

CITY OF ST. ALBERT SMART CITY UPDATE

VERSION 2.0 | DECEMBER 2019



Contents

Message from the Mayor.....	4
1. Introduction.....	5
1.1. Smart City 1.0	6
1.2. Smart City Update 2.0 Principles	7
1.3. Stakeholders	8
1.4. Partnerships.....	8
1.5. Data Governance, Privacy & Security	9
2. Relationship to City Strategic Plans.....	10
2.1. Community Vision	10
2.2. Municipal Development Plan (MDP)	10
3. Relationship to External Smart City Initiatives	12
3.1. Berger Report.....	12
3.2. Infrastructure Canada Smart City Challenge.....	12
4. 2020 Project Plan	13
5. Smart City Update 2.0 Document Structure.....	15
6. Social.....	17
6.1. Education	18
6.2. Community Well-being	19
6.3. Housing Variety.....	21
6.4. Mobility Choices	23
7. Economic.....	26
7.1. Robust Economy.....	27
7.2. Vibrant Downtown	28
7.3. Government Services.....	30
8. Built Environment.....	33
8.1. Great Places	34
8.2. Smart Infrastructure	35
8.3. Waste Management.....	38
9. Natural Environment.....	40
9.1. Green Environment.....	41
10. Culture.....	43

10.1. Cultural Richness.....	44
11. Governance and Implementation	45
11.1. Coordination, Planning, and Implementation	45
11.2. Next Steps	45
11.3. Resources.....	45
11.4. Performance Metrics and Reporting	46
12. Contact Information	46
Appendix A: Beyond 2021 Opportunities.....	47
Social	47
Economic	51
Built Environment.....	55
Natural Environment	57
Culture	58

Message from the Mayor



Since the development of our original Smart City Master Plan in 2016, technology and innovation have been a lens through which we view the way we do business. I am proud that we remain one of Canada's best places to live, raise children and invest. We must use these two catalysts to our advantage.

As our population grows over the coming years, there will be an increasing demand on critical services that the City provides, and a need to look at the most efficient and sustainable ways to meet those demands.

Today's smart city will help do just that. Smart Cities foster innovation and collaboration, apply new technologies and data, generate municipal efficiencies, improve service delivery, and support economic growth.

In April 2019, St. Albert's original Smart City Master Plan was recognized on a global stage by German-based company Roland Berger, who did a worldwide comparison of smart city strategies. St. Albert took third place out of 153 cities, topped only by London, England (second place) and Vienna, Austria (first place).

Smart City Update 2.0 builds on our original plan and is guided by our Community Vision and Pillars of Sustainability. Smart City Update 2.0 helps highlight how we integrate innovation and business process improvements, the foundation of Smart City, into all City business processes and planning.

St. Albert has taken a leadership position in developing an integrated and holistic Smart City Master Plan. As we continue our journey, it's important that we continue to look ahead and evolve, make better informed decisions, and not rest on our laurels. Our future reputation and competitiveness depend largely on what we do today. Smart City Update 2.0 demonstrates how we are evolving into the city we want to be, where technology fuels opportunity, inclusion, engagement, innovation and ultimately, provides an enhanced quality of life for all residents.

1. Introduction

Modern cities are under tremendous pressure from a range of social, economic and environmental factors. St. Albert like so many other cities is feeling the pressure to be responsive, transparent and efficient to meet the challenges of the modern age and our evolving digital society.

In 2016, St. Albert developed its first Smart City Master Plan with the goal to be forward-looking, progressive and resource efficient. At the time, Smart Cities 1.0 not only promoted social and technological innovation, but also openness and accessibility and how technology is used in an integrated way to help accomplish the city's vision for the future. While many of the individual strategies of the Smart City Master Plan 1.0 have been accomplished or have evolved, the primary goals remain the same. Smart cities seek to leverage technologies to improve all aspects of municipal government, directly affecting and improving services and efficiencies delivered to residents. The Smart City Update 2.0 is designed to build on the core values and strategies of the first plan as well as build on the St. Albert definition of Smart City which is:

An urban area that solves its core issues through innovation and collaboration, and that applies new technologies and data for the benefit of all.

Smart City Update 2.0 is the next step in St. Albert's progression and will serve as a progress report from the steps taken starting in 2016, to where we are today, to where we want to be in the future. St. Albert is a community that recognizes the value in actively designing our view of what we want to be as a Smart City of the future, as a complement to its existing reputation as one of Canada's best places to live, best places to raise a family, and best places to invest.

1.1. Smart City 1.0

In October 2016, St. Albert City Council approved one of the first Smart City strategic plans (master plan) in Canada. The plan resulted from nearly two years of resident engagement. The master plan components were similar, but not identical to the “Pillars of Sustainability” identified during the Community Vision development that occurred at about the same time. The Smart City Master Plan was comprehensive, covering a large number of opportunities and initiatives, carefully prioritized according to Council’s direction, which was to concentrate on opportunities for cost savings and service improvements.

St. Albert’s original Smart City Master Plan was driven by three desired outcomes:

- **Greater efficiency** – to support improved operational efficiency, employee productivity, and return on investment.
- **Dynamic economic development** – to support economic development efforts to grow existing business and attract new investment.
- **Enhanced service delivery** – to identify innovations or technologies to improve asset management, sustainability, and enhanced municipal service delivery.

Many St. Albert residents commute to Edmonton and surrounding industrial areas for employment. Lacking heavy industry, City Administration sought a way to differentiate St. Albert and establish a focus for renewed economic development. St. Albert’s highly educated work force provided the answer, recognizing that the digital revolution that began in the late 1950s was far from over and would continue to transform the world economy for decades, if not centuries to come. Smart City has become well established in St. Albert and the City has acted as a lighthouse for Smart City efforts throughout Alberta, Canada and the world.

The impact of St. Albert’s original Smart City Master Plan has been widely felt, as other communities seek to harness technology to pursue their own goals. St. Albert has hosted and participated in numerous events and discussions, seeking to learn and share knowledge. For example, St. Albert helped the Government of Canada design and implement a national Smart Cities Challenge to provide financial supports to Canadian municipalities and Indigenous peoples. Although many of the initiatives prescribed by the Smart City Master Plan 1.0 have been completed, some are still in the planning or implementation stages and will carry over to version 2.0.

1.2. Smart City Update 2.0 Principles

In 2017, a new City Council was elected, and a new Chief Administrative Officer was hired, resulting in new strategic plans and administrative business plans. This update to the Smart City Master Plan was driven by the need to align to the new strategic plans and reflect technological advances and new challenges faced by the City. The updated version of the Smart City Master Plan is called “2.0” to reflect the volume of change that has taken place since version “1.0” was approved. Smart City Update 2.0 will serve as a progress report, from the steps taken since 2016 to where we are today, to where we want to be in the future.

The new plan focuses on the efficient delivery of municipal services, with an additional emphasis on economic development and how technologies are vital to the local and wider economy. Regional partnerships are important, recognizing that St. Albert is part of the larger Edmonton Metropolitan Region and is within a province that has experienced challenges to its traditional petrochemical-based economy. St. Albert recognizes that to be successful, all members of the community need to be considered, including the Indigenous community. This plan reflects the idea that technology can be a catalyst for positive change in the lives and work of residents and City staff.

Smart City Update 2.0 was designed to be easy for the non-technical reader to understand, avoiding technical jargon and other details that would cause the plan to become rapidly outdated. The plan identifies “Smart City Opportunities” that are intended to stimulate innovation and suggest possibilities – they are not intended to be a prescriptive list. As well, the City has a robust capital project prioritization process where Smart City initiatives will compete for funding and staff resources based upon their service delivery benefits and return-on-investment.

Finally, the long-term intent of this update is to ensure the integration of efficient and innovative technology into normal, everyday business practices within the City, including areas where technologies have not traditionally been applied. Applying technology to improve every day, high-volume business practices offers some of the best opportunities to deliver better value to the community-at-large. Adopting technology in innovative ways will serve to enhance and improve the City’s service delivery to its customers and residents. This update will provide the foundation for a more robust and holistic revision in 2020 for version 4.0.

1.3. Stakeholders

Smart City 1.0 had an extensive public engagement process, beginning in fall 2014 and concluding in March 2016. City officials and Steering Committee members connected with over 2,000 stakeholders during the process and received written or verbal feedback from most of these people, making it one of St. Albert's largest and most diverse stakeholder engagement efforts to date.

The Smart City Update 2.0 stakeholder engagement process was much smaller and focused on internal audiences (City staff), as it is an update of the original plan and not a completely new strategy.

The upcoming Smart City 4.0 will re-engage the public during its development. The 4.0 plan will be so named due to the intent to leap forward in the next iteration of Smart City planning.

1.4. Partnerships

The *Municipal Government Act* (MGA) encourages neighbouring municipalities to participate in regional initiatives to provide improved planning, services, and enhanced efficiency. St. Albert has forged and strengthened many partnerships related to Smart Cities, including:

- Alberta Smart City Alliance
- Municipal Information Systems Association (MISA)
- Northern Alberta Business Incubator (NABI)
- Alberta Centre for Advanced MNT Products (ACAMP)
- Autonomous Systems for Transportation (AST) Consortium
- Northern Alberta Institute of Technology (NAIT)
- Alberta Innovates
- St. Albert Chamber of Commerce
- Edmonton Metropolitan Region Board
- City of Edmonton
- City of Calgary

The City of St. Albert will continue to forge and reinforce partnerships as well as promote and learn about best practices in the Smart City field. During the implementation of Smart City 1.0, important lessons were learned about government-industry partnerships: care must be taken to ensure that all requirements are driven by government in response to documented needs. The role of industry is to help the City explore the possible benefits of various technologies and help determine those offering the best return on investment. The role of the City is to encourage industry to grow and invest in the community.

