BRIEFING NOTE
Meeting with Rogers CEO Joe Natale

Briefing Note

What & Who:
Call with Joe Natale, President and CEO Rogers Communications to discuss Rogers' interest in supporting BC during and after the pandemic.

Executive Summary:
As one of Canada's largest telecommunications companies Rogers employs over 1,600 people in 4 offices in BC, and the province represents 10% ($1.4B) in annual revenue. Areas of interest for the call include:

Connectivity & 5G

- *Rogers has received **conditional approval for a large connectivity project** along Hwy 5 between Hope and Pinantan Lake (Kamloops). If successful through the due diligence phase, the province will contribute $7M to a total project value of almost $13M.*
- *As part of a response to COVID-19, Rogers is working to **expand the capabilities of their cellular towers** to offer broadband internet in additional to cellular in rural and indigenous areas.*
- *Rogers is working with the Ministry of Citizens' Services (CITZ) on a number of **future connectivity projects** to leverage the new federal Universal Broadband Fund coming online this year.*
- *In partnership with UBC, Rogers has established a national 5G lab. Rogers and the University of British Columbia are working with the City of **Kelowna on a full-scale 5G demonstration** project.*

BRIEFING NOTE
Meeting with Rogers CEO Joe Natale

Provincial investment & COVID-19 response

- *Rogers has invested in a **call centre in Kelowna** with the intent to expand capacity to remote workers in near-by communities.*
- *All telecommunications providers are keenly interested in any provincial and federal **actions to adopt contact tracing or other enhanced monitoring technologies with mobile devices**. Link: https://www.cbc.ca/news/canada/edmonton/deena-hinshaw-covid-19-coronavirus-1.5542609*

Summary:

Rogers continues to seek an improved relationship and economic footprint in BC. Mr. Natale would like to convey the company's commitment to BC and offer support now and in the recovery from COVID-19.

- ***Economic Framework**: Rogers has an interest in understanding BC's economic goals and looks forward to reading the Economic Framework when released.*
- ***Profile**: Rogers needs to increase their profile and infrastructure investment in the province to be more top of mind. They should be encouraged to participate in the provincial funded Connecting British Columbia program and Federal funding programs to expand connectivity in BC.*
- ***Recovery**: Rogers should work with CITZ and the Ministry of Jobs, Economic Development and Competitiveness on ways they can support the economic recovery of BC.*

BRITISH COLUMBIA | Ministry of Citizens' Services

INFORMATION NOTE
Advice to Minister Kang

Date: April 16, 2020 **CLIFF#:** 113011

ISSUE: COVID-19 Telecommunications Supports for the General Public

BACKGROUND:

Telecommunications providers have voluntarily made temporary changes to home internet and cellular plans to assist customers impacted by COVID-19 to stay connected. While each telecommunications provider has made different changes, consistent themes are the elimination of overage fees on home internet services; the elimination of roaming fees on cellular plans; and flexible payment arrangements. A summary of telecommunications offers can be found in Appendix A.

Telecommunications providers are also voluntarily expanding their low-cost internet services for low-income families. For example, TELUS has expanded its $9.95/month Internet for Good Program to low-income families identified by school districts, whether or not they meet current eligibility criteria. Telecommunications providers are also working with school districts to provide access to low-cost devices and Internet service. A summary of low-cost offers can be found in Appendix A.

Many "free Wi-Fi Internet access" services, typically offered by businesses and in public buildings, are no longer accessible to low-income citizens due to closures. Some telecommunication providers have voluntarily made over 26,000 WIFI hotspots in BC, usually only accessible to their customers, accessible to the general public as a free service.

In addition, TELUS, Shaw and Rogers have been generous in working with both Provincial and Municipal governments to make pools of cellular enabled devices available for rapid deployment to special needs groups. Examples would be providing devices to BC Housing in the City of Vancouver in response to MP Jenny Kwan's April 7 request for support and in providing devices for use by citizens returning home on international flights and having to self-isolate.

General information about telecommunications offers will be added to the BC Government's COVID-19 website (www.gov.bc.ca/covid19), to help inform the general public.

DISCUSSION:

As described previously ("Immediate Need for Household Internet Access" CLIFF #112890, dated March 24, 2020), access to in-home internet is a critical issue during the COVID-19 pandemic. Large telecommunications providers have stepped in to fill a need for low-cost internet at home where they offer end customer services. While in-home internet is still not available to all British Columbians, the large telecommunications providers have significantly expanded eligibility for their low-cost internet programs.

Even with the private sector voluntarily providing affordable Internet access to low-income households, there are still gaps across the province. There is no 'quick fix' for fast, affordable in-home internet due to well know last-mile connectivity costs in rural and remote communities. The Information Communications Technologies (ICT) division within CITZ continues to work on policy options for improving access to Internet across the province.

Covid-19 website
The BC Government is careful not to favour or promote one telecommunications provider above others. With this caveat in mind, it is still important for government to highlight changes to internet and cell phone plans, and the availability of low-cost internet. The draft language can be found in Appendix B and the final wording will be approved by GCPE.

