Eastrail Fiber Development Project RFI Report

September 2022

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II. Proviso Text

Ordinance 19210 as amended by Ordinance 19479, Section 79, Information Technology, P3[1]

Of this appropriation, for capital project 1139245, Eastrail Fiber Development project, no ((~~monies~~)) moneys shall be expended or encumbered, except as provided in Expenditure Restriction ER7 of this section, until: (1) the executive transmits the Eastrail Fiber Development project request for information ("RFI") report required in this proviso; (2) the executive transmits the Eastrail Fiber Development project plan required in this proviso; (3) the executive transmits a motion that should approve the project plan; and (4) a motion approving the plan is passed by the council. The motion should reference the subject matter, the proviso's ordinance, ordinance section, and proviso number in both the title and body of the motion.

A. The Eastrail Fiber Development project request for information ("RFI") report shall be transmitted by September 16, 2022 ((~~no more than two months after responses to the RFI referenced in Expenditure Restriction ER7 have been received~~)). For the purposes of this proviso, "fiber capability" refers to the broadband connection for Internet access and other purposes defined in the Eastrail Fiber Feasibility Report. ((~~Also for purposes of this proviso, the business model definitions in Expenditure Restriction ER7 of this section apply.~~))

The purpose of the RFI is to gather information to analyze the different business models to providing fiber optic service along the Eastrail corridor and a comparison of the ((~~costs and~~)) benefits of the differing business models. The Eastrail Fiber Development project RFI report shall include an analysis of vendors' responses to the RFI. The RFI must be developed so that vendors' responses will allow the executive to report on the following:

1. A summary of the RFI process used that includes time advertised, any outreach or recruitment activities undertaken with potential vendors and the number of vendor responses received for each of the business models, which are public, public-private and private;

2. A matrix that summarizes the responses provided by each vendor including:

a. the vendor's name or other unique identifier if anonymity is required; and

b. for every business model proposed by each vendor:

(1) the entity that would own the fiber infrastructure, including the number of conduits and fiber strands. If joint ownership is proposed, the description shall list the owners and their percentages of ownership and use and how such percentages were determined;

(2) the entity that would be responsible for the maintenance and operation of the fiber infrastructure; and

(3) the benefits to those with property interests in the parcels that comprise the Eastrail ("Eastrail owners"), including the amount of access to the fiber capability each of the Eastrail owners would have and how that level of access would be determined;

~~(((4) the range of vendor estimated capital costs for constructing the Eastrail Fiber Development project, including a breakdown of the amounts by funding sources and payors, including any estimated county portion;~~

~~(5) the range of vendor estimated operating costs and expected payors, including any estimated county portion; and~~

~~(6) the range of vendor estimated revenues from leased fiber capability over the next ten years and how those revenues were calculated;))~~ and

3. An analysis of the benefits and opportunities provided or not provided by each vendor response related to the following council priorities:

[1] Ordinance 19479 [LINK]

a. increase the capacity and affordability for service to either underserved or unserved areas of the county, or both, as defined in the county's 2020 Broadband Access Study, including those residing in affordable and public housing;

b. encourage equitable economic development;

c. preserve or advance the potential for a county-owned broadband system;

d. provide benefits or enhancements for Eastrail users and owners; and

e. provide details and analysis of other benefits proposed by each vendor.

B. The Eastrail Fiber Development project plan shall include, but not be limited to:

1. Based on the information gathered by the RFI process, the recommended business model for the fiber infrastructure with the justification for this selection, and an analysis of how this business model could achieve the council priorities listed in subsection A.3. of this proviso;

2. The type of procurement approach to be used;

3. A summary of next steps for the project that includes a project schedule;

4. A list and description of the lease contract or other agreements ("the agreements") expected to be needed to implement the project and identification of the agreements that will require either council approval or approval by Eastrail owner cities or other entities, or both; and

5. A plan for infrastructure governance that describes how decisions will be made amongst the Eastrail owners and the county.

The executive should file the Eastrail Fiber Development project RFI report, project plan and motion required by this proviso with the clerk of the council, who shall retain an electronic copy and provide an electronic copy to all councilmembers, the council chief of staff and the lead staff for the government accountability and oversight committee, or its successor.

III. Executive Summary

This report is provided in response to Ordinance 19210, Proviso P3, as amended by Ordinance 19479. The Proviso calls for the Executive to complete a request for proposal (RFI) with the purpose of gathering information for analysis of the different fiber optic service business models along the Eastrail corridor and a comparison of the benefits of the differing business models.

The Eastrail (formerly the Eastside Rail Corridor[2]) will be an uninterrupted 42-mile multi-use trail extending from Gene Coulon Memorial Beach Park in Renton, north through Bellevue and Woodinville, and eventually terminating in the City of Snohomish. In addition to providing Eastside communities with non-motorized recreation and transportation, the Eastrail as a continuous right-of-way provides a unique opportunity to locate multiple utilities today and, in the future[3].

Several groups have been involved with the history of the Eastrail, including[4]:

- **Eastrail property owners**: King County, the cities of Kirkland and Redmond, Sound Transit, and Puget Sound Energy. Each hold property rights to Eastrail.
- **Regional Advisory Council (RAC)**: Representatives from the owners who work together to maintain the collaborative, regional planning process for Eastrail. The owners' goal is to achieve connectivity and multiple uses, maximizing public benefit and enjoyment throughout the corridor both directly and indirectly[5].
- **Eastrail stakeholder**: A regional group with interest in the development and expansion of the Eastrail corridor. This group was convened to provide feedback on community needs, use cases for building fiber along the Eastrail, and to jointly fund the feasibility study. It includes:
    - Eastrail property owners
    - Pacific Northwest Gigapop (PNWGP)[6]
    - Connecting Community Consortium[7]
    - Cities of Bellevue and Renton
    - Bellevue School District and Renton School District

The **Eastside Rail Corridor (ERC) Work Plan for 2015-2016**[8] was transmitted by the King County Executive to the King County Council on March 30, 2015. In June of 2016, the Council passed **Motion 14654**[9] approving the 2016 work plan. The work plan[10]included a goal to gain the approval for the addition of communications use within the ERC, encompassing a joint effort with other ERC owners to construct continuous fiber optic and telecommunications cable along the entire ERC.

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[2] Kingcounty.gov: Unveiling Eastrail: [LINK]
[3] Eastside Rail Corridor Regional Trail Master Plan (Ch. 2, Pg. 2): [LINK]
[4] Full list of individuals, where applicable, in Eastrail groups are provided in Appendix A
[5] Kingcounty.gov: Eastrail Regional Advisory Council: [LINK]
[6] Pacific Northwest Gigapop (PNWGP) is a nonprofit corporation serving research and education organizations throughout the Pacific Rim. PWNGP has successfully built fiber optic infrastructure and leveraged fiber for government, research, education, and other public purposes over the course of two decades. [LINK]
[7] Community Connectivity Consortium: Consortium of 27 members that have built over 65 miles of core fiber and operates a high-speed fiber optic ring network in the Puget Sound area. [LINK]
[8] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan: [LINK]
[9] Motion 14654: [LINK]
[10] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan (Pg.14, Action Area PP-7): [LINK]

As a result of the ERC work plan for 2015-2016, the Eastrail Fiber and Conduit Feasibility Study was produced by the consulting firm of CTC Technology & Energy (Appendix B). The study identified that the Eastrail was a viable project area for fiber optic communications. An Eastrail Return on Investment (ROI) study (Appendix C) was produced by CTC shortly after viability was confirmed.

In June 2022, Ordinance 19479[11] was adopted requesting the Executive complete the Eastrail Fiber Development RFI.

KCIT developed this report summarizing over nine years of consultation with groups including Eastrail owners, Eastrail stakeholders Eastrail RFI project team, and the RAC (Appendix A). KCIT utilized CTC to develop findings on fiber optic feasibility and stakeholder priorities for Eastrail that informed the RFI requirement of Ordinance 19479. The recommendations of this RFI report are based on how the responses aligned with the overall opportunity for Eastrail owners as determined by the Eastrail RFI project team.

The ERC Work Plan for 2015-2016 included a goal to gaining ERC approval for the addition of communications use within the ERC.

With this goal in mind and based on the recommendations in the Eastrail Corridor Fiber and Conduit Feasibility Report (Appendix B) and Eastrail Return on Investment (ROI) Analysis (Appendix C), King County conducted a goods and services RFI. Led by King County Finance and Business Operations division's Procurement and Payables section and KCIT, an RFI project team was formed to develop the RFI solicitation and review vendor submittals.

The RFI project team (Appendix A) consisted of participants from the City of Kirkland (Transit, Information Technology, and Geographic Information Systems (GIS) staff, City of Redmond (Parks and IT staff), Sound Transit (Government and Community Relations), City of Woodinville (Intergovernmental Affairs), and King County (KCIT, DNRP, Council staff, and Procurement staff).

The RFI gathered information on three types of business models for the provisioning of fiber optic service along the Eastrail: private, public, and public-private.

The RFI was open for response May 20 - June 15, 2022. It was posted on King County's Procurement website, advertised to approximately 70 registered vendors, and directly emailed to the nine private communication companies that had previously met with CTC and KCIT as part of the Feasibility and ROI studies in 2019. Additionally, the RFI was advertised on the Fiber Broadband Association website, a national 501 C (3) broadband advocacy group.

At the close of the RFI solicitation, four responses were submitted. These four responses came from two telecommunications firms, one consultant, and a private wireless service provider.

All vendors proposed some version of a public/private partnership, requiring some public investment. In all proposals, Eastrail Owners would have no municipal governance; a private partner would govern all operations, maintenance, asset management, initial allocation, requests for use and transactions of

[11] Ordinance 19479 [LINK]

spare fiber. One response indicates a willingness to contribute funds for construction in return for full private ownership of the asset.

RFI responses indicate that revenue generation is uncertain. Hence, Eastrail Owner ROI should be based on cost avoidance such as operations and maintenance costs rather than revenue assumptions. Information on the viability of a fully funded private model was not presented in the RFI responses. Consequently, it is anticipated that market interest in a fully funded private model will not materialize.

The RFI responses did not identify a clear path for next actions. Due to the outcome of the RFI, the Executive does not support continuation of the project.

IV. Background

Department Overview

The Department of Information Technology (KCIT) provides IT support and technology infrastructure for King County government services, employees, and residents. KCIT is home to the Institutional Network (I-Net), which is a county-wide fiber optic network that delivers high-speed broadband service to hundreds of public, education, and government customers. KCIT was named the nation's Top Digital County by the Center for Digital Government and the National Association of Counties two years in a row[12]

Key Context

When completed, the Eastrail. formerly known as the Eastside Rail Corridor[13], will be an uninterrupted 42-mile multi-use trail. It will extend from Gene Coulon Memorial Beach Park in Renton, north through Bellevue and Woodinville, eventually terminating in the City of Snohomish. In addition to providing eastside communities with non-motorized recreation and transportation, the Eastrail as a continuous right-of-way with a unique opportunity to locate multiple utilities. Several major sewer lines and a fiber optic line are in the corridor. Also, there are hundreds of smaller water, gas, and power connections cross the corridor or use the corridor for short segments of their route. It is likely that portions of the corridor will be used for future power transmission in addition to expanded use for water, sewer, gas lines, and fiber optic infrastructure.[14]

Several groups have been involved with the history of the Eastrail, including[15]:

- **Eastrail property owners**: King County, the cities of Kirkland and Redmond, Sound Transit, and Puget Sound Energy. Each hold property rights to Eastrail.
- **Regional Advisory Council (RAC)**: Representatives from the owners who work together to maintain the collaborative, regional planning process for Eastrail. The owners' goal is to achieve connectivity and multiple uses, maximizing public benefit and enjoyment throughout the corridor both directly and indirectly[16].

[12] Govtech.com [LINK]
[13] Kingcounty.gov: Unveiling Eastrail: [LINK]
[14] Eastside Rail Corridor Regional Trail Master Plan (Ch. 2, Pg. 2): [LINK]
[15] Full list of individuals, where applicable, in Eastrail groups are provided in Appendix A
[16] Kingcounty.gov: Eastrail Regional Advisory Council: [LINK]

- **Eastrail stakeholder**: A regional group with interest in the development and expansion of the Eastrail corridor. This group was convened to provide feedback on community needs, use cases for building fiber along the Eastrail, and to jointly fund the feasibility study. It includes:
    - Eastrail property owners
    - Pacific Northwest Gigapop (PNWGP)[17]
    - Connecting Community Consortium[18]
    - Cities of Bellevue and Renton
    - Bellevue School District and Renton School District

History of fiber and the Eastrail

In 2014, Ordinance 17941, Section 18, P2[19] requested that the Executive transmit an Eastside Rail Corridor (ERC) integrated work plan for 2015-2016. The work plan was to include a business plan with milestones and key decision points, define how executive agencies would work together to implement the vision for the ERC as established in the 2013 Creating Connections report.[20] The work plan required financial requirements, how work would be carried out together across organizations and a discussion of how council oversight would be reflected in carrying out the ERC integrated work plan.

The Eastside Rail Corridor (ERC) Work Plan for 2015-2016[21] was transmitted by the executive to council on March 30, 2015, and in June of 2016, Motion 14654[22] was passed approving the 2016 work plan. The work plan identified several action areas along the Eastrail corridor with specific tasks. The action area of relevance for fiber optics along the Eastrail Corridor is Action Area PP-7.[23] The main goals for this area focused on gaining approval for the addition of communications use within the ERC. This would require a joint effort with ERC owners to construct continuous fiber optic and telecommunications cable along the entire ERC. ERC would become a regionally connected high-speed broadband and telecommunications corridor available to commercial, municipal, education, residential, and transportation users.

The key tasks that resulted from the work plan for this action area were:

- Explore, through the Community Connectivity Consortium (C3) group or other appropriate venue, a combined ERC RAC staff effort to implement a significant regional telecommunications and fiber build along the full length of the corridor[24]
- Develop a formal business case proposal for a joint communications infrastructure build in the corridor, including assessment and evaluation of infrastructure alternatives, communications

[17] Pacific Northwest Gigapop (PNWGP) is a nonprofit corporation serving research and education organizations throughout the Pacific Rim. PWNGP has successfully built fiber optic infrastructure and leveraged fiber for government, research, education, and other public purposes over the course of two decades. [LINK]
[18] Community Connectivity Consortium: Consortium of 27 members that have built over 65 miles of core fiber and operates a high-speed fiber optic ring network in the Puget Sound area. [LINK]
[19] Ordinance 17941: [LINK]
[20] Creating Connections report, which initially developed the vision of "A corridor for the ages. The Eastside Rail Corridor (ERC) provides a rare and unique opportunity to develop a major north-south corridor for multiple, important purposes: mobility, utility infrastructure, and recreation." [LINK]
[21] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan: [LINK]
[22] Motion 14654: [LINK]
[23] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan Action Area PP-7 (pg. 14): [LINK]
[24] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan Action Area PP-7 (pg. 14, Task a): [LINK]

use, telecommunications and fiber needs, high-level design, fiscal impacts, and project management roles of the corridor owners. [25]

- Gain King County Executive and King County Council approval of business case for expanding the utility infrastructure to include communications use within the ERC.[26]

As a result of the tasks identified in the ERC Work Plan for 2015-2016, a feasibility request for proposal (RFP) was published in March 2018. CTC Technology & Energy (CTC) was awarded the contract. The RFP was a joint effort with King County and Eastrail stakeholders to identify and understand the overall feasibility of fiber optic infrastructure in the Eastrail corridor.

Eastrail Fiber and Conduit Feasibility Analysis Findings

As part of its work, CTC reviewed documents and information including:

- Eastrail master plan
- Environmental impact study
- Parametric inventory assessment
- Each jurisdictions right-of-way policies and processes
- Eastrail capital improvement project plan

The CTC analyses of the data informed the final **Eastrail Corridor Fiber and Conduit Feasibility Report** (Appendix B) which was provided to City of Kirkland as the agency that published the RFP on July 12, 2019. On August 7, 2019, King County leadership was briefed[27]. The findings of the report were immediately shared with all Eastrail stakeholders and King County. King County Council (Terra Rose and Patrick Hamacher) and the executive office (Karan Gill) were sent the report in February 2021. Finally, the report was distributed to the RAC on July 12, 2021.

Key findings at the time of the report include:

- Construction of fiber optics infrastructure will cost an estimated $6.64-$12.64 million
- Operations and maintenance annual cost is estimated at $75,000 (this doesn't factor in any additional principal or interest on debt financed)
- Revenue generated from the fiber optics infrastructure could offset operational costs
- Multiple deployment models and governance structures were proposed
- Redmond has built conduit in 65 percent of its segment on the Redmond spur

Note: Since the delivery of the report in 2019, cost estimates are out of date. Inflation and supply chain would cause these estimates to increase. Updated costs analysis is not included in this report.

After reviewing the CTC Eastrail Corridor Fiber and Conduit Feasibility Report and understanding that the project was feasible. An additional study was conducted to understand the revenue opportunity for leasing the proposed fiber optic infrastructure. CTC was awarded a waiver to develop the **Eastrail Return on Investment (ROI) Analysis** (Appendix C) to determine the revenue opportunity for the county if the infrastructure investment was made. The study applied different revenue models on the infrastructure proposed in the feasibility to provide an estimate on revenue generation.

[25] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan Action Area PP-7 (pg. 14, Task b): [LINK]
[26] Eastside Rail Corridor 2015-2016 Executive Branch Work Plan Action Area PP-7 (pg. 14, Task c): [LINK]
[27] Invitees: Tanya Hannah, Dwight Dively, Casey Sixkiller, Jennifer Hutson, Christie True, David St John, optional were Heidi Kandathil, Doug Hodson, and Andrew Marcuse

In November 2020, CTC delivered a memo (Appendix D) to the Eastrail stakeholders regarding documented business outcomes and objectives for the Eastrail fiber asset that were collected during outreach meetings conducted by CTC in July-early August of 2020. The purpose of the memo was to capture the Eastrail stakeholder priorities so that they were appropriately addressed in the Eastrail Fiber RFP scheduled for December 2020.

In the **King County 2021-2022 Biennial Budget, Ordinance 19210, ER6, P2**[28], which was adopted in November 2020, the executive was directed to deliver the Eastrail Fiber Development project report and select a preferred vendor through an RFP process.

From August-October of 2021, there were several discussions between the Eastrail project team and King County Council staff about issuing an RFP or a Goods and Services RFI. King County Council (KCC) wanted to include a public ownership option in the RFP, but by doing so both King County Procurement and King County Prosecuting Attorney's Office stated that it would trigger State Public Works law requirements which would create a multi-stage RFP process.

In June 2022, the RFI process replaced the RFP process to accommodate feedback on the public option into Ordinance 19479, Section 79, Information Technology, P3[29]. Council priorities for Eastrail were also identified in the ordinance as follows:

a. Increase the capacity and affordability for service to either underserved or unserved areas of the county, or both, as defined in the county's 2020 Broadband Access Study, including those residing in affordable and public housing
b. Encourage equitable economic development
c. Preserve or advance the potential for a county-owned broadband system
d. Provide benefits or enhancements for Eastrail users and owners
e. Provide details and analysis of other benefits proposed by each vendor

Report Methodology
KCIT developed this report.

V. Report Requirements

The responses below are organized to address the proviso requirements and specific proviso language will be highlighted at the beginning of each section.

1. Summary of the RFI process

> *The Eastrail Fiber Development project RFI report shall include an analysis of vendors' responses to the RFI. The RFI must be developed so that vendors' responses will allow the executive to report on the following:*
>
> a. *A summary of the RFI process used that includes time advertised, any outreach or recruitment activities undertaken with potential vendors*

[28] King County 2021-2022 Biennial Budget Book (pg.393): [LINK]
[29] Ordinance 19479: [LINK]

and the number of vendor responses received for each of the business models, which are public, public-private and private;

King County conducted a goods and services RFI. Led by King County Finance and Business Operations division's Procurement and Payables section and KCIT, an RFI project team was formed to develop the Goods and Services RFI solicitation and review vendor submittals. Eastrail Fiber Development RFI is attached as (Appendix E).

The RFI project team (Appendix A) consisted of participants from the City of Kirkland (Transit, Information Technology, and Geographic Information Systems GIS staff), City of Redmond (Parks and IT staff), Sound Transit (Government and Community Relations), City of Woodinville (Intergovernmental Affairs), and King County (KCIT, DNRP, Council staff, and Procurement staff).

King County conducted several RFI draft reviews with the RFI project team. The RFI reviews included meetings, and emails, to collect feedback and ensure the RFI was addressing the proviso requirements as well as Eastrail owner priorities. The Eastrail owner priorities were captured by CTC in a memo (Appendix D) in November 2020 and were updated in the RFI (Appendix E, pg. 11) to reflect changes over the two-year timeframe. Council priorities were captured in the Proviso as detailed below:

a. increase the capacity and affordability for service to either underserved or unserved areas of the county, or both, as defined in the county's 2020 Broadband Access Study, including those residing in affordable and public housing;
b. encourage equitable economic development;
c. preserve or advance the potential for a county-owned broadband system;
d. provide benefits or enhancements for Eastrail users and owners; and
e. provide details and analysis of other benefits proposed by each vendor.

The RFI was open for response from May 20-June 15, 2022. It was published on King County's Procurement website (approximately 70 registered vendors). It was also sent to nine private telecommunication firms that previously met with CTC and KCIT as part of the Eastrail Fiber and Conduit Feasibility Report and Eastrail Return on Investment (ROI) Analysis. In addition, it was sent to the Fiber Broadband Association website[30] (National 501 C (3) broadband advocacy group).

Four responses to the RFI were submitted. The four responses came from two telecommunications firms, one consultant, and a private wireless service provider.

The vendor response by business model are as follows:

- Public: Zero
- Public-private: Three
- Private: Zero
- One vendor noted that more engagement was needed before recommending a business model

[30] Fiber Broadband Association: [LINK]

2. Vendor Response Matrix

2. A matrix that summarizes the responses provided by each vendor including:
   a. the vendor's name or other unique identifier if anonymity is required; and
   b. for every business model proposed by each vendor:
      (1) the entity that would own the fiber infrastructure, including the number of conduits and fiber strands. If joint ownership is proposed, the description shall list the owners and their percentages of ownership and use and how such percentages were determined;
      (2) the entity that would be responsible for the maintenance and operation of the fiber infrastructure; and
      (3) the benefits to those with property interests in the parcels that comprise the Eastrail ("Eastrail owners"), including the amount of access to the fiber capability each of the Eastrail owners would have and how that level of access would be determined;

Proviso Detail	Business Model - 2b	Infrastructure Asset Ownership - 2b(1)	# of Conduit & Fiber Strands 2b(1)
Respondent A	Public-Private-Partnership	Eastrail Owners	One conduit and 864 fiber strands for Eastrail Owner
Respondent B	Respondent needs more engagement with customers before a business model can be proposed.	Eastrail could achieve some ownership of fiber but, based on the business model selected.	Conduit and fiber based on Eastrail Owner needs.
Respondent C	Public-Private-Partnership	Private Entity	One conduit and 288 fiber strands for Eastrail Owner
Respondent D	Public-Private-Partnership	Eastrail Owners	This is a wireless system & wireless spectrum allocation is unknown.

Proviso Detail	How Use & Ownership Determined - 2b(1)	Entity Responsible for Infrastructure Maintenance and Operation - 2b(2)	Eastrail Owner Benefits (Amount of fiber access and the process for that determination) - 2b(3)
Respondent A	Infrastructure ownership and usage determined by Eastrail Owners.	Private Company	To be defined by percentage of Eastrail Ownership in relationship to the entire Eastrail property.
Respondent B	Ownership and use will be based on the business model selected.	Eastrail Owners can outsource operations, and maintenance to a 3rd party entity.	Ownership will be based on the business model selected.
Respondent C	Infrastructure owned by private company. Use determined by level of public investment.	Private Company	Private company owns assets and will grant Eastrail Owners a 25-year Indefeasible right of use (IRU) agreement for access to fibers. Individual Eastrail Owner access to fiber will be based on percent of Eastrail property ownership.
Respondent D	Infrastructure owned by Eastrail Owners. Use to be defined by Eastrail Owners.	Private Company	Information did not present how wireless spectrum would be shared/distributed to Eastrail Owners.

3. Benefits and Opportunities Analysis

3. An analysis of the benefits and opportunities provided or not provided by each vendor response related to the following council priorities:

- *a. increase the capacity and affordability for service to either underserved or unserved areas of the county, or both, as defined in the county's 2020 Broadband Access Study, including those residing in affordable and public housing;*
- *b. encourage equitable economic development;*
- *c. preserve or advance the potential for a county-owned broadband system;*
- *d. provide benefits or enhancements for Eastrail users and owners; and*
- e. *provide details and analysis of other benefits proposed by each vendor.*

All vendors proposed some version of a public/private partnership, requiring some public investment. In all proposals, Eastrail Owners would have no municipal governance. A private partner would govern all operations, maintenance, asset management, initial allocation, requests for use and transactions of spare fiber. One response indicated a willingness to contribute funds for construction in return for full private ownership of the asset. Summarized responses from each respondent are below.

Proviso Detail	ID Benefits to Undeserved and Unserved Areas of the County, Including Affordable and Public Housing - 3a	Encourage Equitable Economic Development - 3b	Preserve or Advance the Potential for a County-owned Broadband System - 3c
Respondent A	Respondent plans to work with the Parties to identify areas to target & expand services. Use a portion of the revenues to assist in the efforts.	The respondent will communicate with municipalities, private companies & economic development groups and welcome ideas for economic development.	Yes, asset will be preserved for a broadband system.
Respondent B	This is a future capability - i.e., extending the infrastructure to provide internet service to affordable housing developments and other low-income residents along the corridor.	Requires Eastrail owner meetings and a feasibility study before a reply can be given.	Requires Eastrail owner meetings and a feasibility study before a reply can be given.
Respondent C	Respondents existing fiber system in the cities of Woodinville, Kirkland, Redmond, and other eastside areas enables current services for affordable and public housing along the Eastrail.	Information was not submitted by respondent.	No - Asset would be privately owned.

Proviso Detail	ID Benefits to Undeserved and Unserved Areas of the County, Including Affordable and Public Housing - 3a	Encourage Equitable Economic Development - 3b	Preserve or Advance the Potential for a County-owned Broadband System - 3c
Respondent D	Respondent can extend the infrastructure from the base project to provide low-cost, fast, and reliable internet service to affordable housing developments and other low-income residents along the corridor.	Information was not submitted by respondent.	Yes, asset will be publicly owned

Proviso Detail	Provide Benefits or Enhancements for Eastrail Users and Owners - 3d	Other Benefits Proposed - 3e
Respondent A	The new communications infrastructure can be used to support amenities along the route such as smart lighting, wireless internet services, security, etc.	Revenue generated from all retail activities will be shared with the Eastrail Owners in perpetuity.
Respondent B	Requires Eastrail owner meetings and a feasibility study before a reply can be given.	Requires Eastrail owner meetings and a feasibility study before a reply can be given.
Respondent C	Information was not submitted by respondent.	Information was not submitted by respondent.
Respondent D	Information was not submitted by respondent.	Information was not submitted by respondent.

The following table highlights the Pro's and Con's for each vendor submission. The criteria for either pro/con is based on meeting specific criteria within the RFI responses. Anything items that don't fit the criteria will be accompanied with further detail.

	Pro's	Con's
Respondent A	• Eastrail Owners retain ownership of all infrastructure with control and sovereignty. • Public governance not required, respondent acts as the agent to manage and maintain all infrastructure and services. This alleviates resources needed to perform the governance. • Supports sharing revenues generated from commercial leasing of conduit and fiber in perpetuity.	• Respondent lacks availability of fiber infrastructure and will necessitate use of publicly owned assets and/or additional cost to lease infrastructure or services to achieve the business priorities and broadband benefits for the community. This will add operational cost to the Eastrail fiber over time due to the additional 3rd party fiber required to deliver internet services.

	Pro's	Con's
Respondent B	• The respondent has a long history of delivering broadband consulting services, assisting companies, municipalities, and tribes in starting broadband systems and services. This experience could save the Eastrail Owners a significant amount of time and money.	• Respondent does not recommend a specific business model. • Respondent requires more engagement with customers before many of the RFI questions could be answered. • Feels municipalities are unprepared to build, manage and maintain broadband networks.
Respondent C	• The respondent is an existing telecommunications service provider, capable of inter-connecting the Eastrail fiber to the internet, other networks, and provide low-income households with broadband services. • This respondent proposes private funding to complement public funding towards constructing the Eastrail fiber optic infrastructure. This public-private-partnership is beneficial to both parties as it can allow King County the ability to encourage broadband services to areas in the county that private providers are not willing to.	• Respondent requires full private ownership of the Eastrail fiber optic infrastructure. • Respondent will provide the Eastrail Owners access to fiber for a period of 25 years, after which the asset reverts to private ownership. There is only interest if the asset becomes an Eastrail asset in perpetuity. • Respondent information implied limited interest in going south on the Eastrail Corridor. The ability to provide affordable and fast internet along the whole Eastrail Corridor wouldn't be achieved. • Proposed Eastrail Owners achieve return on investment through operations and maintenance cost avoidance. Eastrail Owners have a preference to generate revenue off of the infrastructure through the various models identified in the Eastrail ROI Analysis study.
Respondent D	• This respondent offers an innovative private Long Term Evolution (LTE) managed wireless system that's affordable to construct and deploy. This would enable a broader distribution of internet services since it would be a wireless solution for Eastrail.	• This approach entails investments in both wireless infrastructure (towers and antennas) and building fiber in the Eastrail. Respondent information did not include details of where fiber is required to complete a full Private LTE system along the Eastrail.

	Pro's	Con's
		• The wireless systems require towers & antenna placements along the Eastrail. An Eastrail business priority does not want towers in the Eastrail. • The biggest barrier to Private wireless is the availability of mobile devices that are compatible with the current commercial wireless systems. • Citizen Broadband Radio Service (CBRS) is suitable for college campus and neighborhoods but are unproven as a city-wide solution.

