LA GRANDE ALLIANCE

PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

TECHNICAL NOTE 20
ECONOMIC IMPACT ASSESSMENT

VERSION FINAL

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EXECUTIVE SUMMARY

This technical note analyzes the economic impacts during the construction periods and the operation periods of Phases II and Phase III of the proposed La Grande Alliance infrastructure. It also reports the economic impact results from the construction of the La Grande Alliance's Phase I infrastructure, carried out by the VEI consultant team.

Economic impacts are different from economic benefits. Economic benefits generated by transportation infrastructure come in the form of travel time savings and reduced transportation costs for the entire population, firms, and governments in the Nord-du-Québec region. Economic impacts are understood as the number of jobs created for the workers and the value added to the economy by the entrepreneurs, firms and governments involved in the construction and the operation of the proposed La Grande Alliance infrastructure.

By combining Statistics Canada provincial input-output multipliers with the cost estimate figures presented in Technical Note 16, and the projects' schedule presented in Technical Note 15, we arrive at the following results.

PHASE II

— The economic impacts of the proposed infrastructure will create 41,730 full-time jobs measured in persons-years over the 2027-2039 construction period, 12,031 jobs in persons-years between 2040 and 2069;

— The construction phase will contribute $4.3 billion to the Quebec's GDP, and generate $2.91 billion in labour income, while the operation phase will contribute $1.32 billion to the GDP, and $0.93 billion in labour income;

— Tax revenues collected by all-level governments are estimated to be $214 million in taxes on production and $205 million in taxes on products during the construction phase. The operating phase would generate fiscal revenues of $68 million in taxes on production, and $74 million in taxes on products.

PHASE III

— An equivalent of 32,120 full-time jobs will be created over the 2032-2044 construction period, additional 6,214 full-time jobs will be created between 2045 and 2074 for operating the infrastructure;

— The construction phase will contribute $3.31 billion to the provincial GDP, and require $2.24 billion in labour income, while the operation phase will add $0.68 billion to the GDP and $0.48 billion in labour income;

— Tax revenues collected by all-level governments are estimated to be $165 million in taxes on production and $158 million in taxes on products during the construction phase. The operating phase would generate $35 million in taxes on production and $38 million in taxes on products.

Given the strong capacity and experience of Cree workers and entrepreneurs in the construction sector, in particular for major infrastructure projects such as the construction of Hydro-Quebec power stations in the Nord-du-Québec region, it is expected that the economic impacts for the 10 Cree communities will be significant.

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LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00

TABLE OF CONTENTS

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE i

1 METHODOLOGY

As part of the pre-feasibility study, an economic impact assessment was carried out, and assessments were performed. The assessment of economic impacts is completed, using Statistics Canada provincial input-output multipliers that account for and reflect the diverse structure and linkages of Quebec's economy.

The provincial input-output multipliers provide industry specific multipliers that are used to quantify the economic effects associated with exogenous expenditure shocks, which would include expenditures associated with the construction and operation of several La Grande Alliance infrastructure components. Through this process, direct, indirect, and induced impacts of the proposed La Grande Alliance infrastructure were assessed. The direct, indirect and induced impacts can broadly be defined as the following:

— Direct impacts represent new spending, hiring, and production by civil engineering construction firms to accommodate the demand for resources in order to complete the proposed project;

— Indirect impacts result from the quantity of inter-industry purchases necessary to support the increase in production from the construction industry experiencing new demand for its goods and services. All industries that produce goods and services consumed by the construction industry will also increase production and, if necessary, hire new workers to meet the additional demand;

— Induced impacts stem from the re-spending of wages and salaries earned by workers benefitting from the increase in direct and indirect expenditure activity within an area. For example, if an increase in construction demand leads to new employment and earnings in a set of industries, workers in these industries will spend some proportion of their increased earnings at local retail shops, restaurants, and other places of commerce, which would further stimulate economic activity.

These assessment covers a period expanding from the initial design/construction step through the proposed project operation phase which expands over a 30-year period. The following key economic indicators were assessed:

— Gross Output: the total revenues from output including materials and supplies;

— Labour Income: the salaries and wages of a given workforce;

— Employment: the full-time equivalent workers based upon a 40-hour work week;

— Value-Added Gross Domestic Product (GDP): output net of intermediate revenues.

