

BHP

BHP Canada Exploration Drilling Project (2019-2028)

May 9, 2019





BHP CANADA EXPLORATION DRILLING PROJECT (2019-2028)

Project Description Summary

Pursuant to the Requirements of the Canadian Environmental Assessment Act, 2012

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List of Acronyms and Abbreviations

<i>Accord Acts</i>	<i>Canada-Newfoundland and Labrador Atlantic Accord Implementation Act and the Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act</i>
ADW	Approval to Drill a Well
BHP	Dual listed company: BHP Billiton Limited and BHP Billiton Plc (“the Operator”)
BOP	Blow-out Preventer
CAPP	Canadian Association of Petroleum Producers
CEA Agency	Canadian Environmental Assessment Agency
<i>CEAA 2012</i>	<i>Canadian Environmental Assessment Act, 2012</i>
CIS	Canadian ice service
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board (“the Board”)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
Cubic Inch	1 cubic inch = 16.39 cubic centimetres
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EBSA	Ecologically and Biologically Significant Area
ECCE	Environment and Climate Change Canada
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EL	Exploration Licence
EMCP	ExxonMobil Canada Properties
FCA	Fisheries closure area
FFAW-Unifor	Fisheries, Food and Allied Workers
FSC	Food, social, or ceremonial
GHG	Greenhouse Gas
ha	Hectare (1 ha = 10,000 m ²)
IBA	Important Bird Areas
in	Inch (1 in = 2.54 cm)
km	Kilometre
m	Metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine protected area
MTD	Mass transport deposits
NAFO	Northwest Atlantic Fisheries Organization
NGL	Natural gas liquids
NL ESA	<i>Newfoundland and Labrador Endangered Species Act</i>

NL	Newfoundland and Labrador
nm	nautical mile
NOIA	Newfoundland & Labrador Oil & Gas Industries Association
OA	Operations Authorization
OCSG	Offshore Chemical Selection Guidelines
OL	Operating Licence
OWTG	Offshore Waste Treatment Guidelines
RMA	Representative Marine Area
ROV	Remotely Operated Vehicle
s	Seconds
SARA	Canadian Species at Risk Act
SBM	Synthetic-based Drilling Mud
SEA	Strategic Environmental Assessment
t	Tonne (1 tonne = 1,000,000 g)
UNGA	United Nations General Assembly
UTM	Universal Transverse Mercator
UXO	Unexploded Ordinance
VC	Valued Component
VME	Vulnerable marine ecosystem
VSP	Vertical Seismic Profile
WBM	Water-based Drilling Mud

1.0 Introduction

Project Name: BHP Canada Exploration Drilling Project (2019-2028)

BHP is submitting this Project Description under the CEAA 2012 Regulations for Environmental Assessments. However BHP is aware of the planned Regional Assessment of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador pursuant to CEAA 2012 which is intended to eliminate the need for a specific Project Description which will streamline the process. BHP is fully supportive of the Regional Assessment and is very willing to consider transitioning our application to fall under the Regional Assessment once approved.

BHP is planning to conduct petroleum exploration drilling and related activities in the Eastern Newfoundland offshore region of the Canada-Newfoundland and Labrador Offshore Area over the period of 2019-2028 (the maximum nine-year period which includes a three-year extension option will not extend beyond 2028), hereinafter, also referred to as the Project.

The Project may be subject to a review pursuant to the requirements of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), as it may constitute a “designated project” under the associated Regulations Designating Physical Activities. This Project Description Summary is submitted in association with the Project Description document to initiate determination of whether an environmental assessment (EA) is required. Further Project details are provided in the associated Project Description document.

1.1 Overview of the Project

In Eastern Canada, BHP’s offshore interests include two exploration licences (ELs) in the Orphan Basin Area (EL 1157 and EL 1158) that were issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB, or the Board) effective January 15, 2019. Currently, BHP is the sole interest holder in EL 1157 and EL 1158 (Table 1.1).

BHP proposes an exploration drilling program in EL 1157 and EL 1158 to assess the potential presence of hydrocarbons in prospective oil and gas targets. The Project will involve drilling up to 20 wells in total (with between one and 10 wells on either, or both, ELs). The specific number, location and type (exploration or appraisal) of these wells will be determined as Project planning activities continue, based on available geophysical survey data, information from previously drilled wells and other applicable information. The Project may also include associated vertical seismic profiling (VSP) surveys, well testing and eventual decommissioning and abandonment or suspension activities, and associated supply and service activities required to support drilling activities. Any Project-related onshore support activities are expected to take place at existing onshore supply facilities that are owned and operated by third-party contractors, have been previously approved under applicable regulatory processes, and which provide services to multiple offshore operators. Drilling operations could begin as early as 2021 pending receipt of required regulatory and corporate approvals, availability of suitable drilling units, identification of appropriate drilling targets, and other technical, logistical and commercial considerations.

Offshore exploratory wells in the first drilling program on either of the ELs that comprise the proposed Project Area are a designated project and require the submission of a Project Description under CEAA 2012.

Table 1.1: Licence Size and Interests

Licence Number	Size (ha)	Interest Holder (percent ownership)
EL 1157	269,799	BHP (100%)
EL 1158	273,579	BHP (100%)

1.2 Proponent Information

BHP (hereinafter, also referred to as the Operator) is a world-leading resources company in minerals and oil and gas, with operations primarily in the Americas and Australia. Global headquarters for BHP are in Melbourne, Australia with offices around the globe.

BHP's Petroleum unit offers crude oil, hydrocarbons, and liquefied natural gas exploration and production services. BHP has a unique perspective on the extraordinary potential of natural resources to provide the essential building blocks of progress. BHP's purpose is to create long-term shareholder value through the discovery, acquisition, development and marketing of natural resources. Our strategy is to own and operate large, long-life, low-cost, expandable, upstream assets diversified by commodity, geography and market.

BHP's Petroleum unit comprises conventional oil and gas operations, and includes exploration, development and production activities. BHP has a high-quality resource base concentrated in the United States and Australia with core production operations consisting of conventional assets located in the US Gulf of Mexico, Australia and Trinidad and Tobago. BHP also has interests in offshore oil and gas assets managed by other operators. These are located in Africa as well as the Gulf of Mexico and Australia. BHP's recent exploration activities also occur in the Gulf of Mexico, Trinidad and Tobago.

Sustainability is one of the core values set out in the BHP Charter. To BHP, sustainability means putting health and safety first, being environmentally responsible and supporting communities. The wellbeing of BHP's people, the community, and the environment is considered in everything that it does. BHP's highest priority is the safety of all those impacted by its operations, including BHP employees, contractors, and the communities in which it operates. BHP achieves nothing if it does not do it safely. Recognizing that BHP's operations can impact the health of its people, BHP sets clear requirements to manage and protect the health and wellbeing of its workforce, now and into the future. BHP looks to create a culture of care and trusted relationships with its people through strong leadership and open communication. BHP aims to minimize the environmental impacts from its activities and work in partnership with others to support environmental resilience. BHP seeks to build good relationships with its stakeholders based on mutual respect, open and ongoing communications and transparency over its activities. BHP supports the development of diversified and resilient local economies that contribute to improved quality of life beyond the life of BHP's operations.

BHP intends to establish a local office in St. John's in 2019. The principal BHP contacts concerning this Project and its EA review are as follows:

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1.3 Regulatory Requirements and Processes

The proposed Project will require a number of approvals and authorizations under applicable regulatory processes. No federal financial support will be sought for the Project. It is expected that the Project will be subject to EA review pursuant to the requirements of *CEAA 2012* and associated Regulations. The *CEAA 2012* associated Regulations Designating Physical Activities identify physical activities that constitute "designated projects" that may require a federal EA including the "*The drilling, testing, and abandonment of offshore exploratory wells in the first drilling program in an area set out in one or more exploration licences issued in accordance with the Canada–Newfoundland and Labrador Atlantic Accord Implementation Act or the Canada–Nova Scotia Offshore Petroleum Resources Accord Implementation Act.*"

In the NL Offshore Area, petroleum exploration and development activities are regulated by the C-NLOPB. It is anticipated that the C-NLOPB will be engaged in any offshore EA under *CEAA 2012*. In addition, as part of the required authorizations, the C-NLOPB also requires project-specific EAs in relation to certain types of petroleum activities in the Canada-NL Offshore Area, in addition to EA requirements under *CEAA 2012*. Any Environmental Impact Statements (EISs) completed under *CEAA 2012* will also address the C-NLOPB's EA requirements.

The C-NLOPB's responsibilities also include issuing regulatory authorizations and approvals pertaining to offshore oil and gas exploration and development projects and activities in the Canada-NL Offshore Area. For example, exploration well drilling requires project-specific regulatory approvals and authorizations. During the approval process, the proponent must provide detailed information on planned exploration activities and demonstrate the ability to undertake the work in keeping with applicable requirements and standards for safety and environmental protection. Exploration drilling activities may include obtaining various regulatory approvals including an Operating Licence (OL) and Operations Authorization (OA), and Approvals to Drill a Well (ADW).

The proposed Project will occur in the marine environment more than 300 km off eastern Newfoundland and will not include development of any new, or BHP-owned or operated, on-land or near shore assets. Thus, it is not anticipated that the Project will encompass any provincial environmental regulatory interests. It is not expected that the NL *Environmental Protection Act* (Part X) will apply to the EA review or that approval will be required under other provincial or municipal permits or authorizations.

Various other federal and provincial government departments and agencies may, pursuant to their legislation and mandates, also have regulatory responsibilities, information, advice and other interests regarding the proposed Project and its environmental setting and potential effects. Furthermore, there are various legislation and associated regulations that are or may be relevant to the Project and its EA include the:

- *Accord Acts* and associated *Regulations* and *Guidelines* (as discussed above);
- *Fisheries Act*;
- *Canadian Environmental Protection Act*;
- *Oceans Act*;
- *Navigation Protection Act*;
- *Canada Shipping Act*;
- *Migratory Birds Convention Act*;
- *Species at Risk Act* (Canada) and
- *Endangered Species Act* (NL).