Concerns of small Internet Service Providers (ISPs)
Small ISPs may be negatively impacted by the low-cost Internet being offered by large ISPs, in particular the expansion of $9.95/month internet to low-income families, and TELUS providing school boards with mobile internet sticks that do not require in-home installation. ICT is monitoring the impacts on small ISPs. If necessary, ICT will develop policy options for consideration to support small ISPs.

Sharing information across the social sector
ICT is preparing an information note for Deputy Ministers across the social sector to inform them of Internet and cell phone options for low-income and marginalized British Columbians.

NEXT STEPS:

The week of April 14, 2020, ICT will take the following actions to promote access to internet and cellular phone during the COVID-19 pandemic:

- Provide content for the www.gov.bc.ca/covid19 website;
- Provide Deputy Ministers with information on Internet and cell phone options for low-income and marginalized British Columbians; and
- Continue to monitor the concerns of small ISPs.

Attachments: Appendix A: Summary of Covid-19 Telecommunications Offers
Appendix B: Content for Covid-19 website

Contact: Daphna Mills, 250-216-7301

Appendix A: Summary of Covid-19 Telecommunications Offers

Note: This is a snapshot of offers as of April 15, 2020. Offers are updated and verified on an ongoing basis by telecommunications providers. This list captures offers available to the general public. It does not include offers to specific groups (e.g., offers for hospitals or healthcare workers).

General Offers – current as of April 15, 2020.

	General		Home Internet	Cellular		
Provider	Flexible payment	Notes	No overage charge	Added data	Waived roaming fees	Waived long distance
TELUS	✓		✓		✓	
Shaw		1, 2, 3	N/A	✓		
Bell		4	✓	✓	✓	
Rogers	✓		N/A		✓	✓
NorthwesTel		5	✓		✓	
CityWest	✓		✓	N/A	N/A	N/A
Xplornet		6	✓	N/A	N/A	N/A

1: Free Internet access and Wi-Fi calling at 26,000 Wi-Fi hotspots in BC
2: 2GB extra data for all cellular plans with less than 4GB of data
3: No cellular overage fees
4: 10GB extra data for all cellular data stick / hub plans
5: Overage fees waived for cable Internet; extra data for satellite and DSL customers (offers vary by community)
6: Not throttling upload/download speeds when plan limits are exceeded

Low-income and Education offers – current as of April 9, 2020.

Provider	**Internet access for low-income households and vulnerable populations**
TELUS	• $9.95/mo fee waived for two months for current "Internet for Good" low-cost Internet participants. • Opening up the $9.95/mo program to families in need identified by school districts. • Limited quantity of 30GB cellular data sticks at $80/mo (billed to school board) for rural and remote areas without Internet coverage but with cellular coverage • "Mobility for Good" program for youth aging out of care provides a $0/mo phone plan.
Shaw	• $10/mo fee waived for two months for current "Connecting Families" low-cost Internet participants.
Rogers	• Partnering with Apple to provide a discounted iPad and cellular Internet access. Internet is free for the first three months and then low-cost.

Appendix B: Content for Covid-19 website

Text to be added to www.gov.bc.ca/COVID19
Note: underlined text represents hyperlink to additional information.

Heading: Employment & Finances

Short text (main page): Telecommunications providers are waiving certain fees and increasing data limits.

Long text (jump from "waiving certain fees and increasing data limits"): Telecommunications providers across British Columbia are working hard to ensure their networks can keep up with increased demand. To help people stay connected and access online resources, many individual companies are waiving certain fees and increasing data limits. Check with your local telecommunications providers for details of their offers.

Heading: Education

Short text (main page): Telecommunications providers are waiving certain fees and increasing data limits. They are also working directly with school districts to provide more access to Internet for low-income families.

Long text (jump from "access to Internet"): Families that can not afford Internet access at home may be temporarily eligible for low-cost home Internet programs. Families living in areas not serviced by home Internet, but with cellular coverage, may be temporarily eligible for low-cost cellular programs. Families should connect with their school district to find out more about these programs. Telecommunications providers are also waiving certain fees and increasing data limits for existing customers.

BRITISH COLUMBIA | Ministry of Citizens' Services

INFORMATION NOTE
Advice to Deputy Minister Kot

Date: April 23, 2020 **CLIFF#:** 113033

ISSUE: Connecting British Columbia program and TELUS' South Island funding application

BACKGROUND:

The Connecting British Columbia program Phase 3 expansion was announced in December 2019. A total of $50 million was granted to Northern Development Initiative Trust (Trust) in October 2019 to administer the program. The ministry's role is to fund the program and to assist the Trust with technical assessments and program support. As the program administrator, the Trust is the decision-maker and approves projects for funding. Phase 3 is structured with rolling quarterly intakes.

Intake 1 closed on February 15, 2020, and funding approvals for some projects are in progress:

- A total of 18 applications received for transport[1] and last-mile[2] projects.
- Technical assessments have been completed with 11 of 18 applications in approval by the Trust.
    - The 11 projects seek $9.8 million from the program and have a total project value of nearly $50 million, leveraging 400% from various other sources of funding.
    - Of the 11 projects, seven will also be applying for Canadian Radio-television and Telecommunications Commission (CRTC) Broadband Funds.
- Some projects have been deferred to the next intake and others have been declined for funding.

Intake 1 is aligned to encourage projects from BC to apply to the CRTC Broadband Fund, which has a revised deadline of April 30, 2020, for applications.