— Taxes on production: Taxes payable less subsidies receivable on goods or services produced as outputs and other taxes or subsidies on production, such as those payable on the labour, machinery, buildings or other assets used in production;

— Taxes on goods and services: A tax that is payable per unit of some good or service. The tax may be a specific amount of money per unit of quantity of a good or service.

For each La Grande Alliance infrastructure component, these involve capital construction costs and operational costs attributable to that component. Expenditures were categorized to the appropriate NAICS codes (North American Industry Classification System) and input into the EIA (Economic Impact Assessment) Model.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 1

2 DATA

2.1 CONSTRUCTION COSTS

The breakdown of direct construction costs is taken from Technical Note 16 – Construction Cost Estimate (TN16). TN16 separates the costs by phase, segment, and cost item. Details of the assumptions made and methodology used to obtain the estimated construction costs can be found in TN16. The schedule of the construction costs is presented in Technical Note 15 – Construction Overview (TN15). Breakdown of cost schedule per segment and per item, assumptions, and methodology used are detailed in TN15. The alignment of the construction costs and the projected schedule was made with the help of WSP's technical team. In summary, the cost items are grouped into the following five categories:

— Preparatory studies;
— Detailed design and procurement;
— Construction and commissioning - Rail;
— Construction and commissioning - Roads;
— Construction and commissioning - Harbour.

These cost items were then processed to comply with the industries classified as in Statistics Canada input-output multiplier table[1]. Table 2-1 presents the capital expenditures by industry classification, expense category and by phase. The construction period is scheduled from 2027 to 2044, with the construction of Phase II proposed infrastructure from 2027 to 2039, and Phase III proposed infrastructure from 2032 to 2044. A total amount of $8.23 billion in capital expenditures was estimated for both Phase II and Phase III. Of this number, $4.65 billion will be devoted for Phase II, and $3.58 billion for Phase III. Management, scientific and technical consulting services, including preparatory studies, detailed design and procurement will incur $1.90 billion for the two phases. Transportation engineering construction will incur $6.33 billion in fees. The capital expenditures shown in Table 2-1 are tax-free. For similar infrastructure projects in general, entities will pay the sales taxes and will receive rebates of 100% of the GST and 50% of the QST.

Table 2-1   Capital Expenditures (in million $2023) per Phase, 2027-2044

EXPENSE CATEGORY	PHASE II (2027-2039)	PHASE III (2032-2044)	TOTAL (2027-2044)
(1) Management, scientific and technical consulting services			
Preparatory Studies	715	552	1,268
Detailed Design and Procurement	358	276	634
Total (1)	1,073	828	1,901

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[1] Statistics Canada input-output multipliers provincial and territorial, detail level. Table 36-10-0595-01. Link: https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3610059501

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 2

EXPENSE CATEGORY	PHASE II (2027-2039)	PHASE III (2032-2044)	TOTAL (2027-2044)
(2) Transportation engineering construction			
Construction and Commissioning - Rail	2,199	2,722	4,921
Construction and Commissioning - Roads	1,378	0	1,378
Construction and Commissioning - Harbour	0	29	29
Total (2)	3,577	2,751	6,328
Total (1)+(2)	**4,651**	**3,579**	**8,230**

Source: WSP

All the amounts in lines Total (1) and Total (2) will be input into the EIA Model to estimate the economic impacts of the construction phase. Not that this study does not include contingency and risk costs as presented in TN16 and TN21 – Financial Analysis (TN21) for two reasons. First, these costs cannot be categorized into our EIA model, and second, we do not want to overestimate the economic impact of the proposed project.

2.2 OPERATION COSTS

The operating period for each phase is 30 years starting at the end of their own construction period. As a result, the operating period expands from 2040 to 2069 for Phase II, and from 2045 to 2074 for Phase III. The operating phase involves the following four main activities:

— Road maintenance;
— Railway operating and maintenance – Freight;
— Railway operating and maintenance – Passengers;
— Sustaining capital costs.

Road maintenance costs were calculated from SDBJ's "*Détermination du seuil minimal d'entretien pour la route de la Baie-James (Route Matagami-Radisson et chemin de Chisasibi)*". The total road operating expenses were divided by the length of the BDH to obtain the unit operating cost per km. The initial unit cost per km was first estimated in constant dollar of 2013, then inflated to today's constant dollar by using Consumer Price Index (CPI) obtained from Statistics Canada. Table 2-2 presents data and methodology to arrive at the $16,808/km figure as the unit cost per km for road maintenance.

