Revelstoke is Ready for the Challenge!

Thanks to an amazing amount of Community Collaboration we have now submitted an application to the Smart Cities Challenge in a bid to win $5 million to improve the quality of life of Revelstoke's residents'

he Smart Cities Challenge is a federal government competition open to all municipalities, local or regional governments, and Indigenous communities across Canada.

The goal of the challenge is to "empower communities to address local issues residents face through new partnerships, using a smart cities approach."

What is a smart cities approach?

A smart cities approach aims to achieve meaningful outcomes for residents by leveraging the fundamental benefits that data and connected technology have to offer:

- Openness: When communities make their data truly accessible, usable, and barrier-free, their decision-making processes become transparent, empowering citizens and strengthening the relationship between residents and public organizations.
- Integration: Data and connected technology empower communities to break down silos that exist within local governments and public organizations.
- Transferability: When tools and technological approaches are open-source, transparent, and standardized, they can be used by communities across the country, no matter their size or capacity.
- Collaboration: Connected technology enables communities to bring traditional and non-traditional partners together to collaborate.

Grant Criteria

- The City must consider the following criteria as we develop the application:
- The challenge must be ambitious, measurable, and achievable through the proposed use of data and connected technology

- The use of data and connected technology must achieve a meaningful and measurable outcome (or outcomes) for residents
- Outcomes must reflect the true needs of the community
- Challenge is, or will be, open, interoperable, scalable, and replicable to other parts of Canada
- The formation of partnerships is necessary for the success of the proposal

City of Revelstoke's Smart Cities Challenge Application

Through community wide consultation both online and in person, City staff has worked with a broad spectrum of community members and stakeholders to refine the challenge scope and consider all possible technology solutions.

The application submitted to the Smart Cities Challenge is a reflection of what the community believes to be our current biggest challenge and the best possibilities available for solving these challenges using data and integrated technology!

Question 1: Please provide the following information on your community:

Name of community: City of Revelstoke
Province: British Columbia
Population: 7,300
Indigenous Community: NO

Question 2: Please select a prize category.

- $5 million dollars

Question 3: Please define your Challenge Statement in a single sentence that guides your preliminary proposal. It should describe the outcome that you hope to achieve.

We will improve the prosperity of Revelstoke by closing the gap between the calculated Living Wage and median incomes by 25% by increasing economic growth and reducing costs.

Question 4: Please describe the outcomes your proposal seeks to achieve by elaborating your Challenge Statement

Specific Goals:

- Create a collaborative shipping solution that will allow local companies to work together to take advantage of economies of scale and reduce the overall costs of both shipping items to and from Revelstoke. Lowering the cost of shipping will make it possible for local companies to offer competitively priced products both locally and in external markets both decreasing the Living Wage in Revelstoke and increasing median income as more companies are viably able to compete and expand into external markets.
- Create a big data solution using open-use data warehousing to combine quantitative data (from a network of sensors providing real-time data on population, vehicular traffic, foot traffic, weather conditions, etc.) and qualitative data to drive economic growth. Providing entrepreneurs and businesses access to real-time open data will give our entrepreneurs and businesses the information they need to both identify real economic opportunities (increasing income) and enable data driven decisions to lower their business operating costs. Utilize the big data solution to create a baseline for tracking our core metrics and progress towards closing the gap between the Living Wage and median income.
- Establish robotics, artificial intelligence and sensor systems training programs that will ensure youth and workers develop the required skills to query and send information to big data solutions, skills that will help them to be more competitive and allow them to both obtain better higher wage jobs and develop entrepreneurial tech opportunities locally.

Outcomes we are seeking:

- Reducing the gap between Revelstoke's calculated Living Wage and median income.
- Increasing the median income of youth.
- Decrease the cost of shipping to and from Revelstoke.
- Decrease in the cost of goods in Revelstoke
- Increase in the number of local businesses able to compete in markets outside of Revelstoke.
- Increase in the number of tech enabled start-ups and local companies.

Baseline data and evidence to establish the current state:

Revelstoke relative isolation (the next closest small community is 74km away) in combination with high levels of tourism interested (thousands of tourists come to Revelstoke every year to ski and snowmobile) has resulted in an extremely high cost of living for Revelstoke's residents. As a small rural community with limited job opportunities, these pressures have resulted in a significant gap between the Living Wage and the median income of households in Revelstoke. Quite simply put, for many residents Revelstoke has become unaffordable.

