Taking part in these types of activities is far from mundane when surrounded by the spectacular Valley walls, with their vibrant colours and layers. Access to this abundance of recreation opportunities, and the innate appreciation for the land this fosters, positions Drumheller well for the expansion of eco-tourism operations, sustainable industries (such as renewable energy), and eco-communities that are embedded in the landscape and cater to those who wish to reduce their environmental footprint while enhancing their quality of life. The beauty and rugged quality of Drumheller's landscapes also feed the inspiration and creativity of growing arts, film, and manufacturing communities in the region.

The significance of the badlands to the quality of life of residents, experience of visitors, and overall growth and prosperity of Drumheller cannot be overlooked. It is essential that these landscapes and historic resources are protected and enhanced as the Town continues to grow.

FIGURE 14 WAYNE VALLEY, LOOKING EAST FROM EXCELSIOR HILL

5 UNIQUE PLACES AND NEIGHBOURHOODS

Beyond the stunning river carved badlands, Drumheller is layered with unique places and historic neighbourhoods that tell the story of resilience, discovery, and opportunity. From the natural history of the landscapes and dinosaur fossil beds, to the human histories of Indigenous peoples, European arrival, and the coal industry, these stories make up Drumheller's past and contribute to its future. Understanding the history of Drumheller, its people, and neighbourhoods, helps us to understand it better today, and imagine what it can be tomorrow.

5.1 VALLEY TIMELINE

Important events over the course of its history has shaped Drumheller into a world-class place to live, work, and visit.

FIGURE 15 ILLUSTRATED TIMELINE OF DRUMHELLER VALLEY

Dates (approximate)	Text
11,000 years ago	Indigenous peoples were the first people to experience the Drumheller Valley and the Red Deer River. Archaeological records show evidence that people lived in the Saskatchewan River basin over 11,000 years ago. The Red Deer River got its name from the English translation of the Cree name "Waskasoo Seepee", which more accurately translates to "Elk River". The Siksika First Nations call the area that is now Drumheller "Pistan-akaetapisko" or Coulee Town.
1793	Peter Fiddler, working as a surveyor and mapmaker for the Hudson's Bay Company, discovered coal along the Red Deer River near the mouth of Kneehill Creek.
1884	Joseph Burr Tyrrell led a group travelling by horseback and canoe from Calgary to the area, and discovered a relatively intact skull of a carnivorous dinosaur that was later named *Albertosaurus*. This discovery led to the Great Dinosaur Rush from 1910-1917, when fossil hunters travelled to the valley in search of dinosaur skeletons. Approximately 300 dinosaur skeletons from the Red Deer River are on display worldwide.
1890's	Ranchers arrived and established ranches, having discovered that parts of the Red Deer valley floor had vast amounts of grazing potential and good access to water to raise cattle. By 1905 there were over 60 large ranches in the Drumheller area.
1902	The first permanent resident of the area, Thomas Greentree, builds his house in what is now Drumheller.
1910	Rancher Sam Drumheller purchases Thomas Greentree's land for a townsite. The two flipped a coin to see whether the new town should be called Greentree's Crossing or Drumheller. The latter won and the new little town had a name.
1911	Coal mining started in the Drumheller Valley in 1911 with the opening of two commercial mines, the Newcastle Mine and the Rosedale Mine.
1912	Development in Drumheller expanded quickly after the opening of the first mines and extension of the railway. Drumheller became a railway station in 1912, was incorporated as a village in 1913, and as a town in 1916.
1915	The largest flood on record in Drumheller occurred in 1915. The settlements of Midlandvale and Newcastle were severely flooded; and flooding in low-lying areas occurred in Nacmine, Drumheller, Rosedale and Cambria.
1930	Drumheller is incorporated as a city in 1930, after its population increased 857% in fifteen years.
1940's	At its peak in the mid 1940's there were approximately 3,000 people living in Drumheller proper and an estimated 30,000 in the valley. It was one of the fastest growing communities in the country, with miners arriving from eastern Canada, the U.K., Poland, Hungary, the Ukraine and

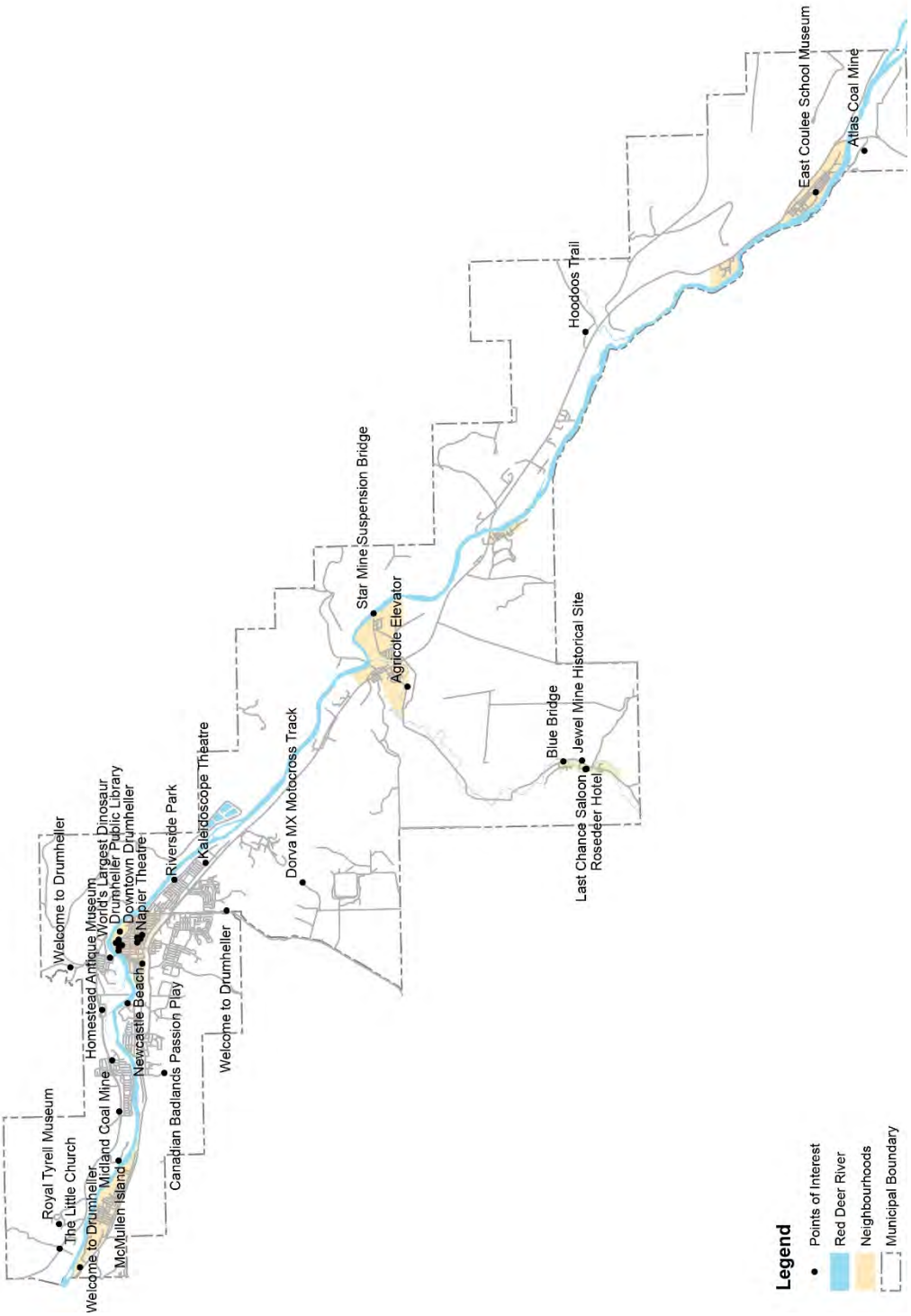
	Italy. As the mines failed, their lands were forfeit and the government created the Local Improvement District, later named the District of Badlands No. 7.
1950's	Drumheller continued to boom until after the Second World War when coal lost its importance as an energy source. From 1911 to 1950 more than 130 mines operated in the valley.
1985	The Royal Tyrrell Museum of Palaeontology opens, and was intended to boost tourism and the local economy. Since its opening it has welcomed over 10 million visitors.
1998	The City of Drumheller amalgamated with the Municipal District of Badlands No. 7 to form the current Town of Drumheller.
2012	The Badlands Community Facility opens in Downtown Drumheller. A recreation and social hub for the valley, the facility includes a fitness centre, art gallery, and library.
2019	The Town of Drumheller is declared a flood community, and the Drumheller Resiliency and Flood Mitigation Office is established to coordinate flood readiness, oversee drought management, and direct flood resiliency projects, and incorporate climate adaptation. The DRFMO's mandate is 'leverage, integrate, legacy'.

5.2 SIGNIFICANT PLACES

Drumheller is home to unique places, each with their own character and history. The town has grown over time to encompass several independent settlements, and today these settlements form Drumheller's distinctive neighbourhoods. In addition to these neighbourhoods, Drumheller's diverse attractions represent a wealth of history in the region, and draw people from all walks of life. These unique places and neighbourhoods are reflected in Figure 16 .

The following section provides a brief history of some of these significant places, and their current value as part of the overall Drumheller experience. The stories of these places should be shared so that future growth and development respects and enhances neighbourhood identity and character.

FIGURE 16 SIGNIFICANT PLACES



5.2.1 NACMINE

The neighbourhood of Nacmine is located along South Dinosaur Trail west of Downtown Drumheller. Once a booming coal mining town, the neighbourhood was named after its mine developers, North American Collieries ('NAC' and 'mine'). In addition to its significance as a mining community, the neighbourhood is significant as one of the first ranching locations in the valley, and a key river crossing.

Since the beginning of European arrival in Drumheller, ranching has been an important part of the local economy. In 1896 James Russell entered the Red Deer River Valley in search of ranch lands. At the present location of Nacmine he discovered unbroken grassland extending from the flat land above Drumheller all the way down to the river. Russell decided to make the area the location of his Lyon Cross Ranch, which he operated on 10,000 acres until 1907. The land was then surveyed and subdivided for homesteads.

The Red Deer River has played an integral part for the way of life and growth within Drumheller. Its riverbanks have historically been an attractive place to settle because of access to water and a means of transportation. Nacmine was no exception; however, in the early days of Nacmine the river was also a barrier to movement. No bridges existed and people had to rely on hazardous fords to cross the river. The fords were located where the river was slower and the banks were solid and not too steep, but these would become treacherous in the spring. To make the dangerous task of crossing the river easier, early settlers began to make homemade rafts and ferries and operate them privately.

Today, Nacmine is primarily a residential community, with some houses dating back to the early 1900s, and some small scale commercial uses. The neighbourhood has local parks and playground areas, an outdoor hockey rink, and an active community centre. The popular Badlands Campground is located next to the neighbourhood along the Red Deer River. Nacmine has the potential to become the gateway to a river trail experience in Drumheller.

5.2.2 NEWCASTLE

Named after Newcastle Mine Company, the neighbourhood of Newcastle is situated on the southern shore of the Red Deer River, separated from the western tip of Downtown Drumheller by a bend in the river. Similar to Nacmine, Newcastle owes its existence to the presence of coal. Drumheller Valley coal is sub-bituminous and was a popular energy product prior to the 1960's for heating houses, cooking, and powering locomotives. It also was used to create power for the settlements and coal mines.

The Newcastle Mine was the first registered coal mine in the Drumheller Valley. It was registered as the Newcastle Coal Company Limited in 1911, but was simply called the Newcastle Mine. The mine began operations in 1912 and the first carloads of coal were sent out of Drumheller by rail that year. One of the mine's founders, Jesse Gouge, had learned of the whereabouts of the sizeable coalfield from a chance meeting with a local resident. He was crossing the river at the Greentree Ferry and met a man with a load of coal dug out from a riverbank in the Newcastle area. Gouge was so impressed with the quality of coal, he hurried to the land office in Calgary and secured a lease in Drumheller.

With the decline in the importance of coal, recreation became a key component of Newcastle's history. Newcastle Beach was developed as a recreational hotspot in the 1960's. It included a sandy beach, campgrounds, mini golf and refreshment booths, and for a time a small train called the Oopland Express. The train had been a small diesel engine that hauled coal from one of the mines. When the mines closed the engine and 10 coal cars were purchased by some residents of Newcastle and was put into service to transport visitors and residents around the beach area. Three baseball diamonds were later built in the park, and it is still a popular recreational and tourist area with a beach, boat launch, and picnic area.

The Badlands Amphitheatre, an outdoor theatre and music venue, is located near the former site of the Newcastle Mine. Boasting spectacular scenery and excellent acoustics, the Badlands Amphitheatre has been home of the award-winning Canadian Badlands Passion Play for 25 years. Every August the Amphitheatre hosts the "Canadian Icons" concert series which showcases the very best in Canadian talent. Previous guests have included legends like Tom Cochrane, Blue Rodeo, Paul Brandt, Corb Lund, and Randy Bachman.

Newcastle has the potential to grow as a recreation-focused neighbourhood with facilities to support river access and year-round sports and recreation. The re-alignment of the existing dike will increase opportunities to access and view social activity within the park and to integrate additional trails and amenities.

5.2.3 DOWNTOWN DRUMHELLER

The area now known as Downtown Drumheller was the site of the original Drumheller settlement named after Sam Drumheller. The downtown area borders a bend in Red Deer River north of the former rail line. Downtown Drumheller is the historical, cultural and civic heart of Drumheller, and the historic structures within the downtown are important community assets that contribute to the community's identity.

The 1920's were Drumheller's booming years and most of the now historic downtown buildings were constructed during this time. Buildings for rent were in high demand because of the numerous coal mines that were being opened up throughout Drumheller and the influx of miners to operate them. Along with the miners came clothing shops, hardware stores, and drug stores to supply them. The buildings were primarily constructed of brick, and often featured a boomtown façade (when the front wall of the building extends higher up than the rest of the building so that the building looked large than it actually was). Roland Langford, a local mason, was the builder of many of the brick buildings in the town. He developed a particular simple but attractive cornice design below the roof line that can be seen on several historic downtown buildings.

Flooding of the Red Deer River has been an ongoing problem for neighbourhoods throughout Drumheller. Following a large flood in 1915 downtown residents living near the river built a stone flood wall to protect their properties. The wall ran from the west side of what is now Highway 9 near the Gordon Taylor Bridge, east along Riverside Drive west and through the residential area south of Riverside Drive. It continued on the edge of the higher land to at least the area near the park on Riverside. The intention of the wall was that residential areas and important industrial

infrastructure would not be developed in the lowlands along the river below the wall. Although much of the wall has been removed, sloped for landscaping or replaced with concrete walls, remnants of the original wall can still be seen along Riverside Drive west and in alleyways between 1st St. and 5th St. East.

A prominent feature of the downtown is its riverfront parks, community recreation facilities (Badlands Community Facility, public library, Memorial Arena, Aquaplex), and the World's Largest Dinosaur and Visitor Information Centre. In the past however, the area was home to Drumheller's first power plant. Proximity to coal from the Drumheller mines and water from the river made this a prime location. The power plant expanded over the years and was still in operation in the mid 1970's, but after the coal mines closed the power plant ceased operations and the infrastructure was removed. In 1928 the Drumheller Rotary Club was instrumental in building and operating the first swimming pool in Drumheller near the power plant in what is now Centennial Park. Excess heat from the plant was used to heat the pool. This pool was eventually replaced with the current outdoor pool by the City of Drumheller in the 1950s. Then in the early 1970s the Kinsmen led a number of service clubs got together to raise money and in 1975 the indoor pool at the Aquaplex opened to the public. The area is still a hub for community events, recreation, and visitor information.

