

Prepared for:

Noble Energy



# *Leviathan Project: Supplemental Lender Information Package – Overarching Environmental and Social Assessment Document*

September 2016

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**Leviathan Project: Supplemental Lender  
Information Package - Overarching  
Environmental and Social Assessment  
Document**

September 2016

A handwritten signature in black ink, appearing to read 'Peter Rawlings'.

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## Table of Acronyms

AIS	Alien Invasive Species
ALARP	As Low as Reasonably Practical
AOT	Ashdod Onshore Terminal
APC	Arab Potash Company
API	American Petroleum Institute
BAP	Biodiversity Action Plan
BAT	best available technologies
BOD	Basis of Design
BOEM	Benthic organisms
BOP	Blowout Preventer
BSEE	Bureau of Safety and Environmental Enforcement
CDP	Carbon Disclosure Project
CFC	Chlorofluorocarbon
CIA	Cumulative Impact Assessment
CL	Confidence limit
CSR	Corporate Social Responsibility
CVS	Coastal Valve Station
DCSP	Domestic Condensate Sales Pipeline
DGSP	Domestic Gas Sales Pipeline
DIHR	Danish Institute for Human Rights
DP	Dynamically Positioned
DREAM	Dose-related Risk and Effect Assessment Model
DVS	Dor Valve Station
EEZ	Exclusive Economic Zone
EHS	Environmental Health & Safety
EIA	Environmental Impact Assessment
EMG	Eastern Mediterranean Gas Company, S.A.E.
EMMP	Environmental Management and Monitoring Plan
ERL	Effects Range Low
ERM	Environmental Resources Management
ERP	Emergency Response Plan
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESS	Ecosystem services
FAD	Fish Aggregating Devices
FAJR	Jordanian Egyptian Fajr for Natural Gas Transmission and Supply Company

FGRU	flare gas recovery unit
FPSO	Floating Production Storage and Off-Loading vessel
GEMS	Geoscience Earth & Marine Services, Inc
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GMS	Global Management System
GSPA	Gas Sales and Purchase Agreement
HAZID	Hazard Identification Documents
HAZOP	Hazard and Operability Study
HDD	Horizontal Directional Drilling
HSE	health, safety and environmental
IAA	Israel Antiquities Authority
IBA	Ramot Menashe Important Bird Area
IFC	International Finance Corporation
IGM	Infield Gathering Manifold
ILO	International Labor Organization
IMMRAC	Israel Marine Mammal Research and Assistance Center
IMO	International Maritime Organization
IMT	Incident Management Team
INPA	Israel Nature and Parks Authority
INGL	Israel Natural Gas Line
IPIECA	International Petroleum Industry Environmental Conservation
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
JBC	Jordan Bromine Company
JGTP	Jordan Gas Transmission Pipeline
LPP	Leviathan Production Platform
MarketCo	NBL Eastern Mediterranean Marketing Company
MARPOL	International Convention for the Prevention of Pollution from Ships
MEG	MonoEthylene Glycol
MIGA	Multilateral Investment Guarantee Agency
MOBM	Mineral-Oil Based Mud
MOEP	Ministry of Environmental Protection
NADF	Non-aqueous drilling fluids
NEML	Noble Energy Mediterranean Ltd
NEPCO	Jordanian National Electric Power Company
NOP	National Outline Plan

NORM	Naturally Occurring Radioactive Material
NPC	National Planning Committee
OCNS	Offshore Chemical Notification Scheme
OCV	Offshore Construction Vehicle
OGP	International Organization of Oil & Gas Producers
OHS	Occupational Health and Safety
OMS	Operational Management System
OPIC	Overseas Private Investment Corporation
OSCP	Oil Spill Contingency Plan
OSHMS	Occupational Safety and Health Management Systems
OSHAS	Occupation Health and Safety Assessment Series
OSPAR	Oslo and Paris Conventions ("OS" for Oslo and "PAR" for Paris)
OSRP	Oil Spill Response Plan
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PLONOR	pose little or no risk
PMS	Production Management System
PRTR	Pollution Release and Transfer Register
PS	Performance Standards
PTW	Permit to Work
QS	Quality Assurance System
ROV	Remotely Operated Vehicle
SCE	Safety Critical Element
SEMS	Safety And Environmental Management System
SEP	Stakeholder Engagement Plan
SFFL	<i>Acanthodactylus schreiberi</i>
SID	Safety in Design
SLIP	Supplemental Lender Information Package
SMS	Safety Management System
SOLAS	Safety of Life at Sea
SOP	Standard Operating Procedures
SOPEP	Shipboard Oil Pollution Emergency Plan
SRP	Spill Response Plan
TAMA	<i>Tochnit Mit'ar Artzit</i>
TALMAT	Israel's National Marine Oil Pollution Event Preparedness and Response Master Plan
TCC	Thermomechanical Cuttings Cleaner Process
TOC	Total Organic Carbon

TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended solids
USEPA	U.S. Environmental Protection Agency
VEC	Valued Environmental and Social Components
WBDF	Water-Based Drilling Fluids
WBG	World Bank Group
WBM	Water-based Mud
WMP	Waste Management Plan

Environmental Resources Management, Inc. (ERM) has been retained by Noble Energy to prepare a Supplemental Lender Information Package (SLIP) for the Leviathan Gas Project in Israel (the Project). The purpose of the SLIP is to assist lenders in their decision making processes by providing them documentation to demonstrate Project alignment with applicable lender standards.

### *Project Description*

The Project will comprise both offshore and onshore components and includes:

- Offshore gas production fields (wells and infield flow lines; 140 km offshore);
- Gathering lines (115 km long);
- Leviathan Production Platform (LPP) (10 km offshore);
- Offshore gas and condensate pipelines;
- Aphrodite export tieback lines;
- Coastal Valve Station (CVS);
- Two onshore pipelines (2 km long);
- Dor Valve Station (DVS) to be built next to the Israel Natural Gas Lines (INGL) station;
- Planned onshore condensate pipelines to Haifa Refineries; and
- Potential option for a 10,000 m<sup>3</sup> API 650 buffer tank to be built at the Hagit station.

The following Associated Facilities have been considered as part of the Project.

- *Gas transportation in the existing INGL network:* Gas from the Leviathan field will be transported to buyer's facilities via INGL's network. This is an existing network.
- *Gas Transportation in New INGL Pipeline:* INGL is currently in the process of designing and obtaining approval for a pipeline to extend from Dovrat to the Jordanian border.
- *Jordan Pipeline:* Once the gas reaches the Jordanian border, the gas will be taken by the Jordanian National Electric Power Company (NEPCO) and transported via a pipeline to be constructed from the border to the existing Jordan Gas Transmission Pipeline (JGTP).

### *Legislative Framework and Applicable Standards*

The Leviathan Project components spread across both Israeli land and territorial waters (up to 12 nautical miles offshore) and beyond 12 nautical miles in the Exclusive Economic Zone (EEZ).

TAMA (Hebrew acronym for “Tochnit Mit'ar Artzit”) 37/ H details the Government of Israel’s environmental and social requirements for the area of the Leviathan Project. As part of the TAMA 37/H process, a TAMA EIA was completed in 2012 on behalf of the Government that covers up to the limit of Israeli territorial waters (i.e., 12 nautical miles from shore). The TAMA EIA includes the proposed LPP location and onshore tie-in of the domestic export pipeline to the Israel Natural Gas Line (INGL) system. Offshore activities beyond the 12 nautical miles have been covered by Noble Energy in two separate EIAs. A Drilling EIA focuses on the gas production field and wells, and a Production EIA covers the installation, operation and maintenance of pipelines and submarine systems. Both EIAs were scoped and performed in close consultation with the Government of Israel.

In addition, Noble Energy has a broad commitment to align the Project with international lender standards, namely the International Finance Corporation Performance Standards on Environmental and Social Sustainability (IFC PS), the World Bank Group’s Environmental, Health and Safety Guidelines, and the policies of the U.S. Overseas Private Investment Corporation (OPIC). ERM performed a gap analysis of the Project development proposals against these Applicable Standards. The status of this gap analysis has informed additional studies and appraisals that Noble Energy has undertaken, and defined future mitigation and management requirements. These are all consolidated in this report.

### *Environmental and Social Risk Management*

Noble Energy has a comprehensive and robust approach to managing environmental and social performance of the Project both through its corporate policies, procedures and management systems, and also Project-level commitments that have been made, including through the EIAs and this document.

### *Alternatives Analysis*

An alternatives analysis has been prepared and is presented to consolidate the various assessments, studies and decisions that have been made in relation to the Project, which have defined its current layout and intent. The alternatives analysis has considered the following tiers of alternatives and decision making:

- Project development alternatives related to the development of the project in general and its location;
- Alternatives related to offshore and onshore components and placements of the natural gas development; and
- Alternatives related to the technology of offshore, onshore and nearshore components.

### *Offshore and Onshore Baselines and Impact Assessments*

Through the TAMA, Drilling and Production EIAs, as well as the supplementary studies contained in this document, Noble Energy has performed a comprehensive series of environmental studies and impact assessments for the Project. These have covered biological, physical, social and cultural resources, and summaries are presented in *Sections 7.0, 8.0, 9.0 and 10.0* of this report. These assessments have also included an assessment of ecosystem services and human rights.

### ***Cumulative Impact Assessment***

A Cumulative Impact Assessment (CIA) of the Leviathan Project has been performed to assess the cumulative impacts of the Project's onshore and offshore components. The CIA follows the IFC's Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets (IFC 2013). The methodology focused on environmental and social components rated as critical by stakeholders and the scientific community - known as Valued Environmental and Social Components, or VECs - which are cumulatively impacted by the project under evaluation, by other projects or developments, and by natural environmental and social external drivers.

### ***Mitigation and Management***

Noble Energy has committed to a comprehensive management and mitigation framework to manage potential environmental and social risks and impacts. These include the following.

- *Mitigation Measures.* The Drilling EIA, Production EIA, and TAMA EIA describe the mitigation measures that Noble Energy will implement in order to minimize the environmental and social impacts of the Project.
- *Environmental and Social Management Plans.* Noble Energy, has prepared an Environmental and Social Management Plan (ESMP) Framework for the Project. The ESMP Framework will comprise:
  - Environmental Management and Monitoring Plans (regulatory EMMPs that will be prepared as a requirement of the Israeli legislative framework);
  - Management and monitoring commitments outside of Israeli territorial waters (beyond 12-mile boundary); and
  - Commitments to align the Project with the IFC PS, which are additional to the regulatory EMMP requirements.
- *Environmental and Social Management System.* Noble Energy intends to structure its Environmental Management Plans in alignment with its Environmental and Social Management System (ESMS), which will integrate with its Global Management System (GMS) and Quality Assurance System (QA).

## 2.0 INTRODUCTION

### 2.1 BACKGROUND

Environmental Resources Management, Inc. (ERM) has been retained by Noble Energy to prepare a Supplemental Lender Information Package (SLIP) for the Leviathan Project (the Project). The purpose of the SLIP is to assist lenders in their decision making processes by providing them documentation—beyond that which Noble Energy has already produced for local regulatory compliance—to demonstrate Project alignment with applicable lender standards, namely the:

- International Finance Corporation Performance Standards on Environmental and Social Sustainability (IFC PS);
- World Bank Group’s (WBG) Environmental, Health and Safety (EHS) Guidelines, and specifically the EHS General Guidelines (2007); EHS Guidelines for Onshore Oil and Gas Development (2007); and EHS Guidelines for Offshore Oil and Gas Development (2015); and
- Overseas Private Investment Corporation’s (OPIC) Environmental and Social Policy Statement.

Noble Energy will be the operator of the proposed Project with co-venturers Ratio Oil Exploration, Delek Drilling L.P., and Avner Oil Exploration L.P. The Leviathan Field is located in the I/15 Leviathan North and I/14 Leviathan South leases, approximately 125 km west of Haifa, Israel, and 35 km west of the Tamar Field, in the Eastern Mediterranean Levantine Basin. The Leviathan Field is estimated to contain 22 trillion cubic feet (Tcf) of gas, and 39.4 million barrels of condensate. The project is currently designed to meet the needs of existing and proved markets (domestic Israel, Jordan, and Palestinian Authority) of up to 1.2 billion cubic feet per day (Bcf/d) and expandable to 2.1 Bcf/d, to be executed when additional markets mature.

Domestic gas will be transported from the fixed platform via a pipeline to the Israel Natural Gas Lines, Ltd. (INGL) onshore grid. Gas export outside of Israel may occur via additional pipelines connected to the fixed platform or tieback of wells, located in the Leviathan Field. Condensate will be stabilized to sales specifications and transported through a pipeline for delivery to a refinery.

Noble Energy is seeking political risk insurance from OPIC to protect its current and prospective investments and rights in the Leviathan Project (see *Section 3.0* for a full project description).

## 2.2 *PURPOSE OF DOCUMENT*

The purpose of this document is to provide a consolidated summary of the various studies and assessments relating to the Project, as well as the existing management programs, plans and systems Noble Energy will implement.

## 2.3 *RELEVANT DOCUMENTS AND INFORMATION*

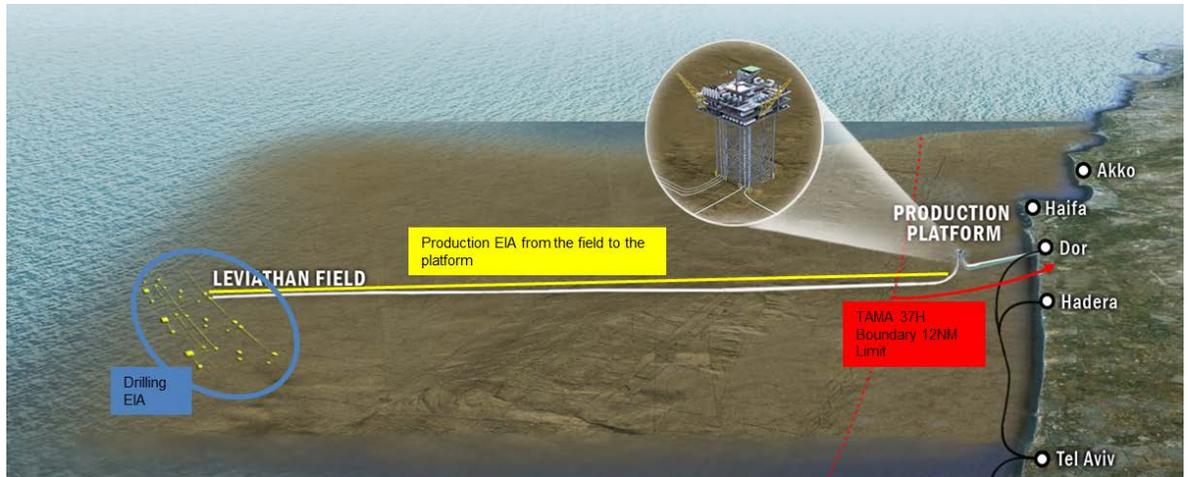
The identification and assessment of environmental and social risks and impacts across the entire Project has been completed over the course of several years, and is documented in the relevant impact assessment and diligence documents performed by various parties that are referenced in this report. This includes studies and assessments focused on the Project's compliance with Israeli regulatory requirements, as well as alignment with the Applicable Standards.

With respect to regulatory compliance, several environmental impact assessments were conducted as part of the Israeli regulatory process for the Project. These documents were the primary source of information for this summary document, and included the following.

- Environmental Impact Assessment for Installation, Operation and Maintenance of Pipelines and Submarine Systems for Leviathan Field Development, prepared by Genesis ("Production EIA"), July 2016.
- National Outline Plan (NOP) 37/H for Natural Gas Treatment Facilities from Natural Gas Discoveries prepared by Lerman Architects and Urban Planning Ltd. ("TAMA EIA" ) comprising the following translated (from Hebrew) sections.
  - Onshore:
    - Chapter 1 - Land Environment (October 2012);
    - Chapter 2 - Onshore Environment (October 2012);
    - Appendix A - Update of environmental impact survey guidelines, Chapters 1-2 (March 2012);
    - Chapters C-E - Onshore Environment - Hagit Site (June 2013); and
    - Appendix A - Update of environmental impact survey guidelines, Chapters C-E (August 2012).
  - Offshore:
    - Chapters 1 - 2 - Marine Environment (November 2012);
    - Chapters 3 - 5 - Marine Environment (June 2013);
    - Appendices A, C, D, E, F, H, L, M, N, and P; and
    - Appendix 2: Best Available Technique for Gas Treatment.
- Environmental Impact Report for Production Drilling, Production Tests, and Completion-Leviathan Field, prepared by CSA -("Drilling EIA"), March 10, 2016.

Figure 2-1 illustrates the relationship between the above three impact assessment documents and the Project.

FIGURE 2-1: RELATIONSHIP BETWEEN IMPACT ASSESSMENT STUDIES AND THE PROJECT LAYOUT



In addition, the following documents also provide context with respect to the environmental and social status of the Project:

- Receiving and Treating Natural Gas from Offshore Discoveries to the National Transmission System (“Investigator’s Report”), May 2014; and
- Connecting Leviathan Gas Field to the Main Transmission System (“Feasibility Study”), October 2013; and
- Israel’s National Outline Plan 37/H (TAMA 37/H) Planning of gas treatment facilities (“ENVID Report”), May 2013.

In addition to these studies, Noble Energy engaged ERM to perform a detailed gap analysis of this documentation to align the Project with Applicable Standards. This gap analysis, described further in *Section 5.0*, and resulted in ERM performing supplementary reviews and assessments on a series of topics including social and health, human rights, labor management, livelihood restoration, biodiversity and ecosystems services, cumulative impact, alternatives analysis and climate change. These supplementary studies are either integrated into this document or appropriately referenced.

## 2.4 STRUCTURE OF THIS DOCUMENT

The remaining sections of this document are structured as follows:

- *Section 3.0* provides a project description and overview;
- *Section 4.0* provides an overview of the legislative framework and the applicable standards;

- *Section 5.0* provides an overview of Noble Energy’s approach to the assessment and management of environmental and social risks and impacts;
- *Section 6.0* presents the alternatives analysis;
- *Sections 7.0 and 8.0* present a summary of the environmental baseline and impact assessments for the offshore and onshore project components, respectively;
- *Section 9.0* presents the social and health baseline and impact assessment;
- *Section 10.0* presents the human rights due diligence;
- *Section 11.0* presents a cumulative impact assessment; and
- *Section 12.0* presents the environmental and social mitigation and management.

## 3.0 PROJECT DESCRIPTION AND OVERVIEW

### 3.1 PROJECT DESCRIPTION

The Leviathan Project (the Project) will comprise both offshore and onshore components and includes:

- Offshore gas production fields (wells and infield flow lines; 140 km offshore);
- Gathering lines (115 km long);
- Leviathan Production Platform (LPP) (10 km offshore);
- Offshore gas and condensate pipelines;
- Aphrodite export tieback lines;
- Coastal Valve Station (CVS);
- Two onshore pipelines (2 km long);
- Dor Valve Station (DVS) to be built next to the INGL station;
- Planned onshore condensate pipelines to Haifa Refineries; and
- Potential option for 10,000 m<sup>3</sup> API 650 buffer tank to be built at the Hagit station.

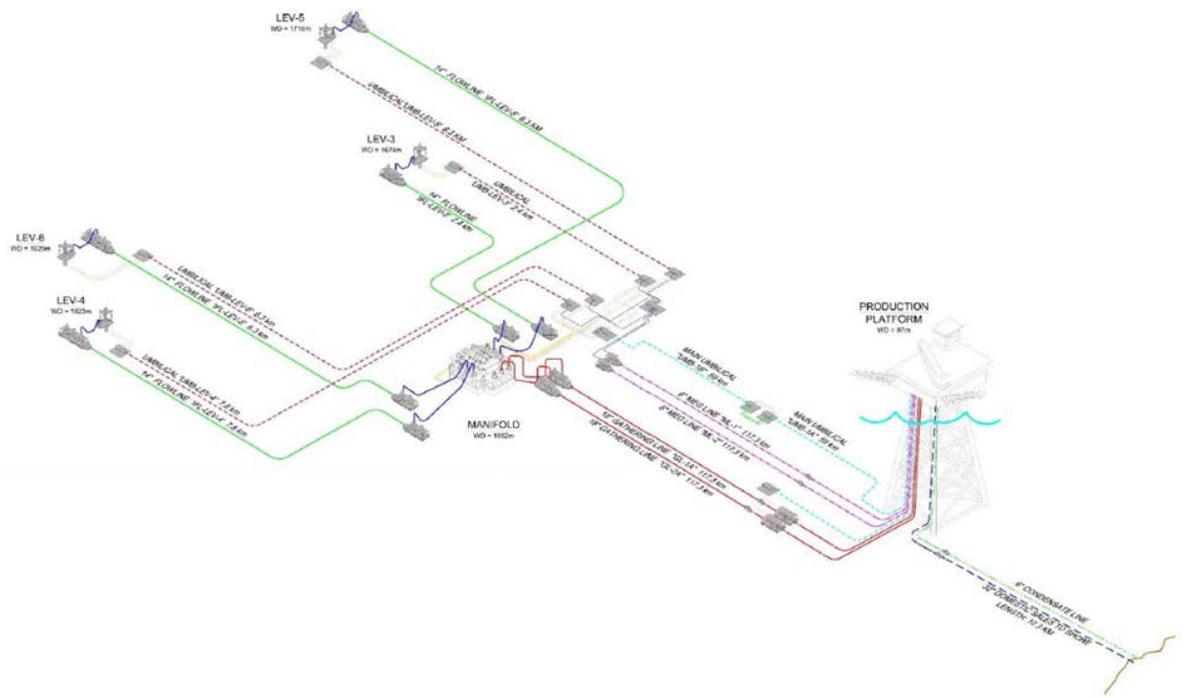
#### 3.1.1 Offshore Components

Two subsea wells have already been drilled in the Leviathan field. The Project's short term plans call for drilling and completing six new wells and completing the two previously drilled wells for a total of eight initial production wells. Full field development will include the drilling and operation of an estimated 29 high-rate subsea wells. The gas will flow from multiple subsea wells through infield flow lines to a subsea manifold. The manifold will be connected to the offshore platform by approximately 115km of gathering lines. In addition to the gathering lines, the offshore platform will be connected to the field via umbilical lines which will provide electrical power, communications, chemicals, and hydraulic control fluid to the field.

