Yukon Diverse Fibre Link Project

Investment Delivery Models Summary Report

Prepared for:
Government of Yukon
Economic Development
Corporate Services

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1.0 SCOPE OF WORK UNDERTAKEN IN REPORT

Stantec was retained by the Government of Yukon (YG) to provide support for business development for the Yukon Diverse Fibre Link (YDFL) project. The scope of work is comprised of three parts including Part 1 - Investment Model, Part 2 - Project Plan, and Part 3 - Implement Project Plan. Stantec submitted its final report to YG on December 16, 2014, which responds only to Part 1 – Investment Model (Final Report).

The identification, evaluation, and selection process for a recommended investment delivery model is based on a route from Whitehorse, YT, to Juneau, AK. This route was recommended in the Feasibility Study for Alternative Fibre Optic Link, Final Report, January 9, 2014, prepared by Planetworks Consulting Corporation (Feasibility Study).

In addition to Stantec's independent determination of the recommended delivery model, Stantec was requested to review the Feasibility Study and comment on technical feasibility, review of rights-of-way (ROW), permits and environmental approvals together with a review of the financial model, market demand and pricing assumptions.

2.0 BACKGROUND

It is an objective of the YG to provide its citizens, businesses, government operations, and visitors, access to fast, affordable, and reliable broadband and telecommunications services for Yukon's social and economic prosperity. Improving the existing telecommunications infrastructure with an alternate or diverse fibre optic routing has been a long standing objective of the YG to ensure reliable and effective services for its citizens and to support public services and private enterprise.

The YG has confirmed the anticipated outcomes of the Project must include:

1. Improving broadband services speeds to Yukoners — Fast
2. Improving product and service prices to Yukoners — Affordable
3. Improving broadband services reliability to Yukoners — Reliable
4. Maximizing benefit to Yukoners — Investment and Job Opportunities

The proposed project is a new diverse fibre optic link that would be constructed on a recommended route between Whitehorse and Lena Point (near Juneau, AK)1. The route from Whitehorse to near Juneau is referred to in this report as the Juneau route. An alternative route,

[1] Planetworks Consulting Corp. 2014. *Feasibility Study for Alternative Yukon Fibre Optic Link*, Final Report, Updated January 9, 2014.

referred to as the Dempster route, is a potential Canadian fibre optic route between Whitehorse and Inuvik, NT. This route is now possible since the November 2, 2014 announcement by the Government of Northwest Territories (GNWT) that a contract for the Mackenzie Valley Fibre Link (MVFL) project had been signed. Finally, a third potential route has been identified that includes a route from Inuvik, NT to Juneau, AK. This route is referred to in this document as the combined Juneau and Dempster route.

3.0 CURRENT SITUATION

Yukon currently has a single fibre-optic line that connects Yukon to southern Canada and has no diverse or alternate route for communications infrastructure. The existing fibre route from Whitehorse to Carcross to Watson Lake, YT, to Fort Nelson, BC, is subject to damage from climatic conditions as well as mechanical damage due to construction work and other operations undertaken by a variety of agencies within the existing fibre ROW. This results in service interruptions for residents, businesses and government. In addition, Yukoners incur higher communication fees for communications infrastructure and have little or no access to alternate service providers.

The YG is planning to make an investment in broadband communications infrastructure. The YG is committed to the YDFL project, based on the Juneau route, to respond to the challenges of providing fast, affordable, reliable, and innovative broadband services for Yukoners and open and non-discriminatory access from multiple service providers. The YG is also committed to exploring an additional project on the Dempster route as a solution for providing communications services throughout the Yukon.

4.0 REVIEW OF JUNEAU, DEMPSTER, AND COMBINED ROUTES

The Juneau route is a new diverse fibre optic link between Whitehorse and Lena Point, AK (near Juneau) that can be constructed in 1 season at an estimated cost of C$26 million.

The Dempster route is a new Canadian fibre optic route between Whitehorse and Inuvik, NT, that can be constructed in two seasons at an estimated cost of C$54 million.