4. Eastrail Fiber Development Project Plan

B. The Eastrail Fiber Development project plan shall include, but not be limited to:

1. *Based on the information gathered by the RFI process, the recommended business model for the fiber infrastructure with the justification for this selection, and an analysis of how this business model could achieve the council priorities listed in subsection A.3. of this proviso;*
2. *The type of procurement approach to be used;*
3. *A summary of next steps for the project that includes a project schedule;*
4. *A list and description of the lease contract or other agreements ("the agreements") expected to be needed to implement the project and identification of the agreements that will require either council approval or approval by Eastrail owner cities or other entities, or both; and*
5. *A plan for infrastructure governance that describes how decisions will be made amongst the Eastrail owners and the county.*

This report does not include the development project plan. This is due to the fact that, based on information provided by the four responding vendors, the business goals detailed in the RFI are not achievable. Respondents noted that prioritization or trade-offs may be necessary to achieve key business objectives. RFI responses indicate that revenue generation is uncertain. Thus, a project plan cannot be completed at this time.

VI. Conclusion

While the Eastrail is a vibrant 42-mile multi-use trail that all Eastrail Owners can be proud of, based on the outcome of the RFI and the infeasibility of the business goals outlined in the RFI, the Executive does not support continuation of the project.

VII. Appendices

Appendix A: List of Eastrail groups and individuals

KCIT Staff:

- Bill Kehoe, Former Chief Information Officer
- Tanya Hannah, Former Chief Information Officer
- David Mendel, Interim Chief Information Officer
- Darryl Hunt, IT Project Manager
- Tommy Lee, IT Manager

Eastrail property owners:

- King County
- City of Kirkland
- City of Redmond
- Sound Transit
- Puget Sound Energy

Regional Advisory Council (RAC):

Co-Chairs

- Sarah Perry, King County Councilmember
- Jay Arnold, City of Kirkland, Deputy Mayor

Members

- Claudia Balducci, King County Council Chair
- Don Billen, Sound Transit Director of the Office of Capital Project Development
- Les Rubstello, City of Woodinville Councilmember
- Vicky Clarke, Eastside Greenway Alliance
- Ryan McIrvin, City of Renton Councilmember
- Reagan Dunn, King County Councilmember
- Jessica Forsythe, City of Redmond Councilmember
- David Hoffman, Puget Sound Energy, Local Government Affairs & Public Policy Manager
- John Stokes, City of Bellevue Councilmember
- Tom Teigen, Snohomish County Parks Director
- Christie True, King County Director of Natural Resources and Parks (representing Dow Constantine, King County Executive)

Eastrail stakeholder:

- Eastrail property owners
- Cities: Bellevue and Renton
- Anchor institutions: Bellevue School District, Renton School District, and PNWGP

RFI Project Team:

- City of Kirkland
    - Kimberly Scrivner, Transportation Planner
    - Donna Gaw, Information Systems Security Officer
    - Xiaoning Jiang, Resilience & Technology Officer
- City of Redmond

    - Jeff Aken, Park Planning Manager
    - Keith Laycock, TIS Infrastructure & Operations Manager
- Sound Transit
    - Ariel Taylor, Government & Community Relations Officer
    - Andrea Tull, Senior Project Manager
- City of Woodinville
    - Diana Hart, Intergovernmental Affairs Coordinator
- King County
    - Darryl Hunt, KCIT, I-Net Business Manager
    - David St John, DNRP, Government Relations Administrator
    - Tera Rose, King County Council, Principal Legislative Analyst
    - Dominic Palo/Bryan Johnson, DES, Contract Specialist III

ctc technology & energy

engineering & business consulting

Eastrail Corridor
Fiber and Conduit Feasibility Analysis

Prepared for Eastrail Corridor Stakeholders
July 2019

Columbia Telecommunications Corporation

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1 Executive Summary

The development of Eastrail (formerly called the Eastside Rail Corridor Trail) on a 42-mile railroad easement running from Renton into Snohomish County will provide the greater Puget Sound region with invaluable new recreational and transportation infrastructure. The Corridor extends through Woodinville, Kirkland, Redmond, Bellevue, Renton, and unincorporated parts of Snohomish and King counties. Within the borders of King County, the easement is owned by five entities—King County; the cities of Kirkland, Redmond, and Woodinville; and Sound Transit (collectively, the Owners).

The Eastrail development process—which includes infrastructure projects for bridges, trails, and street connections—also presents an opportunity to examine whether to create a new communications use within Eastrail. Once installed, new fiber optic and conduit infrastructure along the Corridor could potentially serve a range of current and future municipal, county, and other public sector, business, and nonprofit needs. Many of these potential uses, which are described below, were identified by a group of public sector entities informally known as the Eastrail Corridor Stakeholders[1] (Stakeholders). As a first step, these Stakeholders sought to explore whether to build fiber and conduit along 28 miles of the Corridor, from Renton to Woodinville.

The Owners and other Stakeholders involved in this effort have successfully built dark fiber and leveraged fiber for government, research, education, and other public purposes over the course of two decades. They have developed highly successful models and saved their communities enormous amounts of money with respect to services they would have had to buy from private providers. Their current strategy of seeking to add to fiber assets—where it is prudent and cost-effective to do so—stems from the Stakeholders' experience and knowledge of current and potential future needs, which may include expanding public sector network access, developing smart communities infrastructure, increasing resiliency and redundancy for public safety, and increasing internet access and applications for all citizens. The Stakeholders see value in installing fiber to support such uses; there are early indications that this fiber may have value to private providers, as well.

King County and the City of Kirkland, as co-leads of the Stakeholders, decided that the City of Kirkland should issue the request for proposals (RFP) that resulted in the engagement of CTC

[1] The entities participating in this feasibility study are King County; the cities of Bellevue, Kirkland, Redmond, and Renton; the Renton School District, Bellevue School District 405, and Lake Washington School District; and Pacific Northwest Gigapop (PWNGP). These entities refer to themselves informally as Eastrail Corridor Stakeholders. Formally, this study was conducted by CTC under a contract with the City of Kirkland.

Technology & Energy (CTC) to study the feasibility of constructing the fiber and conduit. The Stakeholders sought design scenarios for such a network, the costs of implementing those designs, annual budgets required to cover construction and operating costs, and an evaluation of governance options by one or more of the Stakeholders or other public entities. As part of its due diligence, CTC met with the Stakeholders several times and reviewed Eastrail documents and development plans to help inform the results of this report.

This report presents:

- Stakeholder-identified use cases for the development of fiber along Eastrail
- Four design scenarios for a fiber and conduit network along the Corridor
- Cost estimates for building each scenario if the five corridor Owners (Owners) decide to build, own, and operate the network themselves on behalf of all Stakeholders
- A financial analysis showing what revenue or public budget allocations would be required to cover debt service and operations and maintenance expenses for each scenario if the Stakeholders decide to proceed
- Three deployment models—an all-owners deployment; a joint public-private (or public-nonprofit) deployment; and a private deployment following an RFP process—documenting the pros and cons of each model
- Five governance options, together with a summary of the pros and cons of each governance option
- Several recommendations and suggested next steps, including that the Stakeholders make key decisions and develop an RFP quickly (i.e., within two months of accepting this report) so as to allow coordination with other planned Corridor improvements

The co-leads, together with CTC, also performed outreach to private providers. In preliminary discussions, these providers saw value in having access to fiber and conduit along the Corridor and saw potential opportunities if such a network were to be constructed.

1.1 The Fiber and Conduit Network Would Be Constructed Along Part of the Main Eastrail Corridor and Along the Redmond Spur

Within the borders of King County, the easement comprises two distinct sections: the Main Corridor (extending from Renton to the Snohomish border) and the Redmond Spur (a lateral to Redmond extending off of the Main Corridor).

This study examined a 28-mile stretch of Eastrail from Mile 5 to Mile 26 along the Main Corridor and Mile 0 to Mile 7 along the Redmond Spur. A map of the Corridor is shown in Figure 1 (below).

Figure 1: Eastrail Corridor[2]

[2] Map source: King County Master Plan (https://kingcounty.gov/services/parks-recreation/parks/trails/regional-trails/popular-trails/eastside-rail-corridor.aspx)

1.2 The Stakeholders Identified Several Potential Use Cases

While CTC did not perform a market analysis as part of this study, the Corridor cuts through fast-growing areas on the eastern shore of Lake Washington. The Stakeholders—who conceived of the idea of building the conduit and fiber infrastructure—have identified several potential use cases for this infrastructure. These include:

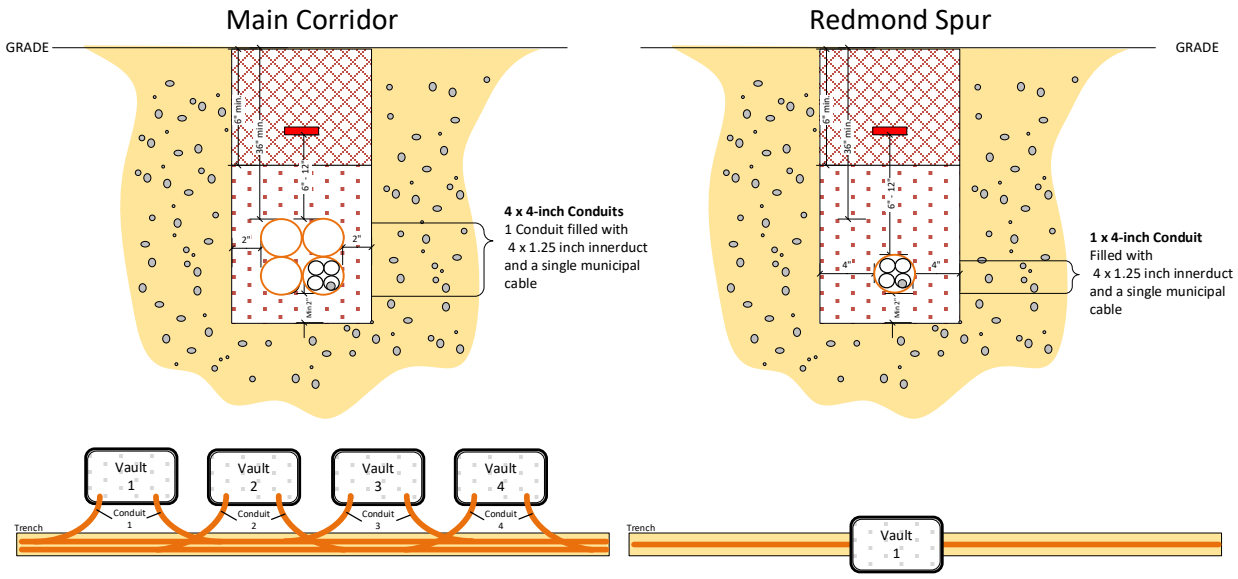
- **Eastrail** – Using fiber infrastructure to support planned recreation and transportation uses and trail enhancements, including wireless internet access, smart lighting, smart parks, surveillance, safety, and wildlife video streaming
- **Cost avoidance** – Developing communications infrastructure for stakeholders to avoid costs for commercial services
- **Stakeholder operations** – Supporting the IT needs for Stakeholder facilities
- **Network resiliency** – Creating redundant capabilities for public networks such as King County's KCWAN, I-Net, and C3; and allowing interconnections to other PEG networks (C3, WA State, NoaNet, PSAPs, Norcom, RCECC, and police and fire departments)
- **Regional connectivity** – Using Corridor fiber as middle-mile and long-haul infrastructure connecting communities, rural areas, and healthcare and education facilities to services in each community along the Corridor
- **Smart communities** – Using fiber to support smart community efforts (e.g., smart transportation, smart lighting, Internet of Things (IoT), surveillance, safety, smart buildings)
- **Broadband availability** – Leveraging the fiber to help narrow the digital divide
- **Economic development** –Using high-capacity fiber to attract companies to King County's south, east, and north regions, thus improving the business climate and quality of life
- **Revenue generation**– Leasing spare fiber to generate new revenue streams to support other government services
- **Other uses** – Using fiber to support, for example, small cell backhaul for future 5G opportunities

1.3 Constructing Fiber and Conduit in the Corridor Will Cost an Estimated $6.64 Million to $12.64 Million

CTC prepared four design scenarios for a fiber and conduit network along the Corridor—a baseline design and three alternatives. The alternatives show how the cost would be affected by the design decision, allowing the Stakeholders to weigh the costs and benefits of each. The Stakeholders' selection of a deployment model may also influence the best design scenario for the project. The scenarios and cost estimates are summarized below and detailed in Section 2.

Scenario A1 – Baseline: This design consists of four 4-inch conduits along the Main Corridor and one 4-inch conduit along the Redmond Spur. In one conduit, four 1.25-inch innerducts are installed. In one innerduct a 288-strand fiber cable is pulled for municipal purposes. At each access point four flush-mounted vaults are installed. This design approach conforms with the standards used by the respective Owners and considers the need for the new infrastructure to have minimal aesthetic impacts and to coexist with existing utilities. This design has the capacity to hold up to 15 additional fiber optic cables along the Main Corridor, with cable sizes up to 864 strands. This scenario is shown in Figure 2. The estimated cost for Scenario A1 ranges from $9.12 million to $10.94 million.

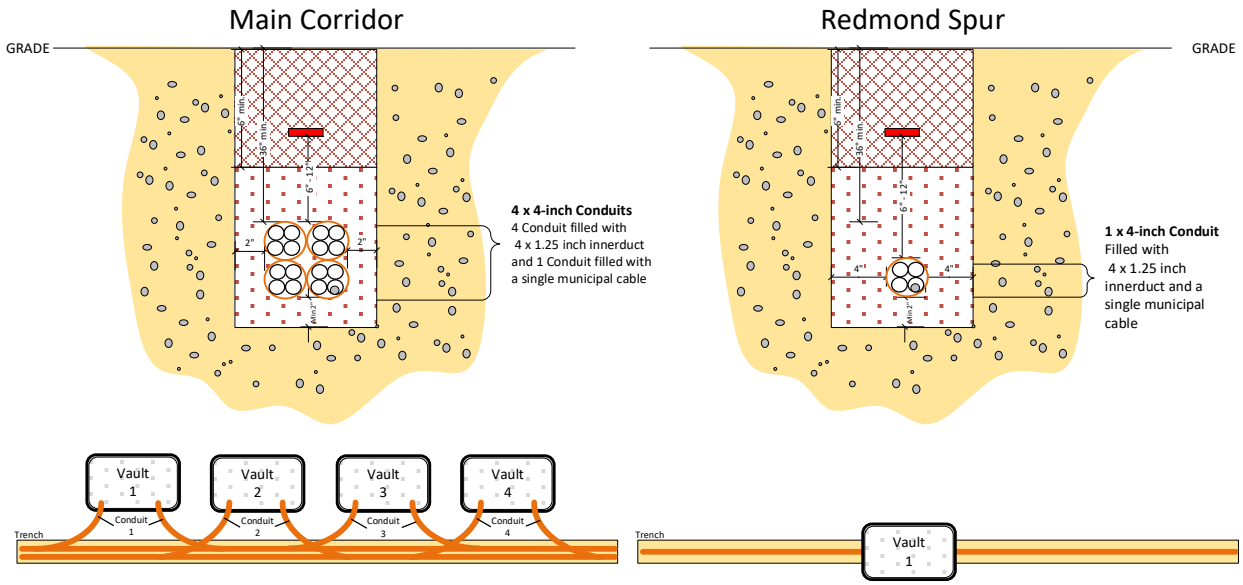
Figure 2: Scenario A1 – Baseline



Scenario A2 – All Conduit Filled with Innerduct: This design consists of four 4-inch conduits along the Main Corridor and one 4-inch conduit in the Redmond Spur. In each conduit four 1.25-inch innerducts are installed. In one innerduct a 288-strand fiber cable is pulled. At each access point

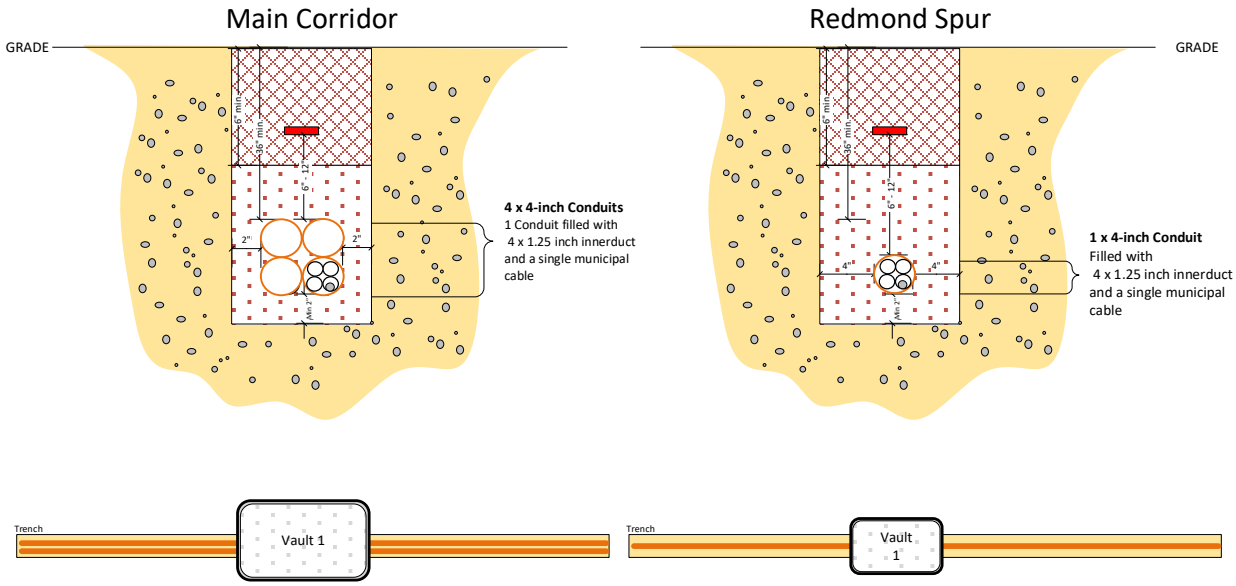
four flush-mounted vaults are installed. This design also conforms with the standards used by the respective Owners and considers the need to minimize aesthetic impacts and to coexist with existing utilities. This design has the same capacity as the baseline scenario. This scenario is shown in Figure 3. The estimated cost for Scenario A2 ranges from $10.53 million to $12.64 million.

Figure 3: Scenario A2 – All Conduit Filled with Innerduct



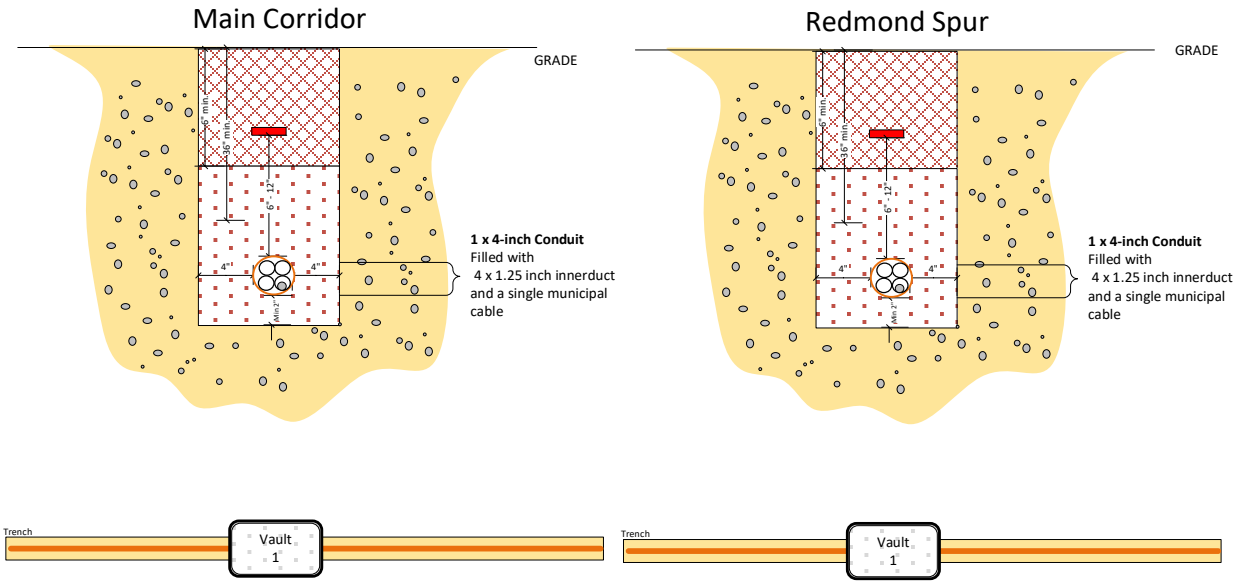
Scenario B1 – Shared Asset Locations: This design consists of four 4-inch conduits along the Main Corridor and one 4-inch conduit in the Redmond Spur. In one conduit one 1.25-inch innerduct is installed. In one innerduct a 288-strand fiber cable is pulled. At each access point a single flush-mounted vault is installed. This design also conforms with the standards used by the respective Owners and considers the need to minimize aesthetic impact and to coexist with existing utilities. This design has the same capacity as the baseline scenario. This scenario is shown in Figure 4. The estimated cost for Scenario B1 ranges from $8.61 million to $10.34 million.

Figure 4: Scenario B1 – Shared Access Locations



Scenario C1 – Single Conduit Along Main Corridor: This design consists of installing one 4-inch conduit along the Main Corridor and one 4-inch conduit in the Redmond Spur. In each conduit four 1.25-inch innerducts are installed. In one innerduct a 288-strand fiber cable is pulled. At each access point a single flush-mounted vault is installed. This design has a smaller capacity than the standard designs used by King County and the City of Kirkland, but it reduces costs by comparison. The design considers the need to minimize aesthetic impact and coexist with existing utilities. This design has a capacity for three additional fiber optic cables along the Main Corridor, with cable sizes of up to 864 strands. This scenario is shown in Figure 5. The estimated cost for Scenario A1 ranges from $6.64 million to $7.97 million.

Figure 5: Scenario C1 – Single Conduit Along Main Corridor



1.4 Operations and Maintenance Would Cost an Estimated $75,000 per Year, Not Including Principal and Interest

The estimated total cost of operations and maintenance (O&M), excluding principal and interest (P&I), for year 2[3] of each scenario is shown in Table 1. As seen in the table we have included a depreciation reserve to fund ongoing replacements of fiber, as well as test equipment and management software. In Section 3 we present the full range of assumptions underlying this cost estimate. Please note that the O&M costs do not include administrative costs. The administrative costs will depend upon the deployment model and governance model selected.

Please note that the statements in this section about required revenues are not forecasted revenues. Rather, they are statements about what net revenues are required to offset the fiber and conduit ownership costs. The required revenues in each scenario could come from a range of sources, including internal budgets, dark fiber leasing, or conduit leasing.

[3] Year 2 is the first full year of operation. Year 1 is construction and initiation of operations.

Table 1: Fiber Infrastructure Annual Cost Summary in Year 2

	Scenario							
	A1		A2		B1		C1	
	Conduit – Fiber and innerduct in one		Conduit – Fiber in one and innerduct in all		Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)		Single Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)	
	Low	High	Low	High	Low	High	Low	High
P&I (20 years at 6 percent)	$642,290	$769,630	$741,000	$888,100	$606,960	$727,250	$469,430	$562,210
Operating Expenses	59,100	59,100	59,100	59,100	59,100	59,100	59,100	59,100
Depreciation Reserve	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Required Revenues	$717,390	$844,730	$816,100	$963,200	$682,060	$802,350	$544,530	$637,310
Required Revenues Without P&I	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100

1.5 Dark Fiber Lease Revenue Could Offset Operations Costs

This section explains what magnitude of leasing revenue would be required to cover the costs presented above.[4] It is important to note that just making fiber available for leasing does not create demand, and that when more fiber is made available for leasing, the monthly leasing prices per strand will be driven down.

Each construction scenario includes a total of 288 fiber strands over 27.96 route miles, netting a total of 8,052 strand-miles of fiber.[5] In Table 2 we show the total strand-miles of monthly leases required to cover the estimated P&I payment and O&M expenses. In Table 3 we show the percentage of available fiber strand-miles required to be leased to cover the estimated P&I payment and O&M expenses.

The pricing and structures of fiber leases vary based on region, population density, volume, alternative solutions, availability of dark fiber strands, and other factors. Usually, the more rural the location, the lower the prices. Also, as more strands are leased by a single entity (volume),

[4] CTC did not perform a market assessment to determine potential demand for leased fiber; such an assessment was not in the scope of this study.

[5] Please note that the three 4-inch conduit that are likely to be available for leasing in the baseline scenario, if fully populated with innerduct, could support 12 significant fiber bundles larger than a 288-count strand. In other words, the design builds potential capacity for a scenario in which more than 96,000 strand-miles are available (assuming relatively small bundles of 288 fibers each).

prices tend to fall. For this analysis we have used three price levels: a low price of $50 per month per strand mile, a mid-range price of $100 per month per strand mile, and a high price of $250 per month per strand mile.

Table 2: Required Strand-Miles of Leases to Cover Estimated P&I and O&M Expenses

Lease Rate	Scenario							
	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	239	282	272	321	227	267	182	212
Medium	598	704	680	803	568	669	454	531
Low	1,196	1,408	1,360	1,605	1,137	1,337	908	1,062

Table 3: Percentage of Available Strand-Miles to Lease to Cover Estimated O&M Expenses

Lease Rate	Scenario							
	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	2.97%	3.50%	3.38%	3.99%	2.82%	3.32%	2.26%	2.63%
Medium	7.43%	8.74%	8.45%	9.97%	7.05%	8.31%	5.64%	6.59%
Low	14.85%	17.49%	16.89%	19.93%	14.12%	16.60%	11.28%	13.19%

1.6 A Range of Deployment Models and Governance Structures Are Feasible—Each with Its Own Pros and Cons

Given a decision to move forward, one of the first steps the Stakeholders must take is to decide on a deployment model (that is, what entities will undertake construction) and subsequently a governance structure (that is, what entities will oversee the network) to guide the deployment and development of the asset.

CTC identified three potential deployment models:

1. The Owners (through one of the governance entities listed below) implement, own, and operate the infrastructure

2. The Owners (through one of the governance entities listed below) and a private or nonprofit entity implement the infrastructure in a joint-build/trench approach to defray costs

3. A private provider implements, owns, and operates the infrastructure following a request for information (RFI)/RFP process that would require the private entity to provide fiber and/or conduit for public-sector needs

The goals of any deployment would be to provide fiber for the use cases identified by the Stakeholders and described above. These include supporting and providing redundancy for municipal and county operations and applications, supporting business growth by providing access to more fiber, and potentially creating dark fiber lease revenue for the Owners.

A comparison of the deployment models is presented in Table 4.

Table 4: Deployment Model Comparison Matrix

Deployment Model	Control (Governance & Use)	Upfront Cost	Ongoing Cost	Revenue Opportunity	Financial Risk	Ability to Execute
Owners implement, own, and operate	Complete	High	Modest	High	Moderate	Moderate to High
Joint public-private or public-nonprofit build	Limited	Modest	Modest	Limited	Low	High
Private entity implements, owns, and operates	Limited	Low to None	None	Moderate	Low	High

CTC also evaluated the pros and cons of five potential governance entities for the network, as outlined by the Stakeholders: the Community Connectivity Consortium (C3); the Owners; King County (as the largest stakeholder); the Stakeholders who sought this feasibility study; and a third party.

In selecting a governance approach, the primary question for the Owners is this: Which approach meets your overall objectives with the lowest risk and the lowest cost? As a secondary consideration, it is likely prudent to ensure that Owners have control of the governance board, because only the Owners ultimately have risk and liability.

The deployment models and the governance structures' pros and cons are presented in detail in Section 4.

1.7 Recommendations and Next Steps

In light of our research and analysis, we recommend that the Owners take the following steps within two months of the Stakeholders accepting this report. We note that given the tight time constraints, some steps will be taken in parallel. Initial steps to get started on a public construction should be taken, as should steps to issue an RFP for a private solution. Taking these initial steps would not bind the Owners to any particular solution, but rather would allow all options to be explored.

Phase 1

1. **King County, serving as the lead agency, in collaboration with other Owners and Stakeholders, will carry out the immediate recommendations** so that the Owners can proceed into the next phase without delay.

2. **Identify potential initial funding sources.** The initial funding is to cover the RFI/RFP and the detailed engineering described below. The estimated cost for the RFI/RFP development and response analysis is $40,000. The estimated cost for the detailed engineering is $360,000.

3. **Engage with City of Renton, Snohomish County and Pacific Northwest Gigapop (PNWGP) to gauge interest in increasing the fiber route length**, which would perhaps increase the economies of scale (i.e., reduce build costs) and increase the project's potential overall value.

4. **Initiate the RFI/RFP process to gauge interest from private and non-profit providers.** The Owners can then assess proposals that come in and potentially refine them through additional submittals in a kind of auction process, subject to a legal review of applicable procurement laws. Even if the Owners decide that a public deployment is the preferred approach, this process would provide valuable market insights and—if an attractive proposal emerges—might hold the potential to meet Owner and Stakeholder needs while both avoiding a large capital expense and generating a revenue stream. This option would not bind the Owners; if the Owners do not like the result, they can proceed with a public deployment. The estimated cost for the RFI/RFP development and response analysis is $40,000.

   In the RFI/RFP, the Owners should establish as minimum requirements:

- Designation of at least one conduit and innerduct for Owner/Stakeholder ownership, restriction-free
- Ownership of designated fiber strands restriction-free
- One-time payment for respondent right to build in Corridor
- Annual payment for respondent right to operate in Corridor
- Operate as an Open Access Transport system which enables any service provider access to fiber and conduit to supply services

5. **Develop utility placement policies**. The new fiber infrastructure could be placed near existing utilities in a designated part of the Corridor or placed further away to limit conflicts with other utilities, depending on the policies developed.