The Leviathan Production Platform (LPP) will be located within an area designated in Israel's National Outline Plan 37/H Planning of Gas Treatment Facilities (TAMA 37/H), in water approximately 86 m deep and 10 km offshore of Dor, Israel. The LPP will consist of two modules: the Domestic Supply Module and the Regional Export Module. The LPP will have permanent onboard accommodation facilities suitably sized and outfitted to support onboard operations, including living quarters, power generation, emergency power generation, safety systems, a heat medium, a cooling medium, fresh/potable water, sewage, instrument/plant air, and nitrogen. Two pipelines will run from the LPP to the onshore pipeline system: the Domestic Gas Sales Pipeline (DGSP) and the Domestic Condensate Sales Pipeline (DCSP). These two pipelines will connect to the onshore pipelines at the CVS and will be constructed using

Horizontal Directional Drilling (HDD) techniques. *Figure 3-2* is a representation of the offshore system.

FIGURE 3-2: OFFSHORE SYSTEM COMPONENTS (SOURCE: NOBLE ENERGY, 2016)



### 3.1.2 Onshore Components

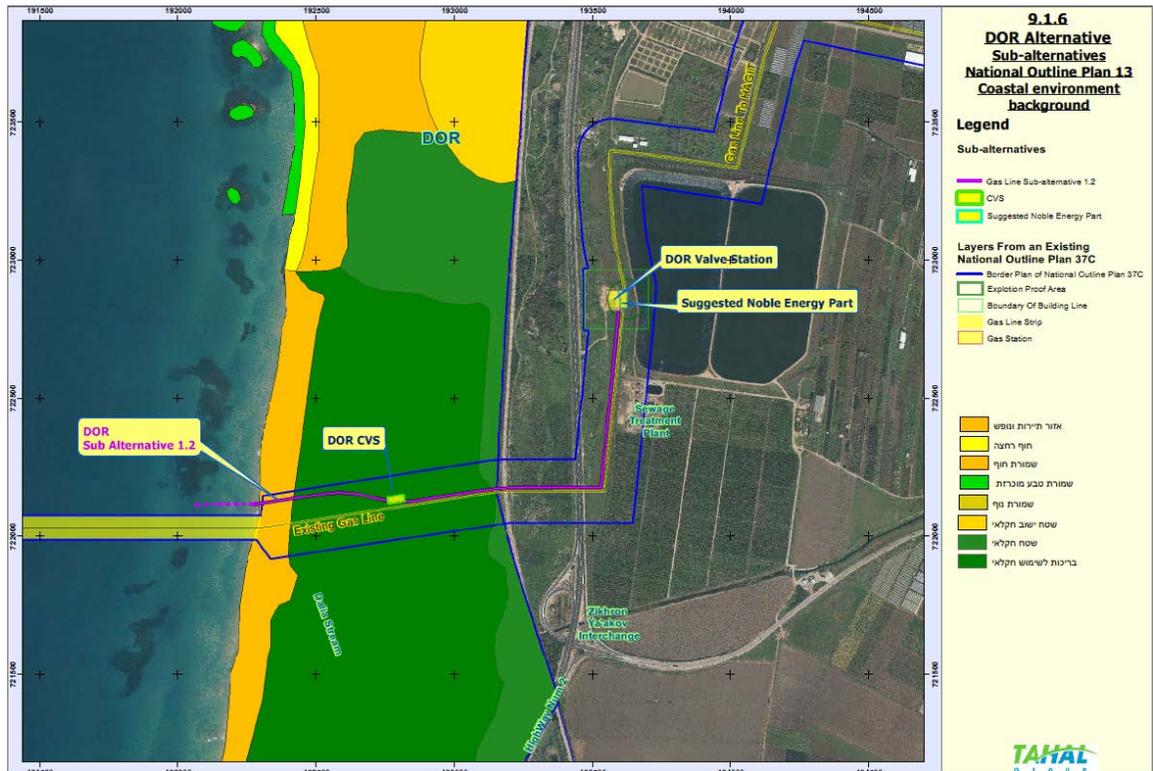
The onshore components include the Coastal Valve Station (CVS), the Dor Valve Station (DVS), onshore gas and condensate pipelines, and condensate transport infrastructure.

The CVS will be built approximately 450 m from the shoreline where the offshore gas and condensate pipelines terminate 450 m east of the beach front. The location of the CVS has previously been determined by the TAMA 37/H. The CVS will consist of subsurface segmenting valves to separate the offshore condensate and gas pipelines to corresponding onshore pipelines. The onshore gas and condensate pipelines will be approximately 2 km long and will connect the CVS to the DVS. These two subsurface pipelines will be trenched and backfilled and built within an existing pipeline right-of-way through a corridor previously delineated by the TAMA 37/H. The gas and condensate pipelines will both have two major transportation crossings: Coastal Road #2 and the Haifa-Tel Aviv railway. Both pipelines will be buried for the entire route between the two stations, while maintaining a cover of 2 m over the gas pipe as required by TAMA 37/H.

The DVS will be an unmanned facility built adjacent to an existing Israel National Gas Lines (INGL) station in Dor. The gas pipeline from the DVS will

tie-into the INGL system in the INGL station. The condensate pipeline will tie-in to existing fuel and crude oil pipeline systems approximately 6 km away at the Nascholim valve pit. From the valve pit the condensate can be routed to refineries or existing pipeline systems. *Figure 3-3* illustrates the locations of the onshore components from the offshore pipeline landfall to the DVS.

FIGURE 3-3: ONSHORE PROJECT COMPONENTS (SOURCE: NOBLE ENERGY 2016)



At present, the Project is considering the use of both existing, independent pipeline systems and the construction of new pipelines to transport the condensate from the DVS to the Haifa refineries, as shown in *Figures 3-3* and *3-4*. In addition to these existing and planned pipelines, the Project will consider the development of a devoted 6-inch condensate pipeline to link Dor and the Haifa refinery in the future.

For the condensate transportation system, if the need should arise, the Project has tentative plans to construct a 10,000 m<sup>3</sup> API 650 buffer tank to be built at the Hagit station. In addition to the storage tank, a pumping station and emergency truck loading station will also be built at the Hagit station.

All of the planned condensate pipelines and storage facilities described above from the Dor coast to the Hagit station are located within the boundary of the TAMA 37/H. The existing pipelines and storage tanks from the Hagit station to the refineries are located within the boundaries of existing TAMAs.

FIGURE 3-3: SCHEMATIC DRAWING OF THE CONDENSATE REMOVAL SYSTEM – BACKUP ALTERNATIVE THROUGH STORAGE TANK AT HAGIT

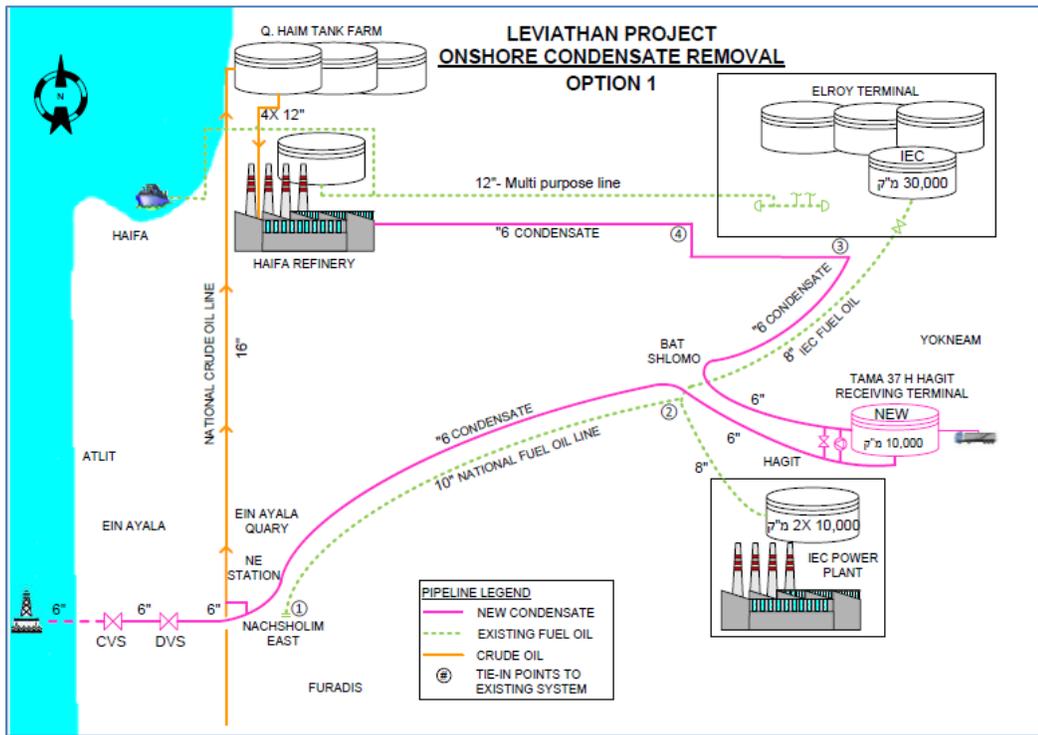
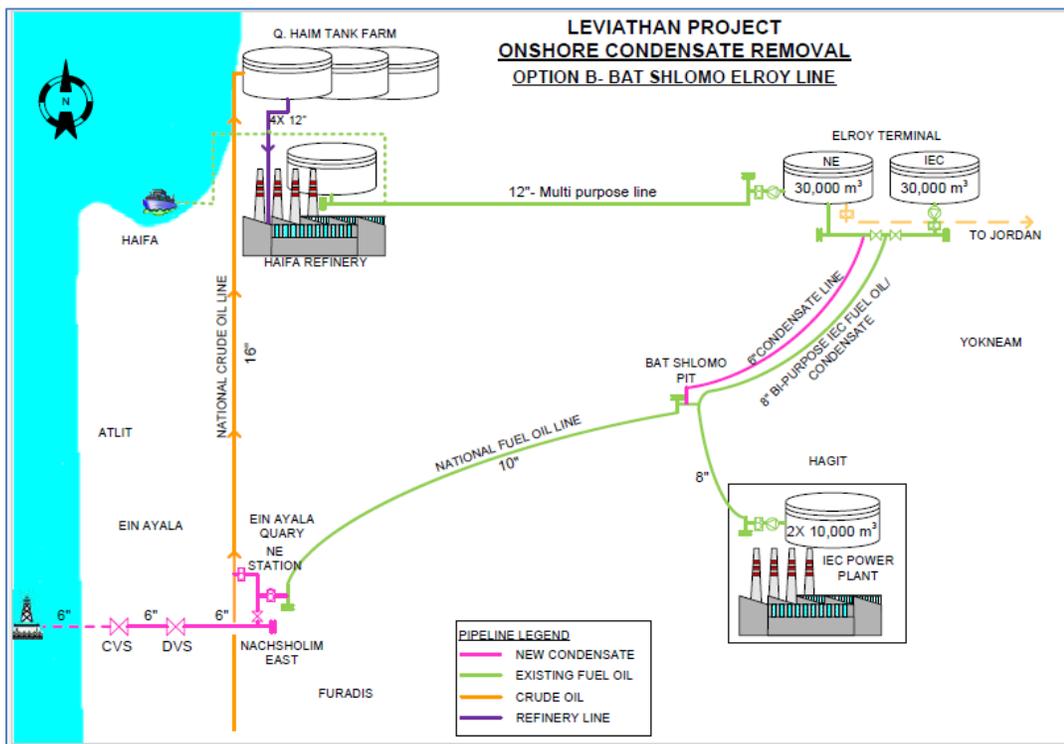


FIGURE 3-4: SCHEMATIC DRAWING OF THE CONDENSATE REMOVAL SYSTEM



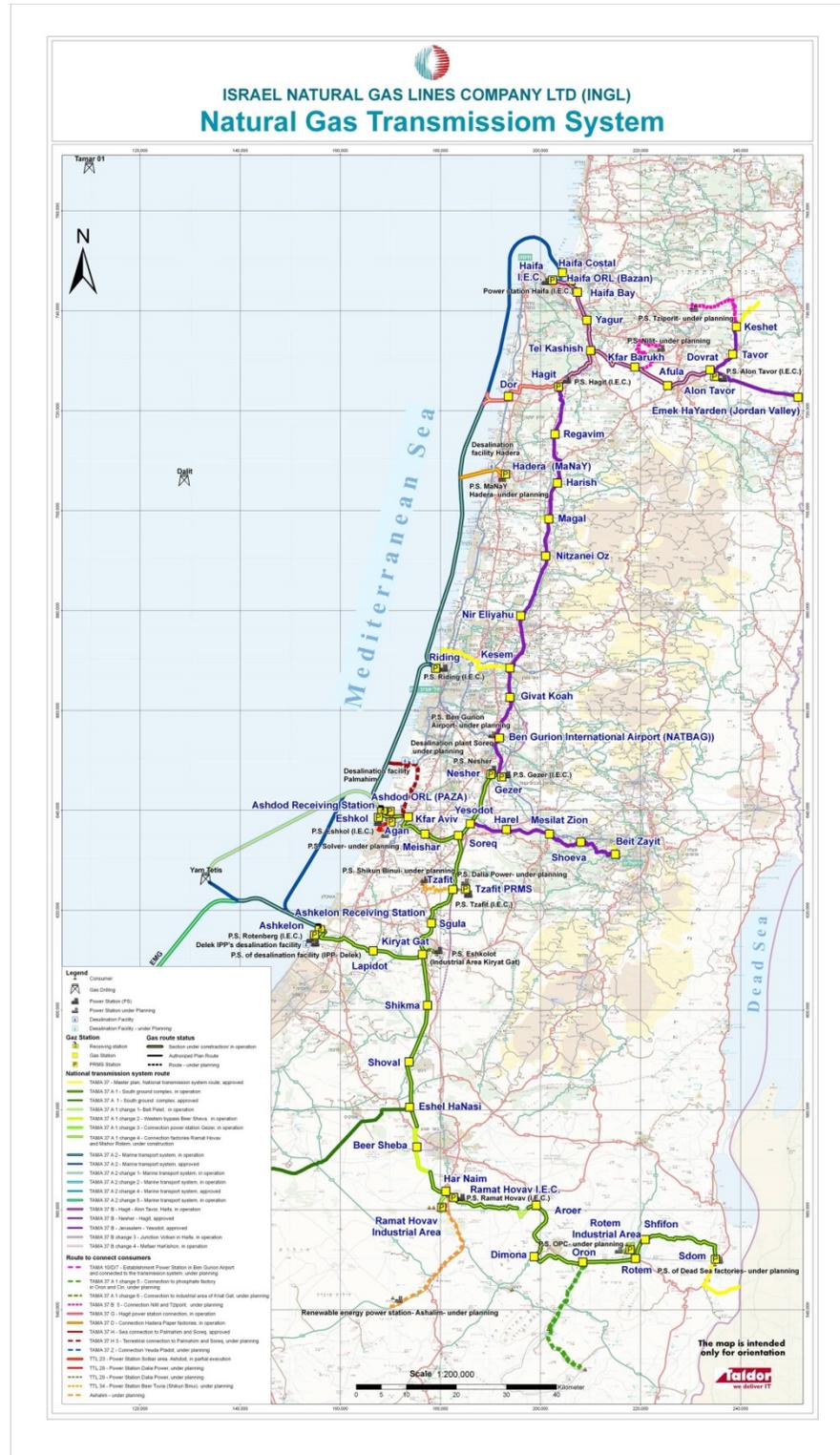
Noble Energy has identified the following Associated Facilities linked to the Project:

- Gas transportation in the existing INGL network: Gas from the Leviathan field will be delivered to buyers at the point the Leviathan facilities connect with the transportation network of INGL, where it is then transported to the buyer's facilities via INGL's network. Gas sales to the Jordanian National Electric Power Company (NEPCO) will be made through a special purpose company, Jordan Marketing, Ltd., which is jointly owned by Noble Energy and its partners (in the same ratio as the Project ownership). Jordan Marketing will take ownership of the gas at the point the Leviathan production facility connects onshore with INGL's pipeline network. The gas is then transported by INGL through its network. This is an existing network - the gas from the Leviathan project changes ownership at the point of entry to the INGL network, and while Noble Energy will hold a percentage ownership in the gas, INGL has full operational control over the gas as the network owner and operator.
- Gas Transportation in New INGL Pipeline: INGL is currently in the process of designing and obtaining approval for a pipeline to extend from Dovrat to the Jordanian border. Construction and operation will be entirely controlled and managed by INGL.
- Jordan Pipeline: Once the gas reaches the Jordanian border, the gas will be taken by NEPCO and transported via a pipeline to be constructed from the border to the existing Jordan Gas Transmission Pipeline (JGTP) owned and operated by the Jordanian Egyptian Fajr for Natural Gas Transmission and Supply Company (FAJR), which will transport the gas to NEPCO's End User facilities.

### 3.2.1 *Gas Transportation in Existing INGL Network*

Israel Natural Gas Lines Ltd. (INGL) is a government owned corporation established in 2003 for the construction and operation of the national natural gas transmission system. In 2004, the Minister of Energy and Water Resources awarded the company a 30 year license. INGL's current and planned offshore and onshore natural gas pipelines are depicted in *Figure 3-5*.

FIGURE 3-5: INGL'S CURRENT AND PLANNED NATURAL GAS PIPELINES.



Source: [www.ingl.co.il/wp-content/uploads/2013/03/Natgaz-Map.jpg](http://www.ingl.co.il/wp-content/uploads/2013/03/Natgaz-Map.jpg).

According to the "Regulatory Compliance" section of their website ([http://www.ingl.co.il/?page\\_id=295&lang=en](http://www.ingl.co.il/?page_id=295&lang=en)), INGL complies with and operates in accordance with the licenses granted to them by the Ministry of

Energy and Water Resources and the bylaws outlined in the Natural Gas Sector Law, and is subject to the decisions of the Natural Gas Authority of the Ministry of Energy and Water Resources. Copies of their Transmission License and its updates are posted on the website.

According to the “Environmental Commitment” section of their website ([www.ingl.co.il/?page\\_id=321&lang=en](http://www.ingl.co.il/?page_id=321&lang=en)), INGL undertakes the following environmental and social activities prior to a project’s operational stage:

- Preparing a detailed orthophoto map of the landscape based on the original landscape rather than the landscape as found immediately before project initiation;
- Obtaining preliminary landscape measurements;
- Visiting the site for preliminary planning and coordination with environmental authorities and organizations;
- Surveying for animals and geophytes in the area;
- Identifying access routes and site operation centers while taking into account the preservation of flora and fauna;
- Preliminary coordination with relevant authorities and organizations, including the Jewish National Fund, Israel Nature and Parks Authority, Trans-Israel Highway Authority, Public Works Authority, Israel Antiquities Authority, and Ministry of National Infrastructures; and
- Preliminary consultation with regional farmers to coordinate project activities with planting cycles.

INGL complies with Israeli regulations for the construction and operation of its facilities and infrastructure. It undertakes the following environmental and social activities during a project’s operational stage:

- Identifying plants for relocation;
- Use of geotechnical landscape fabrics;
- Use of architectural and local elements to lessen visibility;
- Removal and preservation of top soil from work areas;
- Creative solutions for laying pipelines in environmentally sensitive areas, including restricting the total work area;
- Replacing engineering structures with environmentally friendly solutions, when feasible;
- Gathering arable soils and geophytes;
- Fencing off work areas to avoid unintended damage by equipment;
- Supervising the project to ensure compliance with building permits;
- Choosing advanced equipment such as welding tents to minimize environmental disruption;
- Taking care when utilizing dirt roads to lessen potential environmental damage (e.g., removing chains from equipment, repeated watering of the road with fresh water to prevent dust damage);

- Compliance with noise, quality, and safety regulations;
- Prohibiting the burning of plants;
- Removal of sediment to permitted sites prepared for such purposes, according to the guidelines of the Ministry of the Environment and Israel Land Administration;
- Providing highly specific guidelines for sensitive areas, such as riverbed crossings; and
- Ensuring close and constant supervision by the national commission and finding precise solutions to problems that arise.

According to the “Landscape Restoration and Development” section of their website ([www.ingl.co.il/?page\\_id=1599&lang=en](http://www.ingl.co.il/?page_id=1599&lang=en)), INGL adheres to the following landscape restoration principles and procedures:

- Preparing restoration plans on orthophoto maps;
- Outlining procedures for transferring project areas to the authorities (e.g., Public Works Authority, Trans-Israel Highway Authority, Israel Electric Corporation);
- Determining the number of trees and shrubs to be planted in each landscape unit;
- Issuing specific guidelines for the preservation of geophytes (i.e., gathering, preserving, replanting, and maintenance);
- Determining guidelines for the gathering, distributing, storing, and planting of seeds;
- Supporting riverbanks using leafy vegetation rather than concrete;
- Removing harmful plants;
- Supporting vegetation for three years after restoration; and
- Setting goals and objectives and defining a set and measures for ensuring successful restoration.