The CRTC Broadband Fund is unique from other federal programs in the following ways:

- It funds the unprofitable (uneconomic) portion of a project and expects other funding sources to contribute as well.
- It has no funding ratios or funding caps and no prescribed conditions for other funders, including from provincially funded programs.
- Funding contributions from others are used to reduce the CRTC portion of funding towards the uneconomic portion of the project.
- As an administrative tribunal, CRTC decisions may be the subject of a public review, vary or rescind process. Intervenors must file within 30 days of the date of the funding decision.

TELUS submitted two applications to the current Connecting British Columbia program: a project along Highway 20 in the Cariboo-Chilcotin and a project along the south coast of Vancouver Island from Sooke to Port Renfrew.

[1] Transport (or backhaul) is a network infrastructure that transports data traffic between communities or to a location that contains the internet gateway.
[2] Last-Mile infrastructure are the components within a community used to connect homes and businesses to the internet. This may include routers, towers, antennae, fibre optics, electronics, digital subscriber line equipment, cable and wireless radios.

DISCUSSION:

In 2019, TELUS purchased seven small internet service providers on Vancouver Island including one called South Island Cable with facilities in Jordan River and Port Renfrew. The purchase of South Island Cable's assets included a microwave transport system from Sooke to Jordan River, and to Port Renfrew, as well as, last-mile connections in Port Renfrew. South Island Cable does not have last-mile connections in Jordan River. TELUS has already invested in last-mile infrastructure by rolling out fibre-to-the-premises in neighbouring Sooke and Westshore communities.

Recently TELUS applied to the Connecting British Columbia program for fibre transport from Sooke to Port Renfrew. The application includes a point of presence[3] in Jordan River and last-mile fibre connections to the community. Port Renfrew would receive a point-of-presence to serve the existing last mile infrastructure purchased from South Island Cable.

The project cost and requested funding formula appears in the table below :

	Last Mile	Transport	Total
Eligible costs	$679,048	$5,925,142	**$6,604,190**

Connecting British Columbia program Funding Request	TELUS Contribution	CRTC Funding Request	Total
$2,311,466	$990,628	$3,302,096	**$6,604,190**

Funding applications received are considered in the context of other known projects and funding programs such as the All Nations Trust Company's Pathways to Technology program that may conflict with the application. For the transport component of the proposed project, the Trust asked TELUS to confirm alignment to the Connected Coast project, a project that received federal and provincial funds in 2018 to install a subsea fibre line and landing points near many coastal communities, including points-of-presence in both Port Renfrew and Jordan River. s.13; s.17
s.13; s.17

Grant Committee Analysis of Last-Mile: While the Grant Committee found the application for the proposed transport build to conflict with the Connected Coast project, it did find some merit in funding the last-mile component of the application. The Connecting British Columbia program guidelines allow funding of up to 50% of total eligible project costs. The program uses a baseline funding level of $250,000 per community to support the program's objective of achieving a minimum of 50/10 Megabits per second speed to households. If the transport was completed in the next few months there would be some justification for transport funding to replace the existing microwave system. However, TELUS' application indicates the project would start December 2021 and be completed by November 2023. The Connecting British Columbia program guidelines specifies that projects approved for funding should be completed by March 31, 2022.

[3] Point-of-presence is a facility where internet service providers house servers, routers, switches and other communications equipment. It is where an internet service provider's last-mile infrastructure connects to an internet gateway.

Grant Committee Analysis of Transport: TELUS intends to apply to the Canadian Radio-television and Telecommunications Commission (CRTC) for the bulk of their funding request and the Grant Committee noted that there is no fixed funding amount required from third party funders for applications to the CRTC Broadband Fund and no requirement for third party funding to defray project costs. Further, the Grant Committee is unable to determine the unprofitable (uneconomic) portion of the project based on the information TELUS has provided in their application. Ultimately, the CRTC will make the funding decision and there are no guarantees that TELUS' application will be approved. The amount of funding requested from the provincially funded program for the transport component would shift to the CRTC.

The approved funding from Northern Development and suggested funding formula is:

	Last Mile	Transport	Total
Eligible costs	$679,048	$5,925,142	**$6,604,190**

Connecting British Columbia program Funding Request	TELUS Contribution	CRTC Funding Request	Total
$679,048	$990,628	$4,934,514	**$6,604,190**

It is worth noting that social benefits of the transport portion of the project was also considered. TELUS has a proposed Strategic Investment Fund project entitled 'Dam Safety Internet of Things' to bring cellular service s.15 See ATT-3 for project details. The project is currently in the implementation phase. At no time did TELUS mention the Dam Safety Internet of Things project or how it could be leveraged in the context of their application to the Trust and the CRTC Broadband Fund.

NEXT STEPS:

As the program administrator, the Trust will respond to TELUS' application and address any questions TELUS might have in the context of their funding application to the Connecting British Columbia program.

The Grant Committee has recommended the program fund the last-mile component of the application with the remainder of the requested funds moved to the CRTC broadband fund or third-party funding sources.