In planning and conducting its oil and gas exploration activities, BHP will comply with all relevant provincial and federal legislation, regulations and guidelines, as well as applicable international conventions and standards. BHP also has established its own comprehensive environmental policies, guidance and procedures for planning and conducting oil and gas exploration and development activities, and requires its contractors to adhere to these, as applicable.

2.0 Project Description

The Project is located in offshore eastern Newfoundland in the Orphan Basin area within the recently awarded EL 1157 and EL 1158, of which BHP is currently the sole shareholder and operator (Table 2.1 and 2.2). The Project Area (Figure 2.1) covers approximately 1,577,458 km², and the western boundary is more than 300 km east of St. John's NL, Canada. Water depths within EL 1157 and EL1158 range between 1,175 to 2,575 m. Within these ELs, BHP may conduct exploration activities between 2019 and 2028. Current Project plans involve drilling a maximum of 20 exploration or appraisal wells (i.e., between one and ten wells in either, or both, ELs). Specific wellsite numbers, types and locations are being determined as Project planning activities continue. For the purposes of this Project Description, the Project Area also includes a 20 km buffer area surrounding the licence areas to (conservatively) accommodate the location and

extent of supporting ancillary activities that may extend beyond the immediate boundaries of the ELs. These activities may include temporary presence and movement of the drilling rig(s), support vessels, and aircraft during mobilization and demobilization, as well as any required non-drilling activities (such as any planned walk-away VSP, see Section 2.2.2) that could conceivably extend outside the ELs. All drilling operations carried out as part of the scope of this Project will be conducted within the defined boundaries of the ELs.

The location and spatial extent of a Study Area for any required EIS for the BHP Project will be determined as part of the planning and design phase of that assessment. The Study Area will be defined based on consideration of the nature and extent of the various environmental components that may be affected by the Project and upon which the EIS is focused, as well as the potential geographic zone of influence of Project components and activities (both planned and potential accidental events) and their environmental interactions.

Table 2.1: Summary of BHP Exploration Licences off Eastern Newfoundland

Exploration License	Approximate Distance from St. John's NL (km)	Licence Area (ha)	Approximate Water Depth (m)	
			Max	Min
EL 1157	366	269,799	2,575	2,150
EL 1158	324	273,579	2,265	1,175

Table 2.2: Project Area Corner Point Coordinates

ID	Longitude	Latitude	Easting	Northing
A	-47.0133	49.2067	790352	5458086
B	-47.0873	48.2562	790397	5352179
C	-47.4209	48.2672	765583	5352187
D	-47.4418	47.9651	765589	5318554
E	-48.8121	48.0014	663202	5318774
F	-48.7729	48.9048	663202	5419259
G	-48.3778	48.8965	692179	5419259
H	-48.3594	49.2454	692179	5458086
Note: Coordinates shown in NAD83 UTM Zone 22				

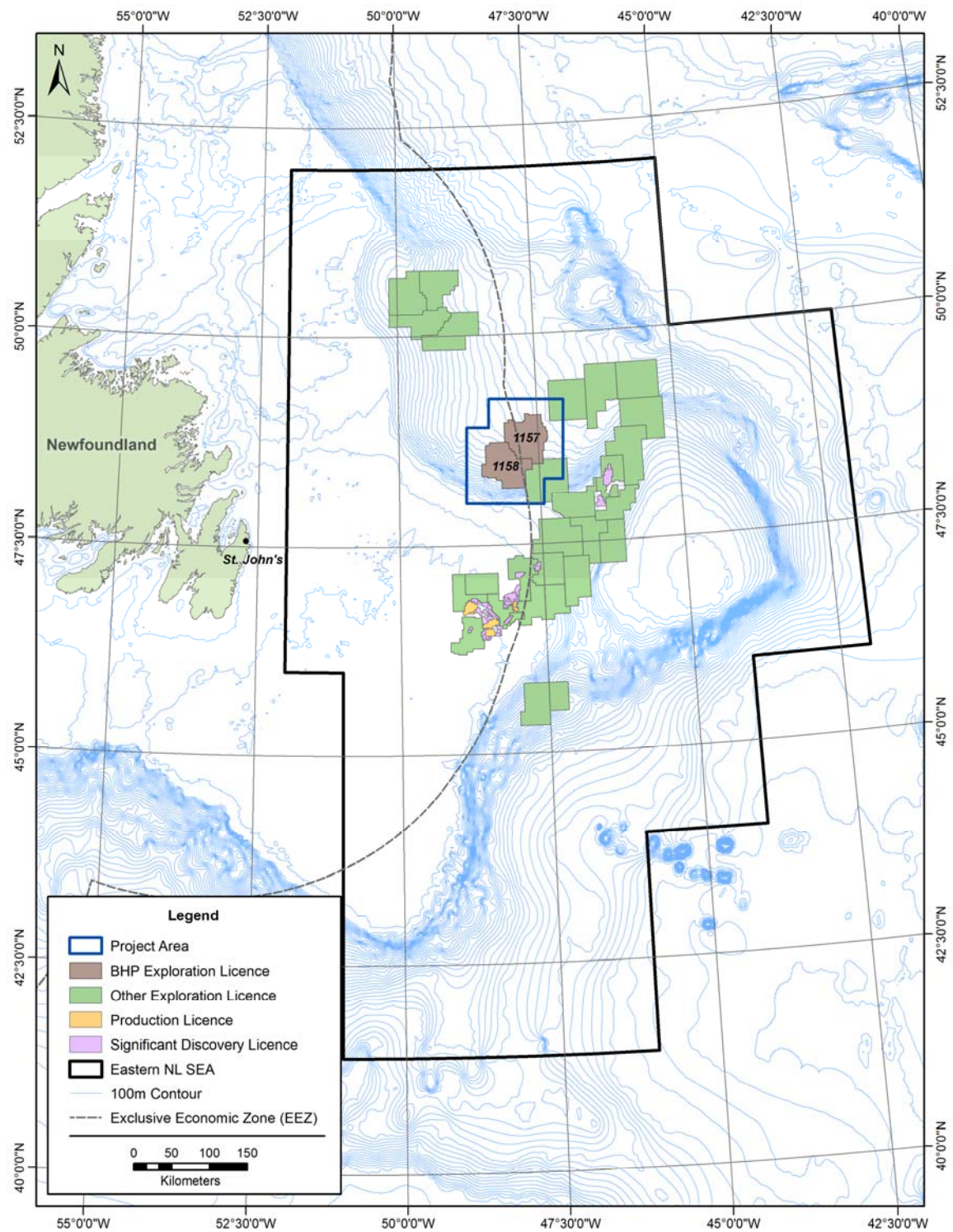


Figure 2.1: Exploration Licences and Associated Project Area

2.1 Schedule

BHP proposes to commence exploration drilling with an initial well in 2021, pending applicable regulatory and corporate approvals, the identification of suitable drilling targets and other technical, logistical, and commercial considerations. Upon completion of these first well(s) and based on results, additional wellsite locations may be identified. It is currently anticipated that up to ten wells (exploration and possibly appraisal) may be drilled in each of the ELs, for a total of up to 20 wells being drilled during the term of the ELs (2019-2028). Exploration licenses issued by the C-NLOPB have a maximum nine-year term (consisting of two consecutive periods), when the interest owner is required to drill or spud and diligently pursue one exploratory well on or before the expiry date of Period I as a condition of obtaining tenure to Period II. Period I is six (6) years commencing 15 January 2019 and Period II shall immediately follow Period I with an expiry date of 15 January 2028.

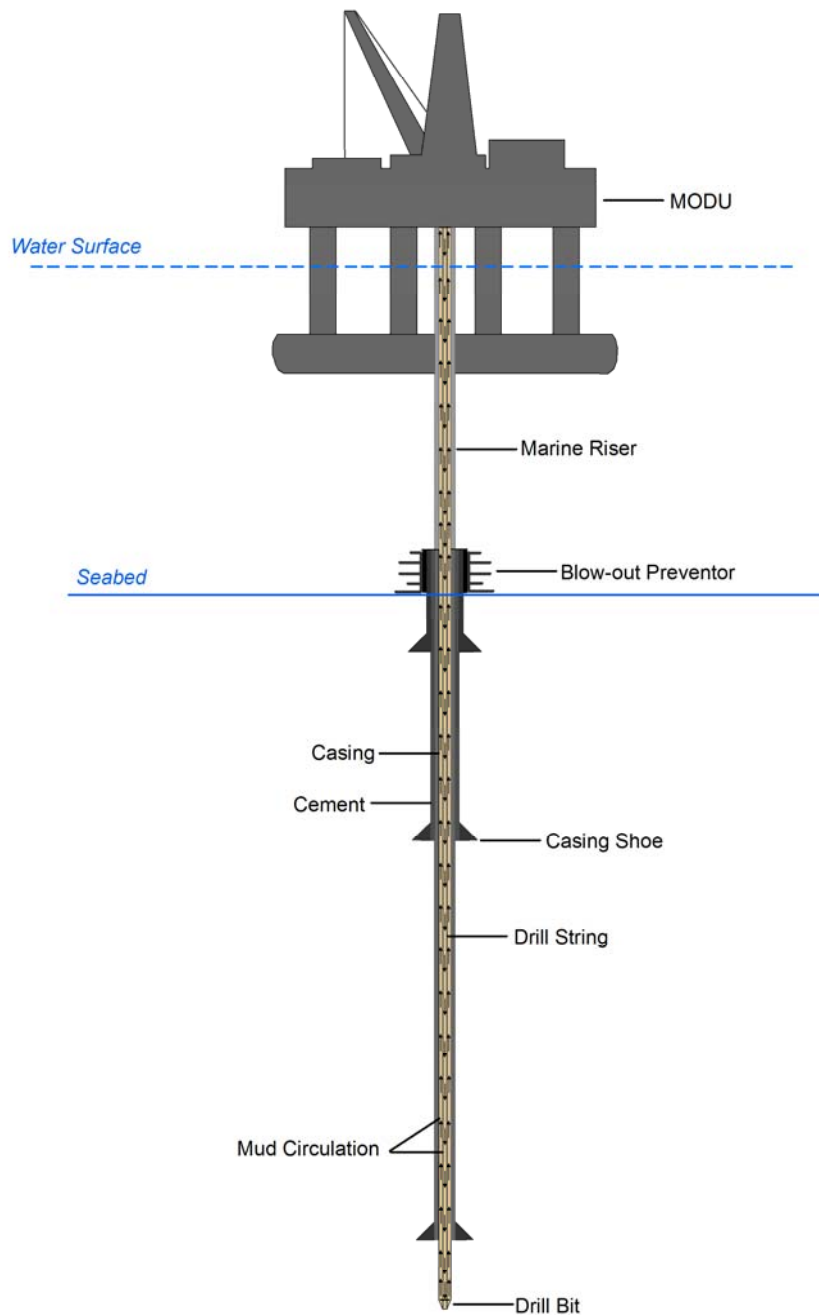
Planned exploration activities that comprise this Project will occur at various times of the year for each and all years of the proposed drilling program. Drilling activities may not be continuous and will be determined, in part, by rig availability and previous wells' results. There may at times be up to two drilling units working in different parts of the Project Area simultaneously. It is expected that each well will require approximately 75 to 115 days for drilling and testing, which will be followed by well decommissioning and abandonment or suspension. Wells designed for suspension and re-entry will be determined through further prospect evaluation. VSP operations are estimated to take approximately one to three days per well and well testing, where required, would occur over a one-to-three week period.

