Project Description

Shelburne Basin Venture Exploration Drilling Project

Prepared by:
Shell Canada Limited
9th Floor Founders Square
Halifax, Nova Scotia
B3J 3M8

AND

Stantec Consulting Ltd.
102-40 Highfield Park Drive
Dartmouth, Nova Scotia
B3A 0A3

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LIST OF ACRONYMS AND ABBREVIATIONS

ADW ..... Authorization to Drill a Well
AZMP ..... Atlantic Zone Monitoring Program
BOP ..... blow out preventer
BP ..... British Petroleum Exploration Operating Company
BSF ..... below sea floor
CEA Agency ..... Canadian Environmental Assessment Agency
CEAA, 2012 ..... *Canadian Environmental Assessment Act, 2012*
CEPA, 1999 ..... *Canadian Environmental Protection Act, 1999*
CNSOPB ..... Canada-Nova Scotia Offshore Petroleum Board
COSEWIC ..... Committee on the Status of Endangered Wildlife in Canada
DFO ..... Fisheries and Oceans Canada
DND ..... Department of National Defence
DP ..... dynamic positioning
DREA ..... Defence Research Establishment
EA ..... environmental assessment
EBSA ..... ecologically and biologically significant area
EEZ ..... exclusive economic zone
EIS ..... Environmental Impact Statement
EL ..... Exploration Licence
ENGO ..... environmental non-governmental organization
FAC ..... Fisheries Advisory Committee
GPS ..... global positioning system
HSE ..... health, safety and environment
km ..... kilometres
KMKNO ..... Kwilmu'kw Maw-klusuaqn Negotiation Office
m ..... metres

MARPOL .....International Convention for the Prevention of Pollution from Ships
MBBA ..... Maritimes Breeding Bird Atlas
MODU..... mobile offshore drilling unit
MPA ..... marine protected area
Mt..... metric tonne
NAFO.....Northwest Atlantic Fisheries Organization
NCNS ..... Native Council of Nova Scotia
NEB .....National Energy Board
OA.....operations authorization
OWTG .....Offshore Waste Treatment Guidelines
PD..... project description
POB..... persons on board
Project.....Shelburne Basin Venture Exploration Drilling Project
RAPID..... RAPID Climate Change Program
RDS .....Royal Dutch Shell
ROV.....remotely operated underwater vehicle
SARA .....*Species at Risk Act*
SBM .....synthetic-based mud
SDL.....significant discovery licence
SEA ..... strategic environmental assessment
TLP.....tension leg platform
TVD ..... total vertical depth
VSP.....vertical seismic profile
WAZ .....wide azimuth
WBM .....water-based mud

Table of Concordance of Project Description with Prescribed Information for the Description of a Designated Project

Regulation Clause	Requirement	PD Section(s)
REGULATION SOR/2012-148		
1.0 General Information and Contact(s)		
1	The name of the Project	1, 2.3, 3.1
1	The nature of the Project	1
1	The proposed location of the Project	1, 3.3
2	The proponent's name and contact information and the name and contact information of their primary representative for the purpose of the description of the Project	1, 2.3
3	A description of and the results of any consultations undertaken with any jurisdictions and other parties including Aboriginal peoples and the public	12
4(a)	Other relevant information, including the environmental assessment and regulatory requirements of other jurisdictions	1.1,13
4(b)	Information concerning any environmental study that is being or has been conducted of the region where the Project is to be carried out.	10.3
2.0 Project Information		
5	A description of the Project's context and objectives	3
6	The provisions in the schedule to the *Regulations Designating Physical Activities* describing the Project in whole or in part.	13.1.1
7	A description of the physical works that are related to the Project including their purpose, size and capacity	4
8	The anticipated production capacity of the Project and a description of the production processes to be used, the associated infrastructure and any permanent or temporary structures.	N/A

Regulation Clause	Requirement	PD Section(s)
9	A description of all activities to be performed in relation to the Project.	5
10	A description of any solid, liquid, gaseous or hazardous waste that is likely to be generated during any phase of the Project and of plans to manage those wastes.	7
11	A description of the anticipated phases of and the schedule for the Project's construction, operation, decommissioning, and abandonment.	6
3.0 Project Location Information		
12	A description of the Project's location, including:	
12(a)	▪ Geographic coordinates	3.3
12(b)	▪ Site maps produced at an appropriate scale in order to determine the Project's overall location and the spatial relationship of the Project components	1, 4, 8,10
12(c)	▪ The legal description of land to be used for the Project, including the title, deed or document and any authorization relating to a water lot	3, 8.2
12(d)	▪ The Project's proximity to any permanent, seasonal or temporary residences	4.3.3
12(e)	▪ The Project's proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples	4.3.3, Figure 10.1
12(f)	▪ The Project's proximity to any federal lands	8.2
4.0 Federal Involvement		
13	A description of any financial support that federal authorities are, or may be, providing to the Project	8.3
14	A description of any federal land that may be used for the purpose of carrying out the Project	8.2
15	Any federal legislative or regulatory requirements that may be applicable	1.1, 13

Regulation Clause	Requirement	PD Section(s)
	including a list of permits, licence or other authorizations that may be required in order to carry out the Project.	
5.0 Environmental Effects		
16	A description of the physical and biological setting	10
17 (a)	A description of any changes that may be caused, as a result of carrying out the Project, to fish as defined in section 2 of the *Fisheries Act* and fish habitat as defined in subsection 34(1) of that Act	11
17(b)	A description of any changes that may be caused, as a result of carrying out the Project to aquatic species, as defined in subsection 2(1) of the *Species at Risk Act*	11
17(c)	A description of any changes that may be caused, as a result of carrying out the Project to migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*	11
18	A description of any changes to the environment that may occur, as a result of carrying out the Project, on federal lands, in a province other than the province in which the Project is proposed to be carried out or outside of Canada	11
19	Information on the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the Project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	11
20	Summary of the information required under section 1 to 19	Project Description Summary Document

Regulation Clause	Requirement	PD Section(s)
Guide to Preparing a Description of a Designated Project under the *CEAA, 2012* (July 2012)		
1.0 General Information and Contact(s)		
1.1	Describe the nature of the designated project, and proposed location (2–3 paragraphs; note that additional location details are to be provided in section 3).	1
1.2	Provide proponent contact information: (a) Name of the designated project. (b) Name of the proponent. (c) Address of the proponent. (d) Chief Executive Officer or equivalent (include name, official title, email address and telephone number). (f) Principal contact person for purposes of the project description (include name, official title, email address and telephone number).	1, 2
1.3	Provide a list of any jurisdictions and other parties including Aboriginal groups and the public that were consulted during the preparation of the project description. (A description of the result of any consultations undertaken is to be provided in sections 6 and 7).	12
1.4	Provide other relevant information: ▪ Provide information on whether the designated project is subject to the environmental assessment and/or regulatory requirements of another jurisdiction(s). ▪ Provide information on whether the designated project will be taking place in a region that has been the subject of a regional environmental study. Proponents are advised to contact the Agency during the preparation of the project description for information regarding any regional environmental studies that may be relevant.	1.1, 13 10.3

Regulation Clause	Requirement	PD Section(s)
2.0 Project Information		
1	Provide a general description of the project, including the context and objectives of the project.	3
2	Indicate the provisions in the *Regulations Designating Physical Activities* setting out the designated activities that describe the project in whole or in part.	13.1.1
2.1	Provide a description of the components associated with the proposed project, including:	4
	▪ Physical works associated with the designated project (e.g., large buildings, other structures, such as bridges, culverts, dams, marine transport facilities, mines, pipelines, power plants, railways, roads, and transmission lines) including their purpose, approximate dimensions, and capacity. Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.	N/A
	▪ Anticipated size or production capacity of the designated project, with reference to thresholds set out in the *Regulations Designating Physical Activities*, including a description of the production processes to be used, the associated infrastructure, and any permanent or temporary structures.	N/A
	▪ If the designated project or one component of the designated project is an expansion, the percent of increase in size or capacity from the existing project (relative to the thresholds set out in the *Regulations Designating Physical Activities*).	N/A
	▪ A description of all activities to be performed in relation to the designated project	5

Regulation Clause	Requirement	PD Section(s)
2.2	Provide a description of any solid, liquid, gaseous or hazardous wastes likely to be generated during any phase of the designated project and of plans to manage those wastes, including the following: ▪ Sources of atmospheric contaminant emissions during the designated project phases (focusing on criteria air contaminants and greenhouse gases, or other non-criteria contaminants that are of potential concern) and location of emissions. ▪ Sources and location of liquid discharges. ▪ Types of wastes and plans for their disposal (e.g., landfill, licensed waste management facility, marine waters, or tailings containment facility).	7
2.3	Provide a description of the timeframe in which the development is to occur and the key project phases, including the following: ▪ Anticipated scheduling, duration and staging of key project phases, including preparation of the site, construction, operation, and decommissioning and abandonment. ▪ Main activities in each phase of the designated project that are expected to be required to carry out the proposed development (e.g., activities during site preparation or construction might include, but are not limited to, land clearing, excavating, grading, de-watering, directional drilling, dredging and disposal of dredged sediments, infilling, and installing structures).	6 5
3.0 Project Location		
1	Coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the facility or, for a linear project, provide the beginning and end points	3.3.1

Regulation Clause	Requirement	PD Section(s)
2	Site map/plan(s) depicting location of the designated project components and activities. The map/plan(s) should be at an appropriate scale to help determine the relative size of the proposed components and activities	3, 4, 8
3	Map(s) at an appropriate scale showing the location of the designated project components and activities relative to existing features, including but not limited to:	1, 8,10
3(a)	▪ Watercourses and waterbodies with names where they are known	Figures 1.1, 10.1, 10.2
3(b)	▪ Linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines)	8
3(c)	▪ Other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas and any waterborne structures)	8
3(d), 6(b)	▪ Location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory	Figure 10.1
3(e), 6(c)	▪ Federal lands including, but not limited to National parks, National historic sites, and reserve lands	8, 10
3(f)	▪ Nearby communities	8, 10
3(g) 6(a)	▪ Permanent, seasonal or temporary residences	N/A
3(h)	▪ Fisheries and fishing areas (i.e., Aboriginal, commercial and recreational)	8.4, Figure 8.1
3(i)	▪ Environmentally sensitive areas (e.g., wetlands, and protected areas, including migratory bird sanctuary reserves, marine protected areas, and National Wildlife areas)	Figures10.1 and 10.2
3(j)	Provincial and international boundaries	3, 8
4	Photographs of work locations to the extent possible	N/A

Regulation Clause	Requirement	PD Section(s)
5	Legal description of land to be used for the designated project, including the title, deed or document and any authorization relating to a water lot.	3, 8.2
3.1	To the extent that is known at this time, describe the ownership and zoning of land and water that may be affected by the project, including the following:	8
3.1(a)	▪ Zoning designations	8
3.1(b)	▪ Current land ownership, including sub-surface rights	8.2
3.1(c)	▪ Any applicable land use, water use (including ground water), resource management or conservation plans within and near the project site.	8
3.1(d)	For the proposed construction, operation, decommissioning and abandonment of a marine terminal, state whether or not the lands are routinely, and have been historically, used as a marine terminal, or are designated for such use in a land use plan that has been the subject of public consultation	N/A
3.1(e)	If the project is to take place within the waters or lands administered by a Canada Port Authority under the Canada *Marine Act* and its regulations, describe applicable land status and zoning under the Port Land Use Plan.	8.2
3.1(f)	Describe whether the designated project is going to require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Aboriginal peoples	9, 11
4.0 Federal Involvement—Financial Support, Lands and Legislative Requirements		
1	Describe if there is any proposed or anticipated federal financial support that federal authorities are, or may be, providing to the designated project	8.3
2	Describe any federal lands that may be used for the purpose of carrying out the designated project. This is to include any information on any granting of interest in federal land (i.e., easement, right of way, or transfer of ownership)	8.2
3	Detail any federal legislative or regulatory requirements that may be applicable,	13

Regulation Clause	Requirement	PD Section(s)
	including a list of permits, Licence or other authorizations that may be required to carry out the designated project.	
5.0 Environmental Effects		
1	A description of the physical and biological setting, including the physical and biological components in the area that may be adversely affected by the project (e.g., air, fish, terrain, vegetation, water, wildlife, including migratory birds, and known habitat use).	10
2	A description of any changes that may be caused as a result of carrying out the designated project to:	11
2(a)	▪ Fish and fish habitat, as defined in the *Fisheries Act*	11
2(b)	▪ Aquatic species, as defined in the *Species at Risk Act*	11
2(c)	▪ Migratory birds, as defined in the *Migratory Birds Convention Act, 1994*	11
3	A description of any changes to the environment that may occur, as a result of carrying out the designated project, on federal lands, in a province other than the province in which the project is proposed to be carried out, or outside of Canada	11
4	A description of the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the designated project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	11

Regulation Clause	Requirement	PD Section(s)
6.0 Proponent Engagement and Consultation with Aboriginal Groups		
1	A list of Aboriginal groups that may be interested in, or potentially affected by, the designated project, including contact information (location, name, mailing address, email address, and fax and telephone numbers).	9
2	A description of the engagement or consultation activities carried out to date with Aboriginal groups, including:	12
2(a)	▪ Names of Aboriginal groups engaged or consulted to date with regard to the project	12
2(b)	▪ Date(s) each Aboriginal group was engaged or consulted	12
2(c)	▪ Means of engagement or consultation (e.g., community meetings, mail or telephone).	12
3	An overview of key comments and concerns expressed by Aboriginal groups identified or engaged to date, including any responses provided to these groups.	12
4	An overview of information on current use of lands and resources for traditional purposes by Aboriginal groups or peoples (e.g., information provided verbally or in writing, and past or present studies).	11
5	A consultation and information-gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information to be collected (or, alternatively, an indication of why such engagement or consultation is not required).	12
7.0 Consultation with the Public and Other Parties (other than Aboriginal consultation included above)		
1	A list of stakeholders that may be interested and potentially affected by the carrying out of the designated project. In addition, please describe consultation activities carried out to date with stakeholders, including:	12

Regulation Clause	Requirement	PD Section(s)
1(a)	Names of stakeholders previously consulted	12
1(b)	Date(s) each stakeholder was consulted	12
1(c)	Means of consultation (e.g., community meetings, mail or telephone)	12
2	An overview of key comments and concerns expressed to date by stakeholders and any responses that have been provided.	12
3	An overview of any ongoing or proposed stakeholder consultation activities.	12
4	A description of any consultations that have occurred with other jurisdictions that have environmental assessment or regulatory decisions to make with respect to the project.	12
8.0 Executive Summary		
	Proponents are to include as part of the project description an executive summary that summarizes the information identified in Sections 1 to 7 of [the] Guide. Under CEAA, 2012, the Agency is required to consult the public on a summary of the project description that has to be posted on the Agency's Internet site in both of Canada's official languages as required under the *Official Languages Act*. As a result, in order to be in a position to initiate the screening phase in a timely manner, the executive summary is to be prepared and submitted to the Agency in both English and French.	Project Description Summary Document

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1 INTRODUCTION

Shell Canada Limited (Shell) is proposing to conduct an exploratory drilling program within the area of its offshore Exploration Licences (EL) 2423, 2424, 2425, 2426, 2429 and 2430 (the Licences). These activities will be conducted pursuant to the six year exploration periods that commenced on March 1, 2012 for ELs 2423, 2424, 2425 and 2426 and January 15, 2013 for ELs 2429 and 2430.

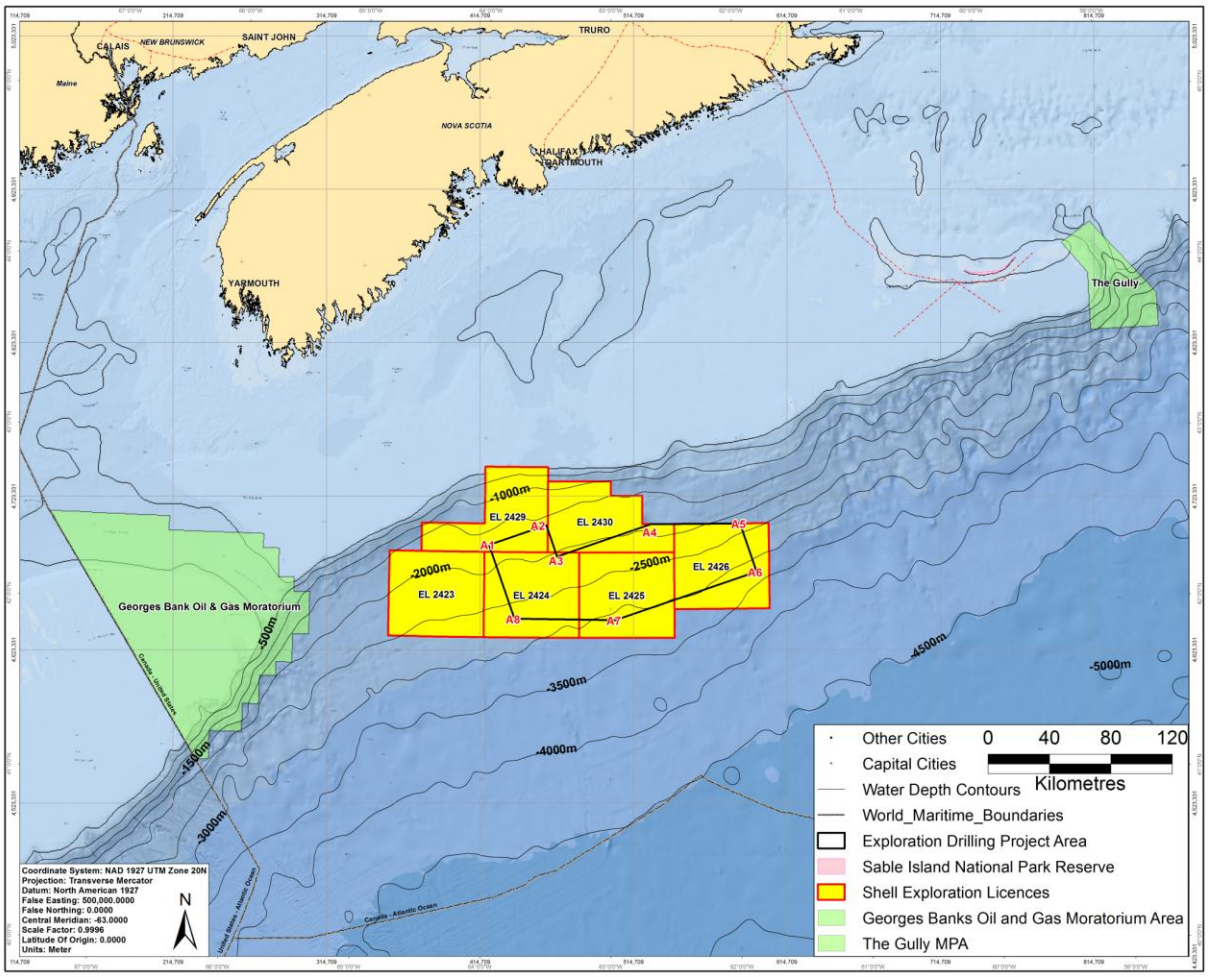


Figure 1.1 Proposed Exploration Drilling Project Area

The Shelburne Basin Venture Exploration Drilling Project (the Project) consists of up to seven exploration wells drilled over a four-year period from 2015 to 2019 in association with the exploration periods of the Licences. The Project will be divided into two separate drilling campaigns, further outlined in Section 6. Each phase of drilling will be contingent upon the results from Shell's Shelburne Basin 3D Seismic Survey conducted in summer 2013, as well as the results of the previous phases of drilling conducted in association with the Project. Specific drilling

locations have not yet been identified and will be determined using seismic data gathered as part of the Shelburne Basin 3D Seismic Survey.

An onshore supply base (supply base) and support vessels will be required to support the Project. The supply base will be owned and operated by a third party. The location of the supply base has not yet been determined, but existing industrial port locations along the coastline of Nova Scotia are currently being considered. Details regarding the potential locations as well as anticipated requirements and activities associated with the supply base are further outlined in Section 4.3. Support vessels will be used to transport supplies to the mobile offshore drilling unit (MODU) during the Project. Details regarding support vessels is provided in Section 4.3.

1.1 Regulatory Context

The Project is expected to require an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) since the drilling, testing and abandoning offshore exploratory wells is listed under section 10 of the Schedule of Physical Activities included in the *Regulations Designating Physical Activities* as amended on October 24, 2013.

Additionally, an EA will be required as part of the Operations Authorization (OA) being sought from the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) for the Project. The CNSOPB is responsible for regulating activities related to the exploration, development and transportation of oil and gas offshore of Nova Scotia through authorizations. It is expected an Environmental Impact Statement (EIS) completed to satisfy the CEAA, 2012 requirements will satisfy the CNSOPB EA requirements. In addition to the requirement for an EA, the CNSOPB will require the following to be submitted in satisfactory form prior to issuing an OA:

- a Canada – Nova Scotia Benefits Plan
- a Safety Plan
- an Environmental Protection Plan (including a waste management plan)
- a Spill Contingency Plan
- appropriate financial security
- appropriate certificates of fitness for the equipment proposed for use in the activities

At present, a provincial level EA under the Nova Scotia *Environment Act* is not anticipated based on the current Project scope. Details of the expected EA triggers and how they relate to the Project are provided in Section 12.

This Project Description (PD) is provided to the Canadian Environmental Assessment Agency (CEA Agency) to provide an overview of the Project and to initiate the associated EA process under

CEAA, 2012. As well, this PD is submitted in order to provide sufficient information on the Project to enable government agencies, the Mi'kmaq of Nova Scotia, and other stakeholders to assess whether they may have an interest in the Project.

This PD is an accurate reflection of Shell's present knowledge of the Project. Additional details will be included in the EIS as Project planning proceeds and Project details become more clearly defined.

2 PROPONENT INFORMATION

Globally, Royal Dutch Shell (RDS) is active in more than 70 countries and worldwide employs approximately 87,000 full-time employees. In Canada, Shell is currently one of the country's largest oil and gas companies having been active in Canada since 1911. Headquartered in Calgary, Alberta, Shell employs more than 8,000 people across Canada. Shell's Upstream business explores for and produces oil and natural gas using a variety of technologies, and includes business streams such as deep water, heavy oil and unconventional (e.g., shale) developments. Shell's Downstream businesses manufactures, refines, distributes and sells oil, fuels, lubricants, petrochemicals and bitumen worldwide.

2.1 Offshore Experience

Shell's experience operating offshore Nova Scotia dates back almost 50 years. Since the company acquired its first offshore leases in 1963 (~80,000 km^2), Shell has participated in 77 of the nearly 200 wells drilled offshore Nova Scotia to date inclusive of the first offshore gas discovery well, Onondaga B-84 in 1969. The first Nova Scotia offshore rig made at the Halifax shipyards, the semi-submersible Sedco H, was built and put into service by Shell in 1970. In the early 1970's, Shell drilled 24 wells and had an active exploration program through the 1980s, which involved drilling the first deepwater well (Shubenacadie H-100) and significant new gas discoveries (Glenelg, Alma, North Triumph). These discoveries resulted in the development of the Sable Offshore Energy Project, of which Shell has a 31.3% interest. As a result of Shell's activities, the company holds 28 Significant Discovery Licences (SDLs) in the Nova Scotia offshore, including the Primrose, Onondaga, Intrepid, Chebucto and Uniacke discoveries near Sable Island. The company's last 100% interest well was drilled in 2002 on the Onondaga B-84 discovery.

Internationally, RDS has a number of existing offshore exploration and production plays and significant experience in deepwater drilling. This deepwater drilling experience includes projects in the United States, Nigeria, Brazil, Malaysia, Brunei, French Guiana, and Norway. In addition, RDS has experience developing and operating in northern offshore environments including the Beaufort Sea and the North Sea. As a result, RDS is a recognized global leader in deep water exploration, with the following industry milestones:

- 2013 – announcement that RDS will design and build the world's deepest production facility at a water depth of 2900 m at their Stones discovery in the Gulf of Mexico. This facility will also include the deepest gas export pipeline in the world
- 2013 – RDS' largest tension leg platform (TLP), Olympus, was constructed and is on location at the Mars B field in the Gulf of Mexico where it is moored in a water depth of 910 m

- 2006 – announcement that three fields will be developed through the use of the Perdido Regional Host development spar; moored in a water depth of 2,400 m. This spar is the deepest production facility in the world
- 2003 – installation of the Na Kika floating development and production system in 1,920 m of water
- 2001 – Brutus TLP installed in 910 m of water
- 1998 – Ursa TLP installed in a water depth of 1,160 m
- 1997 – Ram Powell TLP installed in a water depth of 980 m
- 1996 – Mars TLP installed in 900 m of water, setting a water depth record
- 1993 – Auger TLP established a Gulf of Mexico water depth record when it was installed in 870 m of water
- 1988 – deployment of the Bullwinkle platform, the world's tallest conventional (pile-supported) fixed steel platform in 410 m of water (NRI 2012, Internet site).

