APPENDIX C

Part 5 Outdoor Recreation and Tourism, and Navigation

1 INTRODUCTION

This appendix provides supporting baseline information on outdoor recreation and tourism in the Peace Region. The baseline conditions described consider both the supply and demand of outdoor recreation and tourism in the Regional Assessment Area (RAA) and Local Assessment Area (LAA). The supply of outdoor recreation opportunities and the tourism they support is characterized by the recreation potential of the land base, parks and protected areas that are managed for outdoor recreation, and recreation-focused infrastructure, such as boat landings and camping sites. The types of outdoor recreation activities that occur in the region (including where they occur), participation and demand trends and use values are also discussed. The purpose of this appendix is to support Section 25 Outdoor Recreation and Tourism of the Site C Clean Energy Project EIS.

The navigation content of this appendix includes a BC Hydro memo confirming an approach to determine minimum vessel clearance envelopes for Highway 29 bridge crossings.

2 OUTDOOR RECREATION FEATURES AND AMENITIES

2.1 Recreation Sites

The Peace River Angling and Recreational Use Creel Survey (LGL 2010) identified a total of 49 recreation sites along the Peace River and its major tributaries, 32 of which were found throughout the Peace River mainstem, two on the Halfway River and 15 on the Pine River between the Sukunka and Peace River confluences. Total annual recreational activity level was estimated to be 15,909 user days, of which 10,353 user days were on the Peace River.

According to the survey results camping was the most common activity from May through September, and jet boating was the most popular in April, October and November (LGL 2010). Fishing was a popular activity from May through October, and hunting was popular in the fall. In the summer months, swimming, camping, picnicking and shoreline leisure were popular activities. Fishing and jet boating were the predominant activities upstream of the Project location, whereas camping and jet boating were most popular downstream of the Project and in the Pine River.

All 49 sites are accessible to the public by boat, and 20 are also accessible by road. Of the sites accessible by road, the access road to two of the Peace River sites crosses private land (confluence of Maurice Creek and Unmaintained Campsite E sites. Municipalities or private owners maintain the high-use campgrounds while the primitive, maintained campsites are kept up by the Peace Country River Rats boating club (i.e., designated Forest Recreation sites). BC Hydro maintains the high-use boat launches including Halfway River, Lynx Creek, and Peace Island Park. There are numerous unmaintained campsites, shoreline access sites, scenic locations and boat launches.

Recreation site types within the LAA are listed in Section 25 Outdoor Recreation and Tourism (Section 25.3 Baseline Description). Most of these sites were developed without

sanction from the province as stipulated in the Forest Practices Code of BC Act or the Forest and Range Practices Act (FRPA). Although not officially recognized by government, these sites do support ongoing river use for outdoor recreation purposes. BC Park signs are posted at some sites even though a provincial park does not exist. In most cases, sites were developed by volunteer labour or simply evolved over time through continuous use. Campsites are the most abundant site type, followed by shore access points and boat launches.

Recreation sites used by the public within the Project activity zone are also listed in Section 25 Outdoor Recreation and Tourism (Section 25.3 Baseline Description), including ten sites that are authorized under Section 57 and managed by the Peace Country River Rats Club. The current authorizations were signed in October 2009 for five years and will be re-evaluated at the end of the five year term. The sites are listed by location from Hudson's Hope downstream towards the Site C dam site.

2.2 Parks and Protected Areas

British Columbia has the second largest parks system (by area) in Canada, after Canada's National Parks. Over 13 million hectares, representing 14% of the province's total area, is protected. The parks serve an important role in protecting and conserving a wide range of critical habitats, much of which in a pristine wilderness setting, as well as fish and wildlife populations. They are also highly valued by B.C. residents for the opportunities they afford to hunt, fish, and pursue a variety of outdoor recreation activities.

Provincial parks contain approximately 6,000 km of hiking trails, 118 boat launches and 263 day-use areas. With more than 340 campgrounds and 11,000 campsites, BC Parks is the largest campground provider in the province.

The following list summarizes the results of a survey of B.C. residents completed by BCMOJTI (2010) which asked participants which activities they had participated in B.C. over the previous 12 months:

- Hiking day trip (53%)
- Beach activities, including picnicking at lake or river (52%)
- Swimming in lake or river (49%)
- Road biking or cycling (44%)
- Ocean-side beach activities, including picnicking (43%)
- Other nature viewing or scenic photography (38%)
- Vehicle access camping in a tent (29%)
- Bird watching (28%)
- Swimming in ocean (25%)
- Freshwater fishing (24%)
- Mountain biking on trails with no lift access (23%)
- Motorized boating on a lake or river (21%)
- Vehicle access camping in an RV or motorhome (20%)
- Downhill skiing/snowboarding with lift access (19%)
- Whale watching/other marine based wildlife (18%)
- Bear watching (17%)
- Canoeing on a lake or river (16%)

- Motorized boating on the ocean (15%)
- Visiting non-resort based hotsprings (14%)
- Non-vehicle access camping in a tent, cabin or hut (14%)
- ATV riding (12%)
- Saltwater fishing (12%)
- Horseback riding (11%)

Activities noted in the Northern B.C. region accounted for 6% of all responses, and of those respondents an average of 10 activities were noted per response. For these respondents, the top activities in Northern B.C. were:

- Beach activities, including picnicking at a lake or river (63%)
- Swimming at a lake or river (56%)
- Hiking – day trip (53%)
- Freshwater fishing (50%)
- Other nature viewing or scenic photography (47%)

The Northeast region of the province offers some of the world's best outdoor experiences, many of which are captured within parks. The Muskwa-Kechika Management Area itself has 2.5 million hectares of permanently protected land, including Northern Rocky Mountains Provincial Park, the third largest provincial park in British Columbia at 665,709 hectares. Wokkpash Recreation Area, Stone Mountain Provincial Park and Kwadacha Wilderness Provincial Park are other notable parks.

The parks in the Peace Region (Table 1) tend to be smaller and less oriented to wilderness values than their counterparts to the north and to the south, in part due to the long history of settlement along the river and the prevalence of agricultural activity. The parks, with a total area of 9,650 hectares, protect lake and river habitats mainly for local resident use, although the three parks downstream of Taylor are managed for their wilderness values. Campgrounds, day-use areas and boat launches accommodate camping, boating, fishing, hunting, wildlife viewing, hiking and other water-based activities.

