

Environment and Climate Review

This report was selected as part of the phased implementation of a process change to provide environmental reviews of City of Edmonton plans and projects and to identify environmental risks and opportunities for City Council. The first step in this work is to include an Environment and Climate Review section in City Council and Committee reports. This Committee report, and others, are piloting this new process in Q2 and Q3 2023, prior to full implementation in Q4 2023. The type of analysis and information that will be presented will vary based on the subject of the report and learnings from the pilot will be considered in the full implementation. This report was identified as needing an in-depth review and analysis to assess the environment and climate risks and opportunities, including identifying nation-leading climate action opportunities.

A Need to Change

This is a critical time for environmental and climate action. The Intergovernmental Panel on Climate Change (IPCC) has said that to achieve a global 1.5°C (degrees Celsius) or 2°C (degrees Celsius) carbon budget implies rapid, deep, and, in most cases, immediate greenhouse gas (GHG) emission reductions in all sectors.¹ As well, efforts are needed to adapt and prepare for the growing impacts of a changing climate. The IPCC has also indicated that, along with the climate crisis, ecosystems are also experiencing significant biodiversity loss and facing risks to ecological integrity and functions.² Decisions made today about how the city is designed and built will, in part, set the course for Edmonton's future climate resilience. Urban form decisions are environmental and climate decisions.

Environment and Climate Considerations in the Zoning Bylaw

The Zoning Bylaw is the rulebook for building and developing in Edmonton. It sets the rules for where new buildings should go, the types of buildings they can be and what business and activities can happen on a property. The Zoning Bylaw is one of many planning tools to integrate aspects of climate resilience within the land development process.

¹ IPCC AR6 p. 46

² IPSS AR6 WGII Climate Change 2022: Impacts, Adaptation and Vulnerability p. 55

The proposed Zoning Bylaw interacts with the following key environment and climate areas outlined in The City Plan: i) energy efficiency in development and transportation; ii) adoption of renewable energy; iii) food system resilience; iv) resilience to extreme weather events and environmental hazards and v) protection of natural areas and green infrastructure. For each of these areas, the table below outlines various environmental and climate risks and opportunities in the draft Zoning Bylaw, including opportunities for future work post-renewal. The greenhouse gas impacts of the Zoning Bylaw changes cannot be quantified at this time. Work is ongoing to advance Administration's carbon accounting capabilities.

State of Practice

Climate change and biodiversity loss, combined with increasing urbanization, are causing cities to rethink how urban planning, land development and design interact with climate change and the natural environment. Planning for climate change considerations is a relatively new challenge that cities are facing. New planning approaches are needed that allow for flexibility and adaptive management as new climate and environmental information becomes available. Cities also face different challenges, so at times, the climate actions taken by different cities can be context or location specific. This means that there is no "gold standard" for climate-resilient urban development that the City of Edmonton can simply implement.

Many cities are attempting to address these new and emerging challenges using different approaches and tools. For example, some jurisdictions in Canada have chosen to incorporate elements of climate resilience into their zoning or land use bylaws (e.g. requiring electric vehicle (EV) charging infrastructure or green roofs that consist of vegetation established on the top of buildings). Some jurisdictions have developed stand-alone bylaws for climate action (such as the City of Toronto's Green Roof Bylaw that supports implementation of objectives related to clean air, urban heat island, stormwater and energy management). Other jurisdictions have chosen to develop a suite of development standards that incorporate climate resilience considerations (such as the Toronto Green Standard, which also includes environmental standards around air quality and biodiversity). At this point in time, no jurisdiction is incorporating all elements of climate resilience into one specific planning tool.

Post-Renewal Environment and Climate Action

In the June 15, 2022 Energy Transition Corrective Action Report (UPE00604), Administration identified that one of the corrective actions needed to achieve our climate goals is the development of a climate change planning and development framework. This framework will include the creation of climate-resilient planning and development guidelines and standards, along with developing new planning tools, processes and resources for climate-resilient planning and development. A service package was approved via the 2023-2026 Operating Budget to advance this work, which will begin in Q4 2023. This work, which will identify the specifics needed to integrate climate considerations into all aspects of Edmonton’s land use planning and development continuum, is an opportunity for the City of Edmonton to be a leader in climate-resilient urban planning.