There are several indicators that can be used to determine the extent of the unaffordability and its impacts on local residents:

- The Living Wage calculation, calculated using the National Living Wage Framework, includes the costs of shelter, food, clothing and footwear, transportation, child care, education for the parents, and other costs, such as telecommunications and health related costs. The 2017 living wage calculation for Revelstoke is $19.37/hour (of note, the Living Wage for Revelstoke is only slightly less than the Living Wage calculated for Metro Vancouver). Based on the Living Wage, it is calculated that the after tax income required to live in Revelstoke is $70,825. Based on (2015) taxfiler data the median income for families and non-family persons in Revelstoke is $59,110 and more than 50% of households of Revelstoke are currently not making a Living Wage.
- According to 2015 taxfiler data there are 700 low income families and non-family persons living in Revelstoke. The median income of these families is $14,960. 7% of individuals between the ages of 18 to 64 are categorized as

"Working Poor". Working Poor is defined as individuals with an after tax income below the Low Income Measure and earning an annual individual working income over $3000.

- Core Housing Need is a term that describes households that spend more than 30% of their income on shelter costs. When more than 30% of income is spent on shelter costs, then housing is unaffordable. In 2016 43% of renters in Revelstoke and 17% of owners spent more than 30% of their income on housing.
- According to 2016 Census labour data the unemployment rate for Revelstoke is 8.5 percent. The rate is higher than for BC where the unemployment rate is 6.7%.
- Food bank usage is another indicator of significant disparity between income levels and the Living Wage. In 2017, 239 individuals accessed the foodbank and an average of 236 individuals accessed the food bank over the last five years including an average of 53 children.

Evidence to support the selection of these outcomes over others:

Reducing the gap between Revelstoke's calculated Living Wage and median income was selected as a key outcome as it is measurably quantifiable on both a local and national scale.

The Living Wage as a calculation is a measure substantiated by the Canadian Centre for Policy Alternatives. It includes all of the major categories that determine the cost of living in Revelstoke and the relative affordability of our community including food, clothing, shelter and transportation.

Median income is a measure that can be substantiated through Statistics Canada. By measuring the gap between median income and Living Wage in our community it is possible to determine how unaffordable Revelstoke is and by extension the level to which Revelstoke's residents are being negatively impacted by the cost of living in Revelstoke.

The median income of youth was specifically selected as an outcome to help us determine how effective our specific goals and strategies have been at increasing the number of youth able to access higher paying jobs. Specifically, youth has

been identified as a demographic that will be targeted for robotics and mechatronics training and this outcome is intended to measure how effective we have been at increasing youth's ability to access higher paying jobs through access to training.

The cost of shipping was identified as a major factor impacting the cost of goods locally and in turn the calculated Living Wage in Revelstoke. Decreasing the cost of shipping to and from Revelstoke was seen as an important outcome to measure in order to determining the success of the project. Measuring the cost of (select) goods sold locally will also be important outcome to measure in determining the success of the project. If there is a measurable reduction in the cost of goods being shipped collaboratively it will allow us to assess the impact of the shipping solution on the overall cost of living.

Increase in the number of local businesses able to compete in markets outside of Revelstoke is an outcome that we are seeking to measure. The ability of Revelstoke's companies to compete in external markets is significantly impacted by both the cost of shipping and their ability to ramp up and commercialize. The number of companies that are successfully able to compete outside of Revelstoke is a good indicator of how well our collaborative shipping solution is working and how well access to big data solutions provides them with competitive advantage in understanding market opportunities and challenges.

Increase in the number of tech-enabled start-ups and local companies is an outcome that will allow us to measure both how many companies are utilizing our smart city solutions to create economic opportunities. Understanding the increase in tech enabled start-ups and local companies will also allow us to understand how much our smart city activities are impacting median incomes.