According to the “Operation and Safety” section of their website ([http://www.ingl.co.il/?page\\_id=1138&lang=en](http://www.ingl.co.il/?page_id=1138&lang=en)), INGL follows international safety standards, including the Dutch NEN 3650 and the German operations and maintenance standard DVGW. The company adheres to State security laws and safety guidelines for managing and transmitting natural gas. Employees are required to pass a safety training course and to participate in periodic safety alertness seminars. Customers have access to an emergency hotline 24 hours a day, seven days a week. INGL also adheres to the following internal safety principles:

- Adherence to guidelines for handling natural gas;
- Line operation and maintenance – every point along the line must be carefully maintained and accessible, to ensure easy monitoring and repair;
- Neutralization of risks – removal of all risk factors and structures that could potentially damage the lines;

- A combustion-free safety radius around gas facilities and lines; and
- Engineering performance – assessment of the ability to implement the design according to predetermined safety measures.

In order to uphold rights of way through property as part of supervision and maintenance, INGL engages in the following activities:

- Monitoring of all pipeline routes, roads, and facilities via daily patrols of professional personnel and focused visits to segments in areas of higher risk (such as industrial zones);
- Identifying and eliminating dangers, particularly in the high safety perimeters around pipelines;
- Conducting preventive and breakdown maintenance of transmission facilities, and ensuring cathodic protection;
- Obtaining the required work and digging permits and supervising work conditions accordingly; and
- Supervising as-made drawings for third party plans and designs.

The TAMA for existing INGL pipelines is the “Partial National Outline Plan at the Detailed Level for Natural Gas NOP 37/B” (July 2006). Its objectives include “Land zoning for gas pipeline strips and gas stations of the onshore transmission system from Neshar Ramle in the south to the Haifa power station in the north, with extensions to Jerusalem and to Lower Galilee and the Jordan Valley.” Its objectives also include “Providing guidelines for reducing environmental hazards resulting from construction of the transmission system, and provisions for arranging and restoration of the area.”

The TAMA requires the development of a Work Plan (Section 14), as well as an Operating Plan and Emergency Plan (Section 15). According to the TAMA, the Work Plan will include “information with regard to the existence of nature and landscape reserves, antiquities, or infrastructure facilities in the area.” Section 14 describes the specific requirements for the Work Plan, including subsections on work sites (including minimizing the width of the pipeline strip), construction methods (including top soil retention and water crossings), measures for reducing hazards (including noise, dust, solid waste, and supervision to prevent hazards), landscape restoration, and gas stations.

The TAMA Work Plan described in Section 14 is based on the principles of conservation and restoration specified in Appendix A (Environmental Appendix). Section 3 of the Environmental Appendix describes measures to reduce environmental impacts during construction. It includes subsections on access roads and extra workspace (3.1.1), the pipeline strip or right of way (3.1.2), crossings of rivers and existing infrastructure (3.2.1), noise (3.3.1), dust (3.3.2), and solid waste (3.3.3). Mitigation measures described include: watering of access roads and other work areas for dust control; minimizing the width of pipeline strips; topsoil retention and reuse; protection of archaeological sites,

parks, nature reserves, and forestry areas; protection of flora and fauna (specifically snakes, rodents, and bird nests); horizontal directional drilling for some crossings; and prohibition of the burning of solid waste.

Section 4 of the Environmental Appendix describes landscape restoration measures. It includes subsections on restoration goals (4.1), restoration methods (4.2 and 4.3), restoration by soil components (subsoil, topsoil, and groundcover) (4.5), restoration for each of six landscape units through which the pipelines extend (4.5), effects on land use, including nature reserves, parks, archaeological sites, forestry areas, farmland, and grasslands (4.6), and mapping principles (4.7). Mitigation measures include: surface drainage to prevent erosion; regulating flow channels in streams, both above and below the surface; returning construction areas to their original state, to the greatest extent possible; removal of excess rock and sediment; cleaning the surface to “blur” the signs of excavation; and planting vegetation appropriate to the local habitat.

Finally, Section 5 of the Environmental Appendix describes measures for installing signs along pipeline right of ways after construction. It includes guidance on where to place the signs and what information to include on them.

### 3.2.2 *Gas Transportation in New INGL Pipeline*

INGL is planning two pipelines to extend their network to Jordan. The first is a 12” pipeline to connect the existing Sdom meter station to two Jordanian plants on the Dead Sea, Arab Potash Co. (APC) and Jordan Bromine Company (JBC). According to news reports (e.g., “Israel-Jordan gas pipeline to begin operating in 2017,” *Globes: Israel’s Business Arena*, 10-Mar-16), this pipeline will supply gas from the Tamar reservoir to private customers in Jordan. The second is a 30” pipeline from Dovrat (near Alon Tavor) to the Jordanian border north of Beit-Shean. According to the same news reports, this pipeline will supply gas from the Leviathan reservoir to NEPCO. The pipeline will extend from the existing Dovrat Valve Station to a new valve station at Hazrit, and then to a new meter station at Emek Hayarden (20 km). The pipeline will then extend 2 km to the Delivery Point at the Jordanian border. One of the principal concerns for the project is a natural reserve. The 2 km section from Emek Hayarden to the Jordanian border has reportedly been redesigned to avoid the natural reserve, as requested by the Nature and Parks Authority. These new pipelines will be developed in compliance with Israeli regulations.

The TAMA for the new pipeline to the Jordanian border is the “Statutory Planning System for Natural Gas to Jordan” (April 2015). The TAMA describes the project as a 3 km long, 36” diameter pipeline segment. According to Figure 1.2-1 of the TAMA, the pipeline will be located just north of the town of Neve Ur. Section 9 summarizes the project’s main issues as follows:

- Proximity to areas of high environmental sensitivity;

- Proximity to forests;
- Ecological corridors and open spaces;
- Proximity of residential and public buildings (minor hazards of noise and air quality during construction);
- Crossing declared ancient sites (i.e., proximity to heritage);
- Sensitive landscape areas; and
- Seismic issues.

Section 10 of the TAMA provides environmental guidelines to mitigate identified impacts, especially those related to the issues listed above. The guidelines are organized into the following sub-sections: 1) preserving nature and landscape values and landscape restoration; 2) plant protection guidelines; 3) animal protection guidelines; 4) river and canal crossings; and 5) organizing guidelines. The landscape restoration guidelines consist of the following measures: restricting construction to permitted areas and minimizing the width of the pipeline strips; restoration planning and supervision by a qualified landscape architect; coordination with the Nature and Parks Authority and the Jewish National Fund; revegetation with local plants; and coordination with the district committee. Additional restoration guidelines from the Nature and Parks Authority and the Jewish National Fund are also listed.

The plant protection guidelines consist of the following measures: conduct a tree survey to identify and mark all trees in the project area and obtain permission to cut down any trees; and prevent harm to protected species identified during the survey. The animal protection guidelines consist of the following measures: report any nests or animal dens encountered in trenches or work areas and prevent harm to all wildlife, including snakes; leave mounds of dirt with a 2:1 slope every 300 meters in open trenches at the end of each work day so animals that fall in can escape; and leave 2 by 2 meter holes 40 cm above the ground in fences so that large animals can pass through them.

Mitigation measures for river and canal crossings consist of: supervision by relevant authorities; reduction of the width of the pipeline strip in streams according to detailed work plans; consultation with a hydrology specialist regarding the depth and slope of canal crossings; maintenance or restoration to the natural slope of rivers; removal of excess sediment from the excavation of canals; and prohibition of burning along rivers. The organizing guidelines consist of the following measures: mark the borders of work areas with highly visible tape; locate storage areas and extra workspace outside of environmentally sensitive areas; place chemical toilets at regular intervals in work areas; mark work entrances and exits; prohibit fires near forests and agricultural areas; and restore areas after work is complete.

Additional mitigation measures listed in Section 10 of the TAMA include: retain and reuse topsoil (except for on existing agricultural roads); coordinate with the Jewish National Fund for work beyond areas defined by them; mark mature

trees for protection; use existing roads as much as possible and “blur” temporary access roads after construction is complete, restoring the area to its previous state as much as possible; utilize authorized tanker organizations for refueling and proper sizes of fuel containers placed on pallets to prevent leaks; utilize municipal containers for solid waste, removed in coordination with the Beit She’an Valley Regional Council; provide chemical toilets to employees working in the field; utilize lighting that prevents glare and interference with animals; clean up and “blur” work areas after construction; remove excess sediment to regulated landfill sites; follow the Abatement of Nuisances Regulations regarding noise levels during construction; and examine slope failure and the need for a geophysical survey during the detailed design stage. Section 10 also includes measures for addressing spills, including: controls to prevent overflows when filling gas containers; storage of oil and fuel containers, batteries, and generators, and collection of used oil and oil filters; measures to immediately stop leaks; utilization of a licensed contractor to respond to spills; and prevention of the flow of muddy water into canals.

### 3.2.3 *Jordan Pipeline*

It is understood that approximately 70 km of pipeline would need to be installed to connect the INGL pipeline from the Jordanian border to FAJR’s nearest connection point. At this stage, there is no publicly available information on the pipeline details, routing and associated plans. It is understood that NEPCO has not initiated any work on the pipeline, but that it will be developed in compliance with Jordanian regulations.

## 4.0 LEGISLATIVE FRAMEWORK AND APPLICABLE STANDARDS

### 4.1 REGULATORY STANDARDS

#### 4.1.1 TAMA (*National Outline Plan*)

A TAMA (Hebrew acronym for “Tochnit Mit'ar Artzit”) is a “National Outline Plan” created by the National Planning Committee (NPC) by virtue of the Planning and Building Law, and approved by the Government.

TAMAs are divided into thematic plans (dedicated to each sector like transportation, natural gas, etc.) and integrated plans which cover a number of areas (e.g., TAMA 35 is a comprehensive plan for development and conservation). These TAMAs are not project-specific, but rather act as national master plans. These National Outline Plans are important because they provide instructions for planning, allocate land for relevant usages, and in some particular cases enable granting building permits (Detailed TAMA). The Israeli Law and its subordinate regulations provide a legal foundation for conducting EIAs. TAMAs provide further specific requirements for environmental analysis.

TAMA 37 is the “National Outline Plan for the Natural Gas Transmission System in Israel.” TAMA 37 was created in 2001 and is the "master plan" for promoting Israel’s natural gas infrastructure, mainly the transmission system. Under TAMA 37, several additional detailed TAMAs were approved, covering separate geographic regions of the country related to different purposes.

TAMA 37/ H details the Government of Israel’s environmental and social requirements for the area of the Leviathan Project. As part of the TAMA 37/H process, the TAMA EIA was completed in 2012 on behalf of the Government and it covers up to the limit of Israeli territorial waters (i.e., 12 nautical miles from shore), which includes the proposed LPP location and onshore tie-in of the domestic export pipeline to the INGL system. The TAMA EIA was prepared under the TAMA process following the “Guidelines for the Environmental Impact Assessment TAMA 37/H - Natural gas discoveries treatment facilities” established by The Ministry of Environmental Protection, Planning and Policy Cluster.

#### 4.1.2 *Licensing and Permitting*

The Leviathan Project components spread across several legal jurisdictions as follows.

- Israeli law on land and in territorial waters up to 12 nautical miles offshore. This comprises a strong legal framework for environmental management, and relevant components are referenced throughout this document. As a result, it ensures a robust permitting system associated

with air and water discharges and hazardous waste handling and disposal. Activities involving these functions are regulated through air, water discharge, and toxin permits that are issued for individual facilities.

- The Project falls within the typical 200 miles of an Exclusive Economic Zone (EEZ) which is defined by the United Nations Convention on the Law of the Sea as an area over which a state has special rights regarding the exploration and use of marine resources. Many of the proposed Project components are located outside Israel's territorial waters but within its EEZ.
- International requirements for offshore waters (beyond 12 miles), namely the International Maritime Organization Convention for the Prevention of Pollution from Ships [MARPOL (73/78)] and Israeli regulations in line with Barcelona Convention for the Protection of Mediterranean Sea from Pollution.

Offshore activities beyond the 12 nautical miles have been covered by Noble Energy in two separate EIAs. A Drilling EIA was prepared by the consultants CSA focusing on the gas production field and wells (covering production drilling, production tests and completion). The Drilling EIA was finalized in March 2016 and is aligned with the "Framework Instructions for Offshore Exploration Drilling (October 2014)" prepared by the Government of Israel. A Production EIA was prepared by Genesis covering the installation, operation and maintenance of pipelines and submarine systems and was completed in July 2016. *Figure 2-1* illustrates the relationship between the impact assessment documents and the Project.

The construction of the production platform, onshore gas stations and the gas and condensate pipelines (offshore within the territorial waters boundary and onshore pipelines) all require building permits.

## 4.2 APPLICABLE STANDARDS

Noble Energy has a broad commitment to align the Project with international lender standards, namely the:

- International Finance Corporation Performance Standards on Environmental and Social Sustainability (IFC PS);
- World Bank Group's Environmental, Health and Safety (EHS) Guidelines, specifically the General EHS Guidelines (2007), EHS Guidelines for Onshore Oil and Gas Development (2007), and EHS Guidelines for Offshore Oil and Gas Development (2015); and
- U.S. Overseas Private Investment Corporation's (OPIC) Environmental and Social Policy Statement.

ERM performed a gap analysis of the Project development proposals against these Applicable Standards. The gap analysis has informed additional studies

and appraisals that Noble Energy has undertaken, and defined future mitigation and management requirements. These are all consolidated in this report. It is also noted that the Project is at an early stage in its lifecycle, and therefore commitments and requirements of Noble Energy for later stages of the Project have also been noted. *Table 4-1* provides a summary of the assessment of the Project's alignment with the Applicable Standards (as defined by the IFC PS), and also provides guidance on the relevant sections of this document where the topics are detailed further.

TABLE 4-1 SUMMARY OF GAP ANALYSIS AGAINST APPLICABLE STANDARDS

Performance Standard	Subject within Standard	Brief Explanation on Alignment	Relevant Sections of this Report
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Policy	The Leviathan Project will be undertaken in accordance with Noble Energy’s Global Management System (GMS), and Environment, Health and Safety (EHS) Policy with complete expectations, commitments, roles, and accountability.	5.1
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Identification of Risks and Impacts	Environmental and social risks have been identified and discussed, and a cumulative impact assessment has been performed.	5.2; 6.0; 7.0; 9.0; 10.0; 11.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Alternative Analysis	An Alternatives Analysis has been performed.	6.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Management Program	<p>The Project is required to prepare and submit six TAMA-regulated EMMPs. To date, two EMMPs have been submitted with the associated building permits. All EMMPs have been and will be prepared in accordance with TAMA 37/H EIA guidelines. In parallel, an Environmental and Social Management Plan (ESMP) document will be created that incorporates both the regulatory EMMPs and the requirements of the ESMP Framework (see <i>Section 12.0</i>). This ESMP document will be the actionable document that Noble Energy and its partners and contractors will be responsible for implementing..</p> <p>Noble Energy intends to structure their management plans around the TAMA EMMPs and ESMP, which will integrate with their GMS and Quality Assurance System (QA). Noble Energy’s Global GMS provides a framework for establishing performance goals and incorporates Noble Energy’s Legal Requirements and Best Practices.</p>	5.0; 12.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Organizational Capacity	Based on the stage of the Project, responsibilities have been clearly assigned and defined. The Project has a clear organizational capacity chart and discusses roles and responsibilities to manage environmental, safety and social aspects.	5.3
PS1 – Assessment and Management of Environmental	Emergency Preparedness	Required plans are being prepared prior to construction in order to receive necessary permits. An oil spill analysis was conducted for the LPP and condensate system, which introduce additional risks for oil spills closer to shore. Based on this analysis, site-	5.5; 12.2

<b>Performance Standard</b>	<b>Subject within Standard</b>	<b>Brief Explanation on Alignment</b>	<b>Relevant Sections of this Report</b>
and Social Risks and Impacts	and Response	specific Oil Spill Response Plans will be generated in accordance with applicable Israeli regulations.	
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Stakeholder Engagement	Noble Energy has prepared a Stakeholder Engagement Plan (SEP) relevant to this stage of the Leviathan Project to confirm that all third parties potentially affected by Project development are provided with opportunities to review Project information and provide comment. The SEP has been developed per IFC standards and includes Stakeholder Identification and Mapping, Community Feedback Mechanism, Monitoring and Evaluation components.	5.4; 9.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Consultation and Disclosure	The Project has been subject to transparent and robust public consultation and disclosure requirements of the national agencies responsible for environmental and social assessment and permitting processes. The current consultation processes which are considered post-permit and pre-construction and therefore should be administered by Noble Energy are currently being documented and a process for further consultation and disclosure (which will be defined through the SEP) is under development.	5.4.2; 9.0; 10.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Grievance Mechanism	A Project-managed Community Feedback Mechanism that provides opportunities for stakeholders to communicate concerns directly with Noble Energy and to seek resolution is currently being developed and documented.	5.4.3; 9.0; 10.0
PS1 – Assessment and Management of Environmental and Social Risks and Impacts	Ongoing Reporting to Affected Communities	The Project will be required to provide ongoing information on Project activities and performance as it progresses. To date, reporting activities have depended significantly on pre-permit government-managed consultation processes. The Project’s management and monitoring plans will include engagement and ongoing reporting to Affected Communities.	5.4; 9.0
PS2 – Labor and Working Conditions	Human Resources Policy and Program	The Project will implement Noble Energy’s corporate and national policies and procedures. Noble Energy has experience with projects of this size, and these policies are expected to suit the Project’s size and workforce.	5.4.4
PS2 - Labor and Working Conditions	Working Conditions and Terms of	Noble Energy’s Policy Manual outlines employee rights under national labor and employment law, including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any	5.4.4; 12.2.6

Performance Standard	Subject within Standard	Brief Explanation on Alignment	Relevant Sections of this Report
	Employment	material changes occur. A supply chain assessment and Human Rights due diligence have been conducted and there are no significant risks anticipated for third parties and the primary supply chain.	
PS2 – Labor and Working Conditions	Grievance Mechanism (employees/contractors)	Noble Energy has a global workers’ grievance mechanism (NobleTalk) for the review and resolution of concerns submitted from workers.	5.4.3; 12.2.6
PS2 – Labor and Working Conditions	Workforce Protection	Based on national regulations and Noble Energy policies, Noble Energy will implement policies preventing the use of forced and underage labor.  A supply chain assessment has been conducted and any forced or child labor in the supply chain is mitigated through supplier due diligence, contract language, and assessments on points of origin.	5.4.4; 10.0
PS2 – Labor and Working Conditions	Occupational Health and Safety (OHS)	Noble Energy’s GMS provides a framework for establishing performance goals and incorporates Noble Energy’s Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems.  Safety in Design (SID), a risk-based design process, will be implemented during the development phase. SID will identify Safety Critical Elements (SCE) within each of the components of the production system. An Independent Verification Body will be assigned for verifying that each SCE has been designed, constructed or produced, installed, commissioned, and maintained according to the relevant indicator.  Noble Energy also continues to ensure that occupational health and safety for direct hire and subcontractor personnel throughout all Project phases is managed in accordance with the appropriate and Israeli regulations, and where applicable, in accordance with the US Gulf of Mexico requirements.	5.5
PS2 – Labor and Working Conditions	Workers Engaged by Third Parties	Noble Energy has committed to requiring that contractors selected to support the development of the Project adhere to Noble Energy’s Code of Conduct.	5.4.4; 12.2.6
PS2 – Labor and Working Conditions	Supply Chain	A supply chain assessment and a Human Rights Due Diligence has been conducted and no significant risks are anticipated for third parties and the primary supply chain.	10.0; 12.1.4

<b>Performance Standard</b>	<b>Subject within Standard</b>	<b>Brief Explanation on Alignment</b>	<b>Relevant Sections of this Report</b>
PS3 - Resource Efficiency and Pollution Prevention	Resource Efficiency	<p>In alignment with TAMA 37/H guidance, a robust BAT assessment was conducted for processes related to natural gas production, in the context of combustion equipment, associated processes (e.g. flaring) and overall energy efficiency. This assessment will be applied to BAT design of the LPP.</p> <p>GHG accounting for the entire Project has been completed.</p> <p>On the LPP, both freshwater for processes and potable water will be sourced from the ocean and desalinated.</p>	5.6;12.1.1; 12.2
PS3 - Resource Efficiency and Pollution Prevention	Pollution Prevention	<p>The Project will be required to report emissions and make this information public. For offshore activities beyond 12 miles, the Project will follow international conventions and protocols for managing, minimizing and monitoring environmental risks.</p> <p>Specific to emission and discharge regulations for offshore activities, Noble Energy, through discussions with the Petroleum Commissioner of the Israel Ministry of National Infrastructure, agreed that the design of new facilities shall meet US Gulf of Mexico coastal and offshore air emissions and water discharge regulations or applicable International and Israeli regulations during the commissioning and operation of the Project. Noble Energy will follow not only international standards but also will cooperate with MOEP and will ask for emissions/discharge permits and will follow its requirements. These regulations will meet or exceed the World Bank EHS Guidelines for offshore oil and gas facilities.</p>	5.6;12.1.1; 12.2
PS4 - Community Health, Safety, and Security	Assessment of Risks and Impacts	Potential impacts to the health and safety of Affected Communities have been assessed and no significant impacts identified.	9.0; 12.1; 12.2.6
PS4 - Community Health, Safety, and Security	Infrastructure and Equipment Design and Safety	Noble Energy has indicated it intends to design, construct, and operate the Project facilities in a manner in which risks to third parties are minimized.	9.0; 12.1
PS4 - Community Health, Safety, and Security	Hazardous Materials Management and Safety	Potential impacts to the health and safety of Affected Communities have been assessed and no significant impacts identified.	9.0; 12.1