The 2024 Zoning Bylaw Work Plan will be presented to Urban Planning Committee in Q1 2024. There may be opportunities to align Administration’s post-renewal work with the development of the climate change planning and development framework. In addition, the Zoning Bylaw’s post-renewal work will include updating the existing Floodplain Protection Overlay and evaluating the need for additional environment and climate risks overlays. There may be additional opportunities within this work to align with the River Valley Planning Modernization initiative and any additional recommendations that come from those documents.

Environment and Climate Risks and Opportunities in the Draft Zoning Bylaw

The table below outlines examples of proposed actions in the draft Zoning Bylaw and the associated environment and climate risks and opportunities, including opportunities for future work to advance climate resilience post-renewal.

Energy Efficient Development and Transportation	
Proposed Actions	Environment and Climate Risk/Opportunity
<p>Allow more density and create a more compact urban form by enabling a wider range of dwellings that can be built on a lot. These proposed changes will enable multi-unit housing in more zones and more dwellings to be located on a single lot.</p>	<p>Changes to allow for more housing options in small scale residential zones supports a more compact urban form through gentle densification. A more compact city will support the viability of a greater range of mobility options, make more efficient use of existing City infrastructure and reduce further land consumption (including land for agriculture and natural areas). While the efficiencies and potential greenhouse gas emissions reduction that increasing density can provide is positive, consideration for other environmental impacts such as biodiversity, urban heat island, and air and water quality should be factored into discretionary development decisions where applicable.</p> <p>Green Development Standards are alternate mechanisms that have been adopted by some Canadian cities to improve energy efficiency in the design and construction of buildings. They encourage the adoption of innovative approaches and sustainable practices to minimize environmental impacts that would otherwise be challenging to change in the future.</p> <p>Future Opportunity: Evaluate the opportunity to develop Green Development Standards within the climate-resilient planning and development framework. It is noted that these would require additional research, engagement and changes to land development processes.</p>
<p>Foster The City Plan’s Big City Move, Community of Communities, through changes such as:</p> <ul style="list-style-type: none"> • introducing two new mixed use zones • allowing more commercial and community uses in 	<p>These proposed changes are intended to reduce the need to travel long distances to access daily needs including employment, education and other amenities.</p> <p>By providing access to amenities and services closer to where people live, the Zoning Bylaw changes will support the viability of using mobility options such as walking, rolling, cycling or public transit on a daily basis. These changes contribute to Edmonton's low-carbon goals in the energy transition strategy by helping reduce vehicle kilometers travelled, either by increasing access</p>

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<p>residential zones</p> <ul style="list-style-type: none"> • expanding opportunities for home-based businesses 	<p>to active transportation or by enabling shorter vehicle trips.</p>
<p>Maintain the removal of minimum parking requirements and changes to encourage transit use and other modes of active transportation such as:</p> <ul style="list-style-type: none"> • enhancing bike parking requirements, including introducing design requirements and inclusive bike parking regulations • including Transit Facility as a permitted use in multiple zones 	<p>These proposed changes will support the viability of using mobility options such as walking, rolling, cycling, or public transportation on a daily basis - rather than relying on personal vehicles. These are important changes that support community energy transition. Maintaining the removal of minimum parking requirements supports a shift away from the personal vehicle as the primary method of transportation.</p> <p>Enhancing bike parking regulations will support the viability of cycling as a mode of transportation. Including transit facilities as a permitted use in multiple zones is intended to support integration of mass transit into more neighbourhoods.</p> <p>Future Opportunity: Minimum bike parking requirements for multi-unit residential and commercial uses are based on the 2015 Household Travel Survey. The demand for bike parking may change as bike network projects are completed. Reviewing results of future travel surveys and other data to understand the demand for bike parking could be conducted to evaluate whether minimum proposed bike parking requirements reflect current and future needs.</p> <p>Encouraging developments to be electric-vehicle ready supports energy transition. Some Canadian municipalities have included provisions for electric vehicle charging infrastructure for development in zoning bylaws or Green Development Standards. Administration is working with EPCOR and the provincial utility regulator to resolve potential constraints. This work will be one factor in evaluating the timing and method of implementation of potential changes for electric vehicle charging requirements. Planning and development opportunities for EV charging requirements could be evaluated within the climate resilient planning and development framework. It is noted that these would require additional research and engagement.</p>