It is noted that for the Dempster route to be viable it would need to be connected at Inuvik to the new MVFL project that is under construction by the GNWT to install a new fibre cable between Inuvik and Fort Simpson. An Indefensible Right of Use (IRU) agreement[2] would be

[2] Indefeasible Right of Use (IRU) is the effective long-term lease (temporary ownership) of a portion of the capacity of an international cable. IRUs are specified in terms of a certain number of channels of a given bandwidth. IRU is granted by the company or consortium of companies that built the (usually optical fibre) cable. Some IRU legal agreements forbid resale of the capacity ownership.

required over existing fibre to terminate the traffic at a 3rd party internet exchange point (IXP) in Alberta that is yet to be determined.

The combined Juneau and Dempster route is the summation of the Juneau and Dempster routes, with an estimated cost of C$80 million.

Figure 1 below illustrates the individual and combined Juneau and Dempster Routes.

Figure 1 Juneau and Dempster Routes, and Mackenzie Valley Fibre Link Route

5.0 INVESTMENT DELIVERY MODELS

5.1 INTRODUCTION

The Crown Corporation/Agency, Public Private Partnership, and Private Ownership investment delivery models are individually reviewed. The Crown Corporation/Agency investment delivery model can be broken down into an analysis of:

- Bid-Build (BB) – sometimes called Design-Bid-Build (DBB)
- Design-Build (DB)

The Public Private Partnership investment delivery model can be broken down into an analysis of:

- Design-Build-Own-Operate-Transfer (DBOOT)
- Finance-Design-Build-Own-Operate-Transfer (FDBOOT)
- Design-Build-Finance-Maintain-Operate (DBFMO)
- Design-Build-Finance (DBF)
- Design-Build-Operate (DBO)

The Private Ownership investment delivery model is also analyzed.

5.2 ADVANTAGES AND DISADVANTAGES OF EACH MODEL

5.2.1 Crown Corporation/Agency (Bid-Build or Design-Build)

The two Crown Corporation/Agency investment delivery models are BB and DB with operations and maintenance either outsourced or provided by government.

The BB and DB investment delivery models differ only in the design responsibility being added to the contractor under the DB option. All operating, maintenance, investment, commercial risk and ownership are retained by government. The Crown Corporation/Agency investment delivery model has been used effectively for many years by government for the delivery of required infrastructure projects where government wants to retain a tight control over the design and build functions. Some of the specific advantages and disadvantages are noted below:

Advantages:

- Ability to specify project details
- Ability to specify project performance requirements
- Control over all phases of project post completion
- Better level of participation by construction firms

Disadvantages:

- Project schedule longer for BB due to separate phases
- No design innovation in BB
- Restricted design innovation in DB
- No risk transfer away from government post completion of construction
- All capital and operating costs are funded by government

5.2.2 Public Private Partnership

By comparison to the Crown Corporation/Agency investment delivery models, the Public Private Partnership models have more responsibility for risk, particularly post the construction phase of the project. P3 investment delivery models are becoming more popular, with both federal and provincial governments establishing specific agencies to identify and pursue P3 projects. Some of the specific advantages and disadvantages are noted below:

Advantages

- Shorter project schedule (all models other than DB)
- Lower project costs (all models)
- Encourages design/construct innovation (all models)
- Operations and maintenance risk transfer to private sector (all models but DBF)
- Improve service delivery
- Government retains ownership (in all models except for concession period ownership in the DBOOT and FDBOOT models)

Disadvantages:

- Need for strong "champion" in government to lead project definition and preparation of P3 implementation plan
- Pursuit costs are generally the highest
- Level of service and pricing must be clearly defined by contract with appropriate remedies

5.2.3 Private Ownership

The Private Ownership investment delivery model takes almost all identifiable risks and transfers them to the private sector. This is a significant departure from traditional government procurement methods.