<b>Performance Standard</b>	<b>Subject within Standard</b>	<b>Brief Explanation on Alignment</b>	<b>Relevant Sections of this Report</b>
PS4 – Community Health, Safety, and Security	Ecosystem Services	Project-related impacts on priority ecosystems have been assessed.	9.5;12.12
PS4 – Community Health, Safety, and Security	Community Exposure to Disease	The potential influx of temporary or permanent Project labor or job seekers, and the risks associated with it (e.g. the transmission of communicable diseases), have been considered. The change in the number of workers compared to the population is expected to be small for onshore construction workforce, the magnitude of the impact is minimal, and therefore, the significance of this impact (potential for disease exposure) is negligible. No significant risks to community exposure to disease are anticipated as a result of potential influx or permanent labor and/or job seekers.	9.0; 12.2
PS4 – Community Health, Safety, and Security	Emergency Preparedness and Response	Noble Energy will develop an Emergency Management Plan (EMP) based on the recommendations highlighted by an analysis of evacuation, escape and rescue requirements. The Emergency Management Plan will address all major recommendations identified during an assessment of potential major hazards at an earlier stage of the Project.	5.5
PS4 – Community Health, Safety, and Security	Security Personnel	Security is a critical issue for the Project, given the strategic nature of the resource to regional interests. A security assessment related to the potential for attacks on the facilities has been undertaken. Assessment of the potential risks and impacts related to security and human rights concerns, including government security personnel deployed to provide security services has been addressed. Since control over offshore area security is beyond Noble Energy’s control, ERM suggests that Noble Energy make the Community Feedback Mechanism accessible to those who could be affected offshore by public security forces. This will aid the company in monitoring any actual or potential human rights violations which are directly outside of company control.	10.0; 12.1.2
PS5 – Land Acquisition and Involuntary Resettlement	Economic Displacement	Physical displacement is not expected as a result of the Project. Noble Energy has established a Livelihood Restoration Management Framework in case potential economic displacement of individuals and groups due to the Project (e.g., fishermen, commercial shippers, and individuals working on the tourism industry) occurs.	9.0; 12.1.2; 12.2.6
PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources	Critical Habitats and Ecosystem	Biodiversity and habitats have been assessed and the potential impacts and mitigation measures required have been identified.	7.2; 8.2; 12.2.5

<b>Performance Standard</b>	<b>Subject within Standard</b>	<b>Brief Explanation on Alignment</b>	<b>Relevant Sections of this Report</b>
	Services		
PS7 - Indigenous Peoples	Indigenous peoples	It is not appropriate for Noble Energy to make a determination regarding any group's indigeneity or rights over land and resources. The TAMA 37/H public consultation and disclosure activities have been open, transparent, and accessible to all groups, including Arab stakeholders.	5.0
PS8 - Cultural Heritage	Onshore Findings	The baseline studies and impact assessments have identified a number of known antiquities sites and resources that could be subject to direct physical impacts from the proposed project. Noble Energy has also committed to execute onshore archaeological surveys along the proposed pipeline route and to notifying the Israel Antiquities Authority (IAA) if any antiquities sites are identified during construction. A chance find procedure has also been developed for the Project.	8.4; 12.1.3; 12.2.6
PS8 - Cultural Heritage	Offshore Findings	The identification of cultural heritage resources during the offshore surveys demonstrates there is the potential for encountering additional resources during construction or operations. This information has been shared with the IAA. Noble Energy will relocate infrastructure in order to avoid potential finds, and also a chance find procedure has also been developed for the Project.	7.4; 12.1.3; 12.2.6

## 5.0

### ***APPROACH TO ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT AND MANAGEMENT***

This section provides an overview of Noble Energy's current approach to managing environmental and social performance of the Project. It identifies policies, procedures and plans that Noble Energy already has in place, and also Project-level commitments that have been made. This section is complementary to *Section 12.0*, which describes the additional commitments and requirements that Noble Energy will adhere to as the Project develops further.

## 5.1

### ***POLICY AND MANAGEMENT***

The Leviathan Project will be undertaken in accordance with Noble Energy's Environment, Health and Safety (EHS) Policy. Noble Energy's EHS Policy, in addition to its documented Operating Principles, Visions and Values, describes Noble Energy's expectations and commitments to EHS performance as well as EHS roles and accountability requirements. This overarching framework provides the foundation for the EHS management hierarchy and serves as the guide for Noble Energy's Global Management System (GMS), which establishes that the ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the life cycle of the Project (see *Appendix 1* for an overview of the GMS). The next level of the EHS Management hierarchy is Noble Energy's Corporate EHS Standards and Guidelines, which support the policy framework.

Noble Energy's Corporate Social Responsibility (CSR) Policy documents its commitments to protecting the health and well-being of communities, promoting respect for human rights, and abiding by the ILO's Fundamental Principles and Rights at Work.

Noble Energy has an Operational Management System (OMS) that aligns with the GMS and was certified by an independent third party in 2016. Within this system, the Safety Environmental Management System (SEMS) is managed for Projects and Operations. OMS incorporates occupational safety and health standards across its operations, which align with Israeli requirements and international standards. Social and health related management and monitoring as it pertains to OHS is also covered under the aforementioned systems and a required Safety Plan has been developed. Noble Energy has a formal risk management system comprised of risk ranking and risk registries that operates under best industry practices to meet regulatory requirements.

## 5.2 IDENTIFICATION OF RISKS AND IMPACTS

A number of environmental and social assessments have been carried out for the Project. These have been introduced in *Section 2.3* and the main findings are summarized and/or presented in *Sections 7.0* and *8.0* for environmental issues and *Sections 9.0* and *10.0* for social issues. *Section 11.0* also presents a cumulative impact assessment that has been prepared as part of the Project assessment process.

In regards to risks and impacts associated with primary supply chains (e.g., prefabrication contractors), Noble Energy requires all contractors that would be operating on a Noble Energy-controlled site to submit EHS information. For other contractors, such as equipment manufacturers, they are required to comply with Noble's Code of Conduct.

## 5.3 ORGANIZATIONAL CAPACITY

The Noble Energy Leviathan Team has an environmental manager and an environmental engineer. Responsibilities are clearly assigned and defined in an organizational chart and staff has been hired based on skills, knowledge and experience. There is a community relations/stakeholder manager and other staff at the Project level designated to manage related risks. Noble Energy also maintains community relations/stakeholder management staff at the corporate level. Elements related to organizational capacity will be specified in the management plans which are described in detail in *Section 12.0*.

## 5.4 SOCIAL PERFORMANCE

### 5.4.1 Stakeholder Engagement Plan

Noble Energy is committed to establishing and maintaining transparent, respectful and regular engagement practices to understand and manage stakeholder concerns and interests. These practices are above and beyond the engagement activities managed by Israeli government agencies as a part of the permitting processes. Noble Energy's Stakeholder Engagement Plan (SEP, see *Appendix 2*) takes into consideration environmental and social impacts. The SEP is relevant to this stage of the Project to confirm that third parties potentially affected by project development are provided with opportunities to review project information and provide comment. The SEP has been developed per IFC standards, and includes Stakeholder Identification and Mapping, Community Feedback Mechanism, Monitoring and Evaluation components.

Noble Energy's SEP will ultimately encompass all aspects of Project development, including onshore and coastal facilities. It will be a living document that will be updated at various stages. To date, the Project has

benefitted from the government-managed TAMA and environmental and social assessment engagement processes, which have included the dissemination of information and opportunities to provide comment on the design and potential impacts as the Project has progressed through concept development and design. Public hearings have taken place and, as of the time of the Investigator's Report, 6,711 stakeholder comments had been received (see *Section 5.4.2* below).

Noble Energy has staff dedicated to community relations activities, and Noble Energy led stakeholder engagement at the local level, particularly for land owners and users in Dor, has begun. Ongoing communication with onshore stakeholders at Dor Beach is focused around land access necessary to build the onshore components - more specifically at the CVS and associated roads and laydown areas. Noble Energy's community engagement teams have been engaging with residents of these communities on an ongoing basis as part of the Project's Stakeholder Engagement Program.

Noble Energy is completing stakeholder identification along the onshore pipeline routes, as well as third-party surveys, and will conduct subsequent engagement as part of Noble Energy's compliance with national legislation. Documentation about engagement and reporting activities outside of the permitting processes are also currently being developed by Noble Energy and will be included in the SEP.

#### **5.4.2**      *Consultation and Disclosure*

The Project has been subject to public consultation and disclosure requirements of the national agencies responsible for environmental and social assessment and permitting processes. The Investigator's Report provides detailed descriptions of stakeholder comments, Project proponent responses, government responses and the final comments by the independent investigator on the design components assessed in the TAMA EIA.

The Investigator's Report presents the main issues and arguments raised by opponents against TAMA 37/H during the two-month public consultation and disclosure process in late 2014 and provides independent recommendations to the National Planning and Building Board on how to address these objections. The document also specifies in "Section G: Collection of Similar Objectives" which communities and stakeholders have submitted objections and oppositions that are similar to the more detailed objections outlined in the previous sections. While the report does not discuss all 6,711 comments and objections lodged against TAMA 37/H, it does provide a comprehensive overview of the stakeholders who participated in the consultation process, which was made public over a period of two months in 2014.

While the report does not specify that explicit engagement was conducted with disadvantaged and/or potentially vulnerable groups (as defined by IFC ), it does

make reference to the objections raised by at least two predominately Arab communities/villages in the Haifa District – including Furadis, which is located near the Dor Beach landing site. The report also discusses contributions to the public consultation and disclosure process by the Furadis neighboring council and Hof HaCamel neighboring council (which represents Ein Hawd).

The Government of Israel stakeholder engagement process has been described by many who have participated in the process (planners, designers and proponents) as transparent and robust. It is apparent from not only the Investigator’s Report, but also other documentation from the stakeholder process, that it “allows the views, interests and concerns of different stakeholders, particularly of the local communities directly affected by the Project (Affected Communities), to be heard, understood, and taken into account in Project decisions and creation of development benefits” (IFC, GN1). Therefore, even though the Government of Israel did not deliberately engage with specific vulnerable groups, it is apparent that all villages and communities that could be potentially affected by the Project were invited and did participate in the most recent public disclosure and consultations processes, regardless of their status or ethnicity. The TAMA 37/H public engagement process conducted and its outcomes are therefore consistent with the requirements of IFC PS1.

#### **5.4.3**      *Community Feedback Mechanism*

A Project-managed Community Feedback Mechanism (which is the equivalent of a grievance mechanism) that provides opportunities for stakeholders to communicate concerns directly with Noble Energy and to seek resolution is being developed and documented. This is a requirement of both the IFC PS and national authorities. Noble Energy complies with national requirements by including a dedicated phone line and email address on its website.

#### **5.4.4**      *Labor and Working Conditions*

The Project implements Noble Energy’s corporate and national policies and procedures. Noble Energy has experience with projects of this size, and these policies suit the Project’s size and workforce.

In terms of employment practices that address workforce compliance with human rights (such as freedom of association and effective recognition of the right to collective bargaining), company policies adhere to international standards and are made available to all Project personnel through the Israel Employee Policy Manual, as well as the employee and contractor language in employment contracts. The Policy Manual outlines employee rights under national labor and employment law (which also addresses employment discrimination, minimum wage, etc.), including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur. While it does not discuss

specific collective agreements, it does provide reasonable working conditions and terms of employment. Israeli legislation recognizes workers' rights to form and to join workers' organizations of their choosing, without interference.

Noble Energy has a global workers' grievance mechanism, NobleTalk, for review and resolution of concerns submitted from workers. NobleTalk is integrated into contractor orientation/awareness training.

Noble Energy will include language in primary contracts which require contractors to establish a workers grievance mechanism (in line with NobleTalk) and generally support Noble Energy's efforts to align all work with IFC PS, as well comply with relevant national legislation and regulations.

## 5.5 *HEALTH AND SAFETY*

### 5.5.1 *Occupational Health and Safety (OHS)*

Noble Energy's GMS incorporates the company's Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems (OSHMS), such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06, and ANZI Z10, and Environmental Management Systems, such as EPA RMP, ISO 14001, with World Bank Group standards and guidelines. The GMS is used to establish that the ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the lifecycle of the Project.

The GMS provides for: (i) identification of potential hazards to workers, particularly those that may be life-threatening; (ii) provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) training of workers; (iv) documentation and reporting of occupational accidents, diseases, and incidents; and (v) emergency prevention, preparedness, and response arrangements.

At other Noble Energy operations in Israel, workers are provided health and safety training and are provided adequate protective gear. It is anticipated that Noble Energy will also provide the same for the Project construction staff.

### 5.5.2 *Safety Plan*

A Safety Plan will be developed to meet the requirements of the Israeli Labor Law and describes the process under which OHS principles and procedures are applied for the Project, which includes the methodology to: (i) identify hazards; (ii) establish the risk potential; and (iii) implement policies and procedures as to how such risks will be mitigated. It is a requirement of the Ministry of Energy and the Ministry of Economy. It includes an assessment of physical hazards, including: natural gas fire and explosion; fall from heights (including off-shore

transferring); spillage of volatile liquids; gas leaks; collapse of a structure; struck by / caught between / fell on and other similar hazards; collision with a platform; and drowning.

The Safety Plan will also include a list of chemical/biological/physical elements for which a safety sheet or environmental monitoring is required. The plan will outline medical procedures for those who may be exposed to these hazards. The Safety Plan takes into account special hazard environments as they pertain to offshore and platform operations.

### 5.5.3 *Emergency Preparedness and Response*

Project documents refer to “Emergency Response” in the context of environmental spills and include “TAMA 37/H Guidelines for preparing the Accident Prevention Plan and the Emergency Plan.” Given the stage of the Project development, these plans have not yet been prepared but will be completed prior to construction in order to receive permits. For existing locations, Noble has prepared and periodically updates the emergency response plans for its current production areas and is developing a robust exercise and training program to ensure competency among our employee and contract staff.

ERM understands that the Project is deemed to be a strategic asset by Israel. As such, a security assessment has been undertaken and Noble Energy abides by Israeli military guidelines which require their involvement in the protection of the offshore facilities. Onshore facilities will be protected through a combination of private security (inside the perimeter) and Israeli national police (outside the perimeter).

### 5.5.4 *Oil Spill Contingency Plan (OSCP)*

Noble Energy has used and will continue to follow the framework that has been approved for the development of the Oil Spill Contingency Plan (OSCP). Noble Energy has established emergency response procedures relevant to Noble Energy’s developments in in strategic development areas including the Mediterranean. These regionally-focused Oil Spill Response Plans aligned with requirements established by the US Coast Guard, BSEE (Bureau of Safety and Environmental Enforcement), and Israel’s National Marine Oil Pollution Event Preparedness and Response Master Plan (TALMAT). These include: training in courses from the Center for Domestic Preparedness (e.g., ICS 100/200/300/402); documentation and updates of emergency plans (e.g., Tier 3/4 Oil Spill Contingency Plan); simulations and training on well containment and equipment deployment in response to unintentional releases; participation in multi-national full scale exercise on terrorist response, search and rescue, medical evaluation and spill response; and the assistance to Global Security with a country evacuation exercise.

The framework follows the existing plans that Noble Energy has in place for its other operations in the region, including the Tamar project. Noble Energy will develop a Leviathan Project-specific OSCP and it will include sections on EHS Managements System applicability, administration, concept of operations, Incident Management Team (IMT) roles and responsibilities, coordination with other entities, and plan maintenance. The administration section will include subsections on plan development, risk management, classification of incidents (into Tier 1 - minor incidents, Tier 2 - serious incidents, and Tier 3 - major incidents), review, approval, and implementation.

An oil spill analysis was conducted for the LPP and condensate system. Based on this analysis, site-specific Oil Spill Response Plans will be generated in accordance with Israel Water Regulations for Water Pollution Prevention (Fuel Pipelines, 2006; Fuel Tank Farms, 2004).

The Leviathan OSCP concept of operations section will include subsections on release scenarios and release scenario preparedness for operational failure, equipment failure, ruptured pipeline, and loss of source control. It will also include subsections on immediate and supplementary response procedures, dispersant application, mechanical recovery, shoreline protection, waste management, rehabilitation, and reporting requirements.

The plan maintenance section will include subsections on training and exercise (operational training, simulation drills, and full scale exercises) and records (Incident Action Plan). Appendices will include a glossary, Record of Change, contact information for local and state jurisdictions and a MoEP Spill Report and Dispersant Approval Form.

#### **5.5.5 *Infrastructure and Equipment Design and Safety***

Noble Energy's intent is to design, construct, and operate the Project facilities in a manner in which risks to third parties are minimized. The design and construction of Project facilities is being carried out by competent professionals and will be assessed by the relevant national authorities.

#### **5.5.6 *Hazardous Materials Management and Safety***

The EIA studies have considered potential community exposure to hazardous materials, and mitigation criteria have been developed. These mitigation criteria include categorizing hazardous waste based on the composition and origin of the waste stream. For every hazardous waste stream, or group of waste streams, procedures and instructions will be laid down for their safe handling, taking into consideration community exposure, the environment and statutory requirements. The EIAs have also assessed the probability of an oil spill during the Project and accidental spills of diesel fuel as described in *Section 5.5.4* above.

### 5.5.7 *Security Personnel*

The EIA documents identified security as a critical issue for the Project, given the strategic nature of the resource to regional interests. A security assessment related to the potential for attacks on the facilities has been undertaken. The mandatory use of public security offshore does mean there is a heightened level of risk of the security infringing upon the rights of local communities and stakeholders, which is outside of Noble Energy's control. However, the fact that the buffer zones during construction will be temporary and during operations will remain offshore, the risk of a security incident involving public security forces is reduced although public security force retaliation to a terrorist threat against the facility could still occur. Noble Energy will make the Community Feedback Mechanism accessible to those who could be affected offshore by public security forces.

Noble Energy's CSR policy includes Noble Energy's commitment to be guided by the Voluntary Principles on Security and Human Rights. The Project has also developed a Security Management Plan. Private sector security contractors have been selected based on experience and available procedures related to the protection of human rights. Additionally, training of security teams involves human rights elements.

Further discussion of these issues is contained in *Sections 9.0 and 10.0*.

### 5.5.8 *Workers Engaged by Third Parties*

Occupational health and safety for direct hire and subcontractor personnel throughout all Project phases is managed in accordance with the US Gulf of Mexico Occupational Health and Safety Administration (OSHA) Regulations pertinent to the offshore Oil and Gas industry. The facilities will be regulated in accordance with applicable Israeli regulations.

### 5.5.9 *Safety Management*

Further details on the management of safety are provided in *Section 12.0*.

## 5.6 *RESOURCE EFFICIENCY AND POLLUTION PREVENTION*

The Project is being developed by Noble Energy to avoid impacts on human health and the environment consistent with Good International Industry Practice (GIIP).

### 5.6.1 *Energy Efficiency*

According to Noble Energy, energy for continuous use by the Project on the LPP will be generated by gas turbines, which are equipped to run on both natural gas

(from operation phase) and diesel (if gas is not available). Similarly, drilling operations and the thermomechanical cuttings cleaner process (TCC) will be powered using natural gas, to the extent possible. The Drilling EIA cites decisions taken (e.g., the selection of specific bit materials and drilling muds) that will increase drilling efficiency, ultimately reducing energy use.

For the LPP, the engineering design approach will be to avoid or minimize emissions (and energy consumption) in accordance with Best Available Technology (BAT). In alignment with TAMA 37/H guidance, a robust BAT assessment was conducted for processes related to natural gas production, in the context of combustion equipment, associated processes (e.g. flaring) and overall energy efficiency. This assessment will be applied to BAT design of the LPP.

## 5.6.2 *Climate Change*

Noble Energy and its design team have reviewed the potential for climate change impacts to affect the Project. Based upon the Israeli Government's Second National Communication (published in 2010), the following climate projections have been identified as being relevant for the Project across its planned life:

- Maximum temperatures in Israel could rise by 1.8°C by 2020 compared to 1960-1990 levels;
- A 10% decrease in precipitation is projected by 2020, reaching up to a 20% decrease in 2050, and seasonal rain is expected to decrease;
- An increase in the number of extreme events in Israel is expected; and
- The projected global mean sea level rise by 2100 relative to 1992 could range from 0.21 m to 2.0 m.

Based on these projections, the only significant impact identified would be the 1.8° C rise in maximum temperature by 2020. The most direct effect would be an approximately 5% decrease in maximum power available from gas turbine engines for this increase in ambient air temperature. The 5% decrease in gas turbine power would be within design margins. There would be insignificant effects on other Project processes and utility functions because the identified effects are within design tolerances or in the case of sea level rise projections, are beyond the design life of the Project.

## 5.6.3 *Greenhouse Gas Emissions*

Greenhouse Gas emissions arising from the construction and operation of the Project have been presented in the various EIA reports described in *Section 2.3*.

Emissions during construction will arise from fuel use from two drilling rigs during the initial drilling of the eight wells, and fuel use from vessels and helicopters during the installation of associated infrastructure (submarine systems, pipelines, production platform). The estimated total emissions for these

activities during construction are approximately 828,543 metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) for the offshore works. Specific details of the onshore construction activities are not currently available; however, these activities are not considered to account for any more than 10% of the offshore emissions.

Emissions during operations will arise from fuel use for processing and electricity consumption on the LPP. During the first eight years of operation (through 2024), the pressure of gas will reach the facility at peak pressure. However, from 2025, the gas will require compression to accelerate the rate of gas delivery to the shore. Annual emissions during operation are therefore presented for two periods. Specific details of the onshore operational activities are not currently available, including from the electro-hydraulic control system and pipelines. The electro-hydraulic control system is expected to use minimal energy and annual emissions are expected to be no more than 10% of the offshore annual emissions. The calculated emissions are shown in *Table 5-1*.

