

Climate Considerations

The purpose of this attachment is to summarize how climate considerations are incorporated into the Citywide Growth Strategy, for the purposes of determining the 2023-2026 service plans and budget cycle growth investment component. This includes incorporation of climate actions into the 2022 Industrial Action Plan, climate considerations for the Established Area Growth and Change Strategy, and analysis of the impacts of proposed new community business cases on greenhouse gas (GHG) emissions, climate-related risk, and natural assets valuation.

In 2020 November, a motion arising was approved by Council as part of the New Community Growth Strategy (PFC2020-0963) that directed Administration to establish a framework that assesses the impact of growth on The City's approved climate targets and integrates that data into growth and development decisions for new communities, established areas, and industrial areas. The motion also directed Administration, as an interim measure, to work with and encourage growth and development applicants to conduct climate self-assessments for review by Council prior to approval. This interim measure is outlined below as work on the comprehensive framework is ongoing. Evaluation tools are continually being refined to better inform decision-making, and there is an expectation that climate considerations will be increasingly applied to these recommendations on an iterative basis.

Climate Considerations in Industrial Areas

Industrial properties in Calgary represent approximately 8 per cent of total citywide GHG emissions generated by buildings. While the potential for GHG reductions is large in absolute terms, it is small relative to other sectors. Utilizing existing vacant industrial lands within the city boundary and intensifying under-developed industrial parcels represents an opportunity to enable efficient and low-carbon transportation options while protecting undeveloped natural assets that help mitigate some of the risks associated with climate change. Where greenfield industrial development takes place, climate impacts may be limited through support for enhanced building energy performance standards, and climate-resilient site, building, and infrastructure design standards.

Driving specific actions that are intended to reduce emissions from industrial processes is generally beyond the scope of municipal jurisdiction; however, The City can act as an enabler and regulator to facilitate emissions reductions, particularly through improved building energy performance. For example, by improving energy performance standards of existing and new industrial buildings, cost neutral investments (i.e., those for which expenditures will be recovered through long-term energy savings) could reduce emissions generated by industrial buildings by 7 megatonnes by 2050, while reducing annual energy expenditures by \$127 million.

The 2022 Industrial Action Plan contains an action to identify and evaluate opportunities to support industrial users in achieving their corporate commitment to sustainability and the City's climate mitigation and adaptation goals (Action F.1). This work will be ongoing through 2022 and beyond and will align with implementation of additional Climate Strategy actions to drive emission reductions and reduce climate-related risks.

The identified industrial growth investments that warrant further consideration in the 2023-2026 service plans and budgets will enable more sustainable development of the industrial areas. These investments in roads, Bus Rapid Transit (BRT), and utility upgrades will support the development of existing industrial areas as well as enable new growth within the city boundary.

Road upgrades will result in a barrier-free goods movement network allowing for more efficient movement of goods, people, and services, and reducing GHG emissions from transportation. BRT projects connect people with jobs through lower-carbon transportation options.

Climate Considerations in the Established Area

The Intergovernmental Panel on Climate Change has indicated that all pathways that would limit global warming to 1.5 degrees Celsius require sustainable intensification of land use in developed areas. Data shows that Calgary's 2050 net-zero emission reduction target will not be met through current city-building practices and growth patterns per monitoring and tracking done in support of the Growth and Development Climate Framework.

To reduce emissions, The City should support densification in lower climate risk areas, turn-over/retrofit of older building stock, and improvements to transit and active mobility infrastructure. Much of the established area is exposed to climate hazards such as extreme heat, flooding, and severe storms. Established area vulnerability may be driven by strained social systems, degraded or non-existent natural assets, and aging infrastructure that is not designed for current or future climate conditions. Targeted investments in the public realm can have benefits in support of climate adaptation such as improved stormwater management, urban heat island mitigation, local food production, and resilience against severe storms.

Established Area investments, such as those proposed in this report, are a key component to achieving the balanced growth target of the Municipal Development Plan and realizing actions within the Climate Action Plan. If the balanced growth targets are achieved, The City could avoid 3.85 megatonnes of emissions by 2050, save \$8.73 billion in avoided infrastructure costs, and reduce energy spending from buildings and transportation by \$200 million annually. Net savings from energy expenditure, housing expenditure, and deferred infrastructure cost total \$22 billion from now until 2050.

