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WOOD INNOVATION AND DESIGN CENTRE PROJECT

BUSINESS CASE

CONFIDENTIAL

July 2012



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PURPOSE

The purpose of this document is to summarize the findings of the service delivery and procurement options analyses, including detailed financial and risk assessments, prepared by the Ministry of Jobs, Tourism and Innovation and Partnerships BC that led to the recommendation to procure the Wood Innovation and Design Centre as a Design Build project with a ^{s12} Design Build Price Ceiling.

1. EXECUTIVE SUMMARY

1.1 RECOMMENDATION

The business case for the Wood Innovation and Design Centre (the WIDC, or the Project) demonstrates the opportunity and need for investment in a centre that will bring together industry, academia and government to further the advancement of wood and innovative wood products. The business case concludes that:

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1.2 PROJECT OVERVIEW

The Working Roundtable on Forestry (the Roundtable) was formed in 2008, and was tasked with identifying key issues and opportunities facing the forest sector in British Columbia (B.C.), and making recommendations to ensure a strong, vibrant, sustainable forest industry in B.C. for this and future generations. Through the work of the Roundtable, discussions with industry, and future economic indicators for export opportunities, it is apparent that there is a need for a facility that fosters collaboration between industry, academia and government.

The forest sector makes a significant contribution to provincial gross domestic product (GDP), and it is critical that the industry has the ability to continue to expand, grow, and adapt to new changes. Issues around climate change, the pine beetle epidemic and evolving world economies have made this need even more clear in recent years.

In response to these challenges and opportunities, the proposed WIDC will provide leaders from the forest sector, researchers, students and government with a place to collaborate, develop and enhance skills, and share emerging knowledge. It will align these partners in order to optimize innovation, growth and investment in the B.C. forestry industry.

1.3 PROJECT OBJECTIVES

The following Project objectives have been established to guide the development of the Project:

- Develop capacity for building large, non-residential and multi-use buildings utilizing wood and innovative wood products;
- Bring together builders, architects, designers and engineers to advance the commercialization of innovative wood products, technologies and building processes;
- Strengthen B.C.'s expertise and global reputation as leaders in wood-based construction and design and engineered wood products;
- Contribute to the revitalization of downtown Prince George;
- Build an iconic building, incorporating innovative wood products (e.g., cross-laminated timber (CLT)) and design;
- Foster collaboration between post-secondary institutions, industry and governments; and
- Available for occupancy by November 2014.

1.4 SERVICE DELIVERY OPTIONS ANALYSIS

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1.5 PROJECT SCOPE

Based on the Project objectives and the recommended service delivery option, the scope of the Project will comprise space for economic development, industry, civic and academic purposes.

For economic development, industry and civic uses the space requirements will essentially be Class A office space, with no special or unique requirements. For the academic component, space requirements include classrooms, laboratories, lecture theatres, and administrative and student support spaces.

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1.6 PROCUREMENT OPTIONS ANALYSIS

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1.7 PRELIMINARY PROJECT SCHEDULE

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1.8 PROJECT FUNDING

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2. PURPOSE AND APPROACH

2.1 PURPOSE

The main purpose of the WIDC detailed business case is to:

- Demonstrate the need and provide background information with respect to the Project;
- Describe in detail the planning process and recommended project scope to meet the need;
- Describe in detail the procurement analysis conducted for the Project; and
- Recommend a procurement approach and implementation strategy.

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This business case is intended to provide information and analysis to the Project Board comprised of the Ministry of Jobs, Tourism and Innovation (MJTI), the Ministry of Advanced Education (AVED), the Ministry of Energy and Mines (Office of Housing and Construction Standards), and Partnerships British Columbia Inc. (Partnerships BC). The business case is intended to provide information for decision by government.

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2.2 APPROACH

The business case has been developed by the Project Team, comprising members of MJTI, AVED, Partnerships BC and advisory consultants, according to the following approach:

1. Identifying the most appropriate service delivery option;
2. Identifying the most suitable procurement approach;
3. A qualitative assessment methodology of procurement options using criteria that reflect the Project objectives;
4. A quantitative analysis methodology assessing the risk-adjusted cost of the procurement options on a nominal cost basis; and
5. Selection of a recommended procurement approach and implementation plan.

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3. STRATEGIC CONTEXT, BACKGROUND FOR DEVELOPMENT OF THE PROJECT

3.1 CONTEXT

Formed in 2008, the Working Roundtable on Forestry (the Roundtable) was tasked by the Province to consider the long-term future of the forest industry. This group was asked to consider global changes and make recommendations that would produce a vibrant and successful forest industry for future generations, resulting in strong communities.

The Roundtable emphasized that the future of the industry is reliant upon collaboration, as there is no single entity that can independently strengthen this industry in B.C. While the Province holds a leadership role, the private and public sectors, and industry and post-secondary institutions, must work together to advance a common vision.

Since the release of the Roundtable's report and recommendations,¹ the Province has undertaken a number of initiatives to support and advance B.C.'s vital forest industry:

- Development and implementation of an action plan to generate greater value from B.C.'s forest products and to position B.C. as a leader in innovative and higher-value uses for wood;² and
- Implementation of the Wood First Initiative to promote and encourage the use of B.C. wood products.

The Roundtable specifically recommended the establishment of a wood innovation and design centre, as well as a response to the "needs of business, workers and communities during the current global economic downturn". Under the latter recommendation, WorkBC developed an action plan focused on five specific areas:

- Keeping the workforce in B.C.;
- Developing the skills of existing workers;
- Increasing labour market success for aboriginal people;
- Attracting and recruiting new workers; and
- Addressing regional skills shortages.

In 2011 the Province released *Canada Starts Here: The BC Jobs Plan* aimed at creating long-term jobs and investment in B.C. The main focus of the plan is capitalizing on B.C.'s natural strengths and converting them into competitive advantages for lasting economic benefits.³

¹ Working Roundtable on Forestry, "Moving Toward a High Value, Globally Competitive, Sustainable Forest Industry", 2009.

² BC Government, "Generating More Value from Our Forests: A Vision and Action Plan for Further Manufacturing", 2009.

³ Government of British Columbia, "Canada Starts Here: The BC Jobs Plan", 2011.

The *BC Jobs Plan* identifies forestry as one of B.C.'s most competitive sectors, with the greatest opportunity for continued economic growth and source of employment across all regions. While negatively impacted by the worldwide recession, B.C.'s forest sector has started to recover faster than other sectors due to the continued effort to diversify our export markets.

The strategy for the forest sector under the *BC Jobs Plan* is to:

- Continue seeking new export markets; and
- Open up new product markets for traditional, value-added, and next generation forest products.