Rationale for Applying a Smart City Approach:

The challenge of closing the gap between the calculated Living Wage and median incomes is not one that will be solved easily. Applying traditional solutions to the problem are not likely to be successful. For example:

- Many of the companies that provide employment in Revelstoke are small businesses. On their own they cannot access economies of scale and without collaboration and access to technology solutions they will never be able to access lower shipping costs. Unless they are able to lower their shipping costs they are unlikely to be able to provide goods and products at lower costs nor is it possible for these companies to be competitive in external markets.
- Many of the companies in Revelstoke have been slow to adopt technology. Unless they have access to open data and begin to adopt technology solutions it is unlikely that they will be able to survive. If these businesses disappear, many of Revelstoke's residents will have a decreased job opportunities and decreased ability to garner a Living Wage.
- Although Revelstoke has a very entrepreneurial culture, without access to technology tools (3D printers, software, CAD systems, etc.) and open data it will be very difficult for them to innovate, commercialize and compete on a global scale. Many of the industries that are currently the drivers of Revelstoke's economy are currently undergoing a major transition (i.e. forestry, transportation, tourism, etc.) Without Smart City solutions many of the jobs created in these industries may not exist over the next 10 years.
- With the increase in global connectedness and the ability of companies to access global marketplaces, it will be imperative that youth and workers in Revelstoke have access to training in technology fields. Earning a Living Wage in Revelstoke's prevalent economic sectors will likely become less and less viable over time. As an isolated rural community being able to provide educational or training opportunities will necessarily require connected technology and digital solutions.

Strategy for measuring progress toward outcomes and achievement of outcomes:

All outcomes identified will be monitored and measured on a yearly and ongoing basis.

- Living Wage for Revelstoke is recalculated yearly and will be measured against most recent median income data available

- Decrease in cost of shipping will be measured using data collected through the collaborative shipping platform
- Decrease of cost of goods will be measured using ongoing analysis of selected target goods. Specific focus will be placed on goods shipped using the collaborative shipping solution.
- Number of companies able to compete in market outside of Revelstoke will be collected through both the shipping platform and using company surveys.
- Number of new start-ups and companies will be measured utilizing business licence data and data collected through the fabrication laboratory.

Question 5: Please describe how your community residents have shaped your Challenge Statement. Describe your plans for continuing to engage and involve them in your final proposal going forward.

Ensuring community participation was a significant component of determining what challenge Revelstoke would address and the methods we would use to address the challenge. In order to meet this commitment, The City has undertaken significant community engagement including:

- Online Surveys – community members were invited to participate in an online Survey utilizing Thoughtexchange, an online collaboration tool that allows respondents to answer one open ended question and assign stars to ideas shared by others. The question used for the thought exchange was "What are the biggest challenges facing Revelstoke long term?" 227 participants completed the online survey providing 191 individual thoughts and 3666 ratings of individual thoughts. The online survey was then used to determine the top challenges to be considered in the in person public engagement. The most common challenges facing Revelstoke identified through the online survey were affordable housing, economic diversity, city infrastructure and food security. Although these are four separate challenges, the unifying themes that ran through the majority of comments received and starred were concerns about the unaffordability of Revelstoke, the high cost of living and the inability of residents to make a living wage.

- Public Forum – The community was invited to participate in a public forum aimed at gathering community feedback on both the challenge statement and potential solutions to meeting the challenges specifically utilizing technology solutions and big data. 59 individuals attended the public forum. Participants came from all backgrounds and community demographics. Participants included individuals who had recently arrived as well as those who have been here for many years. At the public forum, participants were asked to self-select the two challenges from the four identified in the online surveys they believed to be the most important and identify the key components of these challenges. Participants were then invited to contribute potential technological solutions to the challenges. Finally, participants were asked to star the challenge they believed to be the best candidate for the Smart Cities Challenge competition. Throughout the Public forum key concerns related to affordability, living wage, job opportunities, cost of living were again the most common key themes that was identified throughout the evening's discussions. Both passion and anxiety surrounded and fueled participant discussions about what is causing housing unaffordability, food unaffordability, the high cost of living and lack of high paying job opportunities. Passion was also expressed by many participants when discussing how to solve these challenges and what are the technological solutions that would have the most impact on solving the challenges being discussed.

- Working Group Meetings – Community members were invited to participate in a working group that provided feedback both online and during in person meetings to identify and give feedbacks on key elements of the challenge. Nineteen members of the community have been actively involved in developing the challenge.