By comparison to the Crown Corporation/Agency investment delivery models and the Public Private Partnership investment delivery models, the Private Ownership model has assumed all risks normally retained to some degree by government. Some of the specific advantages and disadvantages are noted below:

Advantages:

- Shortest possible schedule
- Maximize innovation in all areas
- Lowest project cost
- Complete risk transfer to private sector in all phases
- Permits private investment to deliver needed infrastructure

Disadvantages:

- Limited regulatory control over level of service and pricing
- Difficult to push price reductions through to end users
- Need for high level of confidence in project performance requirements

5.3 COMPARATIVE ANALYSIS OF ALL INVESTMENT DELIVERY MODELS

This section is focused on further and final evaluation of all investment delivery models, including Crown Corporation/Agency, Public Private Partnerships, and Private Ownership. The goal is to select two or more investment delivery models for evaluation and more detailed analysis. The mandate for Stantec was to analyze all Investment Delivery Models for the Juneau route only. A further qualitative analysis of each investment delivery model has been completed using a comparative analysis with the following criteria, namely:

- Allocation of Project Risk
- Design Innovation
- Pursuit Costs
- Implementation Schedule
- Project Completion
- Source of Financial Commitment(s)

It is assumed that government will be either prescriptive or performance based in specifying requirements that must be met by any proponent. It is also assumed that the completion of the project will satisfy government's requirements for faster and more reliable service. All investment delivery models are listed in Table 1 together with narrative comments on the level of achievement that is attainable. In Table 1, each model is cross-referenced against general criteria and responsibility, either noted as 'G' for government or 'C' for contractor. If two (2) letters appear, the first letter has prime responsibility.

Table 1 Comparative Analysis of All Investment Delivery Models

Investment Delivery Model	Allocation of Project Risk	Design Innovation	Pursuit Costs	Implementation Schedule	Project Completion	Source of Financial Commitment(s)
Crown Corporation/ BB	All risk to G except build; Ownership by G	No except by G	More expensive than DB	Quickest after design by G	Reliable	G
Crown Corporation/ DB	All risk to G except design and build; Ownership by G	Yes	Lowest	Quickest	Reliable	G
P3/DBOOT	All risk to C except finance for length of concession (5 – 10 years)	Yes	Second highest	2nd longest due to P3 process	Reliable	G
P3/FDBOOT	All risk to C for length of concession (20 - +40 years)	Yes	Highest	Longest due to P3 process plus financing	Reliable	G/C Mix to be determined
P3/DBFMO	All risk to C for length of operating period (15 to 25 years); Ownership by G	Yes	Higher than BB, DB, DBO, DBF, and Private Ownership	Faster than DBOOT and FDBOOT but not as quick as DB or Private Ownership	Reliable	G/C Mix to be determined
P3/DBF	All risk to C until project completion; Ownership by G	Yes	Second lowest cost P3 model	Faster than all P3 models except DBO	Reliable	G/C Mix to be determined
P3/DBO	All risk to C for a specified time period – ownership by G	Yes	Lowest cost P3 model but more than BB, DB or Private Ownership	Fastest P3 model but slower than DB or Private Ownership	Reliable	G

Table 1 Comparative Analysis of All Investment Delivery Models

Investment Delivery Model	Allocation of Project Risk	Design Innovation	Pursuit Costs	Implementation Schedule	Project Completion	Source of Financial Commitment(s)
Private Ownership	All risks to C	Yes	More than BB and DB but less than P3 models except DBO	Could be almost as quick as DB as long as all performance and financial commitments by G are clearly defined	Reliable	G/C Mix to be determined

5.4 PRELIMINARY MARKET SOUNDING

Market soundings with potential market participants were undertaken during October and November 2014. Eleven participants included a cross-section of the industry with northern and telecom experience and alternate project delivery expertise, including First Nations and firms who have or are participating in the MVFL project. Participants in general all expressed a keen interest in the project from a variety of perspectives and opportunities. Some of the key findings from the market sounding activity are:

- Significant interest in the opportunity by the marketplace, First Nations, investors, constructors and service providers.
- The preferred investment delivery method is a public private partnership (P3).
- Lack of broadband competition and costs to consumers are barriers to growth and restrict opportunities for Yukoners.
- A comprehensive ICT strategic plan is needed.
- IRU's with Canadian and US telecommunications entities need to be concluded in advance and subsequently included within the Request for Proposal (RFP).
- The Partnerships BC P3 procurement processes were met with general favor by all parties. Some indicated the Alberta P3 procurement model was better yet, as it is more defined based on the evolution of the P3 processes within Alberta.
- An honorarium for bidders is important and needs to be a reasonable value comparable with the pursuit costs and should result in more innovation.
- The YG needs to understand the cost of ownership over a 30 year period.