Future drilling locations in association with the Project are anticipated to be in depths less than 3000 m.

2.2 Commitment to Health Safety and the Environment

Shell's general operating principles are underpinned by a deliberate focus on safety and environmental protection. Shell meets or, in most cases, exceeds regulatory requirements applicable to its operations, which are designed to reduce risks to the environment and keep people safe. Shell's safety record is built on strict company standards, multiple safety barriers to prevent incidents from occurring and to enable a quick and effective response should it be necessary, extensive safety competence assurance, and a culture that requires workers, contractors and visitors to stop any unsafe activities.

All operations relating to the Project will be required to comply with Shell standards and regulatory standards. Shell and its Contractors will institute appropriate health and safety programmes to provide a safe working environment for all personnel and to conduct operations in a responsible manner in compliance with corporate standards and regulatory requirements.

In addition to personal safety considerations, Shell's business operations include a number of critical process safety elements that are integrated into all phases of development from Project planning (well design) to operations (well drilling and testing). These process safety elements function to minimize the probability of any accidental events from occurring including physical controls and barriers as well as operational processes and procedures established to reduce the likelihood of accidental events. In addition to preventative measures, response plans will be established and tested to ensure effective response in the unlikely event that an accidental event should occur.

2.3 Proponent Contacts

A Halifax Regional Office has been opened in support of the Shelburne Basin Venture Exploration Drilling Project and key technical staff will be located in Halifax for the duration of the Project. Additionally, support for the Project will also be provided by staff at the Calgary Head Office and will draw upon Shell's deep water expertise from Houston, New Orleans, and other global deep water operations. The associated addresses for these office locations are:

Calgary Head Office	Halifax Regional Office
400 4th Avenue SW	9th Floor Founders Square
Calgary, Alberta	1701 Hollis Street
T2P 2H5	Halifax, Nova Scotia
	B3J 3M8

All communications regarding the EA for this Project should be sent to the following:

Primary Contact:

Candice Cook-Ohryn
Environmental Lead
400 4th Avenue SW
Calgary, Alberta
T2P 2H5
Direct: (403) 384-8747
Email: candice.c.cook@shell.com

Secondary Contacts:

Scott McDonald
East Coast Operations Manager
9th Floor Founders Square
1701 Hollis Street
Halifax, Nova Scotia
B3J 3M8
Direct: (902) 421-6416
Email: s.mcdonald2@shell.com

Erik Goodwin
North Atlantic Frontier Team Leader
Direct: (281) 450-5841
Email: Erik.B.Goodwin@shell.com

3 BACKGROUND INFORMATION

3.1 General Project Overview

The Shelburne Basin Venture Exploration Drilling Project is being proposed to further the existing understanding of the hydrocarbon potential of Shell's currently held Licences within the Nova Scotia offshore area. The Project is anticipated to consist of up to seven exploration wells divided into two drilling campaigns conducted from 2015 to 2019 with the second drilling campaign dependent on the results of the first drilling campaign.

More detailed information on the Project components, associated activities and proposed schedule is provided in Section 4, 5 and 6 respectively.

3.2 Project Purpose and Rationale

In 2011, Shell participated in a Call for Bids issued by the CNSOPB for deep water offshore Nova Scotia parcels. In March 2012, Shell was awarded four ELs covering 13,765 km^2 (ELs 2423, 2424, 2425 and 2426) with a Work Expenditure Bid of $970 million (CNSOPB 2012a, Internet site). Four additional ELs (ELs 2427, 2428, 2429, 2430) were acquired in the 2012 Call for Bids, awarded in January 2013. In the Shelburne Basin, ELs 2429 and 2430 were added to the existing four ELs with a Work Expenditure Bid of almost $28 million (CNSOPB 2012b, Internet site), resulting in six contiguous ELs (ELs 2423, 2424, 2425, 2426, 2429 and 2430) covering an area of 19,845 km^2. ELs 2427 and 2428 are not included as part of the Project. In acquiring the ELs, Shell holds the exclusive right to drill and test for potential hydrocarbons, and to obtain a production licence to develop these areas in order to produce hydrocarbons should the exploratory drilling prove successful.

The schedule of activities proposed for the Project is intended to meet the requirements of the Work Expenditure Bid within the initial six year exploration period of the nine year EL. The purpose of exploratory drilling is to test potential drilling targets identified in the analysis of seismic data to determine the presence, nature and quantities of the potential hydrocarbon resource.

Wells drilled as part of the Project are specifically for exploration and appraisal of the potential hydrocarbon resource and would not be used for production. The outcome of these exploratory activities is uncertain, and it is possible that Shell does not discover hydrocarbons in economic quantities during the Project. However, should the initial exploration wells be successful, additional wells would need to be drilled to appraise the resource. These additional wells are a part of the Project and included in the scope of this Project Description. Wells drilled for production would be considered under a different project scope requiring a separate EA and further licensing from the CNSOPB.

3.3 Spatial Boundaries

3.3.1 Exploration Drilling Project Area

Specific drill sites have not yet been determined and will be identified utilizing seismic data gathered as part of Shell's Shelburne Basin 3D Seismic Survey conducted in 2013, as well as geotechnical surveys anticipated to be conducted in 2014. Shell expects that future exploration drilling activities associated with this Project will occur within the Exploration Drilling Project Area (Project Area) shown in Figure 1.1 and detailed in Table 3.1 below. The Project Area has been delineated based on preliminary results from the Shelburne Basin 3D Seismic Survey data as well as analysis of existing 2D seismic data collected over the area.

The Project Area is inclusive of portions of EL 2424, 2425, 2426, 2429 and 2430 and encompasses almost 40% (7870 km^2) of the total area of the Licences (19,845 km^2). The Project Area is located approximately 250 km offshore from Halifax in a geographical offshore area known as the Southwest Scotian Slope and a geological region known as the Shelburne Basin (See Figure 1.1). Water depths in the Project Area range from 1000 to 3000 m.

The corner coordinates of the Project Area are provided in Table 3.1.

Table 3.1 Project Area Corner Coordinates

Project Area "Corner"	NAD27	
	Latitude DMS	Longitude DMS
A1	42° 22' 25.752" N	63° 57' 51.480" W
A2	42° 18' 37.296" N	63° 25' 22.080" W
A3	42° 29' 58.668" N	62° 40' 56.640" W
A4	42° 29' 59.532" N	61° 58' 32.880" W
A5	42° 12' 58.788" N	61° 50' 58.560" W
A6	41° 56' 34.080" N	63° 45' 29.880" W
A7	42° 29' 35.232" N	63° 30' 44.640" W
A8	41° 56' 11.976" N	62° 57' 54.000" W

3.3.2 Study Area Spatial Boundaries

The study area spatial boundaries for the EIS will be determined as part of the EA process to adequately and appropriately consider any potential adverse environmental effects from the Project. Trajectory modeling will be conducted to consider malfunctions or accidental events (i.e., spills or releases) and the results of this modeling will further inform the extent of the Project's study area spatial bounds. As a result, these spatial boundaries may extend beyond the Project Area and potentially beyond the boundaries of the Licences.

3.4 Project Access

The Project Area is located approximately 250 km offshore from Halifax. During drilling activities, access to the Project Area will be necessary to re-supply the MODU and facilitate crew changes. Support vessels and helicopters will be used to facilitate these requirements. Transit to the Project Area by sea takes about 12 hours travelling at a vessel speed of 12 knots (22 km/h) from Halifax, or about 1.5 hours by helicopter.

It is anticipated that an existing industrial port will be used as a supply base and as such access to the site by land and water will already be in place. Therefore no additional onshore land or port access, or upgrades to existing access is presently anticipated as part of the Project.

3.5 Local Benefits

Shell recognizes the importance of providing local benefits associated with the Project to Canadians and, in particular, to Nova Scotians. Under section 45 of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* (*Accord Act*), an Operator is required to have an approved Benefits Plan prior to the approval or authorization of any work or activity in the Nova Scotia Offshore Area. As part of the Benefits Plan, an Operator is required to address how the following requirements will be met:

- Provision of full and fair opportunity for manufacturers, consultants, contractors and service companies in Nova Scotia, and other parts of Canada, on a competitive basis in the supply of goods and services used in any proposed work or activity referred to in the Benefits Plan
- The establishment of an office in the Province to help support the Project
- Residents of the Province are given first consideration for training and employment in the work or activity for which the Benefit Plan is being submitted
- The development and implementation of an education, training, research and development expenditure program in the Province related to petroleum resource activities in the offshore area
- First consideration given to services provided from within the Province, and to goods manufactured in the Province, where those services/goods are competitive in terms of fair market price, quality and delivery

Consistent with the requirements of the *Accord Act*, Shell is committed to providing local benefits and opportunities associated with the Project activities.

Shell will provide full and fair opportunity to Canadian individuals and organizations, in particular those from Nova Scotia, to participate in the Project and give first consideration to personnel,

support and other goods and services that can be produced and provided within Nova Scotia. Key consideration will also be given to whether the associated goods and services can be delivered at a high standard of health, safety and environmental (HSE) competency, are of high quality and are competitive in terms of fair market price.

4 PROJECT COMPONENTS

The Project will consist of the following primary components:

- A MODU designed for year-round operations in deep water will be used for the drilling activities; and
- Offshore Exploration Wells (up to seven) to be drilled over a four-year period from 2015 through 2019 in association with the exploration period of the Licences.

Logistical support will also be required to support the Project, consisting of:

- Marine support vessels for re-supply and for on-site standby during drilling activities;
- Helicopter support for crew transport as well as delivering light supplies and equipment; and
- Onshore supply base support on the coast of Nova Scotia (location pending) for staging, storage and transfer of supplies and equipment from shore to the offshore MODU.

The only Project component to be newly developed as part of the Project will be the offshore exploration wells. All other associated Project primary components and logistical support (MODU, support vessels, helicopter support, and onshore supply base) will use existing sites, infrastructure and/or equipment.

4.1 Mobile Offshore Drilling Unit

Either a drill ship or a semi-submersible will be used as the MODU for the Project. Both of these MODU options would use a dynamic positioning (DP) system to keep them on location and therefore have no requirement for subsea mooring. The specific MODU to be used for the Project has not yet been chosen and will be dependent on suitability and availability. It is anticipated that the selected MODU will be capable of drilling year round and be rated for ultra-deep water drilling in order to support the potential needs of the Project. Some of the key components of a MODU include:

- DP system to maintain position under various environmental conditions. Typically these systems are equipped with wind sensors, satellite global positioning system (GPS) and gyroscopes to monitor the environmental conditions as well as the MODU's position
- Drilling derrick which contains and operates the drilling equipment
- Ballast control used to maintain stability during operations
- Diesel generated power system to operate the ship and the associated drilling equipment
- Helicopter deck and refueling equipment
- Open storage space to house the associated drilling materials (fuel oil, drilling muds, cement, etc.) and equipment (casing) in advance of use for drilling activities

- Subsea equipment inclusive of well control equipment and marine risers to be used for drilling operations
- Cranes for supply and equipment transfer as well as support for drilling activities
- Waste management facilities for the offshore treatment or temporary storage prior to shipment to shore
- Emergency and life-saving equipment inclusive of fire-fighting equipment, lifeboats and rafts for emergency evacuation
- Accommodations for up to 200 persons on board (POB)

4.1.1 Drill Ship

Drill ships are equipped with an onboard drilling derrick and moon pool (opening in the base of the vessel hull providing direct access to the water for drilling operations). Drill ships are commonly used for drilling in deep and ultra-deep water (up to 3500 m) and utilize a DP system to remain on location. Thrusters are located in the fore, aft and mid sections of the vessel and respond to the DP control system to mechanically maintain vessel position. Figure 4.1 below shows an example of a typical drill ship and illustrates some of the main equipment found onboard.

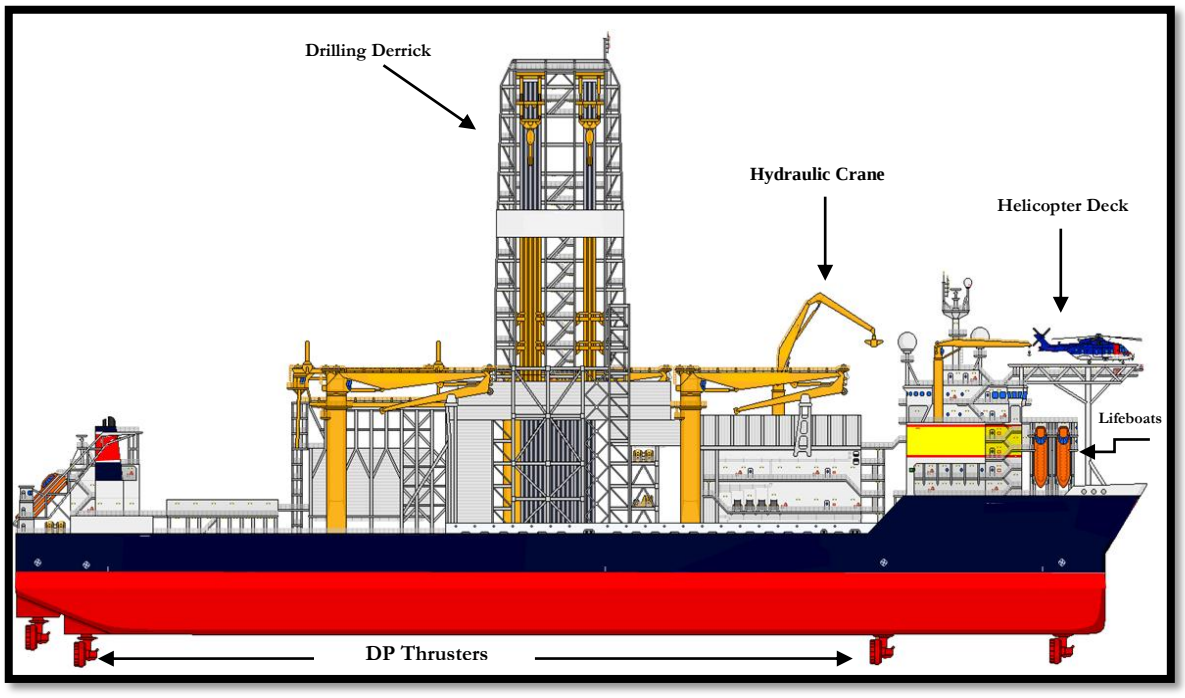
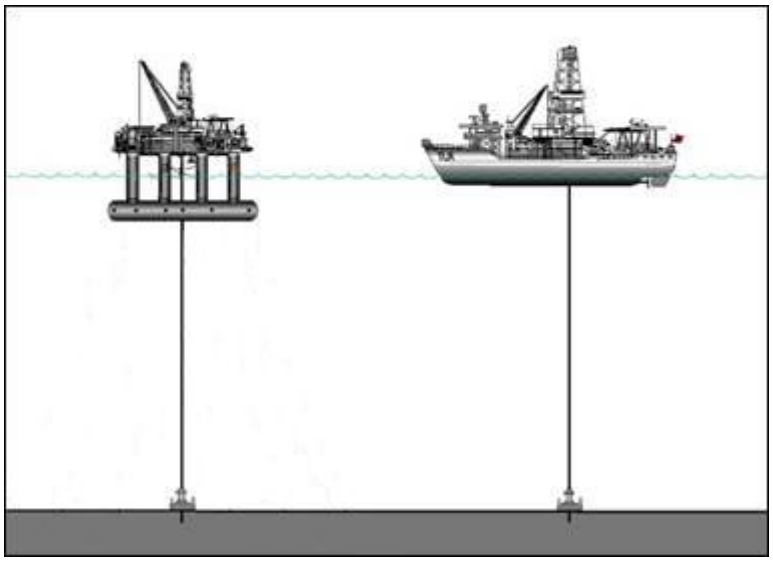


Figure 4.1 Typical Offshore Drill Ship

4.1.2 Semi-Submersible

A semi-submersible rig consists of two lower hulls that function to support several vertical columns, upon which the main deck of the rig sits. Both the submersed hulls and columns are ballasted with water so that the rig floats with the columns supporting the main deck and balancing it above the

water. The hulls remain below the water surface once ballasted. Semi submersibles are quite stable in rough seas providing a stable drilling platform as a result of much of the mass of the MODU being below the waterline. Semi-submersibles can be either towed by tug boat or moved under their own power to the chosen drill site. Once on site and ballasted, a DP system is utilized to maintain position in deep waters and no bottom mooring is used. Figure 4.2 provides a comparison of the two MODU options (semi-submersible and drill ship) under consideration.



Source: Adapted from MMS 2000

Figure 4.2 Schematic of Semi-Submersible (left) and Drill Ship (right)

4.2 Offshore Exploration Wells

Offshore Exploration Wells (up to seven) will be drilled over a four-year period from 2015 through 2019 in association with the exploration period of the ELs. Further information regarding the offshore wells is provided in Sections 5 and 6.

4.3 Logistical Support

4.3.1 Support Vessels

Support vessels will be used for the transport of supplies from the supply base to the MODU to provide as well as for assistance during drilling activities, and for returning waste material for appropriate disposal onshore. It is anticipated that two to three support vessels will be required for the transport of associated materials and equipment (drilling fluids, casing, water, cement, fuel, etc.) and delivery to the MODU. During drilling activities, it is anticipated that the support vessels responsible for transporting supplies will make between two to three round trips per week from the supply base to the MODU.

One support vessel must also be present on site at all times as a standby vessel as required by Shell's operating standards and under the CNSOPB regulations. This support vessel will remain with the MODU for the purposes of on-site support in the event that emergency response or operational assistance is needed.

Support vessels will be compliant with the Eastern Canadian Vessel Traffic Services Zone Regulations when operating in nearshore or harbor areas, and will follow applicable Port Authority requirements when in a port. Although the exact routes for the supply vessels have not yet been determined, they are expected to be consistent with the shipping traffic routes/lanes commonly used by other vessels. Once out in the open sea, the support vessel will select the route most appropriate for reaching the destination.

4.3.2 Helicopter Support

Project activities will require helicopter support for transfer of crew and light supply. During drilling activities, it is anticipated that an average of one trip per day from onshore Nova Scotia to the MODU will be required. Additionally, helicopter support will be used in the event that emergency medical evacuation from the MODU is necessary during drilling activities.

The MODU will be equipped with a helicopter landing pad to support this service. A helicopter contractor will be selected in advance of the start of the Project.

4.3.3 Supply Base

Shell will need to secure an onshore supply base to support the offshore drilling operations. The supply base will be used for temporary storage and laydown areas for the equipment and materials needed to support the exploratory drilling activities. The location of the supply base must be established in advance of drilling operations in order to house the associated equipment and materials in preparation for drilling, as well as to receive supplies throughout exploratory drilling for transport to the MODU.

The supply base will be owned and operated by a third party, which would be responsible for obtaining any new approvals necessary for its management and operation in association with the Project. Shell is currently seeking qualified companies interested in providing the supply base/dock facilities, with associated logistics and management services, in support of the Project. All of the onshore supply base locations under consideration are existing marine terminals operated by third parties in highly developed settings. Furthermore, all of the candidate locations are currently utilized for routine industrial activities that are consistent with those that will be carried out in association with the Project, and therefore already have most of the primary infrastructure and facilities on-site. Although none of the supply bases under consideration would require an expansion of existing site

boundaries, some new infrastructure would be required at each of the sites. A discussion of the infrastructure requirements is provided below.

Shell is currently evaluating options for an onshore supply base through a tendering process and anticipates selecting a location by Q1 2014. The following four alternatives are currently being evaluated: Halterm Container Terminal (Piers B and C) in Halifax Harbour; Richmond Terminals (Pier 9) in Halifax Harbour; Woodside Atlantic Wharf (Dartmouth) in Halifax Harbour; and Mulgrave Marine Terminal in the Strait of Canso (refer to Figure 4.3). The factors considered in the selection of the preferred location will include accessibility (rail and highway transportation options nearby), proximity to the offshore drilling location, existing on-site infrastructure, available space and financial considerations.

The following list identifies the infrastructure that would be needed for the supply base but that already exists at each of the proposed locations without requiring new construction or in-water works (e.g., wharf extension):

- Dock/pier facility with sufficient water depth for safe berthing of two typical sized offshore support vessels
- Access roads
- Storage and laydown area(s) for the placement and temporary storage of drilling materials (cement) and equipment (casing and tubular materials)
- Permanent office space
- Warehousing
- Dock support equipment inclusive of heavy lift cranes, forklifts and additional handling equipment.

Depending on which candidate location is ultimately selected, some or all of the following additional equipment and/or infrastructure may be required to accommodate the supply base requirements for the Project:

- a mud batch plant with associated storage tanks for the storage of drilling mud and dry bulk products (e.g., cement, barite, bentonite)
- storage tanks/silos for the storage of additional dry bulk products (e.g., cement)
- fencing and/or gates within existing property boundaries
- pipe racks and warehouse racking in existing storage and laydown areas
- temporary/portable offices
- additional material handling and dock support equipment (e.g., cranes and forklifts)additional lighting which would be incremental to existing lighting at the site.

On-site excavation and site preparation activities may be required in association with mud batch plant installation and prior to the placement of storage tanks and silos on site respectively (refer to Section 5.1.1). However, no site expansion, clearing, building construction, or in-water works will be required at any of the onshore supply base locations under consideration. Any addition(s) or modification(s) made to the selected onshore supply base location, including mud batch plant installation (if applicable), will be limited to the placement or assembly of equipment and infrastructure within the current spatial boundaries of the site, in onshore areas that are already disturbed (i.e., already paved, graveled, or otherwise developed).

Modifications at the supply base will not include the addition of fueling infrastructure. Fueling of Project-related vessels, vehicles, and equipment will take place only at existing facilities with all of the necessary permits and infrastructure already in place.

There are no wetlands on, adjacent to, or in close proximity to any of the supply base locations. Additionally, there are no First Nation reserve lands located adjacent to or in close proximity to any of the supply base locations. The closest First Nation reserve land is that of the Millbrook First Nation and is located approximately 5 km east of the Woodside Terminal supply base option (refer to Figure 10.1). Based on review of aerial photography, the distances to the nearest permanent, seasonal or temporary residences are approximately 825 m for Halterm, 290 m for Richmond Terminal, 396 m for Woodside Terminal, and 166 m for Mulgrave Terminal.

Figure 4.3 Supply Base Location Options

One of the following four alternatives currently under consideration will ultimately be selected as the preferred supply base. It is anticipated that the contract for the selected supply base will be awarded in Q1 2014.

Halterm Container Terminal (Halifax Harbour)

The Halterm Container Terminal, also known as the South End Container Terminal, is located at the southern limit of the Port of Halifax development. It was opened in 1969 as the first container terminal in Halifax (Halterm Limited n.d.), and is operated by Halterm Limited under a long-term lease agreement with the landowner, Halifax Port Authority (HPA 2012).

The facility comprises Piers B and C and offers 975 linear metres of dock and 2,438 m of on-dock, double-stack rail (HPA 2012). As the largest container terminal in Atlantic Canada, it has processed more than 7,000 vessels and 30 million tonnes of cargo (Halterm n.d.).

Pier C was recently extended and deepened to increase container handling capacity at the Halterm Container Terminal. With two post-Panamax cranes, four ship gantry cranes, three deep-water berths (1,000 m in length), and roll on/roll off ramps, the terminal can simultaneously handle three fourth-generation vessels, as well as break bulk cargo (i.e., cargo that doesn't fit in a 6 m container), rolling stock (Halterm n.d.), heavy-lift cargo, container cargo, and storage (HPA 2012). Other facilities include an on-site consolidation shed, maintenance shop and a full complement of terminal equipment (Halterm n.d.). Use of this site as a supply base for the Project would be consistent with the intended and existing use of the facility.

Richmond Terminals (Halifax Harbour)

Richmond Terminals is a multi-use facility and part of the Port of Halifax development, owned by the Halifax Port Authority. Located in the north end of Halifax, Richmond Terminals is adjacent to the Halifax Shipyard. Cargo capabilities at Richmond Terminals include project cargo, exclusive fibre optic cable facilities, break bulk, heavy-lift, containers, bulk, and offshore resupply (HPA 2012).