Attachment(s): ATT-1 TELUS Letter
ATT-2 Strathcona Regional District Letter
ATT-3 TELUS Strategic Investment Fund
Contact: Howard Randell, ED Network BC

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Statement of Work

Project 2 IoT and Infrastructure Solution for BC Hydro Assessment

February 14, 2020

For

BC Hydro

333 Dunsmuir, 9th floor
Vancouver, BC, V6B 5R3

Attention:

Helen Whittaker
Director, Planning & Performance IT

Submitted by:

TELUS COMMUNICATIONS INC.

Pete Pietramala
Account Executive
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Notices

The purpose of the Dam Safety IoT Project is to explore, develop and deploy a dam safety solution using mobile technology to enhance the safety at BC Hydro operational dam sites and associated public facilities under the auspices of BC Hydro.

This Project is conducted under and is subject to the terms and conditions of the Strategic Relationship Agreement and the Telecommunications Service Master Agreement effective July 1, 2011 (the “TSMA”), as may be amended from time to time, between TELUS Communications Company, Her Majesty the Queen in Right of the Province of British Columbia, as represented by the Ministry of Citizens' Services, Insurance Corporation of British Columbia, British Columbia Hydro and Power Authority, British Columbia Lottery Corporation, Workers Compensation Board of British Columbia, Provincial Health Services Authority, Northern Health Authority, Interior Health Authority, Fraser Health Authority, Vancouver Island Health Authority and Vancouver Coastal Health Authority and First Nations Health Authority.

The Dam Safety IoT Project is planned to be undertaken in several Projects. This Statement of Work (SOW), outlines the process, requirements and deliverables to accomplish the second Project that will continue to deploy additional dam sites and new IoT devices.

The terms “IoT Partners”, “Sub-Contractors”, and “vendors” other than TELUS or “Third parties” as identified in this SOW shall be interpreted and as “Sub-Contractors” as defined in the TSMA.

For clarity, the TSMA defers certain aspects of project management and production support to the GPS Entity involved in the project, which includes this SOW. Where the TSMA defers to the GPS Entity, the terms of the “BC Hydro-TELUS Amended and Restated It Master Services Agreement dated the 1st of September, 2017” (aka the “ITMSA”), from time to time updated shall prevail. In the case of a conflict between the TSMA and the ITMSA, the TSMA terms shall prevail.

This document contains many abbreviations. To avoid confusion, Appendix x Table of Acronyms is provided to aid in understanding.

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Document Information

Document ID:	Statement of Work for IoT and Infrastructure Solution Assessment Project 2
Reference #:	Delivered April 16, Revised February 14, 2020.
Version:	Draft v3
Prepared for:	BC Hydro
Date:	February 14, 2020
Prepared by:	TELUS

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Table of Contents

1 Introduction and Background

Background

TELUS is pleased to work with BC Hydro on the Dam Safety IoT Project. BC Hydro is committed to integrating safety into all aspects of their business. BC Hydro conducts its operations to minimize the chance of injury to employees, contractors and the public. The Dam Safety IoT Program will focus on developing and deploying solutions that will enhance BC Hydro worker and citizen safety.

Background Information

The IoT Dam Safety program is currently in the implementation phase of "Project 1" which has its own SOW and is inclusive of dam sites at WAC Bennet and Bridge River. This SOW for "Project 2" will leverage the existing IoT network infrastructure (custom IoT network, s.15 , and associated applications (s.15 , from Project 1 for s.15 s.15 dam sites, to enhance the safety at BC Hydro operational and recreational facilities, New coverage areas and cell towers for these locations will be identified. This SOW and its associated activities will be executed concurrently to the implementation SOW of "Project 1".

This SOW will be for the second Project that will explore the use of Internet of Things (IoT) solutions to enhance the safety at BC Hydro operational and recreational facilities for three (3) additional dam sites. For Project 2, the scope includes s.15 dam sites. This project has two streams of work:

1. Development and deployment of IoT devices including the integration into several back-end systems that can distribute the information to various BC Hydro systems;

2. Wireless infrastructure builds at each dam site that aligns with a BC Hydro's and TELUS' Construction delivery methodology.

In Project 1, the Dam Safety IoT project created a number of outputs, both in deploying site infrastructure and creating an IoT Device support infrastructure. The intent is to leverage the processes and documentation developed in Project 1, re-using templates, processes and learning from that first project, as appropriate. In Project 1, three (3) IoT devices were selected: s.15
Also in Project 1 interfaces from IoT devices were built into four (4) data capture destinations for IoT sensor information. This includes systems from s.15

In Project 1 the team developed a Business Requirement template. Project 2 will leverage the documents produced in Project 1, however there will be new set of delivery documentation that is customized for each new site and, if any new IoT devices or back-end destinations are selected, new delivery documentation will be created for these as well.

Project 2 – the approach for the next 3 dam sites

TELUS will continue to work closely with BC Hydro during Project 2 on two streams: an IoT Solution stream and a Wireless Infrastructure stream. The project team will meet with each dam site to understand their wireless coverage requirements for each site and the specific IoT devices they wish to deploy. Where possible we expect the sites to use IoT devices we developed and tested in Project 1. The BC Hydro Project Manager shall approve any additional IoT devices requested by the individual dam site teams.

Project 2 of the program will be to develop the plans to extend wireless coverage to a total of three (3) additional sites. The initial priority of these three sites is shown in the list below. Any site re-prioritization will be updated following internal BC Hydro workshops.