6. **Ensure that the project aligns with Eastrail development projects.** A number of capital projects are planned along the Corridor, and it will be important to coordinate the timeline of trenching and other work with these already-planned efforts.

Phase 2

1. **Engage a firm to complete the detailed engineering** for the preferred build scenario. Conducting this task in parallel with the RFI/RFP will help ensure that the Owners maintain the schedule for either deployment option. The estimated cost for the detailed engineering is $360,000. Given the timing requirements, the detailed engineering may require initiation in Phase 1.

2. **Identify the preferred deployment model** based upon the results of the above RFI/RFP and the detailed engineering.

3. **Determine the preferred governance approach**, seek a legal opinion about the viability of the preferred approach, and obtain direction and support for the project and the governance approach from the Regional Advisory Council (RAC).[6] We also recommend that regardless of which governance option the Owners choose, the Stakeholders retain a role, such as through an advisory board.

[6] The RAC represents the Stakeholders' leadership on the Eastrail projects.

4. **Identify potential deployment funding sources.** If no grant options exist, funding will likely need to come from the budgets of the Owners through free cash or the issuance of general obligation bonds or other debt.

The above represent the most critical immediate steps. In the three- to six-month timeframe following acceptance of this study, the Owners should plan to move to a Phase 3, as follows.

Phase 3

1. Finalize the selection of the deployment model based on the results of the RFI/RFP and the detailed design.
2. Refine the preferred governance approach based on the selected deployment model.
3. Identify the lead for the next implementation phase.

2 Conceptual Design and Cost Estimate for Fiber and Conduit Infrastructure

CTC prepared a high-level network design for the placement of fiber and conduit infrastructure along 28 miles of Eastrail: Mile 5 to Mile 26 along the Main Corridor and Mile 0 to Mile 7 along the Redmond Spur. Based on the high-level design, we then developed a cost estimate for the outside plant (OSP) fiber construction. The costs are presented as a range, with the likely costs representing the low end, and the likely costs plus a 20 percent contingency representing the high end. We also explored three variations to the "baseline" conceptual design and documented how those changes would affect the cost estimate.

These cost estimates provide data relevant to assessing the financial viability of network deployment, and to developing models for the network deployment. The estimates also enable financial modeling to determine the approximate revenue levels necessary for the Stakeholders to service any debt incurred in building the network.

2.1 High-Level Technical Design

We developed a conceptual, high-level design that reflects the Stakeholders' requirements for capacity and access while being consistent with existing municipal telecommunications infrastructure placement along the Corridor.

Eastrail presents a unique construction opportunity; it is not public right-of-way, but rather an easement controlled by the municipalities[7] that consists mostly of unpaved walking trails and untouched green space. Due to the prevalence of unpaved surfaces, the Corridor presents an ideal opportunity for cost-effective fiber construction to occur ahead of the municipalities' planned improvements (including paved walking trails, pedestrian bridges, light rail transit access, and landscaped scenery throughout).

2.1.1 Construction Methodologies

Because the Corridor consists mostly of unpaved surfaces, the design assumes that the primary construction method would be underground construction using open trench methods. With open trench methods, construction costs are low because restoration is easy to achieve. But the Corridor also includes numerous road crossings, bridge crossings, and environmentally sensitive areas. In these areas, trenching may not be feasible. In the case of road crossings, the design assumes directional boring will be required to mitigate hard surface restoration costs or minimize disturbance to environmentally sensitive areas.

[7] The Stakeholders counsel should determine the nature of the easement and the Owners' rights to use it.

For each of the existing bridge crossings along the Corridor, the design assumes that a new attachment to the bridge would be required. The bridges along the Corridor vary in size and function; some bypass minor roads and streams and require attachments of 100 feet or less, while others like the Wilburton Trestle in Bellevue extend 975 feet and reach heights of more than 100 feet above grade. It may not be feasible to attach to every bridge along the Corridor for reasons relating to aesthetic requirements, historical impact, or practicality.

Some of the crossings could be traversed using directional boring methodology instead of a new attachment. The bridge design plans for the Totem Lake Connector, which is scheduled to be built in 2019, requires directional boing to be used in place of direct attachment. During the detailed engineering design process an analysis of each bridge crossing in the Corridor would be undertaken to identify the optimal method.

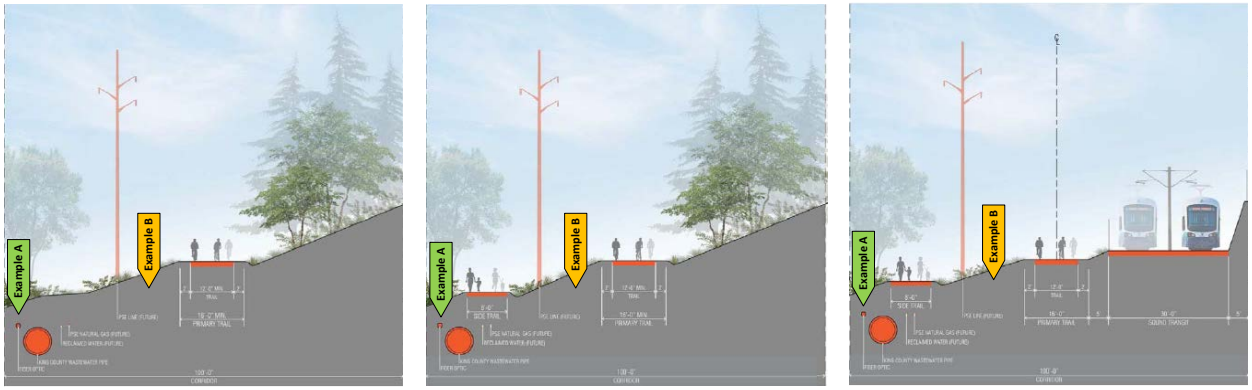
The design assumes the fiber optic infrastructure will be routed around environmentally sensitive areas where possible. Where these areas cannot be avoided, the design assumes directional boring would be used. From CTC's previous environmental permitting experience,[8] directional boring methodology greatly reduces impact to wetlands and other environmentally sensitive areas by eliminating surface-level disturbance. CTC expects that environmental permitting would still be required with directional boring and has accounted for these permitting costs in the cost estimate. The overall environmental impact of the fiber infrastructure should be minimal relative to other Corridor improvements that are planned, such as paved trails and light rail tracks.

With regard to the current and future placement of the light rail tracks in certain areas of the Corridor, the fiber design anticipates placing infrastructure on the opposite side of the easement to minimize possible conflicts. Depending on the policies determined for placement of utilities in the Corridor, the new fiber infrastructure could be placed near existing utilities in a designated part of the Corridor or placed further away to limit conflicts with other utilities. Having polices in place ahead of the detailed design process will mitigate future conflicts and reduce the likelihood (and expense) of having to relocate the fiber.

There is precedent for fiber infrastructure within the Corridor. As part of its acquisition of Starcom, Zayo acquired fiber extending from Renton into Snohomish County. This fiber was installed in 1995 and may be at the end of its useful life; it could potentially be abandoned by Zayo if the company is able access the new fiber assets contemplated here. Figure 6 depicts several examples of placement of the fiber infrastructure within the Corridor.

[8] Reviewing and determining federal and state permitting requirements are part of the next steps of a detailed design.

Figure 6: Example Placement of Fiber Infrastructure Along the Corridor



2.1.2 Design Standards

The design along the Main Corridor calls for the placement of four 4-inch conduits, each filled with four 1.25-inch innerducts. This matches the design standards implemented by both King County and Kirkland, the primary owners of the property running along the Main Corridor and is consistent with their previous work in the Corridor.

The specified conduit configuration provides the capacity for 12 innerducts, each with the ability to hold cables containing fiber counts of 288, 432, 864, and greater. This provides sufficient capacity for municipal needs, which is currently estimated to be one conduit and multiple innerduct and allows for ample use opportunities by others.

The design along the Redmond Spur calls for the placement of a single 4-inch conduit filled with four 1.25 innerducts. This matches what the City of Redmond has already placed along completed portions of the spur.

The proposed conduit configuration along the Main Corridor and Redmond Spur are illustrated in Figure 7 and Figure 8 respectively.

Figure 7: Proposed Conduit Configuration Along Main Corridor

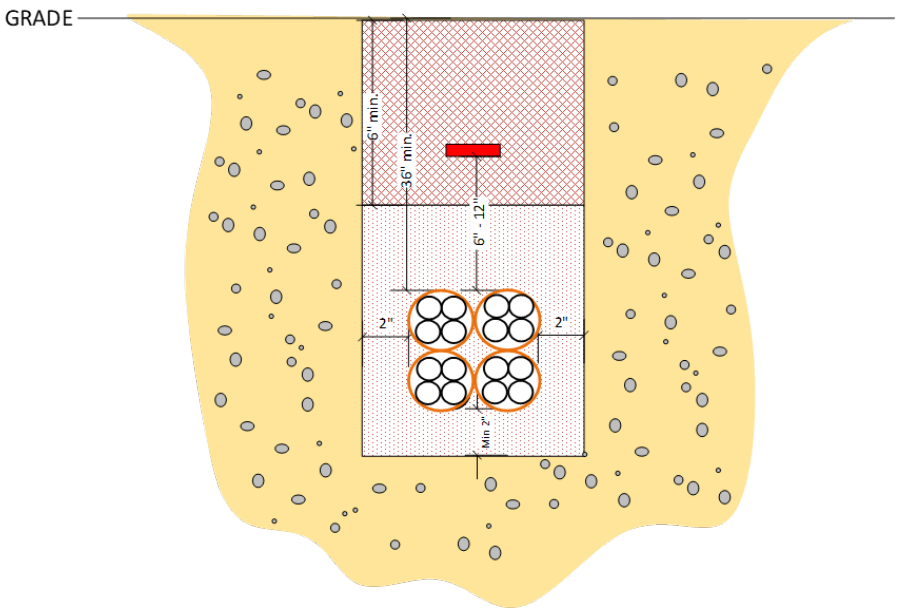
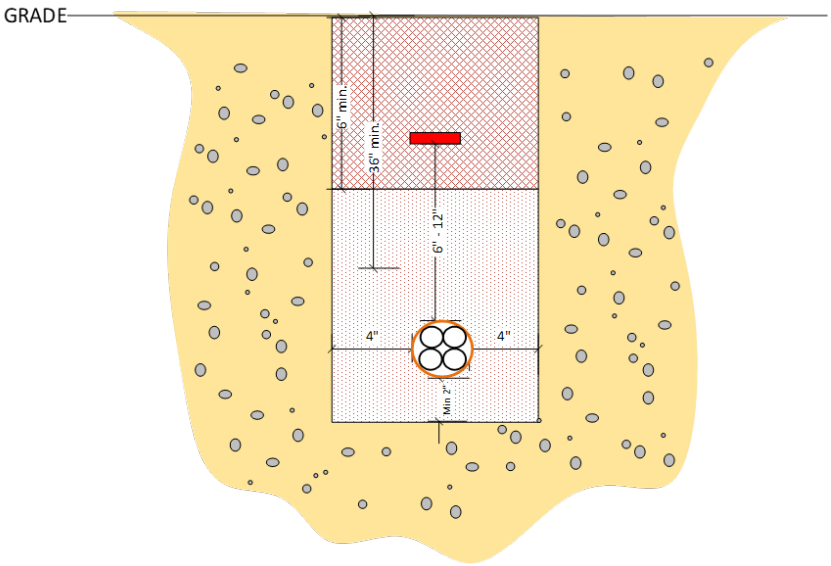


Figure 8: Proposed Conduit Configuration Along Redmond Spur

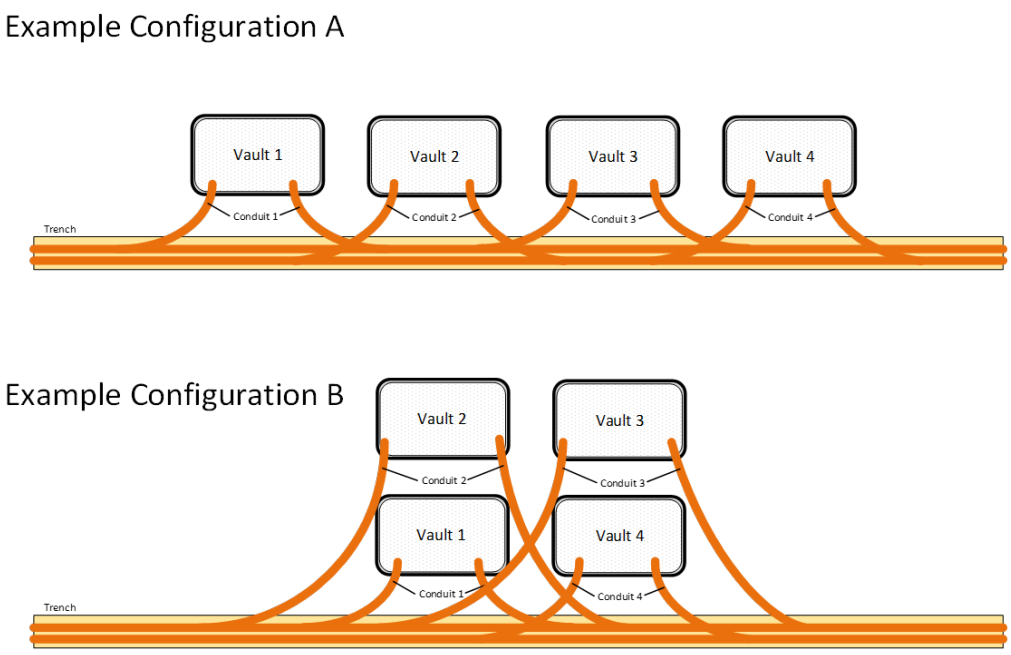


Access locations are required along designed route for maintenance purposes as well as to provide interconnection points to exiting municipal and potential lessee networks. The design proposes access locations to be placed at each road crossing where public rights-of-way intersect

the Corridor, as these crossings are most likely to be where interconnections to existing fiber infrastructure would occur. Additional access locations will be placed at approximately every 1,000 feet along the Corridor to facilitate fiber pulling and other maintenance activities. Access locations need to be large enough to accommodate fiber optic splice enclosures and fiber slack coils. The design anticipates handholes will be either 24”x36”x36 (HxWxD) at locations designated for maintenance only or 36”x48”x48” (HxWxD) at locations with potential to be interconnection points.

Along the Main Corridor where four conduits would be placed, the design calls for four sperate handholes to be placed at each access location. This allows for physical separation between each conduit. This separation could be appealing to potential lessees because separation minimizes the potential for fiber damage during routine maintenance. The four handholes could be placed in various configurations to minimize impact to the aesthetics of the Corridor. Figure 9 depicts a few example configurations for handhole placement at each access location.

Figure 9: Sample Handhole Configurations Along Main Corridor



Along the Redmond Spur,[9] where the design calls for placement of a single conduit, only one handhole would be placed per access location.

2.2 Outside Plant Construction Cost Estimate

Based on the high-level design, we developed four cost scenarios so the Stakeholders can see a sample range of deployment models and the associated costs. All four share a common foundation described in the previous section. However, they vary in terms of deployment configuration details such as the quantity of innerducts and number of handholes placed at each access location.

For each of the scenarios, we developed cost estimates for both the Main Corridor and the Redmond Spur. We provided estimates as a range; the low estimate represents the likely costs, and the high estimate represents a 20 percent contingency added to the low estimate.

The project's cost will be determined to a large extent by which deployment model the Stakeholders select.

2.2.1 Scenario A1 (Baseline Scenario)

Scenario A1 is referred to as the Baseline Scenario for purposes of this study. It represents a logical "middle-ground" approach to deployment of the fiber infrastructure. This design variation meets the Stakeholders' design requirements without the need for further excavation work to increase capacity at a later date. This design variation forgoes placement of additional innerduct and fiber cable beyond the initial municipal needs, thus reducing the initial capital investment required. Additional innerduct and fiber can be placed in the future, driven by demand, without requiring new excavation work along the trail.

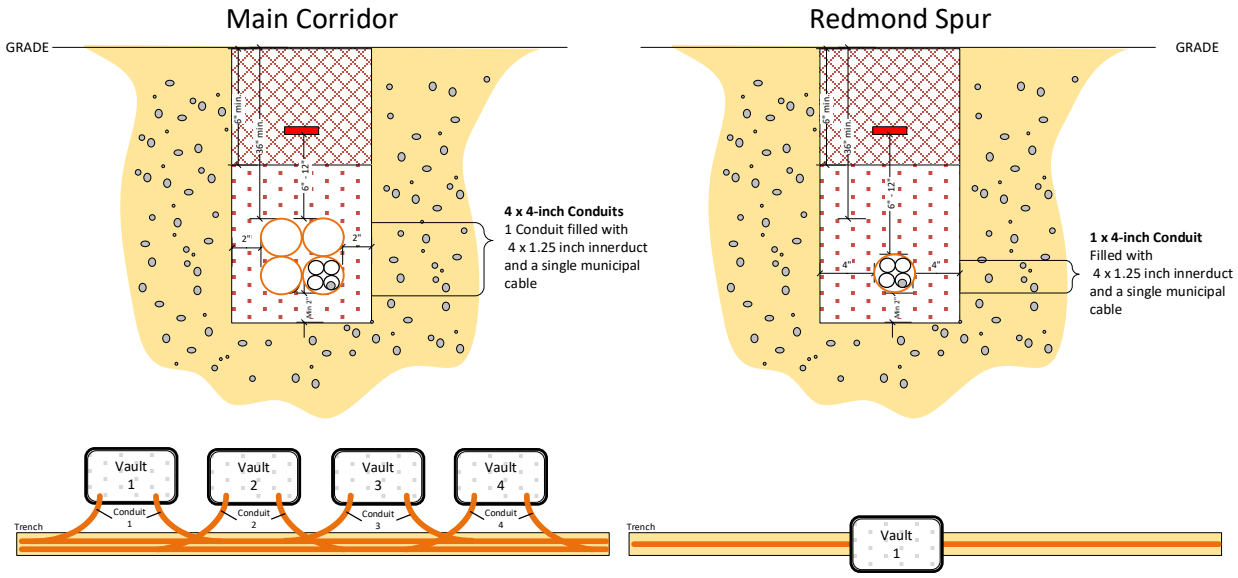
In this scenario, four 4-inch conduits would be constructed along the Main Corridor. One of these conduits would be filled with four 1.25-inch innerducts and one of those innerducts would be filled with a single 288-count fiber cable designated for municipal purposes. The remaining three conduits would be left empty.

Four separate handholes would be placed per access location, with one handhole being designated for each conduit in order to maximize physical separation between potential occupants.

[9] Based on the documents provided to CTC, more than half of the Redmond Spur is in King County and has not been built; the other part of the spur has limited fiber deployment.

For the Redmond Spur, a single 4-inch conduit would be constructed and filled with four 1.25-inch innerducts and one 288-count fiber cable. The single 4-inch conduit matches Redmond's design standards and is consistent with the City's previous work in the Corridor. One handhole will be provided per access location. An illustration of this scenario is depicted in Figure 10.

Figure 10: Scenario A1 Design Configuration



The total estimated cost for Scenario A1 ranges from $9.12 million to $10.94 million. A breakdown of the individual cost components is provided in Table 5.

Table 5: Outside Plant Construction Cost Breakdown for Scenario A1

Cost Component	Main Corridor	Main Corridor (+20% Contingency)	Redmond Spur	Redmond Spur (+20% Contingency)	Total Estimated Cost	Total Estimated Cost (+20% Contingency)
Engineering	$259,000	$311,000	$88,000	$105,000	$347,000	$416,000
Project Management / Quality Assurance	145,000	174,000	49,000	59,000	194,000	233,000
General Outside Plant Construction	6,796,000	8,155,000	1,435,000	1,722,000	8,231,000	9,877,000
Railroad, Bridge, and Interstate Crossings	213,000	256,000	56,000	67,000	269,000	323,000
Outside Plant Fiber Splicing	33,000	40,000	22,000	26,000	55,000	66,000
Fiber Termination / Testing	18,000	22,000	6,000	7,000	24,000	29,000
Fiber Construction Subtotals:	$7,464,000	$8,958,000	$1,656,000	$1,986,000	$9,120,000	$10,944,000

2.2.2 Scenario A2 – All Conduit Filled with Innerducts

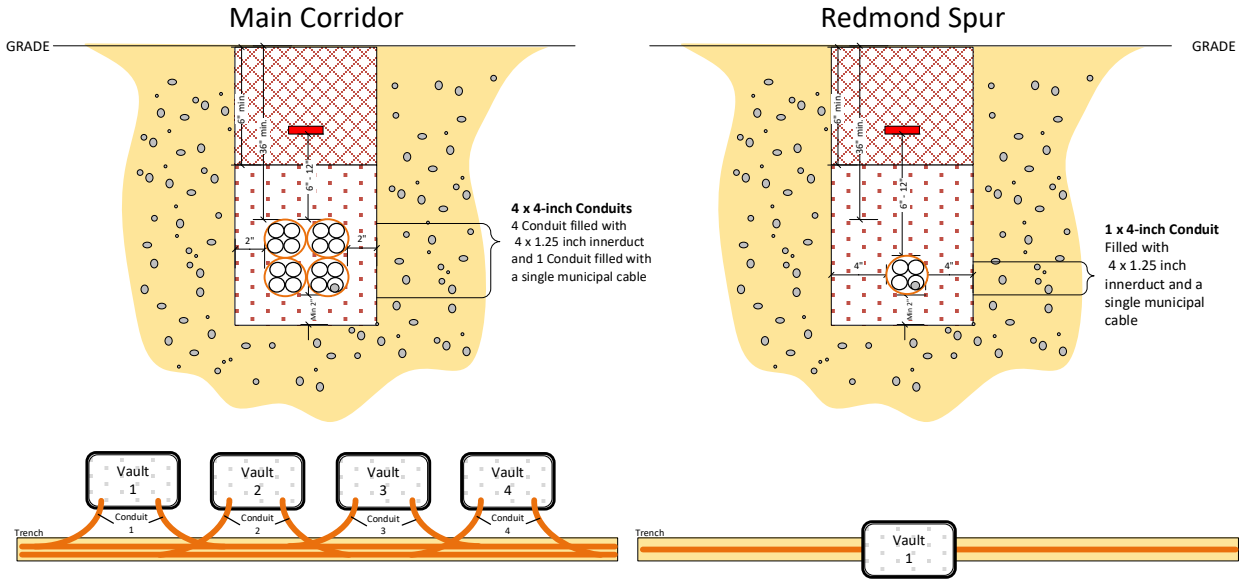
Scenario A2 is the same as the Baseline Scenario with the exception that all four conduits would be filled with innerducts from the outset. This scenario has an increased capital cost but maximizes the network's capacity without requiring later installation of innerduct.

In this scenario, four 4-inch conduits would be constructed along the Main Corridor. Each conduit would be filled with four 1.25-inch innerducts and one of those innerducts would be filled with a single 288-count fiber cable designated for municipal purposes. The remaining three conduits and innerducts will be left empty.

Four separate handholes would be placed per access location, with one handhole being designated for each conduit.

The Redmond Spur would be unchanged from the Baseline Scenario. An illustration of this scenario is depicted in Figure 11.

Figure 11: Scenario A2 Design Configuration



The total estimated cost for Scenario A2 ranges from $10.53 million to $12.64 million. This represents an increase of $1.43 million to $1.70 million compared to Scenario A1. A breakdown of the individual cost components is provided in Table 6.

Table 6: Outside Plant Construction Cost Breakdown for Scenario A2

Cost Component	Main Corridor	Main Corridor (+20% Contingency)	Redmond Spur	Redmond Spur (+20% Contingency)	Total Estimated Cost	Total Estimated Cost (+20% Contingency)
Engineering	$259,000	$311,000	$88,000	$105,000	$347,000	$416,000
Project Management / Quality Assurance	145,000	174,000	49,000	59,000	194,000	233,000
General Outside Plant Construction	8,210,000	9,852,000	1,435,000	1,722,000	9,645,000	11,574,000
Railroad, Bridge, and Interstate Crossings	213,000	256,000	56,000	67,000	269,000	323,000
Outside Plant Fiber Splicing	33,000	40,000	22,000	26,000	55,000	66,000
Fiber Termination / Testing	18,000	22,000	6,000	7,000	24,000	29,000
Fiber Construction Subtotals:	$8,878,000	$10,655,000	$1,656,000	$1,986,000	$10,534,000	$12,641,000

2.2.3 Scenario B1 – Shared Access Locations

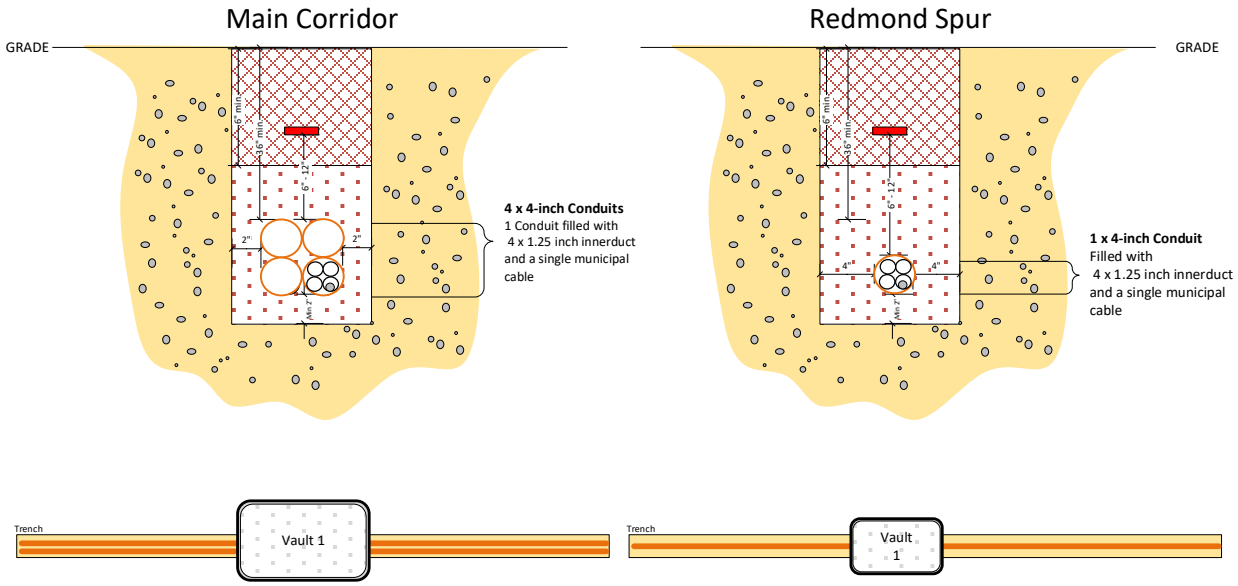
Scenario B1 is the same as the Baseline Scenario except that instead of placing four standard handholes at each location, a single larger handhole would be placed. This scenario has a slightly decreased initial capital cost but eliminates physical separation between the four conduits. This change may confer aesthetic benefits as it reduces the total number of handholes placed in the Corridor.

In this scenario, four 4-inch conduits would be constructed along the Main Corridor. One of these conduits would be filled with four 1.25-inch innerducts and one of those innerducts would be filled with a single 288-count fiber cable designated for municipal purposes. The remaining three conduits would be left empty.

A single larger handhole would be placed per access location, with the one handhole being designated for all four conduits.

The Redmond Spur would be unchanged from the Baseline Scenario. An illustration of this scenario is depicted in Figure 12.

Figure 12: Scenario B1 Design Configuration



The total estimated cost for Scenario B1 ranges from $8.61 million to $10.34 million. This represents a decrease of $510,000 to $600,000 compared to Scenario A1. A breakdown of the individual cost components is provided in Table 7.

Table 7: Outside Plant Construction Cost Breakdown for Scenario B1

Cost Component	Main Corridor	Main Corridor (+20% Contingency)	Redmond Spur	Redmond Spur (+20% Contingency)	Total Estimated Cost	Total Estimated Cost (+20% Contingency)
Engineering	$259,000	$311,000	$88,000	$105,000	$347,000	$416,000
Project Management / Quality Assurance	145,000	174,000	49,000	59,000	194,000	233,000
General Outside Plant Construction	6,290,000	7,548,000	1,435,000	1,722,000	7,725,000	9,270,000
Railroad, Bridge, and Interstate Crossings	213,000	256,000	56,000	67,000	269,000	323,000
Outside Plant Fiber Splicing	33,000	40,000	22,000	26,000	55,000	66,000
Fiber Termination / Testing	18,000	22,000	6,000	7,000	24,000	29,000
Fiber Construction Subtotals:	$6,958,000	$8,351,000	$1,656,000	$1,986,000	$8,614,000	$10,337,000

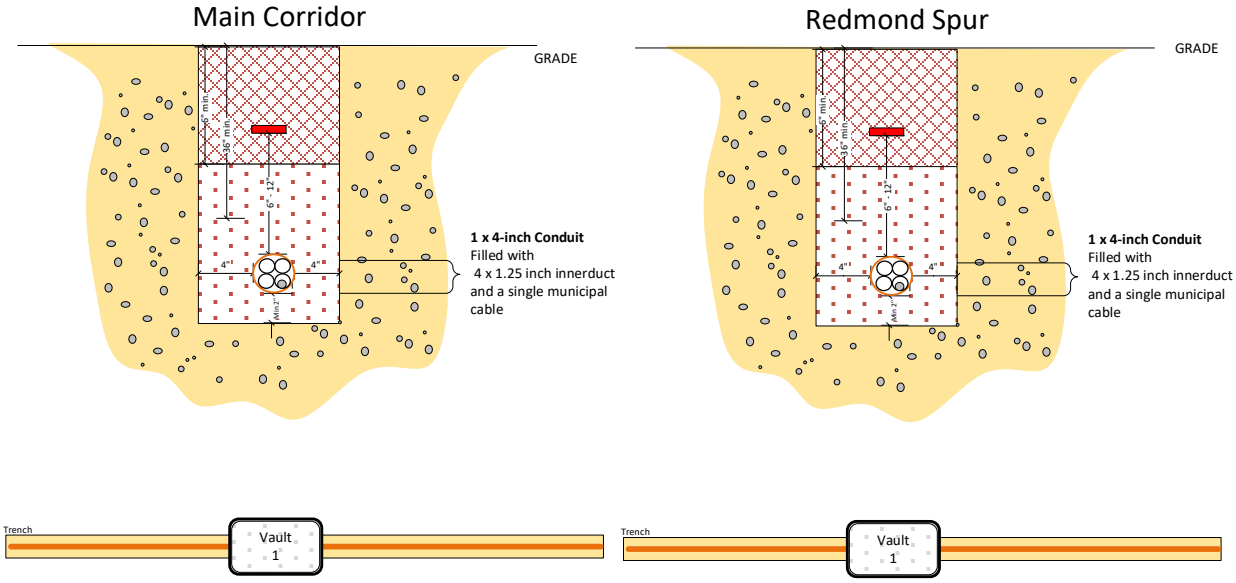
2.2.4 Scenario C1 – Single Conduit Along Main Corridor

Scenario C1 is the same as the Baseline Scenario except that instead of placing four conduits along the Main Corridor, a single conduit and handhole would be placed. This scenario has a significantly decreased initial capital cost but reduces capacity and potential lease revenues.