Richmond Terminals is currently undergoing an extensive upgrade to expand existing facilities with the intent to enhance cargo handling capacity. In particular, Piers 9B and 9C have been strengthened and a shed adjoining these piers has been expanded. The terminal roadway and extension of Pier 9C and 9D is expected to be completed in Q1 2014. Additional modifications to modernize Richmond Terminals are ongoing and are expected to be complete by Q3 2014. None of these modifications are related to the Project and use of this site as a supply base for the Project would be consistent with the intended use of the facility and surrounding land uses.

Woodside Atlantic Wharf (Halifax Harbour)

The Woodside Atlantic Wharf (Woodside Terminal) is located in the Woodside Industrial Park in Dartmouth and is owned by the Nova Scotia Business Development Corporation and managed by Nova Scotia Department of Transportation and Infrastructure Renewal. Among other industrial facilities, the Woodside Terminal hosts an offshore supply base for the Sable Offshore Energy Project and Deep Panuke Offshore Gas Development Project. In addition to servicing offshore development projects, the wharf is used for ship rebuild and repair, and also serves as a layup wharf (HPA 2012).

The wharf offers 168 m of linear dock and there is currently 1.3 ha of laydown space available. Use of this site as a supply base for the Project would be consistent with the existing use of the facility.

Mulgrave Marine Terminal (Strait of Canso)

The Mulgrave Marine Terminal is located in the Town of Mulgrave and owned and operated by the Strait of Canso Superport Corporation. There are two berths, totaling 500 m in length, as well as 0.8 ha of fenced, long-term laydown area adjacent to dockside, 3160 m^2 of warehouse space, and 3170m^2 of office space. Typical cargoes handled at the Mulgrave Marine Terminal include, but not limited to: road salt, aggregate, slag, kraft pulp, and fertilizer (Strait Superport 2013). Use of this site as a supply base for the Project would be consistent with intended and existing use of the facility.

5 PROJECT ACTIVITIES

For the purposes of this PD, the Project activities have been divided into individual phases that are associated with the drilling of each exploration well. These individual phases include:

- Mobilization
- Drilling
- Vertical Seismic Profiling
- Well testing
- Abandonment

5.1 Mobilization

5.1.1 Supply Base

Mobilization activities will commence with the set-up of any new equipment or infrastructure not already existing on the supply base including the mud batch plant facilities and storage tanks/silos. Additionally, arrival of drilling equipment (casing and well head equipment) would also occur. Pending any necessary regulatory approvals, these activities are anticipated to begin as early as Q4 of 2014 to ensure the equipment and materials are in place in advance of drilling activities.

Installation of the mud batch plant will require the longest lead time, if required (i.e., if not already present at the selected supply base or if mud is not sourced from an alternate existing facility). In total, the supply base will require a lead time of approximately six months to allow for pre-installation logistical preparations, as well as physical installation. Physical installation activities will take approximately two months to complete and will include installation of the following components:

- secondary containment consisting of non-permeable liner and dyke system
- concrete pads for the tanks
- tank storage capacity consisting of approximately seventeen 90 m^3 tanks for mud, one 90 m^3 tank for calcium chloride ($CaCl_2$) brine, three 60 m^3 tanks for base oil, one 75 m^3 mix tank
- double-walled feedline to allow for direct transfer to the support vessel, which may be installed underground.

Installation of the mud batch plant will take place entirely on previously disturbed land within the current spatial boundaries of an active industrial site, as will be the case for any other addition(s) or

modification(s) that may be required at the selected onshore supply base location (refer to Section 4.3.3).

Some excavation of existing disturbed areas may be required for installation of the liner and dyke system and feedline associated with the mud batch plant if existing infrastructure is not already in place. As noted in Section 4.3.3, excavation will not be required for any other activities to be undertaken at the selected supply base.

Additionally, existing storage areas may require some preparation (grading, compaction, berming) prior to placement of storage silo and tanks on site, but as indicated such site preparation would not require excavation. Standard industry practices to control erosion, runoff, and sedimentation will be adhered to during these activities, including the use of tarping, berming, silt fencing or other measures as appropriate.

5.1.2 Support Vessels

Support vessels will undergo Shell's internal audit process as well as the CNSOPB pre-authorization inspection process during Q4 of 2014 or Q1 of 2015 in preparation for the Project. These audits will take place to ensure compliance with Shell and CNSOPB requirements prior to operational start-up of the support vessel activity (i.e., supply transport to drilling location) scheduled to commence in Q2 of 2015. Transfer of supplies (mud, drilling chemicals, pipe, etc.) to the support vessels will occur a minimum of one week in advance of the anticipated spud date, pending regulatory approvals.

5.1.3 MODU

Offshore activities will commence with mobilization of the MODU at the pre-determined drill site. Prior to mobilization at the selected drilling site, the chosen MODU will undergo the required regulatory inspections to demonstrate that it meets Canadian safety and technical specifications. Upon receipt of the necessary regulatory approvals, authorizations and permits, the MODU will travel to the drilling site. Travel to the drilling site is anticipated to take between two to four days dependent on where the inspections are conducted and the type of MODU that is selected. Following arrival on-site, mobilization activities will include the following:

- If a semi-submersible is used as the MODU, ballasting operations will take place following arrival on site to provide suitable stability.
- The MODU will utilize its DP system to position above the drilling target. During drilling activities, the MODU will use computer managed thrusters to maintain position. The DP system works to consistently monitor the environmental conditions on site (i.e., currents, wind, etc.) and adjust accordingly so that the MODU is always positioned above the drilling target.

- Once the MODU is in position, pre-drill site surveys will be conducted using a remotely operated underwater vehicle (ROV) deployed to the seabed. These surveys will be conducted to confirm that no potential surface seabed hazards are present at the drilling location. These site surveys will take approximately one day to conduct and will include the video inspection of the seabed to confirm that no surface impediments are present. There is no ground disturbance or seabed samples planned for this remote survey.

Prior to mobilization and drilling activities, more detailed geotechnical and geohazard surveys will be conducted in 2014 over potential drilling locations as determined from the results of Shell's Shelburne Basin 3D Seismic Survey conducted in 2013. These geotechnical and geohazard surveys are not considered as part of this Project scope as they are not a designated project under the *Regulations Designating Physical Activities* and were already assessed under a previously approved EA submitted to the CNSOPB in 2013.

5.2 Drilling

Once the MODU has mobilized and ROV inspection of the seabed has been completed, drilling activities will commence. The actual well design inclusive of total vertical depth (TVD), drilling string depths and casing size are currently being developed, but a general overview of the associated steps for offshore drilling is provided below.

The drilling of each offshore well can be broken into two components starting with riserless drilling (i.e., an open system with no direct connection to the MODU) and continuing with riser drilling (i.e., closed loop system with direct connection to the MODU). Each well is anticipated to take approximately 130 days to drill to TVD. The following details are provided to give a general overview of the activities associated with deepwater drilling.

5.2.1 Riserless Drilling

During the drilling of the initial sections of the well, there is no close loop fluid system (no riser system) in place to return drilling fluid back to the MODU (i.e., riserless drilling). As such the associated drilling fluids, excess cement and cuttings are directed to the seabed and released directly to the seafloor. During this phase, the drilling fluid consists of seawater or water-based drilling mud (WBM) to cool the drill bit as well as transport the cuttings to the seabed. Once approved by the CNSOPB, riserless drilling will be used for the initial drill sections (conductor and surface strings) of each well, prior to connection of a riser system for drilling the additional sections to target depth. The following activities will occur during the riserless drilling portion of each exploration well:

- The drilling will commence with jetting of the conductor in place (conductor section), which will be jetted to about 100 m below the sea floor (BSF).

- The drill string is then re-inserted into the conductor pipe and a surface hole section is drilled to approximately 1000 m BSF. The surface casing is then lowered into the wellbore to depth and cemented in place to surface. This process of drilling, casing and cementing is followed for all further drill sections.
- A blow out preventer (BOP) stack is then placed at the end of the drilling riser pipe that is run down from surface to the well. The BOP is connected to the wellhead via the surface casing creating a connection between vessel and well via the riser system.

5.2.2 Riser Drilling

Following the installation of the BOP stack to the well head, the riser system creates a conduit to capture the associated drilling fluids and cuttings and transport them back to the MODU for further processing. During this phase of drilling the remaining well sections are drilled to TVD using either a water-based or synthetic- based mud (SBM). At varying intervals determined based on assessment of geological and pore pressure parameters, intermediate casing is set at established depths to reinforce the wellbore. At each intermediate section, the casing is cemented in place.

The associated exploration wells are anticipated to require up to six intermediate strings. The specific depths of each section and the size of associated casing have not yet been determined and will require review and approval by the CNSOPB prior to drilling activities. Figure 5.1 is a notional schematic of a typical well, showing the various sections. This schematic is subject to change as individual well design is completed. Final well design for the initial wells is anticipated to be finalized before the end of 2014.These technical details will be provided to the CNSOPB as part of the OA and Approval to Drill Well (ADW) applications submitted in association with the Project.

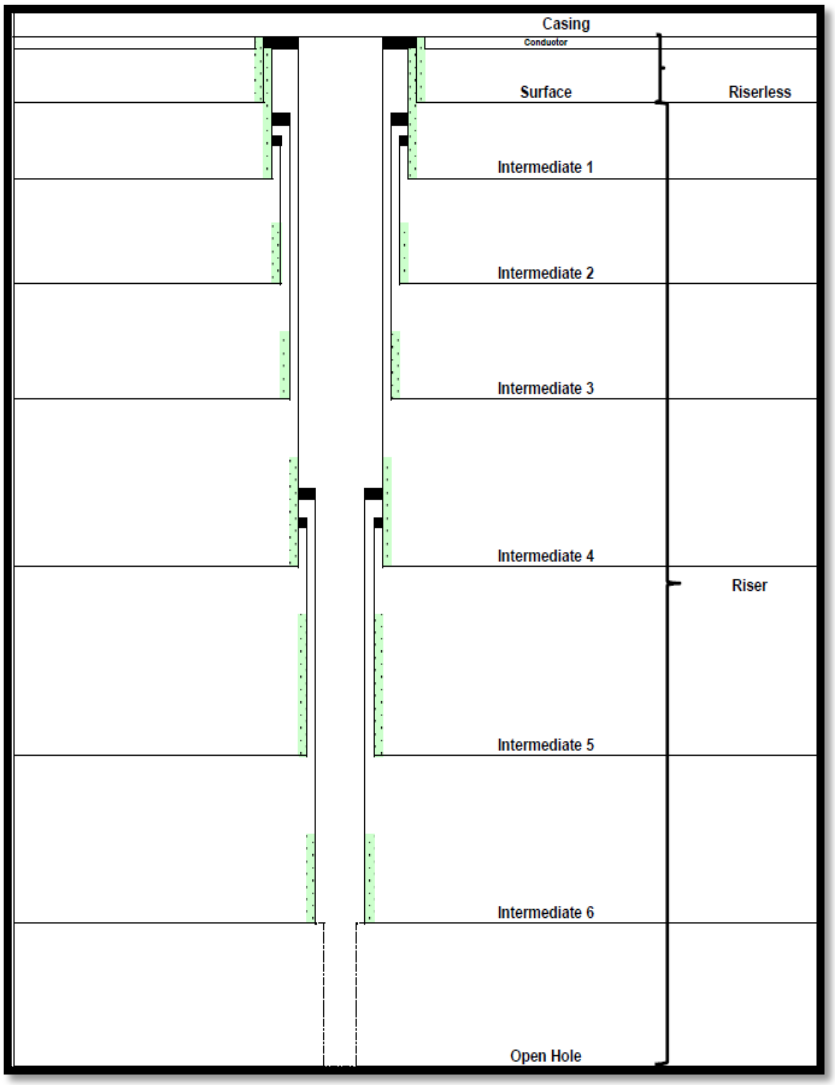


Figure 5.1 Notional Drilling Schematic

5.3 Vertical Seismic Profiling

Vertical Seismic Profiling (VSP) may be conducted in coordination with exploratory drilling activities. VSP employs similar technology to that used during a seismic survey (source and receiver) and can employ a number of different configurations that vary based on the positioning of the associated source and receivers. These methods include Zero-offset VSP, Offset VSP and Walkaway VSP. In Zero-offset VSP, receivers (hydrophones) are placed in the wellbore and a source is deployed directly above the receivers off the MODU. Offset and Walkaway VSP involve similar placement of the receivers within the wellbore, but source deployment and activation is conducted at variable distances from the receivers. In Walkaway VSP, activation of the source is conducted at progressively farther offset distances from the receivers within the wellbore. In an Offset or

Walkaway VSP scenario, the source would be deployed from a support vessel and activated at various distances from the receivers to a maximum distance of 10 km.

At present, they type of VSP to be conducted has not yet been determined, but all proposed methods will be assessed in the EIS. Although VSP uses a seismic source similar to that used in seismic operations (i.e., a source array) the associated size and volume of the array are much smaller than a traditional surface seismic survey. As well, the area in which VSP is conducted is focused around the associated wellbore. As a result, sound effects are localized.

5.4 Well Testing

The testing of a hydrocarbon discovery is a regulatory requirement under the CNSOPB regulations in order to convert an EL to a SDL. Thus, as part of exploratory drilling activities, wells may be tested to gather further details regarding the potential reservoirs and to assess the associated commerciality of any potential discovery. The decision to test any of the associated exploration wells will be made following evaluation of the associated core samples and logs collected during drilling activities. As a result, well testing may not be conducted immediately following drilling activities and the associated exploration wells could be suspended immediately following drilling with a MODU returning at a later date if well testing is determined to be necessary.

As the key objective of well testing is to collect a fluid sample, perforation of the respective reservoir(s) is necessary. Where well testing is determined to be necessary, casing will be set across the reservoir so that the well remains accessible and the borehole is protected. Additional well control tools are placed across the subsea BOP to maintain well control during testing activity. Once the well has been perforated, reservoir fluids are allowed to flow up the well to the deck of the MODU. In conjunction with this flow of reservoir fluids, the ship will have a temporary flow testing facility installed to handle the flow of any fluids from the wellbore. These reservoir fluids may contain hydrocarbons (oil and gas) and/or formation water (produced water).

The hydrocarbons are measured and separated from the produced water. Produced hydrocarbons and small amounts of produced water are flared using high-efficiency igniters for complete combustion and minimization of emissions. If produced water occurs, it will either be flared or treated in accordance with the latest version of the *Offshore Waste Treatment Guidelines* (OWTG) (National Energy Board [NEB] et al. 2010) prior to ocean discharge. Oil recovered during testing is stored onboard the MODU for future onshore disposal. Though sand production is possible during well testing, none is expected. Once well testing is complete, the associated test string is removed from the well and the well is abandoned in accordance with the *Nova Scotia Offshore Petroleum Drilling and Production Regulations*.

5.5 Abandonment

Wells drilled during the first campaign that are required for testing in the second campaign will be suspended for re-entry. Wells drilled in association with the Project cannot be used for production and, following testing, will be abandoned even in the event that hydrocarbons are discovered.

As a result, all wells drilled as part of the Project will be abandoned in accordance with CNSOPB regulatory requirements. Abandonment will take place immediately following drilling or well testing, if required.

Abandonment activities will include isolation of the wellbore using cement plugs. These plugs are placed at varying depths in the wellbore to separate and permanently isolate certain subsurface zones to prevent the escape of any subsurface fluids from the well. As part of well abandonment, approval may be sought to leave the wellhead in place. Where removal of the wellhead is required, the wellhead and associated equipment (casing) will be removed up to 1 m BSF through mechanical means (cutters).

Abandonment of individual exploration wells is anticipated to take approximately seven to ten days per well.

6 PROJECT SCHEDULING

The tentative schedule outlined in Table 6.1 sets out the proposed timeline for the various Project activities. Project planning is currently underway. First Nation and stakeholder engagement as well as regulatory activities specific to the Project began in Q3 of 2013 and will continue throughout the life of the Project as required.

Pending the third party operator's receipt of any regulatory approvals for supply base equipment and operation, supply base mobilization will commence with logistical site preparations and physical installation of the mud batch plant (if required). It is currently anticipated that activities would commence in Q4 2014, approximately six months in advance of the anticipated spud date of the first exploratory well to ensure all support logistics are in place to allow for drilling to commence following receipt of the necessary regulatory approvals required by Shell. Equipment and material storage will subsequently commence at the supply base location as early as Q1 2015. It is anticipated that well heads and casing will be brought on-site for storage first, in January 2015, followed by silos/tank storage necessities and additional equipment in March 2015. Drilling chemicals, mud, and dry bulk materials are not expected to arrive at the supply base until April/May 2015, just prior to commencement of drilling.

Exploration drilling activities are anticipated to commence in 2015, with the potential to continue until 2019. Offshore drilling activities will be initiated with mobilization of the support vessels and the MODU in Q2 2015 (pending regulatory approval). Drilling activities will not be continuous and will instead be divided into two separate drilling campaigns with a number of sequential wells drilled in each campaign. In addition, the second campaign will be dependent on results of the first campaign. The initial drilling campaign is currently planned to commence in Q2 2015 and include up to three exploration wells with the third well drilled dependent on the results of the previous two wells. Each well will take approximately 130 days to drill. Preference is for drilling to occur during the spring and summer months (May to September) where weather is more likely to be favorable. However, drilling could also take place in the fall and winter months (October to April).

Following the first drilling campaign, it is expected that 15 to 18 months will be required to assess the results of the exploration wells. Depending on the results, well testing on the existing exploration wells and a second drilling campaign may be conducted. If conducted, the second drilling campaign would commence in approximately 2017 and include up to four additional exploration wells.

Abandonment or suspension activities will be conducted either immediately following drilling and/or well testing activities.

Table 6.1 Proposed Project Schedule

Task	2013				2014				2015				2016				2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Project Planning	■	■	■	■	■	■	■	■	■																			
Stakeholder Engagement			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Regulatory Approvals			■	■	■	■	■	■	■				■	■	■	■					■	■	■					
Supply Base Mobilization and Use								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
First Drilling Campaign (2 to 3 wells)										■	■	■	■	■														
Assessment of First Program Results													■	■	■	■	■	■										
Well Testing *(dependent on assessment results)*																	■	■	■									
Potential Second Drilling Campaign (3 to 4 wells)																		■	■	■	■	■	■	■				
Abandonment																				■	■	■	■	■	■	■		

7 WASTE DISCHARGES AND EMISSIONS

Waste discharges associated with the offshore drilling operations include wastes that will be disposed of offshore, wastes that will be disposed of onshore, and air emissions. Wastes are divided into three categories based on management and treatment approaches, and are outlined in Table 7.1. A Project-specific waste management plan will be developed, which will address collection, segregation, handling, storage, labeling and manifesting of the wastes generated during the Project. The waste management plan will be submitted to the CNSOPB in association with the authorizations sought for the Project.

All offshore waste discharges associated with the Project will be managed in compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) of which Canada has incorporated provisions under various sections of the *Canada Shipping Act* and its regulations and treated in accordance with the OWTG.

Wastes destined for onshore treatment, recycling, and/or disposal will be managed in accordance with the Nova Scotia *Solid Waste-Resource Management Regulations* and will comply with any applicable federal and provincial waste requirements as well as municipal by-laws. Shell will retain a third party waste management contractor to manage and dispose of wastes transported onshore.

Table 7.1 Waste Classification

Non-Hazardous Wastes Managed On-Shore	Hazardous Wastes including Waste Dangerous Goods Managed On-Shore	Wastes Managed On-Board
Domestic waste	Oil/fuel filters	Grey/black water
Scrap wood	Waste oil	Drill cuttings from synthetic-based mud
Scrap metal	Oily rags/gloves	Drill fluids and cuttings from water-based mud (WBM)
Recyclables (glass, paper, plastic, aluminum)	Oil-contaminated sludge	Produced gas from well testing
Miscellaneous non-hazardous wastes	Batteries	Produced water from well testing
	Medical waste	Bilge and deck drainage water
	E-waste (phones, computers, monitors, UPS batteries, toner cartridges)	BOP fluids
	Fluorescent tubes	Cooling water
	Empty oil/chemical drums	Ballast water
	Empty paint cans	Food waste
	Paints/thinners/spent chemicals	
	Waste chemicals	
	Spent SBM	

7.1 Drilling Waste

7.1.1 Drilling Mud and Cuttings

A combination of WBM and SBM will be used for drilling the well to TVD as detailed in Section 5. The drilling process results in drilling mud, drilling fluid and cuttings.

The drilling mud for a WBM system would typically include additives such as potassium chloride, barite (weighting component), a polymer fluid, an encapsulator, mud loss additives and glycol, suspended in seawater. The SBM system uses similar additives, but a synthetic base fluid is used in place of seawater.

The specific chemicals for the WBMs and SBMs have not yet been selected. The Offshore Chemical Selection Guidelines (NEB et al. 2009) will be applied in selecting chemicals for drilling, as well as to the proper treatment and disposal of chemicals selected.

During riserless drilling, cuttings are transported to the seabed and disposed in place. During riser drilling, cuttings are transported back to the MODU via the riser pipe. On the MODU, cuttings will be separated from the drilling fluid for separate management and disposal through the use of shale shakers, mud recovery units and centrifuges. The recovered drilling mud is reconditioned and reused.

Once treated, all cuttings will be discharged to the sea in accordance with the OWTG. Spent WBM will be discharged at sea, while spent SBM that cannot be reused will be transported to shore for disposal.

7.1.2 Cement

Cement will be used to set the casing strings (conductor, surface and intermediate) in place. Any surplus cement used during riserless drilling will be disposed of on the seabed as is standard practice. Spent and surplus cement utilized during the riser drilling will be transported to shore for disposal in an approved facility.

7.2 Atmospheric Emissions

Anticipated atmospheric emissions for the Project will include exhaust emissions from the MODU and support vessels as well as onshore vehicles, plus potential flaring associated with produced gas encountered during well testing. These emissions will be inclusive of carbon dioxide (CO_2), sulphur dioxide (SO_2) and nitrogen oxides (NO_x). The exhaust emissions from the Project are not expected to measurably affect local air quality or greenhouse gas emissions and will comply with the *Air*

Quality Regulations under the Nova Scotia *Environment Act*, Ambient Air Quality Objectives under the *Canadian Environmental Protection Act* (CEPA) as well as regulations under MARPOL. Potential flaring will occur in accordance with the *CNSOPB Drilling and Production Guidelines*.

7.3 Liquid Wastes

The following liquid waste streams are anticipated to be generated during Program activities:

- Produced water
- Grey/black water
- Bilge and deck drainage water
- BOP fluid
- Cooling water
- Ballast water

Liquid waste will be transported onshore via dedicated and appropriate containers/containment that will comply with any applicable regulatory requirements. Liquid wastes are not expected to be stored at the supply base other than in the course of transportation to an approved disposal facility.

If hydrocarbons are encountered during well testing activities, small amounts of produced water may be flared. Surplus produced water will be treated onboard the MODU in accordance with OWTG prior to ocean discharge. Oil that may be collected during testing will be stored onboard for onshore disposal. Produced sand is not expected during well testing but if encountered, it will be stored onboard for onshore disposal.

The MODU includes living quarters and a galley, which will result in the production of grey and black water. Black water will be macerated to a maximum particle size and treated onboard. Following treatment it will be discharged to the ocean in accordance with the OTWG and MARPOL.

Bilge water and water drained through machinery spaces will be treated onboard the drills ship and discharged in accordance with the OTWG (< 15 mg/L). Any ballast water suspected to be contaminated by oil will be similarly treated and discharged.

BOP fluids are typically fresh-water based, with additives such as biocide, glycol and a lubricant. The biocide or lubricant additive is typically 2% by volume. The fluid is treated similarly to WBM, in that once spent, it will be discharged to sea in accordance with the OWTG.

Sea water is used for cooling purposes aboard the MODU. Following use, the water is treated through an oil-water separator and disposed of at sea. No additives are used in the cooling system.

Ballast water will be used in both the MODU and support vessels for stability. Ballast water is stored in dedicated tanks; therefore, typically, it does not contain any oil or other additives and can be taken on and disposed of as needed for vessel operational safety. Prior to transiting into Canadian waters, the MODU will undergo normal ballast tank flushing procedures as required under Transport Canada's *Ballast Water Control and Management Regulations*.

7.4 Hazardous Wastes and Waste Dangerous Goods

Hazardous wastes, including any waste dangerous goods, generated during the Project will be stored in the appropriate containers/containment and in designated areas onboard the MODU for transportation to shore where it will be collected and disposed of by a third-party waste contractor at an approved facility and in compliance with the associated regulations and requirements.