The WIDC will support the *BC Jobs Plan* and the Working Roundtable on the Ministry of Forests, Lands and Natural Resource Operations strategies as it will:

- Create a centre of excellence for wood innovation, design and product diversification to expand the use of wood in construction and innovative wood product manufacturing; and
- Create a centre that will be globally recognized for its leadership in wood innovation, education, research, and product development.

Combined, these efforts will enable the forest sector to keep growing, develop skills within the industry, and create jobs to support families and communities across B.C.

The WIDC will leverage expertise and resources from existing organizations, research and academic institutions to expand knowledge and serve as a showcase on the use of wood in non-residential construction, facilitate technology transfer, promote training, and expand markets for further-manufactured products.

3.2 BACKGROUND

The forest sector is a large contributor to government revenues and enables expenditures on essential public services. Today, this sector continues to be an economic engine of the province, contributing more than 30 per cent of the province's gross domestic product (GDP) and 12.3 per cent of all employment.⁴ It is commodity-based, export-oriented and impacted by global economic conditions, exchange rates and cyclical demand patterns. The B.C. forest industry is facing a world characterized by significant, fundamental global shifts that will require changes in the way it operates. Even before the current economic crisis, these changes were evident. Climate change and changes to the natural environment such as evolving world economies, pine beetle damage, altered markets and consumer preferences, new technologies, changing demographics and societal expectations for the forest resource and the forest industry present both challenges and opportunities. It is critical that the industry has the ability to continue to expand, grow and adapt to new changes.

⁴ MFLNRO's, "Economic State of the BC Forest Sector", February 2011 with data from BC Stats.

3.3 GOVERNMENT COMMITMENTS TO ESTABLISH THE WOOD INNOVATION DESIGN CENTRE

The Province has expressed its support for the creation of the WIDC during the February and August 2009 speeches from the throne, stating that a wood innovation and design centre will be established in Prince George with the goals of promoting new expertise in “advanced building systems, engineered wood products, interior wood design and application and other value-added products.”

The February 2010 Speech from the Throne further reinforced government’s commitment to the Project and clarified that a wood innovation and design centre will “amplify our expertise and our global reputation as leaders in wood construction, engineered wood products and design.”

Premier Clark further confirmed the need for the WIDC at the Council of Forest Industries’ Annual General Meeting, expressing that “thousands of families throughout the rural and northern region of British Columbia depend on the forest industry...The work, training and research coming out of the wood innovation and design centre will expand the scope and size of our markets, creating good paying jobs throughout the province.”

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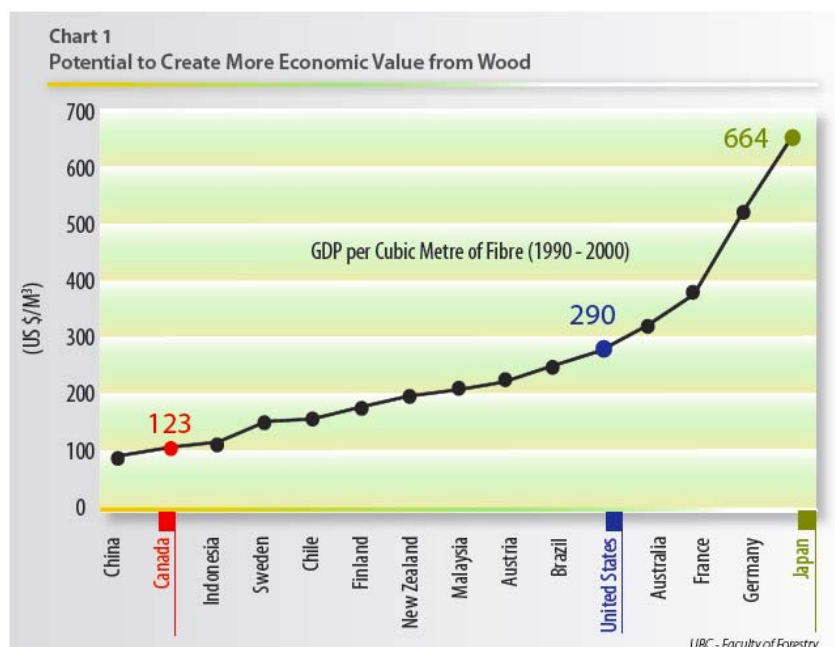
4. ECONOMIC OPPORTUNITY

British Columbia produces a range of forest products from logs to lumber to engineered wood products and beyond for domestic and international use. These products can be grouped into three broad categories: commodities (i.e., standard lumber, pulp and paper), traditional value-added (i.e., shakes and shingles, treated lumber, posts) and next generation manufacturing (engineered wood products, bio-energy, bio-chemicals).

Between 1990 and 2000, on average, Canada’s commodity-focused forest sector generated \$123 of GDP per cubic metre of wood fibre harvested (see Figure 1). Over the same period, the more diversified forest sector in the U.S. generated \$290 of GDP per cubic metre, almost 2.5 times as much as Canada. Germany and Japan generated four and five times as much economic activity per unit of input fibre, respectively due to their focus on the value-added and next generation wood products.⁵

⁵ B.C. Government, “Generating More Value from Our Forests: A Vision and Action Plan for Further Manufacturing”, 2009, p.4.

Figure 1: Potential to Create More Economic Value from Wood



Fortunately, the B.C. forest sector is well-positioned to diversify its markets, products and services and move up the value chain through greater focus on next generation manufacturing. Not only would this lessen the impact from swings in commodity prices, it would provide greater economic benefits from the existing forest resource. In addition, the more varied market base provides more skilled jobs and greater stability for communities and workers.

New products and advancements in manufacturing have ensured that today's wood products are stronger, smarter and more versatile than ever. As a result, applications for wood products are almost unlimited and, through design innovation, architects and engineers can create larger wood buildings of diverse occupancies that meet or exceed the requirements for safety and performance.