- Sites:

  s.15

.

The overall Project has been approved through the SIF governance process.

This SOW defines how TELUS will work with BC Hydro to define high-level business requirements and to determine the classes and types of IoT sensors to be deployed in each location, and the applications that the IoT device information flows into; and the physical locations of mobility towers and projected coverage maps for each in-scope site.

2.1 Professional Services

The professional services in this Statement of Work (SOW) will be delivered by TELUS. Additional resources may be sub-contracted to TELUS from IoT Partners to facilitate customized workshops for specific solutions and technologies. TELUS will notify BC Hydro as to the identity of its Sub-Contractors at commencement of the Work and provide sufficient notice if subsequently changed during the Work.

The work described in this SOW is for three dam sites where TELUS will identify the IoT business requirements and the technical requirements for the wireless coverage.

2.2 General Project Approach

There are two streams of work that will identify requirements and plans for each dam site: IoT and Wireless Infrastructure. The IoT Stream will work with the BC Hydro teams from each dam site to identify the IoT requirements – the sensors, where the sensor data will be consolidated at the dam site, and which system the data is sent to inside BC Hydro's technical infrastructure. The Wireless Infrastructure team will work with the BC Hydro designate(s) to optimize wireless coverage at sites. The Business Requirements have been determined and documented for the s.15 as part of an early start Statement of Work. The Business Requirements for s.15 are currently in progress, and are not part of this statement of work.

IoT Stream

TELUS IoT team will lead Solution Workshops and, working with BC Hydro personnel, identify the IoT requirements and use cases which will form a basis for determining the possible potential solution(s) available for the s.15 locations. This stream will include the following activities:

- There will be a common introductory session for the three dam sites to provide an overview of the project and available IoT devices and back-end systems in place after Project 1.
- High Level IoT Kick-off lead by BC Hydro: to give an overview of the Program and progress to date. Potential alignment with new sites and opportunity to augment design.
- Engagement of subject matter experts and domain knowledge experts as appropriate.

For each individual dam site there will be a Solution Workshop, held at the BC Hydro Edmonds site, to understand and document the specific requirements for each individual site. Based on Project 1, TELUS recommends a common introductory session and suggest an agenda to work through 3 three separate 90 minute Solution Workshops, one for each of the 3 sites, at mutually agreeable dates and times.

The objective of the Solution Workshops is to determine and gather the high-level requirements for both the IoT and Wireless connectivity in each site. By the end of the Identification Phase BC Hydro stakeholders will have been introduced to vendors and technology solutions selected during Project 1 for each of the use cases, and in some cases a preferred vendor may be identified. Current solutions are s.15 s.15 Other options may include s.15 s.15 Additional requirements could potentially follow from the workshops.

Project 2 candidates will leverage the Project 1 outputs of Non-Production IoT Network: to provide high level network design, TELUS change management, Jasper configuration, and staging network implementation. We expect that the majority of the dam's requirements will fit within the products and systems that were developed in Project 1.The expectation is that there will be no changes to the in architecture or products previously defined in Project 1. Any changes would need to be approved by the BC Hydro Program Manager.

Wireless Infrastructure Stream

This stream will focus on determining coverage requirements and providing a high-level assessment of wireless infrastructure needs. The wireless stream will conduct the interviews for the dam sites at the same time as the individual interviews from the IoT team. The activities within this stream include:

- Radio Frequency (RF) coverage and equipment provisioning to identify macro level coverage for LTE and HSPA, in-building coverage requirements, estimated load on LTE services, and estimated load on HSPA services.
- Tower and infrastructure locations to determine if existing structures can be utilized and to determine site location to accommodate tower and equipment shelters.
- Site visits as required for better assessment of coverage, structures, geography, etc.
- Electrical power and transport interconnection: to determine availability of electrical power to TELUS, identify electrical interconnect points and identify transport interconnect points (fibre and/or microwave). TELUS will provide BC Hydro with preliminary designs for engineering review.
- Site access, sub-contracting, work permit requirements, safety standards and HSE working environment: TELUS needs to understand the process of "working on site" for the anticipated work including but not limited to tower construction which may require the use of cranes, heavy equipment, and high-risk aerial work for antenna and cable rigging.

- External factors will be identified in this phase but not necessarily resolved. Examples include lease negotiations, Indigenous rights, public consultations, etc.

Business Analysis and Technical Writing

In Project 1 we learned that the high billing rate of hard-to-find IoT team members makes it more cost-effective for TELUS to provide a Business Analyst resource to facilitate meetings for BC Hydro Personnel who will provide information and content for the documentation of deliverables as identified by BC Hydro. Based on our experience in Project 1, we have allocated additional time for the Technical Writer and Business Analyst than in Project 1. This resource will update the Architecture documents at the direction of the Architects.

Reporting

For every SOW, there is monthly SIF reporting required for review and approval by BC Hydro and subsequent submission by BC Hydro to the TSMA Telecommunications Office (TO). TELUS will prepare monthly activity reports and reconciliation reports. Additionally, TELUS will document workshop contents and other reports needed for the Project for review, approval and filing by BC Hydro.