The transportation of any dangerous goods, waste dangerous goods or hazardous substances will occur in compliance with the *Transportation of Dangerous Goods Act* and its associated regulations. Such products are not expected to be stored at the supply base other than in the course of transportation to and from the supply vessels and the MODU. Should any approvals be required for the transportation, handling, and any temporary storage of the dangerous goods, waste dangerous goods or hazardous substances, these will be acquired by the third party waste contractor and/or supply base operator.

7.5 Non-Hazardous Wastes

Waste food will be macerated to maximum particle size and treated onboard. Following treatment it will be discharged to the ocean in accordance with the OTWG and MARPOL.

Non-hazardous wastes generated during the Project will be stored in designated areas onboard the MODU for transportation to shore where it will be disposed of by a third party waste management contractor at an approved facility.

8 LAND AND OCEAN USE

8.1 Jurisdictional Considerations

The Project Area is located within a portion of the North Atlantic Ocean known as the Southwestern Scotian Slope. The Scotian Slope is the offshore region extending from the boundary of the Scotian Shelf, seaward to the abyssal plain (Nova Scotia Museum of Natural History, Internet site; DFO, 2011a). The Scotian Shelf is the portion of the North American continental shelf off the coast of Nova Scotia.

8.2 Land Ownership and Tenure

The Project Area is located within the boundaries of Canada's Exclusive Economic Zone (200 nautical miles from Canadian coastline) and as such is considered to be located in federal waters. This area is managed jointly by the Government of Canada and the Government of Nova Scotia.

Offshore sub-surface rights are managed by the CNSOPB and are licensed for various industrial activities (exploration, development, production) for the purposes of developing offshore oil and gas resources. The proposed Project Area is inclusive of portions of EL 2424, 2425, 2426, 2429 and 2430 for which Shell currently owns 100% of the working interest and is the Operator.

The location of the onshore supply base has not yet been determined, but all options currently under consideration by Shell are existing industrial sites owned/leased and operated by third parties (refer to Section 4.3.3 for details on ownership for each supply base option). Depending on which location is selected, the supply base may be situated on lands owned by the Halifax Port Authority (Halterm, Richmond Terminal), lands owned by the Nova Scotia Business Development Corporation and managed by the Nova Scotia Department of Transportation and Infrastructure Renewal (Woodside Terminal), or the Strait of Canso Superport Corporation (Mulgrave Terminal).

The supply base locations administered by the Halifax Port Authority are within areas zoned for existing marine industrial use (HRM 2006).

8.3 Federal Funding

No federal funding will be provided to the proponent from any federal authorities in association with the Project.

8.4 Existing Ocean Use and Infrastructure

Within the Project Area and surrounding area additional ocean use includes the following:

- Commercial and Aboriginal fisheries
- Marine shipping
- Marine research
- Oil and gas exploration
- Department of National Defence (DND) operations

In addition to existing ocean users, it is also important to consider historical and current infrastructure that is present in the Project Area inclusive of subsea cables and shipwrecks.

8.4.1 Commercial and Aboriginal Fisheries

The Project Area is located within portions of the Northwest Atlantic Fisheries Organization (NAFO) Fishery Unit Areas 4Wm, 4Xl and 4Xn. Commercial fisheries data from Fisheries and Oceans Canada (DFO) (DFO Commercial Fishery Landings Database, 2005 to 2010) indicates that commercial fishing activities for large pelagics, groundfish and shellfish fisheries occur within and adjacent to the Project Area.

With respect to Aboriginal fisheries, data provided by DFO indicates that 26 communal commercial licences are held for large pelagics and groundfish in and around the Project Area. In 2011, 15 of these licences reported landings. No communal commercial licences are held in the Project Area for shellfish fisheries.

Based on information outlined in Hurley (2011), commercial fishing for large pelagic species has the largest overlap with the Project Area. Commercial pelagic species harvested in the Project Area, particularly in water depths from 200 to 1000 m along the shelf break and slope, consist of swordfish, tuna and shark as well as smaller species such as herring (Hurley 2011; DFO Commercial Fishery Landings Database, 2005 to 2010 in LGL 2013).

Commercial ground fishing activities primarily occur along the banks and basins of the Scotian Shelf region, located to the north of the Project Area, in water depths <900 m and includes Atlantic cod, Atlantic halibut, pollock, haddock, redfish, catfish, monkfish, silver and white hakes, hagfish, Greenland halibut, and Atlantic (striped) wolffish (by-catch species), American plaice, turbot, argentine, skate, and several flounder species (LGL 2013, Hurley 2011). Silver hake, Atlantic halibut and haddock represent the most likely commercial fish species to occur in the Project Area.

Commercial invertebrate fisheries along the southern Scotian Slope consist primarily of shellfish and bivalves, with a seasonal northern shortfin squid component (Hurley 2011). Offshore fishing for lobster and crab are also known to occur adjacent to the Project Area (Hurley 2011).

Figure 8.1 displays the composite landings for groundfish, large pelagics, snow crab, shrimp, and offshore lobster in proximity to the Project Area.

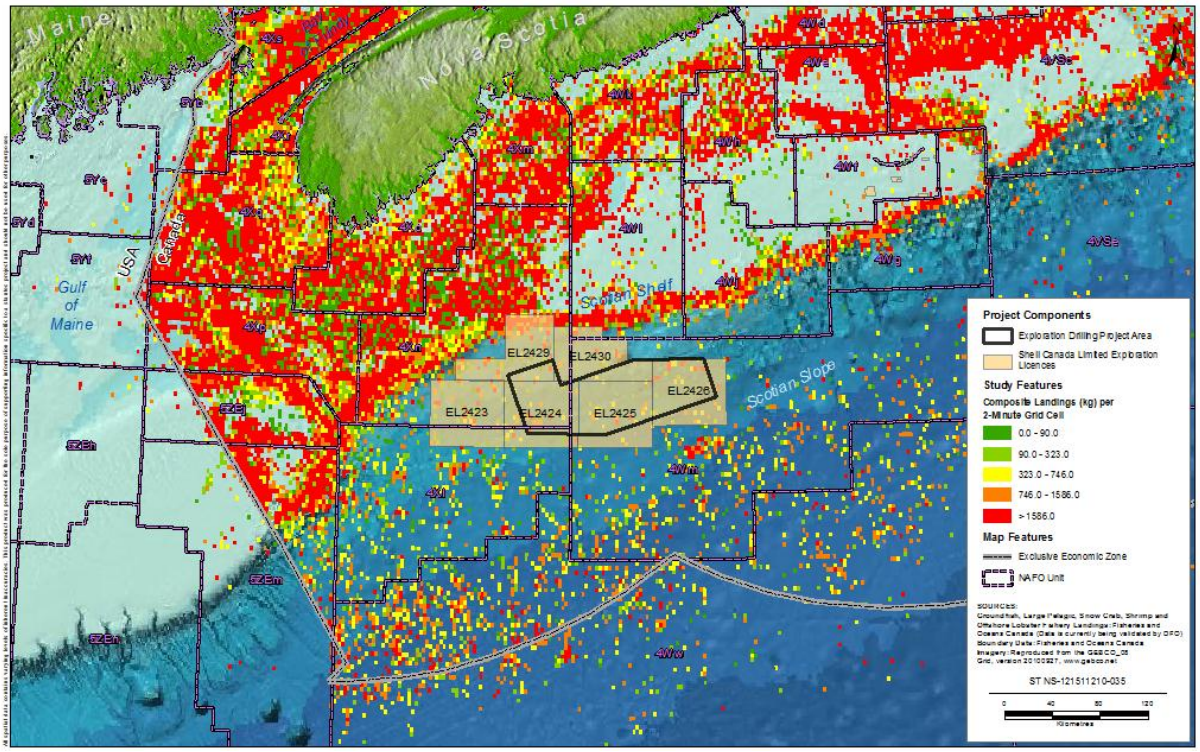


Figure 8.1 Composite Commercial Fishing Landings (Groundfish, Large Pelagic, Snow Crab, Shrimp, and Offshore Lobster) 2006 to 2010, in Proximity to the Project Area

8.4.2 Marine Shipping

Although there is no designated shipping corridor through the Project Area and much of the shipping traffic travels along the Scotian Shelf, adjacent to the Project Area, the Southwest Scotian Slope is host to a variety of ocean vessel traffic (refer to Figure 8.2). This volume of vessel traffic is due to a considerable amount of commercial shipping traffic travelling between the eastern seaboard of the United States as well as from the Great Lakes and Europe. Proximate main ports to the Project Area include Halifax and Port Hawkesbury, Nova Scotia, and Saint John, New Brunswick, as well as smaller ports along Nova Scotia's coastline (Sydney, Liverpool, Lunenburg, Shelburne and Sheet Harbour). Outside of the main shipping corridors it is left to the vessel captain's discretion to select a preferred routing (Hurley 2011).

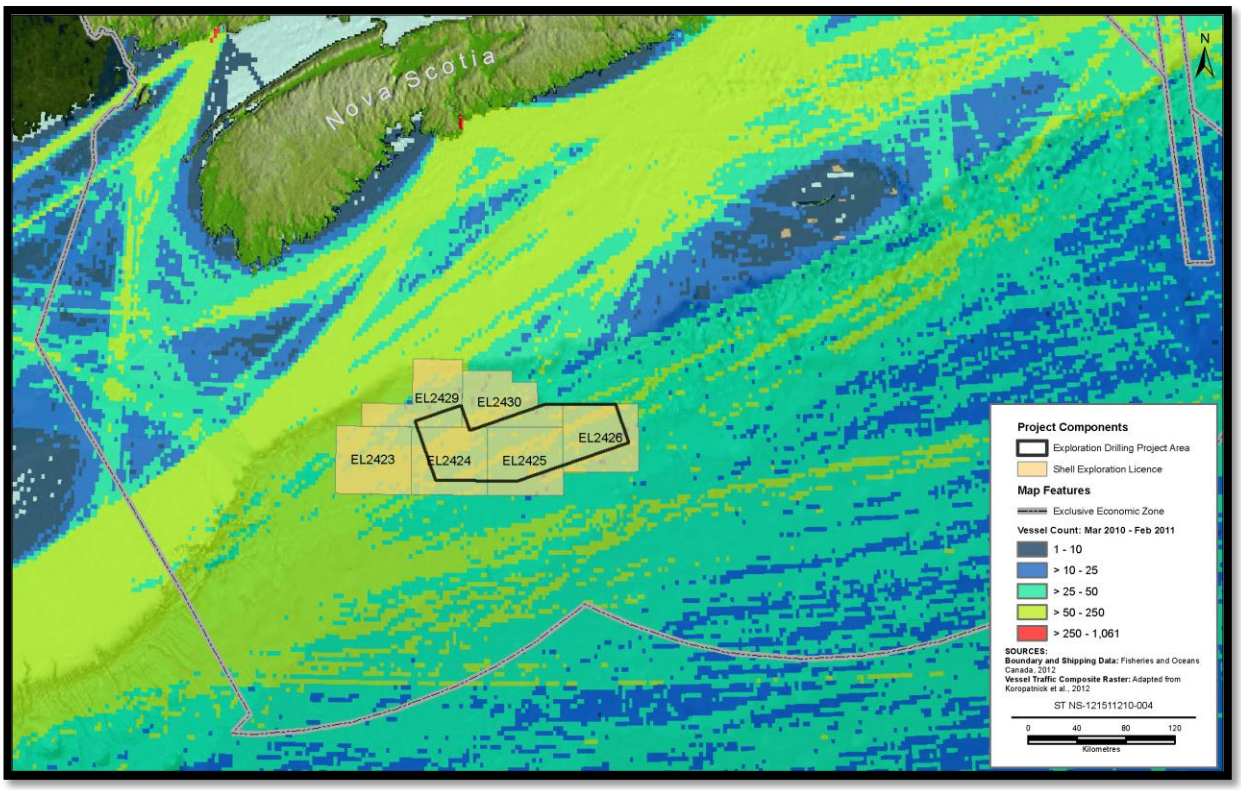


Figure 8.2 Shipping Traffic

8.4.3 Marine Research

At present, Shell is not aware of any research studies occurring or planned for within the Project Area. However, DFO conducts annual research studies within the Scotian Shelf and Slope area. These studies are inclusive of a multi-species trawl survey, RAPID Climate Change Program study (RAPID) and the Atlantic Zone Monitoring Program (AZMP) study. Final locations and scheduling for the surveys are determined on an annual basis. During the Shelburne Basin 3D Seismic Survey conducted in 2013, an Environment Canada weather buoy was identified within the EL boundaries and is located within the Project Area. The locations of RAPID and AZMP moorings from 2013 as well as the Environment Canada weather buoy are shown in Figure 8.3.

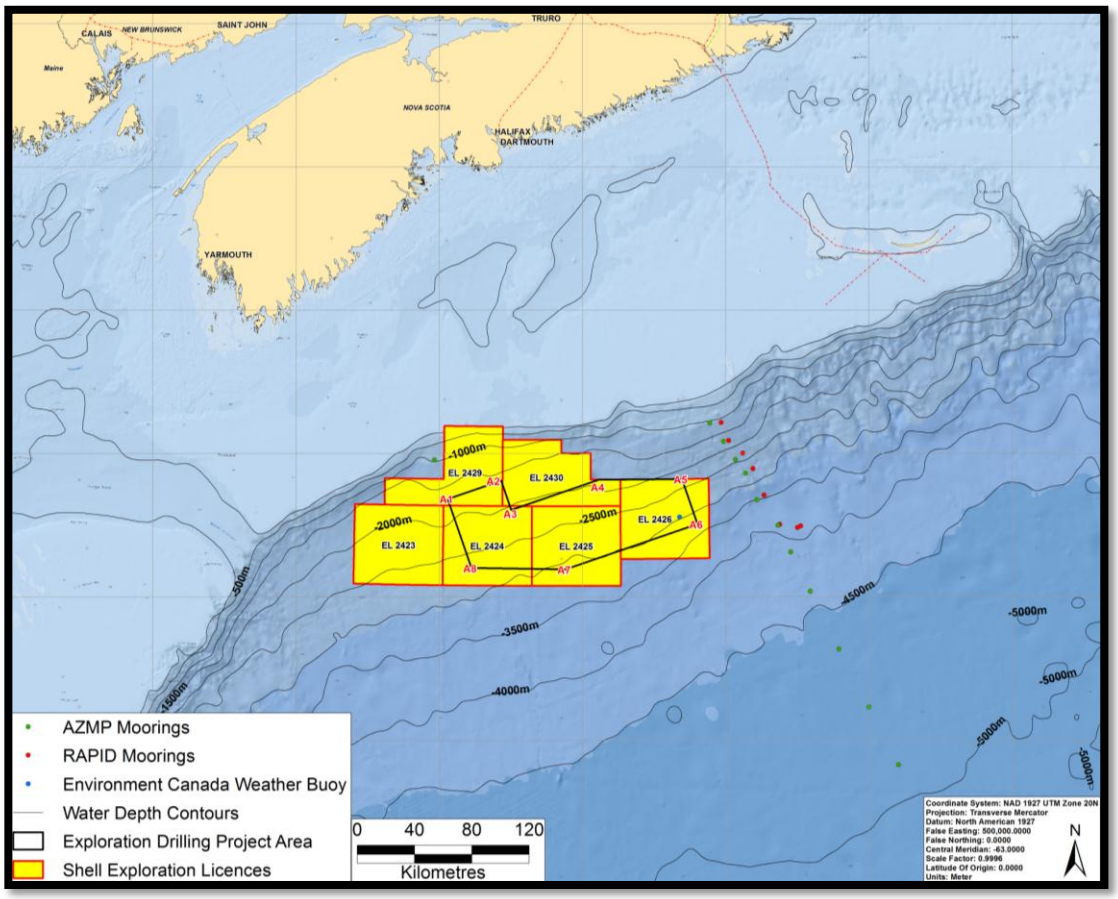


Figure 8.3 Location of Offshore Moorings

8.4.4 Other Oil and Gas Activity

In addition to the Licences awarded March 2012 and January 2013, further Call for Bids have been conducted and are planned for the Nova Scotia Offshore Area. In November 2012 it was announced that British Petroleum Exploration Operating Company Limited (BP) was the successful bidder on four offshore parcels (ELs 2431, 2432, 2433 and 2434) immediately adjacent to Shell's ELs. BP recently submitted a PD to the CNSOPB in association with a proposed 3D seismic program to be conducted in 2014. In March 2013, a Call for Bids (NS 13-1) consisting of six parcels on the central and eastern Scotian Shelf was initiated and closed October 24, 2013 with no bids received. Figure 8.4 outlines the current status of the Nova Scotia Offshore land parcels as well as the location of the NS 13-1 Call for Bids parcels.

In addition to the currently delineated ELs and Call for Bid parcels, the CNSOPB has outlined much of the remaining shelf and slope region of the Nova Scotia Offshore Area as Bid Forecast areas for the period 2014 to 2016. As such, it is anticipated that exploration activities and tenures in proximity to the Project Area will increase.

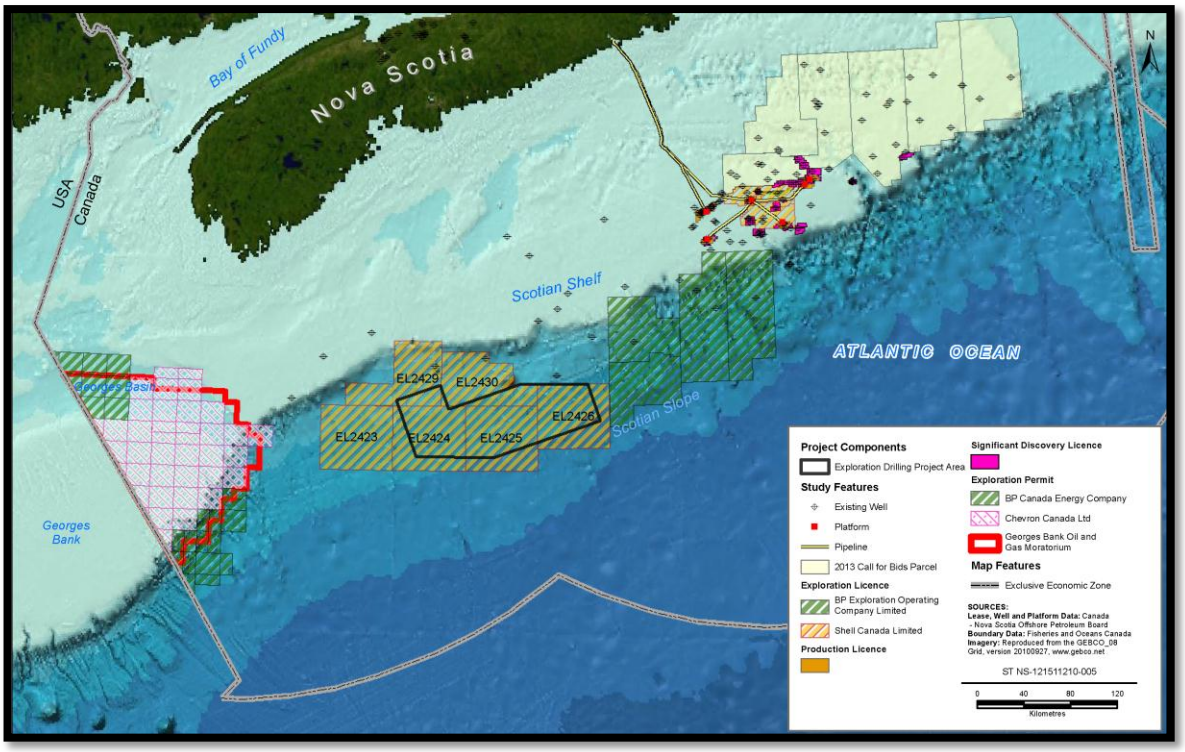


Figure 8.4 Offshore Nova Scotia Licensed Areas

8.4.5 Department of National Defence Operations

The Department of National Defence (DND) conducts training and other operations in designated 'Operations Areas' off the south coast of Nova Scotia. As illustrated on Figure 8.5, the Project Area overlaps with Operations Areas M1, M2, N1 and N2, but is outside of any associated Operations/Firing Exercise Areas.

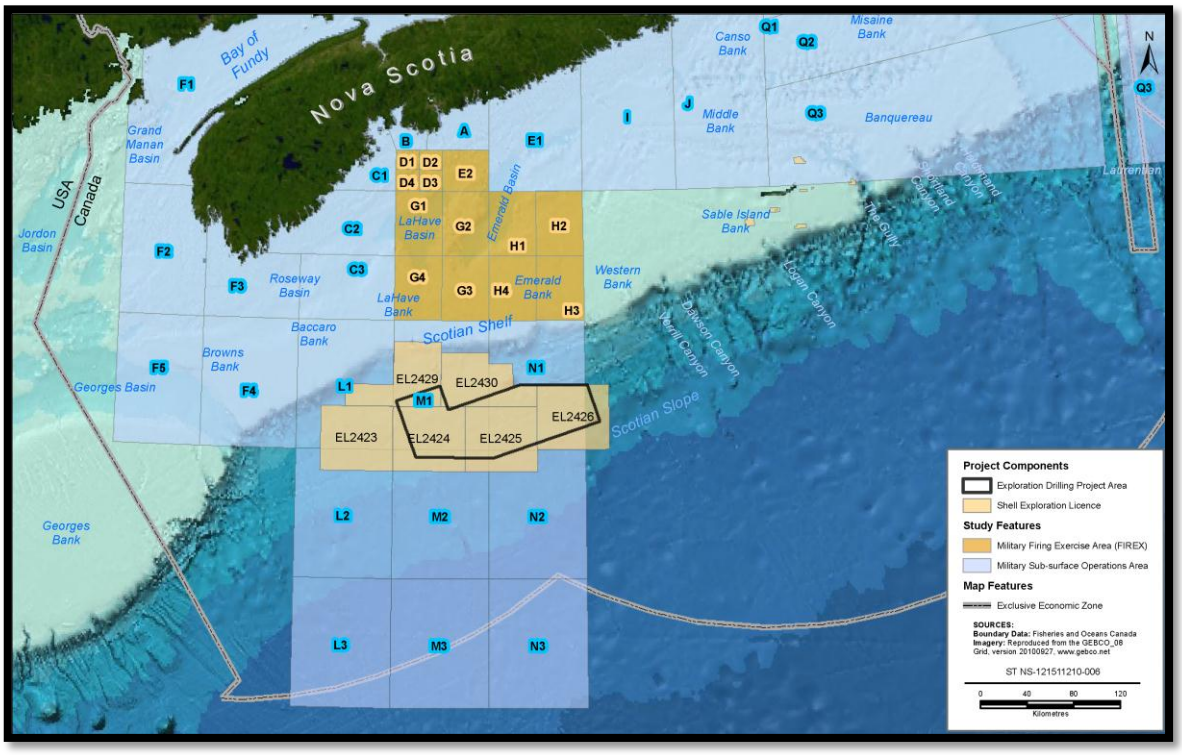


Figure 8.5 Department of National Defence Operations Areas

8.4.6 Additional Ocean Infrastructure

As shown on Figure 8.6, there are several active and inactive cables that cross through the Project Area. The location of subsea cables are charted and as such will be avoided during the selection of drill sites. Geohazard surveys to be conducted in 2014 prior to drilling (refer to Section 5.1), will provide information on any unknown cables or other debris relative to proposed drilling sites. Shell will consult with applicable cable owners prior to drilling to discuss proposed Project activities. Drilling activities will not interfere with active cable operation.