The Centennial Park Plaza has the potential to become the beating heart of the Drumheller experience, a place where locals, tourists, badlands and the river meet. This base-camp for Drumheller will host events and become a launching point for valley-wide adventures. Creation of a new plaza and supporting flood mitigation infrastructure will open up opportunities to connect and animate this amazing gathering place within Downtown Drumheller.

5.2.4 WAYNE

Approximately 10 km southeast of Downtown Drumheller, the neighbourhood of Wayne is located within the Rosebud River valley. Accessed via Highway 10X from Rosedale to the north through a 150 m deep canyon in the badlands, visitors travel along a winding road across 11 bridges that span the Rosebud River.

A hundred years ago, Wayne was a coal mining boomtown of more than 2,500 people working the six mines and the valley's first hospital. In the mid-1950s however, its population began to plummet and its business count dropped to three: a hotel, a garage and a grocery store. By 1970, the town's school had closed and today it has a population of about 25 people. Today Wayne is famous for the Last Chance Saloon and is a popular tourist attraction for motorcyclists and tourists.

Over the years, highways and bridges were built in Drumheller to improve mobility and provide greater access to communities. It is estimated that as many as 67 bridges (road and rail) were built between Rosedale and Wayne across the Rosebud River but many were removed as the road was straightened out over time. Wooden timbers floated down the river from Red Deer were used to build many of these bridges. The famous 11 bridges road to Wayne remains an important tourist attraction in Drumheller.

5.2.5 ROSEDALE / CAMBRIA

The neighbourhood of Rosedale and Cambria is located 5 km east of Downtown Drumheller at the convergence of the Rosebud and Red Deer Rivers. As with many other Drumheller neighbourhoods, it was first settled because of coal.

The Rosedale Mine began operations in 1912 and in 1913 the mine was considered one of the most valuable and reliable properties in the domestic coal field in Alberta. A number of miner's families moved into the community, and a school was built. Concerts and other events were held at the mine's big cookhouse and hall. The first masquerade ball was a memorable event with costumes hired from Beaumonts in Calgary.

Coal mining was a difficult process, so areas that were most likely to produce the greatest amount of quality product with the least amount of expense and effort were sought. Access to transportation was also important so most of the mines were built near the river and later, the railway. A suspension bridge serviced the Star Mine which operated from 1913-1929 across the river from Rosedale. Coal was mined underground and carried across the river in small coal cars suspended from an aerial cable system. It was sorted and loaded into rail box cars. The cable was also used to shuttle miners in Rosedale back and forth across the river to the mine. In 1930 a railroad bridge was laid across the river to the mine, however, the miners still needed to move across the river to work so the cable system was replaced with a suspension bridge. The current 117 metre long bridge is an upgraded and improved version of the original bridge, and along with remnants of the mine are a popular Valley attraction.

Today, Rosedale and Cambria is a residential neighbourhood with a small commercial centre. The neighbourhood acts as a crossroads, providing access to the Star mine Suspension Bridge, the neighbourhood of Wayne, and is situated approximately halfway between Downtown Drumheller and East Coulee. The neighbourhood is home to the Rosedale Community Hall, playground and baseball field, three campgrounds, and a number of businesses.

Rosedale and Cambria has the potential to become a major node in the center of Drumheller, connecting Nacmine, Wayne and East Coulee where the Rosebud meets the Red Deer River. It can act as a starting point for valley-wide recreation, including floating, fishing, cycling, hiking, or relaxing by the river and as a gathering place in Drumheller.

5.2.6 HOODOOS

Located between Rosedale and East Coulee near Willow Creek on the north side of the Red Deer River, the hoodoos are stunning natural features of the badlands landscape. For Canada's 125th year celebration, the alberta coin was the hoodoos.

Composed of sand and clay from the Horseshoe Canyon Formation (deposited between 67-73 million years ago), the hoodoos were created from glacial meltwater and subsequent erosion. They are formed when rocks more resistant to erosion are situated above sediments that more easily erode from wind and rain. The Drumheller hoodoos formed because they have erosion-resistant cap rocks that contain calcium carbonate and iron cements. These cap rocks protect the underlying columns of softer rocks. Erosion of the hoodoos continues today and eventually the existing ones will disappear and will be replaced by new ones as the surrounding outcrop continues to erode.

The protected Hoodoos site has a 0.5 km looped trail for visitors to explore the 5 to 7 metre tall hoodoo formations. Smaller hoodoos can also be found at other sites throughout Drumheller. The Hoodoos are a must-see stop in Drumheller experience. There is opportunity to expand and improve existing facilities, increasing viewing opportunities and trail connections from this node of activity. This would invite visitors to pause and restunder the backdrop of the extraordinary badlands landscape, or continue their adventure, learning about Drumheller's natural, cultural and geological heritage along a series of interpretive trails.

5.2.7 LEHIGH / EAST COULEE

Located 21 km east of Downtown Drumheller, the neighbourhood of Lehigh and East Coulee is on the north bank of the Red Deer River. Originally a mining community, it is now predominantly a commuter community with a small commercial centre.

From 1911 to 1950 more than 130 mines operated in the Drumheller Valley and a number of boomtowns popped up. East Coulee, one of the boomtowns, developed in the 1930s and 1940s as a local service centre and home for miners and their families. A railyard and stockyard served the area mines on the northeast side of the community. Local services in the settlement included the Whitlock Lumber Company, a bank, the East Coulee Hotel, a drug store, City Café, Sam Dragon's Pool Hall, a barber shop, Thomas Shoe Repair, Miller's Bakery and Café, and a grocery and confectionary. The Star Theatre, built in 1930 in East Coulee, was the favourite entertainment spot in town, showing movies twice a week. In the early years of the community the theatre held popular 'Hard Times Dances' with the (locally) famous Si Hopkins and His Old Timers. Tragically, fire destroyed the building in the 1950s and it was never rebuilt.

The Atlas Coal Mine was the most successful coal mining operation in Drumheller and consisted of several different mines over the years. The Atlas Mine #3, across the river from East Coulee, was active for almost 50 years between 1936-1979. Coal was mined from an underground network that covered more than 2,500 acres and extended back from the valley edge for more than 10 km. Today the Atlas Coal Mine is a nationally recognized historic site that describes coal mining history of the valley. Many of the original buildings, and other infrastructure have been preserved.

Today, the neighbourhood has approximately 200 residents living in a tranquil setting along the Red Deer River. The East Coulee Community Hall hosts events and dances, including the annual SpringFest, and holds a pancake breakfast every month. East Coulee's 1930s schoolhouse operates today as the East Coulee School Museum. The museum features a restored 1930's classroom, miners' artifacts, and hundreds of photos of the East Coulee miners, their families and cultural lives.

East Coulee has the potential to be the last stop on river trail within Drumheller, or a resting point for those who wish to continue down the Red Deer River. Structural measures protecting the neighbourhood of East Coulee could become a promenade to connect residents and visitors to the local heritage of the surrounding region, while celebrating views of the Atlas Coal Mine and the river.

THE ROYAL TYRRELL MUSEUM OF PALAEONTOLOGY

The Royal Tyrrell Museum of Palaeontology is located on North Dinosaur Trail at Midland Provincial Park northwest of Downtown Drumheller. The Museum is located in the middle of the fossil rich layers of rock of the Late Cretaceous Horseshoe Canyon Formation. The Badlands Interpretive Trail, a popular 1.4-kilometre hiking trail, is located northeast to the Museum building.

After the collapse of the coal industry, Drumheller's community leaders began talks with provincial government officials in the 1970's looking for ways to bolster the local economy. The government of the time supported the building of a research facility that was then called the Provincial Museum Research Institute somewhere in southern Alberta but there was no plan at that time for a public museum. In 1979 Drumheller was chosen as the site for this facility which was announced the following year. The original plan was soon changed to include a large public museum. Construction began in 1982 and on September 25, 1985 then premier Peter Lougheed officially opened the Tyrrell Museum of Palaeontology. The Royal appellation was added in 1992.

The Royal Tyrrell Museum of Palaeontology is one of the world's leading research and educational facilities in the field of palaeontology. It has welcomed over 10 million visitors since opening in 1985 and is a major economic driver in Drumheller. As of 2020, the Museum houses thirteen exhibits that display approximately 800 fossils on permanent display.

6 OPPORTUNITY

Drumheller is embarking on a bold new chapter. It is a moment of reflection – reading the story again from the beginning to ensure it makes sense. It is a moment of challenge – accepting into the story unfamiliar new characters and settings. And ultimately, it is a moment of excitement – at the immense opportunity that lies in Drumheller's future. Drumheller's residents share a sense of the untapped potential of their place, though it is not always clearly rendered. It is part of the responsibility of this Plan to shine a light on this potential.

Much of the success of this Plan will emerge from a shift in the process of planning and building in Drumheller. Where previous planning documents and authorities have been characterized by constraint and restriction, the new documents and authorities should be encouraging and inviting. Equipped with the vision and policies in this document, development can be more easily assessed – and modified – in support of the Town's goals.

This plan underlines the opportunity in front of Drumheller. Residents, administrators, decision-makers, and investors all have a role to play in bringing this opportunity to life. This will be achieved by seeking out common ground, rallying around the Plan's goals, and keeping open the lines of communication and debate.

FIGURE 17 TOP OF NACMINE LOOKING NORTH FROM MONARCH HILL

PART II
Policies

Part II of the MDP sets out the policies of the plan, building from the context provided in Part I. The policies establish direction on how to achieve the vision, goals, and objectives of the Plan.

PART I — VISION AND CONTEXT

1 ADAPTIVE FLOOD MITIGATION STRATEGY

- Protect existing development
- Implement flood overlay
- Planned retreat of development

2 TRAILS & OPEN SPACE SYSTEM

- River as primary pathway
- Restore river function
- Expand trail network and rec opportunities
- Program a cohesive experience

3 COMPLETE SUSTAINABLE COMMUNITIES

- Infill in existing neighbourhoods
- Diverse housing & mix of uses
- Fiscally responsible municipal services

4 UNIQUE NEIGHBOURHOODS

- Downtown as centre of public life
- Unique form and uses in neighbourhoods
- Conservation and historic resources
- Showcase through open space

5 VALLEY-WIDE TRANSPORTATION

- Sense of arrival
- Multi-modal mix
- Regional connections

6 DIVERSE ECONOMY

- Coordinated visitor experience
- Growth of tourism, rec, and entertainment
- Support existing local businesses
- Expand into emerging sectors

PART II — POLICIES

- FLOOD MITIGATION & CLIMATE ADAPTATION
- TRANSPORTATION & INFRASTRUCTURE
- OPEN SPACE, RECREATION, & TRAILS
- CULTURAL & COMMUNITY SERVICES
- GROWTH
- IMPLEMENTATION
- TOURISM & ECONOMIC DEVELOPMENT

7 FLOOD MITIGATION AND CLIMATE ADAPTATION

Drumheller is a key player in the watershed-wide strategy for flood mitigation in the Red Deer River Watershed. Due to its unique situation in the river valley and the level of development in flood-prone areas, recommendations for local improvements include:

- identifying and pursuing control of existing properties within the defined conveyance zone to preserve channel conveyance capacity;
- upgrading existing dikes to defined flood levels;
- constructing a new diking system in areas where it is technically feasible and can readily be constructed and accommodated within existing rights-of-way;
- accounting for potential impacts of a changing climate by creating an adaptive diking system that can be raised in major flood events;
- detailing the deployment of temporary measures and emergency flood response in the Town's Emergency Management Plan.

Because Drumheller's flood mitigation response is heavily reliant on built infrastructure, the impacts of these structural measures should be understood, particularly for the downstream reaches of the river, prior to construction. In some cases, the structural measures that are required to protect existing neighbourhoods from flooding will encroach on select properties and natural areas. To minimize social, environmental and economic impacts, the appropriate balance must be found between the preservation of channel conveyance capacity, maintenance of existing property, and the development of flood mitigation structures. The following policies are provided to help find that balance and minimize potential negative impacts, and to ensure flood mitigation infrastructure contributes to a shared community recreational asset.

7.1 CONVEYANCE CAPACITY

The first priorities for flood mitigation in the MDP are to define conveyance capacity and make room for the river - which means ensuring river conveyance capacity is not constrained by existing or future development. The following policies outline the requirements for preserving conveyance capacity in Drumheller Valley. Additional policy governing land use and development in flood areas is provided in section 9 Growth Policies.

a) Conveyance capacity for the Red Deer River within Drumheller shall be defined at a rate of 1850 cms plus 0.75 m of freeboard.

b) The defined conveyance zone should be adjusted in the future to reflect changes in flood hazard mapping, river morphology or Provincial policy, among other considerations.

c) Where possible, the Town should reclaim channel conveyance capacity through the acquisition of private lands and establishment of agreements with landowners.

d) The Town will pursue opportunities to increase the role of the conveyance zone as a public amenity for recreation, ecological preservation, education and the enjoyment of nature in the badlands landscape.

7.2 DESIGN AND CONSTRUCTION OF STRUCTURAL MEASURES

The protection of existing neighbourhoods and infrastructure must be balanced with the preservation of channel conveyance capacity in Drumheller Valley. Structural measures are flood barriers that protect Drumheller's neighbourhoods and infrastructures from flooding. Because much of the development in Drumheller Valley is located in flood-prone areas, many neighbourhoods need some level of protection to ensure they remain financeable and insurable. Most existing structural measures in Drumheller are dikes located close to the banks of the Red Deer River and its tributaries. Structural measures will, where possible, build on those existing measures. It is recommended that the system be adaptable, allowing for rapid expansion in advance of flood events. This will make the system more resilient to a changing climate and less intrusive in non-flooding period, as well as allow for better public use and amenity. The following policies provide the guiding framework for the future planning and design of structural measures.

a) Where physically and economically feasible, existing development located in the conveyance zone in the Town of Drumheller should be protected from flooding with adaptive structural measures.

b) Purpose-built structural measures shall be owned by the Town of Drumheller and shall become part of a comprehensive trails and pathway system within the Drumheller Badlands Parks Trail System, to enhance resident quality of life, visitor experience, and catalyze new investment in Drumheller.

c) Structural measures should be designed to:

i. protect to a minimum flow rate of 1850 cms;

ii. include a freeboard of 0.75 m beyond the target flow rate elevation;

iii. have a suitable top width of 6 metres or more, making the system adaptable by allowing vehicle access to add material that raises the barrier elevation in response to higher flow;

iv. consider localized and valley-wide impacts resulting from structural measure construction, such as local and upstream rise in water levels and increased velocity caused by restricting channel flow conveyance during a flood event;

v. provides additional erosion protection measures to mitigate the risks associated with increased velocities; and

vi. consider influence on the river form and long-term trends in the river's stability.

d) Where feasible and suitable, upgrade existing dikes in The Town of Drumheller to increase their level of protection, increase their adaptability, and improve their role in the Valley-wide trail network.

e) Requirements for the deployment of temporary and adaptive structural measures, including required volumes and borrow areas, should be outlined in the Town's Emergency Management Plan.

f) Adverse social, environmental, and economic impacts should be minimized and/or mitigated during the design and implementation of flood mitigation strategies and infrastructure in Drumheller Valley, including:

i. Avoiding displacement of residents and disruptions to neighbourhoods whenever possible;

ii. Mitigating impacts to fish habitat, wildlife, riparian vegetation, water quality and channel maintenance; and

iii. Verifying occurrences of and potential impacts on sensitive species, rare ecological communities, and other site characteristics on site through biophysical assessments, prior to implementation of flood mitigation strategies and infrastructure.

g) Cultural, palaeontological and archaeological assets shall be identified prior to the development of structural measures and should be protected or relocated.

h) Consider the following operational factors during the design and implementation of structural measures and other flood mitigation strategies to minimize adverse impacts to neighbourhoods and the environment:

i. Access for maintenance and operations;

ii. Requirements for fencing and screening; and

iii. Impacts to utilities and stormwater drainage.

i) Structural measures and other flood mitigation strategies employed in Drumheller shall support essential emergency services, such as those provided by the Drumheller Fire Department and Swift Water Rescue.

j) The design of structural measures shall consider ice jams and their formation mechanisms. Considerations for ice jams should be integrated into the use of appropriate freeboards and in the structural design of flood mitigation infrastructure.

k) The design of structural measures shall consider the impacts of debris in flood events, particularly in sharp bends in the river or at man-made structures that constrict the waterway.