2.2 Key Components and Activities

The objective of the proposed project is to explore prospective oil and gas targets to determine the potential presence of hydrocarbons within the ELs currently held by BHP in offshore eastern Newfoundland. Key Project components and activities include exploration drilling, possible appraisal (delineation) drilling, VSP's, well testing, eventual well decommissioning and abandonment, or suspension procedures, and associated supply and service activities.

2.2.1 Drilling

The Project may involve the drilling of up to 20 wells (exploration or appraisal) within the two ELs that comprise the Project Area over its 9 year duration (2019-2028). Specific wellsite locations are not currently defined, and will be selected as Project planning and design activities move forward. Wells may be drilled using either a harsh environment semi-submersible drilling unit or a harsh environment drillship. Any drilling installation and associated planned activities will be subject to regulatory review, inspections, and certifications prior to issuance of an OA by the C-NLOPB. The drilling installation will be mobilized to the drilling location after permits, regulatory approvals, and authorizations have been obtained. Figure 2.2 provides a generalized schematic of a typical offshore well. The proposed Project may include batch drilling activity, in which the riserless sections for multiple wellsites are initially and consecutively drilled, after which the drill rig returns to these sites to complete the remaining portion of the wells. The proposed Project includes installation of seabed or near-seabed components limited to the wellhead, blow-out preventer (BOP) and riser, but will not include installation of excavated drill centres or underwater construction activities.



Note: For general illustration only, drilling unit and well components not to scale. (Additional intermediate casing strings/liners may be installed, depending on well-specific conditions and detailed well design). Diagram by Wood.

Figure 2.2: Conceptual Diagram of a Typical Offshore Exploration/Appraisal Well

2.2.2 Vertical Seismic Profiling

A VSP or “check-shot” survey is often undertaken following completion of drilling to obtain accurate time-to-depth ties to correlate seismic data to well depth. Profiling may include a zero offset VSP or a walk-away VSP. The zero offset VSP is undertaken by placing a string of receiver (geophones) down the well at pre-determined depths, with a seismic source (usually mid-sized airguns) suspended from the drilling unit (approximately 5-20 m). Walk-away VSP surveys may also be undertaken, which involve placing a sound source on a vessel which then moves away while firing the seismic source at pre-determined distances from the borehole receiver. The check-shots are recorded at multiple intervals down the well, and the resulting information assists in determining and confirming the depth of the drilled well and for reconciling drilling information with that obtained through seismic survey work. Between three and six seismic sound sources are typically used, with a volume of 150 to 250 cubic inches each. However, up to 12 sound sources may be used in a larger array. VSP surveys are typically short-term activities, usually lasting several days duration, with seismic source firing often limited to just a few hours.

2.2.3 Well Evaluation and Testing

Well formation logging, which is typically an ongoing process during exploration drilling programs, identifies rock types encountered and any possible zones where hydrocarbons are present. Mud logging and evaluation of drill cuttings and mud gases are the primary methods of well formation zone logging. To establish the viability and commercial potential of the prospect, a well flow test may be conducted to sample and identify formation fluids (which may contain hydrocarbons and/or water) and to measure produced flow rates. During this testing, produced fluid is flowed to the drilling unit, where hydrocarbons are separated from any produced water and samples are collected and analyzed. Produced hydrocarbons and produced water may be flared using high-efficiency burners to limit emissions and the risk of spillage to the sea. In the case of a significant amount of produced water, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge. Flaring activities are anticipated for short periods, if required as part of this Project. Well testing will be subject to BHP’s well test assurance process, which is designed to promote safe and efficient well test operations.

2.2.4 Well Decommissioning and Abandonment or Suspension

Once drilling and any associated well testing is completed and approved by C-NLOPB, offshore wells are typically decommissioned and abandoned. These activities involve isolation of the well bore by placing cement plugs, potentially in combination with mechanical devices, at various depths. Consideration will be given to removing the wellhead from the seafloor if appropriate, mechanical cutters would be used in this instance. Well decommissioning and suspension or abandonment for this Project will be carried out as per BHP’s Well Integrity Standard, as well as applicable industry practice and in compliance with relevant regulatory requirements. These activities will adhere to the requirements set out under the Newfoundland Offshore Petroleum Drilling and Production Regulations (or subsequent amended regulations). Alternative approaches, if required and will be investigated and implemented in consultation with relevant regulatory authorities and in compliance with applicable authorizations. Wells will be monitored and inspected in accordance with applicable regulatory requirements at the time of decommissioning and abandonment.

2.2.5 Supply and Servicing

Supply vessels and helicopters are used to transport personnel, equipment and materials to and from drilling rigs during offshore drilling programs. Supply vessels typically make regular trips to the drilling unit, and a dedicated stand-by vessel will attend to the rig throughout the drilling program. Personnel will be transported to and from the drilling rig by supply vessel or helicopter, according to work schedules and rotations, workforce numbers, distances and other factors.

It is expected that offshore supply vessel and aircraft (helicopter) services for the Project will be based in St. John’s NL. Existing facilities are expected to be utilized for these purposes, as well as for the supply and disposal of materials such as drilling fluids, for fueling and other supply, support and logistical functions. Aircraft support for the Project will be based at the St. John’s International Airport.

It is anticipated that a single drilling unit operating at the site will require an average of two to three return transits per week by supply vessels during the course of the Project with one vessel on stand-by at all times. In the case that two drilling units are operating at the same time, the number of offshore supply vessels could increase to between four to five trips per week. It is estimated that there would be an average of one to three helicopter transits per day to transfer crew and supplies to the drilling unit, which would increase proportionally (i.e., two to six transits per day) if two rigs were used simultaneously.

All drilling units and vessels used for this Project will meet operational and environmental requirements for associated exploration activities, including relevant environmental mitigations and safety and emergency response procedures. All vessels will be in compliance with applicable legislation and regulations and will be inspected by Transport Canada and approved for operation by the C-NLOPB before beginning any Project-related work. Drilling units will have appropriate oil spill/pollution prevention and emergency response plans, and each will be compliant with International Convention for the Prevention of Pollution from Ships (MARPOL).

2.3 Management of Potential Environmental Emissions

Potential emissions and discharges associated with offshore exploration drilling programs include noise, light and other atmospheric emissions (exhaust), liquid discharges, and other waste materials associated with the offshore drilling unit, support vessels and aircraft. Throughout the Project, efforts will be made to reduce waste emissions and generated discharges. Waste will be managed and disposed according to regulatory requirements and applicable guidelines.

2.3.1 Atmospheric Emissions

During Project activities, atmospheric emissions may include exhaust from drilling unit(s), support vessels and associated equipment (e.g., on-board power generators), as well as emissions from hydrocarbon storage and flaring associated with well testing, if conducted. A general estimate of potential greenhouse gas (GHG) emissions that may be associated with well drilling for this type of project is provided for the purposes of this Project Description. Assuming that it could take 75-115 days to drill a well, including well testing activities, it is estimated that CO₂ equivalent emissions associated with active drilling (single unit) and related vessel traffic could be in the range of 16,000 to 32,000 tonnes of CO₂ per well. It is currently anticipated that the number of wells drilled annually for the Project could range from zero to three, which would result in total CO₂ equivalent emissions ranging from 0 to 96,000 tonnes annually. These are preliminary estimates only.

Sound associated with offshore drilling programs include emissions from drilling and other activities on the drilling unit itself, as well as from supporting vessel and aircraft traffic. Light emissions from the drilling unit include artificial lighting as well light associated with any flaring required during well testing. Light is also generated by support vessels, which will be comparable to that from other ships of similar size.

2.3.2 Underwater Sound

Underwater sound is generated from offshore drilling activities, including drilling where sound is emitted directly into the benthic and marine environment. Sound is also generated by operation of supply and supporting vessels as well as the drilling unit including noise from dynamic positioning. These types of sound will occur throughout the exploration drilling program. Underwater sound also results from source arrays for any associated VSP data collection.

2.3.3 Drilling Fluids and Cuttings

Drilling muds are used to lubricate and cool drill bits and holes and to circulate cuttings and transport them to the surface. Drilling fluids also help to maintain appropriate hydrostatic pressure in the well to overbalance formation pressure, providing the primary barrier for well control (BOP forms part of the secondary barrier). Water-based drilling muds (WBMs), which are mainly seawater with other additives including bentonite (clay), barite, and potassium chloride are primarily used for riserless sections of a well. Synthetic-based drilling muds (SBMs) are generally used once the riser has been installed, though WBMs are used in some applications. Other approved chemicals are also added as required to achieve and control the required mud properties (Neff 2000).

The initial “riserless” sections of a well bore are generally drilled using WBM in which case mud and cuttings are returned to the seabed in accordance with the Offshore Waste Treatment Guidelines (OWTG). Once the well conductor and surface hole sections are completed and the riser and BOP are installed, the deeper sections of the well bore are typically drilled using SBMs, which are returned to the drilling unit via the riser. Once onboard, drilled cuttings (i.e., rock) are removed from the drilling mud in successive separation stages. The fluids are reconditioned and reused until the well is abandoned, when the spent SBM is returned to shore for disposal. SBM-associated drill cuttings may be discharged at the drill site, in accordance with the OWTG, provided they are appropriately treated prior to discharge.