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Adoption of Renewable Energy	
Proposed Actions	Environment and Climate Risks/Opportunities
<p>Maintain exemptions for height and setbacks for onsite renewable energy.</p>	<p>Reducing barriers for renewable energy is important to supporting a larger shift in community energy transition. By maintaining exemptions to height and setbacks and not requiring development permits for solar panels on non-heritage buildings, the Zoning Bylaw can support more Edmontonians in adopting the use of renewable energy.</p> <p>Future Opportunity: As part of the community energy transition, the City of Edmonton is working towards implementing other forms of renewable energy such as District Energy Systems and has developed a District Energy Strategy to guide the approach to a District Energy Network build-out. The District Energy Strategy includes specific policies and regulations that would enable District Energy development, such as requiring all buildings over a specific size threshold to be designed to be “District Energy Ready”. Zoning bylaws can be used to activate this type of regulation. Opportunities and potential mechanisms for implementing the types of regulations identified in the District Energy Strategy could be explored.</p>
Food System Resilience	
Proposed Actions	Environment and Climate Risk/Opportunity
<p>Support urban agriculture by removing development permit requirements in low-risk areas and on or in a building. The Bylaw also proposes to protect rural agricultural lands from further fragmentation and from activities that would not support agriculture.</p>	<p>The Zoning Bylaw proposes changes for both rural and urban agriculture which will support Edmonton’s climate adaptation food security and food resilience goals. By removing barriers for urban agriculture activities and protecting productive agricultural land, the proposed changes will help ensure regulations support the prosperity of Edmonton’s agricultural lands and the potential expansion of agricultural businesses that can add more value to food products for sale locally and abroad.</p> <p>The Zoning Bylaw will continue to protect agricultural land within city limits from development until future City Councils decide if and when to plan and develop these lands. This includes</p>

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	removing opportunities for activities on agricultural lands that would not support agriculture, such as natural resource development like mining and resource extraction.
Planning for Extreme Weather Events and Environmental Hazards	
Proposed Actions	Environment and Climate Risk/Opportunity
Maintain the Floodplain Protection Overlay.	<p>Maintaining the Floodplain Protection Overlay will ensure additional considerations are made for development in the floodplain, which is critical for the safety of residents and mitigating the property and infrastructure impacts from catastrophic flooding. The current Floodplain Protection Overlay is based on the Government of Alberta Flood Hazard Area maps for a 1:100-year flood, which is a statistical designation indicating in any given year, there is a 1% chance that a flood risk area will flood. This is in compliance with the minimum design standard required by the Government of Alberta.</p> <p>Future Opportunity: The Government of Alberta is revisiting its Flood Hazard Area Maps. Existing floodplain policies, regulations, Floodplain Protection Overlay and other documents may require updates following the release of updated Flood Hazard Area maps.</p> <p>In addition to better understanding the implication of heavy rainfall events on the river and stormwater management, additional environment and climate risk overlays in the Zoning Bylaw could be considered. Wildfires have become increasingly complex in recent years due to climate change. The Urban Heat Island (UHI) effect, which refers to warmer temperatures in urban areas compared to surrounding rural areas, can become more significant with increased density of infrastructure such as buildings, parking lots and roads. UHI can present an extreme health risk and may become more significant in Edmonton with increasing temperatures and increased density. While incorporating additional climate overlays would be considered nation-leading, some Canadian municipalities have implemented FireSmart</p>