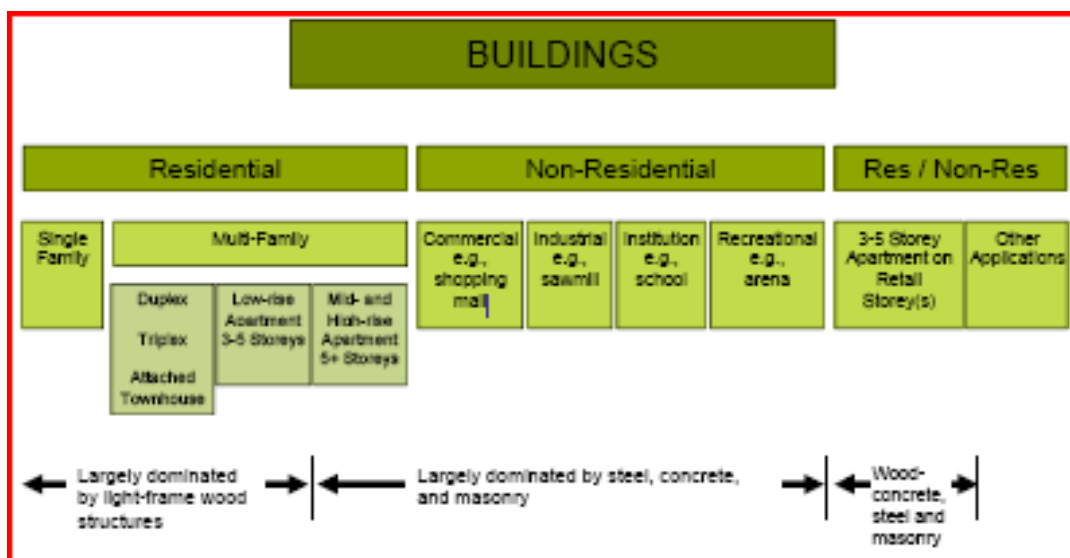
There are several opportunities that the province can benefit from both domestically and internationally.

4.1 DOMESTIC MARKET

In B.C. and North America more broadly, wood is dominantly used in residential construction (see Figure 2 on the following page). Non-residential construction represents one of the greatest domestic growth opportunities for B.C. wood products both domestically and internationally.⁶ Increased wood use supports the development of a key provincial resource and growth engine while contributing to job creation outcomes for forest dependent communities across the province.

⁶ Pablo Crespell, Ph.D., "Wood Usage in Non-Residential and Multifamily Construction in British Columbia – 2009 Benchmark" prepared for Forestry Innovation Investment Ltd., August, p.1.

Figure 2: Buildings – Wood Use in Construction



In B.C., the non-residential sector has an estimated value of more than \$3.5 billion with commercial and institutional construction encompassing the greatest majority of the market (see Table 1 below).⁷

Table 1: Wood Use Construction Values

	Floor Area (sq.ft.)	Value (\$)	Projects (n)
Commercial	4,695,461	\$ 1,393,876,871	99
Industrial	1,609,080	\$ 121,730,000	23
Institutional	4,098,325	\$ 1,557,368,613	102
Miscellaneous	24,800	\$ 5,000,000	2
Multifamily	3,197,064	\$ 526,190,493	50
Grand Total	13,624,730	\$ 3,604,165,977	276

The most recent data for North America indicates that while the non-residential sector is often nearly as large as the residential sector in terms of construction value (see Figure 2 on the following page), the volume of lumber and wood structural panels used in non-residential construction is less than 10 per cent of the volume used in new residential construction.⁸ With respect to B.C. more specifically, non-residential construction wood has a 26 per cent area share in institutional, a 10 per cent area share in commercial, and the industrial area share is virtually zero.⁹

The estimated opportunity for growth where wood may currently be used within the existing relevant B.C. and municipal building codes is estimated at an additional 50 per cent increase in the demand for wood

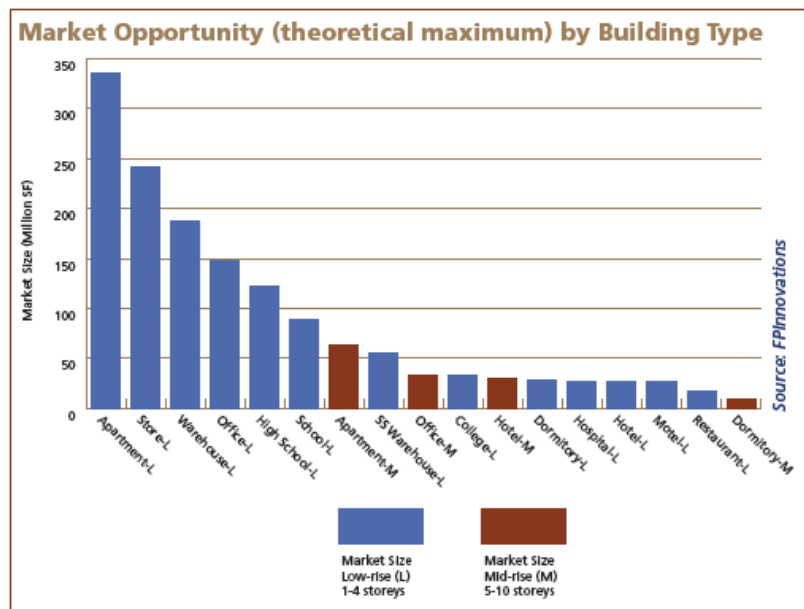
⁷ Crespell, p.6.

⁸ Crespell, p.1.

⁹ Crespell, iii.

products¹⁰, an estimated total consumption of 2.5 million square feet.¹¹ The greatest market growth is estimated to be in low-rise (1-4 storeys) buildings.

Figure 3: Market Opportunity by Building Type



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¹⁰ Crespell, p.14.

¹¹ Crespell, p. iii.

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Further, joint work between the U.S. and Canadian forest industry has been ongoing for some time to promote the use of non-residential wood applications in both countries. While the U.S. market is not a current focus of B.C., it nonetheless presents a significant market for forest products, and a ready market for innovative wood products.

4.2 INTERNATIONAL MARKET

B.C. has made significant progress in leveraging its position as Canada's gateway to the Asia Pacific, and continues to expand B.C.'s wood market share in the Asia Pacific. The value of forest product exports to China and Japan has increased dramatically over the past five years. In 2005, China represented only 5.2 per cent of B.C. forest product exports based on value, and has grown to over 24 per cent by the end of 2010.¹³

Due in large part to this diversification and opening of new markets for B.C. in Asia, forest product exports have increased by 20 per cent, lumber production is up 29 per cent, and jobs are up seven per cent in 2010, despite the continuing recession in the U.S.¹⁴ The U.S. is still the largest single market for B.C.'s forest products, in particular softwood products, but in the last three months of 2010—for the first time in B.C. history—exports to China and Japan exceeded those to the U.S.¹⁵

Under the *BC Jobs Plan*, the province will continue to actively pursue increasing its market share in the Asia Pacific as the U.S. housing market has not recovered to its pre-2008 levels, and the demand for B.C. forest products continues to grow in China and Japan.

China replaced Japan as B.C.'s second-largest export market for solid wood for a second straight year in 2010, as B.C.'s shipments to China continued to climb. Softwood lumber sold to China almost doubled from 2.6 million cubic metres in 2009 to 4.6 million cubic metres in 2010, accounting for 21 per cent of the total B.C. solid wood exports. Conversely, B.C.'s share in China's total softwood lumber imports was 49 per cent in 2010.¹⁶ This increased demand is largely due to the pace of China's urbanization and extensive marketing efforts made by the B.C. forest sector.