2.3.4 Drilling Cement

Drilling cement is pumped into the casing/wellbore annuli following the casing installation. Prior to installation of the marine riser and BOP, any excess cement may be discharged on the seabed surrounding the wellhead. During commissioning, testing and cleaning of a cement unit, small volumes of cement may be discharged at sea. It is necessary to clean the cement unit after each operation to prevent cement from hardening in the mixing tanks and liners. Drilling cement would be discharged in accordance with the OWTG and Offshore Chemical Selection Guidelines (OCSG). In the unlikely event of difficulties being encountered during cement job execution it may be operationally necessary to circulate cement slurry out of the well. In this scenario the slurry would be discharged provided that it meets the applicable regulatory standards for ocean discharge.

2.3.5 Other Liquid and Solid Wastes

Liquid wastes generated by offshore drilling activities include storage displacement, bilge, ballast, cooling, gray and black water, and possibly other materials. The OWTG specifies allowable chemical properties for offshore disposal to the marine environment and associated reporting requirements. Liquid discharges that do not meet applicable standards for ocean disposal are transported back to shore for disposal at approved facilities. Domestic waste materials generated by personnel on-board drilling units and support vessels is collected in dedicated waste receptacles and disposed of on a regular basis, with materials being separated and recycled where possible. Food wastes will be disposed in compliance with MARPOL 73/78 Annex V (Food Waste Regulations). Solid wastes intended for disposal will be stored in dedicated waste containers, transported to shore and collected by an approved waste contractor for transportation to an approved waste disposal facility. Hazardous waste materials (e.g., spent and excess chemicals, chemical containers, spent absorbents and oily rags, batteries, and biomedical waste) that will or may be generated during Project activities will be stored in dedicated and appropriate waste receptacles for transportation to shore and eventual disposal at approved facilities. Offshore waste discharges for this Project will be managed in strict compliance with the OWTG and MARPOL. BHP is committed to establishing safe and environmentally responsible procedures for generation, storage, handling, transportation, treatment and disposal of all waste materials generated throughout the course of the Project.

2.4 Potential Accidental Events

BHP uses a systematic approach to management of potential unplanned events through identification and assessment of hazards and risk, identification of mitigation and control measures, establishment of objectives, plans and performance standards, and development of BHP specific campaign and well risk assessments. Accidental events that could potentially occur during an exploration drilling program and potentially result in a release to the environment, include spills and releases from drilling unit or supply vessels, vessel collision, dropped objects, loss of well control (e.g., blowout), and natural hazards.

Potential well control incidents and releases of other possible hydrocarbons, or other substance spills from the drilling unit and/or associated vessel activities vary considerably in terms of their nature, scale, duration and potential environmental consequences. BHP will, through a third-party service provider, conduct predictive spill modelling to help assess the risk of adverse environmental effects that may occur as a result of potential accidental events associated with the Project. Oil spill prevention, response and overall preparedness approaches for the Project will be further developed and defined as the various regulatory review and approval processes move forward.

During the annual ice season (including presence of icebergs) in offshore eastern Newfoundland (typically between March to June), ice management is a required activity as part of normal offshore operations. Ice management process

will be documented in BHP's Ice Management Plan for Operations and will be implemented should ice pose a threat to the drilling unit and/or other Project equipment, personnel or the environment.

3.0 Environmental Setting

The following sections provide a summary description of the existing biophysical and socioeconomic environments that overlap and may interact with the proposed Project.

3.1 Previous Environmental Assessments and Studies

Previous environmental studies in the Canada-NL Offshore Area are relevant to this Project and any EIS that may be required for it. Offshore oil and gas exploration and development activities have been occurring off Newfoundland and Labrador for several decades, and associated environmental studies and analysis provide important and valuable sources of information on the existing environmental setting in the region, as well as the potential environmental issues and interactions that may be associated with these activities.

Of particular relevance to this Project is the 2014 C-NLOPB SEA for the Eastern Newfoundland Offshore Area (Amec 2014), which identified, reviewed and presented regional environmental baseline data and information (physical, biological and socioeconomic), and completed a review and analysis of likely environmental issues, mitigation and planning approaches as input to future exploration licencing decisions in this area. This SEA is a key source of regional information for the subsequent, project-specific EAs of individual proposed oil and gas exploration and development projects in this area.

Various recent project-specific EAs have also been completed or are in progress for proposed projects and activities off eastern Newfoundland. In addition, numerous environmental studies and surveys have been completed on relevant components of the existing biophysical and socioeconomic environments of eastern Newfoundland, and these provide informative descriptions of the existing environmental setting of the region. The existing and available information provided through these past EAs and other environmental studies provides appropriate environmental baseline information for the Project Area for EA purposes, and no additional and dedicated environmental field work is required or planned in relation to this Project and any EIS that may eventually be required for it. BHP acknowledges that should an EA be required under CEAA (2012), the scope of the Project and its EA will be set by the Canadian Environmental Assessment Agency.

3.2 Physical Environment

The surficial geology within the Project Area is shaped by both natural and human processes (Amec 2014). Located on the eastern Canadian continental shelf, this area was formed by the sea-floor spreading as the North Atlantic Ocean opened during the Late Triassic to Early Tertiary and is underlain by pre-rift basement rocks. The main sedimentary basins in the Project Area include Orphan Basin, a perched slope basin (Fader et al. 1989). The surficial sediment of the area ranges from fine muds and clays to extremely coarse boulders and bedrock (LGL Limited 2011). Quaternary deposits in the southern Orphan Basin include complex mass transport deposits (MTD) comprising both glaciogenic debris flow and blocky MTD. Evidence of past instability within the Orphan Basin includes thick, stacked MTDs on the basin floor and seabed failure scars on the continental slope (Campbell 2005). Water depths within EL 1157 and EL1158 range between 1,175 to 2,575 m. Within the surrounding Orphan Basin, water depths range from approximately 1,200 m at the edge of the continental shelf to as deep as 3,300 m south of the Orphan Knoll.

Available climatological information for sites within and around the Project Area indicate that the prevailing winds over this region are westerly and northwesterly from October to March, while southwesterly and southerly winds are more frequent during the warmer months of May to September. Most of the observed precipitation events in this region include rain or snow, while other precipitation types, such as mixed rain and snow, freezing rain, and hail, occur far less frequently. Visibility in the Orphan Basin varies considerably throughout the year. Good visibility (greater than 10 km) is most frequent from September and October and least frequent in March and April. Visibility is poorest in the spring and summer (Amec 2014; C-Core 2017).

The cold Labrador Current, which dominates the general circulation of water off eastern Newfoundland, is divided into two streams: 1) an inshore branch that flows along the coast on the continental shelf; and 2) an offshore branch that flows along the outer edge of the Grand Banks. The offshore branch flows primarily over the upper Continental Slope at 300-1,500 m water depths including the Orphan Basin, and through the relatively deep Flemish Pass (Amec 2014, LGL Limited 2003). For the Orphan Basin, the most severe sea states occur mainly between December and January when maximum significant wave heights of up to 15.9 m from the northwest can be expected, with an associated peak period of 15.8 s (Amec 2014; C-Core 2017).

The proposed Project Area is, like the rest of the marine environment off eastern Newfoundland, subject to seasonal intrusions of sea ice and icebergs, as well as vessel icing during particular meteorological conditions. Available data indicates that thin first-year ice is the predominant ice type in the Orphan Basin from mid-February to late March with medium and thick first-year ice predominant in April (Amec 2014). Sea ice begins to retreat over the entire eastern Newfoundland offshore area by mid-April, and the Flemish Cap and Southern Grand Banks and adjacent areas are generally ice-free by the beginning of May (CIS 2011; Amec 2014). The waters off Newfoundland and Labrador can be a high traffic area for many icebergs. Annual mean open-water iceberg areal density (frequency) for the Project Area ranged from 57-97 based on pooled aerial surveys and satellite data (C-Core 2017). These observations are mostly of small (100,000 t, 5-15 m height, 15-50 m length) to medium (750,000 t, 15-50 m height, 50-100 m length) sized icebergs and mainly occurs from February to July (Amec 2014).

The ambient air quality is considered to be virtually background levels due to the occasional sources of exhaust products that may compromise air quality in the area. Air quality in the Project Area and surrounding areas would have occasional and transient influence from exhaust products from marine traffic (including fishing vessels), aircraft, and other exploration activities. Long-range contaminants from the Northeast Seaboard and industrial Midwest of the United States may also influence the general region (ExxonMobil Canada Properties [EMCP] 2011). The nearest non-transient emission sources to the Project Area would be the existing offshore oil production facilities (i.e., Hibernia, Terra Nova, White Rose, and Hebron) in the Jeanne D'Arc Basin that are located more than 100 km away (Environment and Climate Change Canada [ECCC] 2018).

3.3 Biological Environment

The upper slope of the Orphan Basin (300-700 m) is dominated by gravel and sandy mud substrates, where polychaetes, bivalves and echinoderms were the dominant benthic invertebrates (Figure 3.1). Sponges, bryozoans, and brachipods are also found on cobbles and boulders in the area (Carter et al. 1979). The middle slope (700-2,000 m) is dominated by mud substrates with associated benthic communities comprised of cnidarians, polychaetes, echinoids, and brittlestars. Structure-forming benthic invertebrate species (e.g., corals, sponges, and sea pens) also occur in the Orphan Basin and in surrounding areas (Amec 2014; Guijarro et al. 2016). These coral, sponge, and sea pen communities provide nurseries, areas of refuge, and spawning and breeding grounds for a variety of species, including commercially-important species (Wareham and Edinger 2007; Working Group on Ecosystem Approach to Fisheries Management [WGEAFM] 2008; Baillon et al. 2012; Baillon et al. 2014; Food and Agriculture Organization of the United Nations [FAO] 2019; Meredyk 2017; Miles 2018). Fish species in the Orphan Basin have been observed in association with remotely operated vehicle (ROV) surveys and baited camera studies at exploration drilling sites. Preliminary surveys indicate the presence of rabbit fish, blue hake, abyssal grenadier and rockling at the Great Barasway F-66 Drilling site at approximately 2,338 m depth (d'Entremont et al. 2008, Gates et al. 2008). Blue hake, grenadiers, rattails, rocklings, deepwater skate, cutthroat eel and deepwater arrowtooth eel have also been observed at the Lona O-55 well site at approximately 2,600 m during an ROV transect survey (Enachescu et al. 2010; Drover 2012 in LGL Limited 2013).