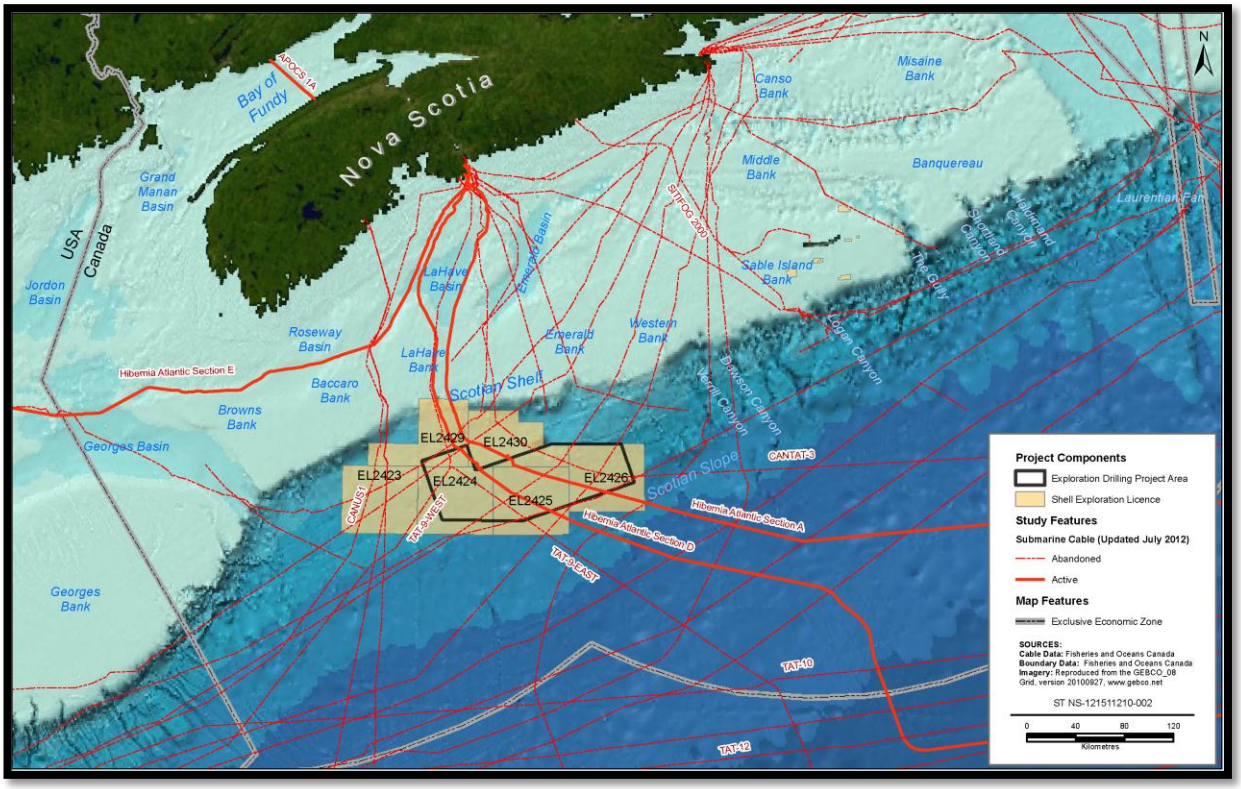


Figure 8.6 Subsea Cables

Geohazard surveys (e.g., side scan sonar, multi-beam sonar, sub-bottom profile, magnetometer, gravity and bathymetric surveys) and ROV video surveys are also conducted to provide information on any other seabed structures at potential drilling sites, including historical shipwrecks (refer to Figure 8.7). Well sites will avoid known locations of shipwrecks or other debris.

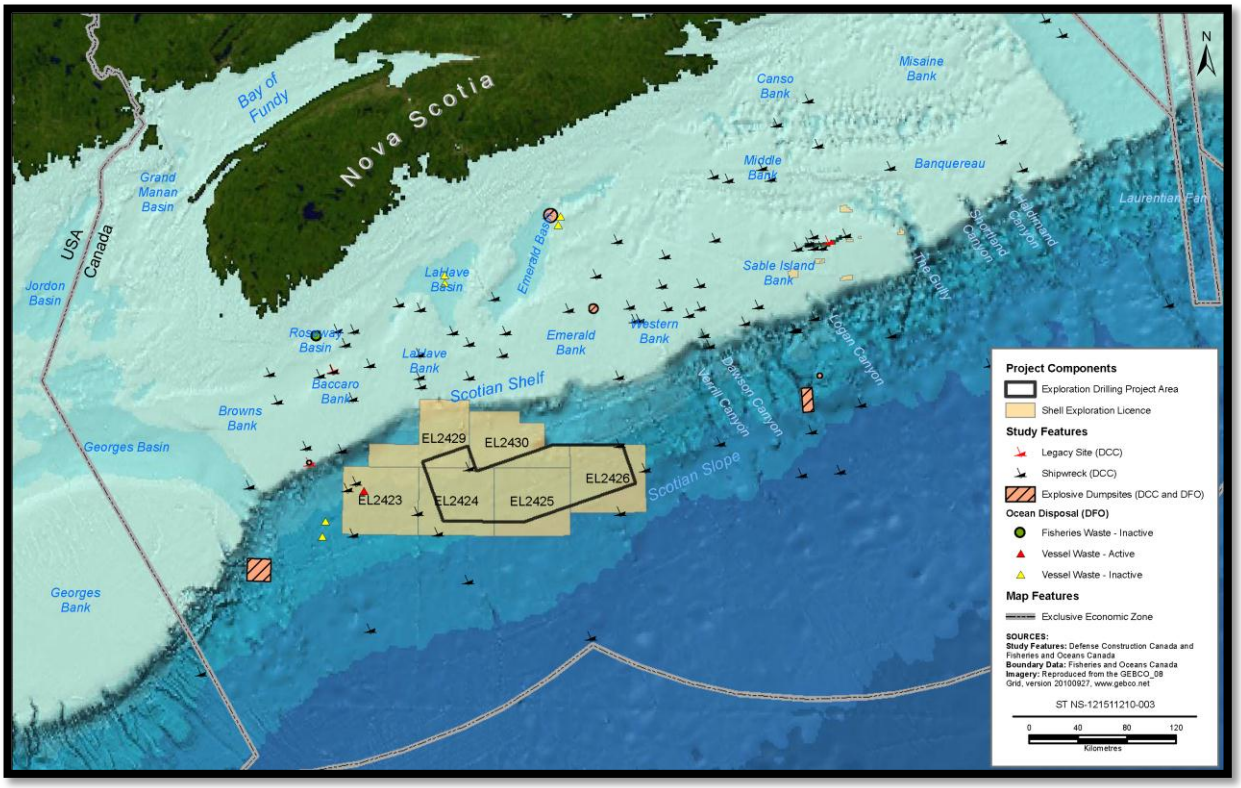


Figure 8.7 Shipwrecks and Ocean Disposal Sites

9 THE MI'KMAQ OF NOVA SCOTIA

The First Nation People of Nova Scotia are the Mi'kmaq Nations comprised of thirteen bands based out of varying locations across the Province. The locations of Mi'kmaq Chiefs and Councils in Nova Scotia are listed in Table 9.1, although it is noted that First Nation lands may be located elsewhere throughout the province.

Table 9.1 First Nations of Nova Scotia

Acadia RR#4, P.O. Box 5914-C, Yarmouth, NS, B5A 4A8 Tel: 902-742-0257	Membertou 111 Membertou St., Sydney, NS, B1S 2M9 Tel: 902-564-6466
Annapolis Valley P.O. Box 89, Cambridge Station, Kings County, NS, B0P 1G0 Tel: 902-538-7149	Millbrook P.O. Box 634, Truro, NS, B2N 5E5 Tel: 902-897-9199
Chapel Island P.O. Box 538, Chapel Island, NS, B0E 3B0 Tel: 902-535-3317	Pictou Landing RR#2, Site #6, Box 55, Trenton, NS, B0K 1X0 Tel: 902-752-4912
Eskasoni P.O. Box 7040, Eskasoni, NS, B1W 1A1 Tel: 902-379-2800	Paq'tnek (Afton) R.R. #1, Afton, Antigonish County, NS, B0H 1A0 Tel: 902-386-2781
Shubenacadie/Indian Brook Indian Brook Post Office, 522 Church St., Indian Brook, NS , B0N 1W0 Tel: 902-758-2049	We'koqma'q P.O. Box 149, Whycocomagh, NS, B0E 3M0 Tel: 902-756-2337
Glooscap P.O. Box 449, Hantsport, NS, B0P 1P0 Tel: 902-684-9788	Wagmatcook P.O. Box 30001, Wagmatcook, NS, B0E 1B0 Tel: 902-295-2598
Bear River P.O. Box 210, Bear River, NS, B0S 1B0 Tel: 467-3802	

The General Assembly of Nova Scotia Mi'kmaq Chiefs (General Assembly) currently comprises the Chiefs from 12 of the 13 First Nations in Nova Scotia and represents the governance for the Mi'kmaq of Nova Scotia. The Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) supports and represents the Assembly with respect to consultation regarding how projects may impact

Mi'kmaq Aboriginal or treaty rights, and directions regarding such matters are obtained through the KMKNO. The Shubenacadie/Indian Brook Mi'kmaq Nation has recently separated and will be conducting its administrative affairs outside of the KMKNO. The Native Council of Nova Scotia (NCNS) identifies itself as "the self-governing authority for the large community of Mi'kmaq/Aboriginal peoples residing off-reserve in Nova Scotia throughout traditional Mi'kmaq territory" (NCNS 2013).

At present, specific reserve lands or traditional lands used to exercise Aboriginal or Treaty rights have not been identified. However, Shell recognizes that Mi'kmaq communities may have an interest in the Project as a result of communal/commercial fishing rights they have in the offshore area. As such, Shell will be engaging directly with the designated representatives of the Mi'kmaq to provide Project details and gather associated input. Given the recent separation, Shell will engage the Shubenacadie/Indian Brook Mi'kmaq Nation separately from the other 12 Mi'kmaq First Nations. Further details regarding engagement with Mi'kmaq are provided in Section 11.

10 ENVIRONMENTAL SETTING

The Project Area is located approximately 250 km off the coast of Halifax in an area of the offshore known as the Southwestern Scotian Slope. Water depths in the Project Area range from 1500 to 3000 m.

The specific location of the onshore supply base has not yet been determined, but, as noted previously, Shell is currently considering a number of existing industrial port locations to function as the supply base for the Project (Section 4.3 describes the potential locations for the supply base). As a result of Shell's use of a pre-existing industrial port location in an active harbour, no changes to the environmental setting in and around the supply base location are anticipated as part of the Project. Nonetheless, Section 10.1 presents an overview of the nearshore and coastal environment surrounding the candidate supply base locations under consideration. The offshore environment is described in Section 10.2.

10.1 Nearshore and Coastal Environment

Halterm Container Terminal, Richmond Terminals, and Woodside Terminal are located in Halifax Harbour, whereas Mulgrave Marine Terminal is located in the Strait of Canso. The description of the nearshore and coastal environmental setting for these areas draws primarily on information reported in EAs previously conducted for marine infrastructure projects in Halifax Harbour and the Strait of Canso (Jacques Whitford 2004, Jacques Whitford 2008, Stantec 2010, Stantec 2012).

10.1.1 Halifax Harbour

Halifax Harbour is a major inlet of the North Atlantic Ocean, approximately midway along the south-eastern coast of Nova Scotia. It is surrounded by the Halifax Regional Municipality in Halifax County and is bordered by the communities of Halifax to the west, Bedford to the north, and Dartmouth to the east. The Port of Halifax accommodates cargo vessels and cruise ships on a year-round basis. In addition to marine container and cruise terminals, the port includes bulk handling facilities, a high volume roll-on/roll-off terminal, oil wharves, rail facilities, and ferry terminals.

The harbour extends inland for over 22 km to the northwest and is composed of outer and inner divisions. The inner harbour comprises two projecting arms (the Northwest Arm and Eastern Passage), as well as a constricted passage (The Narrows) leading to a very deep and large bowl-shaped basin at its head (Bedford Basin). It has four islands from north to south: Georges, McNabs, Lawlor, and Devils. A major river (Sackville River) enters the north end of the harbour in the Bedford Basin. The width of the harbour varies considerably along its length, ranging from approximately

385 m in The Narrows to approximately 4,225 m in the Bedford Basin. It reaches depths of up to 70 m in the Bedford Basin and averages between 20-30 m in depth in other areas.

The shore, intertidal zone and seabed of Halifax Harbour includes a wide variety of anthropogenic features based on the industrialization of the port. This industrialization is pronounced in the vicinity of all three of the candidate supply base locations in Halifax Harbour. These locations are currently subject to high levels of marine-related industrial activity (e.g., ship loading and unloading, container handling, storage and laydown, rail and truck traffic, ship repair and rebuilding, servicing off-shore oil rigs, and/or vessel layup), including associated noise, light, and other sensory disturbance. The three candidate supply base locations in Halifax Harbour have no natural intertidal zones, as the existing shorelines at each site were previously infilled to accommodate present operations.

There are no wetlands, migratory bird sanctuaries, National Wildlife Areas, or marine protected areas in the harbour. However there are some coastal and onshore features in Halifax Harbour and surrounding area which are recognized nationally, provincially, and/or municipally for their cultural, recreational, and/or ecological value (refer to Figure 10.1).

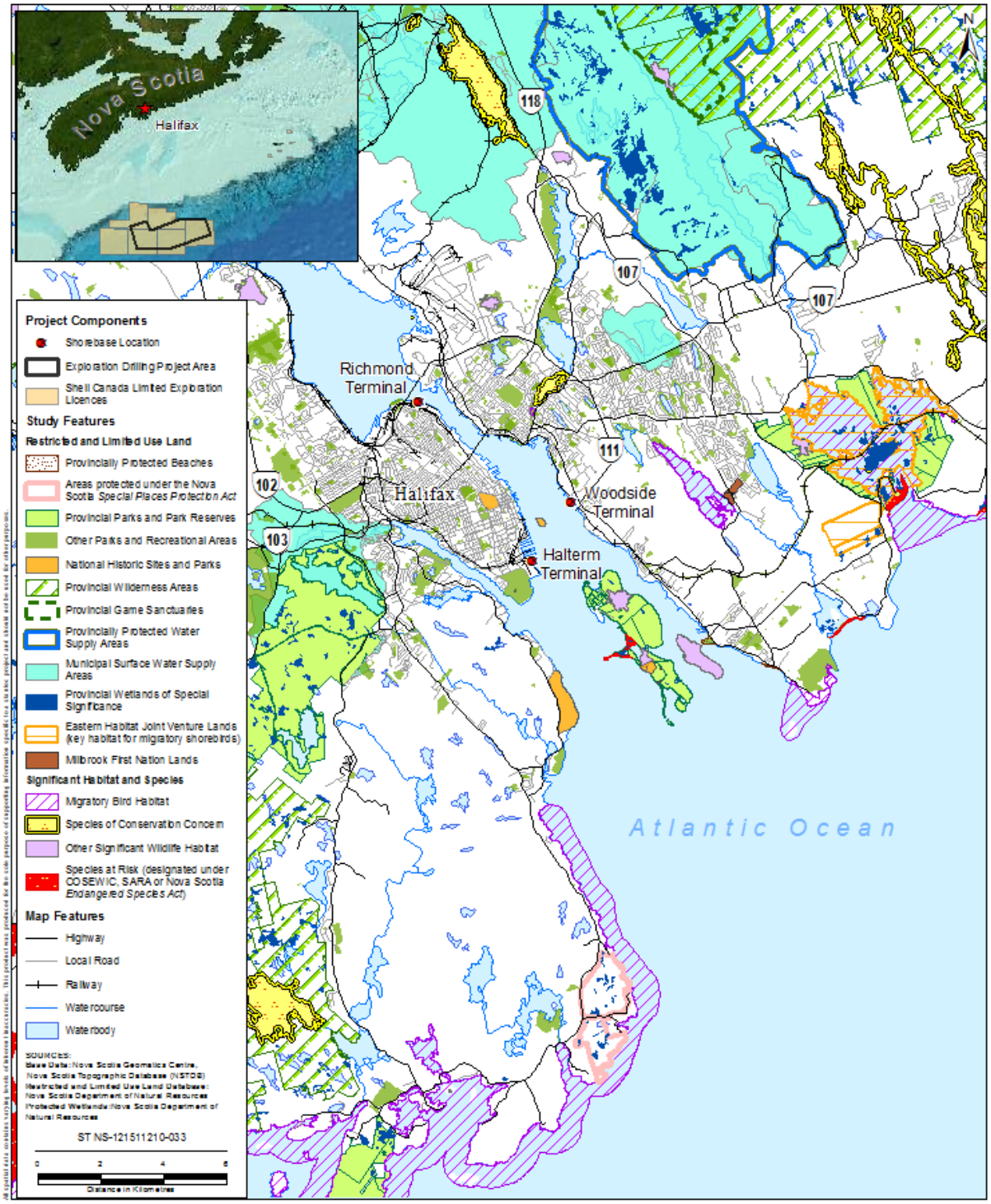


Figure 10.1 Environmentally Sensitive Areas in the Vicinity of Halifax Harbour

10.1.1.1 Fish, Fish Habitat, and Aquatic Species

At least 69 species of fish have been recorded in the nearshore marine habitat of Nova Scotia within the 40 m depth of water (Hardy Associates Ltd. 1984). Marine fish of this coastal environment include the following five groups: demersal (or groundfish); pelagic; shellfish; small fishes of estuaries and tidal inlets; and exotic warm-water and eastern-arctic species.

Groundfish include cod, flatfishes (*e.g.*, winter flounder), redfish, haddock, pollock, and hake. These fishes spend most of their time at or near the bottom of the water column, feeding on benthic invertebrates (*e.g.*, worms, mollusks and crustaceans) and other fish.

Pelagic fish travel in large schools, feeding at the surface or mid-water column. Typical pelagic species observed in the harbour include Atlantic herring and Atlantic mackerel. On occasion, bluefin tuna can be caught in the outer harbour region.

A diversity of fish from southern latitudes occurs in the waters off Nova Scotia in the summer months as the Gulf Stream moves northward. Fishes observed in coastal inlets have included trigger fish, butterfly fishes, seahorses, and flying fish. The Nova Scotia Museum has a collection of 31 species of warm water fishes (NSMNH 1996 that travel northward into Nova Scotia waters inclusive of the swordfish (*Xiphias gladius*), a commercial prize in Nova Scotia waters that ventures north with the Gulf Stream.

Anadromous fish using the Sackville River basin for spawning include Atlantic salmon and gaspereau. These species have adult marine life histories, but require freshwater for spawning and rearing. Additionally, brook trout (sea run) may exploit the Bedford Basin for its abundance of food. The American eel is a member of the Anguillidae family and is the only catadromous species in Halifax Harbour (*i.e.*, the eels live in freshwater, but spawn in salt water). Depending on the lifecycle stage of the individuals, this species can be found in lakes, streams, rivers, and estuaries. The eels migrate to the mid-Atlantic ocean to spawn; the young eels are then carried by currents back to Nova Scotia, where they enter freshwater systems to mature.

The distribution of most fish species varies seasonally in response to physical or chemical changes in the surrounding environment (*e.g.*, depth, substrate, salinity, temperature) and as a result of seasonal habitat requirements (*e.g.*, spawning, feeding). Long annual migrations are undertaken by most pelagic species.

Harbour seals (*Phoca vitulina*) have been observed in large numbers in Halifax Harbour, particularly in the Bedford Basin, during winter, and grey seals (*Halichoerus grypus*) have also been observed occasionally (Brodie 2000). The number of harbour seals frequenting the Bedford Basin at one time may be as high as 20 to 30 individuals (Brodie 2000). These numbers typically decline between

May and July, when most of the animals move to breeding sites along the coast or possibly on Sable Island.

Harbour porpoise (*Phocoena phocoena*), listed as a species of Special Concern and under Schedule 2 of the *Species at Risk Act* (SARA), have also been known to frequent Halifax Harbour. In addition, Atlantic white-sided dolphins (*Lagenorhynchus acutus*) have been sighted at locations in Halifax Harbour, including the Defence Research Establishment Atlantic (DREA) barge and the Narrows, on several occasions. Larger whales have been observed on occasion as well, with most sightings occurring at the approaches and marine inlet to the harbour (Brodie 2000).

10.1.1.2 Migratory Birds

Based on review of the Maritimes Breeding Bird Atlas database (MBBA 2010), a total of 120 bird species have been recorded in the 10 km X 10 km census square in which Halterm Container Terminal, Richmond Terminals, and Woodside Terminal are located.

At the south end of Halifax Harbour, 43 migratory bird species were recorded in or on the edge of Point Pleasant Park (adjacent to the Halterm Container Terminal) during a breeding bird survey conducted in May 2010 (Stantec 2010). Song Sparrow (*Melospiza melodia*), Dark-eyed Junco (*Junco hyemalis*), and Black-capped Chickadee (*Poecile atricapillus*) were the most commonly recorded species during that survey, with 50, 25, and 20 occurrences respectively in or on the edge of the Park. Rare or uncommon species identified during the surveys include Blackpoll Warbler (*Dendroica striata*), Gray Catbird (*Dumetella carolinensis*), Northern Cardinal (*Cardinalis cardinalis*), Pine Warbler (*Dendroica pinus*), Yellow-bellied Flycatcher (*Empidonax flaviventris*), and the federally listed species at risk Canada Warbler (*Wilsonia canadensis*), which is considered Threatened under Schedule 1 of SARA.

The migratory bird habitat illustrated on Figure 10.1 includes Great Blue Heron (*Ardea Herodias*) habitat at Morris Lake, approximately 3 km east of Woodside Terminal; Common Eider (*Somateria mollissima*) habitat in the vicinities of Chebucto Head, along the southwestern extent of the harbour shoreline, and Hartlen Point and Devils Island, at the southeastern extent of the harbour; and habitat for Canada Goose (*Branta canadensis*) and American Black Duck (*Anas rubripes*) on and around the Eastern Habitat Joint Venture Lands in the vicinity of Cole Harbour and Lawrencetown Lake. Maugher Beach, on the western shore of McNabs Island, provides unclassified Tern habitat as well as habitat for Piping Plover (*Charadrius melodus*), which is listed as Endangered under Schedule 1 of SARA. There is also Piping Plover habitat at Cow Bay Beach and Rainbow Haven Beach, which are located to the east of the approaches to Halifax Harbour.

Halifax Harbour provides potential foraging habitat for non-breeding Common Terns (*Sterna hirundo*) (Jacques Whitford 2008). There is reportedly a colony site for this species located in the vicinity of the Imperial Oil Dartmouth Refinery (near the Woodside Terminal) (pers. comm., Michael

Crowell, senior terrestrial ecologist. Stantec, November 2013). However, Common Terns forage in the marine environment, and the waters surrounding the candidate onshore supply base locations under consideration are not ideal foraging habitat for this species due to the level and frequency of disturbance. Common Tern habitat is also present at Cow Bay Beach (Figure 10.1).

10.1.1.3 Commercial and Aboriginal Fisheries

Halifax Harbour is located within NAFO Fishery Unit Area 4Wk. Commercial fisheries in the harbour include a small commercial finfish fishery seaward of McNabs Island which consists of groundfish (cod, haddock, pollock and halibut) and pelagic (herring and mackerel) species (Rozee 2000). The Bedford Basin and other areas throughout the harbour support a bait fishery (pollock, herring, mackerel and smelt) for both commercial and recreational bait (Rozee 2000); these are typically fished using gillnets and hand-lines (Stantec 2012). The fishing season for salmon runs from July through October, and the fishing season for mackerel runs from June through October. Both of these species migrate along the edges of the Narrows during passage to and from Sackville River (Stantec 2012). Commercial and recreational fisheries for clams and mussels are closed due to fecal coliform levels in the harbour.

Lobster is the primary commercial species harvested within Halifax Harbour. The harbour is included within the boundaries of Lobster Fishing Area (LFA) 33, which extends from Cole Harbour to Yarmouth. The majority of fishers in the Halifax area fish with 250 traps. Fishers licensed to fish in LFA 33 are not restricted to stay within a particular area within the LFA. Therefore, certain users' fish in the harbour as one of several fishing grounds that they frequent (Stantec 2012).

The lobster season runs from the last Monday in November until the end of May. Most lobsters are caught during the first three weeks of the season, and lobster fishing activity diminishes in intensity as the season progresses. Approximately 70% of the lobster fishers that use the harbour temporarily cease fishing activities from January to March (Stantec 2012).

The area around McNabs Island supports the majority of lobster fishing activity. Approximately one or two traps are situated around Georges Island. Light lobster fishing also occurs in the Bedford Basin, with most traps placed intermittently along the shoreline, as well as in Tufts Cove. The shallow waters at Black Rock Beach support an active lobster fishing area that extends into the Northwest Arm (Stantec 2012).

A total of approximately 15 to 20 lobster fishers use Halifax Harbour, including those that fish the harbour exclusively and those that also fish in other areas. Eastern Passage and Herring Cove are the home ports for the majority of lobster fishers that use the harbour. In addition to these regular and semi-regular/occasional harbour users, some fishers that do not typically fish in the harbour will temporarily shelter their traps in the harbour during periods of heavy weather (Stantec 2012).

In 2011, four Aboriginal communal food, social and ceremonial licences were known to have been issued for LFA 33. DFO's Aboriginal Fisheries Branch (Maritimes Region) was not aware of any fishing activity in Halifax Harbour related to those licences; however, the licencees are nonetheless entitled to make use of their access if they so choose (Stantec 2012). The Confederacy of Mainland Mi'kmaq (2013) identified the LFA 33 lobster fishery as an active communal commercial fishery for 2013.