  During the working group shipping was identified as a key component impacting both the Living Wage and median incomes. The need to provide technology training in order to ensure both youth and residents are able to

access better paying jobs was also quickly identified by the working group. The potential solution of collecting big data and the impact this might have on companies and entrepreneur's ability to compete and produce higher paying jobs was an idea that was a solution that was developed over multiple working group discussions.

- Engagement of Business Community – Throughout the process, the City has engaged multiple local businesses to determine what their biggest challenges are and how they view technology solutions and data being effective at solving these challenges. Key aspects of solutions proposed as part of the Revelstoke response to the challenge were vetted and discussed with over 30 local businesses.

Engagement with both residents and other stakeholders will continue to shape the way the community approaches the Smart Cities Challenge. If Revelstoke is successful at becoming a finalist, the City will continue to utilize both in person public engagement and online engagement methods to ensure the activities that are involved in the project are meeting the needs of the community.

Question 6: Please describe your preliminary proposal and its activities or projects.

1. Collaborative Shipping Solution:

As a small isolated rural community, transportation of goods is extremely costly. During the consultation for the Smart Cities Challenge the cost of shipping was identified as one of the most significant factors limiting the community's ability to access goods (food, building supplies, manufacturing materials, consumer products, etc.) at affordable rates. The cost of shipping was also identified as a key factor inhibiting Revelstoke businesses from competing in external markets.

Companies are under pressure to deliver orders faster and more efficiently than ever before. For businesses in Revelstoke waiting to have a "full load" to ship is

simply not an option. Shipping goods both in and out from Revelstoke can be costly and can significantly impact the ability of local companies to offer competitively priced products both locally and in external markets.

As part of our Smart Cities solution we will work with software developers to create a platform with algorithms that are capable of analyzing large data sets for companies and individual transportation routes in and out of Revelstoke using data collected from IoT sensors and GPS coordinates at the beginning and end of each route. This software will look for ways to combine geographically compatible goods specifically for bundling, backhauling and round trips.

Local companies will then be able to access the platform utilizing an app that will allow them to seek out opportunities for collaborative shipping in advance and if required adjust their planning and scheduling of their various shipments earlier on in the process. Currently, companies tend to join forces during the implementation phase of transporting goods rather than the planning phase. The intended outcome of the platform and application will be to allow local companies to find opportunities to leverage economies of scale and the sharing economy to reduce their overall shipping costs and in turn both reduce the overall cost of goods locally (reducing cost of Living Wage) and the ability of Revelstoke companies to compete in external markets (increasing median income). The platform will be used to collect data on the cost of goods being shipped allowing us to determine the overall effect of the collaborative shipping solution on the cost of goods being sold on a local level.

During the initial phase of the project the prototype application and software will be built and tested utilizing one shipping company and 5 to 10 selected companies to determine decision making criteria and best possible shipping arrangements. With 5 to 10 businesses on board along with their most common shipping requirements and locations we will also select regional partners with overlapping shipping needs in order to enable optimization and distributed usage. Although initial target companies will be in the select sectors of food and building products, once fully operational the platform will enable both companies and suppliers in multiple other sectors to leverage collaborative shipping opportunities. A key feature of this solution will be working with regional partners

to ensure a dense regional network the ability to backhaul and fill round trip shipping.

In order to ensure scalability and replicability, we are factoring regional partners in at the beginning. The platform created will not be hardcoded for Revelstoke specifically but will be able to be useable for any community/ region in Canada once the software is in place based on the local parameters of an area.

2. Open Data Warehouse Solution

Tourism has become the largest driver of the Revelstoke economy; however, the majority of jobs in the tourism sector are unable to provide households with the income necessary to make a living wage. If Revelstoke is going to meet the challenge of increasing median income, we must look at developing other sectors.

As part of our efforts to develop the tech sector the City is in the process of installing a fabrication laboratory to ensure entrepreneurs and start-ups have access to the technology tools (3D printers, software, CNC systems. etc.) necessary to innovate, grow new businesses. However, setting up a fabrication lab by itself will not be enough. There are a large number of innovation and fabrication labs being set up across North America and without additional support and targeted focus it will be extremely difficult for this strategy to succeed in a small remote community like Revelstoke.