In this scenario, four 1-inch conduits would be constructed along the Main Corridor. The conduit would be filled with four 1.25-inch innerducts and one of those innerducts would be filled with a single 288-count fiber cable designated for municipal purposes. One handhole would be placed per access location.

The Redmond Spur would be unchanged from the Baseline Scenario. An illustration of this scenario is depicted in Figure 13.

Figure 13: Scenario C1 Design Configuration



The total estimated cost for Scenario C1 ranges from $6.64 million to $7.97 million. This represents a decrease of $2.48 million to $2.97 million from Scenario A1. A breakdown of the individual cost components is provided in Table 8.

Table 8: Outside Plant Construction Cost Breakdown for Scenario C1

Cost Component	Main Corridor	Main Corridor (+20% Contingency)	Redmond Spur	Redmond Spur (+20% Contingency)	Total Estimated Cost	Total Estimated Cost (+20% Contingency)
Engineering	$259,000	$311,000	$88,000	$105,000	$347,000	$416,000
Project Management / Quality Assurance	145,000	174,000	49,000	59,000	194,000	233,000
General Outside Plant Construction	4,320,000	5,184,000	1,435,000	1,722,000	5,755,000	6,906,000
Railroad, Bridge, and Interstate Crossings	213,000	256,000	56,000	67,000	269,000	323,000
Outside Plant Fiber Splicing	33,000	40,000	22,000	26,000	55,000	66,000
Fiber Termination / Testing	18,000	22,000	6,000	7,000	24,000	29,000
Fiber Construction Subtotals:	$4,988,000	$5,987,000	$1,656,000	$1,986,000	$6,644,000	$7,973,000

2.3 Design Approach and Cost Estimate Assumptions

In order to develop the proposed network design, CTC worked closely with the Stakeholders to understand their requirements, obtaining input on capacity needs, network goals, and preferred construction standards.

CTC engineers performed an extensive study of the Corridor using a combination of desk review and on-site surveys. Our engineers were also able to leverage the significant amount of research conducted by King County, Kirkland, and Redmond in their respective master plan documents for Corridor improvements.

In developing the OSP cost estimates, CTC developed unit cost estimates based on the current construction conditions, labor market, material costs, and project scope. As part of the effort to obtain accurate unit cost information, CTC collected fiber construction pricing data directly from the Stakeholders themselves. The Stakeholders' pricing information was not comprehensive, as it only included sample price ranges for trenching and directional boring construction methodologies. That said, trenching and boring costs are the most critical determinant of an OSP project's total cost—so, while the pricing information was limited, it did address the key cost components.[10] The Stakeholders' pricing also included a useful data point that allowed us to compare the relevant pricing to our past experience. CTC was able to identify unit pricing from a project of similar scope that matched up with the unit pricing data collected from the Stakeholders. The pricing used for cost estimation was from a competitively awarded fiber construction contract of similar scope, issued by a municipal government.

A full list of the unit price assumptions that were used to generate the range of cost estimates is located in the Appendix A attachments.[11]

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[10] The City of Kirkland provided an additional data point for directional drilling costs from their Totem Lake Bridge budget. That data point suggests pricing of more than $200 per foot, which is significantly higher than the previously provided data point. Because trenching is the main construction method, the impact of this unit price variance is mitigated when accounted for in the total estimate. Of the approximately 28 miles along the corridor where construction would take place, less than 2 miles are expected to require directional boring. If the unit pricing for directional boring were to increase from the $55 per foot unit cost assumption sourced for this study (a composite price based on the data point provided by the Stakeholders and sourced from two separate fiber construction companies that work with CTC) to $200 per foot, the total cost increase would be about $1.26 million or around 10 percent to 13 percent, depending on the scenario.

[11] Cost estimation is a core component CTC's business, and we have a proven track record of providing accurate cost estimation analysis for fiber construction projects. One such example was our cost estimation analysis for the City of Westminster, Maryland. CTC developed a preliminary construction cost estimate for the City's proposed citywide FTTP network, which we further refined after completion of a detailed engineering design. After releasing an RFP for construction, the City found CTC's estimated cost to be very close to the average cost of the four valid bids that were submitted.

3 Financial Analysis for Deployment and Operation by the Owners

CTC performed a financial analysis of a deployment scenario in which the Owners would own and operate the fiber and conduit. For each of the four design scenarios described in Section 2, we developed a financial analysis that describes what annual revenues or budget allocations would be required over 20 years to construct, operate, and maintain the fiber infrastructure. Our analysis illuminates the total cost of ownership to finance, deploy, maintain, and operate the network.

In addition, this section also presents an analysis of the fiber leases required to cover estimated principal and interest (P&I) payments and operations and maintenance (O&M) expenses.

3.1 Estimated Operations Costs

In addition to the capital costs for the fiber infrastructure described in Section 2, our financial analysis includes an additional capital expenditure of $80,000 to purchase test equipment necessary to maintain the fiber (see Table 9). In the financial analysis we have included an annual depreciation reserve of $16,000 to replace this test equipment every five years.

Table 9: Capital Cost for Fiber Test Equipment

Item	Cost
Fiber Management System	$40,000
Emergency Restoration Kit	30,000
Fiber OTDR and Other Tools	10,000
Total	$80,000

The operations and maintenance assumptions for each scenario include:

- Locates and ticket processing are estimated at $5,000 per year
    - Estimated at $150 per month per 10 miles of underground fiber (this is typically estimated at $150 per month per 1 mile of fiber, but we increased this because locates will likely only occur at road crossings)
    - In year one, we assume 25 percent of the above estimate
    - These costs will increase by 3 percent per year
- Fiber maintenance and repair fees are estimated at $16,800 per year
    - Estimated at $600 per year per route mile of fiber

  - In year one, we assume 50 percent of the above estimate
  - Increases by 3 percent per year
- Liability insurance is estimated at $15,000 per year, increasing by 3 percent per year
- In Year 1, legal and other support is estimated at $20,000
- Contingency is estimated at $10,000 per year, increasing by 3 percent per year
- FTE of 0.10 for GIS staff will be required to maintain splicing and other fiber records
  - We assume that a GIS staff is paid $80,000 per year plus 30 percent overhead
  - We assume that this salary cost will escalate at 5 percent per year

The operating and maintenance (O&M) costs do not change from scenario to scenario. Table 10 summarizes the estimated operations and maintenance costs. Please note that the O&M costs do not include administrative costs. The administrative costs will depend upon the deployment model and governance model selected.

Table 10: Estimated Operations and Maintenance Expenses

	Year				
	1	**2**	**3**	**5**	**10**
O&M Expenses					
Locates & Ticket Processing	$1,300	$5,150	$5,300	$5,630	$6,520
Insurance (liability)	15,000	15,450	15,910	16,880	19,570
Fiber Maintenance (breaks and other)	8,400	17,300	17,820	18,910	21,920
Legal & Other Support	20,000	-	-	-	-
Contingency	10,000	10,300	10,610	11,260	13,050
Total	$54,700	$48,200	$49,640	$52,680	$61,060
O&M Salaries					
GIS Support	$10,400	$10,900	$11,400	$12,700	$16,100
Total	$10,400	$10,900	$11,400	$12,700	$16,100
Total O&M Expenses and Salaries	$65,100	$59,100	$61,040	$65,380	$77,160

For each of the scenarios (both low- and high-cost), the only item that varies is the initial capital cost and thus the P&I payment. For the P&I payment we assume the fiber infrastructure is financed over 20 years with an annual interest rate of 6 percent.

Table 11 provides an annual cost summary for Year 2[12] for each of the scenarios.

Table 11: Fiber Infrastructure Annual Cost Summary in Year 2

Cost Category	Scenario							
	A1		A2		B1		C1	
	Conduit – Fiber and innerduct in one		Conduit – Fiber in one and innerduct in all		Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)		Single Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)	
	Low	High	Low	High	Low	High	Low	High
P&I (20 years at 6 percent)	$642,290	$769,630	$741,000	$888,100	$606,960	$727,250	$469,430	$562,210
Operating Expenses	59,100	59,100	59,100	59,100	59,100	59,100	59,100	59,100
Depreciation Reserve	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Required Revenues	$717,390	$844,730	$816,100	$963,200	$682,060	$802,350	$544,530	$637,310
Required Revenues without P&I	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100

After Year 2, the required revenues (for P&I and O&M)[13] would need to increase at approximately 0.3 percent per year to maintain a positive cash flow.

The complete analyses for each of the scenarios are included in Appendix B.

[12] Year 2 is the first full year of operation. Year 1 is construction and initiation of operations.

[13] The P&I payment remains constant during the 20-year period. Staffing expenses increase by 5 percent annually, and other O&M expenses increase by 3 percent per year.

3.2 Market Perspective

This section provides an estimate of how much fiber would need to be leased at market rates in order to cover the above annual costs. Please note that this overview is not a market assessment of demand or lease rates; rather, it is designed to give the Owners a sense of what magnitude of leases might be required to cover estimated P&I and O&M costs.

3.2.1 Typical Dark Fiber Lease Terms

Most commonly, dark fiber is priced on a per strand per mile basis for a set term. Usually, the lease price is for fibers on the existing fiber network, and the customer is responsible for the incremental cost to connect its facility to the closest access point on the existing fiber route. Colocation, splicing, make-ready, and rack space costs are generally assessed on top of the fiber pricing. Some entities will also charge an upfront fee to cover administrative costs.

The following is a range of pricing structures found in both the private and public sectors.

1. **Incremental or proportional cost (either of construction or maintenance).** In this model, dark fiber is priced at the incremental or proportional cost of building the leased fibers or maintaining them. These structures will result in the lowest pricing possible. In our experience, this model is used only where the provider is under some kind of duress or legal requirement.[14]

2. **Upfront payment plus maintenance.** Most commonly, dark fiber is leased as a 10- to 20-year (most often 20) Indefeasible Right of Use (IRU). The customer pays upfront for the IRU and annually for maintenance.[15] The maintenance cost is calculated on route miles, not strand miles. The annual maintenance charge is the same per mile, regardless of whether the lease is for one or 10 or 100 strands on the same route. The upfront payment covers the entire term of the fiber lease, while the maintenance and co-location portion of the contract are often renewable, typically on five-year or shorter terms, which allows for cost adjustments based on experience and inflation. The benefit of this model is the substantial inflow of funds early in the lease term, which can help bridge any potential early-year cash shortfall while an entity is beginning operations and developing new

[14] For example, Minnesota Power was instructed to offer a dark fiber at a rate of $13.65 per mile per strand per month under a ruling from the Minnesota Public Utilities Commission on a transaction agreement between Minnesota Power and Enventis Telecom Inc. (a non-regulated subsidiary of Minnesota Power). The ruling bases the lease price of Minnesota Power's unused fiber assets using an incremental cost basis.

[15] One customer benefit of this model is the possibility that the IRU could be recognized as a financial lease that may allow the IRU to be treated as a capital expenditure.

services. On the other hand, the model will not result in recurring annual revenues over the long term, beyond some of the cost of maintenance.

3. **Per annum or per month pricing.** This structure has the benefit of delivering to the fiber owner a steady annual income stream over time but does not deliver a large upfront payment that could serve to bridge a difficult budget year or finance new investment. On the other hand, this model is more achievable if the dark fiber lessee is not able to make a large upfront payment—but can pay for the fiber on a recurring annual or monthly basis. As a result, this model potentially increases the number of potential dark fiber customers. Net pricing over the term of the lease tends to be higher than in the upfront payment model over the same total period of time.

For our analysis, we have used the third pricing structure—the monthly lease based on total strand-miles (total fiber strands leased times the total route miles).

3.2.2 Dark Fiber Lease Pricing Analysis

For monthly leases we see a large range of prices, ranging from $10 per month per strand mile to more than $1,000 per month per strand mile. The pricing and structures vary based on region, population density, volume, alternative solutions, availability of dark fiber strands and other factors. Usually, the more rural the location, the lower the prices. Also, the more strands that are leased (volume), the lower the prices. For this analysis we have used three price levels—a low of $50 per month per strand mile, a mid-range of $100 per month per strand mile, and a high of $250 per month per strand mile.

Each construction scenario includes a total of 288 strands over 27.96 route miles, netting a total of 8,052 strand-miles of fiber. In Table 12 we show the total strand-miles of monthly leases required to cover the estimated P&I payment and O&M expenses. In Table 13 we show what percentage of available fiber strand-miles are required to be leased to cover the estimated P&I payment and O&M expenses.

Table 12: Required Strand Miles of Leases to Cover Estimated P&I and O&M Expenses

Lease Rate	Scenario							
	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	239	282	272	321	227	267	182	212
Medium	598	704	680	803	568	669	454	531
Low	1,196	1,408	1,360	1,605	1,137	1,337	908	1,062

Table 13: Percentage of Available Strand Miles to Lease to Cover Estimated O&M Expenses

Lease Rate	Scenario							
	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	2.97%	3.50%	3.38%	3.99%	2.82%	3.32%	2.26%	2.63%
Medium	7.43%	8.74%	8.45%	9.97%	7.05%	8.31%	5.64%	6.59%
Low	14.85%	17.49%	16.89%	19.93%	14.12%	16.60%	11.28%	13.19%

In Table 14 we show the total strand-miles of monthly leases required to cover just the estimated O&M expenses. In Table 15 we show what percentage of available fiber strand-miles are required to be leased to cover the estimated O&M expenses.

Table 14: Required Strand Miles of Leases to Cover Estimated O&M Expenses

	Scenario							
Lease Rate	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	25	25	25	25	25	25	25	25
Medium	63	63	63	63	63	63	63	63
Low	125	125	125	125	125	125	125	125

Table 15: Percentage of Available Strand Miles to Lease to Cover Estimated O&M Expenses

	Scenario							
Lease Rate	A1		A2		B1		C1	
	Low	High	Low	High	Low	High	Low	High
High	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%
Medium	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%	0.78%
Low	1.55%	1.55%	1.55%	1.55%	1.55%	1.55%	1.55%	1.55%

4 Deployment Models and Governance Structures

Over the course of this study, the Stakeholders and CTC worked together to identify feasible deployment models for the fiber network and well as appropriate governance structures. From the outset of the project the Stakeholders defined three main goals for the network:

- Fiber for county, municipal and non-profit operations and other use cases, as mentioned above
- Potential for businesses to benefit from fiber
- Revenues (dark fiber lease fees)

CTC, working with input from the Stakeholders, identified three deployment models that might best meet these goals: owners build, joint public-private build, and private build. The Stakeholders also identified five specific governance structures that could be implemented on any of the deployment models. This section describes these deployment and governance structures and their respective advantages and disadvantages.

4.1 Deployment Models

In terms of deployment models, the Owners have the option of constructing, owning, and operating the network by themselves (the option for which the Stakeholders expressed a general preference); jointly constructing the network together with a private or nonprofit entity to potentially share costs; and issuing an RFP seeking a private entity to build the network in exchange for providing some infrastructure and other benefits back to the Owners (and to other public stakeholders, such as the cities of Bellevue and Renton). The Stakeholders considered a comparison matrix summarizing each model's attributes in terms of control, financial impacts, and risk (Table 16).

Table 16: Deployment Model Comparison Matrix

Deployment Model	Control (Governance & Use)	Upfront Cost	Ongoing Cost	Revenue Opportunity	Financial Risk	Ability to Execute
Owners implement, own, and operate	Complete	Modest to High	Modest	High	Moderate	Moderate to High
Joint public-private or public-nonprofit build	Limited	Modest	Modest	Limited	Low	High
Private entity implements, owns, and operates	Limited	Low to None	None	Moderate	Low	High

The matrix conveys that the first model—in which the Owners implement, own, and operate the network— provides total control and flexibility and the highest potential revenue, but with a high cost and the assumption of all risk. The second model—joint-build/trench—would reduce the initial costs and the overall risk, but also reduce the level of control and the potential revenue. The third model—seeking a private provider to build, own, and operate the network while providing some infrastructure to the Owners—would eliminate most costs and risks,[16] and might yield revenue from lease payments on the Corridor. But it would also essentially cede control. An RFI/RFP process would determine whether or not the Owners would get everything the Owners want from such an arrangement. Additional discussion on the matrix is provided below.

The Stakeholders must decide on the basic deployment scenario before deciding on a governance model.

4.1.1 Eastrail Corridor Owners Own and Operate the Network

If the Owners build, own, and operate the network and perhaps build extra conduits on spec, this would allow them to set pricing and collect leasing revenue, maintain control over who has access to the infrastructure, and use the infrastructure for whatever purposes and applications they

[16] Not all costs are eliminated (e.g., the Owners would incur some costs for oversight), and not all risks are eliminated (e.g., the Owners would still have risk that the private entity could default, or damage the corridor).

(and the larger group of Stakeholders)[17] deem appropriate now or in the future. These applications could include adding resiliency to regional public networks, deploying current and future smart communities applications, and increasing the availability of internet access and applications to citizens in the region if the Owners and the other Stakeholders conclude that the additional regional infrastructure would help. And the Owners could implement rules providing for open access.

This option does have the highest upfront costs and requires the assumption of all risk, but once the network is built, the ongoing costs for implementing and owning the infrastructure are fairly modest. In conversations with the Stakeholders, the Stakeholders expressed the opinion that there was a potential revenue opportunity at hand. For some existing providers, this would provide a redundant route; for others, it would be a new opportunity. The Owners would also be responsible for operations and maintenance costs and would need to develop and commit to service level agreements (SLA) for any dark fiber lessee. This might be challenging to execute; while King County has extensive experience with leasing fiber, given its existing I-Net, the Stakeholders as a whole do not.

4.1.2 Corridor Owners Own and Operate the Infrastructure and Coordinate Construction with Private Providers

If the Owners own and operate the infrastructure but reduce costs by means of a coordinated build to reduce the number of conduits that the Owners pay for,[18] it would be expected that private partners would pay their share, or more, of the capital costs. Other entities would be providing services and leasing access to the infrastructure. This approach comes with a tradeoff, however: On the one hand, the Owners will incur additional costs to engage and coordinate with these other providers; on the other hand, the cost to deploy should drop. The exact nature of this balance will not be clear until a detailed design is complete and private entities are engaged in negotiations. And of course, if no private provider steps up, valuable time will have been lost.

This option also still requires the Owners to undertake a construction project; the Owners cannot jointly build something unless they are building it in the first place. And this approach would significantly reduce revenue opportunities given that the private entity jointly constructing fiber and conduit would be positioned to lease fiber to others. This model would also require coordination with other entities when issues arise, such as cable damage or a need to move the

[17] Other key Stakeholders include the cities of Bellevue and Renton; additionally, it is possible that the University of Washington could emerge as a user.
[18] For example, reduced material costs and sharing of labor costs.

fiber to accommodate future construction. And it would entail losing some control over governance.

4.1.3 Corridor Owners Seek Private or Nonprofit Entities to Build the Fiber and Conduit

Through a request for information (RFI) or request for proposals (RFP) process, the Owners could seek proposals to construct the network and require certain conditions including an upfront payment for the right to build in Corridor, ongoing payments for the right to operate in the Corridor, and the provision of specified unrestricted use or ownership of conduit, innerducts, and strands of fiber to the Owners and the other Stakeholders.

The process itself would be valuable in terms of providing information on private interest in the Corridor. If a private solution emerged, it would mean little or no upfront costs, meeting municipal needs, a potential source of revenue, and no need to build or maintain fiber. The Owners would be under no obligation to accept any proposal that emerges from the RFP process; they can always revert to one of the first two options.

4.2 Governance Structures

This section summarizes potential governance structures and some of the potential advantages and disadvantages of each. Governance options identified by the Stakeholders include:

- Community Connectivity Consortium (C3)
- Owners (King County, Redmond, Kirkland, Woodinville, Sound Transit)
- King County (largest stakeholder)
- Feasibility study stakeholder team
- Third party

Table 17 presents some of the pros and cons of each option.

Table 17: Governance Structure Comparison Matrix

Governance Structure	Pros	Cons
Owners (King County, Redmond, Kirkland, Woodinville, Sound Transit)	• Keeps control in the hands of the Owners • The leadership group stays small • Could leverage Owner resources beyond the IT departments	• The project would add to jurisdictional costs and overhead • No agreements in place, could take a while to develop structure
King County (largest Stakeholder)	• Relevant experience from running I-Net • Has the largest staff resources from which to pull • Majority Owner of the Corridor and is its primary influencer • County has the highest risk and is least likely to inadvertently cause project risk • Has a lot of political will behind the project	• King County processes tends to be bureaucratic • Other Owners may want more input
Feasibility study Stakeholder team	• Keeps continuity • Group has already initiated conversations with Snohomish County regarding inclusion	• Group short on resources • Need to formalize structure
Third party	• Requires the least effort and resources	• Tailored to a specific deployment model • Lack of control
Community Connectivity Consortium (C3)[19]	• Allows for greater input from entities that do not have ownership of the Corridor • C3 includes schools and other non-government entities • Better positioned to apply and win grants for funding • Will remain neutral on decisions that affect the Corridor • Shown in the past that the charter can be changed	• The C3 is short on resources to oversee Eastrail • The C3 group is IT focused and lacks construction expertise • Requires change to C3 charter

4.2.1 Community Connectivity Consortium (C3) Governance

Under this option the Community Connectivity Consortium (C3) would manage the infrastructure. The C3 consists of the Lake Washington School District, the University of Washington, and the cities of Bellevue and Kirkland. Currently the C3 provides connectivity for community institutions like hospitals, schools, and city halls. The C3 now includes connection points in Kirkland, Bellevue, Renton, Kent, Auburn, and Tukwila. The network has six optical nodes around Lake Washington, has 10 Gbps capabilities, and is now connecting to regional resources.

C3 is a neutral player that includes both school districts and municipal entities and has demonstrated the capability of winning grants. It won two U.S. Department of Homeland Security Urban Area Security Initiative (UASI) grants, one in 2009 to build from Bellevue to Renton and a second grant in 2010 to build the fiber network into the City of Tukwila. And C3 represents more stakeholders.

That said, C3 itself is thinly resourced and does not have construction and trenching experience; it is more IT-focused (e.g., it builds data centers and splices fiber). Additionally, C3 would need to change its charter and come under new oversight by the public entities building the network. C3 has revised its charter in the past, showing that it is flexible and can take on new roles.

4.2.2 Corridor Owner Governance

The second option is to have governance by the Owners: King County; the cities of Redmond, Kirkland, and Woodinville; and Sound Transit. This option keeps all control with a small group of Owners, meaning decisions can be made faster. And each jurisdiction could perform construction and fix infrastructure on its own land with County or City staff and equipment.

But this approach would involve taking on new overhead and costs, as well as creating a governance structure from scratch. With some of the other options, in contrast, a governance structure already exists.

4.2.3 King County Governance

A third option is to have governance by King County, the largest entity and potentially the biggest influencer among the Stakeholders. King County has deep experience running an I-Net, well-qualified staff, political will, and the institutional connections that might help in making the

[19] While C3 could be a viable governance option, the consortium has stated its preference for remaining a stakeholder rather than being in a governing role.

project successful. King County's majority stake also means it has the most to lose and so is likely to be prudent, and unlikely to take a course of action that accidentally causes risk.

However, this option would tie the project to County-centric processes, and the other Owners would have less say in the project.

4.2.4 Current Feasibility Study Team Governance

A fourth option is for the Stakeholders to form their own governance structure. This option would allow for continuity and might more easily include Snohomish County, given the existing relationship and discussions Snohomish County has had with the Stakeholders. But we note that the current Stakeholders team already is under-resourced and would require a more formal structure than is currently in place.

4.2.5 Third-Party Governance

In this option the Owners would outsource the oversight to the nonprofit or private partner under the third deployment model. Here the Owners and other Stakeholders would act as a customer for their fiber needs and would have a private entity responsible for handling service problems. It is an easy option to implement, but the Owners would give up control once the initial agreement is set. The agreement would be tailored to a specific deployment model and might be difficult or expensive to change.

5 Recommendations and Next Steps

Time is of the essence, so in taking next steps, certain items may need to be done in parallel. Extensive construction for recreational and transportation purposes on the Corridor is planned in the near term. For that reason, the Stakeholders should make certain decisions as soon as possible to allow for construction coordination should a conduit and fiber buildout proceed.

The Stakeholders have expressed a preference that—if network construction proceeds—the Owners build themselves under the first deployment scenario rather than seek a private entity to build the network. Part of this sentiment stems from the fact that the Stakeholders face time pressures given the construction schedule of other Corridor projects. The Stakeholders recognize that it would be faster to simply get started than to develop and issue an RFP, wait for responses, negotiate with private providers, and then wait for the start of construction.

CTC recommends that even if the Owners proceed with construction planning for a public deployment, they should still simultaneously issue an RFP. The RFP process will generate valuable information about private interest in the Corridor. In addition, it is possible that the Owners and the larger group of Stakeholders may get a proposal that provides all the fiber infrastructure they want, and along the way saves millions of dollars in construction costs and hundreds of thousands of dollars in O&M costs and earns a revenue stream from Corridor access fees.

In light of our research and analysis, and the importance of coordinating any work with planned infrastructure improvements along the Corridor, we recommend that the Stakeholders take the following steps within two months of accepting this report. We note that taking these initial steps does not bind the Stakeholders to any particular solution, but rather allows all options to be explored without delay.

Phase 1

1. **Identify the Owner and Stakeholder team roles for carrying out the immediate recommendations** so that the Owners can proceed into the next phase without delay.

2. **Identify potential initial funding sources.** The initial funding is to cover the RFI/RFP and the detailed engineering described below. The estimated cost for the RFI/RFP development and response analysis is $40,000. The estimated cost for the detailed engineering is $360,000.

3. **Engage with the City of Renton, Snohomish County, and PNWGP to gauge interest in increasing the fiber route length**, which would perhaps increase the economies of scale (i.e., reduce build costs) and increase the project's potential overall value.

4. **Initiate the RFI/RFP process to gauge interest from private providers.** The Owners can then assess proposals that come in and potentially refine them through additional submittals in a kind of auction process, subject to a legal review of applicable procurement laws. Even if the Owners decide that a public deployment is the preferred approach, this process would provide valuable market insights and—if an attractive proposal emerges—might hold the potential to meet Owner and Stakeholder needs while both avoiding a large capital expense and generating a revenue stream. This option would not bind the Owners; if the Owners do not like the result, they can proceed with a public deployment. The estimated cost for the RFI/RFP development and response analysis is $40,000.

   In the RFI/RFP, the Owners should establish as minimum requirements:

   - Designation of at least one conduit and innerduct for Owner/Stakeholder ownership, restriction-free
   - Ownership of designated fiber strands restriction-free
   - One-time payment for respondent right to build in Corridor
   - Annual payment for respondent right to operate in Corridor

5. **Develop utility placement policies**. The new fiber infrastructure could be placed near existing utilities in a designated part of the Corridor or placed further away to limit conflicts with other utilities, depending on the policies developed.

6. **Ensure that the project aligns with Eastrail development projects**. A number of capital projects are planned along the Corridor, and it will be important to coordinate the timeline of trenching and other work with these already-planned efforts.

Phase 2

1. **Engage a firm to complete the detailed engineering** for the preferred build scenario. Conducting this task in parallel with the RFI/RFP will help ensure that the Owners maintain the schedule for either deployment option. The estimated cost for the detailed engineering is $360,000. Given the timing requirements, the detailed engineering may require initiation in Phase 1.

2. **Identify the preferred deployment model** based upon the results of the above RFI/RFP and the detailed engineering.

3. **Determine the preferred governance approach**, seek a legal opinion about the viability of the preferred approach, and obtain direction and support for the project and the governance approach from the Regional Advisory Council (RAC).[20] We also recommend that regardless of which governance option the Owners choose, the Stakeholders retain a role, such as through an advisory board.

4. **Identify potential deployment funding sources.** If no grant options exist, funding will likely need to come from the budgets of the Owners through free cash or the issuance of general obligation bonds or other debt.

The above represent the most critical immediate steps. In the three- to six-month timeframe following acceptance of this study, the Owners should plan to move to a Phase 3, as follows.

Phase 3

1. Finalize the selection of the deployment model based on the results of the RFI/RFP and the detailed design.

2. Refine the preferred governance approach based on the selected deployment model.

3. Identify the lead for the next implementation phase.

[20] The RAC represents the Stakeholders' leadership on the Eastrail projects.