10.1.1.4 Heritage, Historic, and Archaeological Resources

As noted in Section 10.1.1, the three candidate supply base locations in Halifax Harbour are existing port facilities with no natural intertidal zones; the existing shorelines at each site were previously infilled to accommodate present operations. The potential for previously undisturbed heritage, historic, or archaeological resources to be present on-site is therefore assumed to be low.

10.1.2 Strait of Canso

The Strait of Canso is a long, narrow channel in North Atlantic Ocean that separates mainland Nova Scotia from the island of Cape Breton. The strait is approximately 27 km long and averages 3 km in width and 60 m in depth. It connects Chedabucto Bay on the Atlantic Ocean to St. George's Bay on the Northumberland Strait, which is a sub-basin of the Gulf of St. Lawrence. Since the construction of the Canso Causeway in 1955, the Strait of Canso has become a tidal inlet. Flows to Northumberland Strait are limited to very small volumes associated with the operation of a lock in the Causeway. The key oceanographic attributes of the southern reach of the Strait of Canso are its lack of freshwater input, its great length and narrow width, and its relatively deep bathymetry.

Located approximately midway along the Strait of Canso are The Town of Mulgrave, which is on the western shore of the strait, in Guysborough County, and the Town of Port Hawkesbury, which is on the eastern shore of the strait, in Inverness County. Both of these communities contain active marine facilities that comprise the Strait of Canso Port (i.e., the Mulgrave Marine Terminal and the Port Hawkesbury Pier, respectively). The Mulgrave Marine Terminal accommodates cargo vessels and industrial operations on a year-round basis, including supply base services, marine construction project support, and a range of bulk and breakbulk cargo activities requiring warehousing and laydown. The Port Hawkesbury Pier provides berth space for pleasure crafts, small cruise ships, service vessels, fishing boats, tugs, barges, and pilot boats (Strait Superport 2013). In addition, the community of Middle Melford, which is located on the western shore of the Strait of Canso, approximately 14 km south of the Town of Mulgrave is the proposed development site for the Melford International Marine Terminal.

The shore, intertidal zone, and seabed of the Strait of Canso at Mulgrave Marine Terminal is currently subject to high levels of marine-related industrial activity (e.g., ship loading and unloading,

container handling, storage and laydown, and truck traffic), including associated noise, light, and other sensory disturbance. The candidate supply base location has no natural intertidal zone, as the existing shoreline was previously infilled to accommodate present operations.

There are no wetlands, migratory bird sanctuaries, National Wildlife Areas, or marine protected areas in the Strait. However there are some coastal and onshore features in the Strait of Canso and surrounding area which are recognized nationally, provincially, and/or municipally for their cultural, recreational, and/or ecological value (refer to Figure 10.2).

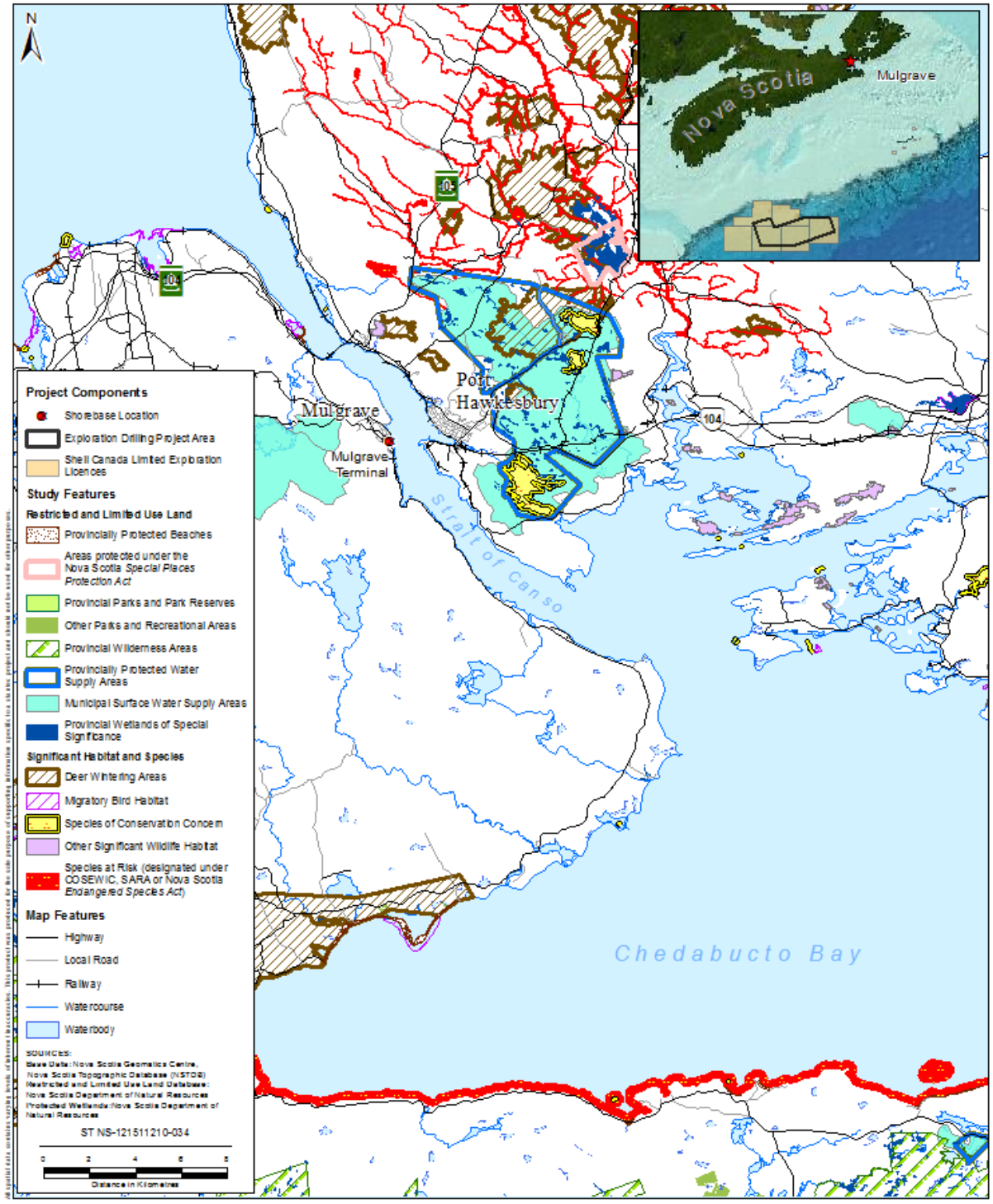


Figure 10.2 Environmentally Sensitive Areas in the Vicinity of the Strait of Canso

10.1.2.1 Fish, Fish Habitat, and Aquatic Species

As noted in Section 10.1.1.1, at least 69 species of fish have been recorded in the nearshore marine habitat of Nova Scotia within the 40 m depth of water (Hardy Associates Ltd. 1984).

Demersal groundfish families known to occur in the Strait of Canso and its approaches include flounders, codfishes, skates, sand lances and redfishes. Similar to Halifax Harbour, typical pelagic species observed in the Strait of Canso include Atlantic herring and Atlantic mackerel. Anadromous fish species known to occur in the Strait of Canso include salmon, trout, gaspereau, and smelt. The catadromous American eel also has potential to be present in the Strait of Canso (CNSSCEC 1975).

Grey seals and harbour seals occur year-round in Nova Scotian waters and fairly common in the Strait of Canso. Hooded seals (*Cystophora cristata*) and harp seals (*Phoca groenlandica*) are seasonal visitors to Nova Scotian waters that also have potential to be found in the Strait of Canso.

Harbour porpoises are likely the most common cetacean in the Strait of Canso, and can be expected during the late spring, summer and early fall months. Pilot whales (*Globicephala spp.*) may be found in the Strait of Canso from time to time in the summer months. Minke whales (*Balaenoptera acutorostrata*) are frequently observed in coastal waters around Nova Scotia and are likely present in the Strait of Canso during the spring, summer and fall. Incidental observations of fin whale (*Balaenoptera physalus*), and a beached blue whale (*Balaenoptera musculus*) have been recorded in the Strait of Canso or its approaches; however, these species are considered uncommon transients given their preference for deeper waters, and would likely only enter the strait area in pursuit of prey (Jacques Whitford 2004). The Atlantic population of fin whale is listed as Special Concern, and the Atlantic population of blue whale is listed as Endangered under Schedule 1 of SARA.

10.1.2.2 Migratory Birds

Based on review of the Maritime Breeding Bird Atlas database (MBBA 2010), a total of 42 bird species have been recorded in the 10 km X 10 km census square in which the Mulgrave Container Terminal is located.

Three species of neritic seabirds (i.e., those species that spend most of their time in coastal waters and occasionally forage in inland areas), the Common Tern, Double-crested Cormorant (*Phalacrocorax auritus*) and Great Cormorant (*Phalacrocorax carbo*), have been recorded as nesting in Chedabucto Bay and Strait of Canso. Unclassified Terns have also been recorded inhabiting islands in Chedabucto Bay. Herring Gulls (*Larus argentatus*) and Great Black-backed Gulls (*Larus marinus*) nest at variety of locations in the vicinity of the Strait of Canso, particularly along the south shore of Chedabucto Bay. Only one species of pelagic seabird (i.e., species that are typically found out of sight of land and return to coastal waters only to breed), the Leach's

Storm-petrel (*Oceanodroma leucorhoa*), is known to breed in proximity to the Strait of Canso. A Leach's Storm-petrel colony is located in the vicinity of Canso.

As depicted on Figure 10.2, there is known habitat for Harlequin Duck (*Histroronicus historonicus*) along the southern shoreline of Chedabucto Bay. Harlequin duck is listed as a species of Special Concern under Schedule 1 of SARA and is designated as Endangered under the Nova Scotia *Endangered Species Act*. Figure 10.2 also indicates unspecified migratory bird habitat on the northern shoreline of Chedabucto Bay.

10.1.2.3 Commercial and Aboriginal Fisheries

The Strait of Canso is located in NAFO Fishery Unit Area 4Wd. Invertebrate fisheries, particularly shrimp and snow crab fisheries, are the most productive and commercially important fisheries in Area 4Wd. Lobster catches are also substantial in Area 4Wd. Snow crabs are caught in deeper waters and in higher numbers in an area located southeast of Isle Madame. Crab traps are set all the way to the shipping lane running south of Isle Madame. An exploratory rock crab season also occurs in the area and can begin one week after the lobster season ends and run until December 31. Other commercial invertebrate landings in Area 4Wd include spider/toad crab, Jonah crab, oyster, scallop, sea urchin, soft shell crab, soft shell clam, squid, stone crab, and whelk.

A large proportion of the groundfish catch consists of cod, Atlantic halibut, and pollock. Other groundfish species commercially fished in Area 4Wd include catfish, cusk, dogfish, haddock, monkfish, plaice, redfish, turbot, flounder, and hake.

The main pelagic fisheries include herring and mackerel. In the Strait of Canso and Chedabucto Bay, herring is caught using traps and weirs and there is, therefore, a year-round mobile gear closure in this area. The location and size of herring catches at any given location on the Atlantic coast are typically highly variable from year to year. There are two licensed mackerel traps in the Strait of Canso. The traps are set in place with the help of 17 anchors ranging from 200 to 1000 kg with lines running up to 150 fathoms from the trap to the. Peak mackerel catches occur around mid-May and mid-October (Jacques Whitford 2004). Other commercial pelagic species in Area 4Wd include alewife, Bluefin tuna, eel, blue shark, mackerel shark, and smelt,

A boat charter (Ship Harbour Boat Tours and Charter Services Limited) is based out of Port Hawkesbury and possesses an educational Lobster Fishing License to fish three lobster traps. However, no other fishing occurs from the boat which tours the strait area (Jacques Whitford 2004).

The Mulgrave Marine Terminal is located within DFO Statistical District 14, which encompasses the area from Mulgrave to Guysborough. A limited Aboriginal fishery operates out of the St. Peters area in District 9. These fishers have rights to access the water of District 14 as well (AMEC 2008) and therefore have potential to do so in the vicinity of the Mulgrave Marine Terminal.

10.1.2.4 Heritage, Historic, and Archaeological Resources

As noted in Section 10.1.2, the Mulgrave Marine Terminal has no natural intertidal zone, as the existing shoreline at the site was previously infilled to accommodate present operations. The potential for previously undisturbed heritage, historic, or archaeological resources to be present on-site is therefore assumed to be low.

10.2 Offshore Environment

The description of the offshore environmental setting, including species lists, draws primarily on information reported in the EA of Shell Canada Ltd.'s Shelburne Basin 3-D Seismic Survey (LGL 2013). This information will be updated as applicable during the preparation of the EIS.

10.2.1 Offshore Physical Environment

The Scotian Slope is defined as the point at which the Scotian Shelf begins to sharply descend from the 200 m isobath indicator to about 2000 m (Breeze et al. 2002; DFO 2010a). Following this extreme descent, the Slope increases in water depth gradually from 2000 m to around 5000 m below the ocean surface reaching out to the commencement of the abyssal plain (Breeze et al. 2002). The Project Area is located wholly within the Scotian Slope region with the northern edge located south of the 1500m isobath contour.

10.2.1.1 Geology and Topography

The Scotian Slope is characterized by a steep to moderately steep topography with a complex and irregular seafloor including geological features such as iceberg furroughs and pits (Breeze et al. 2002 Hurley 2011).

Surficial sediment within the Project Area consists primarily of silt, clay and sand, with rare isolated patches of gravel (Hurley 2011). The Project area is also characterized by a geology underlain by thick rift sediments and characterized by extensive salt deposits (NSMNH 2012, Internet site).

10.2.1.2 Climate

The climate of the Project Area is affected by the varying airstreams that converge in the region. Fog is relatively common in spring and summer months and tropical storms frequent the area in the late summer to early winter. Meteorological and climate data for the Project area is collected from a weather station located on Sable Island.

10.2.1.3 Ocean Currents and Tides

The Project Area is located within an open ocean environment with surface water influenced primarily by the Gulf Stream which flows northeast along the Scotian shelf and mixes with the cooler waters of the Labrador Current to form the slope waters (DFO 2011a). Typical current speeds in the Project area are between 5 to 15 cm/s with a peak current of between 50 to 60 cm/s in the winter months (Hurley 2011).

Based on this historical data, wind direction is most frequently southwest from May to September, shifting to northwest in October to April. Average wind speed ranges from 4.8 m/s in July and 9.8 m/s in January. Wave conditions are characterized by an average wave height in the summer of less than 2 m and around 3 m in the winter months. Extreme maximum significant wave heights have been recorded in the winter months with the monthly maximum for January being over 14 m (Hurley 2011). The EIS will draw on updated data sources for the description of oceanographic conditions, including, but not limited to, the MSC50 Wind and Wave Hindcast Data for the North Atlantic Basin.

10.2.1.4 Air and Water Quality

The air and water quality of the Project Area is not currently monitored or tested on a continuous basis. Influences on air and water quality in Project Area, at present, would include natural changes in conditions and marine processes such as the Gulf of St. Lawrence outflow, natural hydrocarbon seeps as well as limited effects from human use (e.g., marine shipping) previously discussed above (DFO 2012).

Based on the limited use of the offshore Project area, the water and air quality in the offshore Project area is anticipated to be good with minimal to no contaminants present. It has been noted that contaminant and sediment levels in the offshore waters very rarely exceed Canadian guidelines for water quality (DFO 2012).

10.2.2 Offshore Biological Environment

The Project Area occurs within the Southwest Scotian Slope, adjacent to the Southwestern Scotian Shelf. The Southwest Scotian Shelf and Slope support a wide variety of marine species and biological diversity.

In general, there has been little survey work conducted on the Scotian Slope to identify species inhabiting the deep waters there; most available knowledge comes from surveys conducted on the Scotian Shelf.

10.2.2.1 Fish, Fish Habitat and Aquatic Species

Marine benthos includes all flora (plants) and fauna (animals) found within the benthic (seafloor) environment. Benthic diversity and abundance in the Project Area is estimated to be low in consideration of observations in nearby ELs (Hurley 2011). The absence of hard substrates and low current in the Project Area is considered a limitation to coral development in the Project Area, but black corals and sea pens have been noted at depths up to 3000 m in other regions (Hurley 2011). Although seabed surveys at water depths beyond 500 m in the Scotian Slope area are limited, based on existing data in areas of similar depth and characteristics, the Project Area is likely characterized by a benthic community consisting mainly of invertebrate groups such as

anemones, ophiuroids, polychaetesm, sponges, bivalves, gastropods and sea urchins (Hurley 2011).

Although an invertebrate fishery is not prevalent within the Project Area, commercial benthic invertebrate species found in the Southwestern slope and shelf region include lobster, snow crab, Jonah crab, rock crab, sea scallops, squid, and sea urchins (LGL 2013).

No marine benthos species with a distribution in the Project Area are currently listed under the *Species at Risk Act* (SARA) or designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

A number of commercial demersal fish species including cod, redfish, silver hake and American plaice, are found in the Southwestern slope and shelf region shifting from the upper banks in the summer to the lower banks in the winter. Commercial fishing does occur within the Scotian Slope region though it is mostly concentrated along the shelf break in waters between 200 and 1000 m depth (see Section 8.4.1). Most resident deep water species (>900 m) found in the Project Area such as roughhead grenadier, longnose chimera, deep-sea cat shark, boa dragonfish, blue hake and black dogfish, are identified as non- commercial.

The Scotian Slope is considered to be a primary north-south migratory route for a number of pelagic fish, which results in the seasonal presence of large pelagic fish species including sharks, swordfish and tuna.

Spawning activities are mostly concentrated over the Scotian Shelf as opposed to the deeper Scotian Slope area. Thus spawning activity is unlikely within the Project Area.

Table 10.1 outlines the fish species listed under SARA and by COSEWIC that have the potential to occur within the Project Area.

Table 10.1 Nationally Listed Fish Species Potentially Occurring in the Project Area

Common Name	Scientific Name	SARA	COSEWIC
White shark	*Carcharodon carcharias*	Schedule 1 Endangered	Endangered
Northern wolffish	*Anarhichas denticulatus*	Schedule 1 Threatened	Threatened
Spotted wolffish	*Anarhichas minor*	Schedule 1 Threatened	Threatened
Atlantic wolffish	*Anarhichas lupus*	Schedule 1 Special Concern	Special Concern

Common Name	Scientific Name	SARA	COSEWIC
Atlantic bluefin tuna	*Thunnus thynnus*	No Status	Endangered
Atlantic cod (Southern population)	*Gadus morhua*	No Status	Endangered
Roundnose grenadier	*Coryphaenoides rupestris*	No Status	Endangered
Porbeagle shark	*Lamna nasus*	No Status	Endangered
Atlantic Salmon (Nova Scotia Southern Upland population)	*Salmo salar*	No Status	Endangered
Cusk	*Brosme brosme*	No Status	Threatened
Shortfin mako shark (Atlantic population)	*Isurus oxyrinchus*	No Status	Threatened
Acadian redfish (Atlantic population)	*Sebastes fasciatus*	No Status	Threatened
Winter skate (Eastern Scotian Shelf population)	*Leucoraja ocellata*	No Status	Threatened
Spiny dogfish	*Squalus acanthias*	No Status	Special Concern
Roughhead grenadier	*Macrourus berglax*	No Status	Special Concern
Basking shark (Atlantic population)	*Cetorhinus maximus*	No Status	Special Concern
Blue shark (Atlantic population)	*Prionace glauca*	No Status	Special Concern
Smooth skate (Laurentian-Scotian population)	*Malacoraja senta*	No Status	Special Concern
Thorny skate	*Amblyraja radiate*	No Status	Special Concern
Winter skate (Georges Bank – Western Scotian Shelf- Bay of Fundy population)	*Leucoraja ocellataa*	No Status	Special Concern

Concentrations of marine mammal species are present in the Scotian Shelf and Slope area, specifically Sable Island National Park Reserve and the Gullly Marine Protected Area (MPA) (Hurley 2011), see Figure 10.3. While the Scotian Shelf area is a region adjacent to the Project Area, the Sable Island National Park Reserve and the Gully are respectively 220 km and 260 km from the Project Area.

Baleen whale species inclusive of humpback whales (*Megaptera novaeanalia*), blue whales, fin whales, sei whales (*Balaenoptera borealis*), North Atlantic right whales (Eubalaena glacialis)_and minke whales are at their highest numbers in the Project Area from July to November, but are present along the Scotian Shelf edge as early as March. Toothed whale species, inclusive of sperm

whales (*Physeter macrocephalus*), northern bottlenose (*Hyperoodon ampullatus*), and Sowerby's beaked whales (*Mesoplodon bidens*), are present year-round in the Scotian Shelf and Slope with peak numbers observed in summer and early fall each year. Pinniped species, inclusive of grey, harbour, harp, ringed and hooded seals are present in the offshore area, but are mostly concentrated along the Scotian shelf area and nearshore waters with a low likelihood of being found in the Project Area (Hurley 2011, DFO 2011a).

Two species of sea turtle, the leatherback turtle (*Dermochelys coriacea*) and the Atlantic loggerhead turtle (*Caretta caretta*) are likely to be present in the Project Area, particularly during the summer and fall months (June to October). Kemp's Ridley sea turtle (*Lepidochelys kempii*) has been observed occasionally, but the Project Area is not identified as within its normal foraging range (Hurley 2011; DFO 2011a) and so it is estimated to have a low likelihood of being present. Green turtle (*Chelonia mydas*) also has potential to occur in the Project Area during the summer months as a result of its wide range (Hurley 2011).

Table 10.2 lists the SARA Schedule 1 and COSEWIC marine mammal and sea turtle species that have the potential to occur in the Project Area.

Table 10.2 Nationally Listed Marine Mammals and Sea Turtles Potentially Occurring in the Project Area

Common Name	Scientific Name	SARA	COSEWIC
Blue whale (Atlantic population)	*Balaenoptera musculus*	Schedule 1 Endangered	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Schedule 1 Endangered	Endangered
Northern bottlenose whale (Scotian Shelf population)	*Hyperoodon ampullatus*	Schedule 1 Endangered	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Schedule 1 Endangered	Endangered
Fin whale (Atlantic population)	*Balaenoptera physalus*	Schedule 1 Special Concern	Special Concern
Sowerby's beaked whale	*Mesoplodon bidens*	Schedule 1 Special Concern	Special Concern
Loggerhead sea turtle	*Caretta caretta*	No Status	Endangered
Killer whale (Northwest Atlantic-Eastern Arctic population)	*Orcinus orca*	No Status	Special Concern

10.2.2.2 Migratory Birds

Bird species are present year-round in the Project Area with over 25 species having been observed in the Scotian Shelf and Scotian Slope areas. During the summer months, offshore bird populations consist primarily of shearwaters and storm petrels with kittiwakes, fulmars and alcids prevalent in the winter months. Migratory birds inclusive of Roseate Tern and Red Knot, federally listed endangered species under Schedule 1 of SARA, may be present in the Project Area during their seasonal migrations to and from Sable Island National Park Reserve and their southerly overwintering habitat (Hurley 2011). Migratory bird species potentially occurring in the Project Area are listed in Table 10.3.

Table 10.3 Bird Species Listed in Article I of the *Migratory Birds Convention Act, 1994* Potentially Occurring in the Project Area

Common Name	Scientific Name
Procellariidae	
Northern Fulmar	*Fulmarus glacialis*
Cory's Shearwater	*Calonectris diomedea*
Greater Shearwater	*Puffinus gravis*
Sooty Shearwater	*Puffinus griseus*
Manx Shearwater	*Puffinus puffinus*
Hydrobatidae	
Leach's Storm-Petrel	*Oceanodroma leucorhoa*
Wilson's Storm-Petrel	*Oceanites oceanicus*
Sulidae	
Northern Gannet	*Morus bassanus*
Charadriidae	
Black-bellied Plover	*Pluvialis squatarola*
American Golden-Plover	*Pluvialis dominica*
Scolopacidae	
Whimbrel	*Numenius phaeopus*
Hudsonian Godwit	*Limosa haemastica*
Red Knot	*Calidris canutus rufa*
White-rumped Sandpiper	*Calidris fuscicollis*
Red Phalarope	*Phalaropus fulicarius*
Red-necked Phalarope	*Phalaropus lobatus*
Laridae	
Black-legged Kittiwake	*Rissa tridactyla*
Ivory Gull	*Pagophila eburnea*
Herring Gull	*Larus argentatus*
Iceland Gull	*Larus glaucoides*
Lesser Black-backed Gull	*Larus fuscus*

Common Name	Scientific Name
Glaucous Gull	*Larus hyperboreus*
Great Black-backed Gull	*Larus marinus*
Roseate Tern	*Sterna dougallii*
Arctic Tern	*Sterna paradisaea*
Stercorariidae	
Great Skua	*Stercorarius skua*
South Polar Skua	*Stercorarius maccormicki*
Pomarine Jaeger	*Stercorarius pomarinus*
Parasitic Jaeger	*Stercorarius parasiticus*
Long-tailed Jaeger	*Stercorarius longicaudus*
Parulidae	
Warblers	*Setophaga* spp.