7.3 STORMWATER, EROSION CONTROL, AND BANK STABILITY

Even with the regulating influence of the Dickson Dam, erosion and bank stability is a concern along the waterways in the Town of Drumheller, particularly during high flow events. Excessive erosion negatively impacts water quality and can pose a risk to human life, property, and the environment. Erosion control and bank stabilization are critical components of a resilient flood mitigation strategy.

a) Identify and monitor potential and existing risk areas for erosion and scour along the waterways and develop a method for prioritizing bank stabilization projects.

b) Identify critical infrastructure at risk from erosion and bank stability and prioritize these locations for bank stabilization.

c) Infrastructure located on waterways, such as bridges and piers, should be hardened to withstand scour action and to prevent undermining of the supporting structural elements.

d) Flood mitigation measures and bank stabilization techniques should avoid hardened surfaces and should incorporate bio-engineering and riparian planting wherever possible.

e) Creeks and minor drainage channels shall not be obstructed from entering the Red Deer River.

7.4 COORDINATION

An essential part of successful flood mitigation is effective municipal coordination and integration. The following policies direct when the Town will need to coordinate flood mitigation with other municipal projects and priorities.

a) The Town shall engage with Indigenous communities in the planning of structural measures on public lands.

b) The Town shall engage affected homeowners prior to decision making on the provision of structural measures and/or acquisition of properties in the conveyance zone.

c) The Town should engage stakeholders to identify potential and existing risk areas for erosion and scour along the waterway in Drumheller.

d) Ensure the coordination of flood mitigation efforts and regulations between land use planning and emergency management organizations within the municipality, and seek to align the Emergency Management Plan and Municipal Development Plan, where possible.

e) Interpretive materials should be included along berm-top trail systems, as part of the Drumheller Badlands Parks Trail System, to increase understanding of flood history and measures taken to protect Drumheller from flood damage.

8 OPEN SPACE, RECREATION, AND TRAILS

New and exciting opportunities for Drumheller's open space, recreation, and trails network, known as the Drumheller Badlands Parks Trail System, are unlocked through the town's re-imagined relationship with the river and reclaimed identity as a flood community. Anchored by a hierarchy of Trails, Plazas and Pavilions, Parks, and Natural Areas, the Drumheller Badlands Parks Trail System integrates and leverages flood mitigation priorities and infrastructure. These core components of the Drumheller Badlands Parks Trail System invite residents and visitors to explore the landscape and learn about its history, inscribed into the Drumheller Valley by its waterways. Three key elements of the flood mitigation strategy serve as the foundation for the Drumheller Badlands Parks Trail System. These include: (i) the Conveyance Zone, (ii) the System 2100, and (iii) Local Trails/Structural Measures.

CONVEYANCE ZONE

The river draws the primary corridor in the landscape and becomes the spine of the entire Drumheller Badlands Parks Trail System. When it is not used for channel conveyance, the conveyance zone will create space for recreation and ecological connectivity in Drumheller. This zone includes water channels, banks, islands and riparian areas. These spaces are prime candidates for the development of rich natural spaces, a range of recreational amenities, and low-impact uses like campgrounds and sports fields. Bounded by the System 2100, these spaces will invite the river back into the everyday life of Drumheller.

SYSTEM 2100

The System 2100 is a regional route that will provide multi-modal connectivity through Drumheller. This trail will be positioned along the 2100 cms flood level, often following existing rail corridors and roads. This will help define the interface of the safe development and protected zones, providing opportunities to celebrate Drumheller's identity as a flood community through interpretation, public art, and trail and amenity design.

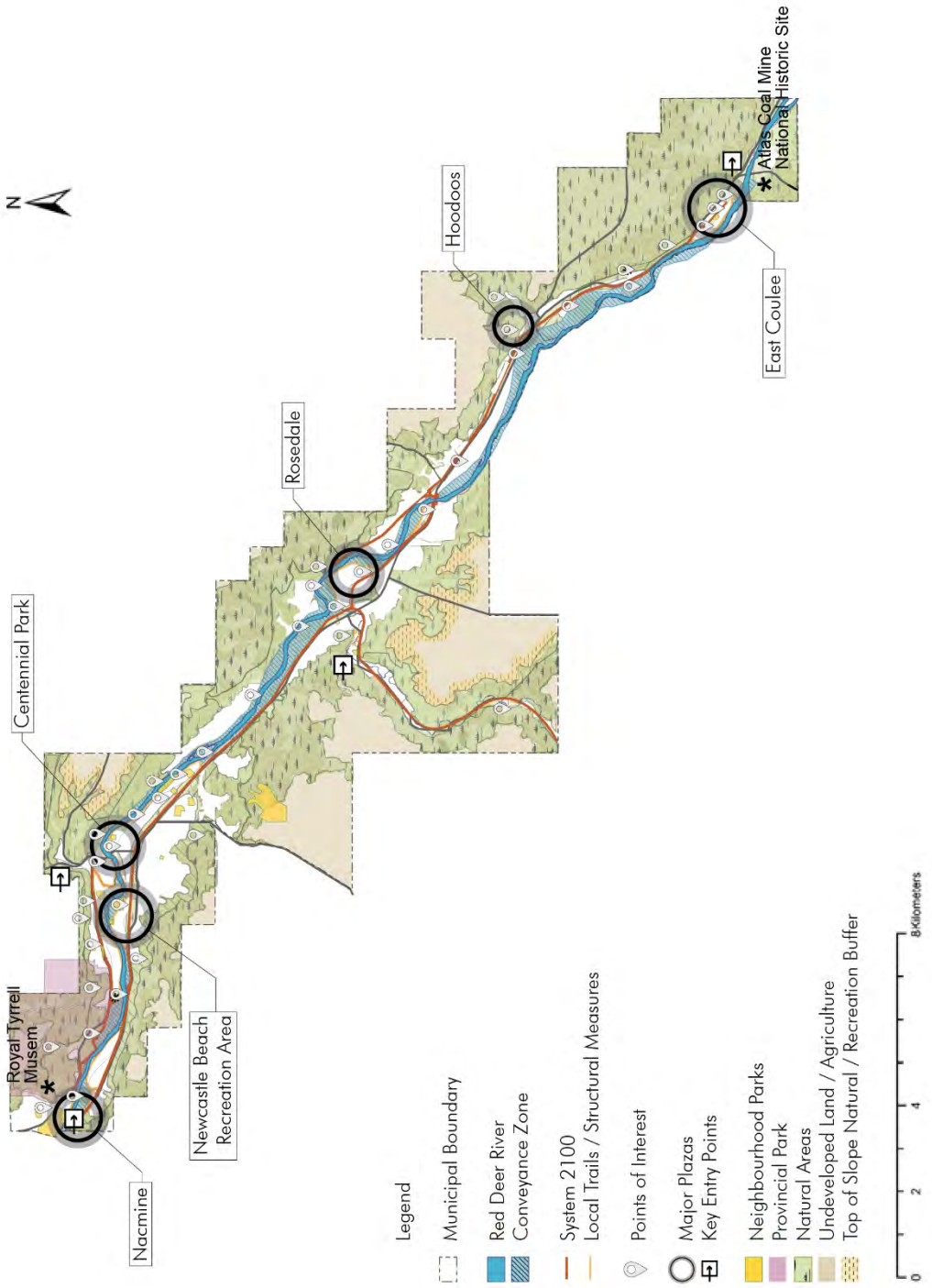
LOCAL TRAILS AND STRUCTURAL MEASURES

Local trails placed along flood mitigation infrastructure and structural measures will provide a publicly accessible neighbourhood amenity and greater access to Drumheller's parks and natural areas. They will connect Drumheller's neighbourhoods to the System 2100 and the Conveyance Zone, with opportunities to celebrate the unique character of each individual neighbourhood.

8.1 DRUMHELLER BADLANDS PARKS TRAIL SYSTEM

The Drumheller Badlands Parks Trail System, shown on Figure 18 , is comprised of four key components: Trails, Plazas + Pavilions, Parks and Natural Areas. These give structure to the Drumheller experience and provide tangible ways to interact with the landscape. Access into Drumheller will be balanced with the preservation and restoration of natural areas for the long-term health of the region's ecological network. This will help to ensure future generations can delight in the discovery of Drumheller and experience the wonder of exploring its inscription on the landscape.

FIGURE 18 DRUMHELLER BADLANDS PARKS TRAIL SYSTEM



a) The Town will continue to improve the Drumheller Badlands Parks Trail System (Figure 18), made up of Trails, Plazas, Pavilions, Parks, and Natural Areas, that integrates and leverages flood mitigation priorities and infrastructure to:

i. protect the conveyance capacity of the river;

ii. protect the integrity of significant badlands landscapes;

iii. increase public access to and enjoyment of open space, trails, and amenities; and

iv. provide opportunities for storytelling and interpretation of Drumheller.

b) The Town will pursue opportunities to leverage the System 2100, Local Trails, Plazas, and Pavilions of the Drumheller Badlands Parks Trail System (Figure 18) as part of the development of the Flood Mitigation and Climate Adaptation System.

c) The overall Drumheller Badlands Parks Trail System will build upon the trails and public places developed as part of the Flood Mitigation and Climate Adaptation System. Future leveraging and integration should:

i. Establish principles and standards for the sustainable and inclusive design, construction, maintenance, and operation of the components;

ii. Provide policies to ensure an adequate supply, quality, diversity and distribution of parks, open spaces, pathways, trails and associated amenities throughout Drumheller;

iii. Provide strategies to finance all components;

iv. Build upon the System 2100 and Local Trails system, by identifying additional local and adventure trails to connect neighbourhoods to active transportation routes, the river, parks, natural areas, and landmarks;

v. Identify significant views, ecological features/corridors, cultural sites, and sensitive landscapes for monitoring, preservation, and/or restoration;

vi. Identify natural areas that are appropriate for varying intensities of use based on a study of environmental sensitivities and potential ecological impacts;

vii. Identify opportunities to increase public access to nature, recreation, and open space through land acquisition or partnerships with private development;

viii. Provide direction for the distribution, planning, and design of additional Plazas and Pavilions.

ix. Establish a park hierarchy that includes River Parks, Neighbourhood Parks and Regional Parks;

x. Provide direction for the creation of new parks or redevelopment of existing parks;

xi. Specify the function of islands along the Red Deer River for river conveyance, habitat, and/or recreation and the extent of open space development to be allowed on them;

xii. Determine the location and suitability of additional river access points;

xiii. Support unique neighbourhood identity and needs;

d) The Drumheller Badlands Parks Trail System should integrate key entry points that announce visitors' arrival into Drumheller. These key entry points should integrate wayfinding and recreation elements where appropriate to connect people to the open space and trail network.

e) Views of the badlands landscape and waterways should be protected from development at key entry points to preserve the sense of arrival.

f) The Drumheller Badlands Parks Trail System will be safe, accessible, and inclusive of people of all ages, abilities, and backgrounds.

g) Employ CPTED principles in the design of all public spaces.

h) A life-cycle fund should be used to assist with capital replacement and repair costs in the Drumheller Badlands Parks Trail System.

8.2 VALLEY CONNECTIVITY

Drumheller's waterways and trail network become the principal way to experience Drumheller and act as the connective tissue that binds Drumheller's extraordinary landscape with its neighbourhoods and unique places.

8.2.1 THE RIVER

The Red Deer River is the primary trail in Drumheller Valley. It is used for transportation and recreation, including boating, fishing, swimming, and other water sports. Located near neighbourhoods, Plazas and Pavilions, river access points will connect to the local and regional trail system, functionally and symbolically weaving the river into the rest of the Drumheller Badlands Parks Trail System.

a) Establish the Red Deer River as the highest tier trail in the Drumheller Badlands Parks Trail System for both transportation and passive river recreation.

b) Locate river access points in areas of lower sensitivity and in close proximity to existing or planned road access.

c) Prioritize the provision of river access points in areas with higher residential density and in parks, pavilions and plazas to take advantage of existing infrastructure where possible.

d) Coordinate the provision of swift water rescue access points between all existing and future bridges.

e) Integrate river access points into the Drumheller Badlands Parks Trail System through pathway and trail connections, wayfinding, signage and amenity design.

FIGURE 19 KAYAKER ON THE RED DEER RIVER

8.2.2 TRAILS

Connecting to the highest tier trail – the Red Deer River – a network of land trails provides multi-modal access throughout Drumheller Valley and reflects the Town's identity as a flood community.

a) Establish a system of land trails in Drumheller that connect parks, the badlands, neighbourhoods, and the river. The hierarchy of trails shall include:

i. A continuous, accessible regional trail (the System 2100) that connects the length of Drumheller. The System 2100 should serve as the secondary regional trail system after the river and communicate the extent of the river's conveyance zone wherever possible;

ii. A network of Local Trails which serve as a tertiary, neighbourhood-level paths. They should be universally accessible wherever possible and should leverage local flood mitigation infrastructure (e.g. structural measures).

iii. Natural or Adventure Trails, which serve as the fourth-level trail system. These should facilitate lower-impact access in natural areas with higher sensitivity.

b) Explore opportunities for the provision of additional pedestrian bridge crossings to create experiential and recreational loops along the trail system and connect to key destinations along the network, including river islands.

c) Ensure the pathway and trail system is sustainable and follows best practices in design, implementation, and maintenance to enhance the user experience and minimize environmental impacts and cost.

d) Where a key trail or pathway connection is required through private land, the Town should pursue land acquisition, easements or partnerships to promote pedestrian connectivity throughout Drumheller.

8.3 PLAZAS AND PAVILIONS

Throughout this new network of trails, plazas and pavilions will provide access, amenity, and legibility to the network. Plazas will be larger nodes along the trail system, serving as venues for larger events or gatherings. Pavilions will be smaller nodes located at intervals along the trail system, at key trail intersections and in neighbourhood parks.

These nodes will activate experiential loops, unlock existing unique places, and provide the scaffolding for unscripted adventure. Drumheller's rich stories, histories, and unique places will be brought to life at these plazas and pavilions. Education about flooding and the changing climate will find a natural home along the river's contours, indicating in real time and space how Drumheller continues to evolve.

a) Provide plazas and pavilions at key trail connections and points of interest to act as gathering areas, resting points and trailheads.

b) The design of plazas and pavilions should allow residents and visitors to enjoy and appreciate significant landscapes, points of interest, landmarks and historic sites in Drumheller while minimizing disturbance in areas of higher sensitivity. Significant landscapes with viewing or interpretation potential include:

i. Sites or structures with historical or cultural significance;

ii. Significant environmental, geological or hydrological features;

iii. Important archaeological or palaeontological discoveries;

iv. Areas of significance to communities and neighbourhoods in Drumheller.

c) Integrate public art, interpretation and educational elements into the design of Plazas and Pavilions.

d) Locate plazas near major landmarks or in regional parks. Plazas should be supported by amenities and infrastructure to support larger gatherings, such as parking lots, buildings/structures and washrooms.

e) Locations for plazas are identified in Figure 18 Drumheller Badlands Parks Trail System.

f) Provide pavilions as rest areas or trailheads. Pavilions should be supported by amenities such as signage, seating, waste receptacles, bicycle amenities, and washrooms.