Table 2-2   Road Operating Costs per km

VARIABLES	VALUE
Operating Expenses ($2013 thousand)	8,182
Length (km)	620
OPEX / KM ($2013 thousand)	13
OPEX / KM ($2023 thousand)	**17**

Sources: SDBJ, Statistics Canada, WSP

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 3

Phase II includes a proposed new road from La Grande to Whapmagoostui/Kuujjuarapik (207 km) and extension of the existing Route 167. This latter includes upgrading and paving of the Mistissini-Albanel Lake road (107 km), upgrading of the access road to the Stornoway Renard mine (97 km), and extension of Route 167 to the Trans-Taiga road (173 km).

For Phase III, there is no road segment. Table 2-3 presents the length of each segment and the total annual road maintenance expenses for Phase II.

Table 2-3   Annual Operating Costs for Road

VARIABLES	PHASE II LA GRANDE TO WHAPMAGOOSTUI / KUUJJUARAPIK ROAD	PHASE II ROUTE 167 UPGRADE AND EXTENSION	TOTAL
Length (KM)	207	376	583
Operating Costs / KM	17	17	
Total OPEX ($2023 thousand)	**3,479**	**6,323**	**9,802**

Source: WSP

For rail components, operating and maintenance costs were brokend own by Freight category and Passenger category. For these expenses, a parametric approach has been applied, using Phase I's rail operating costs as inputs. In fact, cost parameters associated with the Matagami-Rupert River rail segment were used for Phase II and III's rail segments. Table 2-4 summarizes the unit cost per kilometer, and the total operating costs for freight train and passenger train.

Table 2-4 Train Operating Costs by Phase

VARIABLES	PHASE I MATAGAMI TO RUPERT RIVER RAILWAY	PHASE II RUPERT RIVER TO LA GRANDE RAILWAY	PHASE III LA GRANDE TO WHAPMAGOOSTUI/ KUUJJUARAPIK RAILWAY
Length (km)	257	340	219
Freight Train Operating Costs / km ($2023 thousand)	98	98	98
Passenger Train Operating Costs / km ($2023 thousand)	7	7	7
Total Freight Train Opex ($2023 thousand)	25,141	33,261	21,424
Total Passenger Train Opex ($2023 thousand)	1,856	2,455	1,581
Total Opex ($2023 thousand)	**26,997**	**35,716**	**23,005**

Sources: VEI, WSP

During the operation phase, rehabilitation works will be required to maintain the lifespan of the asset. Therefore, sustaining capital costs were added to the operating and maintenance costs, and are expected to occur on the 10th year after the commissioning date, and every 5 years afterward. Since Phase I railway along the BDH from Matagami to Rupert River is the closest rail segment, this latter's sustaining capital costs were used for parametric comparison. A unit cost of $0.07 million per railway km per year was estimated, and then multiplied by the railway length to arrive at a sustaining capital cost amount of $23.67 million for Phase II, and $15.25 million for Phase III.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 4

Table 2-5 summarizes the annual OPEX, the sustaining capital costs which occur every 5 years starting from year 10, and the total OPEX for 30 years of operation by phase. For Phase II, 30 years of operation will cost a total amount of $1.48 billion. For Phase III, the total OPEX over an operation period of 30 years was estimated to be $0.77 billion.

Table 2-5   Operating and Maintenance Period Expenses by Phase (in million $2023)

EXPENDITURE ITEM	PHASE II (2040-2069)	PHASE III (2045-2074)	TOTAL (2040-2074)
(3) Other Engineering Construction			
Road Maintenance (annual cost)	10	0	10
Railway Operating and Maintenance – Freight (annual cost)	33	21	55
Railway Operating and Maintenance – Passengers (annual cost)	2	2	4
Sustaining Capital Costs (cost on Operating year 10, and every 5 years afterwards)	24	15	39
Total (per operating period of 30 years)	**1,484**	**766**	**2,250**