**TABLE 5-1 GHG EMISSIONS DURING CONSTRUCTION AND OPERATION (METRIC TONS)**

Phase	Emissions of CO <sub>2</sub> e (Metric Tons)
<i>Construction Phase (total)</i>	
<b>Construction - Offshore</b>	828,543
<b>Construction - Onshore</b>	82,854
<b>Construction Total</b>	<b>911,397</b>
<i>Operations</i>	
<b>Operations Offshore - Annual (through 2024)</b>	483,221
<b>Operations Offshore - Annual (2025 and on)</b>	560,612
<b>Operations - Onshore (2025 and on)</b>	56,061
<b>Operations - Total (2025 and on)</b>	<b>616,673</b>

There will be technology that is installed to mitigate the potential emissions during operations. During operations, there will be no venting or flaring, since all of the gas will be recovered. During malfunctions, however, gas will be flared. The main GHG produced from flaring is carbon dioxide, while the main GHG produced from venting is methane. Methane contributes to the GHG effect 25 to 28 times more than carbon dioxide. Equipment on the LPP will undergo routine maintenance and monitoring to maintain their efficiency. Mitigation measures are and will continue to be implemented to reduce the emissions of GHGs, including maintenance of vessels and equipment and standard operating procedures.

#### 5.6.4 *Water Consumption*

Water used for the Project includes freshwater for processes and potable water. Processes requiring water include utility stations, chemical cleaning, turbine washing, ship storage tank high pressure washing and make-up water for ship steam boilers. On the LPP, both freshwater for processes and potable water will be sourced from the ocean and desalinated. Given the significant energy use required for desalination, water conservation on the LPP will follow GIIP for water conservation.

#### 5.6.5 *Pollution Prevention*

Israeli pollution prevention regulations are applied to Project components. In accordance with the relevant Israeli legislation and regulations, the Project will be required to "report annual amounts of pollutants released from factories to the air, water, sea and soil, and reporting on the disposal of hazardous materials and waste from factories". The PRTR Law requires that monitoring information be made available to the public.

For offshore activities beyond 12 miles, Noble Energy will cooperate with MOEP and follow its requirements in the EEZ. In addition, the Project will follow international conventions and protocols (i.e., IMO Convention for the Prevention of Pollution from Ships [MARPOL (73/78)] and the Barcelona Convention for the Protection of the Mediterranean Sea from Pollution) for managing, minimizing and monitoring environmental risks. Specific to emission and discharge regulations for offshore activities, Noble Energy, through discussions with the Petroleum Commissioner of the Israel Ministry of National Infrastructure, agreed that the design of new facilities will meet US Gulf of Mexico coastal and offshore air emissions and water discharge regulations or applicable International and Israeli regulations during the commissioning and operation of the Project. These regulations will meet or exceed World Bank Group EHS Guidelines for Offshore Oil and Gas Facilities.

The TAMA EIA addresses the impacts from and commits to mitigations for pollution prevention associated with discharges to marine environments, groundwater and air, and pollution from noise and light. This general analysis will be applied to the Project. Associated mitigation and monitoring activities will be covered in the EMMPs. Where sea discharges are proposed during LPP activities (e.g., produced water, open drains, hydrotest water, and seawater intake), governing Israeli regulations and international best practice will be followed. In order to minimize the overall volumes of oil contaminated discharges to sea, the hazardous and non-hazardous deck drains will be separated at their collection points. They will each flow separately to the sump where any collected hydrocarbons are separated and pumped back to the process for treatment.

The Drilling EIA confirms that the drilling rigs and supply vessels will comply with applicable MARPOL Annex VI regulations, including the use of low sulfur fuels and meeting the applicable NO<sub>x</sub> emission limits under Regulation 12 of Annex VI. In addition, air emissions from the LPP will minimize air emissions, specifically related to stationary combustion equipment, flaring and venting, and fugitive emissions, by ensuring they do not exceed limits in applicable Israeli legislation and regulations and the World Bank Group EHS Guidelines. Combustion equipment will also be subject to permitting (Emissions Permit) under the Israeli Clean Air Act. Modeling was conducted to determine onshore concentrations of NO<sub>x</sub> and PM<sub>10</sub> from combustion sources on the LPP, using USEPA AP-42 emission factors and the AERMOD atmospheric dispersion modeling system. The model concluded that levels of both were significantly below national limits, with NO<sub>x</sub> at 11.3% of the national limit at the nearest sensitive receptor.

The Project will also address potential pollution to water and air and to biodiversity from underwater noise and light.

All of these considerations are recognized by Noble Energy and will be integrated into design and operational aspects at the relevant stages of the Project.

#### 5.6.6 *Wastes*

The Project will generate wastes during normal activities in the form of domestic non-hazardous wastes and hazardous oil or chemical contaminated wastes from the process areas. The Project will consider minimization, separation and proper storage and disposal of waste streams. The Project is committed to a Waste Management Plan (WMP) for the Project's facilities, identifying waste types and specific segregation, handling, and shipping requirements. Contractors will also be expected to develop their own WMPs that recognize the waste hierarchy and promote sustainability through resource efficiency, waste minimization, segregation and responsible treatment and disposal of hazardous and non-hazardous waste streams. Contractors' WMPs will be approved by Noble Energy for alignment with its own WMP. Inquiries on waste management are also included in the Contractor's EHS Questionnaire, used to screen and select Contractors.

Noble Energy maintains a contract with the Port of Haifa for waste management services, and waste generated (including hazardous wastes) by the Project will be dealt with under this existing contract. Additional authorized contractors will be procured as necessary to handle any hazardous wastes that cannot be disposed of at the Port. All waste movements will be documented according to a dedicated Chain of Custody system for the purposes of record keeping and auditability.

### 5.6.7 *Hazardous Materials*

Chemicals that will be used by the Project for subsea activities include mono ethylene glycol (MEG), corrosion and scale inhibitors, methanol (for cold startup on the subsea choke) and xylene (to be injected for flushing purposes). The specific chemicals have not yet been selected and further detail on type and proposed use of these chemicals will be developed during the Project detailed design phase, which will include the final selection of chemicals, their Material Safety Data Sheets (MSDSs) and relevant information on their environmental toxicity.

The EMMP guidelines state that "in case additives are used at the platforms or in the production process that may end up as discharge to the sea the most environmentally friendly alternative must be used" and BAT and As Low as Reasonably Practical (ALARP) must be applied to minimize the risks of accidental releases of hazardous materials.

For sea discharges, any offshore hazardous materials that may be discharged to the sea will be evaluated and substituted with less hazardous materials, as appropriate. Additionally, all hazardous materials used will be subject to cooperation with MOEP and their permit requirements, including in the EEZ. The Drilling EIA states that cuttings from Mineral-Oil Based Mud (MOBM) generated during drilling will be processed to less than 1% base oil content and disposed of on-site as currently permitted by OSPAR Resolution 2000/3. All drill rig operators will receive guidelines and training for handling hazardous waste and hazardous waste segregation requirements, which are detailed in the Drilling EIA.

According to Noble Energy, all hazardous materials associated with the Project will be stored and handled according to Material Safety Data Sheets and written pollution prevention measures established by the contractor. Permitting for the LLP will require development of a Hazard and Operability Study (HAZOP) which assesses risks associated with operational processes. Additionally, risk of exposure to hazardous materials will be evaluated by Contractors in Hazard Identification (HAZID) documents.

Regarding ozone depleting or internationally banned substances, the WBG EHS guidelines state that offshore drilling and production chemicals must avoid ozone depleting substances. The ENVID Report confirms that no ozone depleting substances (e.g. Chlorofluorocarbon [CFC] or Halon) are expected to be used.

### 5.6.8 *Pesticides*

Pesticides will be used in minor quantities, if at all, to prevent invasive species from impacting re-vegetation efforts along the onshore pipeline and at the block valve station. The full need for pesticides is yet to be determined given the Project's stage.

The TAMA 37/H EIA guidelines include direction for the preparation of a detailed Environmental Management and Monitoring Plan (EMMP) to guide management and monitoring over the Project life cycle. Recognizing that the TAMA guidelines intend to cover only TAMA-regulated components (including activities within territorial waters only), Noble Energy has developed an Environmental and Social Management Plan (ESMP) Framework that will supplement the EMMP, and capture management and monitoring commitments outside of Israeli territorial waters (beyond 12-mile boundary) and commitments (which are additional to the EMMP) to ensure the Project aligns with the IFC PS. Further details on the management program are provided in *Section 12.0*.

Noble Energy will develop and structure an Environmental and Social Management System (ESMS) around the EMMPs and ESMP Framework. Noble Energy's Global GMS provides a framework for establishing performance goals and incorporates Noble Energy's Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems (OSHMS), such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06 and ANZI Z10, and Environmental Management Systems, such as EPA RMP, ISO 14001, with IFC PS and WBG EHS Guidelines. The ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the lifecycle of the Project.

ERM has prepared a supplementary alternatives analysis, which is presented in this section. The objective is to consolidate into one location the various assessments, studies and decisions that have been made in relation to the Project, which have defined its current layout and intent.

The alternatives analysis has considered the following tiers of alternatives and decision making:

- Project development alternatives related to the development of the Project in general and its location, as summarized in *Table 6-1*;
- Alternatives related to offshore and onshore components and placements of the natural gas development, as summarized in *Table 6-2*; and
- Alternatives related to the technology of offshore, onshore and nearshore components, as summarized in *Table 6-3*.

TABLE 6-1 PROJECT DEVELOPMENT ALTERNATIVE ANALYSIS

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
The "Project"	Develop or Do Not Develop	Socio-economic	<p>At the start of the Project, Noble Energy and the Government of Israel assessed whether the Project should be developed.</p> <p>A decision not to proceed would result in a reduction of potential gas revenues to Israel and loss of any associated benefits to the economy. Proceeding with the project establishes an additional fuel supply that provides greater redundancy of gas supply thus allowing Israel to switch over more power generation facilities from higher polluting fuels (coal, heavy fuel oil) to cleaner burning fuel (gas).</p> <p>The Project will result in increased domestic gas supply and provides potential for future gas exports beyond Israel, as well as employment creation for national citizens.</p>	The option of not proceeding was therefore disregarded when considered against these socio-economic benefits.	Production EIA
Field Development Options	Onshore vs. Offshore Production	Stakeholder Engagement	As part of TAMA/37/H, opponents of natural gas development recommended any treatment facilities be located exclusively offshore due to safety and security concerns; however, the Investigator <sup>i</sup> rejected this and instead proposed that all treatment options	See subsequent offshore vs. onshore alternatives described below.	TAMA EIA; Investigator's Report

<sup>i</sup> An Investigator's Report was generated as part of the TAMA process. Due to a large number of stakeholder comments being received, an independent Investigator was hired by the Government of Israel to collect all feedback from stakeholders and compile and assess the feedback in one report.

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
			<p>be considered. The Investigator's Report further noted the State of Israel's security establishment has and is included in the Project's design.</p> <p>Opponents recommended that all platforms associated with natural gas be located at a distance greater than 7.5 km from shore, which was the original design. This was partially accepted by the Investigator who stated "the platform should be located as far as possible from the shore".</p>		
Field Development Options	Treatment Options	Cost-Analysis	<p>Noble Energy assessed a variety of development and treatment options (i.e., onshore, offshore, sub-sea), including a Floating Production Storage and Off-Loading vessel (FPSO) with a Pressure Reduction Metering Platform, which was originally preferred, and a Fixed Platform. Subsea processing was not considered a viable option for Leviathan by Noble Energy, as it is generally associated with mature fields with declining pressure and production. There were no significant environmental differentiators or showstoppers identified across all of the viable options. A fixed production platform was chosen, primarily in order to accelerate gas supply to the domestic market thus bringing redundancy to Israel's gas supply earlier.</p>	<p>The Leviathan Production Platform (LPP) will be located within an area designated in Israel's National Outline Plan 37/H Planning of Gas Treatment Facilities (TAMA 37/H), in water approximately 86 m deep and 10 km offshore of Dor, Israel. The platform will consist of two modules: the Domestic Supply Module and the Regional Export Module. The LPP will have permanent onboard accommodation facilities suitably sized and outfitted to support onboard operations, including living quarters, power generation, emergency power generation, safety systems, a heat medium, a cooling medium, fresh/potable water, sewage, instrument/plant air, and nitrogen.</p>	TAMA EIA; Comments from Noble Energy
Future Entry into Northern TAMA Block	Alternative Pipeline Corridor	Feasibility Studies; Environment; Sensitive	<p>An alternative pipeline route into the Northern TAMA zone has been identified based on work performed during previous phases of study on the Leviathan development. This route enters into the</p>	<p>The selected route for the transmission pipelines from the Infield Gathering Manifold to the LPP utilizes an entry point into the Northern TAMA zone that is</p>	Production EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
		Receptors;	southern end of the northern TAMA block, having entered Israeli Territorial Waters approximately 5 km south of the selected entry point for the Leviathan development. From Israeli Territorial Waters, this route runs a broadly northwest direction for approximately 40 km where it meets the selected pipeline route for the proposed Leviathan development.	approximately due west of the LPP location. This route enters Israeli Territorial Waters at a location that is west northwest of the LPP location.	

TABLE 6-2 PROJECT COMPONENTS ALTERNATIVE ANALYSIS

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Offshore Pipeline Routes	None considered	Environment; Sensitive Receptors; Cost-Analysis	<p>The route taken between the Infield Gathering Manifold at the LPP has been optimized during design to minimize total pipeline length, channel crossings, and interactions with existing infrastructure.</p> <p>In order to avoid crossing the Tamar pipelines the transmission pipelines could be routed to the north of the Tamar Field; however, this would require crossing the MED Nautilus fiber optic cable and substantial incremental pipeline length. Such a routing is not considered attractive from an economic, technical, or environmental standpoint, as engineered pipeline crossings are a mature technology that do not present significant technical or environmental risk.</p>	<p>The transmission pipeline corridor runs from the Infield Gathering Manifold to the LPP, the locations of the aforementioned infrastructures define the start and end point of the corridor.</p> <p>The preferred pipeline will require the transmission pipelines to cross all three (3) of the seabed channels, the Tamar production pipelines, the continental shelf, and all items identified within Israeli Territorial Waters. The route runs to the south of the MED Nautilus fiber optic cable system, and thus crossing of this infrastructure is not required.</p>	Production EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Onshore Pipeline Routes	Tie-in Stations at Dor and Hadera	Environment	As part of the TAMA process, environmental impacts and the view of local stakeholders have been taken into consideration. Horizontal Directional Drilling (HDD) techniques will be employed to minimize impacts to the Dor beach area.	Two pipelines will run from the LPP to the onshore pipeline system: the Domestic Gas Sales Pipeline (DGSP) and the Domestic Condensate Sales Pipeline (DCSP). These two pipelines will connect to the onshore pipelines at the CVS and will be constructed using HDD techniques.	TAMA EIA
Gathering and Umbilical Lines	Substantial Pipeline Re-routing	Environment; Sensitive Receptors; Cost-Analysis	See "Offshore Pipeline Routes" discussion.	The manifold will be connected to the offshore platform by approximately 115 km of gathering lines. In addition to the gathering lines, the offshore platform will be connected to the field via umbilical lines which will provide electrical power, communications, chemicals, and hydraulic control fluid to the field.	Production EIA
Onshore Location of Pipeline and Coastal Valve Station	Through Hadera and Michmoret or North of Hadera and Michmoret	Socio-economic; Sensitive Receptors	<p>Opponents of TAMA/37/H suggested that development aspects associated with natural gas be relocated to north of Hadera and Michmoret to avoid tourist areas, a public cemetery, and farm. The Investigator accepted this recommendation, suggesting that the pipelines come onshore 100 m north of the originally planned route, and that the Coastal Valve Station (CVS) be constructed 200-300 meters north of the originally planned location. This will minimize impacts on tourism and residents.</p> <p>The Investigator recommended the development aspects be minimized - specifically related to the survey area and</p>	The Project comes onshore at Dor Beach, connects to the CVS and DVS. The condensate line will continue via pipelines to Hagit. Per the Investigator's stakeholder engagement process, the Hadera and Michmoret area has been avoided.	TAMA EIA, Investigator's Report

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
			onshore footprint, where possible. The Investigator also recommended that where natural gas development impacts other enterprises, that mitigation measures be developed and incorporated into the Project's Development Plan.		
Onshore Gas and Condensate Pipelines	Above-ground Pipelines; Other Routing Locations	Socio-economic; Sensitive Receptors	See above.	The onshore gas and condensate pipelines will be approximately 2 km long and will connect the CVS to the DVS. These two subsurface pipelines will be trenched and backfilled and built within an existing pipeline right-of-way through a corridor previously delineated by the TAMA 37/H. The gas and condensate pipelines will both have two major transportation crossings: Coastal Road #2 and the Haifa-Tel Aviv railway. Both pipelines will be buried for the entire route between the two stations, while maintaining a cover of 2 m over the top of the pipe as required by TAMA 37/H.	TAMA EIA, Investigator's Report
Dor Valve Station (DVS)	Other Beach Landing Locations	Socio-economic; Sensitive Receptors	See above.	The DVS will be built adjacent to an existing Israel National Gas Lines (INGL) station in Dor.	TAMA EIA, Investigator's Report

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Pipeline (DVS to Haifa Refineries)	Other Sites	Socio-economic; Sensitive Receptors	<p>At present, the Project is considering the use of both existing, independent pipeline systems and the construction of a new pipeline to transport condensate from the DVS to Haifa refineries. The Project will consider the development of a devoted 6-inch condensate pipeline to link Dor with Haifa.</p> <p>In line with the Investigator's Report, Noble Energy will minimize its survey area and onshore footprint by using existing, independent pipeline systems, where possible.</p>	Not yet selected.	TAMA EIA, Investigator's Report
Condensate Storage Tank	Ein Ayala Site or Hagit Site	Environment; Safety	<p>Opponents suggested that Ein Ayala and Emek Hefer industrial zones be selected over Hagit and Meretz Wastewater Treatment Facility areas respectively due to environmental landscape vulnerability and other environmental considerations; the Investigator rejected these recommendations. The National Planning and Building Board evaluated Ein Ayala versus Hagit and decided Hagit was a more viable option. The Investigator deemed the Meretz Wastewater Treatment Facility is a safe distance from any residential population.</p>	<p>The Project includes the use of an existing 30,000 m<sup>3</sup> API 650 storage tank at the PEI Elroy Terminal, and a pumping station linked to the national pipeline fuel grid and an emergency truck loading station. If the need should arise, the Project has tentative plans to construct a 10,000m<sup>3</sup> API 650 buffer tank at the Hagit gas station.</p>	TAMA EIA, Investigator's Report
Number of Drill Wells and Location	Varies	Sub-sea Floor, Marine Environment; Archaeological Contacts; Feasibility	<p>The final number of wells will be selected based on factors such as reservoir performance, reservoir connectivity, development phases, production profile, and future appraisal, in addition to shallow hazard evaluations and archaeological contacts.</p>	<p>The Project's short term plans call for drilling and completing six new wells and completing the two previously drilled wells for a total of eight initial production wells. According to the Project Design Premise, the Leviathan Field Development Plan states that full field development</p>	Drilling EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
				will include the drilling and operation of an estimated 29 high-rate subsea wells.	
Type of Drilling Rig	Dynamically Positioned (DP) Drillship / Semi-submersible or Moored Semi-Submersible	Sub-sea Floor; Marine Environment, Archaeological Contacts	DP Drillship/ Semi-submersible more easily meets the Project specifications and consequently, avoids environmental impacts to the seafloor.	Noble Energy will proceed with a DP Drillship/ Semi-submersible rather than a Moored Semi-submersible.	Drilling EIA

TABLE 6-3 PROJECT TECHNOLOGY ALTERNATIVE ANALYSIS

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Infield Submarine Infrastructure	Flexible Flowlines and Jumpers; Multiple Configuration; MEG Flowline	Cost; Rate of Production; Schedule	<p>Alternatives relate primarily to the flowlines, manifold and jumpers.</p> <p>Flexible flowlines and jumpers were considered, but diameter restrictions associated with water depth and operating pressure limit the number of qualified manufacturers and Subsea configuration could be tie-in manifold/structure per production pipeline or daisy chain, but would affect production.</p> <p>For these aforementioned alternatives that have not been selected, there are no environmental benefits.</p> <p>A dedicated MEG flowline in the infield area would result in increased subsea land take and installation duration.</p>	<p>Flowlines connecting the well-heads to the Infield Gathering Manifold (IGM) will be constructed from carbon steel and of rigid construction.</p> <p>The subsea configuration is focused around a single IGM which will tie all initial (and any future wells) into the production pipelines for transmission to the LPP.</p> <p>MEG will distribute from the infield MEG SDU to the relevant infield infrastructure (IGM and wellheads) by way of dedicated tubes within the infield umbilicals.</p>	Production EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Transmission Infrastructure	Fewer Pipelines; Different Materials; Different Control Systems; Direct or Piloted Hydraulic or Direct Electrohydraulic Design; Closed-loop Systems; Other Injection Methods	Cost; Rate of Production; Schedule	Installation of fewer pipelines would be desirable from an environmental standpoint; however, this would present operational issues with respect to meeting daily demand swings from the Israeli domestic market. Other transmission design alternatives were not chosen as they were not considered feasible or Best Available Technique (BAT) due to the associated negative economic and production impacts.	<p>Transmission pipelines, made of carbon steel, will be laid between the LPP and the infield location for the purpose of routing production fluids from the Infield Gathering Manifold to the LPP, and supplying MEG from the LPP to the infield infrastructure. The installation of three (3) separate production pipelines will allow the REM and DSM to be operated broadly in isolation.</p> <p>Use of dual 6" MEG supply lines is planned, as it offers redundancy to this production-critical item.</p> <p>Use of a multiplexed electrohydraulic design is the industry standard for long distance, multiwell, deepwater applications.</p> <p>An open loop controls system will be utilized due to benefits associated with reduced umbilical cores and increased valve response associated with this design.</p> <p>The selected hydrate management strategy for the Leviathan Field development is continuous thermal hydrate inhibition through MEG injection at the subsea wellheads.</p>	Production EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
Drilling Technology	Combination of Rotary Steerable Systems, Polycrystalline Diamond Compact Bits, Modular Mud Motors, Near-Bit Sensors, Measurement while Drilling, and Logging while Drilling	Marine Environment; Water	Drilling technologies were selected based on Noble Energy's experience as most suitable for the safety and efficiency of the drilling program.	The initial drilling plan includes vertical and sidetrack (directional) wells. The new wells (Leviathan-5 through Leviathan-10) are planned as vertical wells where possible, but directional where required to avoid shallow hazards. A directional pilot hole will be drilled to total depth, the reservoir will be evaluated, and the wellbore will be sidetracked back to vertical, offsetting the original wellbore, down to the top of the reservoir, as required. Key drilling technologies include rotary steerable systems, polycrystalline diamond compact bits, modular mud motors, near-bit sensors, measurement while drilling, and logging while drilling.	Drilling EIA
Drilling Mud Selection	Combination of Water-based Mud (WBM) and Mineral Oil-based Mud (MOBM) or Exclusively WBM	Marine Environment; Water	Noble Energy assessed the use of water-based mud (WBM), mineral oil-based mud (MOBM), and a combination of the two. Using WBM exclusively would be less efficient (approximately 15% to 20% longer time to drill wells) and would require the use of numerous specialty chemicals, which potentially pose greater environmental risk to aquatic life. The MOBM Noble Energy considered, ESCAID 110, is a highly refined product with low toxicity, very low aromatic content, and readily biodegradable and not expected to exhibit chronic toxicity to	Noble Energy plans to use a combination of WBM and MOBM, specifically INNOVERT, and intends to use ESCAID 110 for the base fluid.	Drilling EIA

