



PEACE RIVER SITE C HYDRO PROJECT

AN OPTION TO HELP MEET B.C.'S FUTURE
ELECTRICITY NEEDS

PROJECT DEFINITION CONSULTATION
DISCUSSION GUIDE AND FEEDBACK FORM

ROUND 2: OCTOBER/NOVEMBER 2008

BChydro 

FOR GENERATIONS



We Want to Hear From You

Project Definition Consultation, Round 2, takes place October 1 through November 30, 2008. Consultation materials are available on the Site C website (www.bchydro.com/sitec). You can provide feedback and learn more by:

- **Attending multi-stakeholder meetings** (email: sitec@bchydro.com to sign up)
- **Attending open houses** (see schedule)
- **Reading a postcard mailed to households** in the Peace River region
- **Providing feedback online:** www.bchydro.com/sitec
- **Writing submissions to:** sitec@bchydro.com or PO Box 2218, Vancouver, B.C. V6B 3W2
- **Visiting the Community Consultation Office:** 9948 100th Ave., Fort St. John
- **Calling toll-free:** 1 877 217-0777
- **Faxing:** 604 623-4332 or 250 785-3570

Open House Schedule - November 2008*

| Community | Date | Time | Location |
|------------------------------|------------------------|----------------|--|
| Prince George | Monday, November 3 | 6:00–9:00 p.m. | Ramada Hotel Prince George |
| Fort Nelson | Tuesday, November 4 | 6:00–9:00 p.m. | Woodland's Inn |
| Vancouver | Wednesday, November 5 | 5:00–8:00 p.m. | SFU at Harbour Centre |
| Taylor | Monday, November 17 | 6:00–9:00 p.m. | Taylor Community Hall |
| Dawson Creek/ Pouce Coupe | Tuesday, November 18 | 6:00–9:00 p.m. | South Peace Community Multiplex - EnCana Centre |
| Hudson's Hope | Wednesday, November 19 | 6:00–9:00 p.m. | Hudson's Hope Community Hall |
| Fort St. John | Monday, November 24 | 6:00–9:00 p.m. | Quality Inn Northern Grand Hotel |

*Please check www.bchydro.com/sitec for any potential revisions to this schedule.

Multi-Stakeholder Meetings

Several multi-stakeholder meetings are planned as part of Project Definition Consultation, Round 2. If you would like to attend a meeting, please contact us by email at sitec@bchydro.com or phone 1 877 217-0777.



Housing construction, north end of Fort St. John



Playground in Mathews Park, Fort St. John

Site C Background

Site C, a potential third dam and generating station on the Peace River in northeastern B.C., is one of several resource options being considered to help meet B.C.'s future energy needs.

Multi-Stage Evaluation and Consultation Process

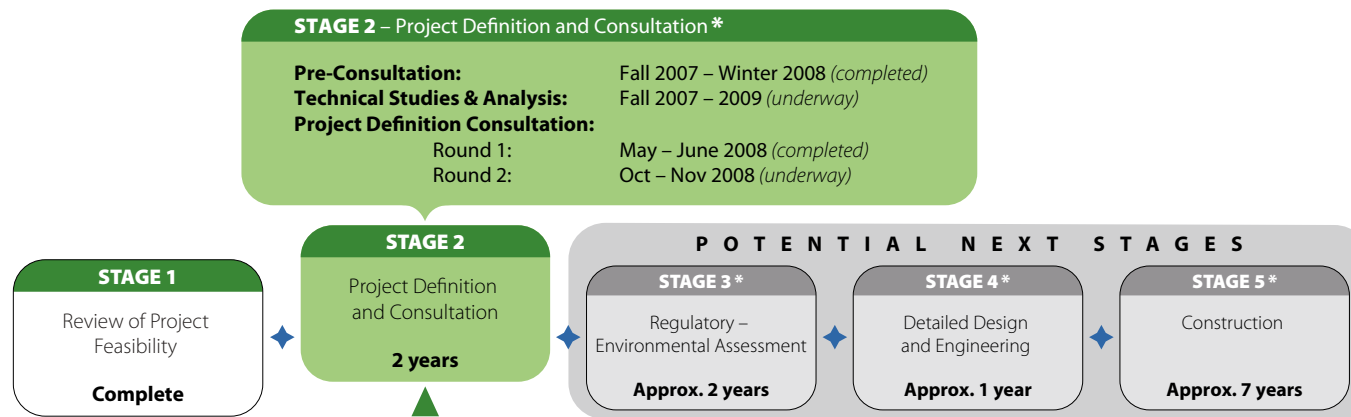
BC Hydro is taking a stage-by-stage approach to the evaluation of Site C as a potential resource option for meeting B.C.'s future electricity needs. At the end of each stage of review, BC Hydro will make a recommendation to government for a decision on whether to proceed to the next stage of project planning and evaluation.

The *BC Energy Plan* called for BC Hydro to move to Stage 2 of the Site C project. Stage 2, Project Definition and Consultation, involves consulting with First Nations, the province of Alberta, the Northwest Territories and communities to discuss Site C, to ensure that communications regarding the potential project and the processes being followed are well known.

No decision has been made to build Site C. However, large projects like Site C have a long lead time, and require early evaluation and study. To preserve Site C as an option for the future, significant work needs to take place now to understand the project's impacts and benefits from a technical, financial and environmental perspective. For that reason, there are a number of studies and comprehensive consultation planned and underway to update the project.

BC Hydro is currently in Stage 2, Project Definition and Consultation. Stage 2 includes Pre-Consultation and two rounds of further consultation. The first round of Project Definition consultation was held in May and June 2008, and the current round is taking place October 1 to November 30, 2008.

In addition, Stage 2 involves extensive engineering, environmental and technical work to further define the potential project, update decades-old studies, as well as to conduct new studies and technical work. Stage 2 will run through to fall 2009; BC Hydro will then make a recommendation to government for a decision on whether to proceed to the next stage of project planning and evaluation.



* Consultation will occur in each stage of the project

◆ Provincial government decision on whether to proceed to next stage

Environmental Assessment and Other Regulatory Processes

During Project Definition Consultation, Round 1, some participants asked about what type of independent review the Site C project would undergo, and what Stage 3 would involve, should the project proceed to that stage.

At the end of Stage 2, BC Hydro will make a recommendation to the provincial government for a decision on whether or not to move to Stage 3, Regulatory – Environmental Assessment. Should the Province decide that the Site C project should move to Stage 3, a number of major regulatory reviews would apply, such as federal and provincial environmental assessment and an application to the British Columbia Utilities Commission. These independent reviews are further described below. In addition, the Site C project would be required to seek permits or reviews under a number of other legislated and regulatory processes, such as a water licence under the provincial *Water Act*, a review by the provincial Agricultural Land Commission and others.

Environmental Assessment

If the potential Site C project were to proceed to Stage 3, the Regulatory – Environmental Assessment stage, the project would be reviewed under provincial and federal environmental assessment legislation: the B.C. *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*.

Generally, the environmental assessments include:

- opportunities for interested parties to identify issues and provide input regarding the terms of reference for technical studies
- technical studies of the potential environmental, social, economic, heritage and health effects of the proposed project
- identification of possible ways to reduce or mitigate impacts and enhance benefits
- consideration of input from the public, First Nations and stakeholders in compiling the assessment findings, and in making recommendations about project acceptability

The federal and provincial environmental assessment processes provide mechanisms for assessing the potential environmental effects of a proposed project, for mitigation measures that may be required, and ultimately for determining project acceptability and any requirements for compensation.

These processes are overseen by the B.C. Environmental Assessment Office (BCEAO), the Canadian Environmental Assessment Agency (CEAA) and responsible authorities. Consultation about the proposed project with First Nations, government agencies and the public is required as part of environmental assessment.

British Columbia Utilities Commission

Another major regulatory requirement would be an application to the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN). This application is required before a utility constructs or operates an extension to its existing system. For approval, the BCUC needs to be satisfied that the new system or extension is in the public interest and necessary for the public's convenience.

Project justification is a key element of a CPCN application. Analysis must demonstrate the need for the project, confirm the technical, economic and financial feasibility of the project, and compare the costs, benefits and risks of the project with alternatives. The CPCN application must also quantify the impact of the project on customers' rates.

British Columbia's Energy Needs are Growing

Clean, reliable and affordable electricity has been key to British Columbia's economic prosperity and our quality of life. By planning ahead, we can ensure that future generations of British Columbians are able to enjoy the same benefits of clean and reliable power that we do today.

While BC Hydro's existing hydroelectric assets are significant, they will not be enough to provide future generations of British Columbians with energy self-sufficiency if demand continues to grow as projected. For much of the last decade, British Columbia has been a net importer of electricity, depending on other jurisdictions to supply up to 15 per cent of our electricity needs. BC Hydro is planning now so that British Columbians will continue to enjoy the benefits of a secure, reliable and affordable electricity supply.

There are three ways this will be achieved – by encouraging consumers to conserve more electricity, by buying more electricity from independent power producers, and by investing more in BC Hydro's existing facilities and considering new resource options.

Conservation First...Power Smart and Energy Efficiency

The first and best way to meet our future electricity needs is to reduce the growth in demand through conservation and energy efficiency. Through its Power Smart program, BC Hydro is a global leader in conservation, providing programs and incentives to encourage customers to use less power. BC Hydro is introducing even more conservation programs to help meet the provincially established target of realizing at least 50 per cent of B.C.'s new energy needs through conservation by 2020. BC Hydro's Power Smart conservation programs include rate incentives to encourage consumer conservation, such as the recently approved conservation rate structure for residential customers, new energy-efficient products and buildings, smart metering infrastructure, electricity audits, incentives, and programs for schools and local governments.



Buying Renewable Energy

BC Hydro is looking to innovative power projects in B.C., such as small hydro, wind power and biomass projects, to help meet our province's electricity needs. BC Hydro has several procurement processes underway to acquire power: a Standing Offer Program for clean electricity projects of less than 10 megawatts, a Clean Power Call for 5,000 gigawatt hours per year, and a Bioenergy Call for projects that generate electricity from under-utilized wood residues, including mountain pine beetle-affected timber. More information can be found on www.bchydro.com.

Reinvesting in Hydro Assets

BC Hydro continues to make important investments to modernize, expand the capacity and extend the life of its hydro assets. By modifying, updating and retrofitting existing generation facilities, such as adding a fifth unit to the Revelstoke generating station, BC Hydro is increasing efficiency and electricity production with little or no environmental impact. Extending the capacity of these facilities will allow BC Hydro to reliably meet electricity demand during peak periods, such as the coldest days of winter.

Exploring Additional Sources of Power

However, even with conservation, purchases from independent power producers, and reinvestment in existing generation assets, we will need to explore additional sources of power in British Columbia that can provide a large, dependable supply of electricity throughout the year.



Nightscape view of Fort St. John, north down 100th Street

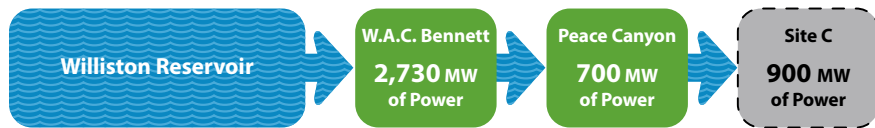


W.A.C. Bennett Dam

Site C Overview

As the third dam and generating station on the Peace River, Site C would gain significant efficiencies by taking advantage of water already stored in the Williston Reservoir upstream of the existing W.A.C. Bennett and Peace Canyon dams and used to generate electricity. Site C would produce about one-third of the electricity produced at the W.A.C. Bennett Dam, with one-twentieth the reservoir area. Site C would provide approximately 900 megawatts (MW) of capacity, and produce about 4,600 gigawatt hours of electricity each year – enough energy to power approximately 460,000 homes.

If built, Site C would effectively add a “multiplier effect” to the use of storage in Williston Reservoir – each unit of water in storage would pass through 4,300 megawatts of generation, rather than the 3,400 megawatts in the existing cascade of facilities.



Site C Dam Design

The potential Site C dam would include an earthfill dam, 1,100 metres in length, with 300 metres of concrete structures located on the south bank for the spillway and power intakes. The reservoir would be 83 kilometres long. It would be one of the most stable reservoirs in the BC Hydro system, with a maximum normal fluctuation of +/- 0.9 metres (three feet). Average daily and monthly downstream flows would not change appreciably from what they are today.