Overall Project Management

TELUS will provide a lead Program Manager, who will report to the BCH program manager, and an additional project manager(s) to assist the program manager in day-to-day delivery of activities. The project managers will be identified by name and responsibilities (See table in project time-line), and this information provided to BC Hydro and updated when any changes are made.

Overall Solution Architect

TELUS is the technical IoT Subject Matter Expert and is responsible for all the technical activities across the streams within IoT, and will provide resources as required. TELUS will manage the engagements of all TELUS and external consultant resources, and coordinate with BC Hydro IT resources. The Overall Solution Architect shall be a named resource.

This role will be responsible for:

- High level requirements gathering, this individual will attend all workshops
- Extend existing Architecture Vision
- Provide support to complete assessments, e.g. Cyber Security Assessment, etc.

TELUS will augment the IoT architect with a local TELUS architect experienced with BC Hydro to ensure the skills remain with the day-to-day TELUS support team.

2.3 Project Timeline

This SOW is anticipated to run from February 14, 2020 to October 30, 2020 for this Project 2.

For details see section 2.6

2.4 Key Deliverables & Activities

The activities in this section are required to complete the IoT and Wireless deliverables. Descriptions of the activities and deliverables can be found below. All members identified in the table below in addition to the

location of activity will be approved by BC Hydro. Each activity has an estimated number of hours needed to complete the tasks and deliverables associated with the activity.

Key Activities	TELUS Partner	TELUS Team	Hours	BC Hydro Team	Work Products
Overall Program Management	n/a	n/a	n/a	Gail Neufeldt	Oversee overall program management, and direct BC Hydro resources. Responsible for BC Hydro Deliverables
Overall Project Delivery Management	n/a	John Penner	900	Gail Neufeldt	Project plan related to this SOW, Project charter, Oversee Project Management and direct TELUS resources, working with Program Manager Weekly Progress Meetings, Bi-weekly Status reports, Steering Committee updates, Communications plan, Issues Management plan, Risk Register, Questions Log, Project Budget, Resource Plan, Quality Plan. Statement of Work for Next phase. Project Change notices. Detailed Project plan for Next phase, including estimates. Review of deliverables, signoffs and final approval that deliverable is complete.

IoT Solution Workshops	n/a	Colin Chester, Rob Chevalier	n/a	Forrest Wagner, Gail Neufeldt BC Hydro resources, SME per solution	HL IoT Requirements, Detailed non-Production IoT Network Design, Customized Solution Workshops, IoT Architecture Workshops
Wireless Infrastructure Workshops	n/a	Bruce Weir, Lee Himbeault, Sr. Engineer	840	Forrest Wagner, Gail Neufeldt, BC Hydro plant managers or delegate	Coverage and loading requirements, Wireless Infrastructure Workshops, Location Selection, Interconnection Points
Business Analyst and Coordinator Create and maintain SIF monthly activity and reconciliation reports	n/a	Trevor Buchan, Shirley Wang	539	Gail Neufeldt	Monthly activity reports and reconciliation reports Workshop activities Solution Workshop meeting minutes
Technical Writer Produce BC Hydro deliverables	n/a	Ana German Jimenez	420	SME for each documented deliverable	Technical documentation at direction of TELUS Architects
Overall Solution Architect	Momenta	Jesse DeMesa	430	Gail Neufeldt and SME for each documented deliverable	H-L Business Requirements revisions Architecture Vision High Level proposed infrastructure document Key Decision Documents (KDD) TELUS to provide input on: NERC CIP Impact Assessment Cyber Security Assessment

IoT Architecture Support	Momenta	Aaron Edmond	60	SME for each documented deliverable	Technical related content on deliverables. High Level proposed infrastructure document KDD (as required) TELUS to provide input on: NERC CIP Impact Assessment Cyber Security Assessment
Senior Solution Analyst	TELUS	Colin Chester	100	Supporting SME for each documented deliverable	Solution analyst activities supporting deliverables, planning and workshops
Architect Support		Matt Alexander	240	SME for each documented deliverable	Assist in Architecture deliverables. Work shops

2.5 Assumptions

- The Parties agree to take commercially reasonable efforts to provide resources in a timely way in order to achieve the deliverables and schedule.

2.6 Deliverables

- Deliverables will be considered accepted upon written acceptance and sign-off by BC Hydro. The BC Hydro Program Manager will provide notification of final deliverable acceptance.
- TELUS is responsible to complete the deliverables in the following table, along with any BC Hydro templates, based on the scope outlined in this SOW.

RACI is attached as addendum 6.1.

Final Draft deliverables will be reviewed and/or approved by domain specialist(s) and shall be of a quality to allow sign-off in a timely manner to meet BC Hydro gate reviews. If these signoffs are not obtained, the Project will not proceed to next stage.