In addition to the partners already mentioned, the City will work with Indigenous Peoples, communities and businesses to advance St. Albert as a smart city and ensure that the

benefits of technology and economic development are shared. This focus on collaboration and partnerships is supported in the City's Corporate Business Plan, which identifies a number of initiatives relating to intermunicipal and Indigenous relationships.

The City depends upon industry partners to help design and implement solutions according to the City's needs. Although industry input is highly valued, in all Smart City endeavors, the City will ensure that the requirements of residents, utility clients and the City itself remain paramount.

1.5. Data Governance, Privacy & Security

Data governance is a key perspective to consider in this Smart City Update 2.0. The compilation and use of data must comply with federal and provincial regulations, such as the Canadian Freedom of Information and Protection of Privacy (FOIP) Act laws. Additionally, through the Strategic Services & Information Technology department, the City of St. Albert has policies in place to manage and secure data and information controlled by the City. Accuracy in the data collected is very important, as an error in master data can cause significant issues for the systems and decisions that rely upon it.

As the City's data collection footprint expands, there is an obligation to ensure that all aspects of data collection, ownership, management and dissemination are properly and securely managed, as well as accurate, timely and used to deliver appropriate services to residents. The protection of privacy is fundamental to maintain trust and public confidence with residents.

Cyber security is a critical and ever-evolving concern. Network disruptions from Denial of Service attacks, data theft or tampering, or device misappropriation are all real-world examples of the threats public agencies face in today's interconnected world. As a data management strategy develops and new device and communication infrastructure is brought online, appropriate network security and data integrity policies will need to be planned and implemented to ensure complete integrity of data and continued safe and secure operations.

The public realm is becoming a place where anonymity and privacy is increasingly scarce. There is a growing public awareness of, and sensitivity to, the increasing amount of data that is gathered on citizen's daily activities, both physically and digitally. Privacy and security must be considered during the design and implementation of every smart city initiative undertaken by the City.

The protection of intellectual property requires careful planning and consideration. While increased use of the Internet and social media allows access to greater audiences, the risks of copyright infringement, theft and fraud have also increased. Intellectual property can be an important consideration when negotiating contracts, often requiring confidentiality agreements for the protection of all parties.

Data governance, privacy and security are fundamental requirements for all Smart City initiatives. As civic technologies increase their presence in the lives of residents, the City must ensure appropriate and secure use.

2. Relationship to City Strategic Plans

The Smart City Update 2.0 aligns to broader City strategies and plans, including the Community Vision and Municipal Development Plan, as detailed in the following sections.

2.1. Community Vision

During 2014, St. Albert developed a Community Vision, which involved a large public engagement effort to find out what residents' long-term goals for the community were. The Community Vision created five concise "pillars" reflecting the values of the community:



Social: We are a friendly and inclusive community of passionate equals, where everyone feels a sense of belonging. We believe that community starts with the person next door.



Economic: We prosper and excel through a strong and diverse economy that is supported by forward-thinking commerce, outstanding local businesses and a dynamic downtown core.



Built Environment: We build our community towards the future to sustain balanced development, with a reverent eye to the past, honouring our unique settlement history and distinct identity.



Natural Environment: We protect, embrace and treasure our deeply-rooted connections with the natural environment through championing environmental action.



Culture: We are proud of our storied history that has fed and nurtured our festive and culturally-rich community.

2.2. Municipal Development Plan (MDP)

Not only has the Smart City Update 2.0 been structured to reflect the pillars (above), it also aligns with preliminary work on a revised Municipal Development Plan (MDP). The new MDP is called Flourish: Growing to 100K and will shape how the city grows and develops to a population of 100,000. The MDP is designed to provide guidance for a much longer duration and will be completed in 2020. Smart City Update 2.0 will align with the MDP to ensure that Smart City progress contributes to larger community goals.



The City follows an established framework to provide direction for strategic and business planning, identifying strategic outcomes, defining priorities, establishing long and short-term goals, and developing performance measures to monitor progress. Smart City Update 2.0 is an update to a long-term plan that fits within this established framework.

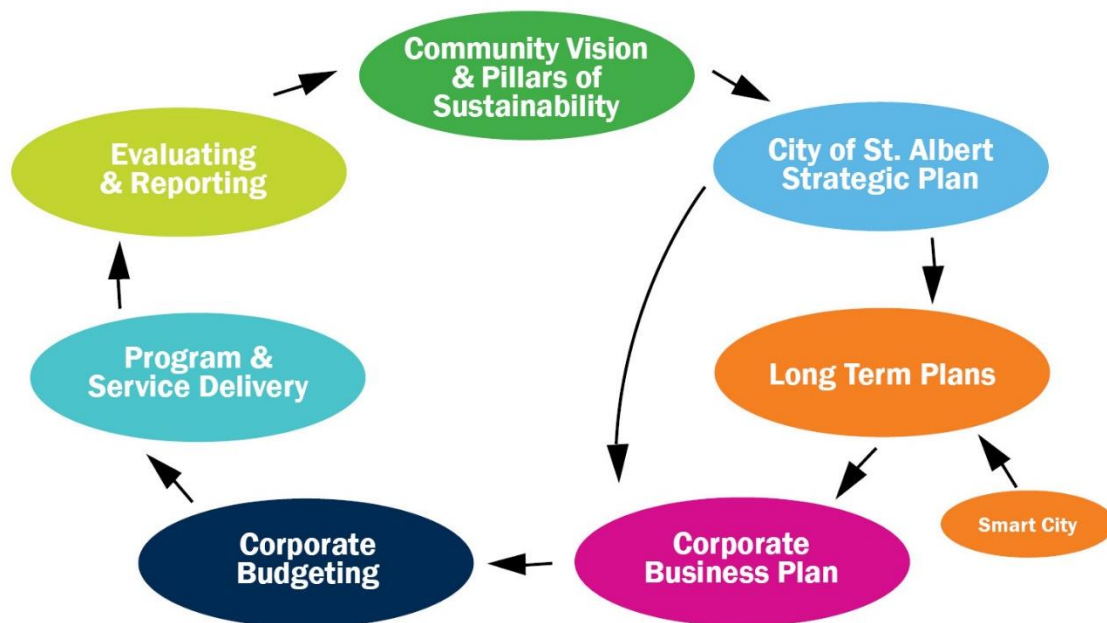


Figure 1 – City of St. Albert Strategic Framework

3. Relationship to External Smart City Initiatives

3.1. Berger Report

In March 2019, European consultant Roland Berger published an analysis of 153 cities around the world that are advancing smart city strategies. St. Albert scored a close third overall, after Vienna and London. Despite this remarkable showing, the Berger Report offered highly useful feedback that the City has used to create even better plans and implementation efforts through Update 2.0 and beyond. Specifically, the Berger Report pointed out that St. Albert's Smart City Master Plan 1.0 did not address the areas of Education and Healthcare. It should be noted that although these two areas are not municipal responsibilities in Canada, the actions of Cities and the urban environment have a great influence on their outcomes and need to be considered.

3.2. Infrastructure Canada Smart City Challenge

In 2018, the Government of Canada conducted a Smart City Challenge, where municipalities could propose solutions to their most pressing problems and compete for grant funds. Although St. Albert was not selected as a finalist or grant recipient, the process of writing the challenge statement and the resulting feedback presented valuable insight into areas where St. Albert's future smart city plans can be improved. Specific lessons included:

- Smart City is not just about technology and innovation. The health of residents and social outcomes must be considered as important end goals to which innovation can be applied.
- Partnerships with other communities and diverse groups can extend the benefits of technology more broadly, crossing the digital divide and contributing to other goals such as reconciliation with Indigenous Peoples. The best smart city solutions should be scalable and repeatable in other communities.

4. 2020 Project Plan

Throughout the Smart City Update 2.0, opportunities have been identified that will create progress towards stated goals. These opportunities are identified within two timeframes: by 2021 and beyond 2021. The table below highlights all opportunities that have been identified as achievable by 2021. Opportunities for beyond 2021 are summarized in an appendix.

Section	Priority	Impact	Opportunity	Output	Current Status
Smart Infrastructure	High	High	Improve infrastructure asset and maintenance management software, including the condition assessment and long-term capital planning models	Major Project	Planned
Waste Management	High	High	Investigate alternative waste disposal options (e.g. waste to energy)	Major Project	In Progress
Government Services	High	High	Streamline and digitally transform paper-based HR administration and payroll processes	Major Project	In Progress
Government Services	High	High	Implement electronic building permit and development application processes	Major Project	Identified, plan for 2021 business case
Community Well-Being	High	High	Planning for CRTC mandated next generation digital 911 services and technologies	Minor Project	Identified, must be in place by end 2022
Community Well-being	High	Medium	Implement new booking and record keeping case management system to improve mental health services (awareness, education and counselling)	Minor Project	Planned
Mobility Choices	High	Medium	Offer real-time transit service notification tools, electronic fare payment, and on-board convenience technologies	Minor Project	In Progress (Regional Smart Fare)
Community Well-being	Medium	Medium	Pilot a community forest, which are trees and bushes intentionally planted to provide food (e.g. apples, berries, etc.) supported by online maps and benefitting local food banks	Minor Project	Pilots identified within the Urban Forest Management Plan
Robust Economy	Medium	Medium	Attract businesses focused on emergent sectors in technology and innovation amenable to the region and City	Minor Project	In Progress

Community Well-being	Low	High	Examine technology to support aging-in-place, (e.g. broadband networks, medical telemetry)	Minor Project	Identified as high potential. Consider pilot projects and partnerships with existing developers
Vibrant Downtown	Low	Low	Pilot virtual overlays of historical images to enhance community awareness of cultural history in public spaces	Minor Project	Identified

5. Smart City Update 2.0 Document Structure

As noted above, the Smart City Update 2.0 has taken into consideration existing municipal planning and strategy documents such as the Community Vision and Pillars of Sustainability. The document also promotes strong alignment with the Municipal Development Plan (MDP) that is currently under development.