If built, Site C would be publicly owned and would have a significant upfront capital cost, a long operating life, and low long-term operating costs. Early interim project cost estimates indicate that Site C could cost between \$5 billion and \$6.6 billion, including direct construction costs, contingency allowances, inflation, escalation, capital overhead and interest during construction. Cost estimates will be updated at the end of each stage of project review, should the project proceed.

New Approach

Significant engineering design and environmental studies have been undertaken since Site C was first examined as a resource option more than 25 years ago. Most studies were carried out from 1976 to 1982, and then again from 1989 to 1991. Today’s approach to Site C will consider a range of potential environmental and social effects, seek opportunities for community benefits, and update design, financial and technical information. Current field studies will contribute to the understanding of issues and project effects, update previous studies, and identify the need for new environmental studies and technical work. The Site C project as originally conceived will be updated to reflect current standards and to incorporate new ideas brought forward by communities, First Nations, regulatory agencies and stakeholders.

Energy Options

BC Hydro’s 2006 Integrated Electricity Plan (IEP) noted that the need for electricity will be particularly acute in the second decade of BC Hydro’s 20-year planning horizon. In fact, in the more recent 2008 Long-Term Acquisition Plan (LTAP), BC Hydro estimates that B.C.’s electricity demand will grow between 25 and 40 per cent over the next 20 years. That is why BC Hydro must begin investigating options for adding new projects that could provide a large, dependable supply of electricity in the longer term.

Large power projects such as hydro with reservoirs, carbon-sequestered coal and gas-fired generation have unique challenges. In addition to various social, environmental and financial impacts and benefits, they typically require long lead times for substantial stakeholder and First Nations consultation, regulatory review, engineering, design and construction.

At the same time, these types of projects have an advantage over many other resources because they supply a significant amount of firm electricity, which is especially valuable to our province in times of peak use, such as during the coldest days of winter. As sources of firm power, they stand in contrast to intermittent resources (such as wind power or small hydro), whose capacity to produce electricity can vary depending on conditions such as weather. In fact, large power projects are required to support the development of renewable, intermittent resources.

Potential Impacts of Site C

The potential Site C project would have impacts on the surrounding communities and environment. Approximately 70 engineering, environmental and technical studies to further define the project and update historical studies or designs are planned or underway as part of Stage 2 work. The following are examples of potential effects that are being or will be studied:

- **Environment.** Effects on the environment include flooding and water flow impacts on fish, wildlife and agricultural land, local air quality impacts and construction impacts.
- **First Nations.** Site C would impact traditional lands of First Nations, including cultural, heritage and land use.
- **Social.** Site C would require the relocation of some families, and some buildings would need to be moved above the reservoir safeline. It would also require relocation of some sections of Highway 29.
- **Construction.** Construction of Site C would require a large number of workers for the construction phase, resulting in demand for housing and services. It would also result in noise, traffic, temporary construction facilities, and access roads.
- **Land.** Development of Site C would create a reservoir, flooding portions of the Peace River valley between the Peace Canyon Dam and the confluence of the Peace and Moberly rivers, as well as in the lower reaches of the Moberly and Halfway rivers.

Potential Benefits of Site C

The potential Site C project would also bring the following advantages and potential benefits to the province and communities in the region:

- **Dependable energy and capacity.** Site C would be able to provide electricity 24 hours a day, 365 days a year. This would complement the development of renewable energy sources such as wind and small hydro.
- **Local benefits/opportunities.** BC Hydro is seeking input to identify benefits and opportunities for residents, communities and First Nations directly affected by the project.
- **Clean and renewable energy.** If built, Site C would have minimal greenhouse gas emissions once operational. There would be an initial impact from the construction of the dam and filling of the reservoir.
- **Long operating life.** If built, Site C would have a significant upfront capital cost, a long operating life of more than 100 years and low operating costs. In addition, the cost of power generated would not be impacted by price and availability of natural gas.
- **Optimizing existing power generation.** As the third dam on one river system, Site C would take advantage of water stored upstream in the Williston Reservoir and used to generate electricity at the W.A.C. Bennett and Peace Canyon dams. It would offer a large amount of dependable power relative to its size when compared to new hydro development on a river without pre-existing dams and reservoirs.

Project Definition Consultation, Round 2 October 1 – November 30, 2008

The Purpose

Project Definition Consultation, Round 2, which builds on public and stakeholder input from Pre-Consultation and Project Definition Consultation, Round 1, is designed to consult the public and local, regional and provincial stakeholders on key elements of the potential Site C project.

Input from Round 2 Consultation will be used, along with technical and financial input, to refine elements of the potential project's design and to assist in defining the scope and nature of ongoing studies.

Stage 2 – Project Definition Consultation

- Pre-Consultation (Held December 2007 – February 2008)
- Round 1 (Held May – June 2008)
- Round 2 (Underway October – November 2008)

Consultation Topics

During Round 2, BC Hydro is seeking public and stakeholder feedback on the following consultation topics:

Site C as an energy option

Examining the potential Site C project as it relates to other energy options, this topic compares energy options, including estimated cost comparisons.

Powerhouse access bridge and associated access roads

Asking for public input about the potential for public use of the powerhouse access bridge and associated access roads.

Provincial and community benefits – other potential infrastructure improvements

Outlining potential provincial benefits and exploring what communities would like to see as other potential infrastructure improvements.

Reservoir preparation considerations

Outlining key elements of Site C reservoir preparation prior to flooding, including considerations regarding vegetation, stump, timber clearing, and waste vegetation disposal and access roads.

Sourcing dam construction materials, and relocation and reclamation of excavated soil and rock

Outlining potential sources of dam construction materials, and areas for relocation and reclamation of surplus materials from excavations.

Environment

Exploring what is important to stakeholders and the public about potential project impacts on land uses such as agriculture, forestry and mining.



Mile 73 on the Alaska Highway, north of Fort St. John



Boating on the Peace River, 1 kilometre east of the Moberly River



Biologist conducts amphibian surveys – wetland between Fort St. John and Taylor



Site C as an Energy Option

The evaluation of Site C in relation to other energy options, such as small hydro, wind, solar, geothermal and biomass, continues to be an important topic of interest for stakeholders and the public.

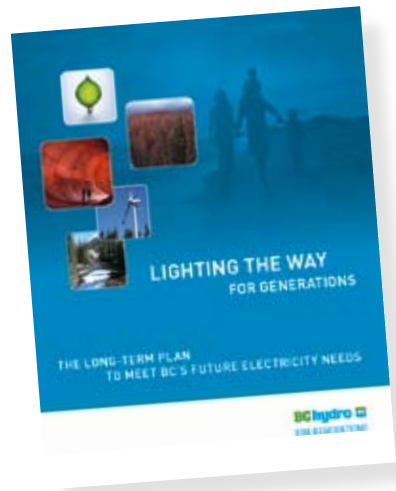
Forecasting B.C.'s future electricity needs is not without challenges. It is like taking a very sophisticated photograph in time. Many variables and uncertainties are at play, including water levels, customer behaviours, technological shifts (such as plug-in vehicles), global energy markets and economic trends. Regardless of potential short-term shifts in supply and demand, the long-term trend is clear: British Columbia's future electricity needs will continue to grow. In fact, British Columbia has imported power (from clean and non-clean sources in other jurisdictions) for seven of the last ten years up to 2008.

Electricity Planning – 2008 Long-Term Acquisition Plan

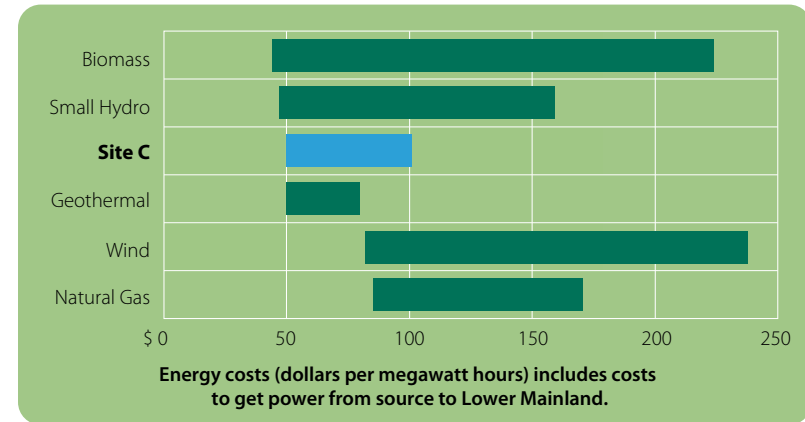
While BC Hydro continues to study the potential environmental and social effects of Site C, the recently released 2008 Long-Term Acquisition Plan (LTAP) provides an updated economic analysis of several energy options, including Site C.

The 2008 LTAP examines the costs and benefits of resource options such as small hydro, wind, geothermal and biomass projects, as well as the potential for Site C. It also analyzes which options provide the best value to BC Hydro ratepayers.

The 2008 LTAP indicates that Site C provides economic benefits to ratepayers compared to other resource options in the majority of future demand and supply scenarios.



Selected Energy Supply Options – Adjusted Unit Energy Cost (UEC)*



The Site C range for the Adjusted Unit Energy Cost (UEC) is based on the interim project cost estimate for the Site C project from the *Site C Feasibility Review: Stage 1 Completion Report*, December 2007

* Source: BC Hydro's 2008 Long-Term Acquisition Plan (LTAP)

Looking Ahead

More information about the 2008 LTAP and BC Hydro's energy planning process is available at www.bchydro.com.



Wind turbines



China Creek Hydroelectric Project on Vancouver Island

B.C. Resource Options Comparison

| Resource Option | Energy Potential Identified in LTAP (GWh/yr) | Adjusted UEC Range (risked) (\$/MWh) | System Considerations | | | Planning Life (years) |
|--|--|--------------------------------------|------------------------------|----------------------|---------------------------------|-----------------------|
| | | | Per cent Dependable Capacity | Per cent Firm Energy | Reliability | |
| Conservation (Demand-side management) | 13,030 | 42 no range available | n/a | n/a | – | n/a |
| Biomass Biogas Municipal solid waste Woodwaste | 4,272 | 44 – 224 | 100% | 100% | Dependable | 20 |
| Small Hydro Run-of-river | 8,415 | 47–159 | 13% | 71% | Intermittent | 40 |
| Large Hydro Site C | 4,600 | 50 – 101 (note 1) | 100% | 87% | Dependable (Flexible) | 70 |
| Geothermal South Meager Geothermal Project | 800 | 51 – 79 | 100% | 100% | Dependable | 30 |
| Wind Onshore wind farms Offshore wind farms | 16,403 | 82 – 238 | 23% | no data | Intermittent | 20 |
| Natural Gas (note 2) SCGT CCGT Cogeneration | n/a | 85 – 170 | 100% | 100% | Dependable (Can be Flexible) | 25 |
| Wave/Tidal | n/a | 88 – 223 (note 3) | 5% | no data | Intermittent | 25 |
| Distributed Generation Net metering solar Net metering wind | n/a | 414 – 2191 (note 3) | 0% | no data | Varies | 20 |
| Coal (Carbon sequestered) Pulverized coal supercritical IGCC | n/a | no data (note 3) | 100% | 100% | Dependable | 35 |
| Solar Large-scale photovoltaic Concentrated solar thermal | n/a | no data (note 3) | no data | no data | Intermittent | no data |