Appendix A: Implementation Cost Estimate

This Appendix is attached as four separate Microsoft Excel files. The files are:

- Appendix A1 Eastrail Cost Estimate Scenario A1 Rev 4 20190503.xlsx
- Appendix A2 Eastrail Cost Estimate Scenario A2 Rev 4 20190503.xlsx
- Appendix A3 Eastrail Cost Estimate Scenario B1 Rev 4 20190503.xlsx
- Appendix A4 Eastrail Cost Estimate Scenario C1 Rev 4 20190503.xlsx

Appendix B: Financial Analysis

This Appendix is attached as eight separate Microsoft Excel files. The files are:

- Appendix B1 Eastrail A1 High Cost Forecast Rev 4 20190503.xlsx
- Appendix B2 Eastrail A1 Low Cost Forecast Rev 4 20190503.xlsx
- Appendix B3 Eastrail A2 High Cost Forecast Rev 4 20190503.xlsx
- Appendix B4 Eastrail A2 Low Cost Forecast Rev 4 20190503.xlsx
- Appendix B5 Eastrail B1 High Cost Forecast Rev 4 20190503.xlsx
- Appendix B6 Eastrail B1 Low Cost Forecast Rev 4 20190503.xlsx
- Appendix B7 Eastrail C1 High Cost Forecast Rev 4 20190503.xlsx
- Appendix B8 Eastrail C1 Low Cost Forecast Rev 4 20190503.xlsx

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Eastrail Return on Investment Analysis

Prepared for King County, Washington

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1 Introduction and summary

This document presents an analysis for King County, Washington, as it develops a business strategy for developing, using, and leasing fiber optic assets on the Eastrail corridor. This report was prepared in late 2019 by CTC Technology & Energy.

The development of Eastrail in King County presents the opportunity to build future-proof fiber optic lines and communications conduit through a significant portion of this fast-growing metropolitan area.[1]

Once installed, new fiber and conduit infrastructure along the Eastrail **will enable decades of communications services** to meet County and other public sector needs. Meeting those needs, which were discussed in a report prepared by CTC Technology & Energy in July 2019,[2] represents a significant part of the potential return on investment in the event that the County and its other public partners choose to build fiber assets in the Eastrail.

Research and outreach to stakeholders in preparation of this report indicate that **the planned fiber holds value for private entities as well**. To prepare this report, County and CTC staff met with a range of private companies we had reason to believe might be interested in fiber in the Eastrail. The magnitude of the potential future leasing revenue is unknown, but if we use as a benchmark the existing pricing for fiber leasing established by a local jurisdiction in the King County area, a single lease arrangement of three strands of fiber along the 28 miles of the Eastrail from Renton to Woodinville would cover the network's projected $75,000 annual operating cost (a cost that applies regardless of the construction scenario).

At the fiber lease pricing used by that local jurisdiction ($83 per month per strand mile), a lease of three strands would produce $83,664 in revenue.[3] A hypothetical lease of 30 strands under this scenario would product $836,640 in revenue. This magnitude of revenue would cover operating costs and $761,640 toward capital costs, a figure that would cover all or most of the

[1] Within the borders of King County, the Eastrail easement is owned by five entities—King County; the cities of Kirkland, Redmond, and Woodinville; and Sound Transit (collectively, "the Owners"). Depending on which entities choose to participate in the potential fiber project discussed here, these Owners may overlap with the entities that will be owners of the fiber infrastructure.

[2] *Eastrail Corridor Fiber and Conduit Feasibility Analysis,* prepared for Eastrail Stakeholders, July 2019. The July report was prepared by CTC Technology & Energy under a contract with the City of Kirkland, with the sponsorship of King County; the cities of Bellevue, Kirkland, Redmond, and Renton; the Renton School District, Bellevue School District 405, and Lake Washington School District; and Pacific Northwest Gigapop (PWNGP).

[3] Fiber strands are almost universally leased in pairs, not in odd numbers, so a lease of three fibers is unlikely. The number is used here not to suggest that any entity would lease this particular number of fibers, but to illustrate the leased fiber count necessary to cover annual operating expenses.

potential annual debt service on capital costs under the various scenarios presented in the July 2019 report. (As described in Table 2 later in this report, these costs plus $16,000 in depreciation reserves range from $485,430 for the low estimate in Scenario C1 to $904,100 for the high estimate in Scenario A2.) We note that all of these construction scenarios include constructing a single 288-strand fiber cable.

Of course, it is not possible to know for sure who will lease fiber, or at what pricing and with what other terms. Pricing may need to be lower than the local jurisdiction's pricing, the desired fiber routes may be for shorter stretches, and volume discounts may need to be applied. But we do know that many of the private entities with whom we spoke demonstrated concrete interest in leasing conduit and potentially fiber, even though all declined to specify the pricing at which they would lease assets from the County. In addition, all stated a preference to build their own fiber or conduit in the Eastrail if this opportunity was made available to them. Several noted that the fiber and conduit would hold considerably more value to them if they had the opportunity to deploy small cell wireless facilities in the Eastrail, connected by the fiber.

Several also suggested a willingness to bid on a potential County procurement for the opportunity to work with the public entities to deploy and use the fiber or to share costs of deployment.

Given these private entities' unwillingness to share concrete data regarding lease pricing, likely revenues can only be reliably projected through a formal, binding procurement or over time, once fiber construction is complete and the asset can be marketed. That said, based on the data collected in stakeholder research and research of other fiber markets, this report offers the following:

Section 2 discusses the results of the market research into private sector interest in the fiber—as well as the value that would be realized by the public sector users of the fiber.

Section 3 offers an introduction to the dark fiber market, dark fiber leasing structures, and pricing considerations.

Section 4 summarizes analogous dark fiber market prices we have observed in other areas, then applies those prices to the revenue opportunity—and the likely avoided cost to the County and its municipal partners—that will arise from the planned Eastrail fiber. The section concludes that the fiber infrastructure owners' ongoing fiber and conduit operations and maintenance costs will almost certainly be covered by fiber lease revenues, though there is likelihood (but not certainty) that fiber revenues would be sufficient to cover any potential debt service. Potential avoided cost to the County and its other public sector partners, however, are so considerable that they cover significant parts of the capital expense.

Conclusion and recommendation. In sum, while carrier reluctance to share proprietary data did not enable us to comprehensively quantify the potential revenues that could flow to the Eastrail fiber infrastructure owners from the conduit and fiber construction, we believe **the potential revenue opportunity is robust, as is the significant value and avoided cost over time** that will be derived by public sector users.

In light of the combined potential revenue and savings opportunities, we recommend continuing with this project, determining a procurement and governance structure, and proceeding fast enough to take advantage of improvements that are currently underway in the Eastrail and that can make deployment more efficient. Moving quickly to take advantage of this opportunity will also enable the fiber infrastructure owners to more quickly capitalize on the benefits described here, to the extent feasible.

A procurement for public-private collaboration involving shared cost may offer the fastest means of deploying the fiber—as well as enabling the Eastrail fiber infrastructure owners to use the potential market value of the fiber as a tool to reduce their own construction costs. For example, shared construction with the private sector would reduce the Eastrail fiber infrastructure owners' cost of construction, simplify procurement, and simplify commercial operations and leasing by leaving them to the private entity that shares the costs. Collaboration with a private entity may also enable more efficient, more extensive use of the fiber assets if the private entity can respond faster than can the fiber owners to potential customer requests. In contrast, purely public deployment, operations, and leasing would increase the fiber owners' costs and risk but also maximize revenues and control, including over operations, leasing, and revenue in the long-term.

A purely public model would allow the Eastrail fiber infrastructure owners to adapt their strategy over time as the connectivity market changes and community internet and connectivity needs evolve. Private operations, in contrast, will likely necessitate private decision-making about the use of the fiber—though the fiber owners could attempt to modestly shape that decision-making through lease terms.

2 The fiber investment offers revenue opportunity and operational value

CTC and County staff undertook the market analysis in order to determine the potential revenues and avoided costs to the County and other owners of the planned fiber. We approached this task by seeking data from potential private lessees of County fiber in order to understand the potential revenue opportunity. We also analyzed the potential savings to the County and other public users of fiber that have been partners to the County in this effort. The goals of the analysis were to determine whether the projected costs for deployment, maintenance, and operations would be covered by a combination of potential revenues and savings—and to understand the return on investment on a $12 million investment by the Eastrail fiber infrastructure owners.

2.1 Potential revenues: Summary of market research

In most markets, there exist only a dozen or two potential dark fiber lessees, given the sophistication and resources necessary for an entity to lease and light dark fiber itself, rather than simply lease lit communications services. In the King County area, these potential lessees include the incumbent and competitive communications carriers (such as Comcast, Wave, and CenturyLink); tower/infrastructure companies (such as Extenet, Crown Castle, and American Tower); and perhaps a handful of large enterprises that seek point-to-point fiber to connect their locations or to connect to other fiber assets they may hold (such as Microsoft, Boeing, Google, or Facebook).

In the course of this project, CTC and County staff-members engaged with 12 potential private lessees or collaborators for the planned conduit and fiber.

In brief, we learned that there exists market interest in the Eastrail opportunity for at least six of the companies with whom we met. Among those with a market interest, there exists particular demand for some segments, depending on the company and its existing service footprint.

While each of the companies has a different business model—serving a slightly different customer base or geography or offering a different set of services—all of the companies that demonstrated interest are primarily interested in leasing conduit, which would enable them to own and control their own fiber. Though stating this preference for conduit, the interested companies did note that they would consider leasing fiber if no conduit option were available.

The companies note that alternative, existing fiber paths do exist in the areas of King County traversed by the Eastrail, thus making the Eastrail fiber an attractive but not singular opportunity to secure connectivity in that part of the County. Some of the companies already have fiber on other routes in those areas and the Eastrail fiber would help add redundancy and resiliency in

their operations, but not be an essential addition. For those that don't currently have fiber in that area, the Eastrail represents a good opportunity to secure fiber assets, but not an irreplaceable one, given that other leasing options exist.

We also learned from the market research that at least one of the companies leases existing, 25-year-old fiber in the Eastrail currently, but the age of that fiber would make the new fiber opportunity very attractive. In addition, the planned fiber is also attractive because of the design contemplated, which offers lessees greater operational flexibility than the existing fiber, which does not enable service to many customers along the Eastrail but rather serves as a long-haul route through King County.

At least three of the companies indicated interest in a turn-key design, build, operate, maintain, and leasing model, through which the County and its public partners would receive access to conduit and/or fiber assets and the private partner would have opportunity to monetize the assets dedicated for commercial use. In effect, this would result in a means of sharing the cost of construction and maintenance. The companies indicate less interest in a model in which they would share revenues with the County, though at least one is willing to consider this approach.

Most of the companies noted the value of an expedited rights-of-way permit that could be part of this initiative as an incentive to investment on their part. And most of the companies noted that the fiber assets would hold more leasing potential if there existed clarity about the potential to place small cell wireless infrastructure in the Eastrail, connected over the fiber.

None of the companies indicated strong interest in a collaboration that would involve sharing private revenues with the County. This is in part because of the challenge of determining which revenues would be recognized for purposes of sharing: dark fiber leases only or also downstream revenues associated with lit services running over the fiber. In a revenue sharing scenario, further complexity arises from the inevitability that leases of the fiber would include other cost elements associated with incremental construction or splicing, as well as leased services over interconnected assets not owned by the fiber owners; unpacking those revenues for purposes of determining the fiber owners' revenue share would be complex and resisted by companies that decline to make their pricing structures public.

2.2 Potential operational benefits and savings: Summary of value to the public stakeholders

The County and other members of C3 have successfully built dark fiber and leveraged fiber for government, public safety, research, education, and other public purposes over the course of two decades. They have avoided considerable cost relative to services they would have had to buy from private providers absent their fiber holdings. Similarly, the Eastrail fiber infrastructure

owners will likely derive significant value (and likely avoid significant future cost) as a result of use of the planned fiber.[4]

2.2.1 Anticipated uses of planned Eastrail fiber

The current strategy of building new fiber assets reflects decades of experience indicating that controlling dark fiber offers both financial and operational benefits that grow over time. These include expanding public sector network access, developing smart community infrastructure, increasing resiliency and redundancy for public safety, and increasing internet access and applications for all citizens.

The County and its public partners anticipate using the planned Eastrail fiber in a range of ways that include service in the Eastrail itself, such as wireless internet access, smart lighting, smart parks, surveillance, safety, and wildlife video streaming. They also anticipate that the fiber will support information technology and communications needs at public facilities and will enhance the fiber owners' municipal operations by creating redundant capabilities for public networks such as King County's wide area network, the County I-Net, and C3. The fiber will also enable interconnection with other public sector municipal networks, including the state of Washington's network, the non-profit NoaNet, the Pacific Northwest Gigagpop, and state public safety facilities.

The fiber also has the potential to serve the region's digital equity and broadband universal service goals. Municipal-owned fiber eliminates the restrictions imposed by communications carriers on fiber, such as the I-Net, provided under franchise agreements; in this way, municipal-owned fiber offers the potential to provide services without restriction at locations on or near the Eastrail, including facilities that serve lower-income members of the community. For example, the Eastrail comes within blocks of a large number of the King County Housing Authority's facilities, offering the possibility that the Eastrail fiber could cost-effectively connect these facilities to enable provision of free or low-cost broadband access to members of the community that cannot afford costly high-speed commercial broadband services.[5]

2.2.2 Potential cost savings created by Eastrail fiber ownership

Government agencies lease circuits at rates that sometimes represent many hundreds if not thousands of percent profit for the lessor companies. And even as lease prices may come

[4] As the County and its partners consider this fiber and conduit investment, we recommend particular consideration of developing an accounting mechanism that can recognize the savings, avoided cost, and value delivered to the County and other public sector users of the fiber. In our experience around the country, public entities seldom account for the true value derived from their fiber assets, leading to the systematic under-valuation of this critical infrastructure.

[5] This potential strategy is discussed in detail in the December 2019 King County Broadband Access Study.

down over time, government needs grow, frequently requiring greater spending by the locality in aggregate. For this reason, we anticipate that the value to the County and the other public users of the Eastrail fiber will grow over time because, like the other publicly owned fiber in King County, public sector use will grow enormously without any corresponding increase in costs.

The Eastrail fiber thus offers a mechanism to mitigate the risk that future demands will exceed the capacity of affordable services and contain the associated exposure to unknown future costs.

2.2.3 Operational benefits of owning Eastrail fiber

In almost any community, the local government is the largest user of communications services, which are essential to government operations and public. In King County, the fiber owned and managed by the County and its C3 partners has delivered enormous operational benefits and savings. Fiber in the Eastrail would potentially secure similar benefits and savings by extending the public fiber assets and securing these routes for decades to come.

To understand these benefits, we first note that the alternative to municipal-owned fiber—a leased circuit—does have some advantages: For example, it does not require internal staff to operate and maintain the network; its upfront costs are lower than constructing municipal-owned fiber; and the time to activation can be shorter. Leasing, however, has critical disadvantages that make it much less desirable than municipal-owned and operated fiber, particularly with respect to public safety and emergency support services. Specifically, leased circuits mean a municipality does not have:

- Total control and management over its own network
- Ability to evaluate the reliability or availability of circuits because there is no transparency into the private provider's proprietary network and its physical infrastructure
- Independence of the networks used by the public, including the public internet, and would therefore be less secure and reliable
- Control over network security between the end points of leased circuits

Indeed, decades of experience demonstrate that owning or leasing dark fiber offers singular benefits to public entities—benefits that generally cannot be replicated with alternative services purchased from commercial carriers. These benefits include the following.

2.2.3.1 Facilitates control and management

A network built on leased network services obtained from a service provider cannot provide the control and management that is available in a municipal-owned and operated network. Leased network services are in essence a black box in terms of control and management. A municipality is forced to rely on the provider (usually the phone company) to maintain and operate the core equipment of a leased service (these tasks include configuring the equipment, monitoring the hardware and physical infrastructure, fiber splicing, service restoration, and performing routine maintenance).

Municipalities' internal capacity requirements include video, voice, and data communications. Both voice and video services usually require dedicated bandwidth. Two-way voice and video services require dedicated bandwidth and very predictable transmission delay properties. In other words, linking two-way radio communications systems or supporting videoconferencing over IP or using TDM connections requires the ability to manage bandwidth across the entire network. This functionality can be provisioned on the edge device when using a managed service provider for connectivity—but because a municipality owns and operates its own fiber network, it has control and the capability to increase bandwidth based on the municipality's time frame (which in turn allows a municipality to properly plan for integration of new applications without an increase in cost for provisioning of new bandwidth). Further, it offers the ability to implement advanced Quality of Service mechanisms that can be enforced on a network-wide, end-to-end basis.

Under the leased service model, the Eastrail fiber infrastructure owners and their stakeholder partners would need to request (and pay for) the private company to make changes in the core of the network for a new application, increase bandwidth, or to implement new policies for enhanced Quality of Service. Under the leased model, the fiber owners would also not be able to control who manages and maintains the core of the network. The knowledge, skill set, and security background of those operating the network would likely be beyond the control of the fiber owners.

In contrast, the Eastrail fiber infrastructure owners would control and manage each piece of the communications network. The fiber owners can choose to operate the network on their own with their own staff or outsource the operations to a contractor. Either way, choices regarding the management of the network are in the hands of the fiber owners.

2.2.3.2 Secures availability and reliability

The availability of a communications link is derived from the probability of a failure within the network between two points. Because the Eastrail fiber infrastructure owners would own and operate the fiber, they would have greater control over availability and reliability—which means they would have the benefit of greater operational stability.

By contrast, in a leased circuit network, the end user is not aware of all of the potential risks to availability of the network. Several key factors that affect availability and cannot be determined by the lessee include:

- Physical redundancy in the plant
- Physical redundancy in the building entrances
- Physical redundancy in the networking equipment
- Ensuring network equipment is properly configured and regularly tested to take advantage of hardware and link redundancy
- Redundancy for power and HVAC
- How many facilities the circuit crosses between endpoints
- Whether the plant is located underground or aerial
- Who has access to the core networking equipment and plant
- The core equipment's age and maintenance
- How the system is monitored and maintained
- The single points of failure in the communications link

Many of the factors can be approximated or relative numbers may be obtained from the leased circuit provider; however, for critical government services such as public safety, the approximations and availability estimates from leased network services may not meet the availability requirements of a critical traffic network. In the case of physical architecture issues, such as the physical routes of cabling, approximations are not sufficient, and detailed maps are usually considered proprietary and confidential to a commercial provider.

In addition, lessees are subject to the lessor's schedule for repair and maintenance of the circuit. Although it may be possible to include provisions in a service level agreement (SLA) for special priority service restoration, it is possible that SLAs will not be adhered to during major disaster events. Further, there may be no way to ensure that a leased circuit for public safety is the first link to be repaired during a major disaster.

A similar problem can arise in both scheduled and unscheduled maintenance of a leased circuit. The timing of these maintenance downtimes may not correspond to available downtimes in a public safety network. Because the County and its partners will own the fiber network, maintenance downtimes can be coordinated to minimize downtime and the fiber owners can prepare for an outage by adapting operational procedures.

SLAs often guarantee availability and repair time, but typically are not reliable in the event of a major disaster. In addition, service providers usually rely on cash rebates to compensate for network outages to the network—an unacceptable solution in the case of public safety, where cash cannot compensate for lost service.

2.2.3.3 Ensures independence from networks used by the public

A municipal communications network owned by government entities does not rely on physical infrastructure, equipment, or other resources that also carry public internet traffic for residents and businesses. In contrast, shared resources are used by a managed network service provider to reduce their cost by taking advantage of the statistical nature of communications traffic. In other words, commercial carriers intentionally oversubscribe their networks to minimize costs (maximize profits), because all of their customers are not likely (statistically speaking) to simultaneously use their services to full capacity all of the time. The advantage of an independent, municipal-owned network is that it is not affected by increases in public internet traffic or outages of networks used by the public.

Additionally, the only way to ensure that there is adequate bandwidth is to overbuild a network to support maximum capacity demand, not average utilization (while absorbing the cost even if the bandwidth is not used). Some leased managed services will charge only for the bandwidth that is used—but capacity is limited. Typically, these services are only cost-effective when institutions have a specific understanding of their applications' bandwidth requirements.

The Eastrail fiber infrastructure would provide a more reliable, higher-capacity, flexible network infrastructure because it would be designed to support a broad range of initiatives and to easily and seamlessly scale to meet new bandwidth requirements.

In addition, networks used by the public, such as the public switched telephone network (PSTN) and the internet, are often overloaded by traffic during major public safety incidents. This can lead to busy signals on the PSTN and a lack of connectivity on the internet. Municipal fiber networks typically do not experience the same traffic increases and can be designed to handle any expected traffic increase during a major incident.

A municipal fiber network like the Eastrail fiber infrastructure can also prioritize bandwidth both in the core and at the edge. This capability would allow the fiber owners to prioritize by location and to preempt all traffic other than public safety traffic, if necessary. More importantly, the Eastrail fiber infrastructure owners can allocate the infrastructure to ensure that sensitive traffic always has dedicated capacity, because capacity can be readily scaled as needed for other applications.

2.2.3.4 Enables transparency to understand network routing and configuration

Commercially obtained connectivity (whether dedicated leased options or simple internet access) traverses physical routes and electronics that are almost never disclosed to the lessees of those services. Some localities have learned the hard way that obtaining services from competing providers as redundant backup did them little good because it turned out both providers had leased physical lines in the same fiber optic bundle that was cut.

Similarly, how traffic is routed in a network matters. If it is all routed to the same central hub where there is a failure, even two government sites physically close to each other may be unable to communicate through such dedicated lines. The Eastrail fiber infrastructure owners would be able to mitigate such vulnerabilities with proper design and operations of the fiber, but that control would disappear if other providers were to design, light, and manage the network.

For proper risk assessment and risk mitigation—truly essential functions of any network manager—the transparency of such information is key.

Fiber owners can physically split the light on a fiber strand into multiple wavelengths to allow different electronics for each, essentially creating multiple physically separable and routable networks. This would be especially useful where fiber counts are scarce and in mixed network environments: some can be for open access commercial partner use, others for federal partners, and some for internal use.

Similarly, separation and capacity can be managed electronically with separate VPNs, each with its own rules and uses. Such flexibility is rarely possible for entities that do not own the network. In addition, the time it takes to turn up such services can be very long as the provider often needs to do its own internal management with multiple internal partners, and a long procurement

process may be necessary. In contrast, the Eastrail fiber infrastructure owners would be able to turn up such services relatively quickly because they would control the infrastructure.

2.2.3.5 Ensures control over network security

Implementation of network security on a leased circuit typically occurs at the edge of the network. Many leased networks use end-to-end encryption to securely transmit data over networks that share a core network with public users. Frequently, the provider of a leased circuit may dictate what types of end-to-end security are allowed on a leased circuit (IP managed services, for example).

The Eastrail fiber infrastructure owners would be able to control end-to-end security throughout the network infrastructure—including elements of data security and physical security, such as:

- Access to facilities and networking rooms
- Passwords to edge equipment and firewalls
- Network access and authentication
- Monitoring of networking rooms, including security alarms, surveillance cameras, etc.
- Desktop security
- Equipment placement and provisioning

2.2.3.6 Enables segmentation

Good security with smart segmentation capabilities—from fiber and physical electronics, to virtual network segmentation—is critical to both internal government operations and working with partners and user groups. The Eastrail fiber infrastructure would offer its owners the ability to segment traffic—either by allocating strands of fiber or segmenting the light within a strand—which would maximize the potential uses and benefits of the fiber across its range of users.

Physical separation with different strands of fiber is appropriate and desirable when partnering with private sector or higher education partners who are able to light the fiber and provision their own networks with electronic equipment. Allocating different strands to different entities allows those entities to assume their own risk and liability for network operations.

For governmental uses of the network, segmentation of the light in a fiber strand into discrete frequencies (a technology called multiplexing) allows for further physical segmentation. This requires optical equipment at each end, which imposes a burden of responsibility to keep the

signal going (including ensuring power and protection of the equipment), but the burden is rather small, and this method is often used as alternative to building costly additional strands. Multiplexing can maximize the cost-effective use of even a single pair of fiber.

For internal separation among public safety, financial, and regular internal traffic, segmentation is typically implemented with electronics. More robust equipment allows for segmentation that can allocate bandwidth and prioritization to specific classes so public safety can be prioritized. Other methods allow for encryption and simulation of separate virtual networks. Segmentation is critical to managing the different policies that attach to traffic (e.g., how sensitive is the data? What quality of service does it need?). More interconnection and more partnerships require more options in terms of fiber and electronics to facilitate communications.

The different types of segmentation are key to managing security. Sometimes such decisions are explicitly stated as requirements. For example, some sensitive federal data require total physical isolation of systems. But in most cases, segmentation is a matter of risk management. Segmenting traffic on the Eastrail fiber infrastructure would allow network and security managers to better isolate traffic, to quarantine threats without affecting other critical communications functions, and to more quickly restore services.

2.2.3.7 Supports last-mile broadband deployment

If fiber in the Eastrail is made available on a competitive basis to commercial and non-profit service providers, it may serve as a platform for new last-mile broadband. Access to middle-mile fiber can reduce the length of connections necessary for a service provider to reach neighborhoods where it may want to invest; provide higher quality, lower-cost internet connections for local providers; and provide more options for backhaul to wireless sites that can support local wireless ISPs (WISP) and enable mobile network operators' (MNO) expansion.

Open access long-haul and middle-mile fiber represents a proven model. For example, from 2009 to 2011, the federal Broadband Technology Opportunities Program (BTOP) awarded $3.5 billion in grants for fiber to anchor institutions like schools and libraries, with a requirement that excess fiber be available for use by ISPs. Generally, those projects that adhered to the open access rules were successful in modestly expanding rural broadband and improving service in metropolitan areas. In one notable case, the statewide Maryland middle-mile project facilitated expansion of wireless in some remote areas, reduced commodity internet costs for small ISPs throughout the state, and enabled connection of WISP facilities in suburban and rural areas to data centers in the Washington, D.C./Baltimore metropolitan area. In Washington, the NoaNet open access fiber network connected numerous anchor institutions and made available competitive capacity for ISPs seeking to reach new markets.

3 Background regarding dark fiber market, lease structures, and pricing

This section of the report summarizes relevant considerations regarding the dark fiber market generally, lease structures, and factors in dark fiber pricing.[6]

3.1 The dark fiber market

Generally, all dark fiber fits into three categories, with some sub-categories: (1) long-haul fiber, connecting towns, cities, or regions to each other; (2) metro-area fiber, connecting locations and facilities within a city or metropolitan area; and (3) distribution fiber, "passing" homes and businesses throughout a community as part of a fiber-to-the-premises initiative.[7]

The fiber in the Eastrail will have the potential to serve both long-haul needs (i.e., traversing a long swath of the County) and metro-area needs (connecting to fiber within the County that then extend to data centers and communications users).

For each of these categories, the dark fiber market is much like the real estate market, in that the value of fiber is location- and market-specific. Unfortunately, it is *not* like real estate in that there exists little publicly-available transaction data by which to understand individual markets or on which to base local pricing decisions. This remarkable national lack of reliable and comparable data makes it challenging to project lease revenues.

3.2 Factors in dark fiber lease pricing

Dark fiber is generally priced on a per strand per mile basis for a set term. Usually, the lease price is for fibers on an existing fiber network, and the lessee is charged the incremental cost to connect its facility to the closest access point on the existing fiber route. Additional fees are also assessed for colocation, splicing, make-ready, and rack space. Some entities also charge an upfront fee to cover administrative costs.

Dark fiber pricing varies greatly among markets and, even in the same market, among carriers. Pricing is route-specific, location-specific, and sometimes frankly arbitrary. Pricing and structures vary greatly based on region, population density, volume, availability of alternate communications services, cost structures, and other factors.

Reasonable pricing models are wide-ranging and influenced by numerous factors, including the location and urbanity of a region and the avoided construction costs. While cost recovery is a

[6] In addition, Appendix A contains a summary of how cities and counties use their dark fiber pricing to incent and enable certain kinds of policy goals, including competition and last-mile broadband deployment.

[7] The Eastrail strategy does not contemplate distribution fiber and is therefore not discussed here. Unlike most long-haul and metro fiber, pricing for distribution fiber will be based on passings rather than on miles.

fundamental objective of lease pricing, ultimately it is what the market is willing to pay that determines pricing. IRU and lease rates vary widely across the country. We have found that, nationwide, shorter-term dark fiber leases can range from $20 to $2,500 per strand per mile per month, based in part on whether a location is urban or rural and whether alternative options exist. This is a large range that reflects the importance of local factors in setting rates.

Metro-area prices are generally higher (on a per mile basis) than long-haul fiber. Within the metro-area category, more urban routes are generally more costly than routes in suburban and exurban areas, depending on existing and potential supply in the urban market. Occasionally, an urban market will prove to be surprisingly cost-effective, usually because a glut of fiber has had the competitive impact of pushing pricing down.

Pricing on major routes is generally more consistent than metro-area pricing, at least in the non-profit sector. Non-profit and public entities tend to publish their rates and offer them to all lessees (though sometimes with discounted pricing for specific types of lessees, such as schools or government), while for-profit entities usually will price dark fiber only on a custom basis and hold pricing data and factors very close to the vest.

Pricing will be higher for routes on which it is particularly difficult to build fiber because the asset represents a singular opportunity unless there exist accessible alternative routes. This is the case for particularly costly build areas, such as urban cores, across rivers or highways, and across mountain paths without roads.

3.3 Dark fiber lease structures

The communications industry in the United States has evolved a range of dark fiber lease structures over the decades of fiber deployment and operations. These structures are used by a full range of entities that own or use fiber, including public, private, and cooperative entities. The structures serve a range of goals, including those related to accounting and tax treatment, but for purposes of this analysis, the structures involve an interplay of two critical elements: first, length of fiber lease/lease and, second, cost. The longer the term, the lower the effective monthly payment, giving the user an effective discount in return for a long-term commitment and (usually) an upfront payment.