B.C. Park attendance records are kept for three of the nine provincial parks in the RSA: Beatton, Charlie Lake and Kiskatinaw (Table 2). Campground attendance is increasing at Charlie Lake but is declining at Beatton and Kiskatinaw parks. Campground revenue is decreasing in Beatton and Kiskatinaw parks and in the region as a whole. Day use area attendance has increased at Kiskatinaw and in the region but has declined at Beatton and Charlie Lake parks.

Table 1 Provincial parks in the regional assessment area

Provincial Park	Area (ha)	Location	Primary Management Purpose	Facilities	Activities
Moberly Lake	104	25 km northwest of Chetwynd	resident recreation	boat launch, campground, day-use area, washrooms, sani-station	canoeing, cycling, fishing, hiking, swimming, waterskiing, windsurfing
Kiskatinaw	54	28 km north of Dawson Creek	resident recreation	campground, day-use area, washrooms	cycling, swimming, fishing
Kiskatinaw River	198	Peace River, 10 km from the Alberta Border	not applicable	none	canoeing, cycling, fishing, hiking, horseback riding, hunting, swimming, wildlife viewing
Peace River Corridor	2,014	Peace River, 25 km from the Alberta border	not applicable	wilderness camping	canoeing, fishing, hiking, horseback riding, hunting, wildlife viewing
Beatton River	186	Peace River at confluence of Beatton and Peace	riparian habitat protection; Fort St. John recreation opportunities	none	canoeing, fishing, hiking, horseback riding, hunting, wildlife viewing
Taylor Landing	2.4	1 km south of Taylor	recreation access to river	washrooms	canoeing, fishing
Beatton	310	13 km northwest of Fort St. John	resident recreation	boat launch, campground, day-use area, washrooms	canoeing, cycling, fishing, hiking, swimming, waterskiing, windsurfing, winter recreation
Charlie Lake	85	11 km north of Fort St. John	resident and local club recreation	boat launch, campground, day-use area, washrooms, sani-station	canoeing, cycling, fishing, hiking, swimming, interpretive programs
Butler Ridge	6,686	25 km west of Hudson's Hope	not applicable	boat launch, washrooms, wilderness camping	canoeing, cycling, fishing, hiking, horseback riding, hunting, swimming, wildlife viewing, winter recreation

NOTES:
ha – hectares
km – kilometre
SOURCE:
BC Parks (2012)

Table 2 Provincial park attendance and revenue in the regional assessment area and Peace Region

Park	2008-2009	2009-2010	2010-2011	Difference 2008-2011	
				No.	%
Beatton					
Campground attendance	8,768	9,341	8,595	-173	-2.0
Campground revenue	$38,732	$43,661	$40,757	$2,025	5.2
Day use area attendance	46,701	49,879	41,430	-5,271	-11.3
Charlie Lake					
Campground attendance	9,702	10,285	10,749	1,047	10.8
Campground revenue	$44,101	$42,949	$46,941	$2,840	6.4
Day use area attendance	44,762	44,450	43,281	-1,481	-3.3
Kiskatinaw					
Campground attendance	3,680	3,974	3,424	-256	-7.0
Campground revenue	$11,543	$17,669	$15,535	$3,992	34.6
Day use area attendance	10,448	24,164	22,967	12,519	119.8
Peace Region					
Campground attendance	86,454	89,062	83,903	-2,551	-3.0
Campground revenue	$406,168	$430,438	$423,806	$17,638	4.3
Day use area attendance	297,630	404,509	362,823	65,193	21.9

SOURCES:
BC Parks (2010, 2011)

The proposed Peace River Boudreau Lake protected area is located between Hudson's Hope and Fort St. John and encompasses a major portion of the south bank of the Peace River valley, the lower Moberly River valley, and the Peace River Islands between Maurice Creek and Moberly River. This protected area was first proposed for protection in the Fort St. John and Dawson Creek LRMPs (BCMFLNRO 1997, 1999). The area protects specific cultural and heritage features including the first European settlement on mainland B.C. at Rocky Mountain Fort. The proposed park also protects ecosystem values such as old growth management areas and Boreal White and Black Spruce biogeoclimatic zone. Recreational activities supported include public and commercial boating, canoeing, bird watching, hunting and fishing, although current access to many parts of the proposed park are limited and use levels are low (BC Parks, Planning Officer 2009 pers. comm.).

Municipal parks in the area are located in central or high use areas and are described in Section 25 Outdoor Recreation and Tourism (Section 25.3 Baseline Description).

There are five regional parks and campgrounds in the Peace River Regional District (PRRD) (Table 3). Regional parks are free of charge. The PRRD is in the process of writing a Regional Parks and Trails Master Plan. The district has been consulting on the Plan and it is due for completion in late 2012. Feedback to date emphasizes that access to the Peace River is currently limited with expanded access a common public request. The PRRD has commented that connecting future Site C reservoir and boat access with a PRRD trail system would be beneficial; however, the district has limited funding and is looking for partnerships with the private sector and local user groups for trail expansion projects (Peace River Regional District, Manager of Community Services 2012, pers. comm.).

Table 3 Regional parks and campgrounds in the Peace River Regional District

Park	Location	Amenities	Activities
Blackfoot Park	75 km east of Fort St. John and 51 km north of Dawson Creek	10 campsites with fire pits and picnic tables, six outdoor toilets, playground, horseshoe pits and raw water well (boat launch not recommended for use)	camping
Montney Centennial Park	northeast shore of Charlie Lake	open campsites, a picnic area with fire pits, two outhouses and a rustic boat launch	camping boating, fishing
Minaker River Park	a quarter mile west of Milepost 200 on the Alaska Highway on the Minaker River flats	fire pits, picnic tables, outhouses and campsites	camping, fishing, hunting, hiking
Spencer Tuck Park	north side of Moberly Lake about 32 km north of Chetwynd	six fire pits, picnic tables, outhouses and a boat launch	day use, boating
Sundance Lake Regional Park	on Sundance Lake, just off of Highway 97S approximately 15 km east of Chetwynd	picnic and rest area	day use, fishing

SOURCE:
Peace River Regional District (2012)

3 TOURISM FEATURES AND AMENITIES

3.1 Tourism Businesses

Estimates of the number of tourism-related businesses in the area adjacent to the Project activity zone are shown in Table . These data, compiled as part of the Site C creel and recreation study, indicate the area has in the range of 40% to 45% of all accommodation properties in the Northeast. In total, 143 businesses were either predominantly tourism-oriented or catered to travelers as a secondary market.