5.5 SHORT LIST OF INVESTMENT DELIVERY MODELS

The justification for eliminating some of the investment delivery models, and shortlisting three investment delivery models for further evaluation and detailed analysis are described below.

5.5.1 Crown Corporation/Agency (Design-Build)

The BB investment delivery model was eliminated from further consideration as it would be identical to the DB investment and delivery model except for the need for the government to deal with two or more contracting parties (design firm[s] and a contracting firm) and would limit design innovation from the contractor.

The DB investment delivery model meets or exceeds the criteria for design innovation, implementation schedule, and project completion. The shortcomings include risk retention by government and source of funds from government.

5.5.2 Public Private Partnership (Design-Build-Finance-Maintain-Operate)

The DBOOT and FDBOOT investment delivery models have been eliminated as a result of:

- Longest implementation schedule for P3's
- High pursuit costs versus small deal size
- Complicated deal structure with time limited ownership by developer

The DBF investment delivery model has been eliminated as a result of:

- No operations and maintenance risk transfer
- Limited transfer of commercial risk
- More long term involvement of government

The DBO investment delivery model has been eliminated as a result of:

- No transfer of financing risk
- No transfer of commercial risk
- More long term involvement of government

The DBFMO investment delivery model meets or exceeds the criteria for design innovation, implementation schedule, and project completion with some level of risk retention and financial contribution by the private sector. The shortcoming is that the risk retention is limited to the operating period, typically 15 to 25 years. On larger projects, the operating period can be longer than 25 years. Government financial responsibilities will include service payments and other commitments as part of the project finance structure. The pursuit costs of the DBFMO model is mid-range of all other P3 models.

5.5.3 Private Ownership

This model meets or exceeds the criteria for allocation of risk, design innovation, source of financial commitment, and project completion. The shortcomings include the lack of input and control by government in the operation and maintenance phases. As a result faster and reliable service will likely occur but not be subject to as much control by government. The implementation schedule is less certain unless the government can clearly define all performance standards, financial commitments and security documentation in its RFP documents. The level of financial contribution by government has the potential to be the smallest in this investment delivery model due to the long term nature of a commercial enterprise versus a time limited operating period in the DBFMO investment delivery model.

5.5.4 Evaluation of Investment Delivery Models for Juneau Route

5.5.4.1 Qualitative Criteria

Ten criteria were selected to evaluate the three short listed investment delivery models (Design-Build, DBFMO, Private Ownership) for the project. The criteria are aligned with the YG's goals for faster, affordable, and reliable service to Yukoners; to maximize benefits to Yukoners in terms of investment and job opportunities; and to achieve these outcomes as soon as possible.

The criteria were reviewed and approved by the YG, and then used to evaluate the three short listed investment models.

The evaluation criteria include the following:

1. Affordability to Consumers
2. Faster/More Innovative Service
3. Reliability
4. Project Completion Date
5. Risk Optimization
6. YG Financial Commitment
7. Benefit to Yukoners
8. Market Interest/Competition
9. Transparency, Accountability & Value
10. Other Government(s) Funding

5.5.4.2 Evaluation Methodology

A multiple-criteria analysis was undertaken in two steps to obtain a rank order for the short listed investment delivery models. This initial analysis was then combined with a qualitative risk assessment of each investment delivery model and the findings from preliminary market soundings to select and recommend the investment delivery model along with an implementation strategy.

Step1: Pairwise Comparison

The pairwise comparison methodology converts the inherently qualitative information in each of the 10 listed criteria into quantitative weightings. The pairwise comparison model is developed by using a rating matrix with the criteria placed along the horizontal and vertical axis. Table 2 below summarizes the pairwise comparison and the right column indicates the percentage of weighting allocated to each criteria.