Sources: VEI, WSP

2.3 INPUT-OUTPUT MULTIPLIERS

For this study, the provincial input-output multipliers table provided by Statistics Canada were used to estimate the economic direct, indirect, and induced effects of an infrastructure investment on jobs, labour income, GDP and tax revenues. The provincial input-output multipliers table is a snapshot of the economy's reaction to a demand shock which is a project investment in this case. This project investment will affect its entire supply chain for the completion of the proposed project. That means different economic sectors will be involved throughout the proposed project from the start to the end. This is understood as economic impacts of an investment. Economic impacts come in the form of direct, indirect, and induced impacts. Direct impacts result from the first level of expenses, including the primary suppliers' labour, materials, and machinery expenditures, as well as related tax payments. The second level of expenditure is the input expenses of the primary suppliers. The indirect impacts comprise the manufactured materials needed by the primary suppliers. The induced impacts are the third level of expenses in this study. Included impacts are employment, GDP contribution and tax payments generated by the spending of workers in the primary and secondary suppliers for their final consumption need.

For the proposed La Grande Alliance infrastructure for example, an investment of $8.23 billion to build the infrastructure in both Phases II and III over an 18-year period from 2027 to 2044 will require mainly the involvement of firms in the professional services sector and entrepreneurs in the transportation engineering sector. These two sectors are called primary suppliers. Since those suppliers alone cannot carry out the entire proposed project, they will need to hire other subcontractors and buy manufactured materials. The subcontractors and manufacturers are called suppliers of the proposed project primary suppliers. Both primary and secondary suppliers will have to pay salaries for their workers who will in turn spend money for food, housing, health and leisure. This redistribution of revenues and expenses process is known as the "demand propagation" mechanism. This process is based on the principle that any spending from an economic agent is a revenue for another which in turn will spend its revenue on goods and services.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 5

The version of the input-output multipliers used in this study employs the version released in November 2021 and the provincial multipliers were derived from the 2018 industry provincial account data. Direct, indirect and induced multipliers for three main economic sectors are presented in Table 2-6. Unfortunately, the Statistics Canada input-output multipliers are reported within a specific industry only. The output shock effects expanded from one industry to the others of the economy are not provided by Statistics Canada, and therefore are not included in this study.

The first row of Table 2-6 reports the multipliers for the management, scientific and technical consulting services sector. They are interpreted to mean that for a $1 million spending in that sector, a total of 10.72 full-time direct, indirect and induced jobs would be created, which is translated into $680,000 as labour income. Those workers would contribute a total of $1.02 million to the GDP of Quebec. And governments would collect a total amount of $43,000 in taxes on production, and $48,000 in taxes on products.

Table 2-6   Direct, Indirect and Induced Multipliers by Industry, Quebec

INDUSTRY	MULTIPLIERS			TOTAL
	DIRECT	INDIRECT	INDUCED	
(1) Management, scientific and technical consulting services				
Jobs (per $million of output)	6.784	2.202	1.731	**10.717**
Labour income (per $1 of output)	0.468	0.127	0.085	**0.680**
GDP (per $1 of output)	0.631	0.210	0.179	**1.020**
Taxes on production (per $1 of output)	0.002	0.003	0.038	**0.043**
Taxes on products (per $1 of output)	0.014	0.014	0.020	**0.048**
(2) Transportation engineering construction				
Jobs (per $million of output)	4.046	2.678	1.726	**8.450**
Labour income (per $1 of output)	0.348	0.177	0.084	**0.609**
GDP (per $1 of output)	0.427	0.289	0.179	**0.895**
Taxes on production (per $1 of output)	0.005	0.005	0.037	**0.047**
Taxes on products (per $1 of output)	0.010	0.013	0.020	**0.043**
(3) Other Engineering Construction				
Jobs (per $million of output)	4.113	2.218	1.777	**8.108**
Labour income (per $1 of output)	0.379	0.159	0.087	**0.625**
GDP (per $1 of output)	0.476	0.231	0.184	**0.891**
Taxes on production (per $1 of output)	0.005	0.003	0.038	**0.046**
Taxes on products (per $1 of output)	0.02	0.010	0.020	**0.050**

Source: Statistics Canada, Table 36-10-0595-01

Note: All monetary units were expressed in 2018 dollars, and employment unit in persons-years. For employment multipliers per $million of output, conversion into today's dollars was made by using Statistics Canada's Consumer Price Index for Quebec. As a result, an investment of $1 million in the transportation engineering construction industry in 2017 would cost $1.16 million in 2023 to generate the same number of full-time jobs. In other words, $1 million in 2023 will generate fewer full-time jobs (8.45) than the same amount of money spent in 2017 (9.79). For monetary variables expressed in dollar terms (GDP, labour income and taxes), their multipliers remain unchanged due to the same inflation applied.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 6