The 81 service businesses counted in Table include 12 outdoor adventure operators who offer guided services to visitors. A check of members listed on the NRAHTA website show four of these companies to be registered guide outfitters who cater predominantly to big game hunters. Most of the rest specialize in backcountry adventures in the remote wilderness, including the Muskwa-Kechika management area. The one jet boat operator who offers custom tours of the Peace River guided approximately 18 tourists in 2008

(Hopkins 2011, pers. comm.). Visitors are generally interested in sightseeing, wildlife viewing and nature viewing. No other companies appear to specialize in Peace River adventures.

Table 4 Businesses supporting tourism and recreation on the Peace River, 2010

Business Type	Fort St. John	Taylor	Hudson's Hope	Total
Accommodation	26	3	11	40
Service	69	3	9	81
Transportation	19	1	2	22
Total	**114**	**7**	**22**	**143**

NOTES:
Accommodation includes hotels, motels, bed & breakfasts, campgrounds.
Service includes food stores, restaurants, sporting goods stores and outfitting or adventure companies.
Transportation includes gas stations, RV, all terrain vehicle and snowmobile rentals.

SOURCE:
LGL (2010)

A tourism operator who provides outdoor recreation services for compensation or reward from residents or non-residents on provincial Crown land must be authorized by the province and issued an Adventure Tourism tenure (BCMFLNRO 2011a). The policy applies to activities that require extensive operating areas on Crown land, any improvements on Crown land and floating facilities anchored to Crown land covered by water that are linked to licensed angling guides and guide outfitters. There are no tenures overlapping or near the Project activity zone.

3.2 Accommodation Facilities

A profile of visitor accommodation facilities in the LAA and RAA is presented in Section 35 Housing and recapped in Table .

Table 5 Temporary accommodation in regional assessment area communities, 2011

Accommodation Type	Ft. St. John		Taylor		Hudson's Hope		Chetwynd	
	Sites	Units	Sites	Units	Sites	Units	Sites	Units
Campground/RV	5	270	2	118	5	116	6	289
Hotel and Motel	21	1,400	2	26	3	173	10	424
Lodges & Camps	0	0	0	0	2	20	4	78
B & B	1	2	0	0	1	3	3	5
Total	**27**	**1,672**	**4**	**144**	**11**	**312**	**23**	**796**

SOURCE:
Volume 4 Section 35 Housing

4 OUTDOOR RECREATION USE LEVELS

Table shows the most common river access points for each month. The boat launch at Peace Island Park is the most frequently used access point to the Peace River. Access occurred in early spring to late fall with a peak in activity in July and August. Of the participants who accessed the river from Peace Island Park, 10% went upstream passed the Site C dam site towards Hudson's Hope and Peace Canyon Dam. Another 30% traveled into the Pine River (LGL 2010).

Table 6 Number of participants by month and river access site, 2008-2009

Activity	All	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peace Island Park	3,263	3	0	0	85	136	705	959	935	386	40	13	1
Clayhurst	524	0	0	0	20	78	126	144	101	45	10	0	0
Alwin Holland Park	428	0	0	0	11	68	76	64	158	45	6	0	0
Lynx Creek RV Park	410	0	0	0	0	107	88	96	72	39	8	0	0
Lynx Creek Launch	352	2	3	0	21	29	88	112	43	52	2	0	0
Hudson's Hope Launch	171	0	0	2	32	39	13	64	14	6	1	0	0
Halfway River Bridge	147	5	0	0	0	15	13	32	58	6	18	0	0
Twidwell Bend	145	0	0	0	5	5	0	80	29	26	0	0	0
Sukunka Road	127	0	0	0	0	5	113	0	0	6	3	0	0
East Pine	90	0	0	0	0	5	13	32	14	26	0	0	0
Highway 29 bridge	85	0	0	0	4	24	38	16	0	0	3	0	0
Farrell Creek Mouth	6	0	1	0	0	5	0	0	0	0	0	0	0
Total	**5,748**	**10**	**4**	**2**	**178**	**516**	**1,273**	**1,599**	**1,424**	**637**	**91**	**13**	**1**
People interviewed	5,722	10	3	2	178	485	1,259	1,598	1,438	644	91	13	1

SOURCE:
LGL (2010)

5 REGIONAL TOURISM VISITOR LEVELS

5.1 Visitor Estimates

The estimated number of visitors and their spending in the North Peace in 2007 is presented in Table and Table , respectively. The estimates were made in a 2009 study commissioned by the North Peace Economic Development Commission with support by Tourism B.C. and the Northern Rockies Alaska Highway Visitors Association (Bass 2009). Fort St. John hosted 176,300 visitors in 2007, while another 47,000 visited other communities or rural areas in the North Peace, including Hudson's Hope and Taylor. Eighty-one percent of visitors stayed in commercial accommodations, with all but a handful of the remainder staying with friends and relatives. Roughly four in five of those staying in commercial accommodations opted for fixed roof facilities, including hotels, motels, B&Bs and vacation rentals. The other 20% used RV and camp sites.

The importance of business travel to the regional tourism economy was a highlight of the study. More than 40% of all visitors in 2007 had business as a primary trip purpose, versus 17.9% visiting friends and relatives and the remaining 40% primarily leisure visitors. The proportion of business travelers may actually be higher than estimated in the study if RV and camp users and those visiting friends and relatives were also conducting business while in the region.

Table 7 Estimate of visitors to Fort St. John and the North Peace, 2007

Type of Visitor	Fort St. John	Other North Peace	Total North Peace	% of Total
Leisure	46,300	2,800	49,100	22.0
Business	91,200	2,900	94,100	42.1
RV and Campground	15,800	23,000	38,800	17.4
Total Commercial Accommodations (Sub-total)	**153,300**	**28,700**	**182,000**	**81.5**
Visiting Friends and Relatives	21,900	18,000	39,900	17.9
Day Visitors	1,100	300	1,400	0.6
Overall Visitation (Grand Total)	**176,300**	**47,000**	**223,300**	**100.0**

SOURCE:
Bass (2009)

Table shows spending by major visitor segments in 2007 for Fort St. John and the North Peace region. Total visitor spending was estimated at $64 million in Fort St. John and $9.2 million in the North Peace for a cumulative total of $73.2 million. Business visitors accounted for 72.6% of this spending, a significant share of the total spending. This is a result of business visitors staying longer and having higher average daily expenditures than leisure travelers or day visitors or visitors who stay with friends and relatives.