10.2.2.3 Special Areas

A number of offshore special areas have been identified for the Scotian Shelf and Scotian Slope regions. Those special areas located in proximity to the Project Area are shown in Figure 10.3.

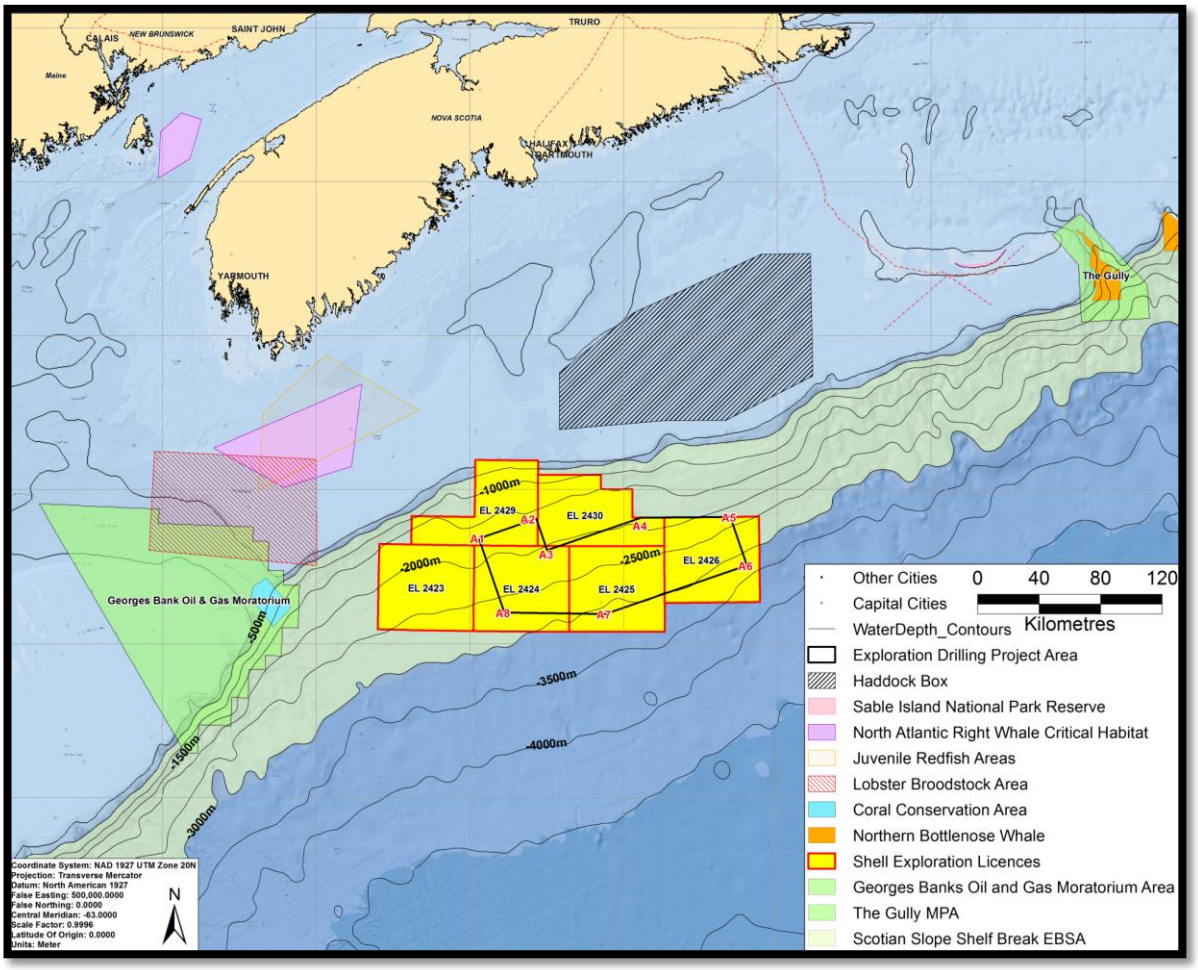


Figure 10.3 Special Areas Relative to the Project Area

The Special Areas include:

- Georges Bank Moratorium Area (122 km west of the Project Area)
- the Haddock Nursery Closure Area (60 km north of the Project Area)
- the Lobster Closure Area (LFA 40) (105 km west of the Project Area)
- the Redfish Nursery Closure Area (92 km northwest of the Project Area)
- the Roseway Basin Right Whale Critical Habitat Area (95 km northwest of the Project Area) (Doherty and Horsman 2007).

The Sable Island National Park Reserve as well as The Gully MPA and adjacent Haldimand and Shortland Canyons, all identified northern bottlenose whale critical habitat under SARA, are over 200 km from the proposed Project Area.

The Project Area lies within a portion of the Scotian Slope/Shelf Break Ecologically and Biologically Significant Area (EBSA). EBSAs are areas that, based on scientific expert opinion,

demonstrate uniqueness, diversity, importance for threatened, endangered or declining species and/or habitats, sensitive habitat and/or abundance of key species (Doherty and Horsman 2007). While EBSAs have no formal designation or environmental protection, they are considered to play a key role in marine protected areas planning. Attributes of the Scotian Slope/ Shelf Break area that justified its selection as an EBSA are presented below (Doherty and Horsman 2007):

- Unique geology (iceberg furroughs, pits, complex/irregular bottom)
- Slopes are areas of high finfish diversity due to habitat heterogeneity provided by depth
- High fish diversity, including demersal, mesopelagic and large pelagic fishes
- Inhabited by corals, whales, porbeagle shark, tuna, swordfish;
- Primary migratory route for large pelagic fishes (e.g., sharks, swordfish, tuna)
- Whale migration route
- Migratory route for endangered leatherback turtles
- High diversity of squid
- Overwintering area for a number of shelf fish species, including Atlantic halibut and lobster
- Feeding/overwintering area for seabirds
- Occurrence of Greenland sharks.

10.3 Existing Environmental Studies

A number of EAs, environmental studies (inclusive of technical reports) and ecological studies have been conducted in association with this marine region (i.e., Scotian Slope and Scotian Shelf) including the following:

- Environmental Assessment of Shell Canada Limited's Shelburne Basin 3-D Seismic Survey (LGL 2013)
- Strategic Environmental Assessment: Petroleum Exploration Activities on the Southwestern Scotian Slope (Hurley 2011)
- The Scotian Shelf in Context: The State of the Scotian Shelf Report (DFO 2011a)
- The Marine Environment and Fisheries of Georges Bank, Nova Scotia: Consideration of the Potential Interactions Associated with Offshore Petroleum Activities (DFO 2011b)
- Ocean Noise: The State of the Scotian Shelf Report (Walmsley and Theriault 2011)
- Effects of Seismic Survey Sound on Cetaceans in the Northwest Atlantic (Moulton and Holst 2010)
- Ecologically and Biologically Significant Areas of the Scotian Shelf and Environs: A Compilations of Scientific Expert Opinion (Doherty and Horsman 2007)
- The Scotian Shelf: An Ecological Overview for Ocean Planning (Breeze et al. 2002)
- Seabirds at Risk Around Offshore Oil Platforms in the North-west Atlantic (Wiese et al. 2001)

The information above will be reviewed as part of the EA process. In addition, the EIS report will draw on strategic environmental assessments (SEAs) that have been completed by the CNSOPB for petroleum exploration activities on the Scotian Shelf and Scotian Slope. These SEAs are intended to inform CNSOPB decision-making prior to issuance of exploration rights by identifying key environmental issues and general restrictive or mitigative measures that should be considered during exploration program application. Additionally, these SEAs are used to inform operators in the preparation of project-specific EAs required as part of the OA application to the CNSOPB. In particular, the EIS will draw on the SEA of Petroleum Exploration Activities on the Southwestern Scotian Slope (Hurley 2011) and SEA for the Western Scotian Slope which is expected to be released as a draft document for public comment in December 2013.

Although no environmental field surveys are currently planned in association with the EA, desktop studies will be conducted to gather recent and relevant publicly available information from existing environmental studies, databases, research papers, projects and reports for use as applicable in the EIS.

11 POTENTIAL PROJECT RELATED ENVIRONMENTAL EFFECTS

11.1 Routine Project Activities

Routine Project activities have the potential to result in Project related changes to the environment. Potential routine Project activities that may result in changes to the environment include:

- installation and presence of physical structures (e.g., wellheads, MODU))
- underwater noise from VSP survey, seabed ROV survey as well as drilling activities
- offshore lights (including flares)
- waste disposal (muds, cuttings, etc.) and atmospheric emissions (including flaring during testing).

Under CEAA, 2012, the PD must provide a description of any potential changes to fish and fish habitat, aquatic species, and migratory birds that may be caused as a result of carrying out the Project. Additionally, the PD must also provide information on the effects of any potential environmental changes to federal or transboundary lands as well as on Aboriginal peoples.

Table 11.1 provides an overview of the potential environmental interactions with routine Project activities (i.e., operation of the MODU and exploratory drilling) that have the potential to result in changes to the environmental components identified in CEAA, 2012.

Table 11.1 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	Routine Project activities have the potential to result in changes affecting fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species due to the following interactions with the environment: ▪ localized sensory disturbance to aquatic species from underwater noise emissions associated with drilling and VSP activities ▪ localized degradation and disturbance to the benthic environment (including benthic species) due to seabed disposal at drill site(s) (i.e., drill mud/cuttings, cement) ▪ localized effects on marine water quality due to routine ocean discharges (e.g., waste water) from the MODU ▪ potential injury or mortality to marine mammal(s) from vessel collisions
Migratory Birds	5(1)(a)(iii)	Routine Project activities have the potential to result in changes affecting migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, due to the following interactions with the environment: ▪ attraction of migratory birds to the MODU lighting (including flares) and discharges (e.g. food wastes) ▪ mortality or stranding of migratory birds (particularly storm petrels) on the MODU
Project Activities Occurring on Federal Lands	5(1)(b)(i)	Routine Project activities have the potential to result in changes to the environment that would occur on federal waters as a result of the Project Area being located within Canada's EEZ and thus entirely within federal waters under the jurisdiction of the Government of Canada.
Transboundary Issues	5(1)(b)(ii)	Environmental interactions from routine Project activities are not anticipated to result in changes to the environment that would occur outside of the Nova Scotian or Canadian offshore area.
Health and Socio-Economic Conditions for Aboriginal and	5(1)(c)(i) 5(2)(b)(i)	Routine Project activities have the potential to result in the following changes to the environment that may have an effect on Mi'kmaq commercial fishing activities, including those carried out under communal commercial licences in and around the Project Area: ▪ establishment of a safety zone (fisheries exclusion zone) around the MODU during drilling activities,

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Non-Aboriginal People		as required by the CNSOPB, and associated spatial and temporal restrictions on commercial fish harvesting activity ▪ localized sensory disturbance from underwater noise emissions, and associated changes in behavior and distribution of commercial fish species The Project is also expected to have economic benefits, including economic and contracting opportunities. Routine Project activities are not expected to result in any changes to the environment that would have an effect on the health conditions of Mi'kmaq or non-Aboriginal peoples.
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)	Routine Project activities are not anticipated to result in any changes to the environment that would have an effect on physical and cultural heritage areas or resources. However, information gathered during 3D seismic surveys, geotechnical and geohazard surveys, and pre-drill ROV site surveys in the Project Area will confirm the absence of marine heritage resources on the seabed before any seabed disturbance takes place. If any concerns related to this matter are identified during engagement with the Mi'kmaq of Nova Scotia, they will be considered in the EIS.
Current Use of Lands and Resources for Traditional Purposes by the Mi'kmaq	5(1)(c)(iii)	Routine Project activities are not anticipated to result in any changes to the environment that would have an effect on the current use of land and resources for traditional purposes by the Mi'kmaq of Nova Scotia, other than those Mi'kmaq commercial fisheries (including communal commercial fisheries) noted above, given the Project Area's water depth and distance from shore. Additional information regarding traditional Mi'kmaq fisheries and traditional resource use will be gathered through engagement with the Mi'kmaq of Nova Scotia. If any concerns related to this matter are identified during engagement with the Mi'kmaq, they will be considered in the EIS.

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
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)	Routine Project activities authorized by the CNSOPB have the potential to result in directly related or necessarily incidental changes to the atmospheric environment due to the following interactions with the environment: ▪ release of air emissions associated with operation of the MODU ▪ generation of noise associated with operation of the MODU

11.2 Routine Logistical Activities

Routine logistical activities conducted in support of the Project include activities associated with the onshore supply base and the support vessels. Routine logistical activities at the onshore supply base are either not anticipated to result in any adverse environmental effects, or have the potential to cause only minor environmental effects that can be adequately managed through other existing legislative or regulatory processes. This conclusion is based on the following considerations noted previously in Section 4.3.3:

- The onshore supply base will be located at an existing port facility in an industrial area, and all associated activities will occur within the existing spatial boundaries of an existing marine terminal facility, on lands that have been previously disturbed and/or developed.
- No excavation will be required at the supply base with the potential exception of mud plant installation, should the facility be needed. Standard industry practices to manage runoff, erosion and sediment control will be adhered to, including the use of tarping, berming, silt fencing and other methods as appropriate.
- None of the following will be needed to support the Project: modifications to existing pier/dock facilities (or construction of new pier/dock facilities); construction of additional warehouses, buildings, or new access to the site; clearing; in-water works; or expansion of existing site boundaries.
- All of the activities proposed to be carried out at the supply base (i.e., vessel berthing, storage, laydown, mud processing, and pipe inspection) are consistent with the current use and the activities currently undertaken at each of the candidate supply base locations under consideration.
- The supply bases will have approvals and management systems in place for the existing operations and infrastructure on the site, and will already be complying with applicable legislation, regulations, rules and requirements, including any applicable environmental assessment processes.
- Should any new approvals be needed for new infrastructure or operations associated with the Project, the third party operator will undertake the regulatory processes necessary to obtain those approvals. Environmental effects, if any, would be adequately managed through these other existing legislative or regulatory processes.

Potential environmental interactions with routine logistical activities in support of the Project are summarized in Table 11.2.

Table 11.2 Potential Environmental Interactions with Routine Logistical Activities in Support of the Project

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	Routine activities at the onshore supply base are not anticipated to interact with the environment in such a way that results in changes affecting fish, fish habitat, aquatic species as defined under SARA, marine mammals, or other aquatic species for the following reasons: ▪ all supply base activities will be carried out entirely onshore ▪ no in-water works (e.g., wharf extension) will be required to prepare the selected supply base location for Project activities ▪ if excavation is required for mud batch installation, standard industry practices for the management of erosion, runoff and sediment control will be adhered to, including the use of tarping, berming, silt fencing and/or other methods as appropriate to prevent discharges to the marine environment	Routine support vessel activities have the potential to result in changes affecting fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species due to the following interactions with the environment: ▪ localized sensory disturbance to aquatic species from underwater noise emissions associated with vessel transiting ▪ localized effects on marine water quality due to routine ocean discharges (e.g., waste water) ▪ potential injury or mortality to marine mammal(s) from vessel collisions
Migratory Birds	5(1)(a)(iii)	Routine activities at the onshore supply base are not anticipated to interact with the environment in such a way that results in changes affecting migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, for the following reasons: ▪ Mitigation will be in place to prevent any discharges to the marine environment ▪ all of the candidate supply base locations under consideration are active marine terminal facilities that currently use artificial lighting	Routine support vessel activities have the potential to result in changes affecting migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, due to the following interactions with the environment: ▪ attraction of migratory birds to support vessel lighting and discharges (e.g. food wastes) ▪ mortality or stranding of migratory birds (particularly storm petrels) on support vessels

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
		▪ installation of additional lighting (if required) would result in only an incremental increase in light emissions beyond those already associated with the supply base and/or surrounding industrial area and the use of directional lighting would be considered.	
Project Activities Occurring on Federal Lands	5(1)(b)(i)	Routine Project activities at the onshore supply base have the potential to result in changes to the environment that would occur on lands owned by the Halifax Port Authority for the Halterm Container Terminal and Richmond Terminals locations. However, these changes would be temporary and would not result in transboundary effects, or environmental effects on aquatic species, migratory birds or Aboriginal people as demonstrated within this Table.	Routine support vessel activities have the potential to result in changes to the environment that would occur in federal waters as a result of the Project Area being located within Canada's EEZ and thus entirely within federal waters under the jurisdiction of the Government of Canada.
Transboundary Issues	5(1)(b)(ii)	Routine Project activities at the onshore supply base are not anticipated to result in any change to the environment that would occur outside of the existing site boundaries of the selected supply base location.	Environmental interactions from routine support vessel activities are not anticipated to result in changes to the environment that would occur outside of Nova Scotian or Canadian waters.
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	Routine Project activities at the onshore supply base are not anticipated to result in any change to the environment that may have an effect on heath and socio-economic conditions for Aboriginal people for the following reasons: ▪ there will be no interaction with Mi'kmaq commercial fishing or other traditional nearshore activities because mitigation will be in place to prevent discharges to the marine environment and all supply base activities will be carried out	Routine support vessel activities outside of the MODU safety zone will be consistent with existing offshore and nearshore shipping traffic in the region and are therefore not anticipated to result in any changes to the environment that would have an effect on Mi'kmaq commercial fishing activities. (Potential environmental interactions associated with the MODU safety zone are addressed in Table 11.1.) Routine support vessel activities are not expected to result in any changes to the environment that would have an effect on the health conditions of Mi'kmaq

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
		entirely onshore ▪ there will be no interaction with Mi'kmaq commercial harvesting of terrestrial resources because all supply base activities will be carried out entirely within existing site boundaries (i.e., within a previously disturbed/developed area in an industrial setting that excludes access for traditional use and that precludes the presence or availability of terrestrial resources used for commercial purposes. Routine Project activities at the supply base are not expected to result in any changes to the environment that would have an effect on the health conditions of Mi'kmaq or non-Aboriginal peoples.	or non-Aboriginal peoples.
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)	Routine Project activities at the onshore supply base are not anticipated to result in any changes to the environment that would have an effect on physical and cultural heritage areas or resources due to the industrial, previously disturbed/developed nature of all of the candidate supply base locations under consideration. Archaeological potential would be considered low for all supply base site options. However, if any potential heritage resources are identified during work onsite, appropriate mitigation will be implemented by a qualified archaeologist in consultation with the Nova Scotia Museum. KMKNO's archaeologist will also be consulted in the event of a suspected Mi'kmaq resource.	Routine support vessel activities will not result in any ground/seabed disturbance or impact availability or access to traditional resources and are therefore not anticipated to result in any changes to the environment that would have an effect on physical and cultural heritage areas or resources.
Current Use of Lands and	5(1)(c)(iii)	Routine Project activities at the onshore supply base are not anticipated to result in any changes to the	Routine support vessel activities will be consistent with existing shipping traffic in the region and are

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
Resources for Traditional Purposes by the Mi'kmaq		environment that would have an effect on the current use of land and resources for traditional purposes by the Mi'kmaq of Nova Scotia for the following reasons: ▪ there will be no interaction with Mi'kmaq commercial fishing or other traditional nearshore activities because mitigation will be in place to prevent discharges to the marine environment and all supply base activities will be carried out entirely onshore ▪ there will be no interaction with Mi'kmaq traditional harvesting of terrestrial resources because all supply base activities will be carried out entirely within the existing site boundaries of a previously disturbed/developed area in an industrial setting that excludes access for traditional use and that precludes the presence or availability of terrestrial resources used for commercial purposes.	therefore not anticipated to result in any changes to the environment that would have an effect on traditional nearshore fishing activities. The support vessels will operate entirely in the marine environment and will therefore have no interaction with the current use of terrestrial lands and resources for traditional purposes by the Mi'kmaq of Nova Scotia. Additional information regarding traditional Mi'kmaq fisheries and other traditional resource use will be gathered through engagement with the Mi'kmaq of Nova Scotia. If any concerns related to this matter are identified during engagement with the Mi'kmaq, they will be considered in the EIS.
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a	5(2)(a)	If the Halterm Container Terminal or Richmond Terminals is ultimately selected as the preferred supply base location, routine activities authorized by the Halifax Port Authority at the onshore supply base have the potential to result in only minor directly related or necessarily incidental changes to the atmospheric and acoustic environment due to the following interactions with the environment: ▪ low-level and intermittent release of air emissions (e.g., exhaust) associated with operation of vehicles and equipment	Routine support vessel activities authorized by the CNSOPB have the potential to result in directly related or necessarily incidental minor changes to the atmospheric environment due to the following interactions with the environment: ▪ release of air emissions associated with operation of support vessels ▪ generation of noise associated with operation of support vessels

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
Duty or Function in Support of the Project		▪ low-level and intermittent generation of noise associated with operation of vehicles and equipment However, the onshore supply base will be located at an existing industrial site in a developed area that is routinely subject to air and noise emissions. Project activities will be conducted in accordance with relevant federal and provincial standards for air emissions and municipal noise by-laws (where applicable).	

11.3 Non-Routine Project Activities

In addition to assessment of environmental effects from routine Project activities, environmental effects from non-routine Project activities such as accidents and malfunctions have also been considered. Potential accidental events that can occur during exploration drilling include blowouts (uncontrolled release of hydrocarbons during drilling), platform and vessel leaks, as well as spills and releases (e.g., hydraulic fluid, drilling mud, diesel). Collectively, these accidental releases are referred to as "spills".

Preventative measures including appropriate management systems and equipment (e.g., well casing, blow out preventer) will be in place throughout the Project to prevent incidents from occurring and to maintain control and safety throughout the Project. In addition to the preventative measures, response plans will be in place to implement effective response in the unlikely event that an incident should occur. The EIS will provide additional details regarding these preventative, contingency, and emergency response measures that are designed to prevent accidents and malfunctions, and to minimize impacts to human health and the environment should it occur.

Table 11.3 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	An accidental spill or release during Project activities could potentially result in changes to fish, fish habitat, aquatic species as defined in SARA, marine mammals, and other aquatic species, including: ▪ reduced availability and quality of habitat ▪ degradation and reduction in marine water quality ▪ injury, mortality and/or reduced health for fish and other aquatic species
Migratory Birds	5(1)(a)(iii)	An accidental spill or release during Project activities could potentially result in changes to migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, including injury, mortality and/or reduced health for migratory bird species.
Project Activities Occurring on Federal Lands	5(1)(b)(i)	An accidental spill or release during Project activities could potentially result in changes to the environment that would occur in federal waters as a result of the Project Area being located within Canada's EEZ and thus entirely within federal waters under the jurisdiction of the Government of Canada.
Transboundary Issues	5(1)(b)(ii)	An accidental spill may result in transboundary effects outside of Nova Scotian or Canadian offshore areas. Spill probability analysis and trajectory modeling will be conducted to determine the potential for and scope of any transboundary environmental effects. According to the CANUSLANT Joint Marine Pollution Contingency Plan, the Canadian Coast Guard Maritimes Region is the agency responsible for assisting with transboundary spills and the associated response.
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	An accidental spill or release during Project activities could potentially result in the following changes to the environment that may have an effect on commercial fisheries, including Mi'kmaq commercial fisheries: ▪ contamination-related closure of commercial fishing areas, and associated restrictions on commercial fish harvesting activity ▪ reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population health, behavior, and distribution of commercial fish species as a result of marine pollution

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
		▪ changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value A vessel collision with fishing gear could also potentially result in changes to the environment that would have an effect on human health and safety for Mi'kmaq or non-Aboriginal peoples.
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)	An accidental spill or release during Project activities could potentially cause a change to the environment that may result in effects to a physical and cultural heritage area or resource due to potential impacts on fisheries and species that may be used for traditional purposes. Given the location of the Project offshore, non-routine Project activities are not expected to result in changes to resources of Historical, Archeological, Paleontological, or Architectural significance.
Current Use of Lands and Resources for Traditional Purposes by the Mi'kmaq	5(1)(c)(iii)	An accidental spill or release during Project activities could potentially result in the following changes to the environment that would have an effect on any traditional Mi'kmaq fisheries within the spill trajectory: ▪ contamination-related closure of traditional fishing areas, and associated restrictions on traditional fish harvesting activity ▪ reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population size, behavior, and distribution of commercial fish species as a result of marine pollution ▪ changes in population size and health of individuals among commercial fish species, and associated reduction in value of fishery resource for traditional use
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)	An accidental fire occurring as a result of Project activities authorized by the CNSOPB could potentially result in temporary and localized changes to air quality.