Various avifauna species occur within the Project Area and in adjacent marine and coastal regions, including seabirds and other marine-associated birds that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities. A diverse assemblage of seabirds, including gannets, phalaropes, large gulls, kittiwakes, terns, alcids (auks), jaegers and skuas, fulmars, petrels and shearwaters, can be found in the marine waters off eastern Newfoundland at all times of year (Amec 2014; Amec Foster Wheeler 2018; Stantec Consulting 2018). Many seabird groups, such as cormorants and terns, are associated with coastal regions, and are rarely observed this far offshore. Waterfowl occur in large numbers in marine habitats off eastern Newfoundland, especially during the winter months, but they prefer open water in coastal areas and are thus not likely to frequent offshore environments including the Project Area (Amec 2014; Amec Foster Wheeler 2018; Stantec Consulting 2018). In the Orphan Basin, seabird aggregations are low (1-10 birds/km²) to moderately high (10-100 birds/km²) from November to February, and moderately high from March to August

with fewer occurrences in September to October (Fifield et al. 2009). In particular, Northern fulmars, storm-petrels and shearwaters are common on the southern edge of the Orphan Basin during summer (Fifield et al. 2009).

Marine mammal (cetacean) species are known or considered likely to occur within the Eastern Newfoundland Offshore Area, including in the Project Area and surrounding areas. This includes a number of baleen whales (mysticetes), toothed whales and porpoises (odontocetes) and seals (pinnipeds), and several sea turtle species. These species differ considerably in the likelihood of presence and in the particular locations and habitat types that they utilize and the times at which they occur in, or pass through, the Eastern Newfoundland Offshore Area. Key feeding grounds such as the Grand Banks are of particular importance to marine mammals and turtles, and several Ecologically and Biologically Significant Areas (EBSAs) have been identified due in part to their known importance to a number of marine mammal species (Templeman 2007; Wells et al. 2017). Given that a number of these species have been designated as species at risk under Canadian legislation or are otherwise considered to be of conservation concern, they are typically a key consideration in the EA review process for projects and activities off eastern Newfoundland.

Species identified as at risk or of conservation concern through the Canadian *Species at Risk Act* (SARA), *Newfoundland and Labrador Endangered Species Act* (NL ESA) and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are known or considered likely to occur off eastern Newfoundland but not necessarily in the Project Area. These include 23 fish species, three bird species, eight marine mammal species, two sea turtle species. Comprehensive and up to date information on the protection and current designations of these species at risk and any associated Recovery Strategies, Action Plans and Management Plans (including any identified and designated critical habitat) is available from the relevant sources and will be used in any required EIS for this Project.

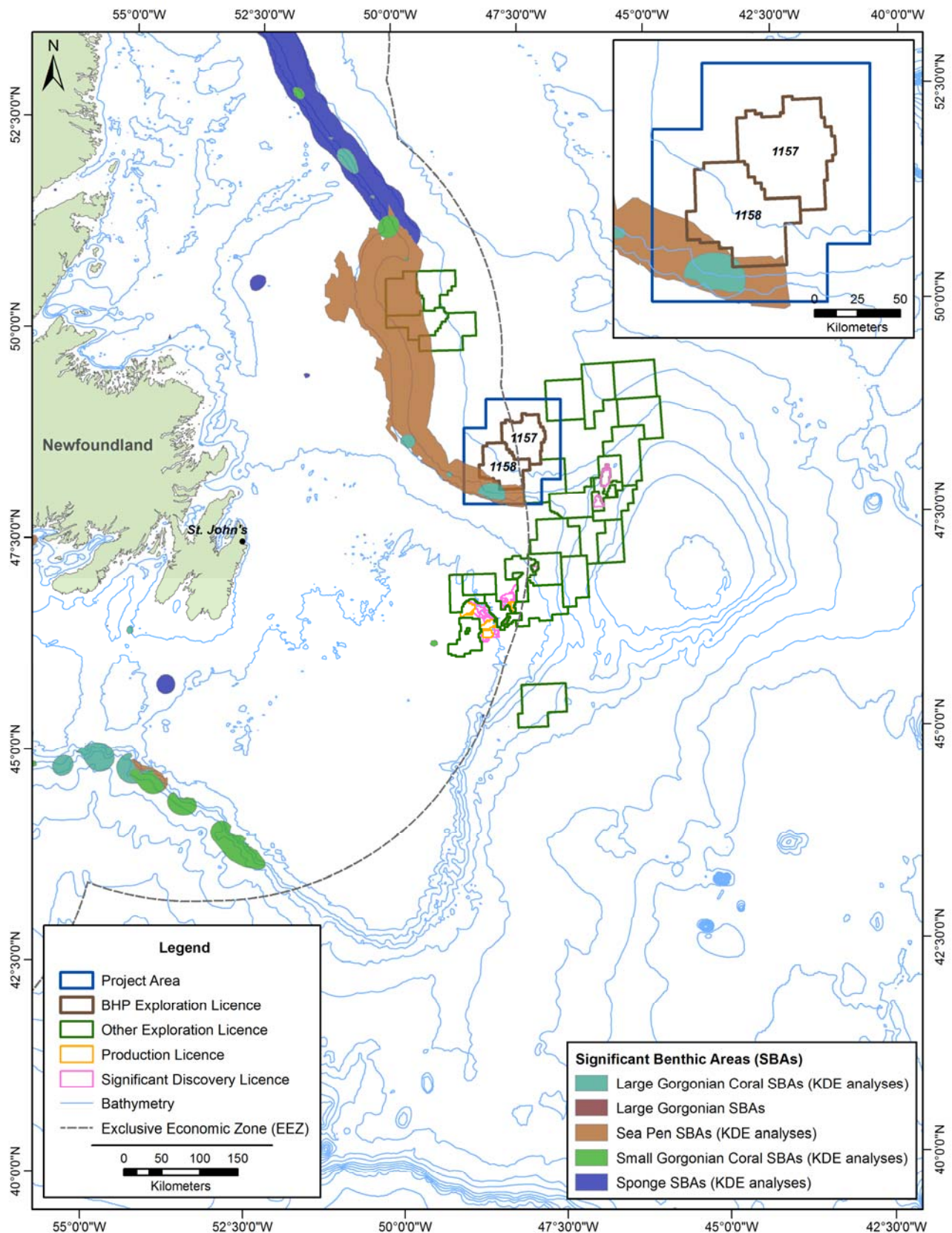


Figure 3.1: Significant Benthic Areas

A number of terrestrial, marine and coastal areas within and off eastern Newfoundland and Labrador have been designated as protected under provincial, federal and/or other legislation, or formally identified through relevant processes as being special or sensitive due to their ecological, historical and/or socio-cultural characteristics and importance. Given its location more than 300 km offshore, the Project will not occur within, or otherwise interact directly with, any of the existing provincial parks or historic sites, national parks or historic sites, World Heritage Sites, Ecological Reserves, Marine Protected Areas (MPAs) or Areas of Interest, Migratory Bird Sanctuaries, Important Bird Areas (IBAs) or other sites that have been designated as protected on or around the coastline of Newfoundland and Labrador. The Project Area likewise does not overlap with either of the identified Canadian fisheries closure areas (FCAs) or Preliminary Representative Marine Areas (RMAs) off Eastern Newfoundland (Figure 3.2).

As illustrated in Figure 3.2, the Project Area overlaps with portions of a Marine Refuge, a Canadian EBSA, a United Nations Convention on Biological Diversity EBSA and a Vulnerable Marine Ecosystem (VME), none of which have associated prohibitions of marine activities such as those being proposed as part of this Project. The Project Area does not intersect any of the Northwest Atlantic Fisheries Organization (NAFO) FCAs, which are closed to bottom-contact fishing activities to protect sensitive coral and sponge habitat.