Table 8 Estimate of visitor expenditures in Fort St. John and the North Peace, 2007

Type of Visitor	Fort St. John			Other North Peace			Total North Peace
	Length of Stay (days)	Per Visitor Trip Spending ($)	Total Spending ($M)	Length of Stay (days)	Per Visitor Trip Spending ($)	Total Spending ($M)	Total Spending ($M)
Leisure	1.3	140	8.4	1.6	120	3.0	11.5
Business	2.7	560	50.9	6.2	810	2.3	53.2
Visiting Friends and Relatives	4.0	210	4.6	4.0	210	3.8	8.4
Day Visitors	N/A	80	0.1	N/A	80	0.02	0.1
Annual Direct Expenditures (Sum)	N/A	N/A	64.0	N/A	N/A	9.2	73.2

NOTES:
Differences in totals are due to rounding
N/A - Not applicable

SOURCE:
Bass (2009)

5.2 Visitor Centre Attendance

The three municipalities in the LAA maintain Tourism B.C. approved visitor centres which serve travelers through professional visitor counseling, travel information and literature, community information, itinerary planning and, in some cases, accommodation reservations. All visitor centres keep track of visitor attendance as a condition of membership in Tourism B.C.'s Visitor Centres Network.

Visitor centre attendance between 2002 and 2010 is shown in Figure 1. Combined attendance was up approximately 8% during this period. Fort St. John and Taylor showed increases of around 40%, while attendance in Hudson's Hope declined almost by half. Visitor centre attendance in the North Peace is in contrast to visitation at South Peace visitor centres (Dawson Creek, Pouce Coupe, Chetwynd and Tumbler Ridge) which has declined sharply over the past 10 years.

The reasons for the divergent trends in the north versus the south may have to do with location, parking, signage, ease of access, building condition, weather conditions, service levels and hours of operation, among others.

The seasonality of visitor centre attendance is illustrated in Figure 2. Over 90% of visitors use the centres in the May to September period. Attendance is much lower in the off-season when touring traffic on the Alaska Highway and visits to friends and family drop off. The attendance totals in Figure 2 are skewed by the fact that Taylor and Hudson's Hope centres are not open before or after the peak summer season, but attendance at the year-round centres in the region (Fort St. John, Dawson Creek, Chetwynd and Tumbler Ridge) show a similar seasonal pattern.

Attendances at the Peace Canyon Dam and W.A.C. Bennett Dam visitor centres are shown in Table . Attendance levels of over 20,000 visitors annually were recorded regularly in the late 1990s but dropped markedly in 2002 after the 9/11 terrorist attacks, when dam tours were cancelled. Attendance has recovered since 2004 but remains well below pre-2001 levels.

Table 9 WAC Bennett & Peace Canyon visitor centre attendance, 2001-2011

Visitor Centre	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
WAC	14,359	9,978	14,561	8,800	12,300	12,508	12,805	11,091	10,509	12,803	13,630
PCN	3,000	3,000	3,000	3,000	3,000	3,000	3,652	2,413	3,438	3,103	3,088
Total	**17,359**	**12,978**	**17,561**	**11,800**	**15,600**	**15,508**	**16,457**	**13,504**	**13,947**	**15,906**	**16,718**

NOTES:
WAC – W.A.C. Bennett Dam Visitor Centre
PCN – Peace Canyon Dam Visitor Centre
SOURCE:
BC Hydro (2011)

5.3 Visitor Estimates for Peace River

The number and origin of tourists using the Peace River are not known, but the Peace River creel and recreation study has provided some preliminary baseline data. As indicated in Table , during the 2008 field season, 15% of all people interviewed lived outside the RAA, which would qualify them as tourists.

Table 10 Residency of respondents to Peace River creel and recreational use survey interviews, by month

Residency	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Number of Users[a]	7	0	0	136	410	1128	1454	1314	560	73	0	0	5096
% Led by Guide	0	0	0	0	0	2	2	0	0	0	0	0	0.98
Residence													
% Peace Area	100	0	0	77	90	78	87	89	74	95	0	0	84
% Rest of B.C.	0	0	0	13	6	7	5	3	16	3	0	0	6
% Rest of Canada	0	0	0	10	1	12	7	7	10	3	0	0	8
% US	0	0	0	0	2	2	1	0	1	0	0	0	1
% Other	0	0	0	0	1	0	0	1	0	0	0	0	0

NOTES:
a addition error on row is from source data
SOURCE: LGL (2010)

5.4 Visitor Characteristics

According to the most recent travel survey in Northeast B.C., as shown in Table , about one half of all overnight travelers to the region are Canadians and 45% Americans (NRAHTA 2005). B.C. and Alberta residents account for 70% of Canadian travelers while Alaska, California, Washington, Michigan, Florida and Texas are the primary sources of US travelers. Germany and Switzerland account for most of the European

visitors. This profile has changed little since the last comprehensive B.C. visitor exit survey in 1996 (Tourism BC 1998).

Table 11 Origin of travellers to Northeast B.C., 2005

Origin	% of Travelers
Canada	49
B.C.	20
Alberta	14
Yukon	2
Ontario	7
Other Canada	7
United States	45
Alaska	10
Pacific	8
Mid-West	9
South	10
New England	3
Overseas	6
Europe	5
Asia Pacific	1
Other	<1

NOTE:
May not sum to 100% due to rounding
SOURCE:
NRAHTA (2005)

Travelers to Northeast B.C. are different in terms of age and travel party composition from other travelers in B.C. More than half were over 55 years of age; a quarter were 65 and older. Most people were travelling in parties of two or four, and less than 15% were travelling with children (NRAHTA 2005). The preponderance of older travelers, including a substantial portion of senior citizens, is attributable to the high proportion of Alaska-bound US and European residents.

Most independent travelers to or within Northeast B.C. were on a leisure trip (Table 12). Another 9% were visiting friends and relatives and 5% were on a business trip. Visiting friends and relatives as a primary trip purpose was higher among Canadians, compared to US or overseas travelers. Most of the US travelers in the Other category were moving to or from Alaska.

Table 12 Trip purpose of travellers to Northeast B.C., 2005

Traveler Origin and Age	Percentage			
	Leisure	Visit friends & relatives	Business	Other
Overall	83	9	5	3
Origin				
Canada	82	11	5	1
United States	82	6	6	5
Overseas	96	3	1	<1
Age				
Under 35 years	75	9	6	9
35 to 54 years	81	9	7	3
55 to 64 years	86	8	6	1
65 years and older	86	9	3	2

NOTE:
May not sum to 100% due to rounding
SOURCE:
NRAHTA (2005)

Only 15% of travelers to Northeast B.C. said the region was their primary destination (Table). Close to one-half of all travelers were going to or coming from Alaska. Most of the remaining travelers were destined either for the Yukon or were on a circle tour with no specific destination (nearly 15% each). The destination of choice among Americans and Europeans was Alaska, while older travelers also preferred Alaska. Travelers who were visiting friends and relatives or on business were more likely to be destined for Northeast B.C., compared to leisure travelers.