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	Regulations, wildlife risk maps and regulations in their zoning bylaw or development standards to mitigate UHI in hot spots.
Increase the top-of-bank development setback along the river valley and ravine system to align with current policy and reduce the risk of landslides, erosions and other environmental hazards.	<p>Increasing the top-of-bank development setback aligns with the current Top of Bank Policy (Policy C542 - Development Setbacks from River Valley/Ravine Crests) and increases the protection of properties and infrastructure from potential landslides.</p> <p>Future Opportunity: Research and analysis could be conducted on how climate change impacts, such as increasing extreme rainfall events, severity and frequency of drought, and wildfire risk, may impact the top of bank and slope erosion.</p>
Change the requirement for Wind Impact Assessments. A Wind Impact Statement (for buildings between 20.0 metres (m) and 40.0 m in height) or Wind Impact Study (buildings over 40.0 m in height) is now mandatory depending on proposed building height.	<p>Climate change is expected to increase extreme wind gusts, and making wind impact assessments and studies mandatory is a positive risk mitigation tool.</p> <p>Future Opportunity: The City has prepared Terms of References for wind assessments and studies. There is an opportunity to update these terms of references to be based on future climate conditions, instead of current conditions.</p>
Supporting Protection of Natural Areas and Green Infrastructure	
Proposed Actions	Environment and Climate Risk/Opportunity
<p>Changes to protect natural areas such as:</p> <ul style="list-style-type: none"> • Limiting permitted uses in the River Valley Zone and Natural Areas Zone to Protected Natural Areas only • Limiting permitted uses in the River Valley Special 	<p>Decisions made at the discretion of Development Planners, in consultation with Ecological Planners, will support the preservation of environmentally sensitive areas and alignment with Statutory Plans. The Zoning Bylaw, along with the work underway on River Valley Planning Modernization, supports the protection of Edmonton’s river valley, a critical natural ecosystem in the city.</p> <p>Future Opportunity: The River Valley Planning Modernization</p>

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<p>Area Zones to Protected Natural Areas and Parks only</p> <ul style="list-style-type: none"> ● Some discretionary uses are maintained to enable alignment with statutory plans and policies and to support the primary preservation intent of the river valley zones. ● Prohibiting new Natural Resource Developments, Residential, and Commercial uses in the River Valley Zone ● Removing the permitted use of Special Events from the Natural Areas Zone ● Add Protected Natural Areas as a permitted use in more zones 	<p>Project (RVPM) will update the Ribbon of Green strategic plan to include all areas of the river valley. It will also renew the 38-year-old North Saskatchewan River Valley Area Redevelopment Plan, which provides the regulatory framework for the river valley. Direction from these documents may provide a basis for future zoning updates and opportunities with respect to the protection of natural areas and green infrastructure.</p> <p>While river valley protection is critical, there are also ecological considerations outside of this area. Edmonton’s Community Energy Transition Strategy estimates that approximately 17% of emissions reductions required will need to come from carbon capture and carbon sequestration by nature-based solutions. Additionally, healthy ecological functioning can help adapt to a changing climate by providing important services, such as stormwater management, water and air quality improvements, reduction of urban heat island and others. These important nature-based solutions will require conservation and restoration in order to contribute to climate goals.</p> <p>Some jurisdictions in the United States have developed tools, such as a conservation overlay, and associated regulations into their zoning bylaws to help protect ecosystems. Research, analysis and engagement would be needed to develop conservation overlays for key ecosystems outside of the River Valley (i.e. places with significant carbon sequestration potential). These types of actions could be considered in the climate-resilient planning and development framework.</p>
<p>Changes to landscaping requirements such as:</p> <ul style="list-style-type: none"> ● Increasing requirements for trees and shrubs for new large-scale residential developments ● Increasing tree requirements in parking areas along walkways 	<p>The proposed changes that will increase trees and shrubs are important as density increases, as they will help mitigate the urban heat island effect. They also support climate action by sequestering carbon.</p> <p>Future Opportunity: As climate change impacts the suitability of species and ecological function, some jurisdictions have begun to look at updating the appropriate species lists to include drought tolerant or other climate resilient species. Other jurisdictions have taken the approach of integrating</p>

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<p>and increasing space for trees in landscaped parking islands.</p> <ul style="list-style-type: none">• Improving the retention of trees and shrubs through enhanced incentives• Continuing to limit impermeable surfaces for small scale residential developments• Continuing to preserve natural areas and require on-site landscaping to include diverse plant materials	<p>performance based targets for impervious surfaces into their zoning regulations or have identified the action to incorporate watershed management protection principles in their planning and development processes. These types of actions could be considered in the climate resilient planning and development framework.</p>
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