Table 2 Pairwise Comparison – Criteria Weighting

Criteria		Affordability A	Faster / more innovative service B	Reliability C	Project completion date D	Risk Optimization E	Yukon Gov't financial commitment F	Benefits to Yukoners G	Market Interest/ Competition H	Transparency, Accountability & Public Value I	Other gov't(s) funding J	Count	Weighting (rounded to 100%)
Affordability to Consumers	**A**	A	A	C	A	E	A	A	A	A	A	8	**15%**
Faster / More Innovative Service	**B**		B	C	D	E	F	B	B	B	B	5	**9%**
Reliability	**C**			C	C	C	C	C	C	C	C	10	**18%**
Project Completion Date	**D**				D	E	D	D	D	D	D	7	**13%**
Risk Optimization	**E**					E	E	E	E	I	E	8	**15%**
Yukon Government Financial Commitment	**F**						F	F	F	I	F	5	**9%**
Benefits to Yukoners	**G**							G	H	I	G	2	**4%**
Market Interest/Competition	**H**								H	I	H	3	**5%**
Transparency, Accountability & Public Value	**I**									I	I	6	**11%**
Other Government(s) Funding	**J**										J	1	**2%**
											Total	**55**	**100%**

Table 2 shows the outcomes of each criteria pair comparison. Based on the government's goals for faster, affordable, and reliable service for Yukoners and maximizing benefits to Yukoners, the aggregate weighing for these four criteria is 46 percent.

Step 2: Options Evaluation

Based on the same 10 evaluation criteria, the three short listed investment models were scored on a comparative basis using a scale of Poor: 0, Fair: 1 and Good: 2.

Table 3 below lists the 10 evaluation criteria and uses the pairwise weighting from Table 2 together with the Option Evaluation Scale of Poor: 0, Fair: 1 and Good: 2 to arrive a Score and Rank Order.

Table 3 Evaluation of Investment Delivery Models (weighted)

Criteria	Pairwise Weighting (per Table 2)	Crown Corporation/ Agency (DB)	Public Private Partnership (DBFMO)	Private Ownership
Affordability to Consumers	0.15	0	1	2
Faster / More Innovative Service	0.09	1	2	2
Reliability	0.18	1	2	1
Project Completion Date	0.13	2	1	2
Project Risk	0.15	0	1	2
Yukon Gov't Financial Commitment	0.09	0	1	2
Benefits to Yukoners	0.04	2	2	2
Market Interest/Competition	0.05	2	1	0
Transparency, Accountability & Public Value	0.11	1	1	1
Other Gov't(s) Funding	0.02	0	0	0
Score		**0.82**	**1.29**	**1.56**
Rank Order		**3**	**2**	**1**

Poor 0
Fair 1
Good 2

5.5.4.3 Rank Order of Investment Delivery Models

Using the weighted criteria scores in Step 1 and the scores of the investment delivery models in Step 2, the Private Ownership model scored the highest and is ranked 1st, followed by the Public Private Partnership (DBFMO) model, which ranked 2nd. The Crown Corporation/Agency model ranked 3rd.

5.5.4.4 Qualitative Risk Assessment

A summary of key risks and mitigation strategies is provided in Table 4. These are the risks which, based on Stantec's qualitative evaluation, have the highest probability of occurrence and the highest impact on the successful completion of the project.

Table 4 Key Risks and Mitigation

Investment Delivery Model	Risk	Mitigation
Crown Corporation/Agency	Design, construction and operating costs escalate to the point that consumers are not able to take advantage of lower pricing for services	Retain an independent project management firm with the skills and experience to successfully implement the project on scope, on budget and on schedule while managing risks
	Risk that First Nations and Aboriginal claims be made in respect of the ROW	Stringent due diligence with Land Registry on potential claims over the ROW Early engagement of community and First Nation consultation over planned route
	Risk that the infrastructure is not maintained over its life cycle resulting in deferred maintenance liabilities, technical obsolescence, and challenges with service reliability	This can be mitigated through performance based service level agreements with vendors, establishing a dedicated capital reserve, a comprehensive asset management plan, and a maintenance management plan
Public Private Partnership (DBFMO)	That P3 delivery will not deliver value for money compared to crown delivery	Complete a value for money assessment to demonstrate if the project can provide value for money to the public with P3 procurement
	That a sufficient number of companies do not bid on the project to ensure the government receives a competitive response, thus resulting in lost time and the need for a government decision to procure the project as a Crown Corporation/Agency	Issue an RFEOI early in the planning process to gauge interest; followed by a RFQ to develop a short list of interested bidders
	Risk that First Nations and Aboriginal claims be made in respect of the ROW	Stringent due diligence with Land Registry on potential claims over the ROW Early engagement of community and First Nation consultation over planned route