The NRAHTA traveler study confirms what is generally seen as the dual nature of the Alaska Highway visitor market—a high proportion of US visitors to and from Alaska who use the Northeast simply as a travel corridor, and a core market of regional visitors from B.C. and Alberta.

Table 13 Main destination of travellers to Northeast B.C., 2005

Traveller Origin, Age and Purpose	Percentage						
	Alaska	Northeast B.C.	Yukon Circle Tour		Other B.C.	Alberta	Other
Overall	46	15	13	13	3	2	8
Origin							
Canada	20	27	24	17	5	3	4
United States	76	2	1	6	0	1	14
Overseas	40	8	11	31	6	1	3
Age							
Under 35 years	40	18	13	14	3	2	9
35 to 54 years	39	18	14	13	4	3	10
55 to 64 years	51	12	14	12	2	2	7

Traveller Origin, Age and Purpose	Percentage						
	Alaska	Northeast B.C.	Yukon Circle Tour		Other B.C.	Alberta	Other
65 years and older	53	11	11	14	3	1	7
Trip purpose							
Leisure	49	11	13	14	3	2	7
Visit friends & relatives	21	34	15	8	6	4	11
Business	35	30	9	8	1	2	15

NOTE:
May not sum to 100% due to rounding
SOURCE:
NRAHTA (2005)

The natural environment is an important travel motivator for visitors to the Northeast (Figure 3). When travelers were asked to rate the importance of specific statements in their decision to take their trip to or travel north, over 60% stated that the key motivators were the desire to see wild places and to have new experiences. An estimated 70% of travelers indicated that opportunities to enjoy outdoor activities or to travel in safe places were also important or very important to their decision to take their trip. Historical or cultural motivators (e.g., history of the Alaska Highway, local way of life, and/or First Nations culture) had lower importance ratings.

Table shows participation rates for selected activity by visitor origin. Participation rates for many activities were relatively consistent among the different visitor origins. Visiting a park, walking, hiking or cycling, and going shopping were all within plus or minus 10 points of the overall participation rate. Considerable variation emerged among the other activities, although the longer- stay, Alaska-bound travelers tended to have higher rates across the board. Travelers destined for Northeast B.C. had lower participation rates for most activities, except walking, hiking and cycling. Close to one-third of all travelers, and one half of overseas visitors, participated in industrial tourism, that is, to local mills, BC Hydro visitor centres or other guided tours.

Table 14 Participation rates for selected activities by travellers to Northeast B.C. (%), 2005

Activities	Overall	Canada	US	Other
Visiting a park (state, provincial or national)	89%	86%	93%	89%
Visiting a museum, heritage or historic site	85%	87%	81%	87%
Walking, hiking or cycling	77%	81%	72%	80%
Go shopping	72%	72%	74%	68%
Unguided outdoor activities	61%	58%	63%	72%
Visiting an art gallery or a studio	47%	52%	42%	53%
Take a day cruise or a boat trip	47%	37%	57%	58%
Attend an aboriginal or native cultural attraction or event	40%	37%	42%	53%
Visit an industrial attraction (BC Hydro Dam,	31%	35%	24%	49%

Activities	Overall	Canada	US	Other
forestry mill, etc.)				
Attend a fair, festival or exhibition	31%	26%	37%	33%
Guided outdoor activities	24%	18%	30%	29%
Visit a family attraction (mini golf, zoo, etc.)	21%	18%	22%	32%
Flight seeing (in an airplane or helicopter)	14%	14%	14%	20%
Participate in or attend a sporting event other than golf	10%	9%	10%	9%
Participate in or attend a golfing event	7%	7%	5%	8%

SOURCE:
NRAHTA (2005)