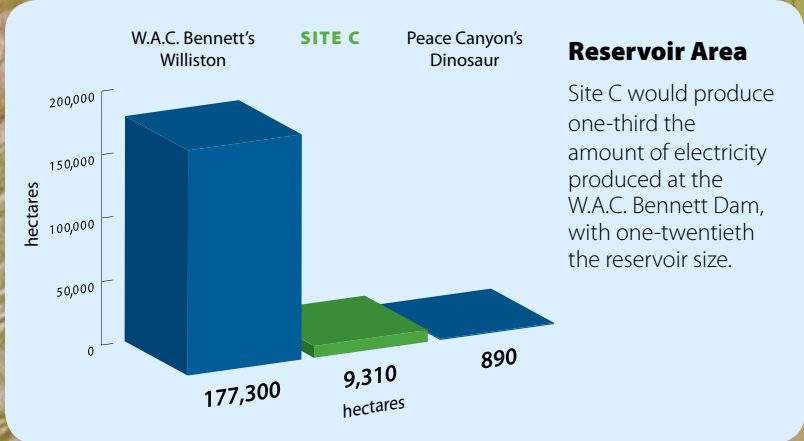
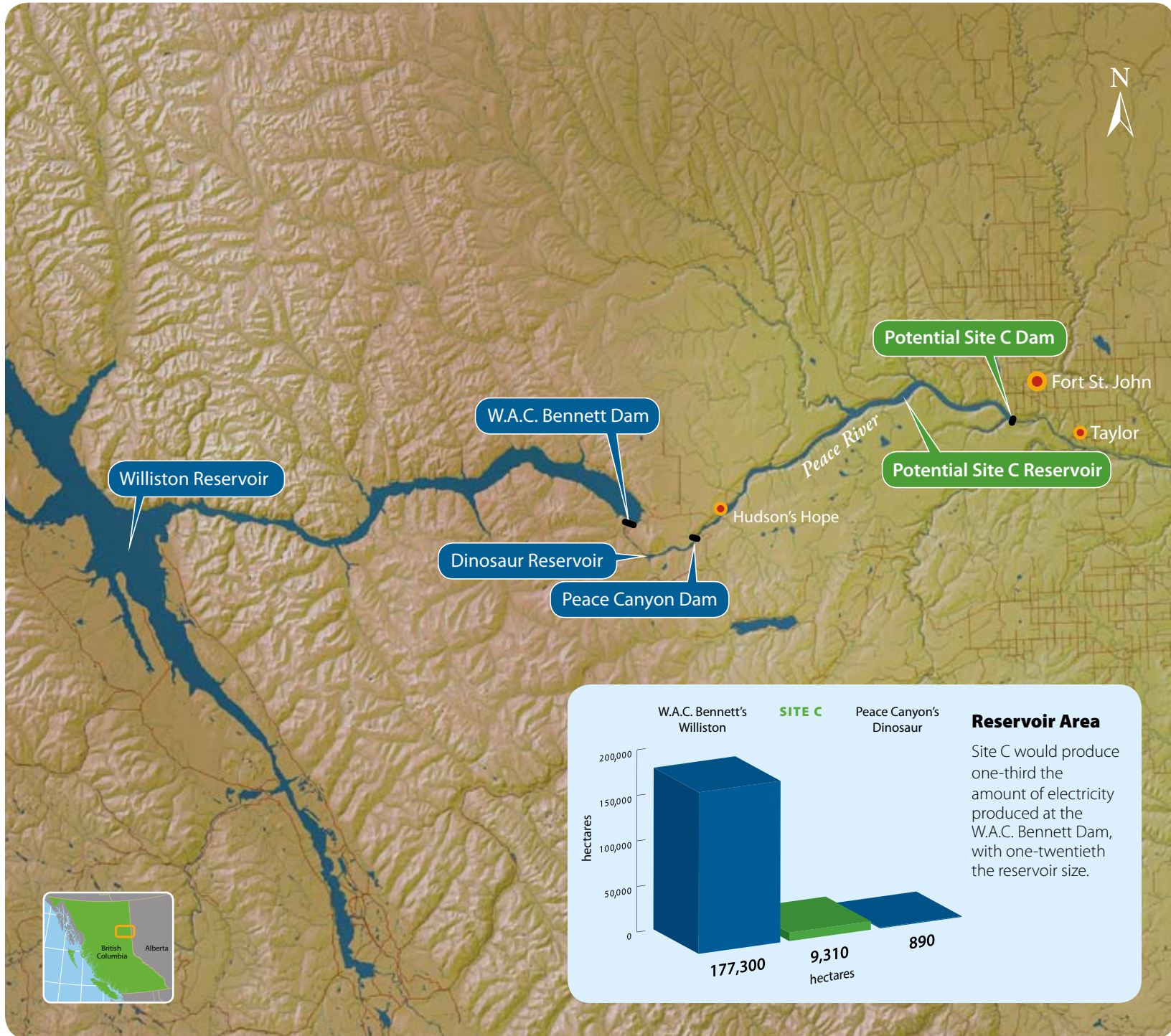
Notes: Information in this table is collected from the 2006 IEP/LTAP and the 2008 LTAP. **1.** A UEC range of 46-97 \$/MWh for Site C was indicated in the Site C Feasibility Review: Stage 1 Completion Report. This is the cost range at point of interconnection at the Peace Canyon Dam. The UEC range of 50–101 indicated in this chart reflects the cost of energy after transport to major load centres and adjustment for reliability and cost of GHG offset. The same adjustment methodology was applied to all resource options in this chart. **2.** The BC Energy Plan mandated that 90 per cent of total electricity continues to be clean or renewable, which means no more than 10 per cent may be generated through options such as natural gas. **3.** The four resource options indicated in blue were not updated in the 2008 LTAP, as these options were considered either uneconomic or not commercially available on a large scale. Data for these options is based on the 2006 IEP/LTAP.

This table compares Site C to several resource options in terms of:

- **Energy potential identified:** This represents the potential gigawatt hours per year (GWh/yr) from each resource that was identified in the 2008 LTAP as a result of updated studies. These studies identified the generation potential that is currently commercially available – there may be additional unidentified potential that is not yet commercially available and thus not covered in the 2008 LTAP. For reference, energy consumption in B.C. in 2007 was 59,000 gigawatt hours.
- **Adjusted UEC range:** This is the unit cost of energy generated from the facility, levelized over the life of the project and in 2008 dollars. This unit energy cost has been adjusted using general assumptions to reflect the estimated cost of energy delivered to the major load centres and includes a dependable capacity credit, greenhouse gas emission offset costs and intermittent interim costs. These adjustments are based on the 2008 LTAP energy planning process. The reliability of the data used for these cost estimates varies significantly between resource types.
- **Per cent dependable capacity:** The amount of megawatts (MW) a plant can reliably produce when required, assuming all units are in service.
- **Per cent firm energy:** The energy that is available (i.e., equalled or exceeded) 100 per cent of the time, either for a given period such as 25 years, or for an analysis period such as a period covered by flow records.
- **Reliability:** A measure of the adequacy and security of electric service. Adequacy refers to the existence of sufficient facilities in the system to satisfy the load demand and system operational constraints. Security refers to the system's ability to respond to short-term disturbances in the system. A project with variable and uncertain generation is characterized as intermittent. A project with constant and reliable generation is characterized as dependable. A dependable project with output that can be varied by operator decision is characterized as flexible. In general, an intermittent resource requires "firming capability" from a flexible resource in order to preserve system stability so that the demand can be met.
- **Planning life:** Planning life is the term over which the 2008 LTAP assumes a project will be available for planning purposes, and is based on the accounting life of the asset. The actual life of a project may be different than the planning life. For instance, Site C would be in service for more than 100 years, but has a planning life of 70 years.
- **Environmental and social impacts:** The effect the project has on land, water, air and greenhouse gas emissions. The impacts listed consider typical environmental and social effects during the construction and operation project phases. (See page 9.)

B.C. Resource Options Comparison

| Resource Option | Environmental and Social Impacts | | | |
|--|---|--|--|---|
| | Land | Water | Air | Greenhouse Gases |
| Conservation (Demand-side management) | Negligible | Negligible | Negligible | Negligible |
| Biomass Biogas Municipal solid waste Woodwaste | Land impacts due to facility footprint, access roads, transmission rights-of-ways and fuel harvest impacts | Consumptive water use | Local air impacts dependent on fuel burned and release of particulate matter | Energy generated from biogas and woodwaste is considered to have net zero GHG impact. GHG emissions from municipal solid waste must be offset |
| Small Hydro Run-of-river | Affects wildlife habitat and traditional uses due to construction, access roads and transmission rights-of-ways | Diverts a portion of stream flow. May affect fish, habitat and recreational use. Generally high gradient streams | Potential short-term construction-related impacts from dust | Short-term construction-related impacts from vehicle and equipment use |
| Large Hydro Site C | Affects wildlife, traditional and recreational land use, agriculture, forestry. Project would expand cleared width along existing transmission right-of-way | Changes aquatic environment and species from riverine to reservoir setting. May affect flows immediately downstream of dam | Possible localized climatic changes | Some level of GHG emissions related to construction and initial reservoir years |
| Geothermal South Meager Geothermal Project | Land required for site and access roads | Potential impact on groundwater and water quality | All non-condensable gases generally injected back into the ground | Short-term construction-related impacts from vehicle and equipment use |
| Wind Onshore wind farms Offshore wind farms | Wind sites may have visual impacts as well as impacts on birds and bats | Offshore wind sites may have visual impacts, as well as an impact on the ocean floor and associated fisheries and on migratory birds | Primarily construction-related impact | Short-term construction-related impacts from vehicle and equipment use |
| Natural Gas (note 2) SCGT CCGT Cogeneration | Land impacts limited to facility, access and transmission right-of-way footprint | Consumptive water use | Local air impacts (such as nitrous oxide emissions) are largely controllable (and do not include GHG) | Greenhouse gas emissions must be offset |
| Wave/Tidal | Land impact due to facility footprint, access routes and transmission right-of-way | Tidal facilities may have an impact on local tide and current regime. Possible impact on fish or mammal migrations | Limited to potential release of particulates during construction period | Short-term construction-related impacts from vehicle and equipment use |
| Distributed Generation Net metering solar Net metering wind | Low – generally implemented on existing site | Negligible | Limited to construction period potential release of particulates | Short-term construction-related impacts from vehicle and equipment use. Microturbines may have GHG emission issues |
| Coal (Carbon sequestered) Pulverized coal supercritical IGCC | Land impact from facility footprint as well as mine, transportation infrastructure and transmission right-of-way | Consumptive water use and water quality impacts | Some sulphur oxide or mercury emissions. Other local air impacts (such as nitrous oxide emissions) are largely controllable (and do not include GHG) | Greenhouse gas emissions must be captured and sequestered on-site |
| Solar Large-scale photovoltaic Concentrated solar thermal | Land impact due to facility footprint, access routes and transmission right-of-way | Consumptive water use for some designs | Limited to potential release of particulates during construction period | Short-term construction-related impacts from vehicle and equipment use |



Powerhouse Access Bridge and Associated Access Roads

If the Site C project were to proceed, a bridge would be required across the Peace River to provide access to the Site C powerhouse.

In response to feedback received in Pre-Consultation and Project Definition Consultation, Round 1, BC Hydro is considering the possibility of public use of this bridge and associated access roads after construction is complete. The project would require the following road and bridge work:

- Access road to Fort St. John on the north bank of the Peace River
- Bridge needed to access the powerhouse that would be on the south bank of the Peace River
- Road to access the powerhouse and the railhead access road to Septimus Siding (the area adjacent to the rail line)

The existing regional road and bridge network does not provide a crossing of the Peace River between Taylor and Hudson's Hope or a crossing of the Pine River north of Highway 97. Existing road networks on the south bank of the Peace River include the partially-paved Jackfish Lake Road and an unpaved network of rail, transmission, oil and gas, and forestry service roads. The roads and bridges required for Site C would connect with these existing unpaved industrial roads on the south side of the Peace River and with the Fort St. John municipal road network on the north side of the river.