Upfront payment plus maintenance. Most commonly, dark fiber is leased or leased for up to 20 or more years through a specialized leasing vehicle known as an Indefeasible Right of Use (IRU). The customer pays a substantial upfront fee, generally calculated based on number of fiber strand miles leased, as well as a recurring annual maintenance charge. The maintenance charge is calculated on route miles, not strand miles.

The upfront payment usually covers the entire term of the IRU, while the maintenance and colocation portions of the contract are variable or change based on predetermined measures, which allows for cost adjustments (modest in the case of maintenance) based on industry trends or inflation.

For the fiber owner, the benefit of this model is that it produces a substantial inflow of funds early in the IRU term. On the other hand, the model will not result in recurring annual revenues over the long term, beyond a portion of the cost of maintenance.

Per annum or per month pricing. This structure is used primarily for shorter-term commitments, which benefits a lessee that prefers a shorter-term financial obligation or that cannot pay a large upfront IRU fee. For the fiber owner, it also offers the flexibility of a shorter commitment and the chance to increase prices over time or lease to other lessees. In addition, it may increase the number of potential dark fiber lessees by making the initial costs more accessible.

Net pricing over the term of the lease is usually higher than in the upfront payment model over the same period.

4 Potential for market revenues and savings to cover fiber costs

To determine whether the potential combined avoided cost and revenues of the projects could meet or even exceed the projected costs of the project, we developed market data from around the country that shed light on potential lease costs and revenues on the Eastrail.

We applied the data to two different means of pricing fiber: first, long-term leases that require upfront payment for the entire term and more modest annual contributions toward maintenance, and second, shorter term leases that are priced on a per month basis with the lease fee and maintenance contribution built into the monthly price.

4.1 Potentially analogous dark fiber market prices in other areas

In light of the challenges securing dark fiber pricing data for King County itself, we researched other markets to understand potentially analogous pricing models. As is discussed above, there exists only limited public data regarding dark fiber pricing, and pricing is extremely location-specific, but with those caveats, we analyzed the Eastrail opportunity in light of the lease prices summarized in Table 1.

Table 1: Dark fiber lease rates in other areas

Location	Fiber lessor (owner)	Monthly rate per strand mile[8]	Term
Arizona urban	Commercial entity	$450	Monthly
King County area	Local jurisdiction in the King County area	$83	Monthly
Colorado urban	Commercial entity	$22, paid upfront, plus monthly maintenance fee	20-year IRU
Burbank, CA	Burbank Utilities	$200	Monthly
East coast urban	Commercial entity	$22, paid upfront, plus monthly maintenance fee	20-year IRU
Eugene, OR	Eugene Water & Electric Board	$57	Monthly, for 1 to 5 years
Palo Alto, CA	Palo Alto Utilities	$177	Monthly
Riverside, CA	Riverside Public Utilities	$125	Monthly

[8] Generally, these are the per mile prices offered to commercial entities. In some cases, public and non-profit fiber owners offer lower pricing to public entities such as schools. In addition, the pricing offered by commercial entities is not standardized or based on a published rate sheet but is rather generated on a case-by-case basis.

4.2 Application of analogous pricing to Eastrail costs

As is discussed in the July 2019 paper,[9] Eastrail conduit and fiber construction costs are estimated to range from $6.6 million to $12.6 million and operations and maintenance costs are estimated at $75,000 per year, exclusive of debt service.

The July report summarized the costs under the various construction scenarios as follows:

Table 2: Annual cost summary and revenue requirement for all construction scenarios

	Scenario							
	A1		A2		B1		C1	
	Conduit – Fiber and innerduct in one		Conduit – Fiber in one and innerduct in all		Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)		Single Conduit – Fiber and innerduct in one (one large handhole vs four handholes in "A" scenarios)	
	Low	High	Low	High	Low	High	Low	High
P&I (20 years at 6%)	$642,290	$769,630	$741,000	$888,100	$606,960	$727,250	$469,430	$562,210
Operating expenses	59,100	59,100	59,100	59,100	59,100	59,100	59,100	59,100
Depreciation reserve	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Required revenues	$717,390	$844,730	$816,100	$963,200	$682,060	$802,350	$544,530	$637,310
Required revenues without P&I	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100	$75,100

As the July paper discusses in more detail, for the lowest-cost scenario (C1), revenues of $544,000 to $637,000 per year would be required to fully cover all costs, including debt service, over a 20-year debt term. For the highest cost scenario (A2), revenues of $816,000 to $963,000 would be required to fully cover all costs, including debt service.

Under all of the construction scenarios, revenues of only $75,000 would be required to cover operations and maintenance but not debt service.

At the pricing used by the local jurisdiction in the King County area ($83 per month per strand mile), ongoing lease of three strands throughout the 28-mile initial phase of the Eastrail project would produce $83,664 in revenue. more than covering the $75,000 annual operations and maintenance cost of any of the construction scenarios. A hypothetical lease of 30 strands under

[9] *Eastrail Corridor Fiber and Conduit Feasibility Analysis,* prepared for Eastrail Stakeholders, July 2019.

this scenario would product $836,640 in revenue. This would cover the $75,000 in operating costs and $761,640 toward capital costs, covering all or most of the potential annual debt service on capital costs under the various scenarios presented in the July 2019 report. (As described in Table 2, the estimates of these costs, plus $16,000 in depreciation reserves, range from $485,430 for the low estimate in Scenario C1 to $904,100 for the high estimate in Scenario A2.) We note that all construction scenarios include constructing a single 288-strand fiber cable.

Given the interest shown by the providers with whom we met, we feel confident that the leasing requirement to cover operations and maintenance will be achievable given the local jurisdiction's pricing. The likelihood of covering debt service, however, is less certain. While not infeasible, we do not have enough market data to conclude that the revenues required are certain. We emphasize that pricing may need to be lower than the local jurisdiction's pricing, the desired fiber routes may be shorter stretches, and volume discounts may need to be applied.

If, however, we recognize the savings to the Eastrail fiber infrastructure owners and other public sector stakeholders associated with the new fiber capabilities, the financial picture is more robust. The savings to the fiber owners, relative to leasing dark fiber from a commercial carrier on the private market, can be measured based on the same pricing data points discussed above—and demonstrates that the savings alone will cover much of the cost to the fiber owners of even the more costly construction scenarios.

To be conservative, we applied to this analysis the lowest of the lease prices summarized in Table 1:

For a 20-year IRU, we applied the costs paid by a public entity in an urban East Coast area. The city leased dark fiber at $22 per strand mile per month for a 20-year term, paid in total upfront, plus an annual maintenance fee of $250 per route mile per year. Applying this model and assuming that the Eastrail fiber infrastructure owners collectively pay for a 24-count fiber IRU (a relatively low number of fibers compared to what they could access by building themselves) across 27 or so miles that approximate the routing of the Eastrail, the upfront cost to the public entities for the 20-year IRU would be $3.4 million and the annual maintenance cost would be $6,750. For a 48-count fiber IRU, the upfront cost would be $6.8 million. This avoided cost represents an amount equal to more than half of the capital cost of building the entire asset.

For a one-year lease, we applied the costs charged by the Eugene Water & Electric Board in Oregon, where the city's utility leases fiber to commercial entities at a cost of $57 per strand mile per month for a one- to five-year term, paid on an annual or monthly basis. Assuming that the County and its public partners collectively leased 24-count fiber (again, a relatively low number of fibers compared to what they could access by building themselves) across 27 or so miles that

approximate the routing of the Eastrail, the annual cost for the fiber lease would be $443,000. For 48 strands of fiber, the annual cost would be $886,000. This avoided cost represents an amount equal to all or most of the cost of annual operations of the fiber, including debt service.

4.3 Summary of potential revenues and savings of Eastrail fiber project

This analysis is summarized in Table 3.

Table 3: Summary of potential revenues and savings of fiber and conduit project

20-year IRU cost analysis	**Estimated costs and savings**
Capital cost[10]	$6.6 to $12.6 million
Avoided cost to public stakeholders of 20-year IRU for **24-count** fiber, based on lowest analogous cost (East Coast city, $22 per fiber mile)	$3.4 million
Avoided cost to public stakeholders of 20-year IRU for **48-count** fiber (East Coast city, $22 per fiber mile)	$6.8 million
Annual cost analysis	
Annual operations and maintenance cost, per year, including debt service	$540,000 to $960,000
Avoided cost to public stakeholders of one-year lease of **24-count** fiber, based on lowest analogous cost (Eugene, OR, $57 per month)	$443,000
Avoided cost to public stakeholders of one-year lease of **48-count** fiber, based on lowest analogous cost (Eugene, OR, $57 per month)	$886,000

Thank you for the opportunity to develop the analysis, which will help inform the investment decision for building a communications use within the Eastrail. The development of Eastrail in King County presents the opportunity to build future-proof conduit and fiber optic lines through a significant portion of this fast-growing metropolitan area. Fiber and conduit infrastructure along the Eastrail will enable decades of communications services to meet the region's public sector needs. Meeting those needs represents a significant part of the potential return on investment in the event that the Owners and their other public partners choose to build fiber assets in the Eastrail.

[10] For a detailed discussion of the capital and operating cost estimates, including debt service assumptions, please see the July 2019 report.

Appendix A: Strategies for using dark fiber pricing to achieve goals

Pricing is one means by which a dark fiber owner can attempt to achieve goals based on policy priorities as well as financial goals. In our experience, both public and private entities have developed fiber and lit service pricing for the purpose of addressing policy goals such as competition in the last-mile market. The sections below offer examples of some of those goals and the pricing strategies that can help achieve them.

One complication, however, is that policy objectives can be in opposition. On one hand, for example, pricing must be high enough to meet revenue goals and discourage customers from leasing unnecessary capacity, whether simply by being wasteful or attempting to control the fiber to block access by competitors. On the other hand, policies and pricing must not discourage potential customers or involve so much cost that the first dark fiber customer is able to undercut the Eastrail fiber infrastructure owners' leasing opportunity by selling other entities lit services over the fiber it has itself leased.

Encourage development of a competitive ISP market

Through very attractive pricing, a fiber owner can seek to attract multiple competitive providers into the market of providing services over certain fiber routes. Pricing for particular routes can be set with consideration of how much competition the owner would like to enable: lower pricing, such that the fiber becomes a resource that is affordable to mid-size users, not only the most sophisticated users, is likely to mean more users.

A fiber owner can price different routes and segments at different amounts, for the purpose of encouraging use in particular areas, perhaps especially those that are less in demand—so long as the fiber owner is comfortable with the modestly greater administrative effort to manage the differently priced segments.

The goal of encouraging use and competition sometimes merits the fiber owner (or its agent) lighting the fiber and offering more accessible services to smaller users. While access to dark fiber on desirable routes greatly reduces the barrier to providing services over that route for those that can take advantage of it, dark fiber access does not lower barriers to competition as effectively as can lit services. This is because there is still considerable cost and complexity in lighting and operating an optical network over dark fiber. Only a sophisticated, well-funded company will have the scale and capacity to do so. Given the cost involved and the potential competition in the market created by the dark fiber itself, it's not likely that more than a small handful of entities would be interested in leasing dark fiber in the near term. Indeed, the market, depending on how the fiber is priced, may support only one or two lessees for the foreseeable

future. (Over the long term, however, market demand and structures may change and new opportunities for dark fiber competition may arise.)

In contrast, access to lit services over the fiber can provide low-cost transport to many service providers, including very small operations with modest resources, at low incremental cost. Lighting the network in the first place is costly, but the platform can then add additional competing providers quickly and cheaply.

At the same time, so long as dark fiber is licensable, the market frequently will provide alternative services for the smaller entities that can't afford to lease and light it themselves. Unless precluded by contract terms, a dark fiber lessee on a desirable route is likely to sell lit services to other entities, including smaller ISPs—thus partially filling the role of providing lit services that the fiber owner has declined. That said, an ISP lessee is less likely to be neutral or non-discriminatory in selling lit services to its competitors, so the prospect of a fiber lessee as wholesaler is not exactly equivalent to the outcome if the neutral fiber owner is the lit services wholesaler, and the result may be less competition than would otherwise emerge.

A fiber owner can also use lease pricing to incentivize last-mile construction investments, particularly in areas that the fiber owner seeks to prioritize for such deployment. In this scenario, the fiber owner would offer reduced pricing (dark or lit) in cases where the customer commits to building last-mile connections that capitalize on the access. That preferential pricing could even be improved further for investments in certain high-priority target areas.

Rather than giving reduced pricing upfront, some fiber owners provide rebates or credits for lessees once they meet their commitments to invest in last-mile construction—for example, based on a sliding percentage of lease fees.

In most circumstances, this strategy has only limited efficacy because the cost of the long-haul or middle-mile connectivity represents a relatively small percentage of the cost for an ISP of deploying and operating last-mile facilities. That said, in circumstances such as those in the County's current case, the credit could represent significant value for a lessee given that the value of the fiber routes under construction is high and the routing itself so singular.

One additional, important means of encouraging competition is to limit the amount of fiber that an individual customer can lease. This is a practice that has been adopted in cases where the fiber owner was concerned about a well-resourced entity leasing most or all of its available strands and then "squatting" on them—effectively reducing competition by tying up a large proportion of the available inventory. Given the abundance of planned Eastrail fiber, this may

not serve to be a concern, but the County may wish to consider limiting any individual lessee to no more than 50 percent of the available asset.

In addition, **pricing can encourage local buildout by creating incentives for use of the dark fiber within the state.** This would entail some combination of limiting the amount of fiber that can be leased to entities that do not operate in King County (i.e., those that use the fiber only as part of a long-haul connection) and higher pricing for such entities.

Support local companies

In particular for public fiber owners, including localities and states, one policy priority is to enable companies within the jurisdiction or state to compete in the broadband market. In these cases, fiber owners offered preferred pricing for local companies.

Maximize revenue

Dark fiber owners frequently seek to maximize revenue by maximizing the number of lessees. But such an approach can backfire if increasing the number of customers lowers the market price of the fiber because of the increased competition and new lit services offered by lessees. Depending on the customers' intended uses for the dark fiber, too, the first lessee could have a business opportunity that is stronger than any other.

To reduce that risk, some dark fiber owners lease newly-available fiber all at once through a competitive process that establishes pricing levels and that mitigates the challenge of lack of information about comparable pricing (especially for singular dark fiber routes).

In another strategy that seeks to maximize revenues (and reduce administrative costs), some fiber owners charge a premium for exclusive leasing of a significant amount of fiber to a single entity whose business model is to wholesale service to other ISPs and offer services itself. Through individual negotiations, auction, or RFP process, the fiber owner awards the lease to the highest bidder that is also willing to commit to wholesaling services to other entities.

Appendix B: Glossary of terms

Dark Fiber – Fiber optic strands that are installed in underground conduit or attached to utility poles, but are not "lit" by network electronics; these fibers are "dark" in that communications are not passing through them.

Dark Fiber Lease – A contract to lease dark fiber, typically for a shorter term than that in an IRU agreement, paid on a month-to-month or annual basis.

Fiber-to-the-Premises (FTTP) – A network architecture in which fiber optics are used to provide broadband services all the way to each subscriber's premises.

Internet Service Provider (ISP) – An organization that provides services over wired or wireless technology enabling customers to connect to the internet.

Indefeasible Right of Use (IRU) – A long-term agreement, typically covering up to 20 years, under which the customer purchases the right to use dark fiber strands on a network.

Last-Mile – The communications infrastructure that connects a network to end users' premises.

Lit Fiber – Fiber optic strands that are "lit" with network electronics and used to deliver broadband services to end users.

Middle-Mile – The communications infrastructure that connects from a network operator's core operational equipment to equipment near end users; this infrastructure does not connect to the users themselves, but brings connectivity close to them and connects to the last-mile.

Outside Plant (OSP) – The physical infrastructure portion of a network (also called "layer 1") that is constructed on utility poles (aerial) or in conduit (underground) and that is largely located in the public rights-of-way.

ctc technology & energy

engineering & business consulting

To: Eastrail Stakeholder Team

From: Mitch Hergett, Senior Engineer, CTC Technology & Energy
Matthew DeHaven, Vice President for Fiber & Infrastructure, CTC Technology & Energy

Re: Eastrail Fiber: Business and Technical outcomes analysis from Stakeholder outreach meetings between July and August 2020

Date: October 23, 2020

CTC held a series of outreach meetings with the Eastrail Stakeholders beginning in late July-early August to obtain their input related to the business outcomes and objectives for the Eastrail fiber asset. Follow-up inquires and meetings were conducted over the subsequent months to confirm and further refine the initial input provided by the municipal Stakeholders as well as obtain additional input from other stakeholders such as Pacific Northwest Gigapop.

The purpose of this memo is to provide a summary of the input received from the Eastrail Stakeholders and to **request that any necessary clarifications or elaborations be provided in follow-up no later than October 30, 2020.**

Our analysis found there to be a general consensus around most business and technical objectives and outcomes. We have summarized our findings below and will use this information to define the terms and requirements of the Request for Proposals document to be issued by King County in December 2020. We anticipate this will take the form of minimum requirements that the bidder must meet, while allowing for flexibility around many business parameters and specific mechanisms for achieving the overall objectives of the initiative.

Business Outcomes and Objectives:

The full range of partnership and ownership approaches presented in the fiber feasibility study remain open for consideration.
There were three primary scenarios defined in the feasibility study:

- Publicly funded project – Eastrail right-of-way owners implement, own, and operate the infrastructure
- Privately funded project - Private entity implements, owns, and operates infrastructure
- Public-private partnership - Joint public-private or public-nonprofit ownership and operations of the infrastructure

All Stakeholders were amenable to any of the approaches presented by the feasibility study and no approach was deemed unworkable with the caveat that terms of each approach could be defined to meet

the desired business outcomes and objectives – in particular those around municipal control over usage of some portion of the installed conduit and/or fiber capacity. What this means in terms of the RFP document is that more response options are available to the perspective bidders and we can expect a wider range of proposed partnerships. This also means that contract terms relating to items such as municipal control, asset ownership, and operations must be clearly defined so they are achieved under any selected approach.

The anticipated value of the Eastrail fiber infrastructure lies primarily in its potential to promote economic development and generate revenue for the right-of-way owners. There is broad consensus that the primary value of the fiber asset for the municipalities lies in potential revenues from leasing fiber and conduit capacity and less direct "off-the-balance-sheet" benefits - promoting economic development opportunities for private investment in the region; and supporting digital inclusion initiatives to better serve the residents of each municipality. It is the goal of the Eastrail Stakeholders that the fiber infrastructure will reduce barriers of entry to competitive and innovative broadband service offerings in their communities.

The municipal Stakeholders indicated they have sufficient connectivity for internal needs through their own networks as well as regionally through membership in the C3. The addition of fiber along the Eastrail will not provide significant cost offset for existing telecommunications services, but it may provide municipalities with some network resiliency though route diversification.

There is a desire for municipal control of the fiber asset. While the Stakeholders have varying preferences on how municipal control would be achieved, ranging from ownership to simply requiring that no restrictions be placed on the use of the fiber/conduit allocated to the municipalities, there is consensus around the need for control of the asset. Having municipal control over the fiber asset will ensure the Stakeholders can undertake economic development and digital inclusion initiatives even if they are in direct competition to the private partner controlling the non-municipal portions of the asset.

As noted above, internal and regional connectivity needs of the Stakeholders are already being met by their municipal networks and the C3. However, it was identified that some portions of the C3 fiber are subject to usage restrictions, primarily limiting its use to non-commercial services for public, educational, and governmental entities. Ensuring there are no usage restrictions on the fiber asset will be important in order to differentiate the Eastrail fiber from what is already offered by the C3.

There is a desire to obtain a tangible return on the Stakeholder investment. As noted above, the lack of internal use for the fiber asset suggests that the value of the fiber asset for the municipalities is tied to revenue generation, economic development, and community benefit. While equally important, it will be difficult to quantify the value that the Eastrail fiber asset will provide in terms of facilitating economic development and community benefit. The direct revenue generated from the asset will be the only discernable way to provide justification of the investment.

In terms of the procurement process, a return on investment can be accomplished in a variety of scenarios ranging from the stakeholders providing 100-percent of the initial investment and establishing contract terms with the selected partner to recoup the upfront cost through ongoing payments over a period time

to the perspective partner providing initial investment, providing the Stakeholders with a "free fiber asset" but little to know ongoing revenue.

There is a need to outsource the network operation. While many of the Stakeholders can perform fiber maintenance, either through inhouse staff or contractors, they do not have the additional capacity required to expand services to the Eastrail fiber asset. It was also identified that a consolidated approach to maintenance and operations across the corridor, to include uniform technical standards for maintenance and repair response, would be more attractive for a potential private partner and any network customers. Additionally, no stakeholder felt they had the ability to broker dark fiber leases on the scale that would be required for the Eastrail fiber asset. This indicates that the Stakeholders would require a partner who could handle the operation of the asset regardless of the ownership model selected.

Technical Requirements Outreach:

In addition to input received during discussions with Stakeholders held in late August-early July, each provided responses to CTC's information request document "*Eastrail Fiber Infrastructure RFP Stakeholder Information Request 9.9.2020.docx*". The purpose of the data request was to identify required technical parameters for the design, construction, and maintenance of the fiber and conduit assets, including processes for permitting and the impact of other planned and ongoing projects along the Eastrail corridor.

The information provided by the Stakeholders is being used to develop the technical requirements sections of the RFP along with various appendices which will help bidders better understand the scope of work required.

The more detail we provide in the RFP the more likely we are to receive better responses, in terms of both project understanding and accuracy cost proposals. To that extent, CTC will be following up directly with Stakeholders to obtain further clarification or additional details related to their technical requirements.

Stakeholder Matrix:

The complete matrix of summarized Stakeholder responses is attached as an appendix (*Stakeholder Outreach Matrix 2020.10.19_v5.xlxs*). Please review this document and provide any updates or edits you feel are warranted to better represent your entity's position and objectives. Once all feedback is returned, CTC will issue an amended matrix to the Stakeholder group. We respectfully request your follow-up no later than October 30, 2020.

Business Outcome Questions	Feasibility Analysis Results Summary (January 2019 through January 2020)	Bellevue
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	The feasibility study presented the three business objectives and recommended that the Stakeholders work to identify their preferred option over subsequent phases.	At this point the City feels every option is still on the table. •Questions remain around the financial investment needed, as well as understanding the balance of limiting financial risk vs maintaining municipal control •Understanding what control would be possible under private ownership is important
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Investor.

Business Outcome Questions	King County	Kirkland
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	King County is open to any option and would prefer to not limit the approach in order to maximize the number or respondents.	Kirkland is open to any of the Business approaches. The City is interested in obtaining as much control of the asset as possible while mitigating the risk (financial or otherwise). Self-governance is important to the City and they would be more inclined to invest in this type of model The City is ok with Privatization of the fiber asset under the right scenario.
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	Owner and Investor.	Owner and Investor.

Business Outcome Questions	Pacific Northwest Gigapop	
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	N/A	
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	Customer.	

Business Outcome Questions	PSE	Redmond
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	PSE's existing infrastructure in this area is sufficient to meet the Company's needs for its internal communications system, and did not participate in the requirement gathering process.	The City of Redmond is open to all options at this point. However, Redmond's current fiber assets are City-owned and they would be inclined to have public ownership and control over this fiber asset as well. Control over how the fiber is used (especially the municipal portions) is key.
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	Entity protecting its own assets in the corridor.	Owner and Investor.

Business Outcome Questions	Renton	Snohomish
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	The City is open to any of the approaches, depending on the identified risk associated with each approach.	The County is open to any approach at this point and will possibly utilize the same approach that the King County stakeholders adopt.
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	The City is more willing to provide investment if the ROI is defined. If the ROI is not certain, they would be inclined to allow others to carry the risk. The availability of funds at the time of deployment may also play a role in how the City approaches investing into the asset.	Owner and Investor (in a subsequent phase).

Business Outcome Questions	Sound Transit	Woodinville
1) Of the three Business objectives presented in the feasibility study, which does your Jurisdiction currently prefer? •Publicly funded project - right-of-way owners implement, own, and operate the infrastructure •Privately funded project - Private entity implements, owns, and operates infrastructure •Hybrid / public-private partnership - Joint public-private or public-nonprofit build, ownership, and operations	Sound Transit is currently ok with any of the three business options as they are all better options (financially) than current connectivity options available to them.	Woodinville feels that any of the three business objectives would be feasible as long as the City does not have to handle the operations. The City does not want to be a fiber utility, at least not within the next 10 years.
2) How do you anticipate your Jurisdiction will participate in this project? •Owner •Investor •Customer •As an entity protecting its own assets in the corridor	Customer and Trail Owner. (Sound Transit owns 1.1 miles of fee interest for the rail corridor and have an easement along the rest of the corridor).	The City would be fine with being an owner of the fiber asset as long as operation and management is handled by others. This could be a public entity like King County or a private partner The City would most likely prefer not to own the asset under most circumstances.

Business Outcome Questions	Feasibility Analysis Results Summary (January 2019 through January 2020)	Bellevue
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	Stakeholders that participated in the feasibility study provided the following use cases for the fiber asset: •Eastrail Corridor uses – Smart Trail applications •Cost avoidance •Stakeholder operations •Network resiliency •Regional connectivity •Smart communities •Broadband availability – Digital Inclusion •Economic development •Revenue generation •Other uses – backhaul for future 5G opportunities, etc.	Both the Digital Equity and Economic Development initiatives are important to the City as their other needs are already met through existing fiber. •If a private model is selected it is important that we ensure they are a good partner for what the municipalities want to accomplish •Creating an eco-system that benefits all telecom providers may provide better service to all A return on investment would also be desired.
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Breaking even and getting community benefit would be great. Obviously, revenue and benefits would be ideal.
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	Stakeholders identified the following use cases in the feasibility study: •Eastrail Corridor uses – Smart Trail applications •Cost avoidance •Stakeholder operations •Network resiliency •Regional connectivity •Smart communities	Due to the City's robust fiber network there would be no additional internal uses provided by the Eastrail fiber that are not already met by existing fiber. Meaning there is not real cost avoidance value for the City from this fiber. Additionally the City already has regional connectivity and connections to key data centers (Weston building and Sabey) via the C3 fiber. •The C3 fiber is comprised of existing connections and there are some areas along the route with use restrictions •Where the Eastrail fiber could provide tangible benefit is by not having the same use restrictions that limit what can be done via the C3 fiber The Eastrail fiber could provide some network resiliency for the City

Business Outcome Questions	King County	Kirkland
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	Digital Equity, Economic Development, and revenue generation.	Both the Digital Equity and Economic Development initiatives are important to the City as their other needs are already met through existing fiber. A return on investment would also be desired.
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	Both things are important, not determination was made on which has priority.	Both things are important, not determination was made on which has priority.
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	The County's internal and regional needs are met by their existing fiber connections, no additional internal uses for Eastrail beyond network resiliency.	The City's internal and regional needs are met by their existing fiber connections, no additional internal uses for Eastrail beyond network resiliency.

Business Outcome Questions	Pacific Northwest Gigapop	
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	Access to fiber strands to serve potential customers. Though much of the Eastside is already connected.	
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	N/A	
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	Access to fiber strands to serve potential customers. Though much of the Eastside is already connected.	

Business Outcome Questions	PSE	Redmond
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	N/A	Both the Digital Equity and Economic Development initiatives are important to the City as their other needs are already met through existing fiber. A return on investment would also be desired.
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	N/A	Both things are important, not determination was made on which has priority.
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	N/A	The City's internal and regional needs are met by their existing fiber connections, no additional internal uses for Eastrail beyond network resiliency.

Business Outcome Questions	Renton	Snohomish
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	Renton's needs would be based around economic development and revenue generation.	Economic Development uses were discussed on the call. A return on investment would also be desired.
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	Both things are important, not determination was made on which has priority.	Question not addressed on call.
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	The City does not need the Eastrail fiber to augment or replace any current internal uses, so there would be not cost offset with the addition of this fiber. C3 fiber already exists to provide inter-jurisdictional connections and connections to the cloud. The Eastrail fiber would not have any use restrictions placed on it (some portions of C3 have use restrictions).	Question not addressed on call.

Business Outcome Questions	Sound Transit	Woodinville
3) What does your Jurisdiction want from the Eastrail fiber asset? •Fiber strands available for internal (municipal) use •Dark Fiber/Conduit leasing as a revenue source •Dark Fiber/Conduit leasing as a driver of economic development along the corridor	Internal use.	Both the Digital Equity and Economic Development initiatives are important to the City as their other needs are already met through existing fiber. A return on investment would also be desired.
4) How would your Jurisdiction rank the importance of ROI vs open access and digital equity initiatives?	N/A	Both things are important, not determination was made on which has priority.
5) Does your jurisdiction intend to use the fiber for internal connectivity needs? •Would any of these uses be for Public safety? •Would any of these uses be for inter-governmental connections?	Sound Transit has a need for fiber along the 405 corridor for applications such as: -Rapid Bus Transit -CCTV – POE – HD – Recording could be active all times -Card Readers for Orca -Connections to Parking lot, Garages -Guard boxes -Etc.	Fiber along the trail would not necessarily result in any cost avoidance for the City. The City does not have any current fiber needs (i.e. connection to data centers) that are not being met presently. Snohomish County monitors the City's traffic an additional connection to Snohomish may be useful, however Snohomish is a few years behind King County on developing their corridor. Some benefit could be derived from the path diversity (physical redundancy) of the Eastrail corridor.

Business Outcome Questions	Feasibility Analysis Results Summary (January 2019 through January 2020)	Bellevue
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	City has redundancy so rapid repair timeframes are not a requirement for support of any internal connectivity applications the fiber might support.
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Not much, mostly redundancy.
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Municipal control is preferred.