8.4 PARKS

Parks are open spaces for people – expressions of the Drumheller's landscape that invite people to play, rest, celebrate and reflect. Drumheller's existing leisure parks offer many recreational and open space amenities for residents to enjoy, such as splash pads, sports fields, playgrounds and gardens. The establishment of the river conveyance zone will unlock opportunities to experience open spaces in Drumheller and the potential to establish new river parks. At a local level, new growth areas will introduce additional neighbourhood parks and local open space connections.

8.4.1 EXISTING PARKS

a) The Town should maintain its existing park assets and re-assess at the time of renewal.

b) The Town should incorporate public and stakeholder feedback in the development or redevelopment of its park spaces.

c) Opportunities should be explored to celebrate unique neighbourhood character in existing parks.

8.4.2 FUTURE PARK DEVLEOPMENT

a) Where parks are proposed as part of a development, the developer shall assume all costs associated with developing the park.

b) River parks should accommodate activities appropriate to the site context and sensitivity in the conveyance zone. River parks should be designed to:

i. provide space for people to gather and celebrate the river valley;

ii. accommodate active and passive uses appropriate to the site with a focus on river activities;

iii. minimize impacts to the conveyance zone and riparian areas;

iv. protect people, infrastructure and amenities from the impacts of flooding; and

v. utilize islands where appropriate as special nodes for recreation and camping along the river.

c) Neighbourhood parks should be within or adjacent to existing neighbourhoods and future growth areas. Neighbourhood parks should be informed by a provision analysis based on present and future needs and be designed to:

i. provide recreational opportunities and access to nature focused on the needs of existing and future residents;

ii. include accessible connections to the regional pathway system; and

iii. reflect the character of unique places and neighbourhoods in Drumheller.

d) All parks should be located throughout Drumheller with consideration for existing infrastructure and environmental sensitivity. Parks should be designed to:

i. support both high-intensity and passive recreation uses;

ii. contribute to a greater understanding and appreciation of the history and natural character of Drumheller;

iii. provide buffers between high-intensity activities and residential areas or areas of higher environmental sensitivity.

8.4.3 MUNICIPAL RESERVE

a) Require that 10 percent of the gross developable land being subdivided, less the land required to be dedicated as environmental reserve or environmental reserve easement, be dedicated as Municipal Reserve in accordance with the provisions of the Municipal Government Act.

b) Municipal Reserve dedication may be provided in the form of land, cash-in-lieu, or a combination of land and cash as determined by the Town.

c) Reserve lands, or cash-in-lieu, may be used for school sites, parks or recreational facilities in accordance with the provisions of the Municipal Government Act.

8.5 NATURAL AREAS

Existing natural areas encapsulate many of the intrinsic qualities of Drumheller and its landscape. These areas include steep slopes, coulees, significant geologic features and areas of native vegetation, including grasslands, shrubland and forests. Many of the most recognizable views and iconic images associated with the Town of Drumheller are within its natural areas, which include the river and the badlands. These natural areas present many opportunities for adventure and exploration as well as the protection of sensitive landscapes.

Natural Areas should be considered in two broad categories: those within the Conveyance Zone and those outside the Conveyance Zone (the Badlands Landscape). Each category of Natural Space should consider their ecological function and programming based on the natural qualities of the landscape.

8.5.1 GENERAL

a) Coordinate the acquisition, protection, and enhancement of natural areas with the design and construction of all new Town structural flood mitigation. Seek opportunities to integrate reclamation and bank stabilization activities with the implementation of flood mitigation work.

b) Natural areas shall:

i. contribute to a connected ecological network through the entire Drumheller Valley;

ii. protect and preserve sensitive features in the badlands landscape, including steep slopes, coulees, significant geologic features and areas of native vegetation;

iii. Preserve important natural viewsheds from transportation corridors, Parks and Plazas; and

iv. Provide interpretation to tell the story of Drumheller for present and future generations.

c) Natural areas in the Conveyance Zone should:

i. act as the primary ecological and recreation corridor in Drumheller;

ii. provide opportunities for trail use, passive recreation, nature appreciation and river access, among other (mainly passive) uses appropriate to the setting; and

iii. contribute to the protection and enhancement of channel conveyance capacity, water quality, fish habitat and riparian health.

d) Empower residents and visitors to become active participants and stewards in planning, sustaining and using the Drumheller Badlands Parks Trail System.

e) Work with Indigenous communities, senior governments, and organizations to protect, manage, and steward natural areas.

f) Encourage development to retain and reintroduce native vegetation.

8.5.2 SENSITIVE LANDS

a) Identify and protect sensitive lands, such as:

i. Significant native grasslands;

ii. Intact forests and shrubland;

iii. Steep slopes and significant landforms;

iv. Sites with archaeological, palaeontological or cultural significance;

v. Areas identified as key wildlife corridors; and

vi. Significant wetlands, riparian areas and fish habitat.

b) Support the integration of low-impact, sustainable recreation in natural areas where appropriate and without adversely affecting environmentally sensitive lands.

c) Wherever possible, seek public ownership of designated environmentally sensitive lands.

d) Wherever possible, connect sensitive lands to parks and other natural areas.

e) Identify and pursue opportunities to reclaim areas that have been disturbed to enhance ecological linkages, improve bank stability and restore wildlife habitat.

8.5.3 ENVIRONMENTAL RESERVE

a) All lands that are unsuitable for development shall be dedicated as environmental reserve through the subdivision process, in accordance with the Municipal Government Act.

b) Any subdivision proposal adjacent to a water body or water course shall dedicate a minimum 30 metre buffer from the water body/ course as environmental reserve to protect riparian areas and provide public access.

c) An environmental reserve easement may be allowed in place of environmental reserve dedication where there is no public access required or likely to be desired in the future.

d) Environmental reserve lands may be used to extend the public trail system, if the ecological integrity of the land is retained or enhanced.

e) Consider the use of land purchases, land swaps, leasing agreements, conservation agreements and easements to protect important natural features that do not qualify as environmental reserve land.

8.6 PROGRAMMING AND INTERPRETIVE ELEMENTS

Neighbourhoods and the Drumheller Badlands Parks Trail System should tell the many stories of Drumheller and its history, with a focus on its waterways and unique places.

8.6.1 GENERAL

a) Educational and interpretive elements in the landscape should be thoughtfully integrated into the Drumheller Badlands Parks Trail System and wayfinding system to create an immersive, layered visitor experience.

b) Leverage physical and cultural heritage to tell the stories of Drumheller's history, celebrate its unique places, build Drumheller's identity, establish a sense of place within the Drumheller Badlands Parks Trail System, and teach visitors about flooding, the changing climate and how Drumheller continues to evolve.

c) The essential qualities of Drumheller's river and badlands corridors should be reflected in the form, materials and programming of elements in the Drumheller Badlands Parks Trail System.

d) Investigate locations for accommodating future events and festivals, considering available amenities, impacts on open space and surrounding neighbourhoods, and the distribution of events and festivals valley-wide.

e) Support events and initiatives in open spaces that actively promote intercultural awareness, including outreach and welcome events for newcomers and other members of the community.

f) Maintain and develop programming and amenities that encourage winter activity, and provide appropriate ancillary facilities, such as winter chalets, temporary shelters, washrooms, cleared pathways and active-transportation connections.

g) Pursue partnerships with schools and organizations to carry out educational programming in the Drumheller Badlands Parks Trail System.

8.6.2 RECREATIONAL USES

a) Multi-functional and joint use parks and recreation facilities should be encouraged wherever possible.

b) Encourage local community groups to assist with the management of local park and recreation facilities and enter into maintenance and operation agreements with community groups when this occurs.

8.6.3 COMMERCIAL USES

a) Allow commercial activities within the Drumheller Badlands Parks Trail System, prioritizing commercial activities that support open-space services (e.g. equipment outfitters, watercraft and bicycle rental shops, food and beverage kiosks). Commercial uses and facilities should reflect the character and identity of Drumheller and should be sensitive to the landscape context.

b) Locate new or expanded commercial services in disturbed areas where they will have the least impact to ecological and trail connectivity.

8.7 CLIMATE ADAPTATION

a) Consider natural features as green infrastructure, recognizing the economic, social, and environmental benefits that they provide to the Town.

b) Apply and integrate natural capital in the municipality's **Asset Management Plan** to recognize the role of ecosystem services and provide for their maintenance and regular support alongside traditional capital assets.

c) Increase the urban tree canopy and vegetated areas on Town streets and parks to reduce the urban heat island effects, decrease surface stormwater runoff, and sequester carbon. Ensure the use of species that are adapted to the climate of Drumheller.

d) Retain significant mature trees whenever possible, and require replacement if removal is necessary.

e) Encourage developers to retain existing wetlands rather than providing compensation to the Province.

f) Naturalize stormwater management facilities wherever possible to enhance their ecological value and recreational benefits.

g) Increase the use of native, low-maintenance, and low-water species in the design and maintenance of parks.

h) Encourage the use of xeriscaping in new developments.

i) Encourage green building techniques and energy efficiency in building design.

9 GROWTH

The rivers shape all growth in Drumheller and have for eons. Most of the existing development in Drumheller is adjacent to the rivers because of their timeless amenity. The rivers are a transportation route, recreation asset, and water source, and are closely linked to Drumheller's most significant natural areas and views. At the same time, development closest to the rivers is at highest risk of flooding. This flood risk is anticipated to ve as the changing climate alters the frequency and severity of weather events.

Building from an understanding of the rivers and their needs, as well as the Town's planned structural mitigation priorities, the MDP provides direction on how and where growth and future land uses should occur in Drumheller (Figure 20 Land Use Map). The policies direct the establishment of a Flood Overlay system in the Land Use Bylaw which will be directly tied to the Town's structural mitigation infrastructure.

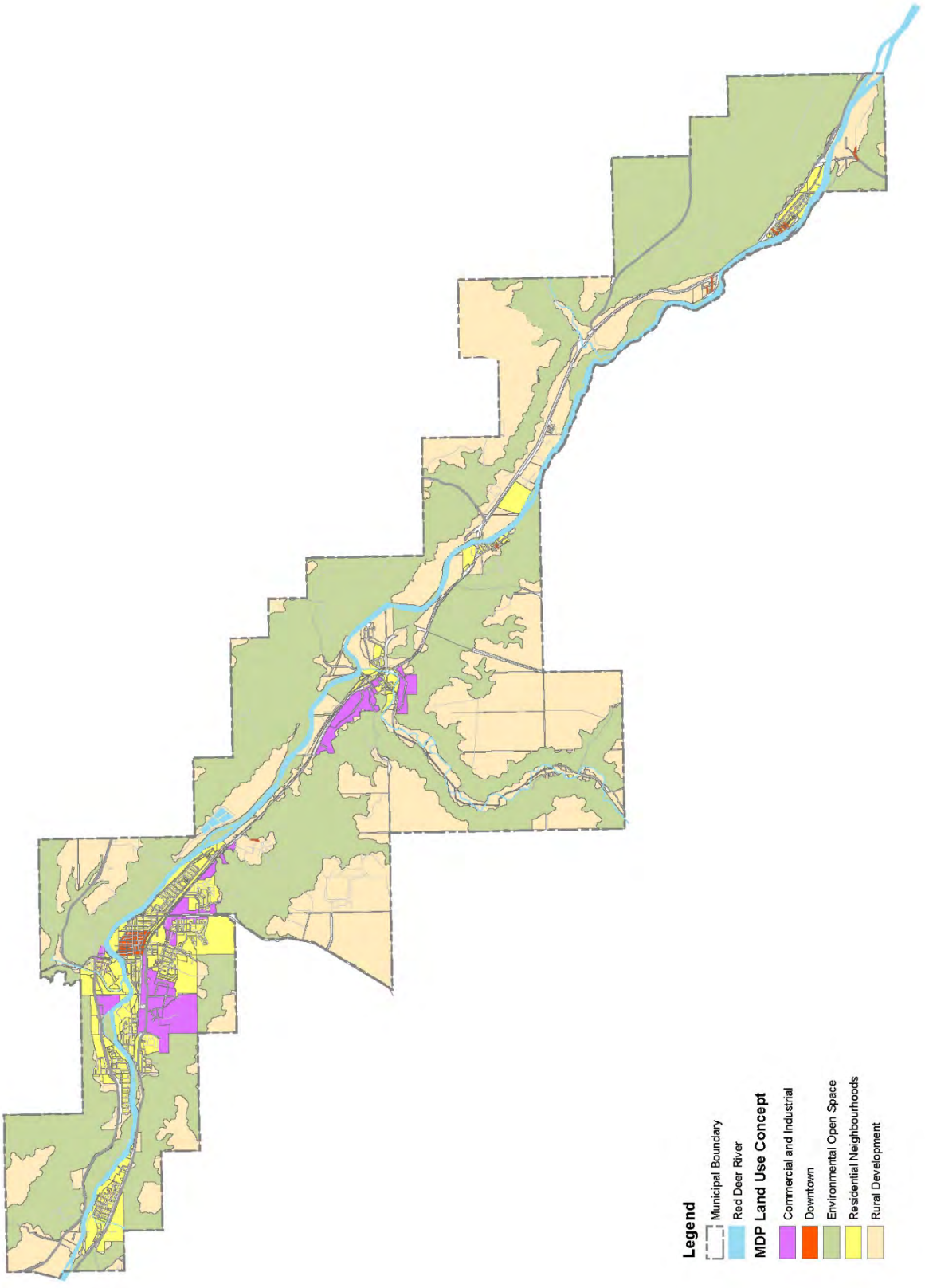
In general, growth will occur in two main forms: through infill within existing protected neighbourhoods, and through the development of new neighbourhoods.

Most of the existing neighbourhoods within Drumheller are located along the banks of the Red Deer River and are inherently at a higher risk of flooding. Through the upgrade and development of new physical mitigation measures, the Town will be providing an additional layer of flood protection to several of these neighbourhoods to improve their overall resiliency and increase their potential for infill growth. Any development in these protected zones will be subject to additional on-site flood mitigation requirements to increase their resilience to flooding.

New neighbourhoods provide an opportunity to build a new generation of flood-resilient development in Drumheller. These new growth areas are located where there is the least flood hazard risk and the least dependence on physical mitigation infrastructure. Growth in these areas will be guided by future Area Structure Plans to ensure that they provide for adequate servicing, transportation, and infrastructure connections, and enable the development of walkable mixed-use communities and high quality employment areas, linked into the overall Open Space, Recreation, and Trails Network**.**

In alignment with the Vision for Drumheller, the MDP provides the opportunity to surpass the existing growth rate and capitalize on new development locations, furthering the Drumheller experience for both residents and visitors. The policies in this section provide additional flexibility for new and innovative development, enabling investor confidence that flood and other hazard risks have been appropriately mitigated.