Climate Considerations in New Communities and Proposed Business Cases

Development of lands at Calgary's urban edge consumes land and natural assets, including agricultural lands, native grasslands, and wetlands, and can increase some climate risks. New communities tend to include predominantly low-density housing forms which have higher per unit GHG emissions intensity compared to medium- and high-density housing. Units in new communities are also larger on average, resulting in higher per capita emissions. Suburbs are generally more automobile-dependent due to their location and design, and are less well-served by transit and active modes transportation opportunities. To reduce emissions from transportation, new community design should prioritize transit and active transportation modes over automobiles. Emissions reductions from new buildings is dependent on adoption of net-zero ready and net-zero equivalent design standards as supported by several actions in the Calgary Climate Strategy. Thoughtfully designed public realm infrastructure has the potential to further lower GHG emissions and better respond to climate change events.

Currently, new community business cases are evaluated biannually and based on criteria reflecting three growth factors: 1) Municipal Development Plan/Calgary Transportation Plan Alignment, 2) Market Demand, and 3) Financial Impact (Attachment 6). For the first time in this 2022 evaluation, as part of the Municipal Development Plan/Calgary Transportation Plan Alignment factor, three climate-related criteria were added which asked proponents to identify:

- if and how they are taking measures to **mitigate GHG emissions**;
- if and how they are taking measures to **adapt to projected climate change**; and
- if and how **natural assets will be protected** and integrated into future communities.

Administration is evolving a Framework on how and when to consider climate actions as part of the development of growth recommendations and other planning decisions. The inclusion of climate considerations in the 2022 new community business case evaluation is based on the readiness of evaluation tools, and on the collaboration between Administration and proponents on expectations of their submissions. Administration's effort and systems continue to ramp up while providing proponents sufficient time to collaborate on, understand, and respond to increased expectations on new community land development. The identification of climate-related actions will carry forward into subsequent phases of land development approvals and support the creation of more climate-responsive communities.

Based on this approach, Administration conducted a supplementary analysis of each business case for informational purposes. This action is an interim measure for the 2022 business case evaluations only, as Administration continually builds and refines decision-making tools to support more meaningful evaluation. For 2022, the results of the supplementary analysis were not used to determine the recommendations of this report; however, the use of these analysis tools in the development of recommendations will be incorporated for the next round of business case evaluations anticipated for 2024.

Summary of the New Community Supplementary Analysis

In order to support complete self-assessments, and to provide Council with clear and consistent information, Administration used tools available to:

1. conduct **GHG modelling** on the proponents' behalf;
2. prepare standardized **Climate Risk Statements** forms for the proponents to complete; and
3. prepare standardized **Natural Assets Valuation** forms for the proponents to complete.

A summary of each of these exercises is provided below. The full versions can be found online on the [New Community Growth in Calgary](#) webpage.

1. GHG Modelling

GHG modelling includes operational emissions from buildings and emissions from transportation at full buildout of each proposed business case area. Analysis shows that the recommended portfolio of business cases will result in an increase in citywide emissions of approximately 1 per cent at full buildout. These emissions could be reduced by approximately 30 per cent if builders were to adopt a standard recommended package of clean building technology (e.g. installation of solar panels and utilization of 100 per cent of the average solar potential of the typical Calgary residence, substituting natural gas fired heating systems with electric heat pump technology, and improving energy performance of homes to align with the

R2000 standard); however, none of the proponents indicated that they would be willing to implement the recommended changes. The recommendations and other measures to reduce GHG emissions may be considered further at subsequent phases of development.

Comparison of the proposed business cases to communities in the Established Area shows significantly higher per capita emissions from transportation. This is a result of increased distance to jobs, services, and amenities, and decreased opportunities for transit and active modes travel. As well, housing in new communities tends to be larger and lower density than infill housing in the established area, which results in higher per capita emissions.

2. Climate Risk Statement

Each business case proponent was asked to complete a Climate Risk Statement. A standardized Climate Risk Statement template was prepared to assist proponents in recognizing and self-identifying which climate hazards a proposed business case area is exposed to and what measures may reduce climate risk. All business cases are exposed to extreme heat, drought, shifting seasons, heavy precipitation, severe storms and winter storms, and some business cases may be exposed to wildfire and river flooding. This information may help inform climate risk reduction measures at subsequent development review and approval stages. Proponents received a rating for the integration of proposed risk reduction measures for each specified climate hazard, as well as an overall Climate Risk Sensitivity Score.