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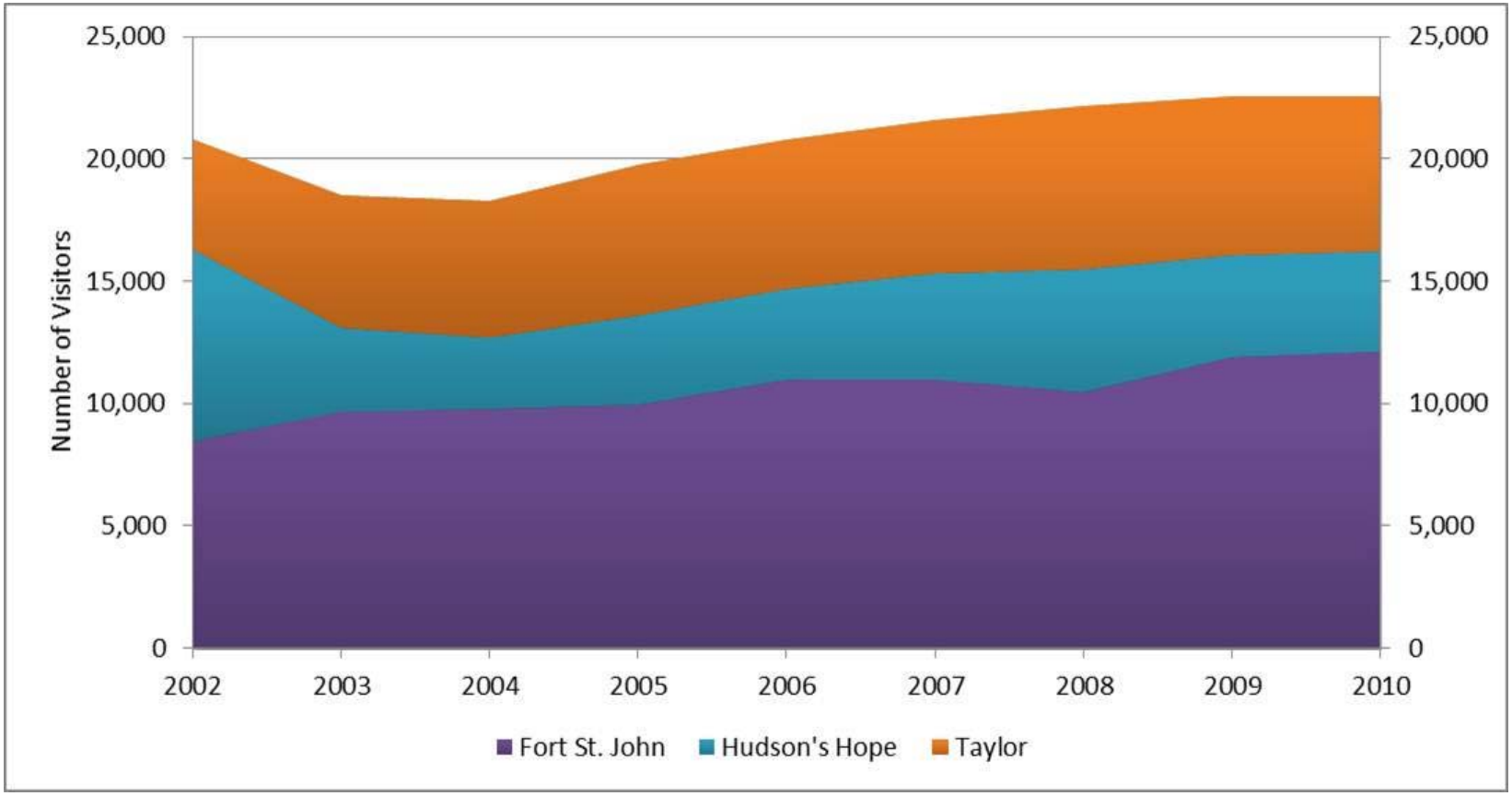
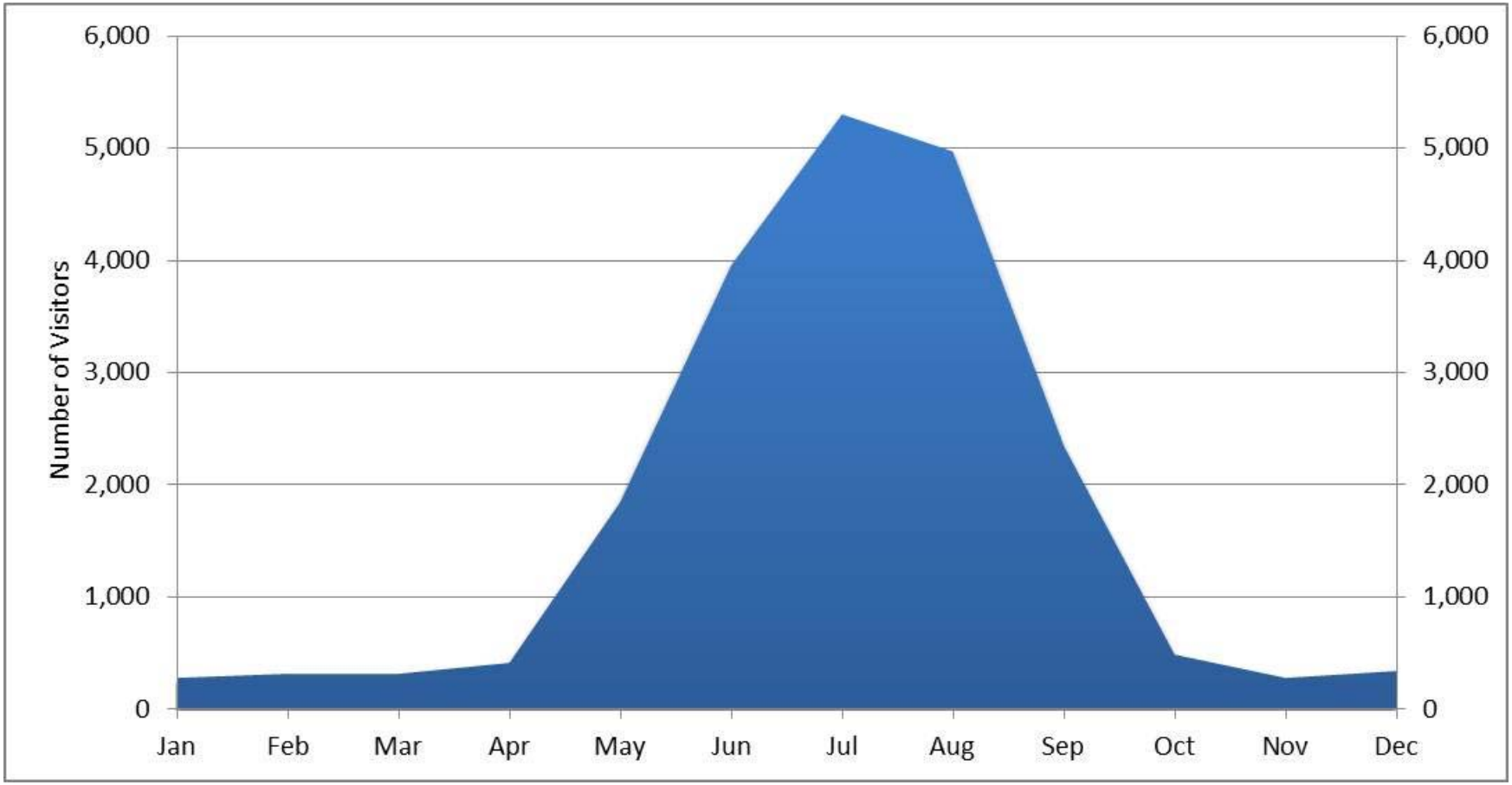


SOURCE:
TBC (2011)

Figure 1 Fort St. John, Hudson's Hope and Taylor Visitor Centre attendance, 2002-2010

Construction of the Site C Clean Energy Project is subject to required regulatory approvals including environmental certification