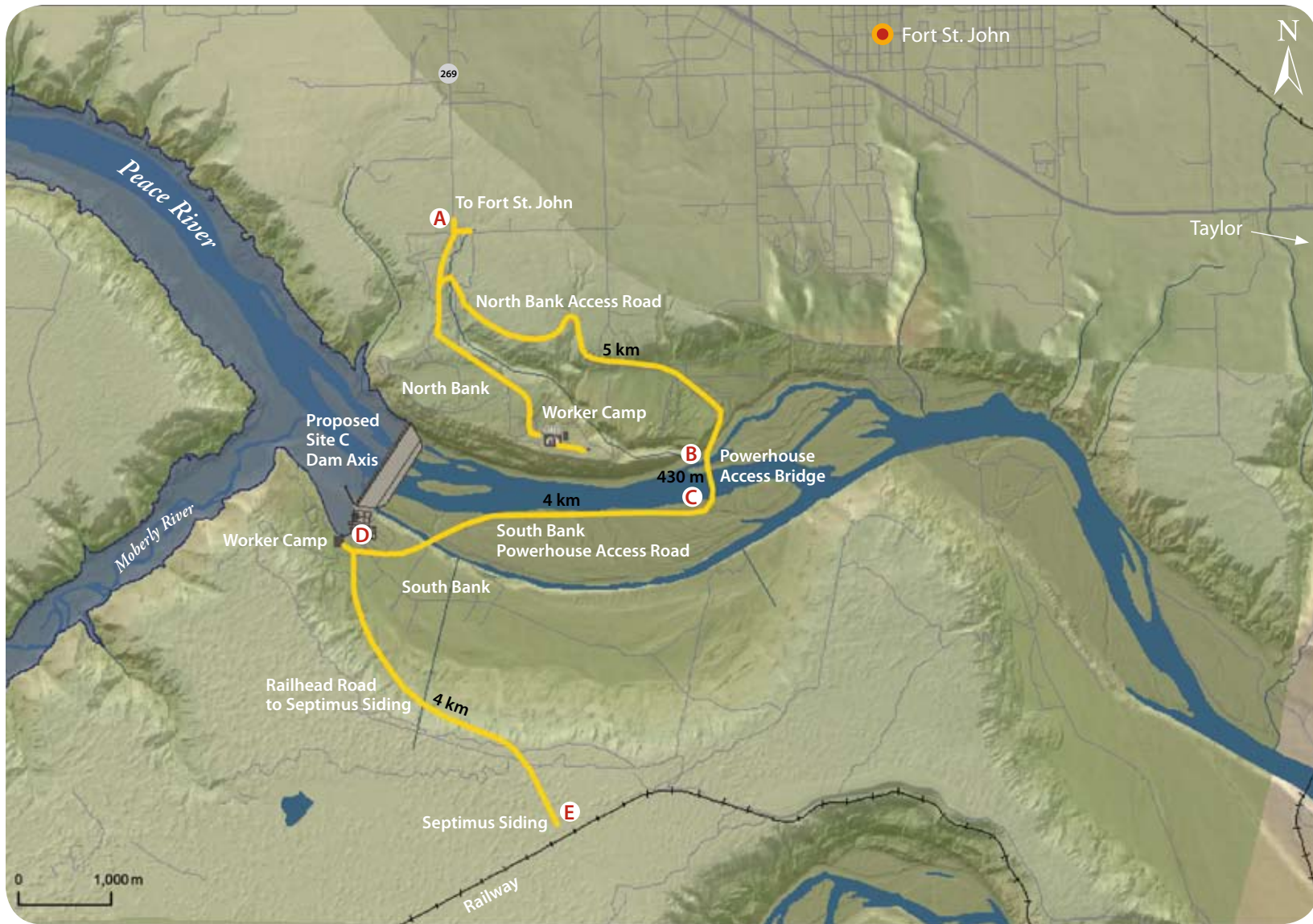
Subject to further consultation with the Ministry of Transportation and Infrastructure, local governments, stakeholders, First Nations, and the public, the potential powerhouse access bridge and associated access roads could possibly be utilized by the public after project construction is complete. Any upgrade or extension to the road network on the south bank, such as the Jackfish Lake Road or industrial roads, are outside the current scope of the potential Site C project.

BC Hydro is interested in feedback regarding potential public use of the powerhouse access bridge and associated access roads, and whether public use would be considered a community benefit.



The Peace River, upstream of Taylor

Powerhouse Access Bridge and Associated Access Roads



North Bank Access Road (5 km) (A to B)

The north bank access road would tie into the existing paved municipal road network leading to Fort St. John on the north bank of the Peace River, near the potential dam. From where the north bank access road connects to the existing public road, the road would extend downstream of the dam and follow the river bank for approximately 3 kilometres. The road would then descend down the slope of the Peace River's north bank, on the west side of Old Fort, to approach the powerhouse access bridge. The north bank access road would be two lanes, one in each direction. The lanes would be wider than standard to accommodate construction vehicles, and provide access to and from Fort St. John, worker camps and the dam site. The existing public road would likely require some form of upgrade as well. Vehicle usage on the road would range from large construction equipment to smaller commuter vehicles. If the project were to proceed to Stage 3, a traffic impact assessment would be conducted and an associated traffic management plan would be developed, incorporating input from this and further rounds of consultation.

Powerhouse Access Bridge (450 m) (B to C)

A new 280-metre-long two-lane bridge would be constructed across the Peace River approximately 2.5 kilometres downstream of the potential dam. The bridge would be built to access the Site C powerhouse, which would be located on the south bank. The approaches to the bridge would have a combined length of about 170 metres, giving a total crossing length of 450 metres.

Powerhouse Access Road (C to D) and Railhead Access Road to Septimus Siding (8 km) (D to E)

The powerhouse access road on the south bank of the Peace River would be two lanes, one in each direction. This road would follow the edge of the large island in the Peace River downstream of the Moberly River and potential dam site before heading towards the powerhouse. This road would also connect to the railhead access road leading to Septimus Siding (the area adjacent to the rail line). The total length of the powerhouse access road and the railhead access road to Septimus Siding would be approximately 8 kilometres.



Peace River, east of Moberly River

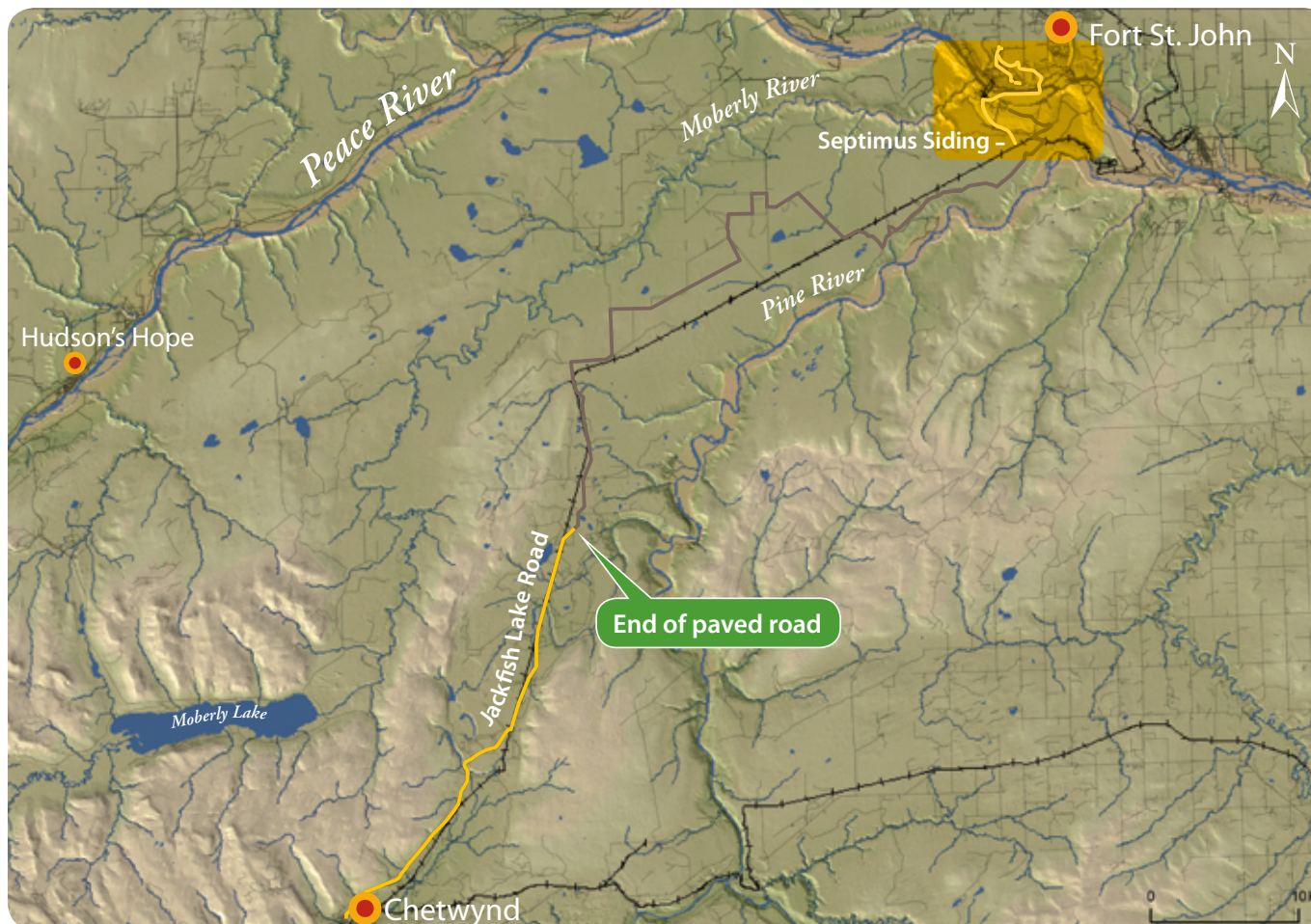
Public Feedback Sought Regarding Potential Public Use of the Powerhouse Access Bridge

During Pre-Consultation (December 2007 – February 2008) and Project Definition Consultation, Round 1 (May – June 2008), a number of stakeholders raised the question of public use of the potential powerhouse access bridge. Some participants suggested there may be regional benefits with shorter travel times between Fort St. John and Chetwynd and greater access to lands on the south bank of the Peace River. However, impacts were also identified, such as potentially less traffic and associated business through Hudson's Hope and Dawson Creek. These topics, and others, require further discussion and consultation.

Looking Ahead

Following public and stakeholder consultation, further consultation and discussion with local governments, First Nations, and the Ministry of Transportation and Infrastructure would be necessary.

Existing Road Networks on the South Bank of the Peace River



Provincial and Community Benefits – Other Potential Infrastructure Improvements

Part of BC Hydro’s consultations with the public, stakeholders and First Nations have focused on discussing long-term benefits to the region and the province.

As discussed in the **Site C as an Energy Option** section of this discussion guide, hydroelectricity can provide a large, dependable supply of power throughout the year. The power generated by the potential Site C project would be an additional source of power for B.C. and would supplement conservation efforts and renewable energy produced by independent power producers. Provincial benefits would include clean, renewable, dependable power.

Community Benefits

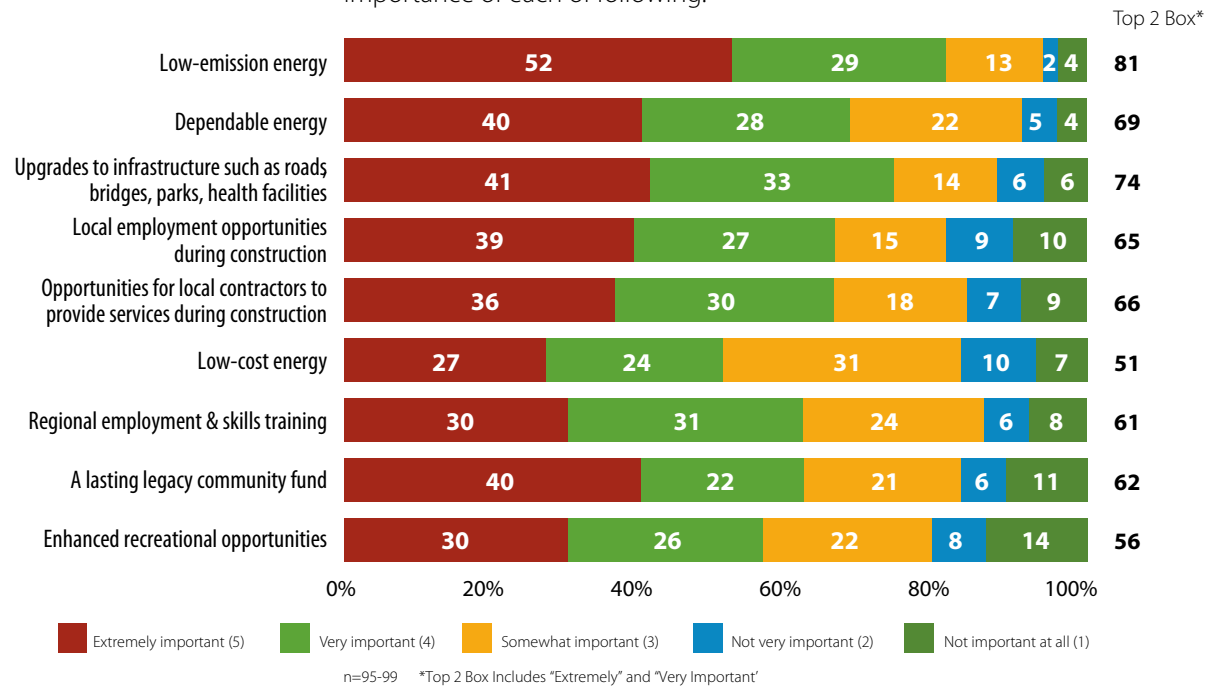
With respect to community benefits, results from the recent Project Definition Consultation, Round 1 (completed in June 2008) show that 66 per cent of consultation participants (provincial and Peace River region), and 74 per cent of Peace River region participants, rate improvements to infrastructure (roads, bridges, parks and health facilities) as very or extremely important.

BC Hydro would like to learn more about these priorities and is asking for public and stakeholder input regarding possible public use of the powerhouse access bridge and associated access roads as well as for ideas concerning potential improvements to other community infrastructure, such as regional parks, housing and other amenities.