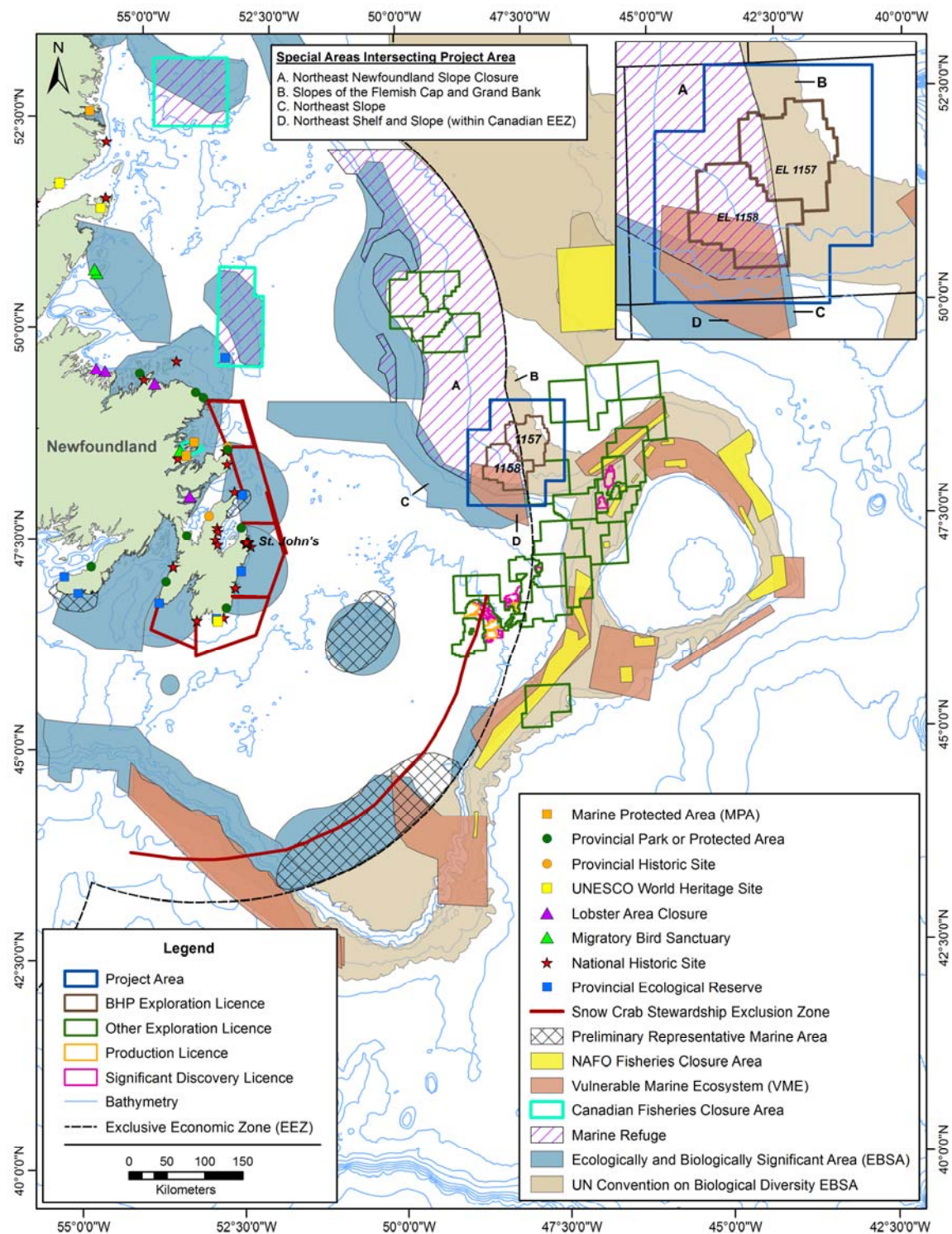


Figure 3.2: Protected and Special Areas in the Eastern Newfoundland Marine Environment

3.4 Human Environment

Fisheries are an important component of the economy of Newfoundland and Labrador, including the various communities along the coastline of eastern Newfoundland where commercial fisheries are extensive and diverse. The Project Area overlaps with NAFO Division 3L and Unit Area 3Le as well as other fisheries resource management areas, and thus has the potential to interact with harvesting activities that have involved a range of species and gear types in past years (Figure 3.3). Various regulatory jurisdictions are relevant to marine fish and fisheries, within and around the Project Area. While the Government of Canada manages most fish stocks and fishing activities within the 200 nautical mile exclusive economic zone (EEZ) and for benthic invertebrates (such as crab) across the entire continental shelf, NAFO manages groundfish and other resource harvesting activities beyond the EEZ.

Indigenous groups or individuals may hold commercial fishing licences for NAFO Divisions that overlap with the Project Area, but as these data are included in general fish harvesting datasets, it is not possible to identify any fishing activity as Indigenous. However, as commercial fishing is limited in the Project Area, it can be assumed that Indigenous commercial fishing is also limited. Various Indigenous groups have asserted or established section 35 rights (*Constitution Act, 1982*) to the right to harvest for food, social or ceremonial (FSC) purposes or to earn a moderate livelihood from these activities in their traditional territories. The available information indicates that FSC harvesting occurs in areas close to communities including coastal and tidal environments (Fisheries and Oceans Canada [DFO] 2018). Though all harvesting for traditional purposes may not be captured in the DFO data, no FSC licences or known harvesting occurs within or near the Project Area. The closest Indigenous community is Miawpukek First Nation (Conne River) on the south coast of Newfoundland several hundred kilometres west of the Project Area.

A number of other human activities also take place in the marine environment of eastern Newfoundland (and potentially waters surrounding the Project Area) on either a year-round or seasonal basis. General shipping traffic includes marine tanker traffic and supply vessels associated with existing offshore oil development and activities, as well as cargo ships, fishing vessel transits and other vessel traffic. Naval training exercises, which involve both surface vessels and submarines, may also occur off eastern Newfoundland. Known and potential unexploded ordnance (UXO) sites exist in the North Atlantic and include shipwrecks and submarines as well as munitions dump sites off eastern Newfoundland. A number of existing subsea cable networks cross the North Atlantic connecting sites in North America and Europe.

Eastern Newfoundland is subject to considerable oil and gas exploration activity, including geophysical surveys and drilling programs, with many thousands of kilometres of seismic survey data collected and several hundred wells drilled to date. Offshore oil production activities have also occurred since the 1990s and currently include four producing oilfields. Offshore oil and gas exploration and development activities also include a variety of ancillary and supporting activities in the marine environment.

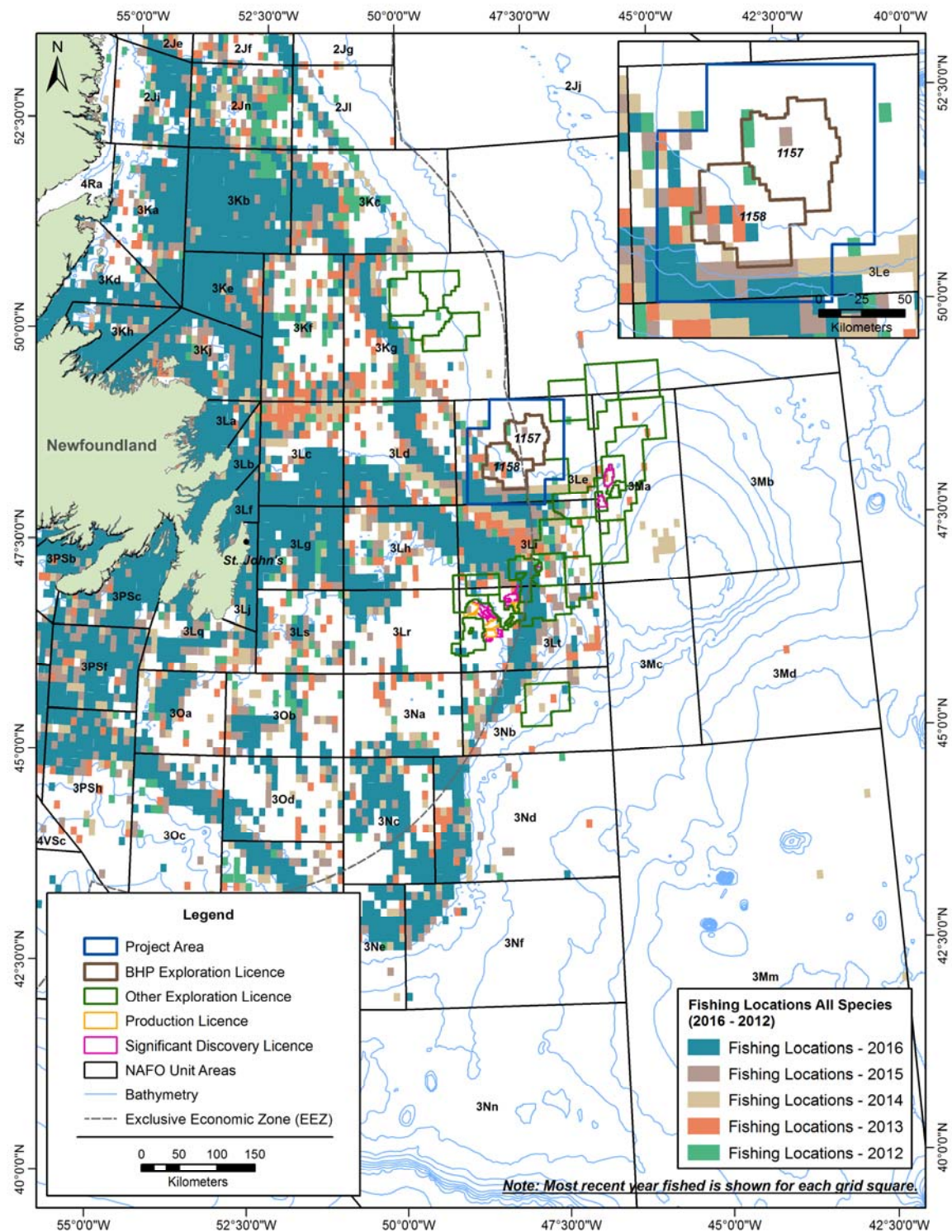


Figure 3.3: Domestically-Landed Commercial Fishing Locations, All Species (2012-2016)

4.0 Consultation and Engagement

Consultation and engagement are often considered to be the cornerstone of the EA process, and are a key component of BHP's approach to the planning and implementation of its oil and gas exploration programs and other business activities. A number of associated initiatives have been undertaken, are in progress, or are being planned in relation to the proposed Project, including discussions with relevant government departments and agencies, Indigenous groups, stakeholder organizations and interested members of the public.

4.1 Government and Regulator Consultation

As part of the planning and preparation of this Project Description, BHP has met with a number of regulatory and government organizations, including the C-NLOPB, CEA Agency and the NL Department of Natural Resources (Table 4.1).

Table 4.1: Regulator Engagement

Jurisdiction	Stakeholder
Federal Government	CEA Agency
Provincial Government	NL Department of Natural Resources
Federal / Provincial Government	Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB)

BHP plans to meet with various government agencies in the coming months. These may also include the following:

- Fisheries and Oceans Canada;
- Environment and Climate Change Canada;
- Health Canada;
- Parks Canada;
- Department of National Defence;
- Transport Canada;
- Major Projects Management Office;
- Natural Resources Canada;
- NL Department of Municipal Affairs and Environment; and
- NL Department of Fisheries and Land Resources.

BHP will also continue to consult directly with relevant government departments and agencies as part of the planning and completion of any required EIS for the Project, as well as in any post-EA environmental permitting and overall environmental management initiatives during its eventual implementation.

4.2 Indigenous Peoples Engagement

BHP is committed to engaging with stakeholder Indigenous groups, ensuring they are informed on a regular basis, and to communicating transparently to ensure understanding of expectations, concerns, and interests. BHP aims to incorporate these engagement principles into our business plans. CEA Agency has identified a number of Indigenous

groups in five provinces as having a potential interest in offshore oil and gas activities in offshore Newfoundland and Labrador (Table 4.2).