3 RESULTS

3.1 ECONOMIC IMPACTS OF THE CONSTRUCTION PHASES

This section focuses on the assessment of the economic impacts resulting from the capital investments in Phase II and III. The expenses generated from the construction of new roads, the upgrade of existing roads, the construction of railways, and the construction of a harbour will increase demand in the Quebec's economy. These expenditures will have direct, indirect, and induced economic impacts on jobs, labour income, GDP, and tax revenues.

To determine the economic impacts of the construction phases, the multipliers have been applied to the construction costs. More precisely, construction costs were multiplied by the management, scientific and technical consulting services and transportation engineering construction industries' multipliers. As detailed in section 2.1, the construction expenditures for Phase II are $4.65 billion from 2027 to 2039 and $3.58 billion for Phase III from 2032 to 2044. Table 3-1 presents the detailed direct, indirect and induced economic impacts of the construction expenditures for Phase II and Phase III.

For Phase II, over the construction period, those expenses translate to an estimated amount of 42,000 full-time jobs measured by persons-years, a contribution to the GDP of $4.3 billion and labour income of $2.91 billion. For the governments, the direct, indirect and induced taxes are respectively $214 million for the taxes on production and $205 million for the taxes on products. The economic impact of Phase III's construction expenditures are estimated to be 32,000 jobs, $3.31 billion in GDP, $2.24 billion in labour income, $165 million in production taxes, and $158 million in product taxes. Those numbers include the direct, indirect and induced economic impacts of the construction phases.

Table 3-1   Direct, Indirect and Induced Economic Impacts, Construction Phases

Variables	Unit	Phase II - Construction (2027-2039)	Phase III - Construction (2032-2044)
Expenditures	**M$**	**4,651**	**3,579**
Economic Impact			
1 – Jobs			
Direct	*persons-years*	21,755	16,749
Indirect	*persons-years*	11,943	9,191
Induced	*persons-years*	8,031	6,181
Total	*persons-years*	**41,730**	**32,120**
2 – Labour income			
Direct	*M$*	1,747	1,345
Indirect	*M$*	770	592
Induced	*M$*	392	301
Total	*M$*	**2,908**	**2,239**
3 – GDP contribution			
Direct	*M$*	2,205	1,697
Indirect	*M$*	1,259	969
Induced	*M$*	832	641
Total	*M$*	**4,297**	**3,307**

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 7

Variables	Unit	Phase II - Construction (2027-2039)	Phase III - Construction (2032-2044)
4 - Taxes on production			
Direct	*M$*	20	15
Indirect	*M$*	21	16
Induced	*M$*	173	133
Total	***M$***	**214**	**165**
5 - Taxes on products			
Direct	*M$*	51	39
Indirect	*M$*	62	47
Induced	*M$*	93	72
Total	***M$***	**205**	**158**

Source: WSP

Note: the "persons-years" term is interpreted as follows: if the proposed project hires 10 workers working full-time during a year, then it can hire 20 workers working full-time for 6 months.

3.2 ECONOMIC IMPACTS OF THE OPERATION PHASES

This section presents the assessed economic impacts of the operation phase of the Phases II and III proposed infrastructure. The operation of the new infrastructure includes maintenance of the new and the upgraded roads, as well as operation and maintenance of the new railway segments. Following a similar logic presented in the previous section for the construction phase, economic impacts were obtained by multiplying the expenses figure presented in Table 2-5 by the multipliers for the "other engineering construction" sector presented in Table 2-6. The resulting direct, indirect and induced economic impacts of the operation of Phase II and Phase III on jobs, labour income, GDP contribution and fiscal revenues are presented in Table 3-2.

From 2040 to 2069, the $1.48 billion operating expenditures of Phase II is expected to create over 12,000 full-time jobs, contribute $1.32 billion to the GDP of Quebec, and generate $0.93 billion in labour income. The governments should receive $68 million in taxes on production, and $74 million in taxes on products, for a total of $142 million in taxes. This includes direct, indirect, and induced economic activity resulting from the road and railway operating and maintenance (output shock) to make the roads and railway operational.