Local parks may be located along the potential reservoir or closer to towns and other residential areas. Other amenities could include additional city infrastructure such as water and sewer services.

Round 1 Consultation Results

In Round 1 Consultation, participants were asked to indicate the importance of each of following:



Top 2 Box*



Reservoir Preparation Considerations

If Site C were to proceed, the reservoir created by Site C would flood approximately 5,340 hectares of land beyond the current water surface of the river.

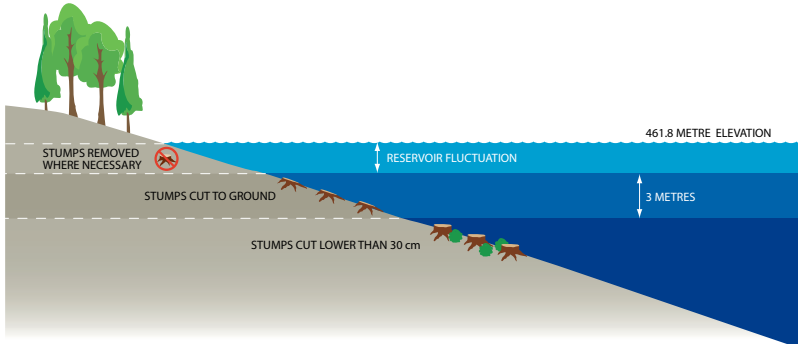
The maximum normal operating level of the reservoir would be at an elevation of 461.8 metres, resulting in a water depth of approximately 52 metres at the Site C dam, and little change in the existing depth immediately downstream of the Peace Canyon Dam. The lower 8 kilometres of Cache Creek, 10 kilometres of the Moberly River, and 14 kilometres of the Halfway River would be flooded, forming arms of the Site C reservoir.

Reservoir preparation would be required prior to filling. Major activities would include clearing of timber and vegetation, removal of trees and other vegetation, shoreline protection and preparation, recreation site development, and fish and wildlife habitat creation. Temporary or permanent access roads would be required to conduct most of these reservoir preparation activities.

Clearing of Timber and Vegetation

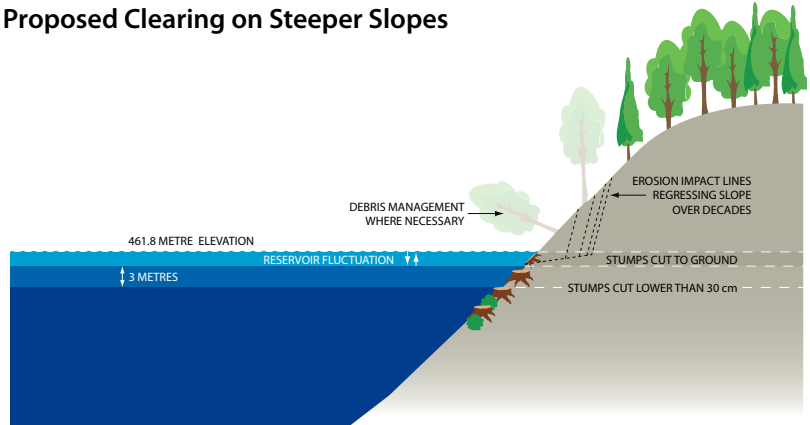
Merchantable timber within the project area would be harvested. BC Hydro would work with the provincial government and local forest licensees and facilities to maximize the utilization of merchantable timber while minimizing disruptions to the local forest industry.

Proposed Clearing on Shallow Slopes



Vertical scale is exaggerated; diagram not to scale

Proposed Clearing on Steeper Slopes



Vertical scale is exaggerated; diagram not to scale

Remaining vegetation could also be removed depending on evaluation of benefits to fish and wildlife habitat, decomposition and water quality, greenhouse gas emissions, and cost. In general, woody vegetation in the reservoir area below the maximum normal operating level would be cleared. Studies would be done to help understand the trade-offs between clearing to reduce greenhouse gas emissions and leaving some vegetation in place that could be beneficial for fish and wildlife habitat, shoreline stability and water quality. For example, to minimize the potential for erosion before and after reservoir filling, and to maintain habitat complexity and soil structure, low stumps would likely be retained except where they may pose a public safety risk or hinder boating or fishing activities.

Clearing or planting activities could occur above the maximum normal operating level of the reservoir, depending on the future shoreline uses such as recreation, wildlife habitat, other land uses, and consideration of minimizing potential erosion and instability.

Clearing activities would occur over a seven-year period before and during construction. If the project were to proceed, the clearing plan and schedules would take into consideration potential impacts to communities, heritage resources, wildlife and aquatic habitat.

Waste Vegetation Disposal

The disposal options for non-merchantable timber and other vegetation would be considered and assessed for feasibility and economic, social and environmental impacts such as community health, air quality, fish and wildlife, and costs.

If the potential Site C project were to proceed, a waste vegetation plan would be developed following further feasibility analysis and consultation with local communities, stakeholders and regulators. Any burning of waste would be performed in accordance with provincial and federal regulations. Alternatives such as chipping, composting or conversion of waste to bioenergy would also be explored. Stumps and larger wood debris could possibly be used in some parts of the reservoir to construct complex habitat structures for fish and wildlife.

Shoreline Stabilization and Habitat Creation

Terrain mapping, field assessments and studies are underway to delineate areas of the shoreline where slope stability could be affected by flooding, and to predict the rate of potential shoreline regression due to erosion.

Selective revegetation and other shoreline protection methods would be used to limit bank erosion in some areas around the potential reservoir, such as at Hudson's Hope. BC Hydro would undertake land use studies and consultations to develop a shoreline plan that would integrate objectives such as recreation, heritage resources protection, creation of high-value wetland, and riparian and shoreline habitat while also considering public safety, cost and scheduling.

Access and Scheduling

Most reservoir preparation activities would require construction or upgrading of roads on both sides of the reservoir and dam site. In addition, helicopter access would potentially be needed for activities on steeper slopes. Feedback received in Project Definition Consultation, Round 1, indicated that BC Hydro would need to balance any increase in access for recreation and other activities with the need to limit access to allow for conservation.

Plans to access the reservoir area would be developed with input from local stakeholders, First Nations, and environmental and geotechnical specialists. Input from these groups regarding potential impacts related to access and scheduling of reservoir preparation activities would also be considered during planning. In addition, the retention, deactivation or rehabilitation of specific access roads following reservoir preparation activities would be considered based on input into desired long-term use.

If the Site C project were to proceed to Stage 3, reservoir preparation plans would be refined. BC Hydro would continue to engage government agencies, stakeholders and First Nations to develop a schedule of reservoir preparation activities that would meet construction requirements while optimizing local benefits, as well as meeting regulatory requirements to minimize local disturbances to communities, wildlife, forestry and fish.

The table on page 18 shows the potential effects of access, clearing, waste vegetation disposal, shoreline stabilization and habitat creation based on several socio-economic and environmental considerations.



The Peace River approximately 2 kilometres east of Moberly River



Back channel of the Peace River approximately 2 kilometres east of Moberly River



North shore of the Peace River



North shore of the Peace River

Reservoir Preparation Considerations Table

| | Socio-Economic | Fish/Aquatic Habitat | Wildlife | Land | Air | |
|--|--|--|---|---|---|---|
| Considerations | <ul style="list-style-type: none"> • Safety • Recreation • Aesthetics • Heritage Sites | <ul style="list-style-type: none"> • Local Community • Forest Industry • Project Timelines • Project Cost | <ul style="list-style-type: none"> • Aquatic Habitat • Water Quality • Aquatic Life | <ul style="list-style-type: none"> • Wildlife • Habitat | <ul style="list-style-type: none"> • Erosion • Slope Stability | <ul style="list-style-type: none"> • Greenhouse Gas Emissions • Air Quality |
| Activities | | | | | | |
| Access | <p>Manage public access during reservoir preparation activities for safety</p> <p>Work with stakeholders to identify access management issues</p> <p>Deactivation & revegetation of some roads</p> <p>Avoid disturbing heritage protected areas and apply mitigation strategies if necessary</p> <p>Recreational facilities in place when safe after construction</p> | <p>Use of specialized construction practices to protect riparian areas during construction</p> <p>Fishing management planning would be considered</p> | <p>Where feasible, avoid critical habitat areas (ungulate winter range)</p> <p>Use of native trees, shrubs, sedges and grasses at/near maximum normal operating level</p> | <p>Where necessary, seed disturbed areas with native grasses to minimize erosion</p> <p>Construct access with appropriate water control facilities to minimize washouts/flooding</p> <p>Deactivation & revegetation of some roads (habitat restoration)</p> | <p>Use of dust control measures close to communities/dwellings (i.e. water, seeding, etc.)</p> <p>Minimize the quantity of crushed rock in road materials</p> | |
| Clearing | <p>Avoid disturbing heritage resources and apply mitigation strategies if necessary</p> <p>Explore capacity building opportunities with the community</p> <p>Clearing scheduling plan to reduce disturbance</p> <p>Consider packaging clearing and other related contracts in order to support local contractors</p> <p>Coordinate merchantable timber delivery to local mills</p> <p>Remove stumps or cut to ground in public use areas for safety and aesthetics</p> | <p>No-machine zones and riparian management zones along watercourses would be identified</p> <p>Consider spawning periods and other life cycle needs when scheduling riparian work</p> <p>Consider leaving vegetation in critical riparian areas</p> | <p>Schedule and sequence clearing activities to minimize disturbance during key seasons (e.g., core bird breeding season) and in key habitats</p> | <p>Revegetate exposed soils to minimize erosion</p> <p>Where necessary, retain stumps on steep terrain (30 cm max height) and/or where feasible, construct shoreline protection to provide slope stabilization</p> | <p>Encourage the use of low sulphur fuels</p> <p>Encourage low-emission heavy equipment</p> | |
| Waste Vegetation Disposal | <p>Fire control measures</p> <p>Burn in accordance with appropriate regulations and venting index</p> <p>Burning rates appropriate to protect community health</p> <p>Where feasible, explore opportunities for alternative disposal options</p> <p>Control and disposal of floating debris</p> | n/a | <p>Timing of burning to minimize disturbances</p> | n/a | <p>Explore alternative disposal options with lower GHG emissions</p> <p>Where feasible, reduce amount to be burned</p> <p>Reduce smoke volume by burning with forced air technology</p> | |
| Shoreline Stabilization & Habitat Creation | <p>Avoid disturbing heritage resources and apply mitigation strategies if necessary</p> <p>Recreational sites</p> | <p>Gravel bed spawning habitat</p> <p>Riparian buffer zones</p> | <p>Wetlands</p> <p>Habitat complexity for amphibians and small mammals using woody debris</p> <p>Nesting structures using woody debris</p> | <p>Slope stabilization</p> | n/a | |
| Scheduling | <p>High recreational use (May – Oct)</p> <p>High timber sector activities (Nov – Mar)</p> | <p>Spawning season, juvenile growth (Apr – Nov)</p> | <p>Ungulate winter range (Nov – Apr)</p> <p>Breeding birds, owls & eagles, etc. (Feb – Aug)</p> | <p>Preferred access on shallow slopes (Nov – Mar)</p> <p>Preferred access on steeper slopes (Jun – Oct)</p> | <p>Preferred smoke ventilation (Sep – Dec) during night hours</p> | |

Impacts on Resources

The reservoir would flood some known gravel resources. Some of these resources could be used for Highway 29 realignment construction or reservoir preparation activities such as the creation of fish and wildlife habitats. In addition, BC Hydro's construction material investigations may identify new local gravel sources. Should the Site C project proceed to construction, BC Hydro would consult with First Nations, stakeholders and the Ministry of Transportation and Infrastructure about future needs and identified gravel reserves.

BC Hydro would also work with the local gas industry to identify existing active and abandoned gas wells and pipelines within the reservoir area that may need to be relocated prior to flooding.

Looking Ahead

Should Site C proceed to construction, future management of the reservoir environment and operations would include activities such as:

- Slope stability monitoring and mitigation measures
- Floating debris management for dam safety, reservoir use and public safety
- Development and maintenance of specific public use management areas (recreational sites)



Potential Site C dam site location, from bank of Peace River, looking up at north bank

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Sourcing Dam Construction Materials, and Relocation and Reclamation of Excavated Soil and Rock

If built, Site C would be a mid-sized facility composed of earthfill material, similar to material used for the W.A.C. Bennett Dam. As currently designed, the Site C dam would be 1,100 metres long, including different zones of gravel, impervious material, riprap and other material. It would also include 300 metres of concrete structures located on the right bank for the spillway and power intakes.