Table 4.2: Identified Indigenous Groups in Eastern Canada

Province	Affiliate Group	Indigenous Groups
Newfoundland and Labrador	NA	Labrador Inuit (Nunatsiavut Government) Labrador Innu (Innu Nation) NunatuKavut Community Council Miawpukek First Nation Qalipu Mi'kmaq First Nation Band Northern Peninsula (Mekap'sk) Mikmaq Band Inc. ¹
Nova Scotia	Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO)	Acadia First Nation Annapolis Valley First Nation Bear River First Nation Eskasoni First Nation Glooscap First Nation Membertou First Nation Paqtnkek Mi'kmaw Nation Pictou Landing First Nation Potlotek First Nation Wagmatcook First Nation Waycobah First Nation
	NA	Millbrook First Nation
	NA	Sipekne'katik First Nation
Prince Edward Island	Mi'kmaq Confederacy of Prince Edward Island (MCPEI)	Abegweit First Nation Lennox Island First Nation
New Brunswick	Mi'gmawe'l Tplu'taqnn Incorporated (MTI)	Fort Folly First Nation Eel Ground First Nation Pabineau First Nation Esgenoôpetitj First Nation Buctouche First Nation Indian Island First Nation

¹ Northern Peninsula (Mekap'sk) Mikmaq Band Inc. has not been recognized by the Federal or Provincial Government.

Province	Affiliate Group	Indigenous Groups
		Eel River Bar First Nation Metepnagiag Mi'kmaq First Nation
	Wolastoqey (Maliseet) Nation in New Brunswick (MNNB)	Kingsclear First Nation Madawaska Maliseet First Nation Oromocto First Nation Saint Mary's First Nation Tobique First Nation
	NA	Elsipogtog First Nation
	NA	Woodstock First Nation
	NA	Peskotomuhkati Nation at Skutik (Passamaquoddy)
	Mi'gmawei Mawiomi Secretariat (MMS)	Micmas of Gesgapegiag La Nation Micmac de Gespeg Listuguj Mi'gmaq Government
	NA	Les Innus de Ekuanitshit
Quebec	NA	Première Nation des Innus de Nutashkuan

As part of its ongoing engagement program, BHP has contacted each identified Indigenous group, directly or through agencies that represent them in consultation and negotiation. In March / April 2019, BHP wrote to the Indigenous groups to introduce the company and the Project, and to provide an opportunity for the groups to identify any questions or comments regarding the Project and its possible effects on Indigenous interests, as well as inviting further information sharing and engagement. As of the time of finalization and submission of this Project Description, three of these groups had responded to BHP acknowledging receipt of correspondence, clarifying contacts and language preference and indicating a concern for migrating salmon from rivers in traditional territory through or near drilling or exploration sites. As the EA progresses, BHP will follow up with each of these groups to confirm receipt of correspondence, request details related to consultation contacts and methods, and to request details on established or asserted rights, including fishing licenses, that may be affected by the Project.

4.3 Stakeholder Engagement and Public Consultation

During the preparation of this Project Description, BHP has met or corresponded with various interest groups (Table 4.3). In the coming months, meetings and / or correspondence are planned with other stakeholders including fishing industry and environmental non-government organizations.

Table 4.3: Stakeholder Engagement

Area of Interest	Stakeholder
Petroleum Industry	Newfoundland & Labrador Oil & Gas Industries Association (NOIA)
	Canadian Association of Petroleum Producers (CAPP)
Fishing / Seafood Processing Industry	Fish, Food and Allied Workers Union (FFAW-Unifor)

Area of Interest	Stakeholder
	Ocean Choice International
	Association of Seafood Producers
	Atlantic Groundfish Council
	Mi'kmaq Alsumk Mowimsikik Kaqoey Association (MAMKA)
	One Ocean
Petroleum / Fishing Industries	

5.0 Potential Project-Related Environmental Interactions

5.1 Routine Components and Activities

The offshore oil and gas exploration activities proposed for this Project have the potential to interact with, and result in associated changes to, various aspects of the existing environment as described in Chapter 3. The Project includes planned offshore exploration activities in two BHP-held ELs within a Project Area off eastern Newfoundland. All drilling operations carried out as part of this Project will be conducted within the defined boundaries of the ELs themselves. The Project could also include VSP, geotechnical and ROV surveys, well testing, eventual decommissioning and abandonment or suspension, and associated supply and service activities. The following key components and activities, and potential environmental disturbances or interactions, are particularly relevant to any environmental effects analysis:

- Presence and operation of the drilling unit(s) (e.g., air emissions, lighting, underwater sound, solid and liquid wastes);
- Drilling activities and associated marine discharges (e.g., drill fluids and cuttings, liquid discharges, atmospheric emissions);
- VSP surveys (e.g., underwater sound);
- Supply vessel, helicopter operations, and ROV, geophysical, geotechnical, and environmental surveys (e.g., air emissions, lighting, underwater sound, solid and liquid waste generation); and
- Well decommissioning, abandonment or suspension activities.

Various environmental components may have potential environmental interactions with routine Project Activities and are described below (Table 5.1). Potential environmental interactions would be assessed in more detail in the EIS should a federal EA process be required under CEAA 2012.

Table 5.1: Environmental Components/Issues and Potential Environmental Interactions with Routine Project Components and Activities Relevant to CEAA 2012

Environmental Component / Issue	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions/Changes
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	<p>Potential environmental changes from routine Project activities may affect fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species (including aquatic plants), due to the following:</p> <ul style="list-style-type: none"> • Direct (injury or mortality) or indirect (alterations of key life history activities and requirements, such as migration, reproduction, communication, availability and quality of food sources) effects on marine biota;

Environmental Component / Issue	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions/Changes
		<ul style="list-style-type: none"> Behavioural disturbances associated with drilling unit(s) and vessel presence, operation, and movements (noise, lights, discharges, habitat availability), resulting in possible avoidance or attraction by marine biota (fish, mammals, turtles); and Possible effects on marine habitats including water quality and the contamination, smothering or other alteration of seabed and benthic organisms due to physical disturbance of the substrate, discharge and deposition of drill cuttings and/or fluids, or other solid and liquid wastes.
Migratory Birds	5(1)(a)(iii)	<p>Potential environmental changes from routine Project activities may affect migratory birds (as defined under the <i>Migratory Birds Convention Act</i> 1994), due to the following:</p> <ul style="list-style-type: none"> Attraction and disturbance/disorientation, potential injury or mortality associated with presence and operation of drilling units and supply vessels; Possible health effects due to contamination of individuals and/or their habitats from emissions from drilling unit(s) or vessels; and Potential changes to the availability, distribution and/or quality of food sources resulting from potential effects on fish and fish habitat.
Project Activities Occurring on Federal Lands	5(1)(b)(i)	<p>Potential environmental changes from routine Project activities in federal waters – the Project Area includes marine areas (federal lands) located within Canada's EEZ – due to the following:</p> <ul style="list-style-type: none"> Potential interactions described for fish, fish habitat and aquatic species, migratory birds, and atmospheric environment (e.g., air and sound emissions).
Transboundary Issues	5(1)(b)(ii)	<p>Routine Project activities that occur within the EEZ are not anticipated to result in environmental emissions or other direct interactions that extend to the environment outside NL or Canadian jurisdiction. Although zone of influence of Project components and activities that occur within EEZ are not expected to extend to other jurisdictions, the Project may potentially affect environmental components (e.g., migratory fish, aquatic species, or birds and air and water quality) that extend to and/or move both within and outside Canadian jurisdiction. Potential interactions include:</p> <ul style="list-style-type: none"> Environmental interactions described for fish, fish habitat and aquatic species, migratory birds, and atmospheric environment (e.g., air and sound emissions).
Health and Socio-Economic Conditions for Indigenous People	5(1)(c)(i)	<p>Potential environmental changes from routine Project activities may affect Indigenous fishing activities (including commercial communal licenses) with associated potential effects to socio-economic conditions, due to the following interactions:</p> <ul style="list-style-type: none"> Potential effects on fisheries (landings and values) and other marine activities due to biophysical changes (resource availability, distributions, quality), access/interference, damage to equipment or other direct or indirect interactions (e.g., fishing exclusion zone);

Environmental Component / Issue	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions/Changes
		<ul style="list-style-type: none"> Potential interactions with protected or special marine areas and possible associated effects on their human use and value; and <p>Health conditions of Indigenous Peoples are not predicted to be affected by changes to the environment resulting from Project Activities.</p>
Health and Socio-Economic Conditions	5(2)(b)(i)	<p>Potential environmental changes from routine Project activities may affect commercial fishing activities with associated potential effects to socio-economic conditions, due to the following interactions:</p> <ul style="list-style-type: none"> Potential effects on fisheries (landings and values) and other marine activities due to biophysical changes (resource availability, distributions, quality), access/interference, damage to equipment or other direct or indirect interactions (e.g., fishing exclusion zone); Potential interactions with protected or special marine areas and possible associated effects on their human use and value; and <p>The health conditions of people are not predicted to be affected by changes to the environment resulting from Project Activities.</p>
Physical and Cultural Heritage, or Resources of Historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	<p>No interactions or adverse effects are anticipated to result from routine Project activities in the marine environment more than 300 km offshore. Presence/absence of marine heritage resources on the seabed will be assessed through pre-drilling well site surveys. If the presence of such resources are identified during Indigenous engagement, they will be considered in the EIS.</p>
Current Use of Lands and Resources for Traditional Purposes by Indigenous Peoples	5(1)(c)(iii)	<p>No potential environmental changes from routine Project activities are anticipated to affect current use of lands and resources for traditional purposes by Indigenous Peoples given the location and water depths of the Project Area. Available information indicates that traditional harvesting areas, including documented food, social, or ceremonial (FSC) licences, occur at least 300 km from the Project Area. None of the identified Indigenous groups (or others) hold, claim or otherwise assert Aboriginal or Treaty rights within or near the proposed Project Area.</p>
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project	5(2)(a)	<p>Routine Project activities authorized by the C-NLOPB and associated air emissions have the potential to result in directly related or incidental changes to the atmospheric environment.</p>

5.1.1 Non-Routine Activities

Accidental events or malfunctions are potential, though unlikely, occurrences during offshore exploration drilling programs. Environmental incidents that may be associated with offshore drilling activities include potential subsurface blowouts (uncontrolled release of hydrocarbons), as well as batch spills of hydrocarbons or other substances (e.g., hydraulic fluid, drilling fluid, diesel) from a drilling unit or associated supply and support vessel activities. These events vary considerably in terms of their nature, scale, duration, and potential environmental consequences. Spills may occur in the offshore (e.g., during drilling activities) or nearshore (e.g., during supply vessel transit) environments. Various potential environmental interactions that may be associated with unplanned events are specified under CEAA 2012 and summarized in Table 5.2.