Aspect	Alternative	Resource	Analysis and Conclusion	Project Description	Source
			marine organisms.		
Cuttings Treatment and Disposal	Onshore, Offshore or Reinjection Cuttings Disposal	Marine Environment; Water	<p>Noble Energy assessed onshore, offshore and reinjection as cutting disposal methods.</p> <p>Onshore disposal would entail disposal at the Ramat Havav facility due to the probable high total dissolved solids content, and the transport of cuttings to an onshore site would add to the environmental footprint of the Project. The cuttings would contribute to filling up the Ramat Havav facility, thereby accelerating the need for expansion of this facility.</p> <p>Onshore disposal requires that materials be transported to shore, with increased risks to the environment and personnel safety through handling, shipping, and transport.</p> <p>Reinjection requires a dedicated well that can store the residual slurry. During drilling, such wells generally are not available because they need a continuous flow of materials to make them feasible. Additionally, the high solids content of injected cuttings material makes it difficult to keep such wells operational.</p>	<p>Noble Energy will discharge cuttings offshore and has implemented a series of mechanisms and procedures to ensure that impacts to the marine environment from on-site discharge are minimized. Mechanisms include proper containment (e.g. containment of all chemical storage areas; use of catchment drains, particularly on the rig floor and in the mud pits), drilling mud treatment and processing (e.g., use of solids control equipment to minimize the amount of drilling fluid retained on the cuttings prior to discharge; implementation of chemical testing and toxicity testing protocols), use of a Thermomechanical Cuttings Cleaner to ensure that MOBMs retained on discharged cuttings is less than 1% by weight; consideration of the receiving environment (e.g., assessment of impacts to water quality and benthic communities), and if needed simulation modeling of drilling deposition.</p>	Drilling EIA
Blowout Preventer (BOP) Technology	No viable alternatives	Health and Safety; Marine Environment	Detailed BOP specifications will depend on the drilling rig. The BOP specifications which were selected are based on best industry practice and reflect Noble Energy's commitment to	Not yet selected	Drilling EIA

<b>Aspect</b>	<b>Alternative</b>	<b>Resource</b>	<b>Analysis and Conclusion</b>	<b>Project Description</b>	<b>Source</b>
			safety.		

This section provides a description of the key impacts for the Project's offshore components. For the purposes of this section, offshore primarily relates to the activities over 12 nautical miles from shore. This is due to the fact that the Israeli TAMA process applies to the permitting and approvals of oil and gas projects in Israel up to the limit of national territorial waters (i.e., 12 nautical miles from shore). Offshore activities were covered in the Drilling EIA and the Production EIA. Where environmental issues apply to both offshore and onshore areas, they are referenced accordingly.

This section comprises a combination of reference to environmental studies and impact assessments prepared by others and also assessment prepared by ERM. The most comprehensive analysis of baseline conditions and potential impacts across the Leviathan Field can be found in the Drilling EIA. The Production EIA covers the baseline conditions and potential impacts for the offshore pipeline corridor from the Leviathan Field to the LPP. The TAMA EIA covers the onshore and nearshore (up to 12 nautical miles from the shoreline) Project components. These three documents are drawn upon extensively for this section.

The offshore components and pipeline routes were selected to avoid obstacles and significant biological communities and/or cultural resources. Protection of these resources is being assured through geohazard surveys and an offshore sampling and ROV survey conducted along the pipeline routes.

Specific to emission and discharge regulations for offshore activities, Noble Energy, through discussions with the Petroleum Commissioner of the Israel Ministry of National Infrastructure, has agreed that the design of new facilities will meet US Gulf of Mexico coastal, the World Bank Group's Environmental, Health and Safety Guidelines for Offshore Oil and Gas Development and Israeli regulations during the commissioning and operation of the Project.

## 7.1 *BIOLOGICAL RESOURCES BASELINE AND IMPACT ASSESSMENT*

### 7.1.1 *Biological Resources Baseline - Leviathan Field*

The Drilling EIA presents the results of desktop and field surveys conducted to collect baseline data on the following biological resources:

- Benthic communities;
- Marine mammals;
- Sea turtles
- Seabirds and migratory birds; and
- Fish.

Key baseline findings for biological resources are summarized below with text from the Drilling EIA in italics.

### Benthic Communities

The Drilling EIA reports the density and percent composition of eight major infauna phyla with the Leviathan Field as determined by Project baseline surveys, as well as previous investigations. It also reports the total density and percent composition of total infauna for the five most abundant taxonomic subgroups. The most relevant finding of the benthic community baseline were as follows:

*Taxonomic diversity, as calculated by the Shannon-Weiner Diversity Index, was low to moderate throughout the region ( $1.6 \pm 0.5$ ). There were no locations with the Leviathan Field where taxonomic diversity was greater than the 99% CL [confidence limit]. This finding indicates that relatively few unique taxa were found throughout the Leviathan Field. Pielou's evenness was high indicating that all taxa within the region have comparable numerical equality (i.e., low densities for most infaunal organisms). Except for high densities of *Prionospio* sp. Around the Leviathan-2 wellsite, there was no apparent visual pattern to organism density, composition, or diversity associated with the distribution of existing wellsites within the Leviathan Field.*

### Marine Mammals

Based on regional sightings and strandings data, the Drilling EIA lists five regular species, five visitor species, and three vagrant species for the Levantine Basin, as well as nine other vagrant species for the Mediterranean Sea, that may be present in the Leviathan Field. Six of these species are listed by the International Union for Conservation of Nature (IUCN) as either critically endangered (Mediterranean monk seal), endangered (fin whale, sei whale, and north Atlantic right whale), or vulnerable (sperm whale and common bottlenose dolphin). Of these, only the common bottlenose dolphin is a regular species for the Levantine Basin. There were five marine mammal sightings during the Project baseline survey, all of which were common bottlenose dolphins.

### Sea Turtles

The Drilling EIA presents the results of tracking studies that indicate three species of sea turtles could occur in the area, the green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), and loggerhead turtle (*Caretta caretta*). The IUCN (2014) lists loggerhead and green turtles as endangered, and the leatherback turtle as vulnerable. No sea turtles were observed during the Project baseline survey.

### Seabirds and Migratory Birds

The Drilling EIA states that the avifauna within the Leviathan Field is likely to consist mainly of pelagic seabirds (i.e., birds that spend most of their life cycle in the marine environment, often far offshore over the open ocean). The document notes that the Mediterranean is home to several hundred bird species, many of which could occur in the area, including:

- At least 38 seabird species native to Israeli waters, including 36 listed by BirdLife International (2014a) and 2 others based on additional information (International Union for Conservation of Nature, 2014; Palomares and Pauly, 2014);
- Two seabird species listed as vulnerable by the IUCN (2014), the Yelkouan Shearwater (*Puffinus yelkouan*) and the Dalmatian Pelican (*Pelecanus crispus*);
- Twelve seabird species listed as endangered or threatened avifauna of the Mediterranean region in Annex II of the Protocol Concerning Specially Protected Areas and Biological Diversity of the Mediterranean (United Nations Environment Programme, 2013); and
- A total of 315 migratory bird species listed by BirdLife International (2014b) as occurring in Israel, 13 of which are listed by the IUCN (2014) as critically endangered, endangered, or vulnerable.

### Fish

The Drilling EIA notes that the Mediterranean Sea supports more than 700 fish species. There are 636 fish species reported in Israeli waters, including 582 native species and 54 introduced species. The most relevant findings of the baseline study for fish is as follows:

*A broad pattern within the Mediterranean is that the number of species decreases from west to east. This gradient of richness is thought to be correlated with gradients of increasing temperature and salinity and decreasing productivity. The waters of the Levantine Basin are considered oligotrophic (nutrient-starved) and do not support particularly rich fisheries.*

*Of the deepwater ichthyofauna, hake (*Merluccius merluccius*) is worthy of special mention. This species, once caught by Israeli trawlers on the slope in hundreds of tons (Shapiro, 2007) has all but disappeared in recent years either due to higher sea water temperatures or overfishing (Edelist et al., 2010). Other deepwater species that show significant declines include the wreckfish (*P. americanus*) and the Haifa grouper (*Hyporthodus haifensis*).*

### **7.1.2 Biological Resources Baseline – Pipeline Corridor**

The Production EIA presents the results of desktop and field surveys conducted to collect baseline data on the following biological resources:

- Coastal habitats;

- Marine mammals;
- Sea turtles;
- Seabirds and migratory birds; and
- Fish.

Key baseline findings for biological resources are summarized below with text from the Production EIA in italics.

### Coastal Habitats

The Production EIA describes benthic communities under the heading “Coastal Habitats” for the Leviathan Field and Pipeline Corridor as determined by Project baseline surveys, as well as previous investigations. The most relevant findings for Pipeline Section 1 (500-1600+ m), Pipeline Section 2 (200-500 m), and Pipeline Section 3 (0-200 m) were as follows:

*The majority of individuals collected (i.e., highest densities) were found between 500- and 1,000-m water depths. The most common taxa were from the phylum Annelida (Class Polychaeta), which accounted for 71.1% of all infauna collected along this segment of the offshore pipeline corridor. Crustacea and Mollusca accounted for 21.1% and 3.5% of all infauna, respectively. The dominant taxon was Spio sp., a polychaete annelid that accounted for 17.54% of all taxa found within this pipeline section. Three other relatively abundant taxa (Notomastus sp., Cirrophorus branchiatus, and Cirolanidae) each accounted for 7.02% of the offshore pipeline taxa.*

*In Pipeline Section 2, polychaete annelids were the dominant taxa, accounting for 61.5% of all infauna. Three polychaetes (Cossura pygodactylata, Dipolydora sp., and Aricidea [Aedicira] sp. 1 EcoA) accounted for 29.6% of the total infauna. Mollusks were the second most dominant group and accounted for 26.2% of all infauna. Bivalvia sp. Was the dominant mollusk, accounting for 9.9% of all infauna.*

*Annelid polychaetes (Prionospio sp., Harpinia sp., Nephtys sp., Salmacinia sp., Caprellidae, and Exogone sp.) were the most abundant taxa in water depths between 50 to 150 m. Other phyla such as Arthropoda (Leptochelia tanykeraia, Leptocheirus sp., Synopiidae sp., and Paranthuridae), Mollusca (Chaetodermatidae sp.), and Echinodermata (Spatangoida) contributed to the list of the most abundant taxa along with Annelida at stations located in shallower water depths between 0 to 60 m.*

### Marine Mammals

The Production EIA reports the same marine mammal baseline data as the Drilling EIA (see Section 7.1.1).

### Sea Turtles

The Production EIA reports the same sea turtle baseline data as the Drilling EIA (see *Section 7.1.1*).

#### Seabirds and Migratory Birds

The Production EIA reports the same seabirds and migratory birds baseline data as the Drilling EIA (see *Section 7.1.1*).

#### Fish

The Production EIA reports the same fish baseline data as the Drilling EIA (see *Section 7.1.1*).

### **7.1.3 *Biological Resources Impact Assessment – Leviathan Field***

The Drilling EIA assesses potential impacts to biological resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.3 of the Drilling EIA. The significance of potential impacts to the biological resources identified during the baseline surveys are summarized below with text from the Drilling EIA in italics.

#### Benthic Communities

Potential seafloor disturbance impacts were assessed as follows:

*DP [dynamically positioned] drilling rigs disturb only a very small area of the seafloor around the wellbore where the bottom template and wellbore are located; the area has been estimated to be 2,500 m<sup>2</sup> or less (BOEM, 2012). Benthic organisms in the immediate vicinity of the wellbore will be crushed or buried... Due to the small area extent, impacts on sediment quality [and] benthic communities are evaluated as negligible.*

Potential impacts from drilling discharges (i.e., treated cuttings) were assessed as follows:

*The benthic communities around all of the proposed wellsites are expected to consist of soft bottom organisms. Soft bottom areas buried by cuttings will eventually be recolonized through larval settlement and migration from adjacent areas. Recovery may require several years (Neff et al., 2000; Continental Shelf Associates, Inc., 2004, 2006) and is dependent on the nature of the indigenous fauna, their tolerance to burial, life history characteristics (e.g., spawning and settlement characteristics), and their relative abundance in the deposition areas.*

Potential impacts from other discharges (ballast water) were assessed as follows:

*The water depth, soft bottom substrate, and distance from shore of the Leviathan Field are factors that make it unlikely for AIS [alien invasive species] from ballast water to become established in the region. Some AIS require hard bottom substrate and will not become established in a soft bottom environment. Due to the distance from shore, any species associated with the drilling rigs are unlikely to reach Israeli coastal waters.*

Potential impacts from marine debris accidentally lost overboard were assessed as follows:

*Debris accidentally lost overboard could have impacts on water and sediment quality and benthic communities (National Research Council, 2008; BOEM, 2012). Heavy items such as welding rods, buckets, pieces of pipe, etc. may have a minor, localized impact on sediment quality beneath the rig location by creating small areas of hard substrate on the soft bottom seafloor (Shinn et al., 1993; Gallaway et al., 2008). Lighter pieces of debris may float on the sea surface and adversely affect water quality and marine biota (National Research Council, 2008; National Ocean Service, 2013). The potential impacts on water quality from marine debris are expected to be similar to those from existing shipping and fishing industries.*

### Marine Mammals

Potential impacts from noise (i.e., noise from drilling rigs, support vessels, and helicopters) were assessed as follows:

*The levels of sound produced during drilling and completion activities are sufficient to be audible to marine mammals, to produce behavioral responses, and possibly to contribute to masking effects; however, the source levels are much lower than those known to cause hearing loss or injury...*

Potential impacts from support vessel traffic between the shore base (Haifa) and the drilling rig(s) were assessed as follows:

*The likelihood of a supply vessel striking a marine mammal or sea turtle is low. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.*

Potential impacts from helicopter traffic between the shore base (Haifa) and the drilling rig(s) were assessed as follows:

*The most likely impacts on marine mammals and sea turtles from helicopter flights would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.*

Potential impacts from marine debris accidentally lost overboard were assessed as follows:

*Materials accidentally lost overboard during offshore oil and gas operations could entangle marine fauna or cause injury through the ingestion of the debris (Laist, 1996). Marine debris is among the threats affecting the population status of both humpback and sperm whales (NMFS, 1991, 2010)... Ingestion of plastic and Styrofoam can result in drowning, lacerations, digestive disorders or blockage, and reduced mobility. The types of impacts on marine mammals and sea turtles from drilling-related marine trash and debris would be similar to those from existing shipping and fishing industries.*

## Sea Turtles

Potential impacts from light hazards (i.e., artificial light on drilling rigs and support vessels) were assessed as follows:

*Due to the distance of the Leviathan Field from nesting beaches (greater than 120 km from the nearest shoreline), it is unlikely that large numbers of hatchling turtles would be affected. In the Gulf of Mexico, where thousands of offshore structures are present, drilling rig and platform lighting has been evaluated as unlikely to appreciably reduce the reproduction, numbers, or distribution of sea turtles (NMFS, 2007). Any exposure of sea turtles to light emitted from supply vessels would be brief and typical of normal maritime activities in the Mediterranean.*

Potential impacts from noise (i.e., noise from drilling rigs, support vessels, and helicopters) were assessed as follows:

*[S]ea turtles near the drillship and supply vessels may be exposed to sound levels sufficient to elicit behavioral responses and potentially to create auditory interference by masking. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departures from the area.*

Potential impacts from support vessel traffic between the shore base (Haifa) and the drilling rig(s) were assessed as follows:

*The likelihood of a supply vessel striking a marine mammal or sea turtle is low. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.*

Potential impacts from helicopter traffic between the shore base (Haifa) and the drilling rig(s) were assessed as follows:

*The most likely impacts on marine mammals and sea turtles from helicopter flights would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.*

Potential impacts from marine debris accidentally lost overboard were assessed as follows:

*Ingestion of or entanglement with accidentally discarded trash and debris can kill or injure sea turtles (Laist, 1996, Lutcavage et al., 1997). Marine debris is among the threats affecting the endangered population status of several sea turtle species (National Research Council, 1990). Leatherback turtles are especially attracted to floating debris, particularly plastic bags because they resemble their preferred food: jellyfish. Ingestion of plastic and Styrofoam can result in drowning, lacerations, digestive disorders or blockage, and reduced mobility. The types of impacts on marine mammals and sea turtles from drilling-related marine trash and debris would be similar to those from existing shipping and fishing industries.*

### Seabirds and Migratory Birds

Potential impacts from light hazards (i.e., artificial light on drilling rigs and support vessels) were assessed as follows:

*Because of the distance between the Leviathan Field and the nearest shoreline (approximately 120 km), it is expected that the drilling rigs will not be visible to migrating birds that routinely migrate along or near the coast. Consequently, drilling rig lighting is unlikely to have significant impact on seabird or migratory bird populations.*

Potential impacts from helicopter traffic between the shore base (Haifa) and the drilling rig(s) were assessed as follows:

*Seabirds and migratory birds can be disturbed by helicopters, and there is a small possibility of a helicopter striking a bird. The most likely impacts would be short-term behavioral changes such as course changes or disruption of activities. Potential impacts on dense bird populations would be reduced by maintaining recommended minimum altitudes when flying over coastal habitats such as parks, wildlife refuges, and wilderness areas.*

Potential impacts from marine debris (i.e., marine debris accidentally lost overboard) were assessed as follows:

*Marine trash and debris could injure or kill birds that ingest or become entangled in it. The ingestion of plastic by marine and coastal birds can cause obstruction of the gastrointestinal tract, which can result in mortality (Laist, 1996). The types of impacts on marine birds from drilling-related marine trash and debris would be similar to those from the existing shipping and fishing industries.*

Potential impacts from air emissions (flaring during production tests) were assessed as follows:

*There is the potential for seabirds to be attracted to the flare (i.e., as a light source) during a production test... Due to the brief duration of flaring (49.5 hours per well), a single production test is not likely to result in collisions or other significant adverse impacts on seabird or migratory bird populations.*

## Fish

Potential impacts from drilling discharges (i.e., treated cuttings) were assessed as follows:

*[C]utting discharges from the drilling rigs will produce turbidity in the water column but are expected to have little or no impact on plankton or fish due to the low toxicity of the proposed MOBAM [mineral oil-based mud] system, the low percentage of MOBAM retained on cuttings (1% or less), and the expected rapid sinking of the cuttings through the water column.*

Potential impacts from other discharges (sanitary and gray water, food waste, cooling water, desalination brine, deck drainage, and ballast water) were assessed as follows:

*The water depth, soft bottom substrate, and distance from shore of the Leviathan Field are factors that make it unlikely for AIS [alien invasive species] from ballast water to become established in the region. Some AIS require hard bottom substrate and will not become established in a soft bottom environment. Due to the distance from shore, any species associated with the drilling rigs are unlikely to reach Israeli coastal waters.*

Potential impacts from light hazards (i.e., artificial light on drilling rigs and support vessels) were assessed as follows:

*Because the drilling rigs are temporary structures and will be moving between wellsites, any impacts on fish populations are likely to be insignificant.*

Potential impacts from noise from drilling rigs, support vessels, and helicopters were assessed as follows:

*[F]ishes that remain for extended periods near the drilling rigs may be exposed to sound levels sufficient to elicit behavioral responses, to create auditory interference by masking, and to cause recoverable auditory impacts (TTS). Due to the limited spatial extent and recoverable nature of impacts, these are unlikely to be significant on a population level.*

### **7.1.4 Biological Resources Impact Assessment – Pipeline Corridor**

The Production EIA assesses potential impacts to biological resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.2 of the Production EIA.

The significance of potential impacts to the biological resources identified during the baseline surveys are summarized below with text from the Production EIA in italics.