Business Outcome Questions	King County	Kirkland
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	Nothing identified beyond the needs of industry standard repair timeframes are anticipated.	Nothing identified beyond the needs of industry standard repair timeframes.
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	Most of the County's needs are already met by internal network.	Most of Kirkland's needs are already met by internal network.
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	The County prefers an option that would not require operation.	Yes. Ownership and control would be the preference.

Business Outcome Questions	Pacific Northwest Gigapop	
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	Nothing identified beyond the needs of industry standard repair timeframes.	
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	Most of the Gigapop's customers on the eastside have connections already. This could provide redundant middle mile infrastructure.	
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	N/A	

Business Outcome Questions	PSE	Redmond
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	N/A	Nothing identified beyond the needs of industry standard repair timeframes.
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	N/A	Most of Redmond's needs are already met by internal network. Some internal needs for that could be leveraged by the trail fiber include the following: Smart Cities Smart Trail Modernize existing systems Traffic management – not on the trail
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	N/A	Redmond's current fiber assets are City-owned and they would be inclined to have public ownership and control over this fiber asset as well.

Business Outcome Questions	Renton	Snohomish
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	Nothing identified beyond the needs of industry standard repair timeframes.	Question not addressed on call.
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	Most of Renton's needs are already met by internal network.	Question not addressed on call.
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	Preference for a solution that does not require the City to be responsible for operation.	Question not asked on call.

Business Outcome Questions	Sound Transit	Woodinville
6) How critical is resiliency of the fiber in terms of repair timeframes? •Is it sufficient to have service level assurances through contractual commitments of a provider (i.e. discounted fees, punitive damages, etc.)?; or •Is it necessary to keep internal control over emergency repairs – warehoused materials, City/County contractors or staff on retainer, unfettered access to effect repairs with priority over any other users / uses of the fiber?	Nothing identified beyond the needs of industry standard repair timeframes.	Nothing identified beyond the needs of industry standard repair timeframes.
7) How much capacity is for internal use needed? •In terms of conduit, fiber strands, bandwidth in the near term and long term? •Along which segments? •Are these needs driven by a particular network design concept? •Do you anticipate a need for broad flexibility to scale capacity if demands change?	Capacity to cover the 405 corridor for applications.	Most of Woodinville's needs are already met by internal network.
8) Is your preference to own the infrastructure in your jurisdiction? •Full or partial (i.e. just the portion used for internal needs)?	N/A	The City would most likely prefer not to own the asset, but it is ok under the right circumstances. Such as the operation being handled by others.

Business Outcome Questions	Feasibility Analysis Results Summary (January 2019 through January 2020)	Bellevue
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase. A subsequent ROI analysis prepared in January 2020 quantified the business case for construction and maintenance of the fiber and conduit infrastructure on the basis of total cost avoidance and/or revenues required for breakeven to occur for varying construction and financing scenarios.	Bellevue intends to participate as an investor. Questions remain around the financial investment needed, as well as understanding the balance of limiting financial risk versus maintaining municipal control.
10) Do you have existing capabilities around fiber maintenance?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Bellevue has their own crews and signal shop for maintenance. Potentially could use internal staff/contractors for Eastrail assets - some synergies with existing fiber, but would need to make sure their capabilities and contracts align with required SLAs. While the City does some fiber leasing/brokering they are not equipped to do large quantities. Assuming the risk is acceptable for municipal ownership, a central fiber broker for leasing would make more sense than each jurisdiction leasing fiber separately.
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	Stakeholders that participated in the feasibility study provided the following use cases for the fiber asset: •Economic development –Using high-capacity fiber to attract companies to King County's south, east, and north regions, thus improving the business climate and quality of life •Revenue generation– Leasing spare fiber to generate new revenue streams to support other government services •Other uses – Using fiber to support, for example, small cell backhaul for future 5G opportunities	Not defined currently.

Business Outcome Questions	King County	Kirkland
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	The County intends to invest in the fiber asset, mitigating risk and ROI are key considerations.	The City intends to invest in the fiber asset, mitigating risk and ROI are key considerations.
10) Do you have existing capabilities around fiber maintenance?	The County does not want to maintain the fiber asset.	Have the capability to maintain fiber, but the capacity is not expandable to the trail fiber.
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	Not defined currently.	Not defined currently.

Business Outcome Questions	Pacific Northwest Gigapop	
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	N/A	
10) Do you have existing capabilities around fiber maintenance?	N/A	
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	N/A	

Business Outcome Questions	PSE	Redmond
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	N/A	Redmond has always planned to build conduit along their portion of the corridor.
10) Do you have existing capabilities around fiber maintenance?	N/A	Yes. However, there is a benefit in uniform trail maintenance.
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	N/A	Digital inclusion is important. Other ideas include "Smart trail" or trail related applications (i.e. traffic light sensors, trail occupancy counter, etc.). The Willows area may have some potentially big clients for leasing this fiber.

Business Outcome Questions	Renton	Snohomish
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	The City is more willing to provide investment if the ROI is defined. If the ROI is not certain, they would be inclined to allow others to carry the risk.	Question not addressed on call.
10) Do you have existing capabilities around fiber maintenance?	For the C3 fiber, the jurisdiction where fiber resides has responsibly for maintenance. For a critical asset like the Eastrail fiber, the City expects the level of support would be beyond what the City could provide (in terms of maintenance and response times). •A private partner would probably prefer a central source for maintenance across the corridor as opposed to each municipality providing this service.	Question not addressed on call.
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	Not defined currently.	Short answer is yes, we did not go into details on the call.

Business Outcome Questions	Sound Transit	Woodinville
9) Is participation as an owner / investor of capital funds contingent upon recovery of capital investment and/or operating expenses? •Full or partial? •Are there cost avoidance opportunities currently by offsetting or replacing existing connectivity costs? Projected in the future?	N/A	The City intends to invest in the fiber asset, mitigating risk and ROI are key considerations.
10) Do you have existing capabilities around fiber maintenance?	N/A	Comcast maintains the City's current fiber assets.
11) Are there particular objectives or plans around economic development for this infrastructure? •Providing open access fiber for competitive service providers? •Providing services directly to businesses and/or residents? •Connectivity to particular locations?	N/A	There is interest in economic development, the City may update its technology plan to include these type of objectives. The City is working on developing its downtown core. Fiber along the rail could be a benefit.

Business Outcome Questions	Feasibility Analysis Results Summary (January 2019 through January 2020)	Bellevue
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	This level of detail was not defined in the feasibility study, but was recommend to be determined in a subsequent phase.	Not defined currently.

Business Outcome Questions	King County	Kirkland
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	Not defined currently.	Not defined currently.

Business Outcome Questions	Pacific Northwest Gigapop	
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	N/A	

Business Outcome Questions	PSE	Redmond
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	N/A	Not defined currently.

Business Outcome Questions	Renton	Snohomish
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	Not defined currently.	Not defined currently.

Business Outcome Questions	Sound Transit	Woodinville
12) How much capacity is needed for Economic Development? •In terms of conduit, fiber strands, bandwidth in the near term and long term •Along which segments?	N/A	Not defined currently.

Technical Questions	Bellevue	King County
1) Can you provide information on related projects / initiatives planned (in-progress or otherwise) occurring along your section of the corridor? •Identify all projects to occur in the corridor (completed, ongoing, future) • Information to include project limits and timelines if possible, otherwise general information would be apricated. •If any existing construction prints and specifications for the projects exist, can they be shared? (what format are the documents in and is there any sensitivity around public dissemination of these documents	These questions are best addressed by King County. The city of Bellevue does not own any of the corridor and is not doing any construction within the Eastrail corridor.	King County has provided a detailed map of project initiatives and timelines throughout their portion of the corridor. Most prevalent work along the corridor is the trail upgrades. The various states include: scheduled for rail removal, no construction scheduled, interim trail, and paved trail. It is a key part of the RFP to define how the fiber work will coincide with the various states of the trail during time of construction. It is important to note that all locations listed as “not currently scheduled for construction are anticipated to be opened for trail use as soon as funding allows, and at latest by 2030. Development may be as interim trail followed by paved trail at a later date, or as paved trail without interim trail phase. All locations listed as interim trail are planned to be developed as paved trail as soon as funding allows.
2) Is there space reserved along the corridor, in a particular alignment, already identified for communications infrastructure? (or other utilities?) •If an alignment is not currently identified/reserved could you commit to providing an alignment (~3 feet wide) along your portion of the corridor •If an alignment is defined, is it consistent throughout? Will narrower segments potentially pose a challenge?	These questions are best addressed by King County. The city of Bellevue does not own any of the corridor or trail.	No alignment is currently identified. The County is amenable to finding a place for fiber along the corridor, regardless of what phase the trail construction is in.

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
1) Can you provide information on related projects / initiatives planned (in-progress or otherwise) occurring along your section of the corridor? •Identify all projects to occur in the corridor (completed, ongoing, future) • Information to include project limits and timelines if possible, otherwise general information would be apricated. •If any existing construction prints and specifications for the projects exist, can they be shared? (what format are the documents in and is there any sensitivity around public dissemination of these documents		CKC Picnic Pavilion Totem Lake Connector Bridge
2) Is there space reserved along the corridor, in a particular alignment, already identified for communications infrastructure? (or other utilities?) •If an alignment is not currently identified/reserved could you commit to providing an alignment (~3 feet wide) along your portion of the corridor •If an alignment is defined, is it consistent throughout? Will narrower segments potentially pose a challenge?	No alignment is currently identified. Kirkland can provide a place for fiber to be placed under the surface of the trail. Surface level access points to be strategically placed roughly every 1,000 ft to minimize disruption to above grade space.	N/A

Technical Questions	PSE	Redmond
1) Can you provide information on related projects / initiatives planned (in-progress or otherwise) occurring along your section of the corridor? •Identify all projects to occur in the corridor (completed, ongoing, future) • Information to include project limits and timelines if possible, otherwise general information would be apricated. •If any existing construction prints and specifications for the projects exist, can they be shared? (what format are the documents in and is there any sensitivity around public dissemination of these documents	PSE's existing infrastructure in this area is sufficient to meet the Company's needs for its internal communications system, and did not participate in the requirement gathering process.	•Sound Transit Downtown Redmond Link Extension (DRLE) (2020-2024) extends from 164th-Bear Creek Trail •PSE maintenance access road (2021-22) extends from NE 97th/Willows to 124th/Willows. •Redmond Central Connector Phase III (2023-24 proposed) extends from NE 99th/Willows to NE 124th. •Future Sound Transit Light Rail (potential but not planned) will follow the PSA Maintenance Access Road, Other future sound transit expansion not planned. Redmond has construction drawings for RCC I and RCC II (PDF) Sound Transit DRLE is design/build and underway. (PDF) Link provided to view PSE Maintenance Access Road LAND-2020-00198
2) Is there space reserved along the corridor, in a particular alignment, already identified for communications infrastructure? (or other utilities?) •If an alignment is not currently identified/reserved could you commit to providing an alignment (~3 feet wide) along your portion of the corridor •If an alignment is defined, is it consistent throughout? Will narrower segments potentially pose a challenge?	N/A	There is not dedicated space set aside at this time, but fiber is planned as part of the trail build out.

Technical Questions	Renton	Snohomish
1) Can you provide information on related projects / initiatives planned (in-progress or otherwise) occurring along your section of the corridor? •Identify all projects to occur in the corridor (completed, ongoing, future) • Information to include project limits and timelines if possible, otherwise general information would be apricated. •If any existing construction prints and specifications for the projects exist, can they be shared? (what format are the documents in and is there any sensitivity around public dissemination of these documents	Renton Team to provide response week of 10/19. May have similar input as Bellevue, since King County owns the corridor that overlaps with their Jurisdiction.	Snohomish County is currently resolving property issues related to the connected corridor extending from King County to the City of Snohomish. Once these issues are resolved, Snohomish County plans to pursue trail development with rail operation.
2) Is there space reserved along the corridor, in a particular alignment, already identified for communications infrastructure? (or other utilities?) •If an alignment is not currently identified/reserved could you commit to providing an alignment (~3 feet wide) along your portion of the corridor •If an alignment is defined, is it consistent throughout? Will narrower segments potentially pose a challenge?	Renton Team to provide response week of 10/19. May have similar input as Bellevue, since King County owns the corridor that overlaps with their Jurisdiction.	There is existing fiber within the corridor from King County to the City of Snohomish. Additional due diligence and design will be needed to verify if/where additional communications infrastructure could be placed.

Technical Questions	Sound Transit	Woodinville
1) Can you provide information on related projects / initiatives planned (in-progress or otherwise) occurring along your section of the corridor? •Identify all projects to occur in the corridor (completed, ongoing, future) • Information to include project limits and timelines if possible, otherwise general information would be apricated. •If any existing construction prints and specifications for the projects exist, can they be shared? (what format are the documents in and is there any sensitivity around public dissemination of these documents	N/A	The City identified private developments adjacent to corridor: •Teatro's ZinZanni, not yet under construction, 14200 NE 145TH ST •Mercury Coffee, new coffee stand currently under construction, 12801 NE 175TH ST •Aloha Car Wash, redevelopment currently under construction, 13001 NE 177TH PL The above projects do not encroach into the rail corridor, but are directly adjacent. Two projects, Mercury Coffee and Aloha Car Wash above, will likely be completed in the next six months. Information on these projects can be found by using project names and addresses to file a public records request for construction documents of the subject developments.
2) Is there space reserved along the corridor, in a particular alignment, already identified for communications infrastructure? (or other utilities?) •If an alignment is not currently identified/reserved could you commit to providing an alignment (~3 feet wide) along your portion of the corridor •If an alignment is defined, is it consistent throughout? Will narrower segments potentially pose a challenge?	N/A	Public Works Department to confirm.

Technical Questions	Bellevue	King County
3) What existing easements/encroachment agreements/utilities run parallel along your portion of the corridor? •Can you identify what they are and who the owner is? •Do you as-built documentation of these utilities? In either GIS or CAD? •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	These questions are best addressed by King County. The city of Bellevue does not own any of the corridor or trail.	Zayo has a very old fiber and conduit pathway along the corridor. King County Wastewater line runs along the corridor. A PDF of Zayo fiber exists; Wastewater route is in GIS.
4) What existing easements/encroachment agreements exist for special crossings (perpendicular to the corridor)? •Inventory of existing utilities and/or crossings (gas lines, bridges, major roadways, waterways)? •Inventory of existing easements / applicable permitting authorities •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	King County is the best source for information regarding “special crossings”. Important crossing locations include, •Short wooden bridge over Coal Creek •Short steel bridge over Coal Creek Parkway •Long steel bridge over Interstate 90 •Short wooden trestle over SE 32nd Street •New concrete bridge over southbound lanes of Interstate 405 •Long wooden trestle over Kelsey Creek/SE 8th St/Lake Hills Connector (trestle to be rehabilitated in 2023) •At-grade crossing of NE 4th Street (a major arterial, with underground sewer line near surface) •New steel bridge over NE 8th Street (a major arterial with many utilities running underground; bridge to be built in 2021)	King County provided a detailed Map of key "events" or areas where considerations need to be made regarding crossings. These include: •NE 8th St. Crossing in Bellevue •Wilburton Trestle •Wilburton Gap surface trail ownership break •SE 32nd Trestle •I-90 Steel Bridge •Coal Creek Trestle •Ripley Trestle •Port Quendall Superfund Site •May Creek Trestle

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
3) What existing easements/encroachment agreements/utilities run parallel along your portion of the corridor? •Can you identify what they are and who the owner is? •Do you as-built documentation of these utilities? In either GIS or CAD? •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	Sound Transit and PSE have easements on the CKC. When Metro was more of a 'utility' agency, they had (and continue to have) their trunk waterline pipe under the trail.	N/A
4) What existing easements/encroachment agreements exist for special crossings (perpendicular to the corridor)? •Inventory of existing utilities and/or crossings (gas lines, bridges, major roadways, waterways)? •Inventory of existing easements / applicable permitting authorities •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	At the Totem Lake Connector bridge, the fiber will need to be routed underground through the intersection. The bridge over NE 68th St and the bridge over Kirkland Way that is frequently hit.	N/A

Technical Questions	PSE	Redmond
3) What existing easements/encroachment agreements/utilities run parallel along your portion of the corridor? •Can you identify what they are and who the owner is? •Do you as-built documentation of these utilities? In either GIS or CAD? •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	N/A	The City identified the following easements: •Sound Transit North Easement •King County Wastewater •PSE (easement still being developed) City will have to confirm if as-builts exist for this information.
4) What existing easements/encroachment agreements exist for special crossings (perpendicular to the corridor)? •Inventory of existing utilities and/or crossings (gas lines, bridges, major roadways, waterways)? •Inventory of existing easements / applicable permitting authorities •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	N/A	The City identified areas where considerations need to be made regarding special crossings. These include: •Sound Transit Infrastructure •SR 520 (King County Trail Section) •Bear Creek Crossing •Sammamish River Crossing •Culverts along the corridor pathway

Technical Questions	Renton	Snohomish
3) What existing easements/encroachment agreements/utilities run parallel along your portion of the corridor? •Can you identify what they are and who the owner is? •Do you as-built documentation of these utilities? In either GIS or CAD? •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	Renton Team to provide response week of 10/19. May have similar input as Bellevue, since King County owns the corridor that overlaps with their Jurisdiction.	Additional due diligence will be needed.
4) What existing easements/encroachment agreements exist for special crossings (perpendicular to the corridor)? •Inventory of existing utilities and/or crossings (gas lines, bridges, major roadways, waterways)? •Inventory of existing easements / applicable permitting authorities •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	Renton Team to provide response week of 10/19. May have similar input as Bellevue, since King County owns the corridor that overlaps with their Jurisdiction.	Additional due diligence and design will be needed.

Technical Questions	Sound Transit	Woodinville
3) What existing easements/encroachment agreements/utilities run parallel along your portion of the corridor? •Can you identify what they are and who the owner is? •Do you as-built documentation of these utilities? In either GIS or CAD? •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	N/A	Overhead powerlines run parallel to and sometimes within the corridor through most of Woodinville. Public Works Department to confirm other easements and encroachments.
4) What existing easements/encroachment agreements exist for special crossings (perpendicular to the corridor)? •Inventory of existing utilities and/or crossings (gas lines, bridges, major roadways, waterways)? •Inventory of existing easements / applicable permitting authorities •Scope of authorization – does it encompass enhancements and modifications, such as adding conduit? Are there restrictions regarding aboveground additions? Are there standards for attachment / underground conduit placement?	N/A	The City identified areas where considerations need to be made regarding special crossings. These include: •Where the corridor crosses SR202 at NE 145th St. •The Sammamish River crossing at NE 175th St, •SR202 at NE 175th St •NE North Woodinville Way at NE 195th St. Public Works to specify crossing methodology for each crossing (during the permitting phase?) Depending on how the crossing at the Sammamish River is done, it may involve the Department of Ecology or other state agencies.

Technical Questions	Bellevue	King County
5) Do you have a permitting process defined for work in your section of the corridor (in the portions of the Eastrail easement that does not overlap with your jurisdiction's ROW)? •Are there standard processes, forms, technical specifications that apply? •Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	City of Bellevue permits, including but not necessarily limited to a Clear & Grade permit, are likely to be required for work in the Eastrail corridor.	Applicants for permits to occupy County property with utilities, or holders of granted franchise rights, who are planning construction work upon, along, over, under or across any County right of way or public place must file an application with the King County Real Estate Services Section, King County Administration Building, 500 Fourth Avenue, Suite 830, Seattle, WA 98104-0237
6) Do you have a permitting process defined for work across your section of the corridor (in the portions of the Eastrail easement that overlap with your jurisdiction's ROW)? a.Are there standard processes, forms, technical specifications that apply? b.Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	A city of Bellevue ROW Use permit is required for any work in the City's ROW, including at streets crossed by the Eastrail. Other permits may also be required, including but not limited to a Clear & Grade permit. Restoration of trenches and roadway in the ROW shall follow the appropriate standards from the City of Bellevue Design Manual. Link: https://bellevuewa.gov/city-government/departments/development/permits/right-way-permits	The majority of Public ROW that intersects the trail belongs to the Cities along the corridor, not the County. Where this the County ROW does intersect, standard permitting procedure applies.

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
5) Do you have a permitting process defined for work in your section of the corridor (in the portions of the Eastrail easement that does not overlap with your jurisdiction's ROW)? •Are there standard processes, forms, technical specifications that apply? •Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?		N/A
6) Do you have a permitting process defined for work across your section of the corridor (in the portions of the Eastrail easement that overlap with your jurisdiction's ROW)? a.Are there standard processes, forms, technical specifications that apply? b.Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?		N/A

Technical Questions	PSE	Redmond
5) Do you have a permitting process defined for work in your section of the corridor (in the portions of the Eastrail easement that does not overlap with your jurisdiction's ROW)? •Are there standard processes, forms, technical specifications that apply? •Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	N/A	The City would require Shoreline permits and adherence to the noise ordinance.
6) Do you have a permitting process defined for work across your section of the corridor (in the portions of the Eastrail easement that overlap with your jurisdiction's ROW)? a.Are there standard processes, forms, technical specifications that apply? b.Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	N/A	

Technical Questions	Renton	Snohomish
5) Do you have a permitting process defined for work in your section of the corridor (in the portions of the Eastrail easement that does not overlap with your jurisdiction's ROW)? •Are there standard processes, forms, technical specifications that apply? •Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	Renton Team to provide response week of 10/19.	Additional due diligence will be needed.
6) Do you have a permitting process defined for work across your section of the corridor (in the portions of the Eastrail easement that overlap with your jurisdiction's ROW)? a.Are there standard processes, forms, technical specifications that apply? b.Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	Renton Team to provide response week of 10/19.	Currently Not Applicable.

Technical Questions	Sound Transit	Woodinville
5) Do you have a permitting process defined for work in your section of the corridor (in the portions of the Eastrail easement that does not overlap with your jurisdiction's ROW)? •Are there standard processes, forms, technical specifications that apply? •Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	N/A	There is not an explicit permitting process for work specific to utility installation. We would require a site development permit for each phase of the work, per Chapter 15.05 WMC. Where work is required in the right of way, a Right of Way permit will be required. A critical areas permit may be required depending on the proximity of the project to critical areas. The City would be the agency that approves site development permits, critical areas permits and right of way permits anywhere within the city limits. Approval authority for city permits cannot be given to King County. A SEPA Determination may also be required unless the project qualifies as exempt by WAC 197-11-800. It is possible King County could act as the lead agency for SEPA review.
6) Do you have a permitting process defined for work across your section of the corridor (in the portions of the Eastrail easement that overlap with your jurisdiction's ROW)? a.Are there standard processes, forms, technical specifications that apply? b.Can you determine if there are aspects of this permitting process that can be managed by a single permitting authority (i.e. King County)?	N/A	A site development permit and a right of way permit are likely all that are necessary. The City uses Chapter 12.30 WMC for regulating Public Utility and Telecommunications Right of Way Use.

Technical Questions	Bellevue	King County
7) Does your jurisdiction have limitations on work hours? •In the Eastrail corridor easement •In your jurisdictional ROWs	Work hours in the Eastrail corridor are limited to **7am-6pm** by the city's noise ordinance. In the City ROW: standard lane closure hours on NE 8th Street are **7am-3pm**. Work in the right of way that does not involve lane closures may have hours of **7am-6pm**. Hours for directional and full road closures for activities such as setting girders will be determined through the ROW permit approval process, and may require night work hours.	The majority of the corridor is in the jurisdictional boundaries of the Cities. The work hours will typically follow the City's guidelines.
8) Are there other projects in your portion of the corridor that will be impacted by the timeline of the fiber project (i.e. need to coordinate construction, multiple construction mobilizations, etc.) a.For the projects identified, would the fiber work ideally occur before, during, or after that project? b.If coordination is required, what entities within your jurisdiction would need to be coordinated with?	Following are anticipated projects along the Eastrail corridor in Bellevue, •Eastrail trail connection to Northup Way (north side), King county lead, 2026 •Eastrail trail connection to Spring Blvd (north side), City of Bellevue lead, timing TBD (est 2024 or 2025) •Eastrail crossing at SE 1st Street with signal, City or County lead (TBD), timing TBD (est 2023-2025) •Eastrail crossing at SE 5th St with RRFB, King County lead, timing TBD (est 2023-2025). •Eastrail crossing of Lake Washington Blvd (at Newcastle Beach Park entrance), City lead 2021. A. The best timing would be to implement fiber infrastructure at the same time as the city projects. Timing for other projects should be coordinated with King County. B. A good starting point is the Transportation Street ROW Use group, https://bellevuewa.gov/city-government/departments/transportation/permits-and-standards/right-of-way-information. Another contact is Michael Ingram, Senior Transportation Planner (mingram@bellevuewa.gov)	Trail upgrades for both interim and paved trails will require grading and other work that may disrupt fiber that is already placed in the trail. Identifying construction methodologies and location of the fiber to best mitigate conflict will be a key part of the design phase. Coordination will be needed with King County DNRP along all portions of the corridor.

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
7) Does your jurisdiction have limitations on work hours? •In the Eastrail corridor easement •In your jurisdictional ROWs		N/A
8) Are there other projects in your portion of the corridor that will be impacted by the timeline of the fiber project (i.e. need to coordinate construction, multiple construction mobilizations, etc.) a.For the projects identified, would the fiber work ideally occur before, during, or after that project? b.If coordination is required, what entities within your jurisdiction would need to be coordinated with?		N/A

Technical Questions	PSE	Redmond
7) Does your jurisdiction have limitations on work hours? •In the Eastrail corridor easement •In your jurisdictional ROWs	N/A	7am-7pm (M-F) 9-7 Saturday, No work on Sunday. (for both)
8) Are there other projects in your portion of the corridor that will be impacted by the timeline of the fiber project (i.e. need to coordinate construction, multiple construction mobilizations, etc.) a.For the projects identified, would the fiber work ideally occur before, during, or after that project? b.If coordination is required, what entities within your jurisdiction would need to be coordinated with?	N/A	Ideally fiber work would occur during the PSE maintenance access road and the Sound Transit Downtown Redmond Link Extension projects. Fiber construction coordination would need to occur with the following departments: •Parks •Planning •Public Works •Communications

Technical Questions	Renton	Snohomish
7) Does your jurisdiction have limitations on work hours? •In the Eastrail corridor easement •In your jurisdictional ROWs	Renton Team to provide response week of 10/19.	Currently Not Applicable.
8) Are there other projects in your portion of the corridor that will be impacted by the timeline of the fiber project (i.e. need to coordinate construction, multiple construction mobilizations, etc.) a.For the projects identified, would the fiber work ideally occur before, during, or after that project? b.If coordination is required, what entities within your jurisdiction would need to be coordinated with?	Renton Team to provide response week of 10/19.	Currently Not Applicable.

Technical Questions	Sound Transit	Woodinville
7) Does your jurisdiction have limitations on work hours? •In the Eastrail corridor easement •In your jurisdictional ROWs	N/A	Per WMC 8.08.060(7), Any sound made by the construction, excavation, repair, demolition, destruction, or alteration of any building or property or upon any building site anytime on Sundays and holidays and outside the hours of 7:00 a.m. through 7:00 p.m., Monday through Friday and 9:00 a.m. through 5:00 p.m. on Saturday, or, from Memorial Day to Labor Day, anytime on Sundays and holidays and outside the hours of 7:00 a.m. through 9:00 p.m., Monday through Friday and 9:00 a.m. through 5:00 p.m. on Saturday. The above limits are imposed citywide, including ROW. If there is
8) Are there other projects in your portion of the corridor that will be impacted by the timeline of the fiber project (i.e. need to coordinate construction, multiple construction mobilizations, etc.) a.For the projects identified, would the fiber work ideally occur before, during, or after that project? b.If coordination is required, what entities within your jurisdiction would need to be coordinated with?	N/A	No private development projects would be impacted. Public Works Department to confirm what capital projects would be impacted.

Technical Questions	Bellevue	King County
9) What are your restoration requirements? •Will the fiber project likely traverse completed segments of the corridor? What type of restoration is anticipated (concrete, asphalt, unpaved surfaces)? •For areas where the fiber project will traverse your jurisdictions roadways, sidewalks, etc. what are your standard restoration requirements? i.Directional drilling test pits (potholes) ii.Open cut of pavement •Does your jurisdiction have any special restoration requirement we need to be aware of? i.Specific locations ii.Specific types of construction	Segments of the corridor in Bellevue will be developed as paved trail within the next 1-2 years. Segments of gravel trail already exist and more will be added in the next 2-3 years. King County is the trail owner and is the appropriate entity to provide information regarding restoration requirements. Pavement restoration requirements on most City streets in the corridor is a 2" grind and overlay, at least 50' in length, for any disturbance. Refer to COB Standard RC-200-1. Potholes may be restored in accordance with RC-220-1 provided that 1) there are not more than three potholes in any 50' segment, and 2) potholes do not exceed 2'x2'. Potholing that does not meet this criteria must be restored by grind and overlay as mentioned above. The City currently does not have any locations with special restoration requirements. No crossings are currently designated as requiring or prohibiting specific types of construction. There is a major sewer line that runs along the corridor and near the surface at the NE 4th Street crossing. NE 8th Street has a lot of utilities underneath in the vicinity of the Eastrail crossing. The construction approach to locations such as these will be reviewed during permitting. There is a no-cut moratorium on NE 8th Street where the Eastrail crosses.	King County Code (KCC) Chapter 14.30 requires Parks to review and make recommendations on Special Use Permit (SUP) applications requesting use of Parks property for non-park purposes. King County Parks Land Use guidance is intended to guide partners and to assist Parks with making recommendations that ensure Parks Property is preserved, protected, and available for public use.