Table 5.2: Environmental Components / Issues and Potential Environmental Interactions Relevant to CEAA 2012 – Unplanned Project Components and Activities

Environmental Component / Issue	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions / Changes
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	<p>Potential environmental changes from non-routine Project activities (i.e., spills) may affect fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species (including aquatic plants), due to:</p> <ul style="list-style-type: none"> • Changes in the presence, abundance, distribution and/or health of marine fish/other aquatic species as a result of exposure to accidental spills; • Reduced availability and quality of habitat including degradation and reduction of marine water quality; • Injury or mortality through physical exposure, ingestion, or effects on prey and habitats/water quality); and • Associated reduced food availability or quality from exposure to spills or degradation of water and habitats.
Migratory Birds	5(1)(a)(iii)	<p>Potential environmental changes from non-routine Project activities (i.e., spills) may affect migratory birds (as defined under the <i>Migratory Birds Convention Act</i> 1994), due to:</p> <ul style="list-style-type: none"> • Changes in the presence, abundance, distribution and/or health of marine birds due to exposure to accidental spills; • Reduced availability and quality of habitat including degradation and reduction of marine water quality; • Injury or mortality through physical exposure, ingestion, or effects on prey and important habitats); and • Associated reduced food availability or quality from exposure to spills or degradation of water and habitats.
Project Activities Occurring on Federal Lands	5(1)(b)(i)	<p>Potential environmental changes from non-routine Project activities may occur in federal waters – Project Area includes marine areas (federal lands) within Canada's EEZ. Potential interactions would include:</p> <ul style="list-style-type: none"> • Potential environmental interactions described for fish, fish habitat and aquatic species, migratory birds, and atmospheric environment (e.g., air and sound emissions).
Transboundary Issues	5(1)(b)(ii)	<p>An accidental event could result in transboundary effects by extending outside Canada's jurisdiction, as well as by affecting environmental components (such as migratory fish, aquatic species, or birds and air and water quality) that extend and/or move both within and outside the Canada's EEZ. No land masses are anticipated to be affected.</p> <p>Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and its potential effects.</p>

Environmental Component / Issue	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions / Changes
Health and Socio-Economic Conditions for Indigenous People	5(1)(c)(i) 5(2)(b)(i)	<p>Potential environmental changes from non-routine Project activities may affect Indigenous Peoples with associated potential effects to socio-economic conditions due to the following interactions:</p> <ul style="list-style-type: none"> • Potential interactions with locations and environmental components used or otherwise valued by Indigenous Peoples, including communities, asserted or established traditional territories and resources, and other components of the health, heritage and other socioeconomic conditions of an Indigenous group; • Potential effects resulting from an accidental event such as an oil spill on marine fish, birds, marine and migratory birds, and marine mammals and sea turtles that are used for traditional purposes. This may include closure and associated restrictions on commercial-communal fish harvesting, reduced catchability of commercial fish species, changes to population size and health of commercial fish species, and loss or contamination of migratory birds or eggs harvested for food; and • Potential interactions with protected or special marine areas and associated effects on their human use and value.
Health and Socio-Economic Conditions	5(2)(b)(i)	<p>Potential environmental changes from non-routine Project activities may affect commercial fishing activities with associated potential effects to socioeconomic conditions, due to the following interactions:</p> <ul style="list-style-type: none"> • Potential effects resulting from an accidental event such as an oil spill on marine fish, birds, marine and migratory birds, and marine mammals and sea turtles. These may include closure and associated restrictions on fisheries, reduced catchability of commercial fish species, changes to population size and health of commercial fish species, and loss or contamination of migratory birds or eggs harvested for food. Potential interactions with protected or special marine areas and possible associated effects on their human use and value; and • Potential interactions with protected or special marine areas and associated effects on their human use and value.
Physical and Cultural Heritage, or Resources of Historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	<p>Non-routine Project activities such as a spill could potentially cause a change to the environment that may affect physical and cultural heritage areas (including shipwrecks). However, interactions and adverse effects from spills are not anticipated as Project activities are located over 300 km offshore and the Presence/absence of marine heritage resources on the seabed will be assessed through pre-drilling well site surveys. Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and its potential effects.</p>
Current Use of Lands and Resources for Traditional Purposes by Indigenous Groups	5(1)(c)(iii)	<p>Potential environmental changes from non-routine Project activities may affect Indigenous Peoples including Aboriginal or Treaty rights to harvesting due to the following interactions:</p> <ul style="list-style-type: none"> • Potential interactions with locations and environmental components used or otherwise valued by Indigenous Peoples, including communities, asserted or established traditional territories and

Environmental Component / Issue	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions / Changes
		<p>resources, and other components of the health, heritage and other socioeconomic conditions of an Indigenous group.</p> <ul style="list-style-type: none"> Potential effects resulting from an accidental event such as an oil spill on marine fish, birds, marine and migratory birds, and marine mammals and sea turtles that are used for traditional purposes. This may include closure and associated restrictions on commercial-communal fish harvesting, reduced catchability of commercial fish species, changes to population size and health of commercial fish species, and loss or contamination of migratory birds or eggs harvested for food. <p>Available information does not indicate that any Indigenous groups hold, claim or otherwise assert Aboriginal or Treaty rights within or near the proposed Project Area, nor undertake traditional activities within or near the Project Area. Furthermore, there are no documented FSC licences within or near the Project Area.</p> <p>Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and its potential effects, including the potential for these effects to extend to or otherwise affect lands and resources currently used by an Indigenous group for traditional purposes.</p>
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project	5(2)(a)	A spill occurring because of Project activities has the potential to result in temporary and localized changes to the marine and atmospheric environment as discussed above.

5.1.2 Potential Mitigations

A summary of some of the standard mitigation measures that are often implemented in offshore exploration drilling programs is also provided below, for initial review and illustrative purposes. These mitigations have been routinely and successfully applied to similar oil and gas exploration programs off Newfoundland and Labrador and elsewhere in previous years. These and/or other planning and management measures, in combination with BHP's own policies, principles and environmental management plans and procedures, will help to ensure that the Project is planned and completed in a manner that avoids or reduces potential environmental effects. These mitigations include:

- Avoidance of known important and sensitive species and areas / times where possible in the planning and conduct of oil and gas activities.
- Minimizing associated vessel and aircraft traffic, use of existing and common travel routes where possible and avoidance of low-level aircraft operations wherever possible.
- Minimizing environmental discharges and emissions from planned operations and activities, including compliance with relevant regulations and standards.
- Conducting sea bed surveys to assess the potential presence of sensitive benthic micro-habitats (such as corals).
- Selection of non-toxic drilling fluids, including the use of WBM's wherever possible and technically feasible.
- Treatment of operational discharges (such as sewage, deck drainage) prior to release in compliance with the Offshore Waste Treatment Guidelines and other applicable regulations and standards.

- Installation and use of oil water separators to treat contained deck drainage, with collected oil stored and disposed of properly.
- Minimizing the use of artificial lighting, where possible with due regard to safety and associated operational requirements.
- Programs and protocols for collecting and releasing marine birds that become stranded on offshore installations, including associated regulatory guidance and permit requirements.
- Inspections of ship hulls, drilling units and equipment for alien invasive species and associated follow-up maintenance. Maximizing use of local vessels, drilling unit and equipment where possible.
- Avoiding or minimizing flaring, and the use of high efficiency burners where flaring is required.
- Appropriate handling, storage, transportation and on-shore disposal of solid and hazardous wastes.
- Water contaminated with hydrocarbons generated during flow testing (within certain tolerances), can be atomized in the flare (using high efficiency burners) or shipped on-shore for disposal
- Selection and screening of chemicals under the Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands.
- Use of mechanical procedures during well completion and abandonment activities where possible, including proactive design of well structures.
- Spill prevention plans and procedures, with associated and effective spill preparedness and response plans.
- On-going information gathering and analysis regarding fishing areas / times and continued monitoring of fishing activity.
- Establishment and communication of safety / no-fishing zones.
- Active and continuous communications and coordination procedures.
- Issuance of Notices to Mariners and other notifications / direct industry communications.
- Educational and training initiatives for Project personnel.
- Establishment, communication and implementation of a Fishing Gear Damage or Loss Compensation Program (as per the associated Guidelines).

5.2 Environmental Assessment Scoping Considerations

Any required EIS for this Project will be planned and prepared in accordance with the requirements of *CEAA 2012* and its associated Regulations, and in full compliance with the EIS Guidelines that may be issued by the Agency. Potential interactions of the Project will be evaluated in the EIS by consideration of components and activities, including those associated with the drilling of exploration and possibly appraisal wells, VSP, geotechnical and ROV surveys, well testing and eventual decommissioning and abandonment or suspension, and relevant supply and service activities. The EIS will provide the required information about the Project, its existing biophysical and socioeconomic environment, potential environmental effects, proposed mitigations and any associated residual environmental effects and proposed follow-up initiatives.

BHP recognizes that the scope and focus of any EIS that may be required under *CEAA 2012*, including the final selection of valued components (VCs) upon which it will focus, will be established by the CEA Agency based upon the requirements of the Act, the results of the review processes described previously, and associated input from participating governmental, Indigenous, stakeholder and public interests. Based on the initial information and analysis provided above (Table 5.1 and Table 5.2) and recent EAs for similar exploration projects off NL and elsewhere, a preliminary list of potential VCs upon which any eventual EIS will likely include:

- Marine Fish and Fish Habitat (including Species at Risk and of conservation concern);
- Marine and Migratory Birds (including Species at Risk and of conservation concern);
- Marine Mammals and Sea Turtles (including Species at Risk and of conservation concern);

- Special Areas;
- Commercial Fisheries and Other Ocean Users; and
- Indigenous Peoples.

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