Goals from the MDP have been used to identify key sections within the Smart City Update 2.0.

Additionally, external bodies within the Smart City world have influenced the development of this documents structure. The 2019 Berger Report identified some sections that the City of St. Albert did not include within its first Smart City plan. We have expanded the scope to address this.

Similarly, the most recent Smart City Challenge hosted by Infrastructure Canada highlighted the importance of tying Smart City implementation back to the communities, showing the impact these technologies and innovations have outside of efficiencies and innovations. By including the new categories, the City of St. Albert hopes to demonstrate that its Smart City Update is broader than just a list of technology applications or partnerships with the business community. The intent behind this Smart City Update is to promote increased value to our residents and ultimately promote a high quality of life within the community.

Section	Municipal Development Plan	Berger Report (2019)
6.1 – Education		X
6.2 – Community Well-being	X	X (includes Health)
6.3 – Housing Variety	X	
6.4 – Mobility Choices	X	
7.1 – Robust Economy	X	
7.2 – Vibrant Downtown	X	
7.3 – Government Services		
8.1 – Great Places	X	
8.2 – Smart Infrastructure	X	
8.3 – Waste Management		X
9.1 – Green Environment	X	
10.1 – Cultural Richness	X	

Within each section, the following sub-sections are included:

- **Goals & Objectives:** Goals and objectives included come directly from the current draft MDP to ensure maximum alignment with the community's long-term direction. Where MDP goals were not provided, the internal Smart City team developed goals and objectives to address Smart City concerns.
- **Existing Services Related to Smart City or Innovation:** City staff were engaged through an internal open house to collect feedback on what the City is currently doing to make progress towards achieving Smart City principles. These activities have been cross-referenced against this plan and its focus on partnerships, data governance, privacy and security, and legal and policy. Achievements that were included within the Smart City Master Plan 1.0 have been identified as well.
- **Technology and Innovation Implications:** Technology and innovations implications have been identified to clearly articulate what specific and unique challenges are present within each section.
- **Opportunities:** Opportunities for how the City could continue to progress towards Smart City principles have been identified. These activities have been cross-referenced against the current plan's focus on partnerships, data governance, privacy and security, and legal and policy. Outstanding opportunities from the Smart City Master Plan 1.0 have also been identified. Opportunities have been categorized: those that can be accomplished by 2021 and those that will be addressed beyond 2021. Opportunities for beyond 2021 are summarized in an appendix.



6. Social

The Community Vision describes the social pillar as:



We are a friendly and inclusive community of passionate equals, where everyone feels a sense of belonging. We believe that community starts with the person next door.

The City of St. Albert believes in the advancement of a fair and equitable society that promotes respect for all citizens, strengthens the community, reduces causes of disadvantage and inequality and ensures that all citizens in St. Albert thrive and enjoy the best quality of life possible. St. Albert is one of 80 UNESCO Inclusive Communities in Canada. Technology can enable people to become more engaged in their local community as well as create virtual communities throughout the world, reducing isolation and strengthening neighbourhoods.

6.1. Education

When it comes to education, although a Provincial responsibility, the City provides certain services, such as libraries, cultural and recreational learning opportunities to its residents. The St. Albert Public Library works closely with the City to provide access to computers, Wi-Fi, and digital collections such as e-books, audiobooks, music, magazines and movies. Furthermore, there are opportunities to strengthen and enhance existing relationships with school boards and other educational institutions through Smart City applications.

6.1.1. Goal & Objectives

The Smart City Update 2.0 aims to:

- Pursue close cooperation and mutual benefit in areas of technology between the City and educational institutions
- Build partnerships with regional post-secondary institutions to design and test smart city technologies and encourage new business ventures
- Cooperate with the St. Albert Public Library on digital literacy and bridging the digital divide
- Liaise with local school divisions to identify areas of mutual benefit

6.1.2. Existing Services Related to Smart City or Innovation

The City via the St. Albert Public Library provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Structured programs for all residents, including literacy, digital literacy and even digital creativity through the “makerspace” program	Minor Project	Complete/In Place
Medium	Medium	Study rooms that can be booked in advance as well as exam proctoring	Minor Project	Complete/In Place
Medium	Medium	Community outreach via a “library on wheels” program and a storefront library in the city’s north end opening soon	Minor Project	Complete/In Place
Medium	Medium	Collaborate with local organizations to provide public computer access, digital literacy and technology education programs, and to foster lifelong learning in the community	Minor Project	Complete/In Place

6.1.3. Technology and Innovation Implications

Education and technology have always been closely linked, both as a method of improving the flexibility and efficiency of delivering education and because technologies require training to use them effectively. The concept of the digital divide addresses the quality of life gap that exists between those who can afford technology and those who cannot. One of the catalysts of the modern education system is Internet bandwidth, enabling many new modes of independent learning such as Massive Open Online Courses (MOOCs). Makerspaces encourage entrepreneurial and creative skills by providing a supported space and access to resources such as video production equipment, sound booths, 3D printers and robotics.

6.1.4. Opportunities

No opportunities are currently identified to be completed by 2021 in this section.

Please see the appendix for all opportunities beyond 2021.

6.2. Community Well-being

St. Albert is a socially diverse community and will become even more so as current residents age and new residents move to the city. The well-being of our growing community requires an inclusive approach that embraces and supports people of all ages, incomes, cultures and backgrounds. Through Smart City's approach of innovation, technology and partnerships, the City's efforts to support community well-being can be enhanced and strengthened by leveraging new opportunities to build strong services that support all residents.

6.2.1. Goal & Objectives

The City's new draft Municipal Development Plan states:

St. Albert supports healthy lifestyles and well-being with a continuum of community services and facilities.

- Ensure all children and youth have convenient and safe access to primary and secondary schools
- Provide a full range of indoor and outdoor recreational facilities
- Ensure all residents have convenient access to a park and a recreation centre
- Expand and improve the city's trail network
- Ensure residents have convenient access to a full range of health and social services within the city
- Ensure all neighbourhoods, commercial areas and employment districts feel safe and are safe

6.2.2. Existing Services Related to Smart City or Innovation

The City already provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	New online activity and facility booking for recreational and physical fitness facilities and programs	Major Project	Complete/In Place
Medium	Medium	Online interactive maps for parks, trails, recreational facilities, streets and amenities	Minor Project	Complete/In Place
Medium	Medium	Use of online tools to facilitate the neighbourhood connection programs	Minor Project	Complete/In Place
Medium	Medium	Active living trade fair (provision of enhanced and portable Wi-Fi hotspots)	Minor Project	Complete/In Place
Medium	Medium	Automated defibrillators with voice prompt instructions within public buildings	Minor Project	Complete/In Place

6.2.3. Technology and Innovation Implications

- Despite the rapid influx, technology has only just begun to affect the delivery of healthcare, which usually requires the patient to travel to a physician, medical clinic, diagnostic lab or hospital. Broadband Internet has the potential to change the delivery method for healthcare and enable remote patient monitoring and diagnostics.
- St. Albert's age demographic has been gradually shifting to an older population; technology could help residents remain in their homes longer (aging-in-place).
- Technology has widely influenced recreational services, from the booking of classes and facilities, to point-of-sale systems, Wi-Fi and asset management.
- Wearable technology is emerging, including fitness trackers, smart watches and medical telemetry (sensors).
- Isolation is a key contributor to many social issues that residents face. Using technology to connect people is one approach that needs further investment. Additionally, the use of technology to connect neighbours to share information and resources is a growing and effective methodology. Many communities are using technological advancements to enable timely access to mental health services online, and to communicate and engage with the growing number of residents whose first language is not English. Technology can help support the most vulnerable residents with increased service efficiencies.

6.2.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Pilot a community forest, which are trees and bushes intentionally planted to provide food (e.g. apples, berries, etc.) supported by online maps and benefitting local food banks	Minor Project	Identified
Medium	Medium	Implement new booking and record keeping case management systems to improve mental health services record keeping case management system)	Minor Project	Planned
Low	Low	Examine technology to support aging-in-place (e.g. broadband networks, medical telemetry, accessibility features in neighbourhoods); Explore partnerships with existing developers	Minor Project	Identified

Please see the appendix for all opportunities beyond 2021.

6.3. Housing Variety

Housing variety means having different housing types available to suit a range of people at various stages of life. A wide array of housing choices will attract and retain residents and enable a healthy and diverse demographic. Smart City technologies can help reimagine housing forms to promote technology adoption within homes, improve energy efficiency, liveability, and embrace household innovations that enhance overall quality of life. Aside from built-form, technology can be leveraged to support and connect residents, including our vulnerable populations, to their housing options. From Host Homes, low-density, single-family homes to high-density apartment buildings, St. Albert can provide opportunities for people from all backgrounds to call our community home.

6.3.1. Goal & Objectives

The City's new draft Municipal Development Plan states:

St. Albert accommodates a full and balanced mix of housing choices, meeting the needs of everyone, at all stages of life.

- Ensure new neighbourhoods include a broad mix of housing types, sizes and tenures (ownership and rental)
- Accommodate new forms of housing in established neighbourhoods that respect the existing scale and character of the area
- Increase the provision of housing affordable to those on low and moderate incomes
- Accommodate mixed commercial-residential developments along St. Albert Trail and in commercial nodes elsewhere

6.3.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Updated Residential Districts in the Land Use Bylaw provide more opportunities for development industry innovation in housing forms	Minor Project	Complete/In Place
Medium	Medium	Solar Readiness through Building Codes, as well as solar energy efficiency and local power generation opportunities through the Land Use Bylaw	Minor Project	Complete/In Place
Medium	Medium	Pictometry/LIDAR programs to assist land-use planning	Minor Project	Complete/In Place
Medium	Medium	The Landscape Property Information Viewer application on the City's website enables residents to view property details, assessment values and neighbourhood features in a printable format	Minor Project	Complete/In Place

6.3.3. Technology and Innovation Implications

Technology has the potential to improve connections between residents and municipal programs and services. Electronic methods can be used to reduce the social isolation of seniors and other community members.