Fuelled by rising urbanization, China is the world's largest construction industry, with more than 20 million people requiring new homes each year. It is home to half of annual new builds constructed globally,

¹³ Ministry of Forests, "Economic State of the BC Forest Sector", February 2011, p.9

¹⁴ Ministry of Jobs, Tourism and Innovation, "Canada Starts Here: The BC Jobs Plan", 2011, p.8

¹⁵ Ibid.

¹⁶ Antje Wahal and James Poon, FP Innovations, "British Columbia Forest Products Trend Analysis in Export Markets 2010, Volume 1: Global Market Overview", p.17

adding approximately 1.6 to 2.0 billion square metres of floor space. Of this, 32 per cent is urban housing and 44 per cent is rural. New housing is expected to hold a growth rate of 10 to 15 per cent to the end of 2011.¹⁷ China's five-year plan for 2011-2015 includes the construction of 36 million affordable housing units by 2015. In 2011 alone, the government plans to build 10 million new units.¹⁸

China's new policies, focused on improving energy efficiency and environmental impact of structures, make wood building systems an increasingly attractive option, with benefits such as carbon reduction and seismic stability.

By increasing its imports of wood in various forms and its exports of finished products, China will continue to have a substantial impact on global trade in wood products, both as a customer for wood, and as a competitor producing finished wood and paper products. By 2025, China is expected to have a net fibre need of 250 million cubic metres per year.

China is not B.C.'s only market in the Asia Pacific. Japan remains B.C.'s largest market for high grade lumber. Between 2009 and 2010, B.C. exported approximately 2.6 million cubic metres of softwood lumber to Japan, a 23 per cent increase from 2008/2009.¹⁹ B.C.'s 2010 market share of softwood lumber imports into Japan represents 39 per cent of the total international share in that country.²⁰

It is expected that Japan will continue to be a valued market for B.C. wood in the coming years. With the earthquake and tsunami in Japan in March of 2011, substantial volumes of wood will be needed for the rebuilding efforts. In addition, Japan has enacted a new Wood First initiative requiring that low-rise public buildings be built primarily out of wood.²¹

4.3 EDUCATIONAL OPPORTUNITIES

The development of value-added new products and processes (e.g., new engineered wood products, biotechnology, textile production, bio-energy and nanotechnology) are vital to future growth in Canada's forest product sector. While new products and processes are in the early stages of implementation, many in the sector expect to bring new engineered wood products, structural systems, and new product processes such as bio-energy, bio-refining and wood chemicals online within the next few years.

New technology and advances in building systems and innovative wood products will also require the development of new education and training programs to prepare workers to support the development of new products and processes. Industry and education providers will need to work closely to ensure the development of new skills and programs which keep pace with, and respond to, the development of new

¹⁷ Logging and Sawmilling Journal :

http://www.forestnet.com/LSJissues/july_august2011/China%20wood%20products%20trade%20briefs%20.pdf

¹⁸ Antje, Vol 2 p.29.

¹⁹ Ibid, p.15

²⁰ Ibid.

²¹ Ibid, p.16.

products.²²

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Labour market demand analysis indicates some need over the next decade for engineers, although forecasts show a mixed picture. The B.C. Labour Market Outlook projects an undersupply of 40 for northern B.C. for the period 2010-2020, and 1,030 for the whole province. B.C. Work Futures describes civil engineering as having limited future job prospects, meaning that the occupation is expected to experience slow or little growth in job openings. With regard to employment by region, B.C. Work Futures indicates that 70 per cent of civil engineering positions are currently located in the Lower Mainland/Southwest, with only one per cent located in the North Coast/Nechako/Northeast region for each of these occupations. There are no current labour market statistics available for engineering positions with a specialization in wood.

Overall, in terms of engineering credentials, Canada lags key competitors internationally and, in turn, B.C. produces fewer engineering credentials per capita than the Canadian average (approximately half). The B.C. Labour Market Outlook analysis shows that for the province as a whole, employment demand for science, technology, engineering and math-related occupations will increase faster than other occupations over the next 10 years.²⁴

Similar to engineers, analysis of the labour market demand for architects indicates some need over the next ten years. Across the province, approximately 8,300 job openings are expected for the occupational group of architects, urban planners and land surveyors. Of these job openings, about 170 are expected to be located in the North. The demand for architects, urban planners and land surveyors in the North is expected to increase from approximately 370 workers in 2010 to approximately 410 workers in 2020. B.C. Work Futures notes that 2 per cent of architects, urban planners and land surveyors in B.C. are currently employed in the North, with just over 80 per cent employed in the Mainland/Southwest region. Provincially, B.C. Work Futures notes that future prospects for architects are limited, indicating that little or slow growth in job openings is expected for this occupation.

Wood technologists are considered as part of the broader occupational group of technical occupations in civil, mechanical and industrial engineering. According to the B.C. Labour Market Outlook, approximately 2,600 job openings in this occupational group are expected for B.C., with about 130 (or 5 per cent) of the openings expected to be in the North. The demand for this technical occupation in the North is expected

²² Forest Products Sector Council, "Renewing Canada's Greenest Workforce: A Labour Market Intelligence Report", May 2011.

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²⁴ http://www.workbc.ca/docs/BC_Science_Related_Occupations.pdf

to range from about 300 to 350 workers over the 2010 to 2020 period. About 7 per cent of workers in this occupation are employed in the North, which is about the same share as for all occupations. Also according to B.C. Work Futures, above average job prospects are expected in B.C. for industrial engineering and manufacturing technologists and technicians, which indicates relatively strong growth in job openings.

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4.4 SUMMARY

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5. GUIDING PRINCIPLES AND PROJECT OBJECTIVES

5.1 VISION FOR THE WIDC

The WIDC will:

- Create a centre of excellence for wood innovation, design and product diversification to expand the use of wood in construction and innovative wood product manufacturing, and
- Create a centre that will be globally recognized for its leadership in wood innovation, education, research, and product development.

5.2 STRATEGIC DIRECTIONS

Strategic alignment of activities in the forest sector (as it relates to industry information, knowledge and education) is vital. The British Columbia (B.C.) forest sector, with its myriad of associations, academic and research programs, and government agencies is highly fragmented. The WIDC will bring together these partners in order to increase the leverage of the individual strengths, strategically align resources, enable opportunities for collaboration to collectively expand the forest sector markets, and diversify its product offerings.