Deliverables	Party Responsible	Description: Purpose for the Service, Deliverable or interim milestone	Target Sign-off Date
Coverage Analysis	TELUS	The proposed coverage and tower placement options for all 3 dam sites will be documented and signed off by BC Hydro prior to site visits and the initiation of lease negotiations. (The first 2 dams have been signed off in June, the s.15 signoff will be in February)	May 24, 2020
Business Requirements (Revisions if required)	TELUS	Summary / Key Business Requirements (Updates to document provided during the assessment phase if required) Solution meetings with BC Hydro stakeholders to determine or confirm: - Equipment and application options - Physical connectivity - Communication protocols - IP Network connectivity path, including current obstacles for communication (e.g. firewalls) Identify resources required for system or application integration into BC HYDRO systems	Jul 27, 2020
Architecture	TELUS	The Architecture Document is BC Hydro's deliverable container for the core architectural artifacts created during project 1. If any changes arise during Project 2, this ADD document will be updated. The Architecture Document spans all architecture domains (business, data, application, and technology) and also examines all relevant states of the architecture (baseline, interim state(s), and target). Multiple architecture views at conceptual, logical and physical level may be required subject to project needs and level of detail required. The Architecture Document provides a qualitative view of the solution and aims to communicate the intent of the architects.	Jul 27, 2020
Key Decision Documents (KDD)	TELUS	A written record of Key Decisions. (If required)	NA

Deliverables	Party Responsible	Description: Purpose for the Service, Deliverable or interim milestone	Target Sign-off Date
PIA	BC Hydro	This assessment is to identify and prevent privacy non-compliance situations. Provide sufficient detail to allow FOICO to understand what your initiative seeks to accomplish and how personal information fits into it.	Jul 13, 2020
NERC CIP Impact Assessment & **Cyber Security Assessment**	BC Hydro With TELUS input	Email submission.	Jun 29, 2020
Support Impact Assessment	BC Hydro TELUS Input	The purpose of this document is to evaluate the impact of the project on the existing support model and review the impact to the current operation process and procedures. If necessary, roles and skill sets will be defined and individuals identified to perform these roles. A skills gap analysis will be performed and a training plan defined. This will be included in the Service Introduction Plan deliverable that will be developed during the implementation of dam sites in future Projects.	Jul 27, 2020
Functional Demo Test Plan	TELUS	The functional demo test plan defines the scope for feasibility testing to be performed during the project's definition phase. Feasibility of the IoT solution covers IoT devices, applications, software platform, and basic integration. Feasibility testing is not expected for Project 2, yet if required, should be limited as the solution is not fundamentally changing for other sites. If new requirements are identified during Project 2 that require feasibility testing, then a minimal functional demo test plan will be developed based on the functional demo deliverables developed for Project 1.	Jul 27, 2020
BC Hydro Detailed estimates for Implementation phase, costs and business case	BC Hydro	Costs, timelines and deliverables to be provided for input to the BC Hydro estimates. Statements of work and detailed MS Project plan.	Sep 13, 2020

Deliverables	Party Responsible	Description: Purpose for the Service, Deliverable or interim milestone	Target Sign-off Date
Deliver IoT Statement of Work, Implementation Phase	TELUS	Statement of Work for Implementation Phase of the IoT Project	Sep 20, 2020
Detailed project plan	TELUS	Detailed MS Project plan with dates, effort, duration, dependencies, resources and milestones identified.	Sep 20, 2020
Project Charter	TELUS	Project Charter for Implementation.	Sep 27, 2020
Initial Change Management Plan	BC Hydro	Plan for managing changes.	Sep 27, 2020
Risk Register	TELUS	Updated excel document with risks, probability, impact and risk mitigation strategies.	Sep 27, 2020
BC Hydro Gating	BC Hydro	Updated excel document with risks, probability, impact and risk mitigation strategies.	Oct 25, 2020

2.7 Out of Scope

Procurement, build and test activities are out of scope for this phase. Anything not formally defined in this SOW is deemed out of scope. Additional requirements will be managed through the SIF change management process.

2.8 Project Communication & Confidentiality Agreement

- TELUS may not publicly communicate about this Project without permission from BC Hydro. This includes any web content, presentations, news releases, comments to media, discussions with stakeholders, industry partners, or vendors.

3 Governance

3.1 SIF Governance

The Governance Structure proposed for this initiative will include representation from the BC Hydro, TSMA Telecommunications Office and TELUS.

3.2 Change Management Process

The following Process is considered for any changes, additions or deletions to the project scope to ensure all parties are clear on required changes and their actions, etc.

- Details of Change will be formally introduced by either party and documented in a Change Request Form
- Within five (5) working days from the receipt of a PCR (Project Change Request), TELUS will provide a written assessment and its estimates of scope, activities and cost to implement such changes.
- A Change Management meeting will be held, where the details of the change request will be discussed with project stakeholders. The request will be formally accepted, rejected or deferred.
- If the Change Request, including contingency funding, has been approved by both BC Hydro and TELUS stakeholders, the work outlined will be completed in according to the governance process.
- Detail will be added to the Change Management Process in the Project Charter.

3.3 Escalations

In the event that a project issue arises that cannot be resolved by the personnel that are directly engaged in the effort, escalations will be brought forward to the Steering Committee.