Reduced energy use can reduce environmental impact and improve housing affordability. Innovations such as solar power, district energy and passive solar techniques can contribute to net-zero energy use.

Technology can enable the thoughtful design of neighbourhoods to improve walkability and other transportation modes, ensure convenient access to services, and reduced isolation.

As the population of St. Albert grows, the demographics and needs of the population will change. An increase in the number of newcomers to the city illustrates the need to provide municipal information in languages other than English and French.

6.3.4. Opportunities

No opportunities are currently identified to be completed by 2021 in this section.

Please see the appendix for all opportunities beyond 2021.

6.4. Mobility Choices

A thriving community requires multiple means of efficient transportation. Through diverse mobility choices, residents can decide how they wish to experience their community. Technology can even enable increased accessibility for those who have limited mobility. By implementing Smart City principles, innovations can be pursued to improve overall mobility in the community through technology and partnerships. Technological advancements will enable people to spend less time travelling and more time at the community amenity of their choice.

6.4.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert supports an efficient transportation network with attractive options for moving around and which promote public health and safety.

- Design streets and other transportation infrastructure to equitably and safely support connectivity for all modes, ages and abilities
- Facilitate the efficient and safe movement of public transit, private vehicles, and commercial vehicles on major thoroughfares
- Make public transit a more attractive and viable alternative to the private vehicle for more residents and support multi-modal commuting
- Design neighbourhoods to enable most residents to conveniently access local services and amenities by walking or cycling
- Expand and improve the network of on-road and off-road facilities for cyclists

6.4.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
High	High	Intelligent Transportation System (ITS) with adaptive signals (e.g. Central Monitoring Systems, Permanent Count Stations, Road Weather Information System (RWIS) stations and Adaptive Signal technology)	Major Project	Implementation
High	High	Complete Streets Guidelines	Major Project	Complete/In Place
High	High	Expedite the development and implementation of an intelligent transportation system strategy for St. Albert	Major Project	Implementation
Medium	Medium	Comprehensive trail systems and online mapping	Major Project	Complete/In Place
Medium	Medium	Electric bus fleet & City vehicles	Minor Project	Implementation

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Work with regional neighbours to coordinate intersection timing on key transportation corridors and actively share transportation data	Major Project	In Progress
Medium	Medium	Provide transportation data and digital trip information, directly and indirectly, to travellers considering all modes of mobility	Minor Project	Complete/In Place
Medium	Medium	Equip transit and emergency vehicles with technologies to facilitate adaptive priority at local intersections	Minor Project	Complete/In Place

6.4.3. Technology and Innovation Implications

Technology plays a key role in the planning and operation of transportation systems as the City endeavours to get the best possible performance from road networks and other assets while remaining cost effective. St. Albert uses a Transportation Master Plan (TMP), which is a strategic document approved during 2016 that will guide future transportation needs for decades to come. The goal of the TMP is to connect and move people, goods and services in a safe, efficient, and effective way. Transportation is broader than road networks; it includes trails, sidewalks and other infrastructure. Technology is required in the pursuit of nearly all of the key goals within the TMP and will no doubt increase over time as new modes of transportation emerge, such as connected and autonomous vehicles, as well as the trend towards plug-in electrical vehicles.

The work that St. Albert accomplished under the Smart City Master Plan 1.0 to install municipal fibre optic networks has laid a strong foundation for success. Approximately three quarters of the City's signalized intersections are now connected via municipal fibre, which is being used to actively monitor equipment, measure traffic, and perform maintenance or configuration changes remotely. Video cameras and other sensors are used to monitor and dynamically adjust for changing conditions. Adaptive signalling is the ability to change signal durations using artificial intelligence – this technology has shown great potential to improve signal wait times and two different implementations are currently being evaluated. Sensors are used to measure road temperatures and snow cover to make optimal decisions for the control of ice and snow during winter months. Sensors collect large amounts of data, which must be properly stored, managed, and analyzed to ensure optimal results.

Road and trail networks are expensive assets that require proactive maintenance. The City uses technology to assess the condition of transportation assets, optimize asset life, and accurately plan for the future. St. Albert's road network connects to the larger Edmonton Metropolitan Region and all neighbouring jurisdictions benefit from close cooperation and joint planning. Transportation system safety is a top priority for

St. Albert, reflected in dramatic improvements under the Vision Zero initiative, with the stated goal of no serious injuries or fatalities. Technological improvements in pedestrian crossings, school zones, and left turn signals on major roadways have already produced remarkable safety improvements.

6.4.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Offer real-time transit service notification tools, electronic fare payment and on-board convenience technologies	Major Project	In Progress

Please see the appendix for all opportunities beyond 2021.



7. Economic

The Community Vision describes the economic pillar as:



We prosper and excel through a strong and diverse economy that is supported by forward-thinking commerce, outstanding local businesses and a dynamic downtown core.

Without a vibrant economy, none of the other Community Vision pillars are possible. Technology can be an important economic influencer as cheap and reliable access to broadband Internet can enable economic growth wherever skilled and educated workers are available. Efficient transportation links such as the Anthony Henday ring road, Highway 2, the rail system and proximity to two airports are key to St. Albert's economic success.

7.1. Robust Economy

St. Albert's economy is the underlying thread that ties the city together. Through employment, retail and industrial opportunities, community well-being can be sustainably supported. A robust economy leads to increased revenue for the City, improving the balance of residential and business taxes. Smart City technologies, innovation and partnerships can promote St. Albert as a stable and future-ready place to do business that supports a high-quality work and home life, contributing to the attraction and retention of businesses and residents.

7.1.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert has a diverse economy that offers a range of opportunities to work and invest and supports a sustainable tax base.

- Establish new employment districts for a mix of businesses, including major employers
- Attract and accommodate a broad range of light and medium industrial uses
- Accommodate and support a full range of local shops, services and entertainment destinations to meet the needs of residents and businesses
- Facilitate and promote business start-ups
- Attract one or more post-secondary institutions

7.1.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Cooperate with industry to improve access to data within business districts (e.g. Wi-Fi zones, 5G networks and fibre optics)	Minor Project	In Progress
Medium	Medium	Work with developers to improve buildings (e.g. net-zero or net-zero ready, alternative servicing such as district heating)	Minor Project	In Progress
Medium	Medium	Improve transportation (e.g. private industry deployment of electric vehicle charging infrastructure)	Minor Project	In Progress
Medium	Medium	Support new technology and innovations such as the use of drones to acquire aerial information, City-owned fibre optic networks, electric buses to transport residents daily and for special events (e.g. commercial broker tours of new development sites) and the use of solar panels on City buildings	Minor Project	In Progress
Medium	Medium	Enable e-services for residents and businesses to make services faster and more convenient	Minor Project	In Progress

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Provide online databases such as commercial property listings to make it easier for businesses to find opportunities to grow and expand	Minor Project	In Progress

7.1.3. Technology and Innovation Implications

The use of new technologies and innovations have the potential to reduce costs and increase revenues for business. Business can pass on savings to customers or use increased profits to expand existing operations or venture into new business lines. The creation of new clusters centered around emerging economies offers the potential for sustained growth. Both improving existing business and the attraction of new business have positive implications that together create a positive feedback loop for growing a well-diversified and robust economy.

Robust Internet connectivity is fundamental to nearly every business, enabling connectivity to clients, suppliers, and supporting services such as telephones, software applications, e-commerce and the exchange of data.

Cities can support the business community by participating in trials and tests of new technologies (living lab) and adopting those technologies that demonstrate cost savings or improved municipal services. Business can bring fresh ideas, processes and industry standards to municipal operations, to the mutual benefit of all parties.

7.1.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Attract businesses focused on emergent sectors in technology and innovation amenable to the region and City, specifically, those related	Minor Project	In Progress

Please see the appendix for all opportunities beyond 2021.

7.2. Vibrant Downtown

The Downtown Perron District is the heart of St. Albert, as the City's cultural epicentre and a key business district. The potential to enhance this district through Smart City is limitless. Connectedness to the broader community as a whole is one of the primary draws of the downtown. By examining technology, innovation and partnerships, a vibrant downtown is just around the corner.

7.2.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert's Downtown is celebrated as the City's civic and cultural heart, a thriving business district, and a dynamic neighbourhood.

- Ensure central civic facilities remain downtown and meet the needs of residents, businesses and government
- Increase the number of retail, restaurant, entertainment and office-based businesses
- Significantly increase the number of dwelling units downtown
- Enhance downtown's open spaces, streetscapes and cultural programming
- Improve connections to downtown by public transit, cycling and walking
- Maintain an adequate supply of parking

7.2.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Facilities and events Downtown that continuously bring residents and tourists into the core of the community: <ul style="list-style-type: none">• Downtown currently features numerous cultural assets, including a public library, a theatre, an art gallery and a museum• The Downtown plays host to the St. Albert Farmers' Market on Saturdays from June to October, one of the largest farmers' markets in Western Canada attracting crowds of 15-20,000 per week	Minor Project	Complete/In Place
Medium	Medium	Parks and open spaces, which are given priority and incorporate unique features to encourage their use as gathering spaces and for events	Minor Project	Complete/In Place
Medium	Medium	Innovative redevelopment to offer additional retail outlets and commercial space (e.g. Grandin Mall site)	Minor Project	Complete/In Place
Medium	Medium	Downtown facilities and events that provide ample space and opportunity for local entrepreneurs to create and test new products and interact with fellow residents and tourists alike	Minor Project	Complete/In Place

7.2.3. Technology and Innovation Implications

Smart cities throughout the world are using technologies to improve busy public spaces to better cope with the demands imposed by major public events and high utilization. St. Albert's historic downtown area has had to evolve from the age of horse and buggy to the information age.