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5.3 PROJECT OBJECTIVES

The following Project objectives have been established to guide the development of the Project:

- Develop capacity for building large, non-residential and multi-use buildings utilizing wood and innovative wood products;
- Bring together builders, architects, designers and engineers to advance the commercialization of innovative wood products, technologies and building processes;
- Strengthen B.C.'s expertise and global reputation as leaders in wood-based construction and design and engineered wood products;
- Contribute to the revitalization of downtown Prince George;
- Build an iconic building, incorporating innovative wood products (e.g., cross-laminated timber (CLT)) and design;
- Foster collaboration between post-secondary institutions, industry and governments; and

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6. WIDC PROGRAM

The WIDC will focus alignment on the following key elements to supports its vision to be a catalyst of economic growth and diversification in B.C.:

- Showcasing and market development of wood construction and related technologies;
- New product development, commercialization and adoption;
- Industry outreach and economic partnerships; and
- Academic partnerships and programs.

6.1 SHOWCASING AND MARKET DEVELOPMENT

Strategic investments are required to properly promote the benefits of wood and create a basis for marketing and market development programs. These pro-wood promotional activities encourage increased consumption of wood, and as such help to expand market opportunities for wood use.²⁷

Current B.C. promotional programs for the use of wood in construction include:

(a) International:

- Jinqiao Townhouse project in Pudong District of Shanghai of 133 units featuring high-end wood-frame construction;
- Construction of two four-storey wood-frame apartment buildings in Tianjin;
- Sanlin Affordable Housing demonstration project demonstrating use of wood for public housing and public buildings;
- Demonstration three-storey walk-up wood-frame apartment building at the 2011 Green Building Show in Beijing;
- Reconstruction of public buildings in Sichuan destroyed by the 2008 earthquake;
- Reconstruction of public buildings in Japan destroyed by the 2011 earthquake;
- Wood construction demonstration pavilion at the Shanghai Expo 2010; and
- Heibei Building Science Research Centre featuring B.C.-designed wood truss roofing and related initiatives in Hebei Province.²⁸

²⁷ Forestry Innovation Investment, "Investment Strategy: 2011-2012", 2010, p.2.

²⁸ Wahal and James Poon, FP Innovations, "British Columbia Forest Products Trend Analysis in Export Markets 2010, Volume 2: Export Market Summaries" p.33

(b) Domestic:

- Wood First Act requiring wood to be considered as the primary building material in all new publicly-funded buildings;
- The Forestry Innovation Investment Ltd. web portal www.naturallywood.com provides facts on wood as a green building and manufacturing material;
- Wood WORKS! BC, a member of the Wood Enterprise Coalition, holds events across the province and country to increase awareness of opportunities to incorporate wood into building design and construction;
- BC Building Code changes in April 2009 allowing for six-storey wood frame residential construction resulting in more than 68 new projects using wood frame construction;²⁹ and
- 2010 Olympic Games' venues and facilities showcased B.C. wood as an innovative and climate-friendly material in their construction and design.

The WIDC will build on these past and current promotional activities. The WIDC will be a wood building that showcases the diversity of B.C.'s forest industry products to both international and domestic markets. Its construction will incorporate the three different categories of manufactured forest products (traditional or commodity-based, value-added, and next generation) and will demonstrate B.C. wood-based products being used in non-traditional ways both structurally and/or architecturally.

Examples of such elements may include:

- Engineered wood products and building systems such as CLT, glulam or other mass timber products;
- New wood-based structural design options for vertical and lateral load bearing systems;
- Wood-based elevator shafts, stairwells and fire walls;
- Wood-concrete-steel mixed construction; and/or
- Next generation durable cost-effective wood composites.

By featuring these products and/or concepts, WIDC will set a precedent for longer-term product, market and code acceptance while accelerating the technical development and knowledge of newer wood-based products and building systems in B.C.

6.2 NEW PRODUCT DEVELOPMENT, COMMERCIALIZATION AND ADOPTION

New product development, commercialization and technology adoption are the drivers of innovation across all sectors of the economy. Innovation drives growth and improves productivity and living

²⁹ The Working Roundtable on Forestry, "Implementation of the Working Roundtable on Forestry's Recommendations: January 2011 Status Update", 2011, p6.

standards. Innovation and commercialization of technology and processes are the answers to the question of how a high-wage economy such as B.C. and a sector such as forestry, can move up the value-added chain and compete on quality, service and uniqueness, not merely on cost.

Both the private and public sectors have important roles to play in making B.C. and its forest sector more innovative and globally competitive: institutions develop a supply of ideas and people to create them; industry harnesses market demand for new innovative products to create wealth; and government sets the policy, business climate, regulatory and policy framework to encourage success both at home and abroad.

While the B.C. forest sector continues to meet increased Asia-Pacific demand for traditional wood products, there is an opportunity to build on this momentum to further diversify markets and product offerings to generate more value from B.C.'s forests.

The B.C. forest sector previously experienced difficulty in successfully commercializing, showcasing and encouraging markets to adopt innovations. For example, innovations such as Parallam were developed in B.C. but more extensively commercialized in other jurisdictions.³⁰

Through integrating and leveraging partnerships among research institutions, industry, academic institutions, economic development agencies, and market development professions, innovation and commercial outcomes from new innovation wood products can be improved, and future next generation wood product opportunities can be successfully acted upon.

One example of an emerging value-added wood product for B.C. is cross-laminated timber (CLT). CLT is a new building system in which multi-layer wood panels are layered crosswise for increased dimensional stability and strength. It has gained international traction in the non-residential building sector since 2000 through the emerging green building movement, as engineered wood products offer a strong combination of environmental performance and sustainability.

While the short-term opportunity for the CLT market is seen to be modest, it is estimated that the mid- to long- term market opportunity will be significant, with billions of board feet of demand potential. As an example, a five to fifteen percent penetration of the non-residential U.S. market will require over 1.5 to 2.0 billion board feet of lumber annually.³¹

Despite the focus on generating greater value from the forest industry, certain barriers continue to exist for the commercialization of new value-added and next generation wood products. Specifically:

- Lack of familiarity with the products and the absence of documented design attributes and code acceptance;

³⁰BC Government, "Generating More Value from Our Forests", p.7.

³¹ Canadian Wood Council, "A Strategic Plan for the Commercialization of Cross-laminated Timber in Canada and the US", March 2010, p.19.