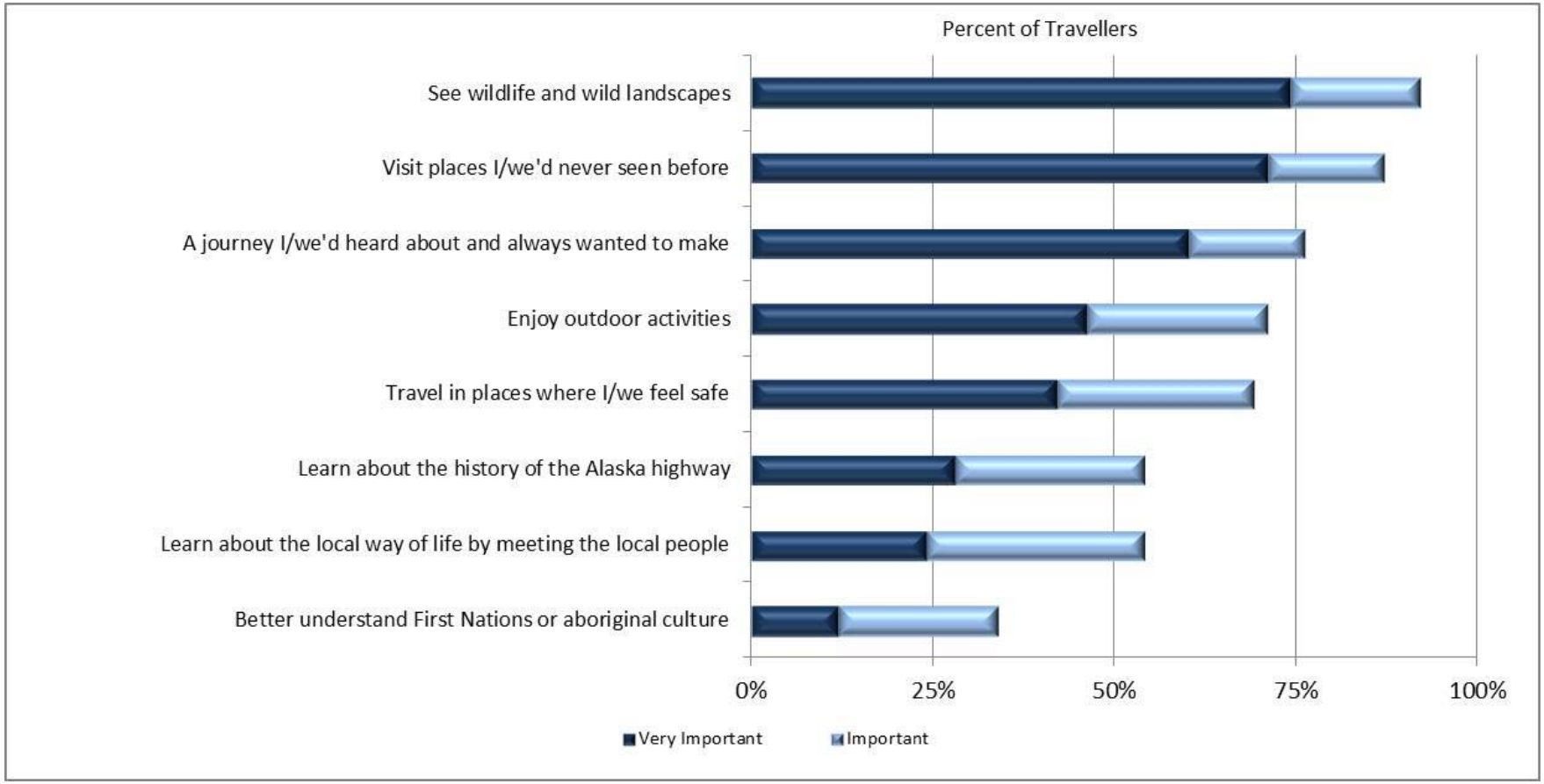
SOURCE:
TBC (2011)

BC hydro

SITE C CLEAN ENERGY PROJECT

Figure 2 Peace River Regional District average monthly visitor centre attendance, 2002-2010

Construction of the Site C Clean Energy Project is subject to required regulatory approvals including environmental certification



SOURCE:
NRAHTA (2005)

Figure 3 Importance of motivators for taking a trip to northeast BC

Construction of the Site C Clean Energy Project is subject to required regulatory approvals including environmental certification

BC Hydro Memo: Navigational Clearances for Highway 29 Bridge Crossings

SITE C CLEAN ENERGY PROJECT

To:	Siobhan Jackson Socio-Economic and Heritage Manager Site C Clean Energy Project	5 January 2013
From:	Alex Izett, P.Eng. Owner's Engineer, Road and Bridge Infrastructure Site C Clean Energy Project	
CC:	Don Wharf, Dave Hunter	
Subject:	**Site C Clean Energy Project: Navigational Clearances for Highway 29 Bridge Crossings**	

Issue: Navigational clearance envelopes under four proposed Highway 29 Bridge crossings.

Purpose

- In order to advance the preliminary and definition design options for Highway 29, the BC Hydro Integrated Engineering team developed an approach to determine minimum vessel clearance envelopes at Lynx Creek, Farrell Creek, Halfway River, Cache Creek, and possibly Dry Creek.

- The Site C Clean Energy Project team requests Transport Canada consideration of and, as appropriate, feedback on or endorsement of the proposed navigational clearances for Highway 29 Bridge Crossings as a component of the Environmental Impact Statement (EIS) submission, including the design basis and assumptions, as described in this memorandum.

- This memorandum is largely similar to that dated 11 October 2011, issued to Transport Canada, but updates certain points to reflect the completion of Definition Design.

Background

- The Site C reservoir and associated realignment of Highway 29 will result in construction of up to five bridge crossings.

- Preferred alignment and corridor options at each of the locations were identified at the conclusion of Definition Design in mid-2012, giving consideration to financial, safety, social, and environmental aspects. Options are shown on figures 26.1 – 26.4 included in Volume 3 Section 26 Navigation, of the EIS.

- Due to the broad nature of commercial and recreational navigation and the varied types of vessels used to navigate (canoes to cruisers and larger) it was difficult to confirm a set clearance envelope standard for all situations in all of Canada.

- Research of other jurisdictions and organizations such as Coast Guard Canada, The United States Coast Guard and The United States Army Corps of Engineers did not provide any definitive standards with respect to clearance envelopes and recreational boating.

Approach

- Reference information was obtained from The Oregon State Marine Board Policy-Procedures for Minimum Channel Clearance Guidelines for Recreational Boating.

- Through a rationalized approach, the Site C Integrated Engineering team established navigation clearance envelopes on the basis of providing safe navigation for recreational boaters and small commercial boats reasonably expected to be navigating the reservoir or the tributaries.

- Consideration was given to the bathymetric and topographic characteristics at each crossing location obtained from LIDAR information and BC Hydro modeling in determining the type of boats that could reasonably be expected to be used in water conditions at the greater of the 100 year flood event (Q_{100}) or reservoir fully supply level combined with Peace Canyon Generating Station controlled discharge of 5,278 m^3s.

- Input was provided by individuals experienced with the *Navigable Waters Protection Act*, boaters and information obtained from other sources.

Recommendation

- Boat classifications are from the Oregon State Marine Board Policy-Procedures Minimum Channel Clearance Guidelines for Recreational Boating and "are the most likely vessels used on the generic class of waterway. Actual use may differ according to local regulations or conditions that limit use by certain types of boats." Assuming flatwater conditions, propeller boats of 27 ft to 40 ft, which require a 16 ft (4.88 m) vertical clearance, could conceivably be on the reservoir. With 8.0 m of bridge clearance, and navigation speeds up to 16 km/h, these types of boats most likely to be on the reservoir would be accommodated, as well as houseboats up to 75 ft (clearance 7.27 m) and sailboats up to 14 ft in length.