FIGURE 20 LAND USE MAP



9.1 RESILIENT DEVELOPMENT

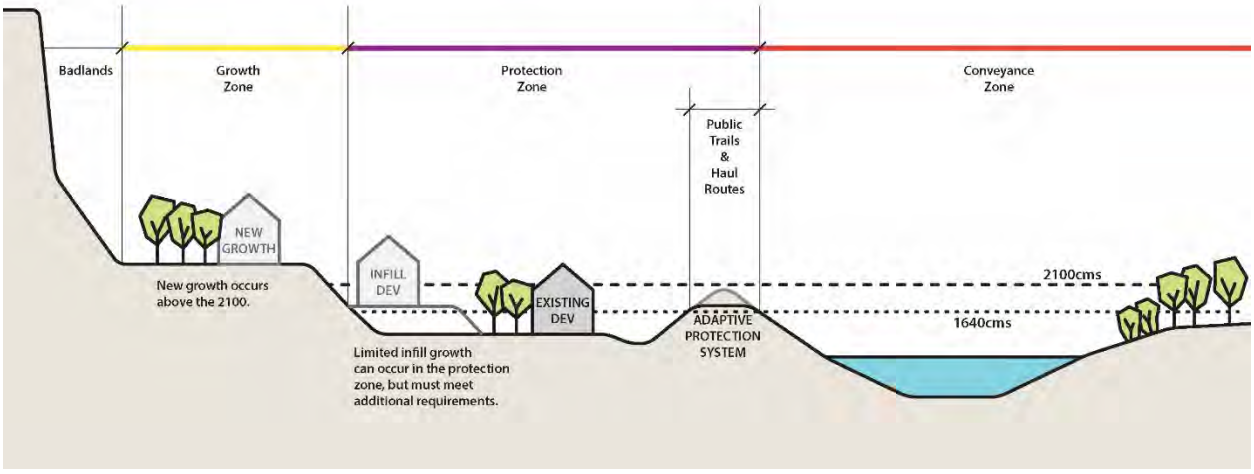
As part of changing the town's relationship to its rivers, the MDP provides direction on how all new development must respond to flood hazard. This direction is integrated with the Town's planned adaptive structural mitigation. In addition to ensuring development is resilient to the flood hazard posed by the rivers, the policies in this section address mitigation required to respond to other hazards present in Drumheller, such as steep slopes and undermining.

9.1.1 FLOOD RESILIENCE

Due to Drumheller's location within the Red Deer River floodplain, large portions of the town are subject to flooding and are designated as flood hazard areas. In response to this hazard and the risk it poses to property and public safety, the Town will be providing structural measures, as per section 7 Flood Mitigation and Climate Adaptation, to protect existing neighbourhoods during flood events. In addition to the structural measures, the Town will provide guidance to ensure that both infill development within existing neighbourhoods and new development outside of the flood hazard area will be flood resilient and appropriately located to minimize and mitigate the risk of flood damage.

Central to the achievement of flood resilient development within the town is the establishment of a Flood Hazard Overlay within the Land Use Bylaw. The Flood Hazard Overlay will define the rules for development within areas of the town that are most susceptible to flooding while also ensuring that enough space is given to the rivers to accommodate their natural fluctuations over time. The Flood Hazard Overlay consists of two zones: the conveyance zone and the protected zone (Figure 21 Flood Hazard Overlay). The conveyance zone will be reserved for public and private recreational use, while areas within the protected zone must provide additional on-site mitigation to reduce overall flood risk. Areas of the town outside of the designated Flood Overlay will not require on-site flood mitigation.

FIGURE 21 FLOOD HAZARD OVERLAY



a) Implement a Flood Hazard Overlay in the Land Use Bylaw that:

i. Protects areas within the conveyance zone to preserve the rivers' flood conveyance capacity, drainage relief functions, and environmental integrity;

ii. Supports the provision of publicly accessible open space, passive recreation, low-impact agriculture, trails, and related amenities and uses within the conveyance zone;

iii. Prohibits new habitable development in the conveyance zone;

iv. Supports infill development and redevelopment of lands within the Protected Zone; and

v. Establishes a Flood Construction Level, which is the minimum construction elevation required, for all new development located in protected zones.

The Flood Hazard Overlay will supersede all other land use district regulations.

b) In the conveyance zone, consult with existing property owners on planning a retreat of development in these areas through land exchange or other mechanisms. Where a landowner wishes to retain the existing development and use, the Town is not liable for damages incurred from flooding.

c) Update existing ARPs and ASPs to conform to the new flood mitigation policies within the MDP and the Land Use Bylaw.

d) Investigate mechanisms to finance ongoing maintenance of structural mitigation infrastructure.

e) Regularly amend the Flood Hazard Overlay in the Land Use Bylaw to reflect updated flood hazard mapping, channel conveyance capacity, and the provision of new or improved Town structural measures.

9.1.2 OTHER HAZARDS AND DEVELOPMENT CONSTRAINTS

In addition to the hazard risk from flooding, there are several additional constraints that impact development in Drumheller, as indicated in Figure 22 Development Constraints. The following policies address the specific requirements of the Municipal Government Act and identify additional Provincially established setbacks required from several uses, including Sour Gas Facilities and waste treatment/management facilities. They also provide direction for development in areas with steep slopes and where there has been undermining to ensure adequate studies and mitigation are or have been conducted to reduce risk.

a) Refer all relevant development and subdivision applications to the Provincial Energy Regulator, in accordance with the Municipal Government Act.

b) Consult with the Provincial Energy Regulator on proposed Sour Gas Facilities to ensure they do not impact existing residential neighbourhoods.

c) Prohibit any development that does not conform to provincial Sour Gas setbacks, unless given official written direction from the Province authorizing a setback reduction.

d) Do not approve any subdivision or development proposals for schools, hospitals, food establishments, or residential use within 300 metres of the Town's wastewater treatment plant or landfill, as per the Alberta Subdivision and Development Regulation, unless a waiver is obtained from the Province.

e) Require technical studies and updates to determine hazard risk for any proposed development with potential undermining. The study shall be conducted by a professional engineer and address:

i. Slumping or subsidence risk;

ii. Estimated level of risk to public safety; and

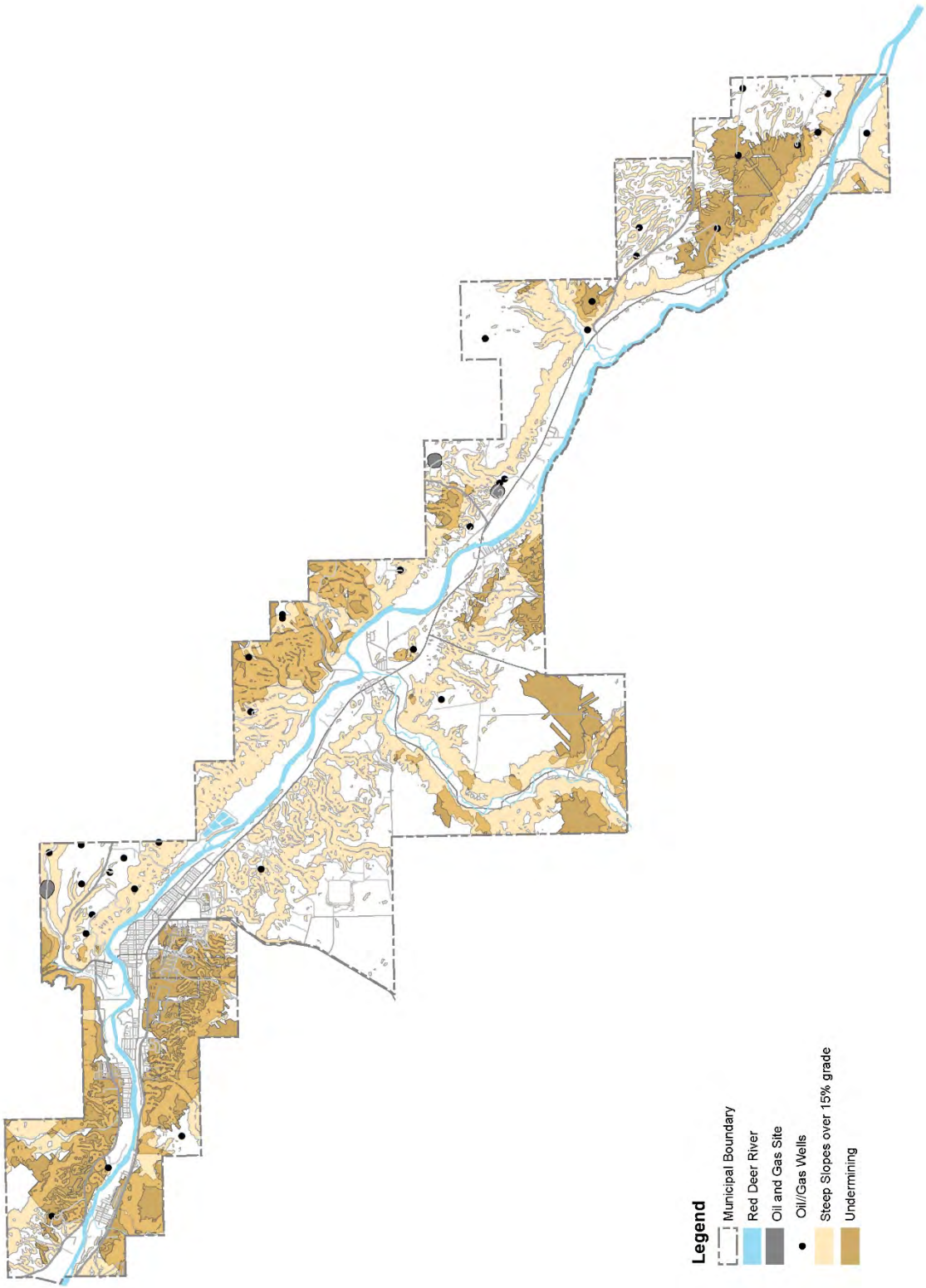
iii. the appropriateness of the proposed development with respect to the undermining conditions.

f) Any proposed development in proximity to or containing a steep slope, defined as any slope over 15% grade, shall conduct a geotechnical engineering assessment to establish required development setbacks from the steep slopes.

g) Discourage new pipeline development in designated growth areas and ensure routing adequately considers impacts on landscapes, natural features, and planned development to ensure land is not unnecessarily fragmented, scarred, or impacted.

h) Encourage the Province and industry to efficiently and effectively remediate abandoned well sites and pipelines.

FIGURE 22 DEVELOPMENT CONSTRAINTS



9.2 LANDSCAPE SENSITIVE DEVELOPMENT

The badlands are the essence of the Drumheller Valley. These dynamic landscapes are a major draw for residents and visitors alike, creating an immersive experience like no other. Understanding their immense significance to economic development, recreation, tourism, and overall aesthetic of the Town, it is essential that critical views of these landscapes are considered and protected as the Town grows. Figure 23 identifies important badlands views at a high level from major transportation routes within the Valley. These are areas where future development could have a significant impact on the overall experience and views of the badlands landscapes, and where these impacts will need to be mitigated.

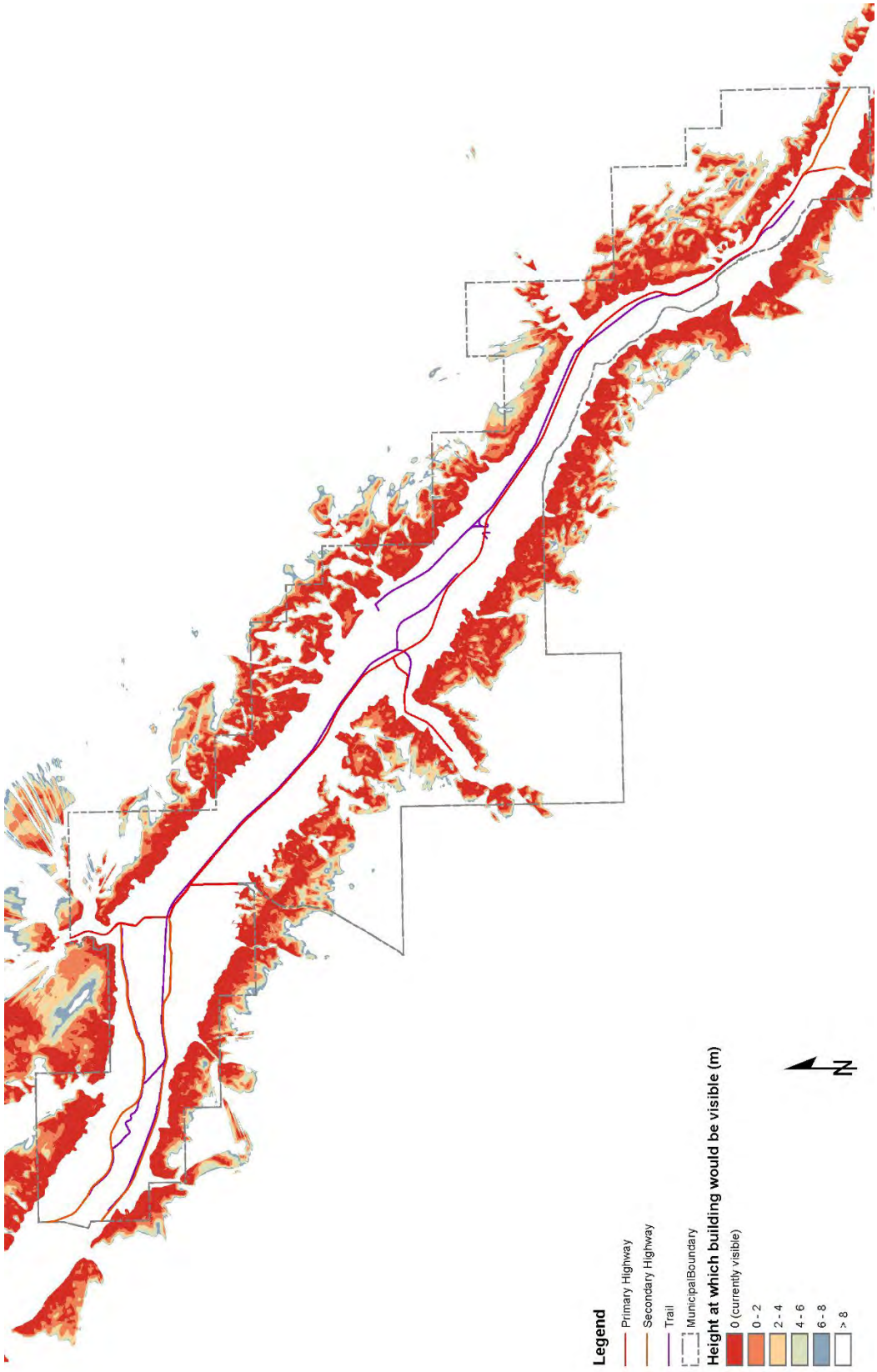
a) Ensure that all new buildings and structures located above the Valley escarpment are not visible from the major highways within the Valley.

b) Ensure that new roads and parking areas are set back from the escarpment edge so that vehicles are not visible from the major highways within the Valley.

c) Where possible, development on the first bench should be designed to enhance the existing badlands landscapes, such as nesting development within existing hills to protect views from main transportation corridors.

d) Work with adjacent municipalities to identify and protect significant views of the badlands outside of but visible from the Town of Drumheller, through Intermunicipal Development Plans.

FIGURE 23 SIGNIFICANT VIEWS



9.3 RESIDENTIAL NEIGHBOURHOODS

Residential neighbourhoods are where the majority of Drumhellerites live. Currently, these areas are made up of predominantly single-family housing. The MDP enables the continued development of this type of housing, while also fostering flexibility to encourage a wider range of ground-oriented, infill, secondary, and multi-family housing options. Additionally, the MDP promotes greater mixing of non-residential uses within neighbourhoods and the establishment of neighbourhood commercial nodes. This will allow residents to access more services, institutional uses, recreation, and employment opportunities within walking or cycling distance from home, creating more 'complete' and walkable communities.