The crest of the dam would be at an elevation of 469.4 metres and the dam would have a height of about 60 metres above the river bed, with a distance of 7.6 metres from the reservoir water level, at the maximum normal reservoir level, to the dam crest.

A diagram of the potential earthfill dam at Site C is shown below.

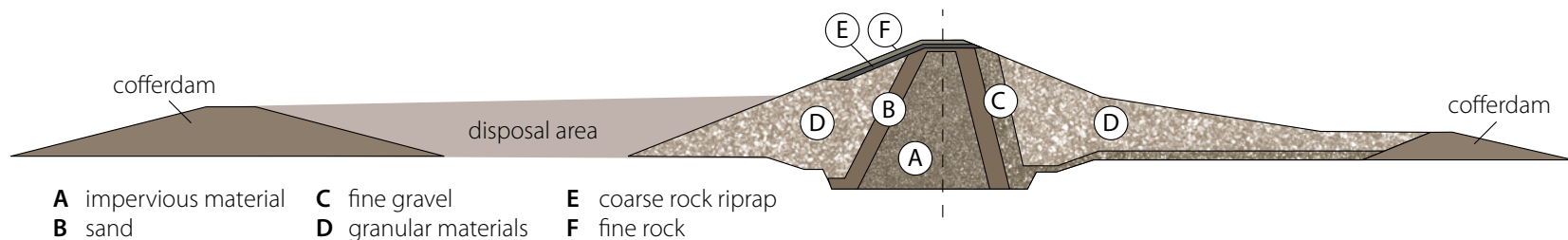
Impervious material such as glacial till or silty clay would be used to construct Zone A, the core of the dam. Filter zones consisting of sand (Zone B) and fine gravel (Zone C) would isolate the impervious core from the granular materials (mainly sand and gravel) that form the shells of the dam (Zone D).

The upstream and downstream cofferdams (small dams used for river diversion) would be incorporated into the earthfill dam. The space between the upstream cofferdam and the upstream shell of the dam would be filled with materials from the excavations required to construct the project structures. The upper part of the upstream face of the dam would be protected from wave erosion by coarse rock riprap (Zone F) on a bedding of fine rock (Zone E). Roller-compacted concrete may be used instead of riprap.

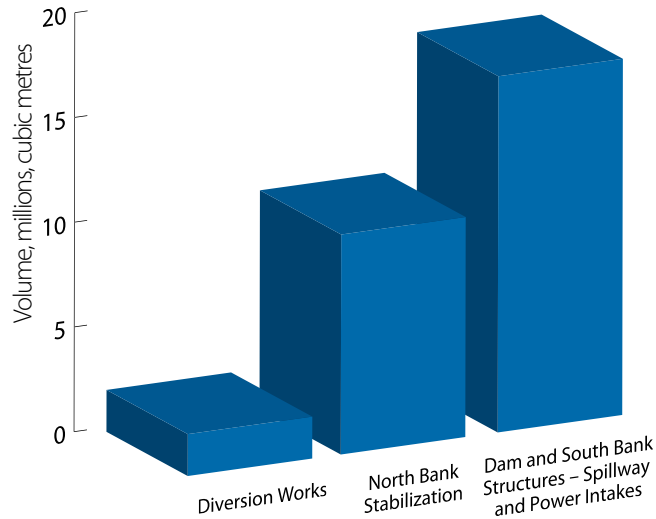
Previous studies indicate that the majority of materials necessary for construction of an earthfill dam (Zone B, C and D) are available in the vicinity of the potential dam. Investigations for feasible options of Zone A materials are currently being undertaken within 10 kilometres of the potential dam site on both the north and south sides of the Peace River. Investigations are also underway to identify suitable options for Zone F materials. Once potential sources are identified, work can be done to assess the potential environmental and social impacts associated with construction material and related transportation requirements.

The total material required for construction of the dam is about 17.5 million cubic metres. By comparison, the W.A.C. Bennett Dam used a volume of about 44 million cubic metres. Previous studies estimate the breakdown of construction material volumes as follows:

| Material Type | Volume (cubic metres) |
|---|-----------------------|
| Concrete Aggregate (for structures) | 190,000 |
| Granular Material (includes dam and cofferdams) | 13,500,000 |
| Impervious Material (for dam core material) | 3,500,000 |
| Riprap (large rock) | 240,000 |
| Total | 17,430,000 |



Relative relocation volumes from project components



Relocation and Reclamation of Excavated Soil and Rock

To accommodate Site C dam infrastructure and to stabilize potentially unstable slopes, excavations would be required for construction. Excavated material would be used for dam construction wherever possible; however, a significant amount of this material would likely be unsuitable for construction and would need to be relocated.

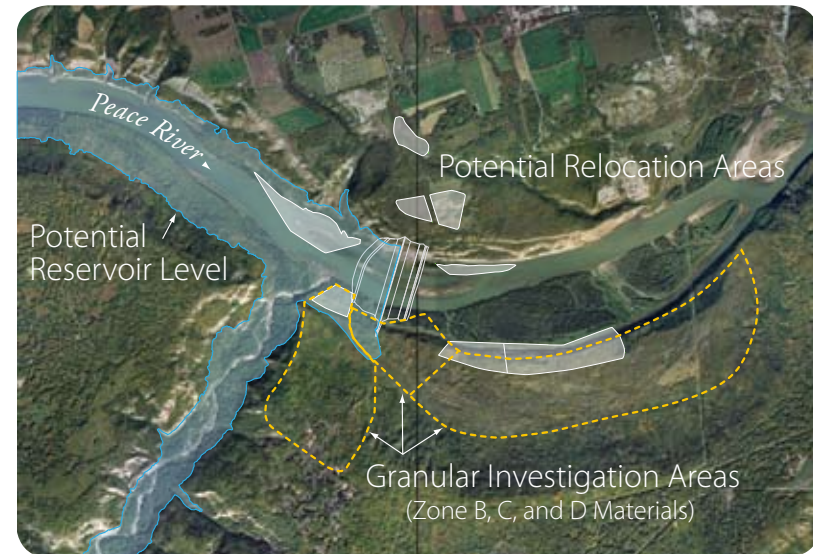
Soil and rock relocation areas would be reclaimed as soon as weather permits. Reclamation would include, as feasible and appropriate, the construction of a combination of the following: habitat features for wildlife such as rock piles, ponds, wet depressions and contoured ground, debris piles, potential den sites, nest platforms, coarse woody debris and snags.

As shown in the cross-section diagram on page 20, some of the soil and rock from excavations would be relocated between the dam and the upstream cofferdam. Approximately 40 per cent of the excavated material would be placed upstream of the dam below the reservoir level, and so would not be visible after completion of the project. Any relocated soil and rock placed along the river banks would be contained by dikes constructed from gravel to prevent sedimentation of the river during construction.

The estimated volumes and sources of materials that would be relocated are as follows:

| Location | Volume (cubic metres) |
|-------------------------------|-----------------------|
| Diversion Works | 2,000,000 |
| North Bank Stabilization | 10,500,000 |
| Dam and South Bank Structures | 17,000,000 |
| Total | 29,500,000 |

Potential Locations for Excavated Soil and Rock Relocation Areas



Looking Ahead

BC Hydro is reviewing and investigating sources of construction material to assess their suitability for the potential project. Locations for potential areas for excavated soil and rock relocations are also being reviewed. The assessment of potential environmental and social effects, mitigation and reclamation opportunities would be done as part of Stage 3, if the project were to proceed to the next stage of planning and evaluation.

Environment

Preliminary and Baseline Resource Studies

During Stage 1 and subsequently Stage 2, of the Site C project, BC Hydro has been conducting baseline inventory studies to help identify the current fish, wildlife, vegetation, water quality and socio-economic aspects that may be affected by the potential project. The locations of study areas vary by subject. For aquatic studies, the study area generally includes the Peace River from Hudson's Hope to the Alberta border and local tributaries within the potential reservoir area. For terrestrial studies, it generally encompasses the core river corridor from Hudson's Hope to the Alberta border, including the floodplain and the ascending slopes extending approximately 2 kilometres on either side of the Peace River, and the transmission line corridor. For socio-economic studies, the immediate region, industries and communities influence the study boundaries. As new issues are identified, study boundaries may be changed.

Baseline fish studies have assessed the life histories and relative abundance of the resident fish species within the study area. While socio-economic studies are underway to collect current information on land use, communities, housing, health services, economic development, population and demographics, labour market and employment, among other factors.

If the potential project were to proceed to Stage 3, environmental impact studies would be undertaken and would be subject to comprehensive consultation overseen by regulatory authorities. BC Hydro would comply with information required by provincial and federal regulators, including the development of potential measures for managing potential project impacts.

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Wildlife Studies

Data on wildlife populations in the potential Site C area has been collected since the late 1970s. Early data collection focused on consumptive wildlife, which are generally game species. Further studies in the 1990s also focused on these species, adding methods such as radio tracking to gather location or seasonally specific information.

Current studies, initiated in 2005, have re-examined beaver and ungulate (deer, moose and elk) populations, as well as adding studies focused on current concerns for species at risk. Species at risk have recently become fundamental in wildlife impact assessments, but were not studied as part of past Site C research. These studies are now ongoing and are focused on collecting data on the presence, habitat use, and distribution of species at risk within the potential project area.

Various project components may affect wildlife. BC Hydro would evaluate mitigation such as habitat protection or habitat compensation areas, where these are practical. Through scheduling (seasonal considerations), mitigation, reclamation and habitat creation, there would be a number of opportunities to reduce the potential impacts to wildlife and wildlife habitat. These would be explored in depth as part of Stage 3, if the project were to proceed to that stage.

Current wildlife studies are gathering baseline inventory data on the following species groups: songbirds, fur-bearers, bats, butterflies, dragonflies, raptor nests, amphibians, owls and ungulates. Data collection will be analyzed and reported at the end of Stage 2.



A marten near Hudson's Hope (photo taken with a motion detector-triggered camera)

Stage 2 baseline studies underway or planned include the following:

Fish/Aquatic

- Peace River Fish Movement and Migration
- Peace River Fish Communities
- Peace River Tributary Fish Habitat
- Peace River Tributary Fish Utilization
- Peace River Fish Habitat
- Fish Passage Assessment
- Methyl Mercury Assessment
- Peace River Genetic Diversity
- Reservoir Fish Community Success Prediction
- Peace River Benthic Invertebrate Communities
- Peace River and Dinosaur Reservoir Lower Trophic Levels
- W.A.C. Bennett and Peace Canyon Dam Spill Entrainment and Mortality
- Peace River and Dinosaur Reservoir Thermal Regime and Total Gas Pressure



North shore of Peace River

Atmospheric and Climate

- Local Climate Modelling
- Climate and Icing/Drift Modelling
- Air Quality Station
- Noise Impact Studies
- Water Temperature Modelling
- Air Quality Dispersion Modelling
- Greenhouse Gas Methods Literature Review, Methods Development and Estimate

Wildlife

- Terrestrial Ecosystem Mapping
- Songbird Survey
- Fur-bearer Survey
- Bat Abundance/Habitat
- Bat Presence
- Butterfly Presence
- Plant/Vegetation Presence
- Eagle Nesting
- Ungulate Winter Field Surveys (critical winter)
- Ungulate Winter Range Use Survey
- Ungulate Tracking Program
- Western Toad Abundance/Habitat
- Owl Field Surveys
- Waterfowl Field Surveys
- Garter Snake Field Surveys

Socio-Economic

- Socio-Economic Baseline Data Collection (pre-existing information)
- Land Use Analysis (Geographically Information System)
- Employment and Population Forecast
- Community Services Study
- Lifestyle and Public Health Study
- Housing Study
- Transportation Study
- Agriculture Study
- Forestry Study
- Mineral and Mining Study
- Oil and Gas
- Hunting
- Trapping
- Tourism and Recreation
- Human Health Assessment
- Angler and River Recreation Use Survey and Infrastructure
- Natural History and Heritage
- Traditional Use Study (with First Nations co-operation)

Water Quality

- Water Quality Sampling
- Water Temperature and Turbidity
- Sediment and Vegetation Sampling
- Dinosaur Reservoir Limnology

Physical Environment (Engineering Lead)

- Fluvial Geomorphology
- Peace River and Tributaries Sediment Loads
- Groundwater
- Contaminated Sites Assessment

Engineering Design Studies

- Probable Maximum Precipitation and Probable Maximum Flood Studies
- Diversion Design Flood Studies
- Maximum Design Earthquake Studies
- Stability of the Left Bank Slope
- Investigations for Construction Materials
- Foundation Studies (Bedding Pore Pressure) for Earthfill Dam
- Foundation Studies (Rebound) for the Right Bank Structures
- Project Impacts on Reservoir Shoreline Stability and Safety
- Highway 29 Relocation Options
- Fish Passage Options
- Turbine Alternatives Studies
- Disposal Area Studies
- Reservoir Clearing and Preparation Studies

Land Use

BC Hydro is seeking input about what is important to the public regarding Site C's potential impacts on land use, including agriculture, forestry, mining, and oil and gas.