- Lack of technical expertise to design and/or use the new wood building systems (e.g., CLT);
- Inability to obtain insurance and/or secure financing for innovative projects that push traditional building codes; and
- Lack of technical and production capacity.³²

A central objective of the WIDC suite of programs is to address these barriers to support the commercialization of innovative products and building systems that increase investment in a higher value-added forest sector by:

- Co-locating key industry leaders, investors, academic partners, and government agencies with like mandates to facilitate information flow, innovative partnerships, and bring further focus and coordination to their collective efforts to promote commercialization opportunities;
- Building technical expertise and stimulating capacity growth through industry-led educational seminars and workshops (e.g., code issues, fire, moisture, structural, building envelopes);
- Increasing awareness by developing information materials and providing in-house workshops for the real estate, insurance and financial sectors to become more familiar with the attributes and features of the new products and building systems;
- Ensuring WIDC research, programs and services have economic and commercial relevance; and
- Continuing to promote and expand MJTI's international market hosting programs that facilitate the attraction of capital investment and encourage strategic alliances.

6.3 INDUSTRY OUTREACH AND ECONOMIC PARTNERSHIPS

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³² Natural Resources Canada, "A Strategic Plan for the Commercialization of Cross-Laminated Timber", March 2010, p.28.

Pages 40 through 53 redacted for the following reasons:

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11. POLICY CONTEXT

The Ministry of Finance has mandated through its Capital Asset Management Framework (CAMF) that the following principles guide all public sector capital procurement:

- Fairness, openness and transparency;
- Optimal allocation and management of risk;
- Value for money and protecting the public interest; and
- Competitive procurement process.

In accordance with the CAMF, the Project Team undertook a detailed procurement assessment to determine an optimal procurement model for the Project.

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18.5 COMMUNICATIONS

A communications plan to support the Project will be developed in partnership with MJTI and Partnerships BC. The purpose of the communications plan is to guide communications activities for the Project from business case through to the end of procurement. A plan strategy is provided in Appendix K, with key points summarized below.

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19. FUNDING ANALYSIS

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21. APPENDICES

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APPENDIX B	MCA – Procurement Options Report
APPENDIX C	Market Outreach Summary
APPENDIX D	Capital Cost Summary
APPENDIX E	Risk Report
APPENDIX F	Funding Model
APPENDIX G	Functional Program
APPENDIX H	Real Estate Assessment
APPENDIX I	Ownership Considerations
APPENDIX J	Land Investment Estimate
APPENDIX K	Communications Plan Outline
APPENDIX L	Equipment List
APPENDIX M	Building Operating Analysis
APPENDIX N	Early Capital Screen
APPENDIX O	Geotechnical Assessment



APPENDIX A MULTI-CRITERIA ANALYSIS – SERVICE DELIVERY OPTIONS

WOOD INNOVATION AND DESIGN CENTRE BUSINESS CASE

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**MULTIPLE CRITERIA ANALYSIS –
SERVICE DELIVERY OPTIONS REPORT
WOOD INNOVATION AND DESIGN CENTRE**

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APPENDIX B MULTI-CRITERIA ANALYSIS – PROCUREMENT OPTIONS

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MULTIPLE CRITERIA ANALYSIS – PROCUREMENT OPTIONS REPORT WOOD INNOVATION AND DESIGN CENTRE

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APPENDIX C MARKET OUTREACH

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**Ministry of Jobs, Tourism and Innovation
Wood Innovation and Design Centre**

**Market Outreach
Report**

July 2012

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APPENDIX D CAPITAL COST SUMMARY

WOOD INNOVATION AND DESIGN CENTRE BUSINESS CASE

July 2012



**CLASS "C" ESTIMATE - OPINION OF PROBABLE COSTS
(INDICATIVE DESIGN ESTIMATE) – REVISION 0**

WOOD INNOVATION DESIGN CENTRE, PRINCE GEORGE

July 9, 2012



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APPENDIX E RISK REPORT

WOOD INNOVATION AND DESIGN CENTRE BUSINESS CASE

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RISK REPORT
WOOD INNOVATION AND DESIGN CENTRE

July 2012

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1. INTRODUCTION

1.1 PURPOSE

The purpose of this report is to document the risk management process for the Wood Innovation and Design Centre project (the Project), being delivered by the Ministry of Jobs, Tourism and Innovation (the Owner) from the business case stage through procurement to financial close. Key areas covered by this report include:

- a) The incorporation of risks into the financial analysis for the business case;
- b) The consideration of risks during the drafting of the Project Agreement; and
- c) The manner in which retained risks will be managed by the project team throughout the Project's implementation.

Currently, the Project is at the business case stage of the process. This version of the report reflects the risk management work that has been done to this point which has largely focused on identifying Project risks, allocating them between the government and private sector, developing preliminary risk management strategies and incorporating risks into the public sector comparator and the shadow bid. This report will be periodically updated throughout the procurement process to financial close.

At this stage, this Project's risk matrix only includes risks related to the approval, procurement and design and construction phases. Operating and life cycle risks did not form a part of the analysis.

2. RISK MANAGEMENT

2.1 PARTNERSHIPS BC GUIDANCE – RISK MANAGEMENT

Risk management includes the actions or planned actions that impact the probability and consequences of a risk event in order to ensure that the level of risk assumed falls within an acceptable limit for the Project team. Every successful project must consider and manage risk.

Risk management in the context of a public-private partnership (PPP) project doesn't simply involve transferring all project-related risks to the private sector. The goal of a PPP arrangement is to allocate project risks to the party best able to manage them. An efficient or optimal allocation of risk between the public and private sector participants will ultimately maximize value for money for taxpayers.

Partnerships BC, in conjunction with Risk Management Branch ("RMB"), has established guidelines with respect to risk management in the context of a PPP project throughout the various stages of the PPP procurement process. These guidelines are discussed below. Partnerships BC uses a standardized risk matrix template as a tool to consolidate risk information throughout the project's lifecycle. Its use at each stage of the project's lifecycle is also discussed below. The Project's risk matrix is included in Appendix A of this report and reflects the work that has been done to date during the business case stage.

2.1.1 Business Case Stage

The Project is in the planning stage during the preparation of the business case. Technical and financial information about the Project is gathered, analyzed and compiled into a comprehensive document that becomes the business case. Most of the information is subject to intense due diligence at this stage. However, there can be further refinement and modification throughout the Project's life cycle.