Table 4 Key Risks and Mitigation

Investment Delivery Model	Risk	Mitigation
Private Ownership	Private Owners' financial exposure to the project and limited other sources of income to shelter contingencies and market fluctuations	Private Owner selected based on financial strength, proven industry performance and diversification of business
	That sufficient number of bidders are available to ensure a competitive response	Structure the project to provide an agreed upon rate of return to garner market interest Issue a RFEOI early in the planning process to gauge interest, followed by a request for qualifications to develop a list of interested bidders
	Operating, market, and competitive conditions are unfavourable and do not result in expected price reductions to consumers	Selection of Private Owner based on expertise in the industry Strict due diligence over financial models and testing for variations in sensitivities

5.5.4.5 Selection of Preferred Investment Delivery Model

Three investment delivery models were short listed including a Crown Corporation/Agency Design-Build (DB) model, a Public-Private Partnership (DBFMO) model, and a Private Ownership model. Firstly, a market sounding exercise was conducted to obtain feedback from potential market participants for the project based on the Juneau route and based on the Dempster route. Secondly, a qualitative multiple-criteria evaluation methodology was used to evaluate, score, and rank order the investment delivery models for the Juneau route only. Finally, a qualitative risk assessment was used, along with information obtained from the preliminary market sounding to select a preferred model.

Based on the analysis performed by Stantec, the DBFMO investment delivery model was selected as the preferred model. A summary of the information used in the analysis is as follows:

Table 5 Analysis Used To Select Preferred Investment Delivery Model

Investment Delivery Model	Pairwise Ranking	Risk Assessment	Market Sounding
Private Ownership	1.56	High	Poor
Public Private Partnership (DBFMO)	1.29	Medium	Good
Crown Corporation/Agency (DB)	0.82	High	Poor

The weighted score for the Private Ownership model of 1.56 is marginally higher than the score of 1.29 for the DBFMO model and, on this measure only, would appear to be the preferred investment delivery model. However, the preliminary market soundings that Stantec carried out revealed that potential bidders were not interested in undertaking the project as private owners, without substantial government support and financial guarantees. Therefore, the following two key risks cannot be mitigated:

a. A Private Ownership model is not expected to withstand financial risks based on limited sources of revenue to shelter contingencies. This assumes the YG will not provide a significant capital grant and market demand and pricing guarantees acceptable for a private investor to finance the project and achieve an acceptable rate of return.
b. A Private Ownership model is not expected to garner market interest from a sufficient number of bidders to ensure a competitive response. This assumes the YG will not mitigate financial risk by providing a significant capital grant and market demand and pricing guarantees.

The weighted score for the Public Private Partnership (DBFMO) delivery model of 1.29 was lower than the score of 1.56 for Private Ownership but higher than the score of 0.82 for Crown Corporation/Agency model. The Public Private Partnership model received the highest level of support during the Market Sounding Process and has the advantage of being recently used on the MVFL project. Based on the qualitative risk assessment and findings from the preliminary market soundings, there are three key risks with the Public Private Partnership (DBFMO) delivery model that can be mitigated, including:

a. That P3 project delivery will not provide value for money compared to a Crown Corporation/Agency (DB) delivery model. This risk can be mitigated by completing a Value for Money Assessment to determine if P3 project delivery has a lower cost than Crown project delivery. If a quantitative analysis determines that value for money is not possible with P3 delivery, the project can be implemented using a Crown Corporation/Agency delivery model.
b. That land access, permits and environmental approvals along the ROW will delay the project. This can be mitigated by stringent due diligence with the Land Registry on potential claims over the ROW, and by early engagement of the community including First Nations.
c. That a sufficient number of companies will not bid on the project to ensure the government receives a competitive response, thus resulting in lost time and the need for a government decision to procure the project as a Crown Corporation/Agency. This has been partially mitigated by the positive response received during the preliminary market soundings. This risk can be further mitigated by issuing a Request for Expression of Interest (RFEOI) early in the planning process to gauge interest, followed by a Request for Qualifications (RFQ) to develop a short list of qualified bidders.