Although the downtown hosts numerous and highly successful events throughout the year, access and parking can be challenging. Properly used, technologies can enhance the experience of visitors and residents, while respecting privacy at all times.

Visitors and residents expect to be digitally connected through technologies such as Wi-Fi and cellular networks, including new 5G data services. Public spaces can even interact with visitors through the use of Wi-Fi beacons, QR codes, video projections and other location-based services that can provide a rich virtual overlay of services and information.

7.2.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
Low	Low	Pilot virtual overlays of historical images to enhance community awareness of cultural history in public spaces	Minor Project	Identified

Please see the appendix for all opportunities beyond 2021.

7.3. Government Services

The provision of services to residents, businesses and utility clients is the City's core function. Government services are created to fill a need for the community. Ultimately these services provide value to residents and customers of the community. To provide the highest quality and most efficient services to residents and other clients, technology must be harnessed. Through our Smart City plan, partnerships are encouraged, technology can be explored, and innovations can propel all government services to a position of increased value to all users, both external to the organization and within. Resident-facing and internal services can benefit from technology. For example, a new human resource information system will enable the City to become a more dynamic and high-performing organization, which provides further benefit to the community.

7.3.1. Goals & Objectives

The Smart City Update 2.0 aims to:

- To deliver exceptional, accessible customer experiences
- Drive customer-driven design and consistent delivery of services across all channels throughout the organization
- Increase mobile and online access to services, where possible
- Improve customer experience through Customer Journey Mapping, and where possible, automating internal and external processes
- Establish a Data Governance Model and use data to inform decision-making and innovation
- Expand open data and open information offerings

7.3.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	A mobile application, See Click Fix, that residents can use to identify required community and neighbourhood repairs and issues	Minor Project	Complete/In Place
Medium	Medium	Website improvements	Minor Project	Implementation
Medium	Medium	Improve the ease and convenience of interacting with the City through expanded e-services and mobile options, within and across City programs and services	Major Project	Implementation
Medium	Medium	Testing artificial intelligence for public participation opportunities	Minor Project	Implementation
Medium	Medium	Communicate municipal open data sets and related information through an online open data portal and facility-based displays	Major Project	Complete/In Place

7.3.3. Technology and Innovation Implications

In modern society, citizens expect to interact with business and public institutions at the time and method of their own choosing. Banks have led the way, by providing access to almost every banking service via secure websites, mobile applications, automated voice services, automated tellers and continued in-person contact with a customer service agent. Municipalities have been slow to adopt customer-centric approaches to most services, often requiring residents and utility clients to attend services in-person at a single location within an inconveniently narrow range of operating hours. The modern service expectations of residents, businesses and utility clients require not only new technologies, but entirely new approaches to understand, document, measure, and design service delivery from a customer-centric point of view.

7.3.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
High	High	Streamline and digitally transform paper-based HR administration and payroll processes	Major Project	In Progress
Medium	Medium	Planning for online building permit and development application processes.	Major Project	Identified, plan for 2021 business case
Low	Low	Expand access to information and data through the open data portal, which residents and businesses can use to help inform decision-making	Minor Project	In Progress

Please see the appendix for all opportunities beyond 2021.



8. Built Environment

The Community Vision describes the Built Environment pillar as:



We build our community towards the future to sustain balanced development, with a reverent eye to the past, honouring our unique settlement history and distinct identity.

The built environment of the City refers to the man-made constructions that adapt the environment to our purposes. These include indoor and outdoor municipal spaces, architecture, and infrastructure including roadways and utilities. Technology forms a vital part of the built environment, especially as it pertains to making infrastructure that is well planned and highly efficient.

8.1. Great Places

At the heart of any great city are great places. These are community spaces that draw people in and keep them engaged in the city's character, history and identity. Through Smart City applications of technology, innovation and partnerships, great places can be enhanced and accessible to all members of the community. Through innovative placemaking, community identity emerges.

8.1.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert cherishes a sense of place and community, designing the built environment to create lively spaces and instill civic pride.

- Maintain or enhance the appearance and character of the city's distinctive and valued places
- Build new distinctive places intended to become destinations for residents and visitors
- Design neighbourhoods to high industry standards for sustainability and excellence in community design
- Ensure infrastructure, community facilities and the public realm generally are designed to high standards for engineering, architecture, landscape architecture and urban design
- Celebrate public and private developments recognized for their design excellence

8.1.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Crime Prevention Through Environmental Design (CPTED) (through the St. Albert RCMP)	Minor Project	Complete/In Place
Medium	Medium	Cultural online map to show the location of public art and other cultural amenities. QR codes are displayed on public art to provide additional information to visitors	Minor Project	Complete/In Place
Medium	Medium	Red Willow Trail system and online trail maps contribute to walkability	Minor Project	Complete/In Place
Medium	Medium	Provision of data to the NextBus system to track bus arrival times	Minor Project	Complete/In Place

8.1.3. Technology and Innovation Implications

Technology can lead to the creation of new connections within the community and help to continue those interactions into meaningful relationships. It can also create destination points for residents and visitors, based on the type of experience or service provided at a location. For example, free and accessible Wi-Fi or charging stations for electric vehicles are a draw to what can be an emerging culturally significant area. Location-based services can add a rich digital layer to the physical experience, allowing visitors to learn more or even interact with the space.

8.1.4. Opportunities

No opportunities are currently identified to be completed by 2021 in this section.

Please see the appendix for all opportunities beyond 2021.

8.2. Smart Infrastructure

Infrastructure is the backbone of any city. It is the roads we drive on, the buildings we live and work in, and the pipes below the ground that connect our city with key municipal services. The Smart City approach allows the City to re-examine opportunities to define partnerships, implement technologies and strive for innovations that make our infrastructure smart and multi-dimensional. Infrastructure is expensive and must be properly planned and managed throughout its lifecycle to ensure safe and reliable service within the financial constraints faced by municipalities. Supported by data-driven decision-making and other technologies, the City will pursue best practices for the management of critical infrastructure to support and enhance the community.

8.2.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert ensures infrastructure systems are resilient, efficient and adaptable, embracing innovative, smart-city technologies.

- Decrease per-capita water usage
- Optimize land and facilities required for stormwater management
- Optimize existing wastewater infrastructure
- Increase the number of certified green buildings and the use of green building technologies generally
- Build new infrastructure and upgrade older infrastructure, where appropriate, to withstand a higher frequency of severe storms
- Build new infrastructure and improve existing infrastructure with advanced data gathering and operational technologies

8.2.2. Existing Services Related to Smart City or Innovation

The City already provides:

Priority	Impact	Existing Service	Output	Current Status
High	High	Supervisory control and data acquisition (SCADA) for water utilities, which monitors and controls the water system to ensure reliable service	Minor Project	Complete/In Place (upgrade in progress)
High	High	Water Advance Metering Infrastructure (AMI) system to collect meter readings with increased frequency without the requirement to visit each residence or business in person and provide client dashboards and alerts	Major Project	Complete/In Place
High	Medium	Accelerate the development of a municipal fibre-optic broadband network that will connect current and future facilities and other assets	Major Project	Complete/In Place
Medium	Medium	Closed circuit television (CCTV) inspection of pipes and mains	Minor Project	Complete/In Place
Medium	Medium	Inflow and Infiltration Studies	Minor Project	Complete/In Place
Medium	Medium	Remotely Operated Vehicle System	Minor Project	Complete/In Place
Medium	Medium	Sustainable Building Policy	Minor Project	Complete/In Place
Medium	Medium	Remote sensing air photo imagery and LIDAR (airborne laser radar) elevation mapping to understand drainage patterns and floodplains	Minor Project	Complete/In Place
Medium	Medium	Solar panels on some current and proposed City-owned facilities	Minor Project	Complete/In Place
Low	High	Advocated for the extension of the City's municipal broadband network infrastructure into under-served local business areas through Telus PureFibre	Major Project	Identified
Low	Low	Inform, encourage, and facilitate if necessary, greater investment and faster speeds for residential Internet service delivery	Minor Project	Complete/In Place

8.2.3. Technology and Innovation Implications

As the City's population and commercial/industrial base increases, the strain on existing infrastructure and the demand for new infrastructure also increases. Smart technologies can help to monitor and optimize the capacity of current infrastructure and extend its life. New infrastructure can be carefully planned to reduce construction costs and ensure a long and low-maintenance future.

- Supervisory control and data acquisition for our wastewater and water programs provides current and historical data for flow monitoring and pump runtimes. By recognizing flow or usage anomalies, it allows the City to prepare operating or capital programs to optimize the system which will increase the service life of utility infrastructure and prepare programs for upgrading required capacities for future events.
- CCTV for storm and sewer allows the City to inspect infrastructure internally, which is intended to locate areas in need of repair and prioritize to optimize the effectiveness of the systems.
- Automated water meters allow the City and residents of the City to see real-time changes in their water usage. The system will flag possible leaks or water infrastructure problems on private and public land and enable a decrease in per capita water usage.
- Inflow and infiltration studies provide the City with knowledge of areas where there may be capacity issues due to infiltration or inflow from ground water. This allows the City to target work and/or to repair problem areas.
- The Environment & Utilities department follows the sustainable building policy for new infrastructure housing such as pump houses, lift stations or future buildings which would support growth of the department.
- A remotely operated vehicle system would provide inspections of the reservoirs with an underwater "drone" that previously was required to be inspected by a contracted diver.