Proponents received advice from Administration on how to improve their Climate Risk Sensitivity Score, and some suggestions have been incorporated into the Climate Risk Statements. These statements may be used to inform decision making and designs during subsequent phases of development. Ratings for the recommended business cases ranged from 'poor' (indicating that the proponent has made unspecific references to climate adaptation measures that may be considered for some climate hazards) to 'very good' (indicating a strong intention to respond to all hazards that a business case area is exposed to with specific climate adaptation practices that exceed requirements and expectations).

Climate risk has inherent spatial differences, and each geographic area of the city has a unique climate risk profile, therefore making generalized statements about the impacts of new community growth is challenging. Approval of the recommended portfolio of business cases would increase the City's overall climate risk by increasing the area of developed land and number of assets exposed to climate hazards.

Business cases in the Glacier Ridge, Keystone, Ricardo Ranch and Rangeview ASP areas face increased risk from wildfire due to proximity to agricultural lands and natural areas. Business cases in the Ricardo Ranch ASP area are being assessed for slope stability; however, other similar Bow River Valley slopes within the city are known to be unstable and climate change increases the risk of slope instability, through factors such as increased freeze/thaw cycles, fluctuating drought, and severe storms (precipitation volumes), which can destabilize soils. Proposed development in the flood hazard area within the Ricardo Ranch ASP area is an additional liability which may be amplified by climate change.

The use of climate-resilient infrastructure design standards that account for projected climate change can result in improved community climate risk scores. Voluntary design measures that can be implemented at the Outline Plan, Development Permit, and Building Permit stages, as described in proponents' Climate Risk Statements, would further reduce climate risk.

3. Natural Assets Valuation

The Natural Assets Valuation template accounts for the natural assets (such as wetlands and grasslands, but excluding lands used for food production purposes) that are present pre-development and proposed to be protected as land develops. Natural assets provide valuable ecosystem services that mitigate some risks associated with climate change, such as stormwater absorption, urban heat reduction, carbon sequestration, and support for biodiversity.

The percentage loss of natural assets was calculated for each business case, where possible, based on disclosures provided by the proponents. There are no business cases which propose to retain natural assets beyond the minimum legal requirements for provision of Municipal or Environmental Reserves as set out in the Municipal Government Act, and recommendations from Administration did not result in commitments to further protect natural assets.

Approval of the recommended portfolio of business cases would result in the destruction of over 300 hectares (740 acres) of natural assets based on the proponents' disclosures, including wetlands, ponds, native grasslands, and slopes. Accommodating growth within the existing footprint of the city would avoid pressure on and better protect natural assets, and help ensure the continued delivery of the valuable ecosystem services that they provide.

Conclusion

Application of a climate-lens analysis to the development of the Citywide Growth Strategy recommendations for the 2023-2026 service plan and budget demonstrates that how, when, and where the city grows has important implications for both GHG emissions and climate-related risk. Intensification and improvement of the Established Area and existing Industrial Areas represents the most climate-compatible path for accommodating future growth. The recommendations in this report help to realize desired growth within these areas.

Current city-building practices are a marked improvement over historical practices in terms of both GHG emissions intensity and vulnerability to climate-related risk. However, significant further efforts are required to align growth and development patterns with The City's 2050 net-zero goal and risk mitigation objectives as detailed in the Climate Strategy and Action Plans.

Accommodating growth in New Communities is the most GHG-intensive way for the city to grow. Approval of new communities will lock in generations of high-energy intensity land use and transportation patterns and eliminate large areas of climate-mitigating natural assets that would make it more difficult to achieve The City's 2050 net zero emissions goal. Approval of the recommended portfolio of business cases would result in an increase in citywide GHG emissions of approximately 1 per cent, increase climate risk through additional exposure of developed lands and assets to climate hazards, and result in the destruction of over 300 hectares of natural assets and the ecosystem services they provide.

Directing growth towards the Established Area could result in emissions savings; however, any measures to limit suburban expansion must be combined with proportional efforts to facilitate redevelopment in the Established Area in order to avoid unintended consequences such as spiking housing prices or increasing social inequity.

The tools and frameworks that have been applied in support of decision-making in the 2022 Citywide Growth Strategy are limited but evolving, and should be understood as a progressive

step. The methods used in future decision-making will be continually refined and improved through an iterative process to support better climate-related outcomes on behalf of the citizens of Calgary. Acknowledging the importance of working with city-builders to find solutions, Administration is committed to working collaboratively with our private sector partners to continually improve the integration of climate mitigation and adaptation in all types of future development.