For Phase III, the operating expenses amount to $0.77 billion over the 2045-2074 period. Phase III's operating expenses are projected to create 6,200 full-time jobs, add $0.68 billion to the GDP, and $0.48 billion in labour income. The taxes paid should amount to $74 million, divided between the taxes on production ($35 million) and taxes on products ($38 million).

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 8

Table 3-2   Direct, Indirect and Induced Economic Impacts, Operating Phases

Variables	Unit	Phase II - Operations (2040-2069)	Phase III – Operations (2045-2074)
Expenditures	**M$**	**1,484**	**766**
Economic Impact			
1 – Jobs			
Direct	persons-years	6,103	3,152
Indirect	persons-years	3,291	1,700
Induced	persons-years	2,638	1,362
Total	**persons-years**	**12,031**	**6,214**
2 – Labour income			
Direct	M$	562	290
Indirect	M$	236	122
Induced	M$	129	67
Total	**M$**	**927**	**479**
3 – GDP contribution			
Direct	M$	706	365
Indirect	M$	343	177
Induced	M$	273	141
Total	**M$**	**1,322**	**683**
4 - Taxes on production			
Direct	M$	7	4
Indirect	M$	4	2
Induced	M$	56	29
Total	**M$**	**68**	**35**
5 - Taxes on products			
Direct	M$	30	15
Indirect	M$	15	8
Induced	M$	30	15
Total	**M$**	**74**	**38**

Source: WSP

Note: the "persons-years" term is interpreted as follows: if the proposed project hires 10 workers working full-time during a year, then it can hire 20 workers working full-time for 6 months.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 9

3.3 COMBINED PHASES I-II-III ECONOMIC IMPACTS

This section presents a summary of the economic impacts of the three La Grande Alliance phases. Phase I's economic impact results calculated by the VEI consultant team are now presented in Table 3-3 for informational purposes only. It is worth to note that Phase I 's economic impacts were estimated for the construction period only, from 2023 to 2027 due to lack of information on operating and maintenance costs. It is also important to note that VEI consultant team used the Quebec input-output model (in French, Modèle intersectoriel du Québec – MISQ) developed by the Institut de la statistique du Québec, while WSP used the input-output multipliers developed by Statistics Canada. The former provides economic impact assessment for the province of Quebec only, while the latter provides economic impact assessment for the province of Quebec and the rest of Canada.

Combining the three phases together, the total costs sum to $14,9 billion which do not take Phase I's operating and maintenance costs into account. This amount of expenditures is expected to create over 120,000 full-time jobs over 52 years from 2023 to 2074 period, for a total of $8.77 billion in labour income; contribute $12.63 billion to the Quebec GDP, and bring in $1,6 billion in fiscal revenues. All tax revenues of Phases I, II and III were grouped under the "fiscal revenues" category due to the fact that WSP team uses a different approach than VEI team.

Table 3-3 Direct, Indirect and Induced Economic Impacts, Program Total

Variables	Unit	Phase I Total (2023-2027)	Phase II Total (2027-2069)	Phase III Total (2032-2074)	Program Total (2023-2074)
Expenditures	**M$**	4,451	6,135	4,346	14,931
Economic Impact					
1 – Jobs					
Direct	*persons-years*	13,972	27,858	19,901	61,731
Indirect	*persons-years*	9,795	15,234	10,890	35,920
Induced	*persons-years*	4,527	10,669	7,543	22,739
Total	*persons-years*	**28,294**	**53,761**	**38,334**	**120,389**
2 – Labour income					
Direct	M$	877	2,310	1,635	4,822
Indirect	M$	961	1,005	714	2,680
Induced	M$	382	521	368	1,271
Total	M$	**2,221**	**3,836**	**2,718**	**8,774**
3 – GDP contribution					
Direct	M$	1,597	2,911	2,062	6,570
Indirect	M$	974	1,602	1,146	3,722
Induced	M$	454	1,106	782	2,341
Total	M$	**3,024**	**5,619**	**3,990**	**12,633**

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 10

Variables	Unit	Phase I Total (2023-2027)	Phase II Total (2027-2069)	Phase III Total (2032-2074)	Program Total (2023-2074)
4- Fiscal revenues					
Direct	M$	352	108	74	534
Indirect	M$	197	102	74	373
Induced	M$	140	352	249	742
Total	*M$*	**690**	**562**	**397**	**1,648**

Sources: VEI, WSP

Note 1: the "persons-years" term is interpreted as follows: if the proposed project hires 10 workers working full-time during a year, then it can hire 20 workers working full-time for 6 months.