## Benthic Communities

Potential submarine production infrastructure and transmission/supply pipeline impacts were assessed as follows:

*Temporary disturbance will occur to benthic fauna during construction, installation and commissioning activities along the proposed pipeline route and in the vicinity of the Leviathan Field where the subsea facilities will be located. Sessile and sedentary fauna will be most susceptible due to their limited ability to move away from affected areas, particularly immotile species. Motile species such as crustacea will likely move away from the area of activity, however immotile species will be directly impacted due to placement of the infrastructure. The majority of the species inhabiting the benthic environment along the proposed pipeline route and in the Leviathan Field are mobile and are likely to demonstrate quick recovery as a result of disturbance. Temporary direct effects will be limited to the direct area of the footprint of the activity which is of a negligible spatial scale in comparison to the Levantine Basin and no sensitive or protected benthic species have been identified in the vicinity of the Leviathan Field Development Project.*

*A permanent net reduction in the total area of original benthic habitat will occur as a result of the placement of subsea infrastructure on the seabed and the removal of sediment should dredging activities be conducted. Should dredging activities be required, the removed sediment will also be directly displaced to another area of the seabed.*

*DP construction, pipe lay and support vessels will be used for infrastructure installation activities. This removes the requirement for vessel anchoring and the associated impact to the seabed and benthic communities.*

Potential noise impacts were assessed as follows:

*It is generally accepted that exposure to anthropogenic sound can induce a range of adverse effects on marine life (e.g. OSPAR, 2009). These can vary from insignificant impacts such as temporary avoidance or changes in diving behavior to significant behavioral changes and also include non-injurious effects such as masking of biologically relevant sound signals (Richardson et al., 1995). Activities that generate very high sound levels can cause auditory and other physical injuries and in some circumstances, lead to mortality (Southall et al. 2007; Richardson et al. 1995). Auditory effects include temporary or permanent reduction in hearing sensitivity. Non-auditory impacts may include damage to body tissues, especially air-filled cavities including swim bladder and muscle tissues (review by Richardson, et al. 1995).*

Potential pre-commissioning and commissioning activities impacts (chemical discharge, specifically biocides) were assessed as follows:

*Ecotoxicity tests have demonstrated that phytoplankton are the most susceptible organisms to biocides. However, such tests also demonstrated that healthy*

*phytoplankton populations were recorded within one week following hydrotest discharge activities (Boulton, B. and Roddie, B.D., 2008), showing the capacity of ecosystems to rapidly recover from temporary impacts associated with subsea chemical discharges. The majority of hydrotest discharges will occur in the deepwater infield area which precludes the presence of phytoplankton, as such the impact of these discharges is expected to be less than an equivalent shallow water discharge due to decreased susceptibility of species at this depth.*

Potential ballast water discharge impacts were assessed as follows:

*Non-native invasive species are typically introduced to a new area via uptake and discharge of ballasting water from vessels which transit from one geographically distinct location to another. These species may also be introduced via bio-fouling on vessel surfaces and within ship systems. In the case of Leviathan, various support vessels may be used to facilitate transfer of infrastructure from international waters into the eastern Mediterranean and therefore present a risk of introducing non-native invasive species.*

Potential subsea control valve operations impacts were assessed as follows:

*During operations, there will be occasions that necessitate actuation of subsea valves in order to maintain safe operations and test their functionality. During actuation, small quantity of hydraulic fluid will be released into the marine environment.*

*All hydraulic fluid discharge will be minimized as far as practicable, and where possible the environmental impact will be minimized by selecting low toxicity alternatives that are Gold rated under the OCNS. The majority of discharges associated with the aforementioned activities will occur in the deepwater environment where the risk of significant environmental impact is considered to be decreased.*

Potential bio-fouling impacts were assessed as follows:

*It is not considered likely that biofouling of the pipeline will result in any significant impacts, either to the surrounding environment or to the integrity of the pipelines.*

The Production EIA reports the same impacts to benthic communities under hazardous materials (waste from vessels, waste during the installation and commissioning phase, and waste during the production phase) as the Drilling EIA reports for marine debris (see Section 7.1.3).

### Marine Mammals and Sea Turtles

Potential construction, installation, and support vessel/helicopter presence impacts (vessels, helicopters, and artificial light) were assessed as follows:

*Due to the speed at which the support vessels will be traveling and the relatively low levels of both vessels and marine mammals present in the application, the impact significance is considered to be low... The risk of striking a sea turtle is low due to the slow vessel speeds during pipelay and subsea facility installation.*

*Helicopter traffic also has the potential to disturb marine mammals (Richardson et al., 1995). Reported behavioral responses of marine mammals are highly variable, ranging from no observable reaction to diving or rapid changes in swimming speed or direction (Efroymson et al., 2000; Smultea et al., 2008). Similarly, sea turtles may experience behavioral disturbance from helicopter noise. Sea turtles will hear the sound prior to any exposure to these source levels; they may respond by changing course or diving to avoid further exposure. Smultea et al., (2008) concluded that behavioral responses to brief overflights by aircrafts are short-term and probably of no long-term biological significance.*

*Artificial lighting on the construction, installation and commissioning vessels has the potential to alter the behavior or disorientate marine organisms that use light for natural responses. Artificial light has several effects on female turtles searching for locations for nests and on hatchlings finding the sea. The female turtles avoid illuminated beaches for their nests with the effect that the nests are concentrated in the less illuminated and shaded areas (Salmon M, 2003; Deda, 2007). Given the duration of construction, installation and commissioning activities and the distance between these activities and coastal nesting sites in the eastern Mediterranean, any light sources are unlikely to have a significant impact upon those species most vulnerable to changes in natural light patterns.*

Potential construction, installation, and support vessel discharges (sewage, domestic waste, and drainage) were assessed as follows:

*Routine discharges from installation and support vessels are unlikely to affect most marine mammals, sea turtles and birds since the concentrations discharged are considered to be non-lethal and if the environment is non-favorable, such organisms are likely to adopt avoidance behavior.*

The Production EIA reports the same impacts to marine mammals and sea turtles under hazardous materials (waste from vessels, waste during the installation and commissioning phase, and waste during the production phase) as the Drilling EIA reports for marine debris (see Section 7.1.3).

### Seabirds and Migratory Birds

Potential construction, installation, and support vessel/helicopter presence impacts (vessels, helicopters, and artificial light) were assessed as follows:

*Marine vessels on transit between port facilities and offshore installation areas will follow vessel speed restrictions as appropriate and it is expected that they will seldom disturb populations of coastal and marine birds. Recreational vessel traffic is a much greater source of impact to birds in coastal habitats and they often flush*

*coastal and marine birds from feeding, resting and nesting areas. As such the incremental impact from vessels associated with the Leviathan development are expected to be negligible.*

*Birds in flight over water are expected to avoid helicopters; giving rise only to temporary disruption of feeding or flight paths when encountering low flying helicopters.*

*Birds are also attracted to sources of light, particularly those on migratory paths during the hours of darkness. Birds tend to circle around light sources reducing their energy reserves and making them unable to reach the next shore or decreasing their ability to survive the winter or reproduce effectively (Deda et al., 2007). However, due to the limited duration of construction, installation and commissioning activities and the low abundance of seabirds present in the Application Area, the impacts of artificial light on seabirds are considered to be low.*

Potential construction, installation, and support vessel discharges (sewage, domestic waste, and drainage) were assessed as follows:

*Routine discharges from installation and support vessels are unlikely to affect most marine mammals, sea turtles and birds since the concentrations discharged are considered to be non-lethal and if the environment is non-favorable, such organisms are likely to adopt avoidance behavior.*

The Production EIA reports the same impacts to seabirds and migratory birds under hazardous materials (waste from vessels, waste during the installation and commissioning phase, and waste during the production phase) as the Drilling EIA reports for marine debris (see Section 7.1.3).

### Fish

Potential pre-commissioning and commissioning activities (discharge of residual entrained solids) impacts were assessed as follows:

*Where avoidance of fish is not possible, the sensitivity to turbidity varies greatly between species and their life stage (Newcombe, C.P. & Jensen, J.O.T, 1996). Fish gills, the major organ for respiration and osmoregulation, are directly exposed to and can be blocked by suspended solids in the water, which can lead to oxygen deprivation. Juvenile fish are most vulnerable to this, as they have smaller, more easily clogged gills, and a higher oxygen demand (FeBEC, 2013).*

Potential construction, installation, and support vessel/helicopter presence impacts (vessels and artificial light) were assessed as follows:

*As is typically observed across the offshore oil and gas industry, certain fish species will be attracted towards vessels due to artificial light sources projected onto the sea surface. Other fish species will exhibit avoidance behavior from artificial light*

*sources. The effects of this change in behavior of affected fish species is typically localized and minor.*

Potential construction, installation, and support vessel discharges (sewage, domestic waste, and drainage) were assessed as follows:

*In the upper portion of the water column, the turbidity plume caused by routine discharges will reduce light penetration for a short period of time in close proximity to the discharge, with limited impacts on phytoplankton. Whilst increased turbidity is not expected to physically affect fish (interference with gill function), turbidity increases may alter the foraging success of some fish when they are present within a plume (De Roberts et al., 2003). Given that the total area affected by these discharges is very small, foraging fish are expected to either avoid or move out of the discharge plume and overall, turbidity effects will be localized.*

## 7.2 HABITAT ASSESSMENT

### 7.2.1 Introduction and Scope

ERM has prepared on behalf of Noble Energy an assessment of habitats in the Project and its area of influence following the criteria of IFC PS 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources. The objective of this habitat assessment is to evaluate the extent to which the project is located in areas of modified<sup>ii</sup>, natural<sup>iii</sup> and critical<sup>iv</sup> habitats as defined by PS 6 and to provide recommendations for the application of the mitigation hierarchy to achieve the applicable requirements of PS 6 and then provide recommendations for a Biodiversity Action Plan in the event of the identification of critical habitats.

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<sup>ii</sup> Modified habitat: Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of Affected Communities.

<sup>iii</sup> Natural habitat: Areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.

<sup>iv</sup> Critical habitat: Areas with high biodiversity value, including, but not limited to, (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

This habitat assessment evaluates the available information on the biodiversity values of the Project area in order to determine the extent of modified and natural habitats and then evaluates these values against the criteria for critical habits. This available information includes that generated by Noble Energy, Israeli Government departments, and information available in the public domain. The identification of critical habitats considers the contribution and the concerns of stakeholders and groups on the basis of the information gathered during the consultation process to develop TAMA 37/H and environmental review documents.

### 7.2.2 *Spatial Boundaries*

This habitat assessment evaluates the area of influence of the Project, which includes the following:

- Elements directly managed, operated or owned by the project owner or contractors, which are a component of the Project;
- Elements resulting in indirect impacts on biodiversity or ecosystem services upon which livelihoods are dependent;
- Associated facilities that are not funded as part of the Project but would not exist without the Project; and
- Includes the Project construction, commissioning, and operational phases.

The spatial boundaries have been defined using:

- The approved activities and locations included in TAMA 37/H;
- The EIA documents produced; and
- Feedback from stakeholders during the TAMA engagement process.

### 7.2.3 *Modified and Natural Habitats*

The offshore environment lies in the Levant Basin of the Eastern Mediterranean Sea. While there has been significant human activity in region for thousands of years, including fishing, navigation, and more recently, hydrocarbons exploration and production activities resulting in the construction of platforms, wells, and pipelines, the offshore environment is still considered natural habitat.

The areas of modified habitat within the offshore environment include primarily the footprint of existing hydrocarbons facilities. While the long history of human use of marine resources in the Levant Basin has led to changes in the quality of the environment, marine ecosystems retain their primary ecological functions and species composition.

The marine ecosystems and habitats of the Project support biodiversity of importance to the people of Israel and across the Eastern Mediterranean region, including fisheries, seascapes of tourism value, and wildlife listed on the IUCN Red List of Threatened Species. IUCN-listed Threatened species include the

Endangered Mediterranean subpopulation of the short-beaked common dolphin (*Delphinus delphis*), the Endangered green turtle (*Chelonia mydas*), the Vulnerable Dalmatian pelican (*Pelecanus crispus*) and the Endangered Atlantic bluefin tuna (*Thunnus thynnus*).

#### 7.2.4 **Critical Habitat Assessment**

Paragraph 18 of PS 6 states that “critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.”

ERM assessed the applicability of each of these five criteria for the biodiversity values identified as present or likely to be present in the Project area.

Furthermore, Paragraph GN56 of IFC’s Guidance Note 6 states that “the determination of critical habitat however is not necessarily limited to these criteria. Other recognized high biodiversity values might also support a critical habitat designation, and the appropriateness of this decision would be evaluated on a case-by-case basis.” Such biodiversity values should take into consideration the views of local stakeholders, including national authorities with jurisdiction over biodiversity, conservation, land use planning, or protected areas, NGOs, and affected communities.

The critical habitat is not an area defined by the Project footprint or area of influence, but rather an area defined naturally on the scale of a landscape or ecosystem and the ecology of the species or biodiversity value in question. Thus, the Project may be located *within* one or more critical habitats. However, the Project footprint is highly unlikely to be identified *as* a critical habitat itself.

Specific to the offshore areas, the IUCN Red List includes the Mediterranean subpopulation of the short-beaked common dolphin (*Delphinus delphis*) as Endangered (Bearzi, 2003). According to the IUCN (2012), “it has apparently vanished from many areas of the Mediterranean including the Adriatic Sea, Balearic Sea, Provençal basin and Ligurian Sea”, but there are localized areas where it is considered “relatively abundant”, including the waters off Israel. Based on the 2012 IUCN report on the Mediterranean marine mammals and sea turtles, the waters of Israel may be considered to maintain a regionally important

concentration of the Endangered Mediterranean sub-population of the short-beaked common dolphin and thus qualify as Tier 2<sup>v</sup> critical habitat for this endangered subpopulation.

Sea turtles are discussed further in *Section 8.2* for the Onshore section, recognizing the importance of beaches for their life stages.

### **7.2.5 *Conclusions Regarding Offshore Critical Habitats***

The offshore components of the Project are located in critical habitat for the short-beaked common dolphin due to the national and regional importance of the waters off the coast of Israel for the Endangered Mediterranean subpopulation of this species.

### **7.2.6 *Recommendations for a Biodiversity Action Plan***

The above findings suggest that the Project should develop a Biodiversity Action Plan (BAP) to demonstrate its approach to ensuring alignment with PS 6 requirements for critical habitats.

IFC PS 6 establishes a series of requirements for all projects located in any type of natural habitat and for activities in critical habitats. These requirements are based on the application of the mitigation hierarchy where avoidance of impacts to biodiversity is the preferred approach and compensation or offsetting should be considered a last resort to address residual impacts after other mitigations have been applied. Stakeholder and expert consultation is another key aspect of the PS 6 approach and the BAP should be developed through this approach. Further details on the recommended BAP for the Leviathan Project is detailed in *Section 12.0*.

## **7.3 *PHYSICAL RESOURCES BASELINE AND IMPACT ASSESSMENT***

### **7.3.1 *Physical Resources Baseline - Leviathan Field***

The Drilling EIA presents the results of desktop and field investigations conducted to collect baseline data on the following physical resource receptors:

- Water quality;
- 

<sup>v</sup> Tier 2 critical habitats are of lower priority than Tier 1 critical habitats.

- Sediment quality;
- Air quality; and
- Noise.

Key baseline findings for physical resource are summarized below with text from the Drilling EIA in italics.

### Water Quality

Based on baseline studies conducted by CSA in the Levantine Basin, as well as a review of peer review literature, seawater in the Leviathan Field has the following characteristics:

- Very low nutrient concentrations;
- Metal concentrations that are below detection limits and/or below the relevant criteria and standards;
- Concentrations of total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs) that are below detection limits; and
- Radionuclide concentrations that are below the U.S. Environmental Protection Agency (USEPA) established maximum contaminant level.

### Sediment Quality

Key findings of sediment sampling and analysis for total organic carbon (TOC), metals, hydrocarbons, radionuclides, and polychlorinated biphenyls (PCBs) conducted for the Drilling EIA are as follows:

*Sediment TOC concentrations were low and uniform (0.43%±0.05%) throughout the Leviathan Field. TOC concentrations were within the 99% CL of the Leviathan Field mean and also within the 99% CL of the Levantine Basin Baseline for TOC concentration.*

*Concentrations of all metals were below effects range low (ERL) values with the exception of arsenic, copper, and nickel, and only nickel exceeded the effects range median. However, these three metals are within the upper 99% CL of the Levantine Basin Baseline and are naturally found in high concentrations throughout the Levantine Basin.*

*Sediment TPH [total petroleum hydrocarbons] concentrations within the Leviathan Field ranged from 4.0 to 27.1 ppm, and had a mean (±SD) of 13.2±4.8 ppm. TPH concentrations throughout the entire survey area were within the 99% CL of the Levantine Basin of 21.85 ppm.*

*The USEPA (1998) established a protective health based level for radium and thorium of 5 pCi/g at the sediment surface as a threshold for the clean up of the top 15 cm of soil from contaminated U.S. Superfund sites. Mean radium and thorium concentrations within the Leviathan Field survey area were well below this threshold.*

*PCBs were not detected from the eight sediment samples from the Leviathan Field sampling grid.*

### Air Quality

The air quality of the Leviathan Field was characterized in the Drilling EIA as follows:

*No site-specific air quality data are available for the Application Area (as required in Guidelines section 1.9.3). However, in the offshore environment of the Application Area, more than 100 km from the coastline and urban areas, air quality is expected to be good. The major pollutant sources of anthropogenic origin in the Mediterranean region are located in central and southern Europe, with minor contribution from North Africa and the Middle East (Asaf et al., 2008).*

### Noise

The underwater acoustic environment was characterized in the Drilling EIA as follows:

*There are no site-specific measurements of underwater noise in the Application Area. The most likely dominant source of ambient noise is shipping. Shipping noise is ubiquitous in the world's oceans and is the dominant source of underwater noise at frequencies below 300 Hz in many areas (Wenz, 1962; Ross, 1976; Hildebrand, 2009; McKenna et al., 2012). The Eastern Mediterranean region is one of the busiest sea routes in the world, with a number of high-volume port facilities and crowded shipping lanes. The opening of the Suez Canal significantly increased the volume of shipping traffic, particularly in the Eastern Mediterranean region.*

## **7.3.2 Physical Resources Baseline – Pipeline Corridor**

The Production EIA presents the results of desktop and field investigations conducted to collect baseline data on the following physical resources:

- Water quality;
- Sediment quality;
- Air quality; and
- Noise.

Key baseline findings for physical resource are summarized below with text from the Production EIA in italics.

### Water Quality

The Production EIA describes water quality for the Leviathan Field and Pipeline Corridor as determined by Project baseline surveys, as well as previous investigations. There are separate descriptions for Pipeline Corridor Section 1

(500-1600+ m) and Pipeline Corridor Sections 2 and 3 (0-500 m). In both cases, TOC concentrations were lower than the Levantine Basin baseline 99% CL and the mean permissible level according to the proposed MEWQS in Israel. All analyzed nutrients along the planned pipeline corridor were found in concentrations similar to those measured at the Leviathan Field. Mean total suspended solids (TSS) concentrations were below the Levantine Basin baseline 99% CL and in agreement with results from recent studies conducted in the northeastern Mediterranean. Onboard pH measurements of seawater samples were within the mean range provided by the proposed MEWQS and do not exceed the maximum permissible levels. All ion concentrations were generally similar to average seawater and typical of the eastern Mediterranean Sea. Dissolved metals concentrations were below MEWQS reference values. TPH was not detected in any seawater samples, and radionuclides were below the Levantine Basin baseline 99% CL.

### Sediment Quality

The Production EIA describes water quality for the Leviathan Field and Pipeline Corridor as determined by Project baseline surveys, as well as previous investigations. There are separate descriptions for Pipeline Corridor Section 1 (500-1600+ m) and Pipeline Corridor Sections 2 and 3 (0-500 m). In both cases, all TOC concentrations were below the Levantine Basin baseline 99% CL. Most values of metals were lower than the ERL and ERM values. Exceptions included arsenic, chromium, and copper, which were higher than the ERL values but not the ERM values, and nickel, which was higher than both. Concentrations of arsenic, chromium, copper, and nickel are not elevated relative to Levantine Basin baseline means, however, and should be considered ambient. TPH concentrations in Pipeline Section 1 were below the Levantine Basin baseline 99% CL. Average TPH concentrations in Pipeline Section 2 were higher and more variable than within Pipeline Section 3 and greater than the Levantine Basin baseline 99% CL. PAHs were analyzed for samples with TPH concentrations higher than the Levantine Basin baseline 99% CL. Total PAHs for both Pipeline Sections 2 and 3 were higher than the Levantine Basin baseline mean, but lower than the 99% CL. Radionuclides were below the Levantine Basin baseline 99% CL. PCB concentrations were low or below the detection limit for all samples, although other investigations indicate elevated PCB levels in the nearshore environment.

### Air Quality

The Production EIA reports the same air quality baseline data as the Drilling EIA (see *Section 7.2.1*).

### Noise

The Production EIA reports the same noise baseline data as the Drilling EIA (see *Section 7.2.1*).

### 7.3.3

#### *Physical Resources Impact Assessment – Leviathan Field*

The Drilling EIA assesses potential impacts to physical resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.3 of the Drilling EIA.

The significance of potential impacts to the physical resources (water, sediment, and air) identified during the baseline surveys are summarized below with text from the Drilling EIA in italics.