9.3.1 GENERAL

General residential neighbourhood policies apply to both infill neighbourhoods and new neighbourhoods in Drumheller.

a) Direct future residential development to the Residential Neighbourhood areas identified in Figure 20 Land Use Map.

b) Encourage a mix of uses in all residential neighbourhoods.

c) Enable and encourage 'live-work' and home-based business and services in all residential neighbourhoods.

d) Through the Land Use Bylaw, support the development of a wide variety of housing forms and densities scaled to fit within traditional single-unit areas, such as cottages, courtyard housing, row housing, duplexes, triplexes, and stacked flats.

e) Encourage the development of attached and detached secondary residences.

f) Encourage the development of small flex units. Monitor unit design and implications for neighbourhood livability and affordability.

g) Support the development of mixed-use local commercial nodes in neighbourhoods to provide walkable amenities, services, employment opportunities, and multi-family housing.

h) Local commercial nodes in residential neighbourhoods shall be designed as pedestrian-focused environments, integrated with the public realm and streetscape.

i) Local commercial nodes should be sited in central locations within residential neighbourhoods with access from collector roads and connections to active transportation networks and trails. Consideration should be given for potential future transit connectivity.

j) Support the development of seniors' housing and age-in-place facilities.

k) Encourage the use of Crime Prevention Through Environmental Design (CPTED) principles in site planning for private properties and neighbourhood design, as a means of enhancing security and safety in the community.

l) Remove minimum parking requirements in the Land Use Bylaw for new residential development.

m) Encourage the provision of bicycle parking in multi-family and mixed-use developments, including local commercial nodes.

n) Ensure the location, design, and scale of residential development is sensitively integrated with adjacent parks, open space, pathways and trails in a comprehensive and supporting manner.

9.3.2 INFILL NEIGHBOURHOODS

Infill areas allow future development to capitalize upon the assets and amenities in Drumheller's existing neighbourhoods. The following provides direction on how Infill areas may be developed to compliment existing neighbourhoods and character. Over time, new development should move above 2100 cms.

a) Allow infill development in existing neighbourhoods and the construction of already planned neighbourhoods within the protected zone.

b) Ensure infill development within existing neighbourhoods is compatible with existing development, including consideration for:

i. Compatibility in height and scale;

ii. Continuity with existing lot patterns, laneways, and streetscapes;

iii. Preservation of existing vegetation;

iv. Integration of buildings considered to have historical significance; and

v. Capacity of municipal utilities and infrastructure.

c) Develop Area Redevelopment Plans to support community revitalization efforts or redevelopment of major sites.

d) Consider the provision of specific neighbourhood overlays in the Land Use Bylaw, to retain and enhance the characteristics and/or built form of neighbourhoods.

9.3.3 NEW NEIGHBOURHOODS

New neighbourhoods allow for the continued growth and expansion in Drumheller, providing opportunities for diverse new housing options and lifestyles. The policies in this section ensure that all new neighbourhoods are aligned with the goals and objectives of the MDP and are developed in a logical sequence to ensure continuity and connection to the rest of Drumheller.

The MDP sets out several potential future growth areas for the development of new neighbourhoods. All new future growth areas are outside of the conveyance and protection zones of the Flood Overlay, making these areas the most resilient to flood risk and significant opportunities for new and innovative development. The potential growth areas are shown on Figure 24 Potential Growth Areas**.** The growth areas identified are not exhaustive, and it is anticipated that the Town will identify additional growth areas in the future.

The potential growth areas are organized into three levels of development opportunity. Level I are the highest opportunity growth areas, given their ability to be serviced and connected efficiently to existing development. Level II present the next level of opportunity, where there are some challenges, restrictions, and servicing that would need to be addressed before growth can occur. Level III are longer term opportunities, that should be considered once the Level I and II have been developed. The identified growth areas represent development opportunities that have the capacity to enrich and grow Drumheller safely out of the river's reach.

a) Encourage the establishment of new neighbourhoods in the potential growth areas identified in Figure 24 Potential Growth Areas, and in future growth areas identified by the Town above 2100 cms.

b) Ensure all new neighbourhoods are designed to have a high level of connectivity for active modes, through the provision of street networks and pathway and trail connections.

c) Discourage exclusively large-lot single-unit developments within new neighbourhoods.

d) Encourage sustainable, complete community design of new neighbourhoods, including:

i. Water protection and conservation;

ii. Compact build form;

iii. Resource conservation/reduction of waste;

iv. Protection of locally significant wildlife habitat and ecological systems;

v. Provision of local open space and recreation amenities;

vi. Energy efficient buildings and renewable/district energy systems; and

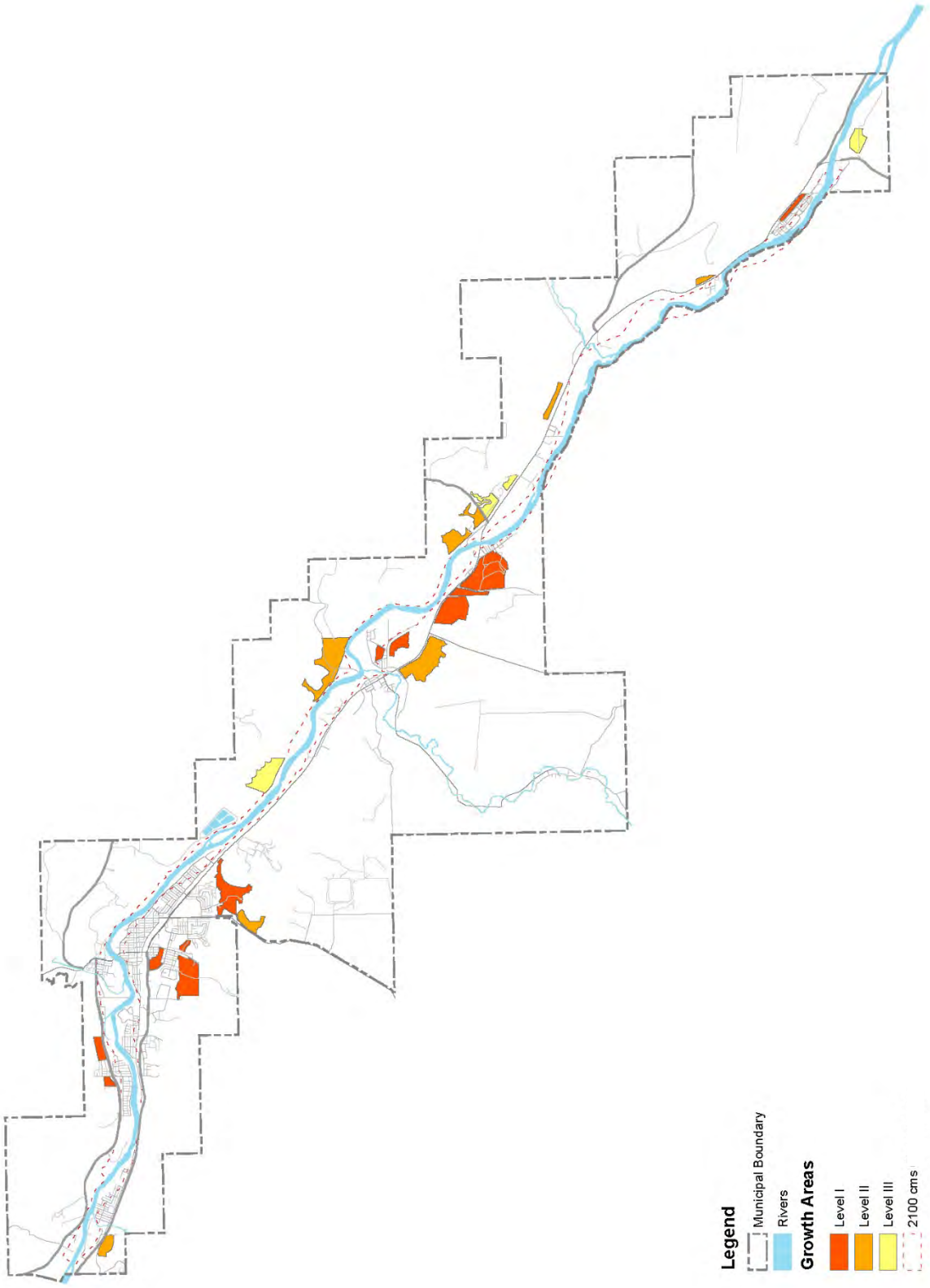
vii. Green roofs.

e) Consider the use of Envision, the Public Infrastructure Engineering Vulnerability Committee (PIEVC) and National Asset Management System (NAMS) Canada to evaluate the sustainability of future large scale developments.

f) Actively identify growth areas to developers and seek opportunities to partner in their development and servicing.

g) Require the completion of an Area Structure Plan (ASP) for the development of all new neighbourhoods. ASPs may be led by the developer or the Town. Area Structure Plans shall be consistent with the policies of the Municipal Development Plan.

FIGURE 24 POTENTIAL GROWTH AREAS (ABOVE 2100 CMS)



h) Area Structure Plans must incorporate the following:

i. Plan area and land ownership;

ii. Identification and mitigation of hazard risk;

iii. Identification of environmentally sensitive features and wetlands, and areas to be established as Environmental Reserve;

iv. Identification and consideration of cultural/historical resources;

v. Parks and open spaces network and linkages to the Valley-wide trail network;

vi. Proposed land uses;

vii. Any lands to be designated as Municipal Reserve for school or other public uses;

viii. Proposed roads and streets network;

ix. High level servicing concept;

x. Projected population and maximum number of dwelling units;

xi. Potential emergency shelter and supply locations and egress routes;

xii. Conceptual phasing/sequencing of development; and

xiii. Any additional technical studies requested by the Town.

9.4 COMMERCIAL AND INDUSTRIAL AREAS

Commercial and industrial areas facilitate the retention and expansion of critical industries and businesses in Drumheller, contributing to a diverse and prosperous economy. The majority of Drumheller's commercial and industrial development will be located within downtown and identified employment areas. The following policies direct where and how commercial and industrial areas will be developed to enable a prosperous and diverse Valley economy.

a) Direct major commercial and industrial uses to the commercial and industrial areas indicated in Figure 20 Land Use Map.

b) Commercial and industrial areas shall include a variety of industrial and commercial developments to provide for a range of employment and economic development opportunities in Drumheller.

c) Encourage large-scale value-added agricultural industries and related manufacturing to develop in identified commercial and industrial areas.

d) In existing unserviced employment areas, encourage uses that require outdoor storage and/or have limited need for municipal services.

e) Discourage heavy employment traffic routing through residential areas.

f) Ensure roads and parking for major employment areas are paved to handle heavy traffic.

g) Development in commercial and industrial areas should provide:

i. accessible and connected pedestrian pathways, crossings, and entrances;

ii. paved roads and parking areas with adequate drainage;

iii. landscaping adjacent to roads and residential areas;

iv. bike parking;

v. screened storage areas; and

vi. loading areas to the side or rear of buildings.

h) Ensure the location, design, and scale commercial, and industrial development is sensitively integrated with adjacent parks, open space, pathways and trails in a comprehensive and supporting manner.

9.5 DOWNTOWN

A downtown is a highly visible and important indicator of a community's economic and social health. When downtown Drumheller thrives, the town as a whole benefits. Enhancing downtown Drumheller as a destination for retail, dining, entertainment, culture, and events will play a significant role in attracting new residents and visitors, as well as stimulating new investment, businesses, and industries throughout the town.

Successful downtowns are not just places for recreation, shopping, dining, or work; they are also places where people live. More people living downtown means more regular business for shops of all kinds, more foot traffic, and a greater sense of local vitality in the area. A diverse downtown with more residents and activities will result in a more physically, socially, and economically vibrant community that attracts visitors and investment.

The MDP reinforces downtown's role as Drumheller's heart of civic life and centre of commerce, as well as a complete and livable community. The policies direct creation and implementation of a Downtown Area Revitalization Plan, which will set out further direction for land use, programming, and actions to attract and coordinate reinvestment and promote downtown as the basecamp for all visitors to Drumheller.

a) Establish, maintain, and implement a Downtown Area Revitalization Plan. The Downtown Area Revitalization Plan should:

i. Coordinate public and private investment;

ii. Provide direction on urban design and public realm improvements, including streets, parks, and other public spaces;

iii. Guide land use planning and development;

iv. Enhance the visitor experience of downtown;

v. Support economic, social, cultural, and environmental prosperity in Drumheller;

vi. Provide measurable goals for successful implementation.

b) Increase the number and diversity of residents living in downtown by allowing for additional residential density, incentivizing residential development (through grants and other programs), and prioritizing the development of services and amenities to support residents.

c) Create a clear visual and pedestrian linkage between downtown, the surrounding badlands landscape, and the Red Deer River by integrating its public realm and open space concepts with Drumheller Badlands Parks Trail System.

d) Target initiatives in downtown to revitalize and activate vacant properties and generate economic development, such as business incubation programs or temporary placemaking projects.

e) Elevate the pedestrian experience in downtown and improve universal access through coordinated public realm and wayfinding improvements and the implementation of design guidelines.

f) Focus Valley wide-celebrations in downtown and Centennial Park and support temporary street closures for events.

g) Encourage private and non-profit educational institutions to locate campuses downtown.

h) Work with the existing downtown business community to generate more evening, weekend, and year-round activity and traffic in the downtown.

i) Communicate and promote Town-led downtown initiatives to encourage uptake of incentives and build assurance in the Town's commitment to reinvest in downtown.

j) Prioritize the enforcement of the Community Standards Bylaw in the downtown.

9.6 RURAL DEVELOPMENT AREAS

Rural development is part of the badlands landscape and the overall Drumheller experience. Rural development areas contribute to the economy through various agricultural and resource development activities as well as recreational and cultural pursuits. Drumheller's rural development areas also provide for country living, immersed in the badlands landscape.

9.6.1 GENERAL

The general policies apply to all rural development areas.

a) Allow country residential development in specific locations within the rural development areas identified on Figure 20 Land Use Map, where it will not adversely impact the badlands landscape, is compatible with surrounding uses, and either has adequate soil capacity for proper sewage disposal or is connected to municipal servicing.

b) Large concentrations of large country residential lots should be discouraged.

c) Support the development of private recreation, such as golf courses, ranches, and other uses in rural development areas provided that:

i. The intensity and scale of development is appropriate for the site;

ii. Uses are sensitive to the natural landscape on and adjacent to the site; and

iii. Potential impacts on the environment, cultural and historic resources, and adjacent uses can be mitigated

appropriately, including the functionality of adjacent wildlife corridors or habitat

patches,

9.6.2 AGRICULTURE

Agriculture is an important part of the local economy. The MDP encourages innovative agriculture that employs sustainability techniques and technologies to enable a food system that is adaptive to a changing climate.

a) Allow continued agricultural operations in specific locations within the rural development areas identified on Figure 20 Land Use Map where it is compatible with surrounding land uses and supports the overall Drumheller experience.

b) Support land use applications for new, innovative agricultural ventures that may require unique planning solutions when they support the vision and guiding principles of the MDP.

c) Prohibit confined feeding operations within the municipal boundaries, given flood hazard risk and impacts on residential neighbourhoods.

9.6.3 RESOURCE DEVELOPMENT

Historically Drumheller's economy was entirely dependent on resource development and extraction. Today resource development remains a smaller yet still important component of the Town's economy. All resource development needs to be considered within the lens of protecting the badlands landscape and overall Drumheller experience.

a) Allow natural resource extraction in specific locations within the rural development areas identified on Figure 20 Land Use Map where it is compatible with surrounding land uses and does not detract from the badlands.

b) Natural resource extraction activities shall provide appropriate buffers and screening to minimize land use conflicts and preserve the badlands landscapes.

c) Aggregate resource extraction shall only be allowed in Drumheller when it is conducted on less visible slopes.

d) Further development of oil and gas wells shall be discouraged within sight of the brink of the escarpment, or any other distance required to ensure well site structures and facilities are not visible from the valley floor.

e) The development of new oil and gas well sites and pipelines along the valley floor and within the Town of Drumheller shall be discouraged.

f) Support the development of renewable energy production projects to diversify Drumheller's economy where they do not detract from significant views and landscapes.