11.4 Non-Routine Logistical Activities

Table 11.4 considers potential environmental interactions that may result from accidents and malfunctions during logistical activities in support of the Project. As indicated in Table 11.4, potential accidents and malfunction at the onshore supply base relate primarily to accidental spills or releases. Accidents and malfunctions are not expected to result in adverse environmental effects to fish, aquatic species, migratory birds, and/or Aboriginal peoples. Any effects are expected to be localized and temporary in nature, and are not expected to extend beyond the existing boundaries of the site or into the marine environment. In the unlikely event that effects extend beyond the boundaries of the site and into the marine environment, they have the potential to cause only minor environmental effects that can be adequately managed through other existing legislative or regulatory processes. This is due to the following considerations:

- The onshore supply base will be located at an existing port facility in an industrial area and active harbour;
- The supply bases would have approvals and management systems already in place for the existing operations and infrastructure on the site, including systems to address accidents and malfunctions. The operators will already be complying with applicable legislation, regulations, rules and requirements, including any applicable environmental requirements.
- Should any new approvals be needed for new infrastructure or operations associated with the Project, the third party operator will undertake the regulatory processes necessary to obtain those approvals. Environmental effects, if any, would be adequately managed through these other existing legislative or regulatory processes.

Accidents and malfunctions during supply vessel operations may affect certain components identified in CEAA, 2012, and in particular may affect fish and aquatic species. Potential accidents and malfunctions relating to the supply vessel operations include marine spills associated the transfer of materials to or from the support vessel while berthed at the dock, spills during re-fueling or other vessel operations, and vessel collision.

The Atlantic Pilotage Authority has designated Halifax Harbour and the Strait of Canso as compulsory pilotage areas under the *Pilotage Act*. This means that, regardless of which supply base location is selected, support vessels will be under mandatory pilotage when transiting within nearshore waters to and from the supply base, thereby substantially reducing the risk of vessel collision.

Table 11.4 Potential Environmental Interactions with Accidents and Malfunctions during Logistical Activities in Support of the Project

Environmental Component of Concern	Relevant Section of CEAA. 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	An accidental spill or release at the onshore supply base is not expected to result in changes to fish, fish habitat, aquatic species as defined in SARA, marine mammals, and other aquatic species for the following reasons: ▪ a secondary containment system will be in place for the mud batch plant ▪ all potentially hazardous materials will be stored and handled only in designated areas by trained personnel ▪ spill containment/clean-up equipment will be kept on-site for use by trained personnel in accordance with Project-specific emergency response plans	An accidental spill or release from a support vessel could potentially result in changes to fish, fish habitat, aquatic species as defined in SARA, marine mammals, and other aquatic species, including: ▪ localized reduction in availability and quality of habitat ▪ localized degradation and reduction in marine water quality ▪ localized injury, mortality and/or reduced health for fish and other aquatic species
Migratory Birds	5(1)(a)(iii)	An accidental spill, release or other malfunction at the onshore supply base is not expected to result in changes affecting migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, including injury, mortality and/or reduced health for migratory bird species because these are existing industrial areas, and an accidental spill or release is expected to be contained to the site and not affect the marine environment.	An accidental spill or release from a support vessel could potentially result in changes to migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, including injury, mortality and/or reduced health for migratory bird species as a result of the spill/release entering the marine environment.
Project Activities Occurring on Federal Lands	5(1)(b)(i)	An accidental spill or release at the onshore supply base could potentially result in changes to the environment that would occur on lands owned by the Halifax Port Authority for the Halterm Container	An accidental spill or release from a support vessel could potentially result in changes to the environment that would occur in federal waters as a result of the Project Area being located within

Environmental Component of Concern	Relevant Section of CEAA. 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
		Terminal and Richmond Terminal locations. Given the existing industrial operations at these locations, any potential environmental effects are expected to be minor and adequately managed through other existing legislative or regulatory processes or requirements applicable to these sites.	Canada's EEZ.
Transboundary Effects	5(1)(b)(ii)	An accidental spill or release at the onshore supply base would not result in any change to the environment that would occur in another province or outside of Canada.	An accidental spill or release from a support vessel would not result in any change to the environment that would occur in another province or outside of Canada.
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	An accidental spill or release at the onshore supply base is not expected to result in a change to the environment that would have an effect on commercial fisheries, including Mi'kmaq commercial fisheries as any spill/release is expected to be contained onsite and given the existing industrial operation of the site and the nearshore area.,	An accidental spill or release from a support vessel could potentially result in the following changes to the environment that would have an effect on commercial fisheries, including Mi'kmaq fisheries: ▪ temporary and localized restrictions on commercial fish harvesting activity ▪ localized reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population health, behavior, and distribution of commercial fish species as a result of marine pollution ▪ localized changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value An accidental event or malfunction resulting in a vessel collision could also potentially result in changes to the environment that would have an effect on human health and safety for Mi'kmaq or

Environmental Component of Concern	Relevant Section of CEAA. 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
			non-Aboriginal peoples.
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)	Accidents and malfunctions at the onshore supply base are not expected to cause a change to the environment that would result in the disturbance and/or destruction of a physical and cultural heritage area or resource given the industrial nature of the sites and their current levels of disturbance/development.	Accidents and malfunctions from support vessel activities are not expected to result in changes to physical and cultural heritage and resources of historical, archeological, paleontological or architectural significance given that supply based operations are marine based and not land-based. Potential impacts from accidents and malfunctions are therefore expected to be limited to the marine environment or foreshore areas.
Current Use of Lands and Resources for Traditional Purposes by the Mi'kmaq	5(1)(c)(iii)	An accidental spill, release or other malfunction at the onshore supply base is not expected to result in a change to the environment that would have an effect on current use of lands or resources for traditional purposes, including traditional Mi'kmaq fisheries given: • the supply base options are located on existing industrial lands used as active port facilities and not for traditional purposes; • any spills/releases are expected to be contained onsite.	An accidental spill or release from a support vessel activities could potentially result in the following changes to the environment that would have an effect on any traditional Mi'kmaq fisheries within the spill trajectory: ▪ temporary and localized restrictions on traditional fish harvesting activity ▪ temporary and localized reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population size, behavior, and distribution of commercial fish species as a result of marine pollution ▪ temporary and localized changes in population size and health of individuals among commercial fish species
Other Changes to the Environment Directly Related or	5(2)(a)	If the Halterm Container Terminal or Richmond Terminals is ultimately selected as the preferred supply base location, an accidental fire occurring a result of	An accidental fire occurring as a result of support vessel activities authorized by the CNSOPB could potentially result in directly related or necessarily

Environmental Component of Concern	Relevant Section of CEAA. 2012	Potential Environmental Interactions	
		Onshore Supply Base	Support Vessels
Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project		Project activities authorized by the Halifax Port Authority at the onshore supply base has the potential to result in directly related or necessarily incidental changes to the atmospheric environment, including air emissions. However, these changes are not likely to results in effects on migratory birds, aquatic species or Aboriginal peoples.	incidental changes to the atmospheric environment, including air emissions, and/or result in localized changes to the marine environment affecting other offshore users.

11.5 Environmental Effects Considerations

As part of the EIS, the potential interactions of the Project are evaluated by considering individual biophysical and socio-economic components which could be affected by the Project. These interactions are evaluated to determine what environmental effects may occur as a result of the Project.

Table 11.5 outlines the proposed environmental components to be assessed in the EIS. This scoping has been based on the interactions discussed above as well as guidance from previously completed CNSOPB scoping documents, SEAs, and project-specific EAs of offshore exploration projects. The selection of environmental components provided below also takes into consideration existing regulations and guidelines for routine exploration-related operational activities that apply to the Project. Adherence to these guidelines and regulations effectively mitigates the potential for adverse environmental effects to occur in association with routine operational activities, and may therefore allow certain environmental components to be excluded from consideration in the EA.

Shell recognizes that CEAA will ultimately be responsible for determining and finalizing the environmental components to be assessed in the EIS through their issuance of the Project-specific EIS Guidelines

The selection of proposed environmental components considers that the onshore activities (i.e., onshore supply base) will occur at existing facilities. The onshore supply base will be at an existing port facility in an industrial area operated by a third party and will be compatible with proposed Project servicing and supply requirements. As a result and for all the reasons provided previously, it is anticipated that the onshore supply base will not have adverse environmental effects that require special consideration and inclusion in the assessment. The proposed environmental components therefore focus on offshore components.

Table 11.5 Proposed Environmental Components to be Assessed in the EIS

Environmental Component	Basis for Selection
Species of Special Status	Species of Special Status includes consideration of the following: ▪ Species listed on Schedule 1 of SARA and their critical habitat determined to be potentially affected ▪ Species assessed as endangered, threatened or of special concern by the Committee on the Status of Endangered Wildlife of Canada (COSEWIC) ▪ Migratory birds as defined by the *Migratory Birds Convention Act, 1994* Several Species of Special Status occur in the Study Area including fish, other aquatic species (e.g., marine mammals,

Environmental Component	Basis for Selection
	turtles) and migratory birds. SARA-listed species and migratory birds are protected under federal legislation. Species at risk can be more vulnerable to changes in their habitat or population levels and therefore may require special consideration.
Fisheries	Fisheries includes consideration of commercial and Aboriginal fisheries (including commercially important fish species) that could be affected by the Project. Fisheries are proposed to be included due to their cultural and economic importance and their potential interaction with the Project.
Special Areas	Special Areas includes consideration of areas that have been designated of special interest due to their ecological and/or conservation sensitivities and that could be affected by Project activities. These areas may include the Georges Bank Moratorium Area, the Roseway Basin North Atlantic Right Whale Critical Habitat, Northeast Channel Coral Conservation Area the Haddock Box, the Scotian Shelf/Slope Break EBSA. Routine Project activities may not interact with these Special Areas but potential effects from accidental spills will be assessed.

Provided that Species of Special Status are assessed as part of the EIS and appropriate mitigation is applied in association with any identified potential environmental effects, any potential adverse environmental effects on secure population of fish, marine mammals and sea turtles associated with the Project are considered addressed and therefore not proposed to be specifically assessed as part of the EIS.

Considering the short-term duration of the Project activities, the relative distance from potential receptors, and adherence to the applicable regulations and guidance (e.g., MARPOL Annex VI, Regulations for the Prevention of Air Pollution from Ships; air emissions provisions of the OWTG), no effects are anticipated to air quality in the Project Area. Air quality is therefore not proposed to be selected as an environmental component for assessment.

For routine operational activities, no effects are anticipated to water quality as a result of adherence to the following regulations and guidelines: Nova Scotia Offshore Area Petroleum Geophysical Regulations; OWTG; Offshore Chemical Selection Guidelines; *Fisheries Act* (section 36); and MARPOL 73/78. Water quality is therefore not proposed to be selected as an environmental component for assessment.

12 CONSULTATION AND ENGAGEMENT

Shell's core values of honesty, integrity and respect for people form the basis of the Shell General Business Principles. Shell works with neighboring communities, First Nations, governments, and other stakeholders to reduce environmental and social effects and to develop appropriate ways to provide benefits from their operations.

Shell is committed to managing the effects, both positive and negative, of our business activities on the communities and areas in which we operate. As part of this commitment, Shell works to ensure the effects of Shell's activities on communities and local residents are assessed and considered in business decisions and seeks to minimize the negative effects of our business and enhance the positive benefits.

The following stakeholders and interest groups are identified as potentially having an interest in the Project

- CNSOPB
- DFO
- CEA Agency
- Environment Canada
- DND
- Nova Scotia Environment
- Fisheries Advisory Committee (FAC)
- Nova Scotia Assembly of Mi'kmaq Chiefs and its administrative arm the KMKNO
- Shubenacadie/Indian Brook Mi'kmaq Nation
- Native Council of Nova Scotia
- Nova Scotia Office of Aboriginal Affairs
- Nova Scotia Department of Energy
- Commercial Fisheries Industries Representatives (non FAC)
- Environmental Non-governmental Organization (ENGOs)

Shell has initiated consultation with local stakeholders regarding the Project and will continue to engage them throughout the Project. Through this dialogue, Shell hopes to gain an understanding of any issues or concerns in order to identify ways in which any potential negative effects of the Project can be reduced and benefits enhanced.
Comprehensive consultation and engagement specific to this Project is currently being implemented. This includes engagement with Aboriginal peoples, fisheries representatives,

government agencies with regulatory or permitting responsibilities related to the Project, and other interested parties. An overview of the engagement and consultation activities to date is provided in Table 12.1.

In September 2013, Project information packages were sent via email to stakeholders and follow ups were made by phone and email to gather any feedback and comments. Additionally, face to face meetings were held with interested stakeholders in September/October to introduce the Project and provide an overview of the proposed Project components and activities. These opportunities were used to gather any feedback, input or comments that stakeholders may have in regards to the proposed Project.

In association with engagement and consultation activities undertaken for the Project, Shell will take into consideration any concerns expressed by Aboriginal groups, government agencies and other stakeholders regarding the planned Project. Key questions, concerns and comments raised to date by engaged stakeholders have been in regards to the following:

- Local economic benefit from Project activities
- Accidental event prevention (process safety) and response
- Potential effects to marine life from offshore drilling

Comments provided to date have been general in nature. However, more specific comments and details are anticipated to be obtained in upcoming meetings and engagements to discuss the Project. Shell will continue to meet with these parties to provide information on the planned Project, to continue to document and address interests and concerns, to gather information where necessary on the biophysical and social environment, and to obtain feedback.

Table 12.1 summarizes consultation and engagement undertaken to date by Shell on the Project.

Table 12.1 Summary of Consultation and Engagement (as of October 15, 2013)

Stakeholder/Organization	Date	Type of Engagement	Engagement Topics/Purpose
Government Agencies			
Canadian Environmental Assessment Agency (CEAA)	May 23, 2013	Meeting	▪ Introduction ▪ Regulatory changes under CEAA, 2012 ▪ Project Overview
	August 16, 2013	Meeting	▪ Project Update ▪ Regulatory changes under CEAA, 2012
	September 6, 2013	Email	▪ Follow up discussion ▪ Provision of meeting minutes
	October 2, 2013	Meeting	▪ Project Overview ▪ Regulatory follow up
Canada-Nova Scotia Offshore Petroleum Board (CNSOPB)	March 6, 2013	Meeting	▪ Project Overview ▪ Regulatory
	May 23, 2013	Meeting	▪ Regulatory changes under CEAA, 2012 ▪ Project Overview
	August 15, 2013	Meeting	▪ Project Updates ▪ Regulatory
	October 2, 2013	Meeting	▪ Project Overview ▪ Regulatory follow up

Stakeholder/Organization	Date	Type of Engagement	Engagement Topics/Purpose
Environment Canada (EC)	September 23, 2013	Email	▪ Project Information
	October 2, 2013	Meeting	▪ Project Introduction and Overview ▪ Regulatory
Nova Scotia Environment	September 24, 2013	Meeting	▪ Project Overview ▪ Regulatory
Fisheries and Oceans Canada (DFO)	September 23, 2013	Email	▪ Project Information
The Mi'kmaq of Nova Scotia			
Nova Scotia Office of Aboriginal Affairs (NS OAA)	September 5, 2013	Email	▪ Information Package ▪ Project Overview
Native Council of Nova Scotia	September 5, 2013	Email	▪ Information Package ▪ Project Overview
	September 26, 2013	Phone Call	▪ Follow up on Project Information Package.
Nova Scotia Assembly of Mi'kmaq Chiefs (12 Nations) via the Mi'kmaq Kwilmu'kw Maw-Klusuaqn Negotiation Office (KMKNO)	September 5, 2013	Email	▪ Information Package ▪ Project Overview
	September 26, 2013	Meeting	▪ Project Introduction and Overview
Shubenacadie/Indian Brook Mi'kmaq Nation	September 13 2013	Phone Call	▪ Introductory Call ▪ Meeting invitation
	September 25 2013	Email	▪ Information Package ▪ Project Overview
Fisheries			
Fisheries Representatives (FAC and non FAC members)	September 5, 2013	Email	▪ Information Package ▪ Project Overview

Stakeholder/Organization	Date	Type of Engagement	Engagement Topics/Purpose
	September 26/27, 2013	Phone Calls and Emails	▪ Follow up on Project Information Package.
Fisheries Advisory Committee (FAC)	September 25, 2013	Meeting	Project Introduction and Overview
Other Stakeholders			
World Wildlife Federation (WWF)	September 13, 2013	Email	▪ Information Package ▪ Project Overview
	September 30, 2013	Meeting	▪ Project Introduction and Overview
Ecology Action Center (EAC)	September 13, 2013	Email	▪ Information Package ▪ Project Overview
	September 30, 2013	Meeting	▪ Project Introduction and Overview
Canada Parks and Wilderness (CPAWs), Atlantic chapter	September 13, 2013	Email	▪ Information Package ▪ Project Overview
	September 27, 2013	Phone Call and Email	▪ Follow-up on Project Information Package
Sierra Club Canada, Atlantic Chapter	September 13, 2013	Email	▪ Information Package ▪ Project Overview
	September 27, 2013	Phone Call and Email	▪ Follow-up on Project Information Package
	September 30, 2013	Email	▪ Follow-up on Project Information Package
	October 3, 2013	Email	▪ Follow-up on Project Information Package

12.1 Engagement with the Mi'kmaq of Nova Scotia

Shell has commenced its engagement with the Mi'kmaq regarding the Project. In addition, as a precursor to this Project and in association with the Shelburne Basin 3D Seismic Survey conducted in summer 2013, Shell was invited to participate in engagement opportunities (information sharing and relationship building) with the Mi'kmaq of Nova Scotia. As such, the objectives of engagement with the Mi'kmaq of Nova Scotia have been, and will continue to be:

- to provide Project information in a timely manner and at regular intervals to create an opportunity for feedback and open dialogue;
- to understand community interests and work to develop a positive long-term relationship;
- to create a context of open dialogue to discuss Project questions and potential concerns related to environmental, cultural, and traditional land and resource use issues
- to identify appropriate ways to provide benefits from the Project.

Engagement with the Mi'kmaq of Nova Scotia in relation to the Project began in August 2013 with the anticipation that opportunities for further engagement will be sought and continued throughout the Project. The following activities are proposed in association with the Project:

- provision of Project information materials inclusive of Project scope, timing and additional relevant details with the opportunity for the Mi'kmaq of Nova Scotia to provide feedback, pose questions and identify any further information requirements
- provision of regular Project updates (i.e., direct meetings, written materials and/or other communication mechanisms)
- Monthly calls/meetings to touch base for the life of the Project or as appropriate
- response to information requests and queries in a timely fashion
- participation in synergy groups and committees as appropriate to achieve the mutual aims noted above (e.g., Mi'kmaq Benefits Committee, Energy Committee, and Fisheries Advisory Committee)
- participation in other initiatives and forums as requested and as appropriate.

These proposed engagement activities will build upon the existing relationship between Shell and the Mi'kmaq of Nova Scotia, which began in August 2012 in association with the planning and development of the Shelburne Basin 3D Seismic Survey. Similar activities detailed above have been conducted throughout the time period of August 2012 to October 2013. In addition to these activities, Shell and the Mi'kmaq of Nova Scotia co-organized a *Mi'kmaq Supplier's Information Session and Introduction to the Offshore Drilling Program* session that took place in Millbrook on Aug 21, 2013. Invitation was also extended to the various Mi'kmaq communities to

other public sessions on the same topic held at various locations across the province that same week.

In association with the Project, Shell will also make similar efforts to engage the Shubenacadie/Indian Brook Mi'kmaq Nation, as a result of the recent separation from the KMKNO and its administrative function. Shell will also seek advisement from the KMKNO on this matter. Shell has provided the Shubenacadie/Indian Brook Mi'kmaq Nation with a Project Information Package (Sept 2013) and is currently tentatively scheduled to meet with their leadership in early December 2013. Additionally, Shell will also engage the Native Council of Nova Scotia to receive its input in early December 2013.

12.2 Stakeholder and Community Engagement

Engagement with regulatory agencies and government in association with the Project began in January of 2013. Additional meetings are anticipated to occur between Shell and regulatory agencies throughout the regulatory process to achieve compliance with all regulatory requirements, to gather departmental knowledge and feedback and assure that expectations and requirements are understood.

In addition to engagement with regulatory agencies, engagement and consultation with additional stakeholders will be conducted.

13 REQUIRED PERMITS AND APPROVALS

13.1 Environmental Assessment Requirements

13.1.1 CEAA, 2012

The *Regulations Designating Physical Activities* under CEAA, 2012 and as amended on October 24, 2013 are in force. Based on the nature as well as location of the Project, it is a "designated project" under section 10 of the amended Regulations. The Project consists of the drilling, testing and abandonment of offshore exploratory wells within the Licences issued to Shell by the CNSOPB, and these proposed wells constitute the first drilling program in the licensed areas. Section 10 of the amended *Regulations Designating Physical Activities* states:

> Section 10: *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 Atlantic Accord Implementation Act *or the* Canada-Nova Scotia Petroleum Resources Accord Implementation Act.

Additionally an EA is required in support of an OA being sought from the CNSOPB for the Program. It is expected that the EIS completed to satisfy the CEAA, 2012 requirements will also satisfy the CNSOPB EA authorization requirements.

The onshore supply base does not trigger an EA under CEAA, 2012. None of the activities or infrastructure proposed for the supply base and required to support the Project are listed in the *Regulations Designating Physical Activities*.

13.1.2 Nova Scotia Environment Act

The Nova Scotia *Environment Act* establishes the provincial EA process for the Province. Under the *Environment Act* and associated *Environmental Assessment Regulations* made under section 49 of the *Environment Act*, designated Class I and Class II undertakings require a provincial level EA to be completed in association with the undertaking.

The Project will not trigger an EA under the *Nova Scotia Environment Act* as offshore projects are not designated under the *Environmental Assessment Regulations*.

The supply base will be owned and operated by a third party, which will be responsible for obtaining any approvals necessary to manage and operate that facility, including fulfilling any

environmental requirements. At present, it is not anticipated that the supply base will trigger the requirement for a provincial level EA under the Nova Scotia *Environment Act* due to the anticipated use of existing industrial facilities. In the event that the operator of the supply base determines that an EA is required under the Nova Scotia *Environment Act*, this is more appropriately conducted through a regulatory process separate from the CEAA, 2012 EA process given the Provincial jurisdiction, the industrial nature of the site and the operation by a third party. This is also appropriate given the lack of a CEAA trigger and lack of environmental effects under CEAA, 2012 (refer to Tables 11.2 and 11.4).

13.1.3 Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act

Under paragraph 142(1)b of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, the CNSOPB is provided the authority to authorize offshore activity following application by an Operator and provided they meet the prescribed application requirements. Section 142(1) b states:

> 142(1) *The Board may, on application made in the form and containing the information fixed by it and in that prescribed manner; issue*
>
> *(b) subject to section 45, an authorization with respect to each work or activity proposed to be carried on.*

Pursuant to s. 142(1), the CNSOPB is able to prescribe the application requirements associated with authorizing offshore activity. The CNSOPB has confirmed that under this provision, an EA will form one of the requirements of an application for an OA that is required prior to the commencement of the proposed Program.

13.2 Additional Authorizations

In addition to the EA, the permits, approvals and authorizations anticipated to be required from the Government of Canada for construction and operation of the Project, in addition to a federal EA decision, are summarized in Table 12.1. At present, no provincial permits are currently anticipated to be required for the Project.

Table 13.1 Additional Permitting Requirements

Permit Required	Governing Agency	Project Component
Operations Authorization	CNSOPB	Authorization to conduct exploration drilling program in association with an EL.
Approval to Drill A Well	CNSOPB	Licence to drill a well in association with an Operations Authorization.
Migratory Bird Handling Permit	Environment Canada	Salvage of stranded birds during operation of the MODU, VSP vessel and support vessels

Federal Legislation that is relevant to the environmental aspects of this Project includes:

- *Canadian Environmental Assessment Act, 2012*
- *Canada-Nova Scotia Accord Implementation Acts*
- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Protection Act*
- *Species at Risk Act*
- *Migratory Birds Convention Act, 1994*
- *Canada Shipping Act*
- *Canadian Environmental Protection Act*

The operator of the supply base will already have regulatory approvals in place to support their existing operations. However, additional authorizations may be required for new activities or infrastructure needed to support the Project. The third party operator will be responsible for identifying any obtaining any necessary regulatory approvals that are not already in place.

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