Note 2: Phase I GDP contribution has been calculated from the shared VEI outputs, by grouping the Value Added and Taxes economic impacts, and subtracting the Grants economic impacts.

Note 3: VEI consultant team used the Quebec input-output model (in French, Modèle intersectoriel du Québec – MISQ) developed by the Institut de la statistique du Québec, while WSP used the input-output multipliers developed by Statistics Canada. The former provides economic impact assessment for the province of Quebec only, while the latter provides economic impact assessment for the province of Quebec and the rest of Canada.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 11

4 CONCLUSION

As discussed in the market study, the proposed La Grande Alliance transportation infrastructure will improve access to the Nord-du-Québec Region, facilitate the movement of goods and people, thus making transportation costs lower and access to the region safer and faster, amongst other things. Those economic benefits are likely to stimulate the regional economic activity. In turn, this will create jobs, generate labour income, contribute to the GDP and raise the fiscal revenues for the governments. Future studies will need to investigate in more details the economic impacts of the proposed infrastructure. Although stakeholders had difficulties to assess the future impacts of the proposed La Grande Alliance infrastructure on their economic activities, the market survey revealed that better transportation infrastructure and new transportation infrastructure north of La Grande could make them reconsider previously rejected projects or consider never considered before projects in the newly accessible area.

Furthermore, development programs and agreements with the Nord-du-Quebec's communities will improve access to employment for the local population from the proposed development projects. The Cree communities have a growing population, and the proposed La Grande Alliance transportation infrastructure would be a great job generator for the Cree workers and entrepreneurs. In fact, Cree workers and entrepreneurs have a proven record of their capacity, skill, and experience in the construction of major projects such as the construction of Hydro-Quebec's La Grande complex in the 1970s and 1980s, the Eastmain 1 power station in the 2000s, and more recently the Eastmain 1 A-Sarcelle-Rupert complex from 2005 to 2012. The proposed La Grande Alliance transportation infrastructure will bring numerous benefits to the regional job market by creating job opportunities during the construction and operation of the project phases, as well as making the region more attractive for future projects and investments.

The construction of Phase II is scheduled from 2027 to 2039. The $4.65 billion in capital costs are expected to create 42,000 full-time jobs measured by persons-years, contribute $4.3 billions to the GDP, produce $2.91 billion of labour income, and generate fiscal revenues for the governments of $214 millions from taxes on production and $205 million from the taxes on products. Phase III's construction period is scheduled from 2032 to 2044. The capital costs of $3.58 billion is expected to result in 32,000 full-time jobs, $2.24 billion in labour income, $3.31 billion in GDP, $165 million in production taxes, and $158 million in product taxes.

An operating period of 30 years has been considered, from 2040 to 2069 for Phase II, and from 2045 to 2074 for Phase III. Over the 2040-2069 period, $1.48 billion in operating and maintenance expenditures for Phase II is foreseen. These expenses are expected to create more than 12,000 full-time jobs, contribute $1.32 billion to the GDP of Quebec, generate $0.93 billion in labour income, $68 million in taxes on production, and $74 million in taxes on products. During the Phase III operating period from 2045 to 2074, operating and maintenance expenses of $0.77 billion are estimated to positively impact employment (6,200 full-time jobs), contribute $0.48 billion to labour income and $0.68 billion in GDP, and generate $74 million in taxes for the governments.

Combining all the three phases of the La Grande Alliance project, the amount of $14.93 billions over the 2023-2074 window is expected to create over 120,000 full-time jobs, adding $8.77 billion to labour income. The entire project is foreseen to contribute $12.63 billion to the GDP, and generate fiscal revenues of $1.65 billion over the 52 years of construction and operation.

CREE DEVELOPMENT CORPORATION (CDC)
LA GRANDE ALLIANCE
PRE-FEASIBILITY STUDY – PHASES II & III – TRANSPORTATION INFRASTRUCTURE

WSP
PROJECT NO. 211-08415-00
PAGE 12