8.2.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
High	High	Improve infrastructure asset and maintenance management software, including the condition assessment and long-term capital planning models	Major Project	Planned

Please see the appendix for all opportunities beyond 2021.

8.3. Waste Management

Waste Management is a municipal service with tremendous potential to benefit from Smart City applications. Every municipality is faced with pressures to manage its community waste in more efficient and environmentally conscious ways. Through a Smart City approach, partnerships could be identified, new technologies could be leveraged, and innovations could be put into practice to better serve the community and the ecological footprint.

8.3.1. Goals & Objectives

The Smart City Update 2.0 aims to:

Explore collaborative ecosystems and the circular economy as a way of reducing waste and developing new economic models:

- Reduce the influx of single-use plastics and other products that are difficult to recycle
- Develop new ways of dealing with waste that currently cannot be recycled
- Examine waste-to-energy technologies
- Ensure that hazardous waste is processed appropriately

8.3.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Be Waste Wise App that provides waste collection reminders, a sorting tool, and notifications/service alerts for users	Minor Project	Complete/In Place
Medium	Medium	Solid waste diversion system to reduce the volume of waste through recycling and composting programs (see section 5.3 Waste Management)	Major Project	Complete/In Place

8.3.3. Technology and Innovation Implications

Recently, the City's ability to recycle plastic products has diminished due to market forces, resulting in resident frustration and a reduction of solid waste diversion away from landfills.

Plastic recycling is the process of recovering waste plastic and reprocessing it into useful products. Since the vast majority of plastic is non-biodegradable, recycling has been an important way to reduce the amount of plastic entering the waste stream or the natural environment. Compared with the lucrative recycling of metal, plastic recycling is more challenging because of low density, low value, and technical hurdles. For example: when different types of plastics are melted together, they tend to separate like

oil and water, making the resultant material useful in only limited applications. The two most widely manufactured plastics, polypropylene and polyethylene, behave this way, which limits their utility for recycling. Other materials such as glass and Styrofoam are also challenging to recycle.

The City is currently studying waste-to-energy solutions, which convert solid waste to energy and other useful by-products. Waste-to-energy is widely used in northern Europe, in combination with other technologies including landfill, recycling, and composting.

8.3.4. Opportunities

Smart City Update 2.0 will explore the following opportunities:

By 2021

Priority	Impact	Opportunity	Output	Current Status
High	High	Investigate alternative waste disposal options (e.g. waste to energy)	Major Project	In Progress

Please see the appendix for all opportunities beyond 2021.



9. Natural Environment

The Community Vision describes the Natural Environment pillar as:



We protect, embrace and treasure our deeply-rooted connections with the natural environment through championing environmental action.

St. Albert takes pride in its natural environment and seeks to protect natural spaces in which residents can enjoy. Technology can help to conserve energy, water, and other resources, as well as monitor and display current environmental conditions and trends. New facilities can achieve energy “net zero” and Leadership in Energy and Environment Design (LEED) efficiencies to reduce lifetime operating costs and improve occupant comfort. The City’s extensive trail system is not only enjoyable, but also provides access to our natural environment as well as transportation options across the city.

9.1. Green Environment

St. Albert's natural environment is fundamental to the City's physical character and is central to the well-being and quality of life of residents. Environmental goals and obligations will be honoured and reinforced through the City's Smart City plan by examining opportunities to leverage technology, innovation, and partnerships that will bolster and facilitate the conservation and enhancement of the City's natural features.

9.1.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert is a leader in energy efficiency and climate resilience while ensuring the protection of its natural ecosystem.

- Protect and conserve natural areas within St. Albert
- Protect and expand the urban forest and the city's total tree canopy
- Enhance the ecological integrity and diversity of regionally significant environmental features
- Protect water quality and quantity in the Sturgeon River watershed
- Ensure neighbourhoods have a strong green character through a combination of street trees, parks, other public open spaces, private landscaping and natural features
- Reduce energy consumption and overall greenhouse gas emissions from all sources
- Protect the health and well-being of St. Albertans and the City in response to a changing climate

9.1.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Air Quality Monitoring Station integrated with regional systems to measure and report on air quality	Minor Project	Complete/In Place
Medium	Medium	Solar panels on Transit Centre and other buildings to generate power	Minor Project	Complete/In Place
Medium	Low	Empower residents and businesses with municipal utility information and usage tools, such as for water consumption, waste generation, energy consumption, and heating	Major Project	In Progress
Medium	Low	Install renewable energy systems on City facilities and other infrastructure, with an emphasis on solar energy micro-generation	Major Project	Complete/In Place

9.1.3. Technology and Innovation Implications

The phrase “you can’t manage what you can’t measure” (Deming, Drucker) is pertinent for environmental technology and innovation. Environmentalism is at its heart about preservation, enhancement and efficient use of resources.

Technology allows for analysis, measurement and modeling of resource use, such as energy efficiency. Smart-utility metering may allow a facility operator an opportunity to avoid unnecessary energy use by modeling energy savings that can be achieved by reducing lighting or heating requirements when they are not needed. Technology may also provide a business case for the introduction of an energy efficiency technology, such as heat recapture, or even energy generation onsite to provide a facility on demand energy during peak use periods.

Technology also allows for justification of policy or programming changes. Decentralized air quality monitoring, for example, may show areas of localized poor air quality that is influenced by an unknown event. Water utility metering may also show spikes during certain periods of the day, which may lead to policy or bylaws around restrictions for water use.

9.1.4. Opportunities

No opportunities are currently identified to be completed by 2021 in this section.

Please see the appendix for all opportunities beyond 2021.



10. Culture

The Community Vision describes the Culture pillar as:



We are proud of our storied history that has fed and nurtured our festive and culturally rich community.

Culture is fundamental to the quality of life that St. Albertans enjoy. The community places a high value on its heritage and cultural amenities. Events and activities provide opportunities for expression, entertainment, dialogue, community building and place-making. They also support the city's creative economy and attract visitors from far and wide.

St. Albert is located on the traditional land of Indigenous peoples, within the Treaty 6 Territory and in the homeland of the Métis people of Alberta. Through cultural and place-making initiatives, St. Albert has the opportunity to highlight this history, reconcile relationships with Indigenous peoples, and celebrate the people, places and stories that make St. Albert what it is today.

St. Albert places a high value on its cultural resources and extensive programming, ranging from the Museum, Heritage walks, Art Gallery, Arden Theatre, craft guilds, botanical garden, Children's Festival, Rodeo, Farmers' Market, and many, many others.

10.1.Cultural Richness

Quality of life and cultural richness go hand-in-hand. Through the combination of heritage, cultural amenities and a thriving economy, St. Albert can support, embrace and nurture its creative industries. By viewing cultural richness through a Smart City lens, innovation, technologies and partnerships can be leveraged to enhance and promote existing amenities and create opportunities for new creative minds to harness the community's potential.

10.1.1. Goals & Objectives

The City's new draft Municipal Development Plan states:

St. Albert celebrates its heritage, promotes the arts, and provides residents and visitors with opportunities for cultural enrichment.

- Conserve, interpret and, where appropriate, adaptively re-use properties of historic significance
- Enhance facilities for artistic production and performances, and cultural practices generally
- Grow the number of small-scale cultural and creative businesses
- Facilitate more cultural celebrations and other community events
- Increase the presence of public art and heritage features across the city

10.1.2. Existing Services Related to Smart City or Innovation

The City provides:

Priority	Impact	Existing Service	Output	Current Status
Medium	Medium	Recreation & Public Art mobile applications and event guides	Minor Project	Complete/In Place
Medium	Medium	Cultural online interactive Map	Minor Project	Complete/In Place
Medium	Medium	Arden Theatre Technology Upgrades to improve service to patrons and rental clients	Minor Project	Complete/In Place

10.1.3. Technology and Innovation Implications

Technology has the potential to increase the ability of audiences to participate in arts and cultural activities. Pairing the arts and technology also has the potential to greatly impact the education system by offering exciting methods of engagement and curriculum delivery tools. Technological innovations also have the potential to increase access and remove barriers to arts and cultural experiences to people with disabilities.

10.1.4. Opportunities

No opportunities are currently identified to be completed by 2021 in this section.

Please see the appendix for all opportunities beyond 2021.

11. Governance and Implementation

11.1. Coordination, Planning, and Implementation

Smart City Update 2.0 was developed with the help of a cross-functional working group made up of employees from various City departments. The working group or a similar body should continue to be used to encourage innovation and the adoption of best practices laterally within the City. As the City's information technology service provider, the Strategic Services and Information Technology Department will coordinate updates to this plan and related strategies, as well as the design, transition to operations and support of most of the technologies ultimately implemented.

11.2. Next Steps

Smart City planning and initiatives require continuous effort to advance the projects already in progress and to plan for future initiatives. In addition, the Smart City plan itself requires regular updates to reflect accomplishments and new requirements.

Planned activities:

- Public engagement and initiation of the next version of the Smart City plan, version 4.0. Development of version 4.0 to commence during 2020. Version 4.0 will also identify emerging technologies that may be applied to municipal problems, in order to rapidly progress the City's technology as compared to its peers.
- Infrastructure Canada Smart City Challenge. It is widely expected that the Government of Canada will launch the next iteration of the Smart City Challenge in early 2020. The Challenge is a competition for grant funds for a small number of grants in response to proposals submitted by Canadian municipalities. If a challenge program is announced, a concentrated effort will be required to produce a strong proposal.
- Implementation of existing and new Smart City initiatives as identified within the City's approved budget and capital plans.
- Continued engagement of partners, including other municipalities, associations such as AUMA and EMRB, academic partners such as NAIT and school boards, industry, and others.