The weighted score of 0.82 for the Crown Corporation/Agency model was the lowest. Based on the qualitative risk assessment and findings from the market soundings, there are three key risks with the Crown Corporation/Agency model that can however be mitigated, including:

a. That design, construction and operating costs escalate to the point that consumers are not able to take advantage of lower pricing for services. This can be mitigated by retaining an independent project management firm with the skills and experience to successfully implement the project on scope, on budget and on schedule while managing risks.
b. That land access, permits and environmental approvals along the ROW will delay the project. This can be mitigated by stringent due diligence with the Land Registry on potential claims over the ROW, and by early engagement of the community including First Nations.
c. That the infrastructure is not maintained over its life cycle resulting in deferred maintenance liabilities, technical obsolescence, and challenges with service reliability. This can be mitigated through performance based service level agreements with vendors, establishing a dedicated capital reserve, a comprehensive asset management plan, and a maintenance management plan.

The DBFMO model is a common P3 model in Canada and has been used extensively by government to deliver justice facilities, education, hospital, transportation and other public service buildings. The MVFL project is the most recent example of a DBFMO model used in Canada and is of particular relevance to the YDFL project.

The relationships between the responsible DBFMO parties are illustrated in Figure 2.

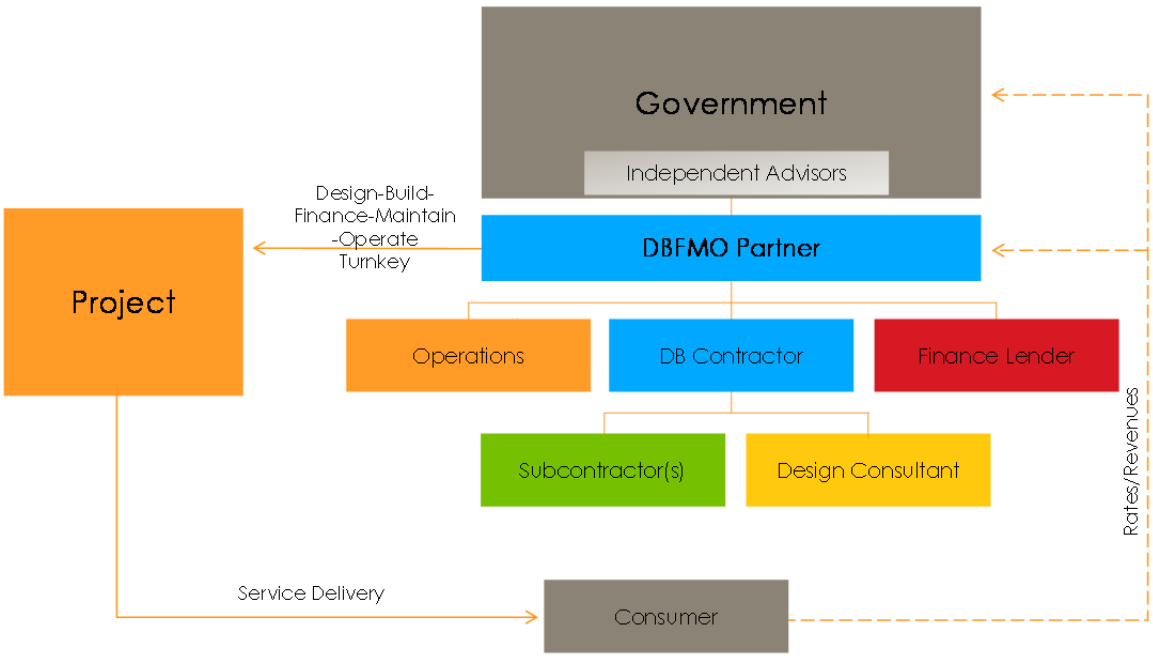

Figure 2 Design-Build-Finance-Maintain-Operate (DBFMO)