As part of our Smart Cities solution we propose creating an open data warehouse solution, providing entrepreneurs and businesses access to real-time open data. This will give businesses the information they need to both identify real economic opportunities, create data-driven businesses and enable them to make data driven decisions. This solution holds the potential of both making local entrepreneurs and businesses more competitive in the market (increasing median income) and lowering their business operating costs (reducing Living Wage).

Using sensors, cameras, and other data collection means, we will create a near real-time data platform that can be shared with entrepreneurs, business owners, planners and individuals. We anticipate the initial use to be by businesses who

wish to tailor their offerings and purchase decisions based on data like current influx of traffic, predicted pedestrian movement, and other useful analytics generated by the platform.

Implementation steps will include confirming the usefulness of geo-spacially and time distributed data utilizing Telus Insights data as a baseline from which to glean value. Using these learnings, we will replicate the useful portions of this data with our own suite of software and hardware (via sensors, cameras and detection systems) which will stream data to a centralized data-warehouse. This data will then be aggregated into real-time networks utilizing a dashboard platform that can be accessed digitally by multiple users. The platform will also provide access to the raw data in order that individual users can create their own customized data sets and solutions.

Businesses, entrepreneurs and government will be encouraged to actively contribute new sources of data to the warehouse as they're created and adopted, ensuring that the solution is "living", changing and adapting to support the community over time.

3. Robotics, Artificial Intelligence and Sensor Systems Short Course Programs

Revelstoke Youth and Workforce have limited opportunities to receive training in technological or data driven fields. If local youth and workforce are to take advantage of created job opportunities that provide a living wage they must be able to access appropriate training on technological tools and in technology related fields. Leaving town to receive training or pursue a multi-year degree is, for many of our youth and workforce, simply not an option they can afford. If youth and workers are to be able to take advantage of jobs created in the tech sector they must be able to access training in the basic fundamentals of mechatronics, programming, and data analysis, machine learning and data collection.

For this project we will create short-course education programs that provide practical, ready-to-use, tech skills. A constant, fundamental curriculum will be available covering mechatronics, product development, programming and data

collection, artificial intelligence and data analysis. This fundamental curriculum, will be augmented with topics and content identified in the analysis of the open-data set. By using a data driven process we aim to target investments in building local capabilities that will unlock opportunities for our employers and create well-paying employment.

The structured approach of using data to identify gaps in our community capabilities, the curriculum, and the content will all be sharable and scalable to other communities across Canada.

Question 7: Please describe the ways in which your preliminary proposal supports your community's medium and long-term goals, strategies, and plans.

The City of Revelstoke Council Objectives for 2016 identifies "Quality of Life" as a key priority for our community ("The City of Revelstoke will emphasize the quality of life issues including social, active living, cultural experiences and recreation opportunities"). Addressing the gap between the Living Wage and the median income in our community speaks directly to Quality of Life. The current unaffordability of Revelstoke is significantly impacting the quality of life of many of Revelstoke's residents and as such addressing utilizing Smart Cities solutions to address the Gap between Living Wage and median incomes directly addresses a key priority of our City.

The 2017 Community Economic Development Plan identified protected and enhanced access to affordable living as one of 5 strategic priorities. The Community Economic Development Plan also identifies the technology sector as a major focus for present and future economic development activities.

The Revelstoke High Tech Strategy, developed and endorsed by City Council in 2016 is the basis for Revelstoke's focus on developing a tech sector in Revelstoke and the subsequent Revelstoke Start Up Strategy that was developed and endorsed by Council in December 2017 identified data collection, fabrication lab resources and youth training opportunities as key strategies integral to successfully supporting the growth of start-ups.

Question 8: Please describe your community's readiness and ability to successfully implement your proposal.

The City of Revelstoke has extensive experience implementing complex projects that includes multi-stakeholders and spans multi-business lines and functional units. On a regular basis the departments of Economic Development, Development Services, Parks and Recreation, Engineering and Public Works and Corporate Administration work together to implement and manage these projects. Complex projects that have involved multiple stakeholders and multiple City department over the last year include the Housing Needs and Demands Assessment, the development of the Revelstoke Fabrication Lab Project, The Smart Cities Challenge Proposal, The Food Security Strategy, Implementation of The High Tech Strategy, Development of the Start Up Revelstoke Strategy, the implementation of the Electric Vehicle Charging Station, The Destination Tourism Plan.