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
9) What are your restoration requirements? •Will the fiber project likely traverse completed segments of the corridor? What type of restoration is anticipated (concrete, asphalt, unpaved surfaces)? •For areas where the fiber project will traverse your jurisdictions roadways, sidewalks, etc. what are your standard restoration requirements? i.Directional drilling test pits (potholes) ii.Open cut of pavement •Does your jurisdiction have any special restoration requirement we need to be aware of? i.Specific locations ii.Specific types of construction	Required restoration would be to return the trail to the 'interim trail status' which is packed gravel. This is with the caveat that the fiber is added while we still have an interim trail (which is highly likely to happen before any paving begins).	N/A

Technical Questions	PSE	Redmond
9) What are your restoration requirements? •Will the fiber project likely traverse completed segments of the corridor? What type of restoration is anticipated (concrete, asphalt, unpaved surfaces)? •For areas where the fiber project will traverse your jurisdictions roadways, sidewalks, etc. what are your standard restoration requirements? i.Directional drilling test pits (potholes) ii.Open cut of pavement •Does your jurisdiction have any special restoration requirement we need to be aware of? i.Specific locations ii.Specific types of construction	N/A	Fiber construction would traverse complete sections of the corridor and full restoration to existing conditions would be required. One key restoration requirement that should be noted is that there are existing portions of the Redmond Central Connector that utilize brick pavers.

Technical Questions	Renton	Snohomish
9) What are your restoration requirements? •Will the fiber project likely traverse completed segments of the corridor? What type of restoration is anticipated (concrete, asphalt, unpaved surfaces)? •For areas where the fiber project will traverse your jurisdictions roadways, sidewalks, etc. what are your standard restoration requirements? i.Directional drilling test pits (potholes) ii.Open cut of pavement •Does your jurisdiction have any special restoration requirement we need to be aware of? i.Specific locations ii.Specific types of construction	Renton Team to provide response week of 10/19.	Currently Not Applicable.

Technical Questions	Sound Transit	Woodinville
9) What are your restoration requirements? •Will the fiber project likely traverse completed segments of the corridor? What type of restoration is anticipated (concrete, asphalt, unpaved surfaces)? •For areas where the fiber project will traverse your jurisdictions roadways, sidewalks, etc. what are your standard restoration requirements? i.Directional drilling test pits (potholes) ii.Open cut of pavement •Does your jurisdiction have any special restoration requirement we need to be aware of? i.Specific locations ii.Specific types of construction	N/A	Public Works Department to confirm.

Technical Questions	Bellevue	King County
10) What are your traffic control requirements? •For areas in the corridor easement will pedestrians and/or vehicular traffic of any kind be present during conduit construction? What is expected in terms of partial closures? •For where the conduit crosses your roadways, sidewalks, ROW assets (perpendicularly), what type of traffic control do you anticipate? •Are there specific roadways that will pose more of a challenge than others?	King County is the trail owner and is the appropriate entity to provide information regarding conditions for trail closure. Detours onto city streets/ROW will need to be coordinated with the City of Bellevue ROW Use group, https://bellevuewa.gov/city-government/departments/transportation/permits-and-standards/right-of-way-information. All traffic control affecting arterial streets requires a traffic control plan designed by a TCS, TCDS, or PTOE and approval under the ROW use permit. Traffic control must follow MUTCD and provide adequate safety and access for all road users. The challenge of any particular roadway will be largely determined by the type of traffic control designed by the TCS.	Utility right-of-way construction permits are required for all utility construction, reconstruction, relocation or maintenance activities within the King County right-of-way or easement -- see King County Code Chapter 14.44. The right-of way is the designated area granted to the County through an easement or other instrument for the purposes of maintenance or expansion of existing transportation services within the right-of-way. After confirming the road is a King County ROW, complete the appropriate application with one set of plans and traffic control plan attached. An additional set will be necessary for project on bridges or within close proximity to shorelines.
11) Will you be able to provide space for material storage and/or construction staging? •While the fiber project is being construction in your jurisdiction •Over the life of the entire fiber project	Staging space is typically secured by contractors. Bellevue does not control space that is readily available for this purpose. Bellevue does not control space that is readily available for this purpose.	King county does not have a yard readily available for contractor staging.

Technical Questions	Kirkland	Pacific Northwest GIGAPOP
10) What are your traffic control requirements? •For areas in the corridor easement will pedestrians and/or vehicular traffic of any kind be present during conduit construction? What is expected in terms of partial closures? •For where the conduit crosses your roadways, sidewalks, ROW assets (perpendicularly), what type of traffic control do you anticipate? •Are there specific roadways that will pose more of a challenge than others?	A traffic control plan is required for any construction work taking place on public right of way. Our trail is open and traffic control for the trail and at intersections will be a big part of this project in Kirkland. There are some cases where the CKC has limited access so in those places, closures would be preferred to be kept at a minimum and pedestrian /cyclist detour plans may be required	N/A
11) Will you be able to provide space for material storage and/or construction staging? •While the fiber project is being construction in your jurisdiction •Over the life of the entire fiber project	There is room for staging along the corridor but we will need to negotiate where this is. It will not be everywhere.	N/A

Technical Questions	PSE	Redmond
10) What are your traffic control requirements? •For areas in the corridor easement will pedestrians and/or vehicular traffic of any kind be present during conduit construction? What is expected in terms of partial closures? •For where the conduit crosses your roadways, sidewalks, ROW assets (perpendicularly), what type of traffic control do you anticipate? •Are there specific roadways that will pose more of a challenge than others?	N/A	Traffic control required for areas with open trails would include a notice of closure date and duration as well as a approved detour route. An approved traffic control plan will be required when crossing roadways. NE 124th, NE 90th Leary Way, and Bear Creek Parkway are all roadways that will pose additional challenges.
11) Will you be able to provide space for material storage and/or construction staging? •While the fiber project is being construction in your jurisdiction •Over the life of the entire fiber project	N/A	The City can most likely provide staging during construction, there will be areas where staging can occur. No long term storage can be provided. The corridor build out is a shared-use pathway for active transportation and recreation.

Technical Questions	Renton	Snohomish
10) What are your traffic control requirements? •For areas in the corridor easement will pedestrians and/or vehicular traffic of any kind be present during conduit construction? What is expected in terms of partial closures? •For where the conduit crosses your roadways, sidewalks, ROW assets (perpendicularly), what type of traffic control do you anticipate? •Are there specific roadways that will pose more of a challenge than others?	Renton Team to provide response week of 10/19.	Currently Not Applicable.
11) Will you be able to provide space for material storage and/or construction staging? •While the fiber project is being construction in your jurisdiction •Over the life of the entire fiber project	Renton Team to provide response week of 10/19.	Currently Not Applicable.

Technical Questions	Sound Transit	Woodinville
10) What are your traffic control requirements? •For areas in the corridor easement will pedestrians and/or vehicular traffic of any kind be present during conduit construction? What is expected in terms of partial closures? •For where the conduit crosses your roadways, sidewalks, ROW assets (perpendicularly), what type of traffic control do you anticipate? •Are there specific roadways that will pose more of a challenge than others?	N/A	Public Works Department to confirm.
11) Will you be able to provide space for material storage and/or construction staging? •While the fiber project is being construction in your jurisdiction •Over the life of the entire fiber project	N/A	Public Works Department to confirm.

Appendix E

Request for Information (RFI)

Department of Executive Services
Finance and Business Operations Division
Procurement and Payables Section
206-263-9400 TTY Relay: 711

Release Date: May 2, 2022 Request for Information (RFI) Title:	**Eastrail Fiber Development**
RFI Number:	
Due Date:	June 15, 2022
Contract Specialist:	Bryan Johnson, bryan.johnson@kingcounty.gov, 206-263-7889
Alternate Contract Specialist	Gina Keolker, gina.keolker@kingcounty.gov, 206.263-9143

Pre-Response Conference: No pre-response conference will be held for this RFI. Questions should be submitted in the E-procurement portal.	

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Company Name		
Address		City/State /Postal Code
Signature	Authorized Representative / Title	
Email	Phone	
Contact Name:	Phone	Email

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SECTION 1 – INTRODUCTION REQUEST FOR INFORMATION (RFI)

1.1 Introduction

King County, a home rule charter county and political subdivision of the State of Washington ("King County"); Central Puget Sound Regional Transit Authority, a regional transit authority operating pursuant to Chapter 81.112 RCW ("Sound Transit"); Puget Sound Energy, Inc., a Washington public utility corporation ("PSE"); the City of Woodinville, a Washington municipal corporation ("Woodinville"); the City of Redmond, a Washington municipal corporation ("Redmond"), and the City of Kirkland, a Washington municipal corporation ("Kirkland"), each a "Party" and collectively the "Parties."

King County is conducting a Request for Information (RFI) on behalf of the Parties to solicit information from vendors ("Respondents") exploring creative partnership ideas for the design, construction, lease, operations, and maintenance of communications infrastructure along the Eastrail to maximize the public benefit of the asset. Information from this RFI may inform a future request for proposals for a fiber construction project. As a result, this RFI seeks information that leads to a greater understanding of the potential business models, and their potential to achieve the Parties goals defined in section 5 of this RFI solicitation. No contract will be awarded because of this RFI.

SECTION 2 – RFI ADMINISRTATION

2.1 Communications

Upon release of this RFI, no oral interpretations of the RFI will be made to any Respondents. Oral explanations or instructions will be considered unofficial and are not binding. Any information modifying a solicitation will be furnished to all Respondents by addendum. Communications concerning this RFI, with other than the listed Contract Specialist or Alternate Contract Specialist may cause the Respondent to be disqualified from any future relate procurements. Any information modifying the RFI will be furnished to all Respondents by addendum**.**

To view all bidding opportunities, Respondent's shall go to https://fa-epvh-saasfaprod1.fa.ocs.oraclecloud.com/fscmUI/faces/NegotiationAbstracts?prcBuId=300000001727151.

2.2 Deadline for Questions

All questions and any explanations must be requested in writing and directed to the Contract Specialist and Alternate Contract Specialist no later than seven (7) days prior to the close date specified in the RFI. Questions about this RFI may by submitted on or before the deadline through the Message function within King County electronic procurement supplier portal ("E-Procurement Portal") or via email to the listed Contract Specialist and Alternate Contract Specialist.

Respondent shall log in to the E-Procurement Portal at https://kingcounty.gov/procurement/supplierportal King County will respond via an addendum and/or clarification via email or bell notification which will be available for viewing in the E-Procurement Portal.

2.3 Late Proposals

The County's E-Procurement Portal will not allow late responses or modifications of submission after the close date and time specified for receipt. Respondents shall assume full responsibility for ensuring electronic delivery of Proposals on or before the close date and time as specified via the E-Procurement Portal or via email to the Contract Specialist and Alternate Contract Specialist. Responses, or modifications of Responses, received via the email of the Contract Specialist designated in the solicitation after the exact hour and date specified for receipt may be considered at the discretion of the County.

2.4 Cancellation of RFI or Postponement of RFI Closing

The County reserves the right to cancel this RFI at any time. The County may change the date and time for submitting proposals prior to the date and time established for submittal.

2.5 Addenda and Clarifications

If at any time, the County changes, revises, deletes, increases, and/or otherwise modifies the RFI, the County will issue a written Addendum to the RFI. Respondent must acknowledge all Addenda to the RFI before submitting a proposal in the E-Procurement Portal or via e-mail. Clarifications are for informational purposes only.

Respondents that indicate they will participate will receive an automatic notification of any Addenda/Clarification via email from the E-Procurement Portal.

2.6 Document Holders

Document Holders: Document Holders list can be viewed at the following website: https://kingcounty.gov/depts/finance-business-operations/procurement/for-business/solicitation-resources.aspx.

2.7 Proposal Submittal Procedure

King County registered suppliers interested in responding to this RFI or bidding on current solicitations must log in to their Supplier Portal to view any current bid opportunities, express interest, communicate with the Contract Specialist via the Message feature and/or successfully submit a proposal through the E-Procurement Portal prior to the close date and time indicated in the solicitation.

King County prefers to accept electronic submittals through the E-Procurement Portal in response to this RFI. Submissions via email will be considered at the discretion of the County in response to a request from a Respondent. Responses that do not conform to the requirements specified herein may be rejected.

Instructions on how to submit a bid, proposal or response electronically are provided at: https://kingcounty.gov/~/media/depts/finance/procurement/Documents/eprocurement-supplier-guide-solicitation.ashx?la=en

2.8 Participation

To the extent it is applicable, this RFI is open to any vendor who believes their responses would add to King County's understanding.

2.9 Limited Use of Responses

Responses to this RFI will not be used in the evaluation of future bids or proposals. This RFI will not be used to pre-qualify a Respondent's solutions for a future procurement, disqualify any company from responding to a future procurement and selection for a demonstration has no bearing on or connection to any future procurement. Responses are strictly voluntary and failure to provide a response will not affect a company's standing with King County or its ability to bid or propose on future procurements.

2.10 Cost of Responses and Samples

The County is not liable for any costs incurred by Respondent in the preparation and evaluation of responses submitted.

2.11 Public Disclosure of Responses

This RFI is subject to the Public Records Act, Chapter 42.56 RCW: https://apps.leg.wa.gov/rcw/default.aspx?cite=42.56. Responses submitted under this RFI shall be considered public documents unless the documents are exempt under the public disclosure laws. Respondents are encouraged to be open in their support of this RFI, while not providing records that are proprietary. Proprietary details may be discussed during post-submittal discussions.

SECTION 3 – PUBLIC ASSET; PURPOSE AND PROJECT OPPORTUNITY

3.1 Project Opportunity

A. Eastrail Corridor – As a Public Asset

The Eastrail (LINK TO: An Interactive Map) is located on a 42-mile railroad corridor running from Renton in King County into Snohomish County, WA. The base project contemplated for the fiber project includes 28 miles, comprised of two (2) distinct sections: The "Main Corridor" (extending from Renton, mile marker 5 to mile marker 26 in Woodinville i.e., the King County - Snohomish border) and the "Redmond Spur" (a lateral to Redmond extending off the Main Corridor), from mile marker 0 in Woodinville to mile marker 7 along Redmond Eastrail Spur (See Figure 1).

The Eastrail corridor provides a unique opportunity to expand and strengthen broadband infrastructure on the Eastside. The Parties seek ideas and proposals about how to maximize this public asset to support the Parties goals for next generation, future-proofed infrastructure that enables affordable broadband services for the Eastrail users, residents, businesses, and local institutions along the Eastrail. The Parties can mobilize assets and resources across organizations, including but not limited to City streets, rooftops, and organizational resources to facilitate the buildout and sustainability of fiber infrastructure that benefit Parties organizations and communities along the Eastrail.

The Parties and other public stakeholders have worked collaboratively to identify multiple use cases and business goals for building communications infrastructure (see Addendum 6 – CTC Eastrail Feasibility Study, and Section 5 – Business Goals), particularly for areas along the Eastrail including, not limited to, the cities of Renton, Newcastle, Bellevue, Kirkland, Redmond, and Woodinville.

This RFI is an opportunity for commercial companies to inform the Parties planning for building communications infrastructure in the Eastrail for the benefit of all communities. The Parties encourage responses to this RFI that contribute to increased affordable broadband access for communities (such as families living in King County Housing Authority housing), and for small and minority owned businesses along the Eastrail. The Parties anticipate that this RFI will be a primary means of industry input before it determines a specific implementation plan for how it will achieve its business goals for building communications infrastructure within the Eastrail.

The Parties have preliminarily identified business models in section 4.4 of this RFI. Respondents are asked to respond to a minimum of the public business model and may elect to respond to all other business models included in this RFI or propose alternative models to be considered.

We welcome responses from all interested entities including collaborations, comprising but not limited to:

1. Telecommunications companies and Internet Service Providers: Those currently operating in Washington State and potential new market entrants, including entities that are not traditional internet service providers but are interested in offering service under an innovative business model.
2. Construction contractors, equipment vendors, and operations or maintenance service providers.
3. Managed Service Providers, and companies in the broadband construction and internet service industry.

The Parties anticipate using information gleaned from the responses to shape the direction and form of a forthcoming Requests for Proposal.

SECTION 4 – BACKGROUND

4.1 The Parties Prior Work

In 2018 the Parties and local stakeholders, engaged CTC Technology and Energy ("CTC"), a consulting firm, to evaluate the viability of building fiber optic infrastructure along the entire length of the Eastrail (see addendum 6 for CTC's Feasibility report). CTC focused on understanding the long-term vision, use cases, construction feasibility and cost, as well as opportunities for regional collaboration and revenue opportunities associated with private partnerships.

Based upon this premise, CTC developed a conceptual base route. The primary focus was to develop a fiber plan (i.e., a map illustrating the potential "start and end points" of conduit and fiber), and a high-level conceptual design for a fiber construction project.

The scope of work also required CTC to develop a business case analysis and high-level business models and likely roles for the Parties in project funding and ownership of the infrastructure. Additionally, the CTC study provided analysis of the primary strengths and weaknesses of the Eastrail as a communication corridor and barriers to building fiber facilities on the corridor. See Addendum 7 for the complete study. During January of 2020, CTC produced a follow-on report, Addendum 8, which analyzes the potential return on investment if the County and its other public partners choose to construct conduit and fiber assets in the Eastrail.

4.2 The Eastrail as a Public Asset and Fiber Route

Base Project: Includes 28-miles along the Eastrail corridor within King County. From Renton (Milepost 5) to Woodinville (Milepost 26) and then, from Woodinville (Milepost 0) to Redmond (Milepost 7), Link Interactive Map

The Eastrail map in Figure 1 provides a high-level view of the planned routes. The communications infrastructure will pass through the cities of Renton, Newcastle, Bellevue, Kirkland, Redmond, and Woodinville through existing residential, commercial, and industrial areas. We would encourage Respondent's ideas on the number of conduits to be installed along the Eastrail. Preliminarily, the Parties envision fiber infrastructure will generally consist of up to four (4), four (4)-inch conduits. A minimum of one (1) of the four (4) conduits will be designated for Parties use and shall be occupied with a minimum of Six (6), innerducts and 288-count fiber optic cable placed in one or divided across the six inner-ducts. Excess conduit placed along the Eastrail may be used by a private company for commercial and public uses.

Figure 1: Proposed Base Route, High-Level Conduit and Fiber Route Map

4.3 Eastrail Property Rights

The Eastrail Corridor property is being developed as an uninterrupted 42-mile multi-use pedestrian and transportation trail system. In 2009 the Port of Seattle purchased the corridor from Burlington Northern Santa Fe railroad. As part of that transaction, the area of the Eastrail south of Woodinville (south of the "wye" at milepost 23.8) was "railbanked" under the federal National Trails Act. Between 2010 and 2015 ownership interests were purchased from the Port of Seattle by various entities including the City of Redmond, Puget Sound Energy, the City of Kirkland, Sound Transit, City of Woodinville, and King County. These six (6) entities have property rights in the corridor between Renton (mile post 5) thru Woodinville (to mile post 28). The corridor is "rail-banked," which means that it must be preserved as a continuous route and there is the potential for reactivation of the corridor for freight rail under certain circumstances. The portion of the Corridor owned by the City of Woodinville has not been railbanked. Today Eastrail has active redevelopment activity occurring across many segments of the trail (refer to Addendum 2 - Eastrail Project Schedule).

Figure 2: Property Rights in the Eastrail Corridor

	King County	Sound Transit	Puget Sound Energy	City of Woodinville	City of Kirkland	City of Redmond
Main Line (Mile Post*)						
5.0-12.4	7.4	7.4	7.4			
12.4-13.5	1.1	1.1	1.1			
13.5-14.8	1.3	1.3	1.3			
14.8-20.3	5.5	5.5	5.5		5.5	
20.3-23.8	3.5	3.5	3.5			
23.8-26.0	2.2		2.2	2.2		
Redmond Spur (Mile Post*)						
0.0-3.4	3.4	3.4	3.4			
3.4-7.3	3.9	3.9	3.5-5.2			3.9

Easement	
Fee**	

* All milepost references are approximate, provided for convenience only, and subordinate to the relevant legal description in any recorded deed of conveyance, grant of easement, or similar real property instrument of record.

** "Fee" here is shorthand for all the residual rights that BNSF conveyed to the Port of Seattle in 2009, less those specific easement rights conveyed by the Port to others (e.g., King County, PSE, Sound Transit, etc.). The interests labeled as "fee" here thus may amount to fee simple title to the corridor in some segments, or a railroad easement in others. This summary table is not a substitute for complete title work competently performed by a reputable title company or other resource.

4.4 Anticipated Business Models

A. Business Model Options and Alternatives

The Parties seek ideas and proposals that maximize this public asset for public benefit. While the Parties are open to receiving creative ideas and alternative business models, respondents are asked to respond to a minimum of the public business model.

As indicated below, if there are other ways you can assist the Parties in meeting the business goals, please provide ideas and suggestions in your response to this solicitation.

The Parties anticipate that this RFI will be the primary means for industry input before it determines an approach for a follow-on Request for Proposal to build fiber infrastructure within the Eastrail.

Business models anticipated for a fiber project include:

1. **A Public business model** — Parties fund all construction, own all infrastructure, and lease (up to three quarters) a portion to Respondent and/or another fiber company to deliver retail services and provide maintenance for all conduit and fiber infrastructure.

2. **A Private business model** — The Respondent and/or a fiber company rents or leases property from the Parties, funds all construction, owns all infrastructure except for a minimum of one (1) conduit and fiber installed in that conduit retained for public use, maintains all infrastructure, and provides low cost/affordable internet services to areas designated by the Parties as underserved.

3. **A Public-Private Partnership business model** — To be defined by the Respondent as an option between the public and private models as defined in this RFI but must preserve at least one (1) conduit and fiber installed in conduit for unrestricted public use.

4. **Propose creative new ideas and alternative** business models or technical solutions you believe will satisfy the Parties goals.

   Note: For additional information related to the business models refer to the consultants Eastrail Feasibility Study, addendum 7.

SECTION 5 – THE BUSINESS GOALS TO BE ADDRESSED

5.1 Parties Business Goals

The Parties have developed a set of goals and a common view for a successful infrastructure project. The following are goals which the Parties will use to evaluate various business models and will guide development of an Eastrail Fiber system.

Your responses will be most useful if your response is focused on the objective's items a thru n.

a. Investigate building fiber in the Eastrail and identifying business a model that provides the greatest benefits to the Parties.
b. Construct approximately 28 miles of communications infrastructure along the Corridor with a capacity equivalent to four (4) four (4)-inch conduits.
c. For any business model(s) proposed a minimum of one (1) conduit, six (6) inner-duct and 288 strands of fiber will be available for unrestricted government use. Or if alternative technology is proposed ensure there's capacity for Parties private and exclusive use.
d. Reserve the option to lease excess communications infrastructure to a private entity for its exclusive commercial use.
e. The Parties desires to recover funding contributed toward construction of the communications infrastructure.
f. Integrate, when possible, construction of Eastrail fiber with currently planned Eastrail capital projects.
g. Provide affordable broadband services to current and future subsidized housing development in proximity of the Eastrail Corridor and other low-income residents.
h. As opportunities develop, build extensions and inter-connections from the base project to locations requested by existing and/or new municipal partners in the region.
i. Maintain Parties control and sovereignty of the communications infrastructure.
j. Increase the capacity for service to underserved areas of the county, as defined in the county's Broadband Access Study.
k. Balance upfront and ongoing costs with maximizing service, particularly to underserved individuals, including those residing in affordable and public housing.
l. Encourage equitable economic development.
m. Preserve or advance the potential for a county-owned broadband system.
n. Provide other service benefit or enhancements for Eastrail users, and the local community

In addition, benefits to the public could include:

- extending the infrastructure from the base project to provide low-cost, fast, and reliable internet service to affordable housing developments and other low-income residents along the corridor;
- providing amenities along the corridor, such as smart lighting, wireless internet service, security, electronic street/trail crossing signs, trail sensors and counters etc.;
- supporting commercial and business development along the corridor;
- providing an ongoing source of revenue to support infrastructure development and maintenance;
- providing network redundancy for Eastrail Partners wide area networks; and
- providing other potential benefits.

SECTION 6 – PROJECT CONSIDERATIONS

6.1 Capital Projects Happening in the Eastrail

The Eastrail Corridor is currently undergoing a range of capital development activities in various phases of completion. The Eastrail Corridor has twenty-six (26) trail sections, there are nine (9) capital projects (valued at more than $64 million), in various stages of development. These projects are currently planned for completion between 2021 and 2026. (Note: future projects and construction may occur along the Eastrail after 2026). Refer to section 9 - Addendum 2 for a list of projects.

Due to the number of currently planned Eastrail capital projects, and their complexity a frequent cadence of communications and coordination with Parties will be necessary to ensure successful integration of project schedules. A list of current Eastrail capital projects is detailed as Addendum 2.

6.2 Incentives to help drive vendor replies to this RFI.

A. The Parties anticipate using information from the RFI responses to shape the direction of a forthcoming Requests for Proposal.

B. To speed up any follow-on RFP's. It is expected that the vendors responsive to the RFI will be invited to submit a request for proposal for the Eastrail Fiber Development project.

SECTION 7 – SCOPE OF WORK QUESTIONAIRE FOR RESPONDENTS

Respondents are asked to complete the questions below to provide information and insights useful for the Parties consideration. To expedite our review and analysis of the RFI responses, observe the following guidelines:

- Please limit marketing material and collateral as part of the RFI response. It is appropriate to provide "executive briefing" level information about the company.
- If web sites, tutorials, or external documents are provided as support material for any response, provide an appendix at the conclusion of the document identifying those external links and references.

A. Cover Letter or Executive Briefing

Provide an executive summary that describes your organization, experience, and the business models detailed your response, along with the following information.

B. Respondent Profile

Please provide an overview that describes your organization.

- Name:
- Title:
- Organization name:
- Street Address:
- City:
- State:
- Zip Code:
- Phone Number:
- Email Address:
- Describe your company's fiber optic or other communications infrastructure and locations of your internet points of presence in King County and in proximity to Eastrail?

1. The Business model: What kind of collaboration or business model might you propose for the Parties consideration?

2. Please share for each business model your ideas about what might be the respective roles for a vendor and the Parties (and other entities, as appropriate) in the following areas; (please feel free to address other areas in addition)?
    - Design and engineering
    - Investments/financing
    - Construction
    - Lease of Eastrail property for the infrastructure placement
    - Management of conduit & fiber; sales and operations
    - Maintenance
    - Other areas

3. Please share your thinking about how each of the EASTRAIL OWNER goals (as detailed in section 5 of this RFI), can be achieved using the business model (s) you detailed in question #1 above.

4. The Parties are interested in understanding the strengths and weakness for the business models detail in question #1 above. Please share your ideas, you believe the Parties should consider for the business model you detailed in question #1 above.

5. To what extent and in what manner would your potential participation in the Eastrail fiber project and the pursuit of the described goals ensure project success?

6. To support commercial uses (i.e., not including the potential of 1 conduit for government use), how many conduits and fiber optic cables would you recommend be constructed along the Eastrail?

7. In using public assets, the Parties are interested in recovering investments. Please share your thinking about the potential revenue opportunities a conduit and fiber or alternative communications system can enable?

8. Using the Eastrail Corridor start, and endpoints described in section 4.2; to what extent, in what manner, and where would you suggest integrating or interconnecting with existing fiber and wireless networks along the Eastrail and/or coordinating with other fiber network installations?

9. What other information or perspectives should the Parties keep in mind as it evaluates the potential for communications infrastructure along the Eastrail? What other public and/or private benefits, do you believe are possible with communications infrastructure along the Eastrail?

10. Is it important to have the Parties as an anchor tenant for establishing a viable business model to support industry investments in new infrastructure that extends from the Eastrail fiber points? Please share your thinking about opportunities to extend the communications infrastructure to serve other communities and businesses in the region.

11. Please describe how your business model could help address the Parties goal of affordable community broadband internet (e.g., for low income or subsidized housing properties adjacent or in proximity to the Eastrail), and for small and minority owned businesses). More generally, how you would suggest that the Parties support and enhance its affordable broadband internet access goals.

12. The Parties are willing to consider all ideas and recommended approaches to building communications structure along the Eastrail, and welcome respondents' unique proposals and ideas. The Parties also welcomes suggestions and proposals regarding alternative communications technologies with the potential to meet the business goals identified in section 5 of this RFI.

SECTION 8 – REVIEW AND EVALUATION TEAM

To inform our next steps and a future solicitation, submittals will be analyzed and evaluated on the following criteria:

- Analysis of the approaches submitted for each of the business models i.e., the Public, Private, Public-Private and/or alternatives approaches.
- Analysis of the information, ideas proposals and how they meet the business goals identified by the Parties.
- Analysis of the interest and potential of the Eastrail fiber to created revenue streams through rents or lease of real property to build the infrastructure, and/or leasing of conduit and/or fiber assets to be achieved.
- Level of potential partnership interest to manage ongoing operations, maintenance, and provide services.
- Additional benefits (Inter-connections for Parties use, the potential for on-going engagement to construct extensions from the Eastrail infrastructure to future Eastrail Owner facilities and/or areas).
- Alternative technologies proposed and capable of meeting the Parties business objectives

RFI Evaluation Team

Lead by King County Procurement, and King County IT, the RFI review team will consist of 1 representative from each of the Parties as follows;

1. **King County**
2. **Sound Transit**
3. **City of Woodinville**
4. **City of Kirkland**
5. **City of Redmond**

SECTION 9 – INFORMATION RESOURCES

A. Addendum 1 - Eastrail Municipal Master Plan Documents
B. Addendum 2 - Eastrail Project List and Overview Map
C. Addendum 3 - Eastrail Road Crossings
D. Addendum 4 - Eastrail Critical Road Crossings Map Requiring Coordination
E. Addendum 5 - Definitions
F. Addendum 6 - CTC Eastrail Feasibility Study
G. Addendum 7 - CTC Eastrail ROI Analysis
H. Addendum 8 - Eastrail Trail Jurisdictional Permitting Requirements