3.4 Contacts

TELUS Contacts

Name, Title	Role	Project Team	Governance Team	Contact Information
Derek Gale	TELUS SIF Program Director	No	Yes	Derek.Gale@telus.com
Pete Pietramala,	Project Lead, SIF Business Case	Yes	Yes	Pete.Pietramala@telus.com

Name, Title	Role	Project Team	Governance Team	Contact Information
Account Executive	and TELUS Business Case lead			
John Penner, Senior Program Manager	TELUS overall delivery manager	Yes	Yes	John.Penner@telus.com
Indira Manuel	TELUS SIF Program Manager	Yes	No	Indira.Manuel@telus.com
Bruce Weir, Sr. Manager Infrastructure	TELUS Infrastructure	Yes	No	Bruce.Weir@telus.com
Jesse DeMesa	TELUS overall Solution Architect	Yes	No	Jesse.DeMesa@momenta.partners
Aaron Edmond	TELUS Sr. Technical Architect	Yes	No	ae@stratusight.com
Colin Chester	TELUS Sr Solution Analyst	Yes	No	Colin.Chester@telus.com
Matt Alexander	Architect Support	Yes	No	Matt.alexander@telus.com

BC Hydro Contacts

Name, Title	Project Team	Governance Team	Contact Information
Kip Morison BC Hydro CIO	No	Yes	Kip.Morison@bchydro.com
Helen Whittaker Project Sponsor	No	Yes	Helen.Whittaker@bchydro.com
Forrest Wagner Project Initiator	Yes	Yes	Forrest.Wagner@bchydro.com
Gail Neufeldt Overall Program Manager	Yes	Yes	Gail.Neufeldt@bchydro.com

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4 Costing and Payment

4.1 Cost Structure

The total fee for this Definition Phase is estimated to be s.21 A travel budget has been included in the table below.

Phase	Cost	Estimated hours	Rate
Site IoT Infrastructure Sr. Manager Sr. Engineer Business Analyst Coordinator Wireless Designer Wireless Network Ops	s.21		
Wireless Infrastructure Stream Sr. Engineer Sr. Manager Technical Site Visit			
Delivery Project Management			
Technical Writer			
Business Analyst & Coordinator			
IoT Subject Matter Expert and Overall Technical Architect			

Sr. Technical Architect	s.21
Architect Support	
Sr. Solution Analyst	
TOTAL Estimated Project Fee	
Contingency (if needed)	
Travel & Room Rentals (Budgetary)	
TOTAL	

TRAVEL BUDGETARY QUOTE

- The travel budget is based on estimates.
- All final expenses for travel incurred will adhere to the BC Government's travel policy, allowances, reimbursement rates and limits, per the BC Government Policies and Procedures. Expenses will be reimbursed on a pass-through basis with no markups.
- For each trip, detailed travel pre-approval requests will be submitted at least 2-weeks in advance of travel, to BC Hydro for approval prior to purchase as per BC government travel policy.
- All site visits need to be communicated by BC Hydro Program Manager to Site Manager for approval and necessary arrangements for escort.
- No travel to be incurred unless approved in advance in writing by BC Hydro Manager.

4.2 Payment Schedule

An activity report and a reconciliation report will be produced on a monthly basis for the work hours completed by TELUS. BC Hydro will review the reports, and once approved the report will be forwarded by BC Hydro to the AO for approval for the funds to be released to TELUS.

5 Approvals

Resource Name	Title	Project Role	Date	Signature
Forrest Wagner	IT Advisor	Project Initiator	2020-02-26	
Gail Neufeldt	IoT Project Manager	Program Manager	2020-02-14	
Chris Ozeroff	TELUS Sales Director	Project Sponsor	2/27/2020	

6 Addendums

6.1 RACI

Assessment (confirms the scope, business requirements, and reviews solution alternatives)		
Activity	BC Hydro	TELUS
Project Administration TELUS Deliverable	A	R Maintains plan, risk register, issue log
Implemetnation Project Charter TELUS Deliverable	A	R
Solution Business Requirements TELUS Deliverable	A Reviews and approves R Provide coverage requirements	R Collects and documents
Architecture Vision TELUS Deliverable	A	R
Implementation Business Case BC Hydro lead Deliverable	R,A	C
firm Cost Estimates, and Project Plan. Resulting Statements of Work and Service Orders. (supporting Business Case and generating SOWs and SOs to move project forward) TELUS to lead deliverable	A	R
Privacy Impact Assessment BC Hydro lead deliverable	R,A	C
Cybersecurity Risk and NERC CIP Compliance Assessment Template BC Hydro lead deliverable	A,R	C
Monthly Reporting to SMC Joint deliverable	A C Reviews all reports.	R prepares and submits.

A = Accountable
R = Responsible
C = Consulted

Appendix B Table of Acronyms

Acronym	Definition
SOW	Statement of Work
s.15	
SMC	Strategic Management Committee
s.15	
SIM	Subscriber Identity Module
MPLS	Multi-Protocol Label Switching technology used for private connectivity in the Dam Safety project
IoT	Internet of Things
VM	Virtual Machine
s.15	
COE	Center of Excellence is the TELUS IoT support center
MITs	Managed Information Technology Solutions
SLO	Service Level Objective
TSMA	Telecommunications Service Master Agreement
ITMSA	Information Technology Master Service Agreement
SIF	Strategic Investment Fund
APN	Access Point Name
GPS	Greater Public Service
UAT	User Acceptance Testing
PM	Project Manager
KDD	Key Decision Documents
SME	Subject Matter Expert
NERC	North American Electric Reliability Corporation
CIP	Critical Infrastructure Plan
RACI	Responsibility Assignment Matrix
HSPA	High Speed Packet Access (Wireless Network)
LTE	Long Term Evolution (Wireless network)
TO	Telecommunications Office