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Agriculture

The Peace River valley has soil and climatic conditions that have contributed to the historical development of the agricultural community. The agricultural community, lifestyle and economy have been, and continue to be, important to the people of the region.

In the area around the potential Site C project, agricultural land generally includes lands within the Agricultural Land Reserve (ALR). If the Site C project were to proceed, there would be both direct losses of agricultural land and indirect effects that may limit future agricultural land use. Major project components that would cause these effects would be:

- Reservoir preparation, filling and flooded land
- Highway 29 realignment and secondary access road development
- Dam construction materials that may be sourced from agricultural land
- Clearing from widening of the existing transmission line right-of-way

If the project were to proceed to Stage 3, Regulatory – Environmental Assessment, BC Hydro would involve the Agricultural Land Commission (ALC) and would develop an agricultural assessment that would consider measures for agricultural land and industry enhancement.

BC Hydro is seeking public input in identifying factors that are important when considering potential agricultural land impacts or industry enhancements.



Trees above the potential Site C dam site

Forestry

As with agriculture, and more recently oil and gas, the forest industry has played an important role in the development and economy of the region. If Site C were to proceed, potential forest industry effects would be related to:

- **Flooding:** Removing timber from both the Dawson Creek and Fort St. John Timber Supply Areas (TSA)
- **Erosion:** Additional timber loss during initial period of shoreline stabilization
- **Clearing for infrastructure:** Both temporary and permanent clearing required for project components such as worker camps and transmission line right-of-way
- **Market:** The timing and volume of releasing Crown and private timber to area mills
- **Forest management:** Removal of current biodiversity components and visual landscape features as part of the managed forest landscape within the Site C flood reserve
- **Infrastructure:** Forest industries on the Peace River may have minor infrastructure impacts such as changes to water supply

The forest industry in northern B.C. is undergoing change due to the mountain pine beetle epidemic and market changes in North America. The interaction of the potential Site C project with this industry will be assessed in discussions with communities, regional stakeholders and the provincial government. BC Hydro is seeking input from stakeholders and the public about the potential impacts of the Site C dam on the forest industry.



Reforested area at Mile 80, north of Fort St. John, off the Alaska highway



Near Mile 70 of Alaska Highway, north of Fort St. John

Mining

Some of the reserves of sand and gravel in the Peace River valley would be affected by the potential project. This material is currently used for local road construction and maintenance and for concrete production for local development. Gravels and materials adjacent to the potential dam site and Highway 29 realignment sections would be used for construction of the Site C project, where practical. Other known aggregate sources may be flooded by the reservoir, whereas project investigation for construction materials may identify new sources, and new roads and bridges may increase accessibility to known sources.

There are also known coal reserves near Hudson's Hope at the west end of the potential Site C reservoir. The potential reservoir would likely not prohibit coal extraction.

Oil and Gas

Northeastern British Columbia is the second-largest natural gas producing area in Canada and as a result, is experiencing billions of dollars of investment. Natural gas production, one of the main drivers of B.C.'s northeastern economy, is responsible for more than 3,000 jobs in the Fort St. John area alone and for providing more than one-third of the community's income.

The reservoir, dam site, roads and transmission components of Site C are not expected to have a major effect on the oil and gas industry. A few active or abandoned drilling sites and pipelines may be in the vicinity of the proposed dam site and reservoir, and may be affected by access roads or project impact lines once finalized. BC Hydro will work with the Ministry of Energy, Mines and Petroleum Resources, the Oil and Gas Commission and affected parties to determine the extent of any impacts if the project proceeds and once project design components are refined.

The oil and gas industry would potentially benefit from the powerhouse access bridge, if it were available for public use, as it would allow servicing of gas fields on the south side of the Peace River by road from Fort St. John.

Potential Land Use Effects

The table below summarizes the potential land use effects of the potential Site C project. If the potential Site C project were to proceed to Stage 3, detailed land use impact studies would be completed to predict specific effects and evaluate mitigation and enhancement options.

| Major Project Components and Potential Land Use Effects | | | | | |
|---|---|---|--|--|---|
| Land Use Type | Reservoir Preparation and Flooding | Highway 29 Realignment | Transmission (Site C to Peace Canyon) | Powerhouse Access Bridge | Dam Site, Access and Staging Areas |
| Forestry | Reservoir preparation would require timber and some vegetation removal, including islands and shoreline areas; access roads would be required | Depending on alignment and right-of-way, timber clearing would be required | Timber removal required for widening of the right-of-way | Would increase accessibility of the timber supply area (TSA) lands on the south bank | Dam site will affect vegetation; temporary staging and material relocation areas can be reclaimed with planned habitat types |
| Agriculture | Flooding removes agriculture land from the Agricultural Land Reserve | Depending on alignment and secondary access, agricultural land may be disturbed or alienated | Some existing and widened right-of-way is within the Agricultural Land Reserve, and agricultural uses may continue | Would increase accessibility of Agricultural Land Reserve lands on the south bank | 240 hectares impacted in dam construction |
| Mining and Minerals | Would flood direct surface access to materials (like gravel and coal) | If economic, could use local materials (gravels) that would be flooded | Minor effects overall since transmission would follow an existing route | Would increase accessibility of south bank mineral resources | Construction materials required to build the earthfill dam, but materials search may identify new aggregate reserves. Mining activity under or near the dam would be prohibited |
| Oil and Gas | Prevents drilling in flooded areas | Not likely to affect oil and gas industrial activities | Minor effects overall since transmission would follow an existing route | Would enable servicing of the Monias and south bank from Fort St. John | Oil and gas access under and near the dam site would be prohibited |
| Tourism/ Recreation | Reservoir preparation would reduce visual quality during construction; a planning opportunity for development of recreation facilities and features; long-term changes would shift use toward lake-type activities. | Shift from river to reservoir view, may be a planning opportunity for recreation access and scenic components | Minor effects overall since transmission would follow an existing route | Would increase accessibility of south bank for tourism and recreation use | The dam site would have tourism potential similar to existing BC Hydro facilities on the Peace River. Planning opportunity with regional governments about the role of the site as an attraction. |
| Socio-Economic | Displaces other potential land uses | Highway realignment may divide land parcels | Minor effects overall since transmission would follow an existing route | Construction and public use of the bridge would shift the dynamics of land use, resource use and communities | Displaces other potential land uses |

Information Item

Transmission Lines

As currently designed, Site C would be connected to the existing provincial transmission line system by two 500 kv transmission lines. The lines would run from Site C to the existing Peace Canyon Generating Station via an existing 76-kilometre transmission corridor on the south side of the Peace River presently used by two 138 kv lines.

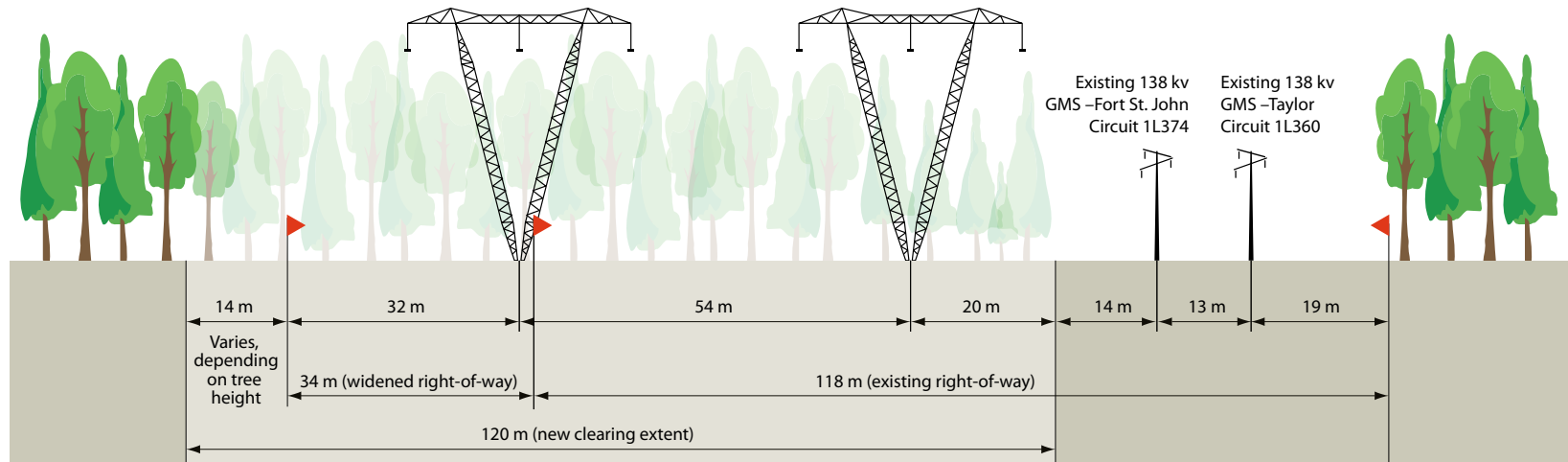
The existing 118-metre right-of-way that runs from the potential Site C area to Peace Canyon would need to be expanded by 34 metres to accommodate both 500 kv lines. Trees within 14 metres of the right-of-way would likely require clearing to safeguard the new lines. Any clearing of the transmission line corridor would be based on British Columbia Transmission Corporation standards.

In addition to the transmission interconnection at Peace Canyon, it is expected that transmission upgrades would be required going south from Peace Canyon. These transmission requirements would be evaluated in conjunction with reviewing other potential new electricity generation from the North which could include wind or other renewable projects. British Columbia Transmission Corporation would conduct this evaluation as part of its province-wide transmission planning.



500 kv transmission lines

View looking east from where 500 kv circuits would parallel existing circuits 1L374 and 1L360



Ongoing Site C Consultation

Property Owner Consultation

BC Hydro is committed to consultation and effective communications with landowners. As part of the Stage 2 technical and consultation work program, BC Hydro has been meeting with property owners since December 2007.

In fall 2008 and winter 2009, BC Hydro will be meeting individually with many potentially-impacted property owners to discuss the Highway 29 realignment options. The purpose of this consultation is to provide information as it is available, gather further input from the property owners, determine owner preferences in terms of possible alignment options and hear property owner concerns. Consultation with property owners is an individual process, as it deals with specifics of each property.

First Nations Consultation

BC Hydro is committed to effective communications and consultation with First Nations, with the goal of building positive long-term relationships. We are committed to working fairly and equitably with First Nations as decisions about how best to meet our energy needs are made. BC Hydro is consulting directly with First Nations in a parallel, but separate, process from public consultation.



Conceptual design of Site C hydroelectric facility (as historically conceived).

Public and Stakeholder Consultation

There were more than 1,600 local, regional and provincial participants in Pre-Consultation (December 2007 – February 2008) and Project Definition Consultation, Round 1 (May – June 2008).

Pre-Consultation Overview

During Pre-Consultation, which was conducted from December 2007 to February 2008, stakeholders were asked how they wanted to be consulted and about what topics. For further information on Pre-Consultation, and to view the Pre-Consultation Summary Report, go to www.bchydro.com/sitec.

Project Definition Consultation, Round 1 Overview

Project Definition Consultation, Round 1, was conducted from May 1 to June 30, 2008, and consulted the public and local, regional and provincial stakeholders on key impacts, benefits and features of the potential Site C Project. The consultation sought feedback on elements of project design, recreation, infrastructure, local impacts, land uses and community benefits.

Project Definition Consultation, Round 1 Participation

- 936 people participated in Project Definition Consultation, Round 1
- 224 feedback forms returned
- 284 people attended 29 stakeholder meetings, in the Peace River region and provincially
- 380 people attended 10 open houses, in the Peace River region
- 22 submissions (fax, email, phone and mail)
- 250 people visited the Community Consultation Office between May 1, 2008 and June 30, 2008

To view the Project Definition Consultation, Round 1 Summary Report, go to www.bchydro.com/sitec.

FEEDBACK FORM We want to hear from you.