10 TOURISM AND ECONOMIC DEVELOPMENT

Historically, Drumheller's economy was focused on resource extraction and agriculture. Many of the Town's existing neighbourhoods owe their existence to early coal mining settlements. While resource development and agricultural industries are still present, the economy has shifted over time to a wider variety of tourism and service industries that capitalize on the remarkable Drumheller experience, including the scenic badlands landscapes and the layers of natural and human stories. Today, the Drumheller Institution and the Drumheller Health Centre are the two major employers in the town.

Drumheller sees nearly 500,000 visitors annually for the Royal Tyrrell Museum of Palaeontology alone. Additional visitors come to the area for the many other attractions, recreational pursuits and events; however, many of these visitors do not stay in town for long. One of the critical tourism and economic development priorities of the MDP is to capitalize on existing visitor traffic, providing visitors with reasons to both stay longer in Drumheller and return often. With the expansion of regional trail networks and wayfinding, many opportunities will be unlocked for the expansion of recreation, adventure, and eco-tourism activities and services throughout Drumheller as well as a range of other cultural and experience-based tourism industries.

When appropriately integrated and leveraged, tourism provides an investment in community's social and economic wellbeing. It can also help to protect and promote the distinct culture and heritage of a place. The economic benefits of tourism include sustaining local businesses; enabling diverse food, beverage, and retail options; increasing employment opportunities; and stimulating additional economic activity. The success of established and new businesses results in more tax revenue that can be used by municipalities for infrastructure improvements, grants and support for businesses, and additional services for residents.

The Town's economic development strategy supports a diverse and prosperous economy. The MDP policies provide guidance for fostering tourism and recreation industries that enhance the Drumheller experience and Drumheller's reputation as a world class tourism destination. At the same time, the MDP supports the expansion, retention, and promotion of local, 'made-in-Drumheller' business and talent, as well as the introduction of new and innovative enterprises. The MDP seeks to remove barriers to economic development, generate more year-round and seasonal employment opportunities, and build in added flexibility that allows development to capitalize on opportunities and be more resilient to changing markets.

10.1.1 GENERAL

The general economic development policies focus on supporting existing business and industry while also diversifying economic activity in Drumheller.

a) Create and maintain an Economic Development Strategy for Drumheller.

b) Actively pursue new economic opportunities to diversify the local and regional economic base through marketing developable land to new and existing industries and businesses.

c) Regularly review municipal processes to remove barriers to business development and expansion.

d) Actively pursue the expansion of postsecondary and skills training opportunities within Drumheller and market distance learning opportunities, with a focus on retaining and attracting youth and young professionals in the Town.

e) Pursue opportunities to permanently establish and support the growing film industry in Drumheller.

f) Build capacity and market Drumheller as a destination for conferences and events.

10.1.2 TOURISM

The tourism policies contribute to retaining Drumheller's reputation and value as a world class tourism destination, while leveraging investment to improve the Drumheller experience for both visitors and residents.

a) Maintain and regularly update a Tourism Master Plan. The Tourism Master Plan shall align with the priorities of the MDP, and should address:

i. Strategic leadership for Tourism in Drumheller;

ii. Curation of a cohesive Drumheller experience;

iii. Valley-wide branding and marketing;

iv. Town-provided tourism infrastructure and amenities;

v. Wayfinding strategies and initiatives;

vi. Monitoring of tourism and recreation industries;

vii. Events attraction and promotion;

viii. Tourism incentives and partnership opportunities; and

ix. Implementation strategy and rollout.

b) Work with existing and potential tourism and recreation providers to enable and promote greater year-round tourism opportunities and services.

c) Encourage the development of private recreation and adventure tourism businesses in Drumheller.

d) Monitor and promote federal and provincial economic and tourism development funding and grant opportunities within the business community and seek partnership opportunities in funding applications.

e) Consider entrance features and signage at all entrances to Drumheller to enhance the ‘sense of arrival’.

f) Support the provision of short-term rental and tourism accommodations in the Land Use Bylaw. Develop and implement guidelines for short-term rentals accommodations.

FIGURE 25 LOOKING NORTHEAST FROM MONARCH HILL OVER NACMINE

11 TRANSPORTATION AND INFRASTRUCTURE

Drumheller's transportation and infrastructure, including roads, utilities, and other municipal servicing, support growth and development. The MDP envisions a future where Drumheller begins to shift from a predominantly auto-oriented transportation model to a model that supports a higher share of alternative transportation and active modes. This approach to transportation acknowledges the need for 'complete streets' which provide connectivity for all modes as well as serve as vibrant public spaces in the community. A diverse and well-connected transportation network will reinforce the Drumheller Badlands Parks Trail System, and link Valley neighbourhoods. Sustainable municipal servicing and utilities support Drumheller's continued growth and resiliency.

11.1 FLOOD RESILIENT INFRASTRUCTURE

Critical infrastructure in Drumheller, including the water systems (e.g. water treatment plants, wastewater treatment plants, stormwater infrastructure, etc.), bridge structures, critical roadways and hospitals, require additional consideration when it comes to flood mitigation and protection against extreme flood events.

a) Critical infrastructure shall be protected and/or adapted to withstand impacts and prevent damage from a flood event with a flow rate of 2,500 cms or higher, with consideration for freeboard.

b) Wherever possible, structural measures designed to protect critical infrastructure shall be adaptable to accommodate the addition of temporary barriers during higher flow events.

c) New critical infrastructure (e.g. new bridges) shall be designed to the latest defined flood levels.

d) The existing bridges and road networks shall be hardened against defined flood levels.

e) Requirements to adapt existing critical infrastructure to new protection levels should be considered in the prioritization of capital improvement projects.

f) Identify critical infrastructure that is at risk due to impacts of a changing climate and retrofit priority assets.

11.2 TRANSPORTATION

There are many modes in which to travel in Drumheller, each offering a different perspective and experience. From walking and cycling, to driving or boating, Drumheller's comprehensive transportation network shall ensure connectivity and ease of access for all these modes.

The transportation network is linked to the Drumheller Badlands Parks Trail System to support and enhance the overall Drumheller experience. Figure 26 Transportation Network identifies the major transportation corridors in Drumheller.

11.2.1 GENERAL

a) The Town shall maintain and regularly update a Transportation Master Plan to guide future improvements and additions to the Town's transportation system. The Transportation Master Plan shall:

i. Establish a mode hierarchy, identified in Figure 27 Mode Hierarchy**,** which prioritizes active transportation modes;

ii. establish a compact, efficient street and pathway hierarchy and associated guidelines that are coordinated with the MDP Land Use Concept;

iii. provide requirements for development of complete streets in urban areas within town, with design emphasis on compact, human scale environments such as narrowing rights of ways and turning radii;

iv. provide direction and phasing for future street improvements and ongoing management of transportation infrastructure;

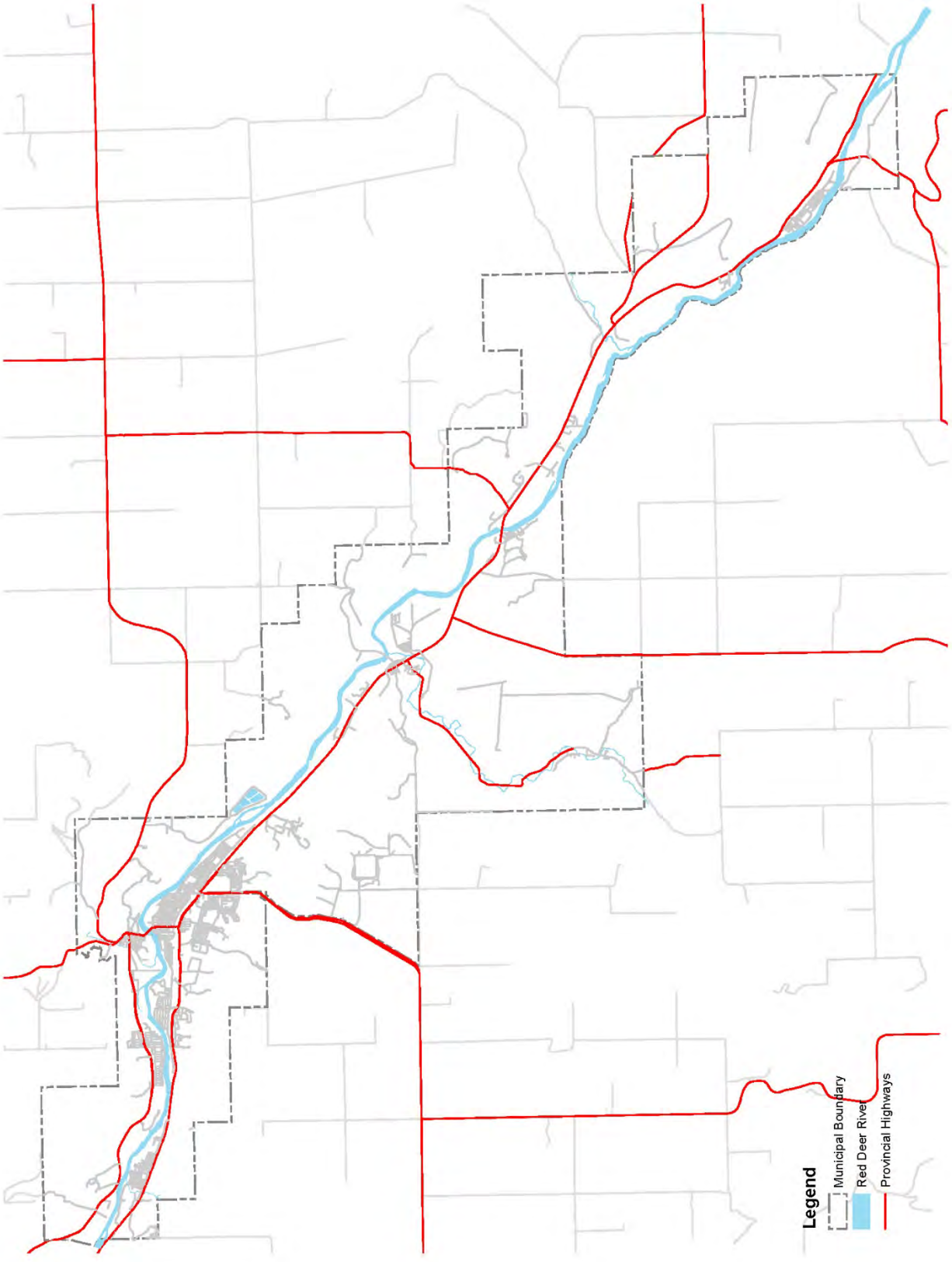
v. ensure efficient movement of people and goods; and

vi. ensure coordinated planning and development with provincial transportation networks.

b) Base transportation network development and decision-making on existing development, future growth areas, Area Structure Plans, and interconnectivity with adjacent municipalities.

c) Ensure all new development provides a high degree of road connectivity to allow for shorter travel distances between destinations for all modes of transportation.

FIGURE 26 TRANSPORTATION NETWORK



d) Ensure pathway and roadway connections are developed in a logical sequence throughout the implementation and phasing of Area Structure Plans and Outline Plans to ensure access and connectivity to the existing network.

e) Ensure appropriate transportation infrastructure is provided in employment areas, to accommodate both the movement of truck traffic and the travel needs of employees and customers.

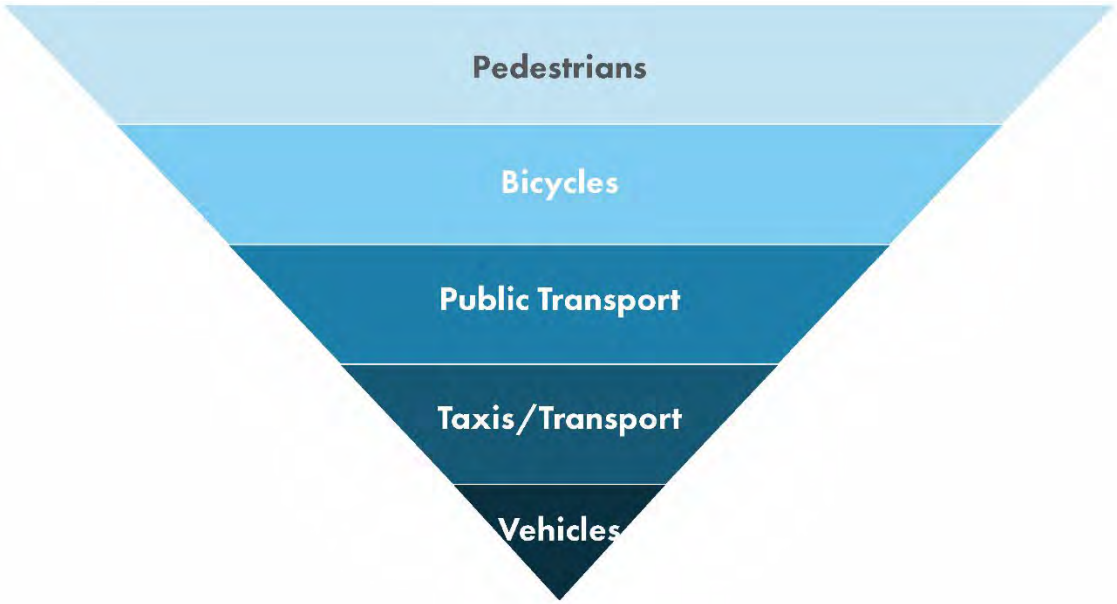
f) Support the provision of regional transit connections.

g) Work with the Province in the determination of any future river crossings, which are the responsibility of Alberta Infrastructure and Transportation.

h) Ensure all existing and new transportation infrastructure located in the conveyance zone minimizes impacts on river conveyance capacity and flow.

i) Secure and protect the CPR and CNR rail corridor for future active transportation connections within Drumheller.

FIGURE 27 MODE HIERARCHY



11.2.2 MAJOR CORRIDORS

Drumheller is accessed by several major provincial transportation corridors. These corridors offer the first experience and sense of arrival for visitors to Drumheller, as well as provide the major connections between neighbourhoods.

a) Coordinate road and trail connections with the Province of Alberta and adjacent municipalities to ensure regional connectivity.

b) Reduce/consolidate signage and other visual disturbances on the Highway 9 and 575 entrances to Drumheller to retain the experience of arrival and keep the focus on the landscape transition.

c) Reduce/consolidate signage and other visual disturbances along the highway 10 corridor from Rosedale to East Coulee to retain the landscape experience.

d) Protect future road rights-of-ways through building setbacks as required.

11.2.3 COMPLETE STREETS

Complete Streets ensure that there is safe right of way provided for a range of users, through the provision of infrastructure such as wide sidewalks, safe crossings, and cycling lanes.

a) Update existing design guidelines for streets to provide for complete street features that will improve public safety, encourage alternative and active transportation, improve livability, and accommodate a range of users. Features should include but are not limited to:

i. Bicycle lanes;

ii. Bump outs;

iii. Wider sidewalks in urban areas;

iv. Safe crossings for those with mobility challenges;

v. Curb cuts; and

vi. Patterned paving.

b) Consider the provision of a transit service, particularly to address the needs of youth and young adults and provide an alternative travel method for visitors to Drumheller.

c) Ensure all new development creates linkages to the town’s overall trail network.

11.3 UTILITIES AND SERVICING

Utilities, such as waste, water, and electricity, are essential to support growth and quality of life in Drumheller. Utilities should be well planned and integrated with future growth areas, as well as consider the impacts of a changing climate and economy.