11.3. Resources

11.3.1. Budget

The City has a robust capital project prioritization process that is integrated with the annual budget. Larger technology projects must compete on their own merits with all other capital projects, ranging from facility upgrades, maintenance of roads, vehicles, equipment and so on. The capital project prioritization process is valuable both because of its rigour and because Administration and Council must agree on each approved project and its relative priority.

The City will be using priority-based business planning and budget software to assist with the development of annual operating budgets and the relationship of operating funds to service levels.

11.3.2. Staff

St. Albert is an early adopter and has substantial accomplishments in the Smart City field, in many cases achieving national and international recognition for its plans and initiatives, while using a limited number of staff resources that the City can reasonably support. Currently, approximately half of the time of the Senior Manager of Information Technology is dedicated to Smart City. A major contributor to the City's success is the degree to which technology has been incorporated into everyday business and other strategic initiatives and plans. Smart city and innovation are normal business practices at St. Albert and are expected to occur.

"Many cities lack a central unit with the right expertise to coordinate and drive the Smart City project." – Thilo Zelt, (Roland Berger)

As noted elsewhere within this update, the influence of technology on every aspect of modern municipal service is expected to increase over time. The Chief Administrative Officer and Council may consider acceleration through assignment of additional resources at their discretion.

11.4. Performance Metrics and Reporting

The City currently uses technology to manage its corporate reporting and online dashboard, STATracker. A new software strategic planning and reporting solution will be implemented beginning in 2020. The new system will facilitate line of sight and integration between municipal strategies across various planning exercises. The new system will also provide a new way to manage the City's online dashboard, STATracker. Smart City Update 2.0 will use these existing and planned reporting systems to manage and report on its progress.

12. Contact Information

The City of St. Albert website contains extensive detail on current Smart City initiatives and plans:

Website: stalbert.ca/smartcity

Email: smartcity@stalbert.ca

Appendix A: Beyond 2021 Opportunities

Social

Education

Priority	Impact	Opportunity	Output	Current Status
Low	Medium	Enhance cooperation between the Library, school boards, and the City's Municipal Area Network (MAN) fibre optic network	Minor Project	Identified
Low	Medium	Integrate and expand municipal, Library and school Wi-Fi networks	Major Project	Identified
Low	Medium	Establish direct connections with academic institutions on applied research and create work placements in support of talent and idea acquisition	Minor Project	Identified

Community Well-Being

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Continuously improve universal accessibility for civic facilities and outdoor space, use technology where appropriate	Major Project	Implementation
Medium	Medium	Integrated and improved dispatch technology for fire and ambulance services (with Alberta Health Services)	Minor Project	Planned
Low	Medium	Implement mobile application or website to connect residents to available social services (with regional partner)	Minor Project	Identified
Low	Medium	Engage the RCMP to test and deploy innovative crime prevention and law enforcement technologies in St. Albert	Major Project	Identified
Low	Low	Create an online map application that indicates public drinking fountains and other amenities to enable better planning of outdoor activities	Minor Project	Identified
Low	Low	Use technology to connect and tell stories about neighbourhoods, ex: online "story maps" that combine maps with photos and information. This will help preserve and bring awareness to the various cultures within our community.	Minor Project	Identified

Housing Variety

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Increased energy efficiency requirements in the Building Code to improve new residential building performance and energy usage (Net Zero Homes) and costs, including solar readiness, highly efficient building envelopes, and possibly methods of financing	Minor Project	Identified
Low	Low	Improve communication ability between smart homes and smart cities	Minor Project	Identified
Low	Low	Provide connections between electronic energy efficiency home modelling and energy upgrade programs and services, ex: use of air photo or LiDAR to identify solar opportunities	Minor Project	Identified

Mobility Choices

Priority	Impact	Opportunity	Output	Current Status
High	High	Integrate electronic payment systems, offer real-time transit service notification tools, electronic fare payment and on-board convenience technologies (Regional Smart Fare)	Major Project	In Progress
High	High	Integrate new technologies for collection, management and sharing of traffic data <ul style="list-style-type: none"> • Fiber Network/Municipal Area Network • Count stations for vehicular traffic and active modes • Central monitoring systems and performance metrics for traffic controls 	Major Project	Planned
Medium	High	Continue to integrate new Traffic Management Systems <ul style="list-style-type: none"> • Adaptive Signal Control systems • Active mode accommodation at signalized intersections; Advance Pedestrian Movements, Accessible Pedestrian Signals, Pedestrian Criss-Cross • Pre-emptive signal systems for emergency services, public works and transit • Intersection safety cameras for enforcement of corridor speed and intersection compliance to signal controls • Adaptive speed display signs 	Major Project	Planned
Medium	High	Consolidate transportation management, emergency operations, security oversight, asset tracking and controls, and other municipal operations within a Smart City control centre	Major Project	Identified

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Provide Wi-Fi at transit stations and on-board buses	Major Project	Identified
Medium	Medium	Develop and deploy Advanced Traveller Information Systems to share network information on road conditions to inform traveller choice <ul style="list-style-type: none"> • “Real-time” traveller information City website • Bluetooth travel technologies and real-time travel information • Corridor web cameras for public viewing • Road Weather Information Systems • Mapping system of planned or active construction zones 	Major Project	Planned
Medium	Medium	Monitor the network and develop and deploy Integrated Corridor Management (ICM) Systems: <ul style="list-style-type: none"> • Transportation Management Centre • Central monitoring system for corridor and intersection operations and performance metrics • Use traffic performance metrics and conditional/operational information to respond to roadway conditions and incidents or events • Capital programs for constructing new roadways or network roadway improvements; integrating ICM where applicable • Incident Management Program • Variable message boards for driver information messaging 	Major Project	Planned
Medium	Medium	Enhance accessibility and ease of public transportation <ul style="list-style-type: none"> • On-demand Transit • Deploy Next Bus arrival system • Deploy Transit Signal Priority • Deploy Smart Bus Onboard Architecture • Bus Rapid Transit; bus only lanes • Transit exchanges 	Major Project	Planned
Medium	Medium	Commercial Vehicle Operations <ul style="list-style-type: none"> • Commercial Vehicle Enforcement Strategy • Dangerous Goods Monitoring Program 	Major Project	Planned
Medium	Medium	Emergency Management <ul style="list-style-type: none"> • Commercial Vehicle Enforcement Strategy • Aligned with ICM Systems, integrate a Dangerous Goods Monitoring Program 	Major Project	Planned

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Integrate Connected and Autonomous Vehicle Strategies <ul style="list-style-type: none"> • Be aware and plan for new connected and autonomous technologies and timelines • Develop necessary municipal policies or guidelines surrounding the integration of connected or autonomous infrastructure and support • Test and deploy connected vehicle technology • Autonomous vehicle technology • Develop research partnerships with industry and learning institutes 	Major Project	Planned
Medium	Medium	Maintenance and Construction Management <ul style="list-style-type: none"> • Smart Work, School and Playground Zones • Asset Management 	Major Project	Planned
Medium	Medium	Pilot parking management systems within high traffic areas to better understand, communicate and control usage	Minor Project	Identified
Medium	Medium	Conduct a local review of the future opportunities related to connected and autonomous/self-driving vehicles, and serve as a pilot community for new vehicle technologies	Minor Project	Identified
Medium	Medium	Have in place flexible municipal policy that responds to transportation innovations and evolving modes, including those within the sharing economy	Minor Project	Identified
Medium	Medium	Transportation Routing and Vehicle Information System (TRAVIS) Large Load Permitting	Major Project	Identified
Low	Low	Enhance cooperation between school and municipal transit systems	Minor Project	Identified
Low	Low	Implement trail and outdoor space usage counters	Minor Project	Identified
Low	Low	Implement additional interactive maps and wayfinding	Minor Project	Identified
Low	Low	Investigate bike and e-scooter share (with industry partner)	Minor Project	Identified

Economic

Robust Economy

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Establish City policies in anticipation of emerging economies (e.g. 5G Networks) that provide known rules for the orderly and smooth deployment of enabling technologies	Major Project	Identified
Medium	Medium	Actively attract emergent sectors of the economy that will bring innovative new businesses to all districts and new employment opportunities for residents through the creation of new, complimentary economic clusters The City intends to attract educational institutions to support newly emergent clusters by offering training options to residents and businesses, as well as research and development support	Minor Project	Planned
Low	High	Designate an area of St. Albert as a highly connected, technology enhanced 'innovation district' where complementary businesses and others may cluster and thrive	Major Project	Identified
Low	High	Partner to launch a multi-sector innovation centre where entrepreneurs, business, academic, and public innovators collaborate to create shared value	Minor Project	Identified
Low	Medium	Position the City's broadband infrastructure as an "open network" that facilitates access by Internet service providers, local public sector organizations, and other interested parties	Major Project	Identified
Low	Medium	Identify methods to incubate and accelerate tomorrow's "Smart" and innovative businesses within St. Albert's economic development strategies. This could include working with organizations such as the Northern Alberta Business Incubator (NABI)	Minor Project	Identified
Low	Medium	Have in place municipal policy to position St. Albert as a 'living lab' including processes by which testing opportunities and locations may be identified and supported	Minor Project	Identified
Low	Low	Continue to lead by example by installing new technology that demonstrates to residents and businesses the cost-savings potential (e.g. the installation of Electric Vehicle charging infrastructure)	Major Project	Identified

Priority	Impact	Opportunity	Output	Current Status
Low	Low	Collect location-based vehicle and pedestrian information within high traffic public areas to provide valued data for municipal and business purposes	Major Project	Identified
Low	Low	Solicit interest in innovative network development partnerships or other service delivery options	Minor Project	Identified
Low	Low	Launch a program, in partnership with business leaders, to recognize businesses integrating data analysis and “Smart” technologies into their operations	Minor Project	Identified
Low	Low	Promote St. Albert as a “Smart City centre of excellence” and integrate Smart City themes into key economic development strategies	Major Project	Identified
Low	Low	Explore opportunities to support social enterprises. Build on Creative industry niche markets, identify partnerships with Indigenous Peoples	Minor Project	Identified
Low	Low	Utilize creative industries and innovations to support economic development through non-traditional businesses and enterprises and through social innovation	Minor Project	Identified