Your feedback is important to us. At the conclusion of this consultation period, we will report the results of input in a Round 2 Consultation Summary Report, which will be made available at www.bchydro.com/sitec, at the Community Consultation office in Fort St. John, and by request.

Site C as an Energy Option (see page 7)

1. A) To meet long-term electricity demands of B.C. consumers and businesses, a number of different sources of electricity may be required.

Please indicate whether you strongly support, support, oppose, or strongly oppose each of the following ways of meeting the demand.

| | Strongly support | Support | Oppose | Strongly oppose |
|--|------------------|---------|--------|-----------------|
| Building power plants fired by clean coal technology | 1 | 2 | 3 | 4 |
| Building power plants fired by natural gas | 1 | 2 | 3 | 4 |
| Building more small electricity-generating stations located on smaller rivers | 1 | 2 | 3 | 4 |
| Taking more aggressive steps to encourage energy conservation | 1 | 2 | 3 | 4 |
| Importing more electricity from outside B.C., including Alberta and the U.S. | 1 | 2 | 3 | 4 |
| Making major investments in renewable energy such as wind, solar, and biomass | 1 | 2 | 3 | 4 |
| Buying more electricity from private companies that generate power using a variety of fuel sources | 1 | 2 | 3 | 4 |
| Reinvesting in upgrades of the province's current generating assets | 1 | 2 | 3 | 4 |
| Building a major hydroelectric dam | 1 | 2 | 3 | 4 |
| Gradually raising prices to help promote conservation | 1 | 2 | 3 | 4 |

1. B) In thinking about a possible new Site C dam, please indicate your level of agreement with the following statement:

“Site C should be considered if conservation, refitting existing equipment and investments in new sources, including sustainable energy, were not going to be enough to meet the energy demands of consumers and business in B.C.”

- Strongly agree
 Somewhat agree
 Neither agree nor disagree
 Somewhat disagree
 Strongly disagree

Additional Comments (Please add any additional comments on Site C as an energy option.)

Powerhouse Access Bridge and Associated Access Roads (see page 11)

2. A) Please indicate your level of agreement with the following statement:
 “If the Site C project were to proceed, the powerhouse access bridge should be available for public use once construction is completed.”

- Strongly agree
 Somewhat agree
 Neither agree nor disagree
 Somewhat disagree
 Strongly disagree

2. B) How often would you be likely to use the powerhouse access bridge for the following purposes if it were available for public use?

(Please circle one choice next to each purpose.)

| | Daily | Weekly | Monthly | A few times a year | Never |
|--------------------|-------|--------|---------|--------------------|-------|
| Business | 1 | 2 | 3 | 4 | 5 |
| Personal | 1 | 2 | 3 | 4 | 5 |
| Commuting for work | 1 | 2 | 3 | 4 | 5 |
| Recreation access | 1 | 2 | 3 | 4 | 5 |
| Other _____ | 1 | 2 | 3 | 4 | 5 |

2. C) Please indicate your level of agreement with the following statement:
 “Public use of the powerhouse access bridge and access roads would be a community benefit to the Peace River region.”

- Strongly agree
 Somewhat agree
 Neither agree nor disagree
 Somewhat disagree
 Strongly disagree

Additional Comments (Please identify other key considerations concerning potential public use of the powerhouse access bridge and associated access roads.)

Provincial Benefits and Community Benefits – Other Potential Infrastructure Improvements (see page 15)

3. A) Local parks and amenities may include sites and amenities along the potential reservoir or downstream river, or sites and amenities closer to towns and residential areas. In your opinion, what types of park infrastructure improvements would create a lasting benefit for the Peace River region?

- 1. _____
- 2. _____
- 3. _____
- 4. _____

3. B) Improvements to other amenities in the Peace River region could include such things as additional city infrastructure (water and sewer), social services, housing, and policing. Please indicate which of these suggested improvements could create a lasting benefit for the Peace River region.

- 1. _____
- 2. _____
- 3. _____
- 4. _____

3. C) Other than roads, bridges, parks and additional city infrastructure, what other types of infrastructure improvements would create a lasting benefit for the Peace River region?

- 1. _____
- 2. _____
- 3. _____
- 4. _____

Additional Comments

Reservoir Preparation Considerations (see page 16)

4. **A) If Site C were to proceed to construction, reservoir preparation would be performed at various times over a seven-year period. During this reservoir clearing and preparation period, trade-offs between different interests may be required.** How important are each of the following factors during the reservoir preparation period?

(Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|---------------------------------------|---------------------|----------------|--------------------|--------------------|----------------------|
| Visual quality and aesthetics | 1 | 2 | 3 | 4 | 5 |
| Wildlife and terrestrial habitat | 1 | 2 | 3 | 4 | 5 |
| Fish and aquatic habitat | 1 | 2 | 3 | 4 | 5 |
| Forestry industry needs | 1 | 2 | 3 | 4 | 5 |
| Slope stability and erosion | 1 | 2 | 3 | 4 | 5 |
| Air quality | 1 | 2 | 3 | 4 | 5 |
| Water quality | 1 | 2 | 3 | 4 | 5 |
| Minimizing access roads | 1 | 2 | 3 | 4 | 5 |
| Increasing the number of access roads | 1 | 2 | 3 | 4 | 5 |

Waste Vegetation Disposal

4. **B) Waste vegetation disposal options such as burning, conversion to bioenergy, chipping and composting will be identified and assessed for feasibility and for impacts on community health, air quality, environment, project schedule and costs, if the project were to proceed.** How important are each of the following factors in waste vegetation disposal? (Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|--|---------------------|----------------|--------------------|--------------------|----------------------|
| Minimize greenhouse gas emissions | 1 | 2 | 3 | 4 | 5 |
| Minimize visibility impacts/health impacts (air quality) | 1 | 2 | 3 | 4 | 5 |
| Minimize costs for disposal | 1 | 2 | 3 | 4 | 5 |
| Minimize impacts to local residents | 1 | 2 | 3 | 4 | 5 |
| Minimize duration of disposal activities | 1 | 2 | 3 | 4 | 5 |

Access

4. **C) Access roads would need to be built for reservoir preparation activities. Generally these roads would be decommissioned once project activities are complete, however depending on the area, some of these roads could be considered for permanent access to the reservoir. For the selections below, please choose which is more important to you:** (Check one box in each row)

- Permanently increased access to the south bank of the reservoir vs. Decommissioning access roads required for reservoir preparation on the south bank
- Permanently increased access to the north bank of the reservoir vs. Decommissioning access roads required for reservoir preparation on the north bank

Additional Comments

Dam Construction Materials (see page 20)

5. How important are each of the following factors in identifying sources of construction materials and relocation areas for excavated soil and rock?

(Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|--|---------------------|----------------|--------------------|--------------------|----------------------|
| Minimize impacts to wildlife habitat | 1 | 2 | 3 | 4 | 5 |
| Minimize impacts to fish and aquatic habitat | 1 | 2 | 3 | 4 | 5 |
| Minimize impacts to local residents | 1 | 2 | 3 | 4 | 5 |
| Minimize GHG emissions from hauling and transport of materials | 1 | 2 | 3 | 4 | 5 |
| Minimize costs | 1 | 2 | 3 | 4 | 5 |
| Minimize disturbance to heritage sites | 1 | 2 | 3 | 4 | 5 |

Additional Comments

Environment

Nature-related (see page 22)

6. A) How often do you participate in the following nature-related activities?

| | Never | Occasionally | Often |
|------------------|--------------------------|--------------------------|--------------------------|
| Birdwatching | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wildlife viewing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Photography | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Berry picking | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fishing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hunting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trapping | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Agriculture (see page 24)**6. B) How important do you think each of the following aspects of valley-based agriculture are to the Peace River region?**

(Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|--|---------------------|----------------|--------------------|--------------------|----------------------|
| Local food production | 1 | 2 | 3 | 4 | 5 |
| Forage crops and food for domestic animals | 1 | 2 | 3 | 4 | 5 |
| Farm fields that provide habitat and grazing areas for wildlife | 1 | 2 | 3 | 4 | 5 |
| Scenic and pastoral views that contribute to tourism and livability | 1 | 2 | 3 | 4 | 5 |
| Farms that provide a connection with the region's pioneering history | 1 | 2 | 3 | 4 | 5 |
| Farm businesses that contribute to the local economy | 1 | 2 | 3 | 4 | 5 |
| Hobby farms that provide desirable lifestyle options | 1 | 2 | 3 | 4 | 5 |

6. C) How important do you think each of the following options are for mitigation and enhancement of agricultural development in the region?

(Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|--|---------------------|----------------|--------------------|--------------------|----------------------|
| Minimize the direct loss of agricultural land where feasible through road alignment selection | 1 | 2 | 3 | 4 | 5 |
| Optimize the agricultural usability of remaining parcels where feasible through road alignment selection | 1 | 2 | 3 | 4 | 5 |
| Minimize construction disturbance to farming operations through scheduling and planning | 1 | 2 | 3 | 4 | 5 |
| Develop or retain a network of secondary access roads around farming areas | 1 | 2 | 3 | 4 | 5 |
| Remove and reuse premium topsoil prior to reservoir filling | 1 | 2 | 3 | 4 | 5 |
| Create ongoing legacy financial support to the region's agricultural sector | 1 | 2 | 3 | 4 | 5 |
| Provide support to a regional noxious weed control program | 1 | 2 | 3 | 4 | 5 |
| Other _____ | 1 | 2 | 3 | 4 | 5 |

Forestry (see page 25)**6. D) How important do you think it is to consider each of the following factors in developing project-related harvest and reclamation plans?**

(Please circle one number next to each factor.)

| | Extremely important | Very important | Somewhat important | Not very important | Not important at all |
|--|---------------------|----------------|--------------------|--------------------|----------------------|
| Minimizing impact on old growth or mature seral stages where feasible | 1 | 2 | 3 | 4 | 5 |
| Maximize the total number of jobs in the region | 1 | 2 | 3 | 4 | 5 |
| Maximize the duration of jobs in the region (longer harvesting period) | 1 | 2 | 3 | 4 | 5 |
| Minimize access road requirements (e.g., using more water or aerial methods) | 1 | 2 | 3 | 4 | 5 |
| Optimize the timing and release of timber for the forestry sector | 1 | 2 | 3 | 4 | 5 |
| When replanting areas, focusing on merchantable timber | 1 | 2 | 3 | 4 | 5 |
| When replanting areas, focusing on ecosystems | 1 | 2 | 3 | 4 | 5 |
| Other (name) _____ | 1 | 2 | 3 | 4 | 5 |

How Input Will Be Used

Feedback gathered through Project Definition Consultation, Round 2 will be used along with technical and financial input to refine the key features of the potential project and to help define the scope and nature of environmental and other studies. Feedback collected via print and online feedback forms, stakeholder meetings, open houses, fax, phone, email and mail will be recorded and summarized in a **Project Definition Consultation, Round 2, Summary Report**. The Summary Report will be posted at www.bchydro.com/sitec.

Do you live in the Peace River region?

Yes No

Would you like to receive updates on the project, including the Project Definition Consultation Report?

Yes No

Please provide your contact information (*optional*):

Name: _____

Address: _____

Postal Code: _____

Phone: _____

Email: _____

CONSENT TO USE PERSONAL INFORMATION

I consent to the use of my personal information by BC Hydro for the purpose of contacting me and keeping me updated about the potential Peace River Site C Hydro Project. **For purposes of the above**, "my personal information" includes name, mailing address, phone number and email address, as per the information I provide.

Signature: _____ Date: _____

Project Definition Consultation, Round 2, deadline for feedback is November 30th, 2008

For further information or to submit your feedback form:

Peace River Site C Hydro Project:

Toll-free: 1 877 217-0777

Email: sitec@bchydro.com

Fax: 604 623-4332

250 785-3570

www.bchydro.com/sitec

Mailing Address:

PO Box 2218, Vancouver, B.C. V6B 3W2

Community Consultation Office:

9948 100th Avenue, Fort St. John, B.C. V1J 1Y5

*Any personal information you provide to BC Hydro on this form is collected and protected in accordance with the **Freedom of Information and Protection of Privacy Act**. BC Hydro is collecting information with this form for the purpose of its Site C Hydro Project and related energy resource options in accordance with BC Hydro's mandate under the **Hydro and Power Authority Act**, the **BC Hydro Tariff**, the **Utilities Commission Act** and related Regulations and Directions. If you have any questions regarding the Site C Hydro Project, and/or the information collection undertaken on this form, please contact the Site C Hydro Project at 1 877 217-0777.*

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