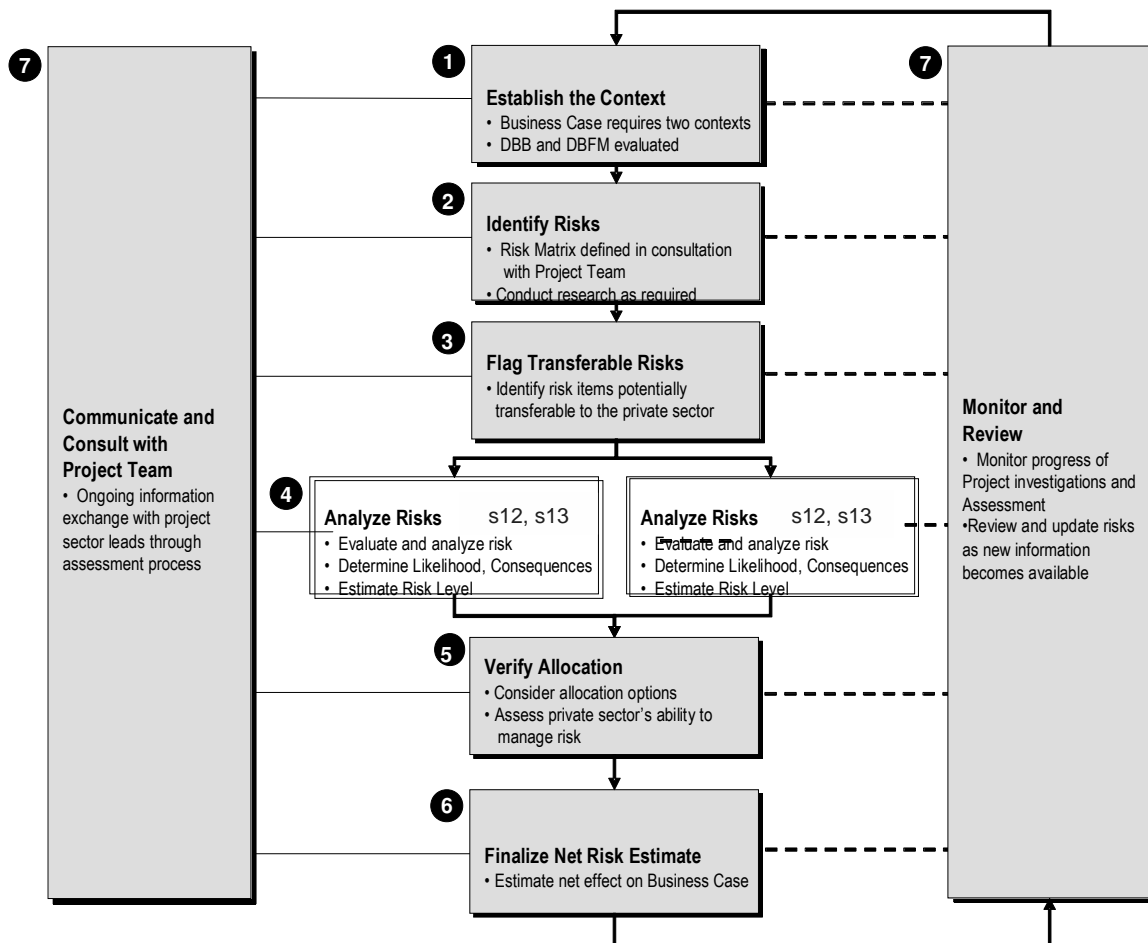
The risk management objective at this stage is to identify and analyze the Project's risks and opportunities as follows:

- a) Risks are identified through a series of risk workshops;
- b) Risks are allocated between the government and the private sector;
- c) High level mitigation and prevention strategies are identified; and
- d) Where possible, risks are quantified based on the best available information at the time.

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Figure 1: Risk methodology



The risk matrix is the key document produced in the risk management process. It consolidates and provides a record of the following information:

- The identification and description of all relevant risks;
- Identification of mitigating and preventative strategies;
- Risk allocation; and
- Risk quantification.

The risk matrix is then used in the initial drafting of the Project's legal documents. Risk quantification is discussed separately in Section 2.2.

2.1.2 Procurement Stage

During the procurement stage, the risk matrix should be periodically updated to reflect new information as it becomes available. Areas that can be re-visited are:

- a) Risk identification – as the Project moves through the planning phase and into procurement and more information about the Project emerges, new risks not previously recognized will be identified (especially through the development of the Project Agreement). These risks should be added to the risk matrix, allocated appropriately and quantified where possible.
- b) Risk allocation – during the business case phase there is a preliminary allocation of risk between the government and private sector. All of the identified risks are either transferred, retained, or shared. As the Project progresses during the procurement process, it may become apparent that the initial allocation does not provide the best value for money for the government in which case the allocation is amended as appropriate.
- c) Risk mitigation – the mitigation strategies for the retained risks need to be closely managed by the Project team through the procurement phase with the intent of minimizing or in some instances eliminating a number of the retained risks. A contingency for retained design, construction, and approvals risks should be added to the project budget to absorb risk events if they occur.
- d) Risk quantification – new information on expected outcomes or probabilities should be incorporated to improve the Project risk pricing.

2.2 RISK QUANTIFICATION

A failure to fully take account of risk is one of the key reasons why public projects are frequently not delivered on time, on budget or to specification. Risk management takes a sophisticated and systematic approach to risk, estimating the range of potential impacts of risk on a cost-by-cost and risk-by-risk basis rather than the traditional approach of simply applying an overall contingency to project costs.

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In traditional procurement, contingencies are often budgeted for in addition to the expected cost reflecting the fact that unforeseen circumstances may arise that could cause additional cost to be incurred or delay. This approach was adopted during the Project Definition stage. These contingencies represented an initial estimate, based on the project team's experience of the likely expected additional costs over the cost estimates. The contingencies usually account for typical issues associated with public sector procurement such as changes, unanticipated events etc.

However, this approach has some shortcomings because it does not:

- a) Systematically consider the full risk register to ensure a comprehensive assessment;
- b) Consider the range of possible outcomes;
- c) Consider the risk associated with operating and lifecycle costs; or
- d) Consider specific characteristics of unique risks.

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A systematic evaluation of risk has been performed to:

- a) Present a range of likely cost outcomes;
- b) Provide a reliable means of testing value for money and provide a consistent benchmark and evaluation tool; and
- c) Encourage bidding competition by creating confidence in the financial rigor applied in creating the Project's financial model.

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3. BUSINESS CASE STAGE

3.1 METHODOLOGY

3.1.1 Overview

The first step in the Project's risk management process was to identify project risks. A series of risk workshops was held in November 2011, facilitated by Partnerships BC.

A mixture of professionals from the private and public sectors participated in the risk identification and quantification exercise. These participants were subject matter experts in one or more of the following areas:

- Procurement
- Engineering
- Cost estimating
- Design and construction
- Project management

Participants included representatives from the Owner, the Ministry of Transportation and Infrastructure, the Ministry of Advanced Education, the Building and Safety Standards Branch of the Ministry of Energy and Mines, Office of Housing and Construction Standards, CEI Architecture, the QS, CFT Engineering and Partnerships BC.

During the workshop, participants reviewed an existing list of previously brainstormed risks associated with the approval and construction phases of the project. Some risks were deleted as they were no longer relevant and other new risks were added to the risk matrix. A copy of the final business case risk matrix is included in Appendix A of this report.