Vibrant Downtown

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Understand and ensure readiness for 5G network deployments by industry in downtown	Minor Project	Identified
Medium	Medium	To enhance the work of an Emergency Operations Centre using advanced technology to better manage civic emergencies and proactively manage risks during large public gatherings and events	Major Project	Identified
Low	Low	Expansion of free Wi-Fi throughout the downtown core	Major Project	Identified
Low	Low	Explore the installation of a district energy system connecting buildings in the downtown, including St. Albert Place	Major Project	Identified
Low	Low	Install unique infrastructure to support the Farmer’s Market (e.g. the installation of electrical infrastructure for food trucks, outdoor stalls that will replace diesel generators)	Minor Project	Identified

Priority	Impact	Opportunity	Output	Current Status
Low	Low	Smart parking lots that track and display capacity and use, making it easier to park and reducing emissions and traffic	Minor Project	Identified
Low	Low	Security cameras to reduce crime	Minor Project	Identified
Low	Low	Interactive wayfinding apps, display screens and emergency 911 access	Minor Project	Identified
Low	Low	Mobile device charging stations	Minor Project	Identified
Low	Low	Electric vehicle charging stations	Minor Project	Identified
Low	Low	Fill sensors in waste bins	Minor Project	Identified
Low	Low	Projections and video displays on building facades or outdoor digital signs	Minor Project	Identified

Government Services

Priority	Impact	Opportunity	Output	Current Status
High	High	Increase advanced analytical capacity across municipal departments, and improve its integration within the City's organizational culture	Major Project	Identified
Medium	High	Expand the City's business intelligence tools to support visualizations and data-based decision making	Major Project	Identified
Medium	High	Launch a mobile application and/or tool that serves as a single portal to the City's municipal e-services and other mobile applications, and that offers users personalized information, notifications and civic payment functionality	Major Project	Identified
Medium	Medium	Engage with residents on planning and development applications through electronic methods	Major Project	Identified
Medium	Medium	Engage with staff to generate new and innovative ideas to provide customer-centric services and positive experiences enabled by technology, as well as identify corporate innovation barriers, required processes and supports, and training needs	Minor Project	Identified
Medium	Medium	Introduce business services focused on the provision of open data, basic business analytics and related education programs	Major Project	Identified

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Establish a centralized location for local data through negotiations on long-term regional protocols and data sharing agreements	Major Project	Identified
Medium	Medium	Track the movement and condition of City vehicles and other mobile assets to inform the public and support efficient operations	Major Project	Identified
Low	High	Acquire a Customer Relationship Management (CRM) System to better manage customer experience and use data to proactively improve services to the community	Major Project	Identified
Low	High	Improve public purchasing outcomes and supplier management through a unified account and relationship system	Major Project	Identified
Low	Medium	Develop Customer Journey Maps to better understand, streamline and improve customer experience across all channels	Minor Project	Identified
Low	Medium	Provide one sign-in access for residents for all online services	Minor Project	Identified
Low	Medium	Increase the use of technology for public participation when guiding design	Minor Project	Identified
Low	Medium	Test artificial intelligence to deliver services where possible	Minor Project	Identified
Low	Medium	Support employee collaboration through new digital workplace technologies and physical supports	Major Project	Identified
Low	Medium	Co-create with civic innovators to build innovation capacity, test new digital services, and generate creative and “Smart” solutions to St. Albert’s challenges	Minor Project	Identified
Low	Medium	Have in place municipal policy that recognizes data and information as a strategic resource and confirms that all non-confidential data will be ‘open by default’	Major Project	Identified
Low	Low	Provide municipal information in accessible formats to reflect the increased diversity of the City’s population	Minor Project	Identified
Low	Low	Develop an interactive Land Use Bylaw application	Minor Project	Identified
Low	Low	Provide planning and development process information in interactive formats	Minor Project	Identified
Low	Low	Pilot voice-activated services, especially for after hours	Minor Project	Identified
Low	Low	Actively collect ideas from outside St. Albert, foster cross-sector collaborations and engage in knowledge networks and other forums	Minor Project	Identified
Low	Low	Launch a program to recognize residents integrating “Smart” technologies in their homes and lives	Minor Project	Identified

Priority	Impact	Opportunity	Output	Current Status
Low	Low	Enhance property risk assessment with analytics to prioritize fire and other types of property-based inspections	Minor Project	Identified
Low	Low	Expand stakeholder engagement channels through new digital participation technologies, gamification, and two-way communications	Minor Project	Identified
Low	Low	Publish an open data 'blue book', collaborate with data users to identify desired data sets and ensure ongoing data accuracy and security	Minor Project	Identified
Low	Low	Incorporate 'requests for innovation' into the City's purchasing policies to improve flexibility and support the identification of alternative solutions	Minor Project	Identified
High	Low	Investigate integrations between software solutions utilized at the City to reduce licensing costs and duplication	Major Project	Identified

Built Environment

Great Places

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Improve indoor and outdoor public Wi-Fi within public buildings and outdoor spaces, via Internet service providers or City	Major Project	Identified
Medium	Medium	Advocate to telecommunications providers when gaps in cellular phone coverage become evident	Major Project	Identified
Low	Medium	Provide mobile device charging stations in public spaces	Major Project	Identified
Low	Low	Provide electric vehicle charging stations at St. Albert Place	Minor Project	Identified
Low	Low	Create adaptable public space (e.g. areas that change with time, season or need)	Minor Project	Identified
Low	Low	Develop interactive public art to create more of a connection to the user	Minor Project	Identified
Low	Low	Infuse public amenities and spaces with convenience technologies and interactive features, and amend St. Albert's Community Design Principles to emphasize the seamless blending of technology with the natural and built environment	Minor Project	Identified

Smart Infrastructure

Priority	Impact	Opportunity	Output	Current Status
High	High	Improve and integrate asset and maintenance management systems	Major Project	Planned
High	High	Develop awareness programs and incentives to encourage district energy systems across the community	Major Project	Planned
Medium	Medium	Implement neighbourhood district energy generation along with net-zero housing capabilities to improve housing affordability through reduced energy costs	Major Project	Identified
Low	High	Maximize the efficient operation of civic facilities through expansion of centralized building controls and automation systems, and other efficiency technologies	Major Project	Identified
Low	Medium	Encourage and facilitate local development innovation with an emphasis on the use of new materials, emerging methods, and high energy efficiency solutions, and review the Land Use Bylaw and supporting regulations for alignment	Minor Project	Identified
Low	Medium	Amend St. Albert's Community Design Principles and related policy to ensure that multi-chamber public conduit is installed in priority locations whenever municipal work provides the opportunity, and work with the development industry to install public conduit in growth areas	Major Project	Identified
Low	Medium	Deploy a wide-scale St. Albert sensor array supported by device-to-device communication capacity between all connected things	Major Project	Identified
Low	Low	Use sonar/laser for integrity checks of City piping	Minor Project	Identified
Low	Low	Implement remote Internet of Things (IoT) sensors to continuously monitor conditions that are difficult to check (e.g. the volume of water travelling through a storm sewer or the quality of water in a storm pond)	Minor Project	Identified
Low	Low	Use sensors and analytics to compare flow rates into and out of a water system to determine where losses (leaks) are located	Minor Project	Identified

Waste Management

Priority	Impact	Opportunity	Output	Current Status
High	High	Alternative Servicing and Waste to Energy (see section 5.3 Waste Management)	Major Project	Planned
Medium	Medium	Collaborate with other regional municipalities for waste-reduction programs and initiatives	Major Project	Planned
Medium	Medium	Global Positioning System (GPS) to show garbage trucks' routes and progress (location) Some municipalities and the Government of Alberta 511 service make this type of data available for snowplows	Minor Project	Identified
Low	Low	Explore virtual assistant technology like Alexa/Google to answer questions about sorting, waste collection, etc.	Minor Project	Identified

Natural Environment

Green Environment

Priority	Impact	Opportunity	Output	Current Status
Medium	Medium	Expand alternative energy opportunities for civic facilities, including geothermal, air source heat exchange, combined heat and power systems, energy monitoring, heat recapture and solar systems	Minor Project	Identified
Medium	Medium	Provide open data sets, including air quality, water quality, facility energy use, naturalization sites, invasive and noxious vegetation sites	Minor Project	Identified
Medium	Medium	Have in place municipal policy to advance resource conservation through the City's fixed and mobile infrastructure – with an emphasis on energy efficiency, adaptive lighting systems, and electric power sources	Minor Project	Identified
Low	Low	Implement citizen science, including portable or decentralized air quality monitoring, water quality sampling and energy efficiency/generation systems	Minor Project	Identified

Culture

Cultural Richness

Priority	Impact	Opportunity	Output	Current Status
Low	Medium	Enhance local events and festivals with technology and Smart City demonstrations to engage and inspire	Minor Project	Identified
Low	Low	Create new digital art forms using immersive, 3D, artificial intelligence and/or geographic information system (GIS) enabled technologies	Minor Project	Identified
Low	Low	Use 3D modelling and printing technologies to create new opportunities to integrate the art and creative design into our physical environments	Minor Project	Identified
Low	Low	Use networking and next generation wireless technology to increase access to conventional art forms and performances	Minor Project	Identified
Low	Low	Explore an artist in residence program, where artists are available to work with other departments, or on infrastructure projects to help identify creative and innovative solutions	Minor Project	Identified