- The clearance envelopes listed in Table 1 (Column J) are proposed as a minimum for navigation purposes for the bridge options at Lynx Creek, Farrell Creek, Halfway River and Cache Creek. In general a minimum clearance envelope of 8 m x 25 m is provided, however other design factors may lead to some bridges having clearances greater than the minimum. These clearance envelopes are subject to change based on on-going discussions with the British Columbia Ministry of Transportation and Infrastructure.

- At Dry Creek the reservoir will create a small area of inundation approximately 100 m x200 m behind the highway within what is presently a predominantly dry creek bed. The suitability of a bridge at this location (instead of a culvert as presently exists) will be reviewed in preliminary design with the British Columbia Ministry of Transportation

and Infrastructure, with consideration given to the requirement for navigation past the structure.

- While there may be some recreational value for smaller sail craft within the relatively confined areas of the upstream tributary arms, the need to provide access sailboats > 14 ft is not anticipated.

- While final locations for the bridges have not yet been determined, at least small embayments are created downstream of all bridge location options off the main reservoir. These will provide for boaters seeking refuge from the main reservoir without needing to pass under the bridge.

- River/creek classifications (Table 1 columns B and C) based on flow velocities which are to be confirmed will be provided when they come available for the existing rivers/creeks at bridge crossings, as well as for the river/creek portions which will be upstream of the embayments. These classifications will provide confirmation of the type of river/creek-going vessels which would need to be accommodated, however, it is not anticipated that the type of vessel expected to be navigating the embayment will be affected.

- Columns D, E, and F in Table 1 are provided as indicators of the sizes of the predominantly still-water embayments upstream of the bridges. These water bodies may be of interest to lake-going boats which may be larger than river/creek-going vessels.

- Column I in Table 1 notes the lengths of causeways that would be constructed on the approaches to the proposed bridges. These causeways would act as fingers of land that that would stretch into the embayments, and behind which would be protected bodies of water.

- Figure 1 includes pictures of types of vessels under consideration. Four houseboat photos are included as Figure 2, three of which are examples of large houseboats that could be accommodated under an 8 m clearance.

Next Steps

- BC Hydro will submit the Site C Clean Energy Project Environmental Impact Statement (EIS), with the bridge design and vessel clearances described in this memorandum included therein.

- BC Hydro will consider input received related to vessel clearances during the EIS review in preliminary design of the crossings.

- BC Hydro will seek Transport Canada's feedback on or approval of the Highway 29 Bridge clearance envelope requirements outlined in Table 1, in support of their review of the EIS or in support of any relevant regulatory authorizations under the *Navigable Waters Protection Act*.

SITE C CLEAN ENERGY PROJECT

Table 1 – Summary of Estimated Clearance Envelope Requirements

A	B	C	D	E	F	G	H	I	J	K
Bridge Site	**Existing River/Creek Classification at Bridge[1]**	**River/Creek Classification Upstream of Inundation[2]**	**Approx. Area of Inundation u/s of Bridge[3] (ha)**	**Approx. Width of Inundation at Bridge[3] (m)**	**Approx. Length of Inundation u/s of Bridge[3] (m)**	**Largest Motorized Boat Expected Under Bridge[4]**	**Largest Non-Motorized Boat Expected Under Bridge[4]**	**Bridge (B) and Causeway Approach (c) Lengths from Definition Design[5]**	**Estimated Required Navigation Clearance Envelope (at speed<16k/h)**	**Greater of Q_{100} Elevation[6] (Preliminary) or Maximum Normal Reservoir Level combined with Peace Canyon 5,278 m^3s discharge**
Lynx Creek			13	325	450	26 ft. propeller boat	14 ft. sailboat	B: 160 m C: 300 m	8 m x 25 m	462.1 m
Farrell Creek			56	250	2,300	32 ft. propeller boat	14 ft. sailboat	B: 170 m C: 180 m	8 m x 25 m	461.9 m
Halfway River			790	925	14,100	32 ft. propeller boat	14 ft. sailboat	B: 305 m C: 690 m	8 m x 25 m	461.8 m
Cache Creek			138	470	3,800	32 ft. propeller boat	14 ft. sailboat	B: 200 m C: 250 m	8 m x 25 m	461.8 m

Notes:

1. To be confirmed but it is not anticipated that river or creek classification will affect the type of boat reasonably expected to be navigating the waterbody at the bridge site.
2. To be confirmed but it is not anticipated that river or creek classification upstream of inundation will affect the type of boat reasonably expected to be navigating the river or creek.
3. Areas and distances are estimated from the Maximum Normal Reservoir Level, and are subject to change based on on-going discussions with the British Columbia Ministry of Transportation and Infrastructure regarding alignment and bridge options.
4. Boat classifications are from the Oregon State Marine Board Policy-Procedures Minimum Channel Clearance Guidelines for Recreational Boating and "*are the most likely vessels used on the generic class of waterway. Actual use may differ according to local regulations or conditions that limit use by certain types of boats*." Assuming flatwater, according to Oregon, propeller boats of 27' (8.23 m) to 40' (12.2 m) which require a 16' (4.88 m) clearance could conceivably be on the water. With 8.0 m of clearance at navigation speeds up to 16 km/h we should be able to accommodate the most likely types of boats to be expected on the Peace River reservoir including 75' (22.87 m) long houseboats with bridge clearance of 23'10" (7.27 m) with the exception of sailboats larger than 14' (4.27 m).
5. Lengths are subject to change throughout subsequent design stages. Length of causeway reflects the approximate length of earth fill as measured at full supply level along centreline of the proposed highway alignment.
6. Preliminary elevations provided by Klohn Crippen Berger. Revised elevations represent combination of Maximum Normal Reservoir Level (461.8 m) and 5,278 m^3s discharge from Peace Canyon Dam governing water level rather than Q_{100} or Q_{200} tributary flow at this stage.

Figure 1. Examples of types of boats under consideration.

26’ (7.93 m) Cruiser

30’ (9.15 m) Cruiser

20’ (6.1 m) Cruiser

20’ (6.1m) Water Taxi / Emergency Transport

14’ (4.27 m) Sailboat

14’ (4.27 m) Runabout

Figure 2. Examples of houseboats on Okanagan Lake

75’ (22.87 m) long Houseboat with 23’10” (7.27 m) bridge clearance

94’ (28.66m) long Houseboat with a bridge clearance of over 30’ (9.15 m)

66’ (20.12 m) long Houseboat with 20’6” (6.25 m) bridge clearance

55’6” (16.92 m) long Houseboat with 20’6” (6.25 m) bridge clearance