11.3.1 GENERAL

The general utilities and servicing policies apply to utilities and services provided in Drumheller by both the Town and other providers.

a) Provide high quality utility services, in accordance with federal and provincial standards.

b) Ensure all utility systems are adaptive to changing technologies and a changing climate.

c) Maintain, fund, and implement a comprehensive long- term plan for utility infrastructure and establish budget priorities in alignment with the MDP.

d) Provide servicing in a logical manner to support both infill growth and growth areas.

e) Update the Town's engineering design guidelines for the construction and maintenance of infrastructure, rights-of-way, and service connections to ensure they are consistent with the policies of the MDP.

f) Review and update the Off-Site Levy bylaw to align with the new priorities of the MDP.

11.3.2 WASTE

Waste management is an integral service provided by the Town. This service contributes to Drumheller fulfilling its potential as the 'cleanest, friendliest, and most sought after' community.

a) Promote the principles of reducing, reusing, and recycling materials as well as efficient energy use in all Town facilities and in the broader community through outreach.

b) Ensure the provision of on-site recycling facilities in all multi-family residential, commercial, and industrial areas.

11.3.3 WATER

Drumheller's main water source is the Red Deer River. The Town will continue to protect water quality and ensure that all stormwater is managed effectively in Drumheller, in coordination with flood mitigation strategies.

a) Ensure adequate stormwater management in all development areas.

b) The release of storm water run-off from any development area to downstream areas shall be designed and managed in accordance with Alberta Environment requirements.

c) Encourage water conservation through implementation of community outreach programs and monitoring.

d) Encourage the use of constructed wetlands for stormwater management and treatment.

FIGURE 28 VIEW TO THE NORTH EAST FROM ELGIN HILL

12 CULTURAL AND COMMUNITY SERVICES

In addition to hard infrastructure and utilities, the Town provides and supports a wide variety of services that contribute to the overall health, safety, and wellbeing of Valley residents. This includes recreation facilities, schools, protective services, community centres, and other social and health services. Many of these facilities and services are provided in partnership with other organizations and levels of government. These services enhance the overall Drumheller experience, providing amenities for Drumheller residents and visitors.

12.1 GENERAL

The following policies apply to all Town-owned and leased facilities.

a) Work towards making all Town facilities barrier-free to enable use by all ages and levels of mobility.

b) Where possible, Incorporate environmental design considerations into all new Town facilities and the retrofit of existing facilities, including:

i. water conservation;

ii. stormwater management/low impact development (LID);

iii. renewable energy;

iv. energy efficiency;

v. use of recycled materials;

vi. reduction of waste;

vii. adaptive reuse; and

viii. green roofs.

12.2 COMMUNITY AND PROTECTIVE SERVICES

Community and protective services include fire and police services, which are essential for the safety of our community.

a) Establish thresholds for expansion of fire services tied to growth, and ensure the Town's capital budgets reflect these increases in services.

b) Ensure subdivision and development plans provide safe and efficient access for emergency service vehicles.

c) Cooperate and partner with adjacent municipalities in the provision of emergency services.

12.3 RECREATION AND EDUCATION SERVICES AND FACILITIES

Recreation and educational services contribute to the quality of life in Drumheller and make our neighbourhoods great places to live, learn, and grow.

a) Work with local school boards in the planning and location of school sites.

b) Site new schools within easy, safe walking/biking distances to neighbourhoods.

c) Where deemed appropriate the Town may require developers to build or contribute to the building of recreation and education facilities, such as schools, playgrounds, and libraries.

d) Prioritize investment in recreational infrastructure based on population, density and identified resident needs.

e) Recreational and educational needs resulting from growth should be identified, as well as methods to finance those needs, in advance of new development.

f) Update and maintain a **Community Services Master Plan**, to address the recreation and community service needs of Drumheller in accordance with the direction of the MDP.

g) Ensure that Town facilities are flexible and multi-use to support a variety of recreation opportunities and adapt to changes in recreation services over time.

h) Encourage the provision of childcare and other social services within recreation facilities through partnerships with private providers.

i) Partner with other recreation providers to expand recreation amenities and opportunities for youth and older adults in the community.

12.4 SOCIAL, CULTURAL, AND HEALTH SERVICES

Social and cultural capital are part of what make Drumheller's unique neighbourhoods incredible places to live and visit. Drumheller also boasts significant health services, which make the town an attractive place to receive treatments or to retire.

a) Ensure social and health services, programs, and facilities are considered within area structure plans and area redevelopment plans to ensure that these necessary services are:

i. provided in accessible, convenient locations along primary pedestrian routes;
ii. co-located with other services into service hubs;
iii. barrier-free; and
iv. integrated within the design of the community.

b) Expand and improve community support services relative to population growth and change, recognizing the growing diversity of Drumheller including Indigenous peoples, newcomers to Canada, young families, seniors, youth, and adults.

c) Recognize the value of culture as an economic contributor to the Town and the role it plays in quality of life for residents.

d) Support and promote cultural programs, activities, and facilities that generate a sense of community pride and local identity.

e) Work with the Health Authority to facilitate the development of long-term health care services, senior care residences, and aging-in-place facilities in the town to meet the needs of the growing older adult population.

f) Ensure that development near and adjacent to the Drumheller Health Centre and Community Cancer Centre does not conflict or limit the current and future operations or expansion of the facilities.

12.5 HERITAGE

Heritage comes in many forms, from structures to landscapes and even more intangible features and activities. The MDP supports the conservation and adaptive reuse of heritage to both celebrate the past and make heritage relevant to the present and future.

a) Ensure adherence to the Alberta Historic Resources Act in the identification and preservation of archaeological, geological, palaeontological, and historic resources.

b) Develop and maintain an inventory identifying historically significant buildings and landscapes.

c) Encourage the protection of identified heritage properties, features, or landscapes.

d) Encourage the adaptive reuse and retrofit of existing heritage structures and support this through consideration of building code equivalencies where necessary and appropriate.

e) Where adaptive reuse is not feasible, encourage the incorporation of elements of the existing structure complimentary elements into the design of new development or recognition of the heritage value through art, signage, or other interpretive elements.

f) Collaborate with Indigenous communities, private agencies, and individuals to preserve and promote historic sites.

13 IMPLEMENTATION

Bringing the vision for Drumheller to life requires coordinated and sustained implementation and monitoring of the goals, policies, and objectives of this Plan. The following section outlines critical actions to ensure successful implementation of the MDP.

13.1 PLAN MONITORING

The MDP will be monitored and regularly reviewed based on a series of performance measures to ensure the successful implementation of Drumheller's Vision. Implementation and monitoring of the MDP will occur through a number of mechanisms and processes, including:

- Ongoing administration of the development review process and periodically reviewing and amending area structure plans and Concept Plans;
- Carrying out next steps required to implement the vision, goals, and objectives of the MDP; and
- Collaborating with neighbouring municipalities on planning and development matters, as well as activities related to major processes and plans.

The MDP may be amended or updated to reflect changing circumstances and to ensure it remains an effective tool for achieving the goals and objectives of Council and aspirations of Drumheller.

a) Town administration will report to Council on implementation of the MDP annually.

b) Administration will develop performance measures to monitor the implementation of the MDP.

c) A comprehensive review of the MDP shall be undertaken every 5 years to consider administrative updates, emerging trends, implementation progress, and policy gaps.

d) At the discretion of Council, the Town shall permit developer-funded area structure plans and concept plans that incorporate public and stakeholder engagement and require Administration and Council approval.

e) The Town will monitor and report to Council annually on the rate of development within area structure plans and concept plans, including the number of new dwellings, and dwelling types.

f) When creating or amending area structure plans and area redevelopment plans, the Town shall include a condition requiring municipal review of the plans after 10 years, and a review after 5 years if sufficient development has not been undertaken after 5 years of the plan's approval.

13.2 IMPLEMENTATION ACTIONS

The implementation actions identify internal coordination efforts and policy updates required to align with the new vision and objectives of the Municipal Development Plan. All of these implementation actions are subject to capital funding approval for implementation, and should be incorporated into the Town's asset management planning.

a) Construct structural measures to protect existing development in Drumheller.

b) Commence development of the valley-wide trail network.

c) Update existing area structure plans and concept plans to conform with the MDP.

d) Update existing and draft IDPs with adjacent municipalities to reflect the new priorities of the MDP.

e) Develop new ASPs for priority growth areas.

f) Update the Downtown Area Revitalization Plan.

g) Complete or amend area structure plans for employment areas to conform with the MDP.

h) Review and update the Town's Transportation Master Plan.

i) Develop an Economic Development Strategy.

j) Identify and acquire additional land for parks, trails, recreation, and cultural amenities.

k) Update the Town's Tourism Master Plan.

l) Review and update the Town's Community Services and Recreation Strategy.

m) Create an asset management plan to ensure sustainable long-term financing, operations, and management of new assets directed by the MDP.

13.3 REGIONAL COOPERATION

Drumheller shares municipal borders with Wheatland County, Kneehill County, Starland County, and Special Areas. The Town will continue to partner with these municipalities to maintain Intermunicipal Development Plans and uphold the policies contained therein, to coordinate and fulfill the aspirations of the region.

a) Work with Wheatland County, Kneehill County, Starland County, and Special Areas to maintain up to date Intermunicipal Development Plans.

b) Implement all IDP policies for communication, referral, and formal dispute processes with adjacent municipalities.

c) Work with adjacent municipalities, surrounding communities, and relevant agencies to ensure the coordinated delivery of emergency and social services in the region.

d) Foster relationships of mutual trust and collaboration with First Nations and work together to advance reconciliation initiatives and mutually beneficial projects.

13.4 PUBLIC ENGAGEMENT

Citizens should be involved in decisions affecting their communities. The Town is committed to ensuring that the public is informed and has opportunity to provide feedback on major decisions in Drumheller.

a) Strive to meaningfully involve residents, businesses, and stakeholders in decisions affecting them through transparent and accessible engagement and communications protocols.

b) Ensure timely reporting on feedback received and how it was incorporated in decision-making.

c) Require local engagement with affected parties as part of the creation of Area Structure Plans and Area Redevelopment Plans.

d) Use a variety of engagement tactics to reach the broadest and most diverse range of feedback from the public. Consider targeted engagement to increase participation levels from groups that are underrepresented in municipal decision making and/or face barriers to participating in regular public engagement processes.

e) Maintain an accessible and up to date Town website, that clearly communicates Town aspirations as well as functional information for future and prospective residents, developers, and businesses.

14 GLOSSARY

Active transportation: walking and cycling, as well as other forms of human powered transportation, including rollerblading, longboarding, skateboarding, jogging, among others.

Adaptive structural measures: a type of flood mitigation structure that is designed to be able to be adapted to different severities of flood events through the addition of fill or other barriers on top of permanent structures.

Age-in-place: homes or seniors' facilities designed to allow residents to meet their changing needs (medical, mobility, etc) as they age, enabling them to stay in that location instead of needing to relocate to another home.

Changing climate: shifting global climate patterns, including increasing temperatures, rising ocean levels, and more frequent extreme weather events (droughts, floods, and forest fires) related to increased greenhouse gas emissions in the atmosphere.

Complete community/neighbourhood: a community or neighbourhood that is planned and designed with a mix of uses, within close proximity, to support everyday needs for a variety of lifestyles to live, work, shop, learn, and play. This includes a range of housing options that can accommodate a diversity of incomes and household types for all stages of life, as well as jobs, local services, schools, recreation, and open spaces.

Complete streets: streets which are designed to enable safe access for all users including pedestrians, bicyclists, motorists, and transit riders, of all ages and abilities.

Conveyance capacity: the total channel capacity required by a river in a determined flood event or flow rate scenario. The Red Deer River conveyance capacity used in the MDP is based on a 1850 cms flow rate (including 0.75 m of freeboard).

Crime Prevention Through Environmental Design (CPTED): a crime prevention approach that uses the design and use of the built environment to a reduce fear and incidence of crime, and generally improve public safety and a community's quality of life.

Environmental reserve: the land designated as environmental reserve by the Town as per Section 664 of the Municipal Government Act. Environmental reserve may include natural features, land subject to flooding, water features/wetlands, steep slopes, or riparian areas for the purpose of preserving their environmental integrity, protecting public safety, or providing public access.

First bench: means the first intermediary plateau or area which occurs between the toe of a slope (valley bottom lands) and an escarpment or valley wall top (or rim). Bench-lands typically have a slope of between 1 and 15 percent and a valley edge may have more than one bench at different elevations.

Flood fringe: as defined by the Province, the portion of the flood hazard area outside of the floodway. Water in the flood fringe is generally shallower and flows more slowly than in the

floodway. New development in the flood fringe may be permitted in some communities and should be flood-proofed.

Flood mitigation: the implementation of measures (physical, organizational, etc) that reduce the risk of flooding and the potential damage that could result from a flood.

Floodway: as defined by the Province, the portion of the flood hazard area where flows are deepest, fastest and most destructive. The floodway typically includes the main channel of a stream and a portion of the adjacent overbank area. New development is typically discouraged in the floodway.

Flow rate: is the volume of water, measured in cubic metres, passing through a specific location on the river in a one second time frame. Flow rate can be used to determine conveyance capacity of a river channel in a flood event.

Freeboard: the additional height above a predicted flood level. The Town of Drumheller has selected 0.75 m as the minimum freeboard to be included in required height of structural measures. Freeboard is provided to account for various uncertainties relative to actual ground elevations and digital elevation modelling, hydraulic modelling, flood forecasts, debris, localized river levels, dike settlements, and other uncertainties.

Historic resource: any work of nature or of humans that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific, or esthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object.

Land Use Bylaw (LUB): the Land Use Bylaw is a regulatory bylaw of the Town, required by the Municipal Government Act, that implements the land use direction provided in the Municipal Development Plan. Every parcel of land in the Town has a land use district, which specifies which uses are permitted and discretionary and how buildings and land can be developed in the Town.

Low impact design (LID): a land development and stormwater management approach that focuses on maintaining and restoring the natural hydrology (movement of water) by managing stormwater close to its source. LID can reduce the burden on conventional infrastructure, maintain ecological functionality, and establish a cleaner and more secure water supply. LID practices include bioswales, stormwater collection and reuse, and alternative paving methods.

Mixed-use: different uses that are in close proximity to each other. This can be in the same building (e.g. residences above retail) or on the same site (e.g. offices adjacent to restaurants or other commercial activities).

Municipal Development Plan (MDP): a statutory document required by the Province of Alberta as specified by the Municipal Government Act (MGA). The MDP is intended to guide all growth and development in the Town and may provide policies on a range of other relevant matters.

Municipal reserve: the land designated as municipal reserve under Division 8 of the Municipal Government Act.

Natural area: areas that include steep slopes, coulees, significant geologic features and areas of native vegetation, including grasslands, shrubland and forests.

Open space: is an area of outdoor land or water that is publicly owned or allows public access, including municipal parks, civic spaces, provincial, or federal parkland, institutional campuses, and other public spaces. Elements of the public realm, such as main streets and promenades, can also provide open space functions.

Secondary Residence: a dwelling unit that is an accessory to a single-detached dwelling and is intended for use as a separate and independent residence. The intent of this type of development is to provide flexibility and variety in housing types, as well as increase the density without changing the overall character of the residential neighbourhood.

Stormwater Management: the practice of minimizing the strain that stormwater places on municipal infrastructure and private property; lessening overland flooding during significant weather events; and reducing the impact of polluted water flowing into waterbodies.

Sustainability: the World Commission on the Environment and Development (1987) defines sustainability as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Universal access: the ability of an environment, amenity, or place to be accessed, understood, and used to the greatest extent possible by all people regardless of their age, size, ability, or disability.

Xeriscaping: means a creative, natural approach for constructing low maintenance, water efficient, and sustainable landscapes. It includes designing the landscape using native plants and drought-tolerant species which require less water and chemicals.