6.0 CONCLUSIONS

The main conclusions are summarized as follows:

1. The Juneau route is a new diverse fibre optic link between Whitehorse and Lena Point, AK (near Juneau, AK) that can be constructed in 1 year at an estimated cost of C$26 million. The estimated duration for the complete project schedule including planning, approvals, permitting, construction, and commissioning will be developed at a later stage of project planning.
2. The Dempster route is a new Canadian fibre optic route between Whitehorse and Inuvik, NT, that can be constructed in 2 years at an estimated cost of C$54 million. Similarly, the duration for the complete project schedule will be developed at a later date.
3. The combined Juneau and Dempster route is the summation of the Juneau and Dempster routes with an estimated cost of C$80 million.
4. Based on the Juneau route only, the preferred investment delivery model is the Public Private Partnership (DBFMO) model.

7.0 RECOMMENDATIONS

The main recommendations are summarized as follows:

1. The recommended investment delivery model for the Juneau route is a Public Private Partnership (DBFMO) model. The Public Private Partnership (DBFMO) model is recommended because it is best aligned with the government's goals and objectives, achieves an optimal level of risk transfer to the private sector, and is expected to achieve market interest and competition during the procurement phase.
2. Further discussions should be held with the Government of Canada (GC) to determine if there is funding available for the Juneau route, the Dempster route, or a combined Juneau and Dempster route.
3. Given that the GNWT announced on November 2, 2014 that a contract for the MVFL project was signed, the route options analysis completed in the Feasibility Study should be updated with qualitative and quantitative information including potential new sources of funding, and a total cost of service analysis. The Total Cost of Service analysis would include full life cycle costs for the project, based upon either the Juneau or the Dempster routes.
4. A Value for Money Assessment should be undertaken to provide a quantitative analysis of the costs of a Crown Corporation/Agency model compared to the costs of a Public Private Partnership model. If the Value for Money analysis determines that Crown delivery is more cost effective than P3 delivery, then the recommended investment delivery model should be revised to the Crown Corporation/DB model.

5. A Request for Expressions of Interest should be issued to receive feedback from the market on the proposed investment delivery model.
6. A regulatory implementation strategy should be undertaken with constraints mapping.

8.0 IMPLEMENTATION STRATEGY

The recommended investment delivery model will require the implementation of specific supporting tasks to ensure that the Project can be successfully implemented. The requirement for a Project Plan has been identified by the YG as Part 2 Scope of Work.

Tasks to be included in a comprehensive Project Plan and detailed in terms of scope, costs, and schedule are summarized to include:

1. **Determine if Federal Funding Is Available**—Based on the recent approval of the MVFL project the YG should engage in early discussion to see if funding from the federal government is available for the Juneau route, the Dempster route, or the combined Juneau and Dempster route.
2. **Update the Route Options Analysis**—Update and expand upon the route options analysis undertaken in the Feasibility Study based on a total cost of service analysis and new information related to the MVFL project.
3. **Stakeholder Engagement Program and Communications Strategy**—Develop a comprehensive stakeholder consultation program and Communications Strategy to identify issues, manage expectations, build trust, build consensus, and mitigate issues and inform decision making.
4. **Value for Money Assessment**—A value for money assessment is required to determine if a P3 delivery model can achieve lower costs than traditional Crown delivery.
5. **Request for Expression of Interest**—Develop an RFEOI to receive feedback from the market on the proposed delivery model.
6. **Regulatory Implementation Strategy**—A regulatory implementation strategy should be developed to minimize scope, schedule, and cost risks**.**
7. **Procurement Tasks**—A detailed list of all tasks and associated resources related to the planning, approval, contract awards, and implementation of the project.

A Project Plan including a master schedule will be prepared during the Part 2 Scope of Work to cover all phases of the project through to commissioning, currently estimated to be in late 2016 or 2017.