Key strategies that are in place to ensure successful management and implementation of complex projects include weekly interdepartmental meetings between directors and managers, key City policies and protocols in place to ensure collaboration on joint projects between departments, and clearly identified project leads and supporting members of project teams. In addition to these strategies, staff utilize digital resources and tools to collaborate and ensure clear communication between functional units regarding joint projects.

One of Revelstoke's biggest organizational strengths for implementing Revelstoke's smart city proposal, is that several of the City's directors, managers and staff across functional units understand the potential of connected technologies and big data and have a high comfort level working with projects that require development of technological solutions. In addition through the implementation of previous projects, staff has significant comfort level engaging diverse stakeholders with wide breadth of views.

A potential organizational weakness in terms of the management of this project is that this will be the first time the City of Revelstoke will be implementing a Smart Technology Solution specifically. In order to ensure success, of the Smart Cities proposal staff will work closely with tech experts within the community, regional

partners with expertise (Kootenay Association of Science and Technology, Columbia Basin Trust) to implement the project. A strength that was developed through the development of the Fabrication Laboratory Project and the Smart Cities Challenge proposal is significant connections with both local and regional tech stakeholders. Working closely with both local and regional tech experts will be integral to ensuring the project is implemented in a way that achieves the intended outcomes.

Question 9: Describe your plan for using the $250,000 grant, should you be selected as a finalist. Provide a breakdown of spending categories and an accompanying rationale.

We will utilize the $250,000 grant to validate our solutions by developing "minimum viable products" (MVPs). MVPs are a cornerstone of the agile product development process, which posits that an iterative approach to problem solving is necessary because requirements will always change over time and no initial solution can fully address a problem space. In this spirit, our MVPs will be viable, working versions of our solutions, that, with further operating funding, could continue in their own right, but in the event we win the challenge, will form the basis of our end-solution.

- $100,000 to establish the data warehouse solution and work with Telus Insights to establish a baseline.
    - $20,000 for software and infrastructure required to establish and run the data warehouse, create the qualitative feedback forum and validate sensor technology choices.
    - $40,000 to develop a warehouse design and to perform data integration and analysis consulting and training.
    - $40,000 to acquire baseline data from Telus Insights and to perform analysis and integration as required.
- $100,000 to pilot the establishment of the collaborative shipping solution
    - $70,000 to develop and test the MVP version of the software application
    - $30,000 to subsidize logistics and the engagement of a single shipping company

- $50,000 to establish training programs covering data and robotics
    - $20,000 to adapt or create a fundamental course covering data acquisition and analysis
    - $30,000 to extend our existing youth mechatronic program to adults, purchase required training equipment, and develop a follow-on advanced module.

Question 10: Describe the partners that are or will be involved in your proposal. Where partners are not yet determined, describe the process for selecting them.

Key partners already identified in the Smart Cities Proposal process are:

Revelstoke Community Futures (RCF), the Revelstoke Chamber of Commerce and the Revelstoke Mountain Colab. All three organizations are key business development organizations in Revelstoke and will be involved in connecting and communicating with local stakeholders and ensuring that the Smart City solutions the City of Revelstoke is implementing are inline with community needs.

Okanagan College and School District 19 are key community partners in ensuring that youth have access to technology training. They will be involved in both developing the curriculum for the robotics, artificial intelligence and sensor systems short course programs.

The High Tech Committee is a sub-committee of City Council. The High Tech Committee will be involved in providing feedback and direction regarding the further development and implementation of the Smart Cities Challenge solutions.

Telus Insights is a business unit of Telus that has the ability to provide key population data utilizing its cellular networks. We are proposing to utilize Telus Insights data as a baseline component of the Open Data Warehouse solution. Telus Insights has been selected for this component because of its ability to provide key data inputs on all cellular users in our area.

The City of Revelstoke has not yet selected key partners to implement the technological solutions indicated as part of Revelstoke's proposed projects.

Technology partners for each part of the project will be selected using Request for Proposal and Expression of Interest processes and based on their knowledge, qualifications and ability to implement their component of the solution.