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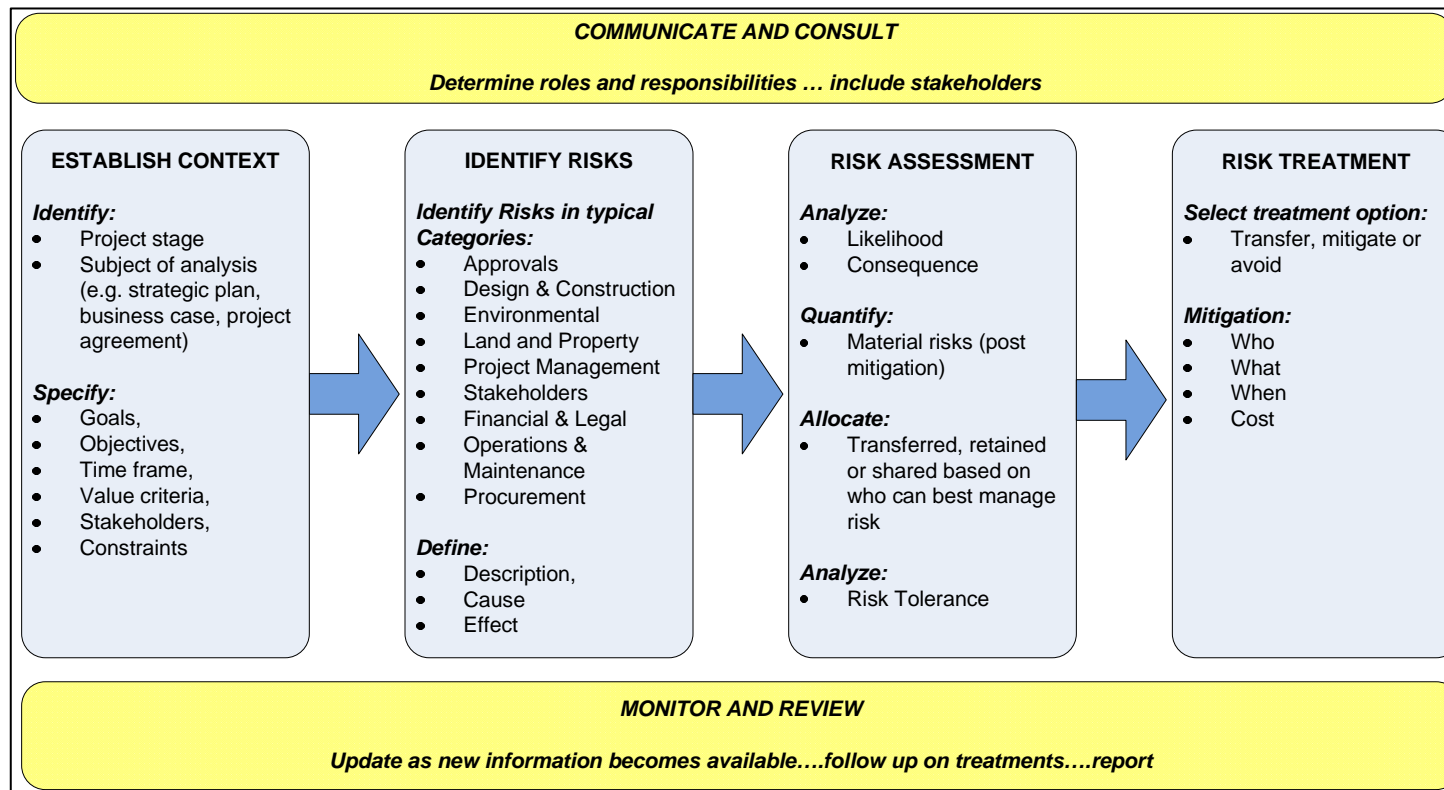
Wood Innovation and Design Centre Business Case Risk Analysis

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Jul-12

This booklet is a compilation of the risks identified and quantified by the Project team in February 2012. The numbers were updated with the cost estimate update received in July 2012. The risk methodology and quantification was facilitated by Partnerships BC.

RISK MANAGEMENT PROCESS: OVERVIEW



LIKELIHOOD

Descriptor	Approximate Probability (range / single value)	Frequency example, in a 30-year context	(for
Almost Certain	.90 - 1.00 [.95]	e.g. Once a year or more.	
Likely	.55 - .89 [.72]	e.g. Once every three years.	
Possible	.25 - .54 [.40]	e.g. Once every ten years.	
Unlikely	.05 - .24 [.15]	e.g. Once every thirty years.	
Improbable; Rare	.00 - .04 [.02]	e.g. Once every hundred years.	

CONSEQUENCE

Descriptor	Effect
Catastrophic	Project or program irrevocably finished.
Major	Program or project re-design, re-approval; i.e., fundamental re-work.
Significant	Delay in accomplishing program or project objectives.
Minor	Normal administrative difficulties.
Insignificant	Negligible effects.

RISK RANKING

5	LOW	MED	HIGH	EXT	EXT
4	LOW	MED	HIGH	HIGH	EXT
3	LOW	MED	MED	HIGH	HIGH
2	LOW	LOW	MED	MED	MED
1	LOW	LOW	LOW	LOW	LOW
LIKELIHOOD	1	2	3	4	5
CONSEQUENCE					

L x C

Score 0 - 5 = Low

Score 6 - 10 = Medium

Score 12 - 16 = High

Score 20 - 25 = Extreme

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APPENDIX F FUNDING MODEL

WOOD INNOVATION AND DESIGN CENTRE BUSINESS CASE

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1. FUNDING MODEL

A digital Excel file with the final business case funding analysis is available upon request.



APPENDIX G FUNCTIONAL PROGRAM

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APPENDIX H REAL ESTATE ASSESSMENT

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APPENDIX I OWNERSHIP CONSIDERATIONS

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APPENDIX J LAND INVESTMENT ESTIMATE

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APPENDIX K COMMUNICATIONS PLAN

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APPENDIX L EQUIPMENT LIST

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APPENDIX M

BUILDING OPERATING ANALYSIS

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BUSINESS CASE

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1. LEASE REVENUE AND BUILDING OPERATIONS ESTIMATES

Tenancies for the WIDC will be derived from the two main program areas, including:

- Office (including economic development agencies, industry and civic tenancies) and
- Academic.

The degree to which the programmed areas contribute to facility revenues and the recovery of building operations costs is described below.

1.1 OFFICE

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APPENDIX N EARLY CAPITAL SCREEN

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Wood Innovation and Design Centre

Early Project PPP Screening

July 2012

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APPENDIX O GEOTECHNICAL ASSESSMENT

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