#### Water Quality

Potential impacts from drilling discharges were assessed as follows:

*[C]uttings discharges from the drilling rigs will produce intermittent turbidity in the water column but are expected to have little or no impact on plankton or fish due to the low toxicity of the proposed MOB system, the low percentage of MOB retained on cuttings (1% or less), and the expected rapid sinking of the cuttings through the water column.*

Potential impacts from other discharges (sanitary and gray water, food waste, cooling water, desalination brine, and deck drainage) were assessed as follows:

*Sanitary and gray water as well as organic food waste from the drilling rigs and support vessels may affect concentrations of suspended solids, nutrients, and chlorine as well as generating biochemical oxygen demand. Sanitary waste will pass through an IMO-approved sewage treatment plant prior to discharge. Gray water will be discharged without treatment while food waste will be macerated to pass through a 25-mm mesh in accordance with MARPOL requirements. These discharges are expected to be diluted rapidly in the open sea (BOEM, 2012). Impacts to water quality would likely be undetectable beyond 100 m from the source, and impacts on fishes or other water column organisms are unlikely due to the intermittent and transient nature of the water quality impacts.*

*Cooling water and desalination brine are discharges that do not contain any added chemicals or contaminants. The discharges may have localized impacts on water temperature and salinity near the discharge point. It is expected that these discharges would be rapidly diluted and impacts to water quality would likely be undetectable beyond 100 m from the source.*

Potential impacts from marine debris accidentally lost overboard were assessed as follows:

*Debris accidentally lost overboard could have impacts on water and sediment quality and benthic communities (National Research Council, 2008; BOEM, 2012)... Lighter pieces of debris may float on the sea surface and adversely affect*

*water quality and marine biota (National Research Council, 2008; National Ocean Service, 2013). The potential impacts on water quality from marine debris are expected to be similar to those from existing shipping and fishing industries.*

Potential impacts from air emissions (flaring during production tests) were assessed as follows:

*There is the potential for water quality impacts during flaring due to “fallout” of oil droplets from the flare. Noble Energy will use a high-efficiency burner to minimize the potential for fallout.*

*Any brine, produced water, or condensate water flowed back will be collected, filtered, and tested and discharged overboard as per Noble Energy standards. Discharges from production testing will be rapidly dispersed in the ocean and no significant impacts on water quality are expected.*

### Sediment Quality

Potential impacts from seafloor disturbance were assessed as follows:

*DP drilling rigs disturb only a very small area of the seafloor around the wellbore where the bottom template and wellbore are located; the area has been estimated to be 2,500 m<sup>2</sup> or less (BOEM, 2012)... Due to the small areal extent, impacts on sediment quality [and] benthic communities are evaluated as negligible.*

Potential impacts from drilling discharges were assessed as follows:

*During the two initial well intervals, releases of WBM [water-based mud] and cuttings at the seafloor will create a mound with a diameter of several meters to tens of meters around the wellbore. Also, during setting of the casing, cement slurry will be pumped into the well to bond the casing to the walls of the hole. Excess cement slurry will emerge from the hole and accumulate on the seafloor, typically within 10 to 15 m around the wellbore (Shinn et al., 1993). Cement slurry components include cement mix and some of the same chemicals used in WBM (Boehm et al., 2001). These releases will alter the sediment quality near the well location. Sediments will eventually return to baseline conditions due to normal sediment movement, remixing of sediments by benthic organisms, and sediment deposition from the water column.*

Potential impacts from marine debris accidentally lost overboard were assessed as follows:

*Debris accidentally lost overboard could have impacts on water and sediment quality and benthic communities (National Research Council, 2008; BOEM, 2012). Heavy items such as welding rods, buckets, pieces of pipe, etc. may have a minor, localized impact on sediment quality beneath the rig location by creating small areas of hard substrate on the soft bottom seafloor (Shinn et al., 1993; Gallaway et*

*al., 2008)... The potential impacts on water quality from marine debris are expected to be similar to those from existing shipping and fishing industries.*

### Air Quality

Potential impacts from air emissions (engines) were assessed as follows:

*Air pollutant emissions from engines on the drilling rigs will produce localized, transient impacts on air quality near the drilling site... Although emissions will be occurring over a long period, the annual emission rates represent a small percentage of the emissions from shipping in the Mediterranean. Due to the distance of the drillsites from shore (greater than 120 km), no impacts on coastal air quality are expected.*

Potential impacts from air emissions (flaring during production tests) were assessed as follows:

*The magnitude of emissions from production testing (sum of all eight initial wells) is negligible in comparison with annual regional emissions from shipping in the Mediterranean... The air pollutant emissions from flaring are expected to disperse rapidly in the atmosphere and may produce localized, transient impacts on air quality near the drilling rig... Due to the distance from shore (greater than 120 km), no impacts on coastal air quality are expected.*

## **7.3.4 Physical Resources Impact Assessment – Pipeline Corridor**

The Production EIA assesses potential impacts to physical resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.2 of the Production EIA.

The significance of potential impacts to the physical resources (water, sediment, and air) identified during the baseline surveys are summarized below with text from the Production EIA in italics.

### Water Quality

The Production EIA lists the following potential impacts from pre-commissioning and commissioning activities (initial flood and hydrotest water discharge):

- Temporary increased water toxicity due to chemical discharge (specifically biocides);
- Temporary decline in water quality due to the presence of oxygen depleted water; and
- Temporary increase in turbidity due to discharge of residual entrained solids.

Potential impacts from construction, installation, and support vessel discharges (sewage, domestic waste, and drainage) were assessed as follows:

*In the upper portion of the water column, the turbidity plume caused by routine discharges will reduce light penetration for a short period of time in close proximity to the discharge... Given that the total area affected by these discharges is very small... turbidity effects will be localized.*

Potential impacts from subsea control valve operation were assessed as follows:

*During operations, there will be occasions that necessitate actuation of subsea valves in order to maintain safe operations and test their functionality. During actuation, small quantity of hydraulic fluid will be released into the marine environment.*

*All hydraulic fluid discharge will be minimized as far as practicable, and where possible the environmental impact will be minimized by selecting low toxicity alternatives that are Gold rated under the OCNS. The majority of discharges associated with the aforementioned activities will occur in the deepwater environment where the risk of significant environmental impact is considered to be decreased.*

The Production EIA reports the same water quality impacts under hazardous materials (waste from vessels, waste during the installation and commissioning phase, and waste during the production phase) as the Drilling EIA reports for marine debris (see Section 7.3.3).

### Sediment Quality

Potential impacts from submarine production infrastructure and transmission/supply pipeline were assessed as follows:

*Hydraulic fluid is denser than seawater, therefore will initially sink to the seabed which may have impacts on benthic communities and sediment quality. DREAM modeling has indicated that due to the water depth at the infield location the seabed currents are low and as a result any discharge plumes will not traverse the seabed at a significant rate...*

The Production EIA reports the same impacts to sediment quality under hazardous materials (waste from vessels, waste during the installation and commissioning phase, and waste during the production phase) as the Drilling EIA reports for marine debris (see Section 7.3.3).

### Air Quality

Potential impacts from air emissions (under cumulative impacts) were assessed as follows:

*Emissions from vessel activities, also have the potential to contribute to a variety of cumulative environmental impacts, including local air pollution, acidification (acid rain) and on a wider scale will contribute to global warming (greenhouse gases). Vessel activities within the scope of this EIA include installation, supply and support vessels during the construction phase, and those vessels required to perform intermittent maintenance operations.*

*Localised impacts may include elevated levels of atmospheric emissions in the immediate area. However, it is considered that these elevated concentrations will be short lived and it is unlikely to be detectable within a short distance of the vessels due to the dispersive nature of the offshore environment and the fact that vessels are mobile thus preventing emissions being concentrated at a single location.*

## 7.4 CULTURAL HERITAGE RESOURCES

### 7.4.1 ***Cultural Heritage Baseline – Leviathan Field***

Noble Energy contracted Geoscience Earth & Marine Services, Inc. (GEMS) to conduct a remote sensing survey of the Leviathan Field. The survey identified 397 unidentified side-scan sonar contacts. Of these, 38 were interpreted to represent possible cultural resources. GEMS recommended a 305 m archaeological avoidance or investigation via a Remotely Operated Vehicle (ROV) for these 38 sites. GEMS recommended implementation of a 31 m shallow hazard avoidance for the remaining 359 contacts.

### 7.4.2 ***Cultural Heritage Baseline – Pipeline Corridor***

GEMS conducted a remote sensing survey of the Pipeline Corridor. The survey delineated 59 unidentified side-scan sonar contacts. Of these, five were interpreted to have a high potential for historical or archaeological significance. GEMS recommended a 305 m archaeological avoidance or ROV investigation for these five sites, as well as two others. GEMS recommended the implementation of a 31 m shallow hazard avoidance for the remaining 52 sites.

### 7.4.3 ***Cultural Heritage Impact Assessment – Leviathan Field***

The Drilling EIA assesses potential impacts to cultural heritage sites due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.3 of the Drilling EIA.

The significance of potential impacts to the cultural heritage sites during the baseline surveys are summarized below with text from the Drilling EIA in italics

The Drilling EIA identified the following potential sources of impacts to cultural heritage resources:

- Seafloor disturbance; and
- Drilling discharges.

Potential impacts from seafloor disturbance were assessed as follows:

*All potential impacts of seafloor-disturbing activities are expected to be avoided. Because a DP drillship or DP semisubmersible will be used, there will be no anchoring. All of the new drillsites (Leviathan-5 through Leviathan-10) are beyond the recommended avoidance zones, with a minimum distance of at least 3.0 km from the nearest sonar contact. The other two drillsites (Leviathan-3 and Leviathan-4) are existing wells that will be reentered with little or no additional seafloor disturbance; these are 3.3 km and 5.2 km, respectively, from the nearest sonar contact.*

Potential impacts from drilling discharges were assessed as follows:

*No significant impacts are expected from drilling discharges. Simulation modelling of drilling discharges... predicts that thickness of 1 mm or greater would be limited to distances of 279 to 290 m from the drillsite, and thickness of 0.1 mm or greater would be limited to distances of 1,070 to 1,100 m from the drillsite. Because all of the drillsites are at least 3.0 km from the nearest sonar contact, no significant deposition is expected.*

#### **7.4.4 Cultural Heritage Impact Assessment – Pipeline Corridor**

The Production EIA assesses potential impacts to cultural heritage sites due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.2 of the Production EIA.

The significance of potential impacts to the cultural heritage sites during the baseline surveys are summarized below with text from the Production EIA in italics

Potential impacts were assessed as follows:

*The results of surveys will be used to ensure potential archaeological resources are not impacted. The overall impact significance is considered to be low.*

This section provides a description of the existing environmental characteristics of the onshore project area. For the purposes of this section, onshore incorporates land-based activities and those activities up to 12 nautical miles from shore. This is due to the fact that the Israeli TAMA process applies to the permitting and approvals of oil and gas projects in Israel up to the limit of national territorial waters (i.e., 12 nautical miles from shore). Where environmental issues apply to both offshore and onshore areas, they are referenced accordingly.

This section comprises a combination of reference to environmental studies and impact assessments prepared by others and also assessment prepared by ERM. The most comprehensive analysis of onshore and nearshore conditions and potential impacts is presented in the TAMA EIA, and this document is drawn upon extensively for this section.

The onshore components and pipeline routes were selected to avoid obstacles and significant biological communities and/or cultural resources. Specific to emission and discharge regulations for nearshore and onshore activities, Noble Energy, through discussions with the Petroleum Commissioner of the Israel Ministry of National Infrastructure, has agreed that the design of new facilities will meet US Gulf of Mexico coastal, the World Bank Group's Environmental, Health and Safety Guidelines for both Onshore and Offshore Oil and Gas Development and Israeli regulations during the commissioning and operation of the Project.

## 8.1 *BIOLOGICAL RESOURCES BASELINE AND IMPACT ASSESSMENT*

### 8.1.1 *Biological Resources Baseline*

The TAMA EIA presents the results of desktop and field surveys conducted to collect baseline data on biological resources. It covers two nearshore environments, the soft bottom environment, and the rigid bed environment (i.e., the kurkar ranges), and addresses the Hadera, Havatzelet HaSharon, and Netanya alternatives for the platform site. It also covers the onshore environment and addresses the Dor, Michmoret, Nachal Alexander, and Neurim alternatives. The following biological resources are addressed:

- Benthic communities;
- Marine mammals; and
- Sea turtles.

Key baseline findings for biological resources are summarized below with text from the TAMA EIA in italics.

## Benthic Communities

The TAMA EIA describes the soft bottom habitat at a depth of 67-85 m (points 1-6 of the gas float survey) and 49-60 m (points 7-10 of the gas float survey), as well as its infauna (i.e., benthic communities). The results are summarized as follows:

*In general, it seems that the characteristics of the infauna in the sandy bed in the depth range of 49-85 is generally similar... and also from the point of view of the groups of organisms detected on the seabed by the photographic survey. It should be emphasized that the survey was only made at a specific point in time and that seasonal sampling would emphasize possible differences between the various depths. From the faunal data within the seabed, it may be noted that at the more shallow stations (B7 and B8) echinoids from the Capitellidae family were observed and that their presence serves as an indication of enrichment with organic material (Pearson and Rosenberg, 1978).*

The TAMA EIA also describes the kurkar ranges opposite Dor, opposite Kibbutz Sdot Yam at a depth of 90-125 m, facing Ga'ash/Herzliya, opposite the Orot Rabin power station, facing Michmoret-Beit Yanai, and in the pipeline corridors to the east of the offshore sites (opposite Netanya, opposite Hadera, and slightly to the north of Ma'agan Michael). It describes the benthic communities associated with each kurkar range, and recommends avoidance by construction based on geotechnical reasons as well as the conclusions of a document prepared by the Nature and Parks Authority (Engert and Yahel, 2011), which states:

*The findings reinforce the need to declare a large marine nature reserve within the survey area that will provide special protection for sensitive habitats within this region. This is particularly appropriate in view of the underwater infrastructure works carried out to connect the Tamar and Dalit gas drilling sites located at a distance of about 100 kilometers from Israel's coast and which are planned to be connected in future to a national network by means of a pipeline system that will pass through the surveyed area.*

## Marine Mammals

The TAMA EIA provides baseline data on marine mammals in the soft bottom environment. The results are summarized as follows:

*A recently published article provides up-to-date and valuable information regarding the variety of species and locations of observations and summarizes the stranding data and observations of live individuals as collected by the IMMRAC (Israel Marine Mammal Research and Assistance Center) between the years 1993-2009 (Kerem et al., 2012). The data collected indicate the existence of populations of marine mammals from a number of species that are frequently found opposite Israel's coast. The article defines these species as "ordinary": a species that reproduce in the region of the Israeli coast and/or there is a high chance of observing them in Israel's littoral waters on an annual basis. The "ordinary" species include:*

*Grampus griseus, Tursiops truncatus, Stenella coeruleoalba, Ziphius, Steno bredanensis, and Delphinus delphis. With respect to the latter, it should be noted that medium and large groups of these species were not observed north of the Netanya area. Information collected also indicates the existence of “guests” or “migrating” species, which are defined as those that do not reproduce in the area and are observed within the boundaries of the region at a low frequency. The Common Bottlenose Dolphin (Tursiops truncatus) is the most common species found along Israel’s coast, with a segmented population... [I]n the area extending from Netanya to Dor the following species of marine mammals were observed: Delphinus delphis, Grampus griseus, Stenella coeruleoalba, Tursiops truncatus, and Physeter microcephalus which is a “guest” species.*

### Sea Turtles

The TAMA EIA provides baseline data on sea turtles along the Israeli coast. The results are summarized as follows:

*[T]he sandy beach area serves as the sight of sea turtle layings... [A]long the shore area to the south of Dor only a medium number of layings has been documented (40-80). It is important to note that in the vicinity of the Dalia River mouth a sea turtle egg incubation farm has been established and that the turtle nests are transferred to that spot whenever there is concern for their safety.*

## **8.1.2 Biological Resources Impact Assessment**

The TAMA EIA assesses potential impacts to biological resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.7 of the TAMA EIA.

The significance of potential impacts to the biological resources identified during the baseline surveys are summarized below with text from the TAMA EIA in italics.

### Benthic Communities and Fish

The TAMA EIA identified the following potential sources of impacts to benthic communities:

- Laying pipes from the wells area up to the platform
- Laying a pipeline from the platform to the shore;
- Rock dumping and using concrete mattresses;
- Laying the pipeline in the kurkar ridge area;
- Laying pipes using the horizontal directional drilling (HDD) method;
- Constructing the platforms; and
- Operations.

Potential impacts from laying pipes from the wells area up to the platform were assessed as follows:

*Assuming that the pipeline lane passes through soft media and the pipes are laid uncovered on the floor (at these depths covering the pipes is not a requirement) the main impact will be that of adding a rigid element to the floor environment. The presence of a new rigid artificial structure in a soft-bed area may attract larval stages of various invertebrates, including invasive species (Boehlert and Gill. 2010). Inhabitants of the new rigid bed (epifauna) may locally enrich the area with organic material in their immediate vicinity (within a few meters of the structure perimeter) as a result of feeding and expelling feces that will sink to the bottom. This local eutrophication can bring in its wake a change in species composition in the soft bed around the structure (Coates et al. 2011).*

Potential impacts from laying a pipeline from the platform to the shore were assessed as follows:

*Assuming the lane passes through a soft medium, digging, dropping anchors, and dragging the anchor chains can cause mechanical damage to the floor; in practice this means removing part of the sandy habitat bed. Results of such damage include:*

- 1. Uncovering cryptic species (such as worms, crabs, clams, sea urchins) and exposing them to predation*
- 2. Injuring the delicate texture of the habitat bed, the burrows and tubes made by worms, crabs, and various Cnidaria.*
- 3. Local change in the habitat bed for organisms that live on the bed.*

*The disruptions listed above are limited in scope and will only occur in the pipeline land and on its sides... Assuming this is a one-time disruption, within a few months from covering the pipeline, the fauna in the bed can be expected to recover and the excavated area will be repopulated (OSPAR, 2009). It is of significant note that there is a high probability of finding opportunist species such as polychaetes and nematode in the initial stages of repopulation.*

Potential impacts from rock dumping and using concrete mattresses were assessed as follows:

*These activities, if implemented in areas where the bed is commonly sand/silt, will create a change in the nature of the bed and add rigid bed where there was none before. This will create a potential colonizing site for reproductive material that is carried on the currents. Availability of reproductive materials depends on a variety of factors: season, depth, current regime, vicinity to natural rigid medium, etc. there are other factors that influence the colonizing process itself (nature of the medium, chemical stimulation, etc.) In view of all this, it is difficult to predict the exact composition of the population that will develop on the artificial bed... The inhabitants of the new ridge bed (epifauna) may locally enrich the area with organic material in their immediate vicinity (within a few meters of the structure perimeter) as a result of feeding and discharging feces that will sink to the bottom. Local*

*eutrophication can bring in its wake a change in species composition in the soft bed around the structure (Coates et al., 2011).*

Potential impacts from laying the pipeline in the kurkar ridge area were assessed as follows:

*Laying the pipeline on the Kurkar ridges and using gravel bags and rock dumping will cause significant mechanical damage to the rocky habitat and its inhabitants. The area under the pipe and around it (rock dumping area) will be destroyed and the sessile animals will not survive. Assuming this activity leaves so of the habitat standing, the pipe and its stabilizing accessories will become a potential bed to be re-colonized. This bed will gradually become colonized by reproductive material of organisms from the neighboring beds as well as by fish and motile invertebrates.*

*The physical damage to the rocky bed, of the kind that excavation will cause, will first and foremost eradicate part of the habitat and its inhabitants (sessile organisms that have been disconnected from the bed cannot reattach themselves). Further, apart from the population on the rock there is also an entire population inside the rock (mainly in Kurkar, which is porous). If the rocky bed is damaged in part but there is still some intact rocky bed nearby, the sessile organisms may still recover through supplies of larval stages from the neighboring beds. If no such beds are available, there will be a problem repopulating the remaining bed.*

*A further problem that may arise as a result of excavating the rocky bed is that the stability of the remaining bed may be compromised. It is possible that excavating in the middle of a Kurkar ridge will weaken it to the extent that it will eventually crumble (crumbling can be caused by a combination of physical erosion such as that caused by current activity and biological erosion as in the case of rock-boring organisms weakening the rock). Note that if the ridge in question is deeper than 100m, the chance of physical erosion decreases with depth.*

Potential impacts from laying pipes using the HDD method were assessed as follows:

*[I]n most cases this method is indeed preferable in sensitive areas, but it does have its drawbacks and each project must be examined individually.*

*The most common environmental problems associated with HDD in marine environments usually result from failures during performance. This includes:*

- i. Incomplete seal of the borehole so that there is uncontrolled release of drilling mud into the body of water...*
- ii. A malfunction in the drilling-mud circulation system causing circulation loss to the environment...*
- iii. Collapse of the borehole (as a result of problematic soil composition)...*
- iv. Mechanical failure of the drilling equipment and the loss of a part/parts inside the borehole...*

*This method also produces underwater noise that may interfere with marine mammals (Australia Pacific LNG Project EIS, 2010). However, it is likely that the range of the disruption will be short in time and small in space (depending on the number of workdays) and the marine mammals will voluntarily stay away from the source of noise.*

Potential impacts from constructing the platforms were assessed as follows:

*The activities... include activity in the water column and around the floor that will temporarily alter normal conditions. These changes include:*

- 1. Significant physical disruption of the seabed in the construction area – turning and mixing the sediment, breaking up biogenic structures in the floor, exposing organisms that live in the bed to probable predation or death.*
- 2. Sediment suspension – laying the platform bases and the pipes, and driving piles will suspend fine-grain sediments (silt) that will make the water turbid around the bed and in the water column in the work area. The extent of the suspension depends on several factors such as water depth, water current conditions, and sea condition (GDF Suez, 2012). Increasing the amount of suspended material around the bed can mainly harm filtering organisms found on the edges of the work area, and that were not directly injured by the floor being dug up. The expected impact includes compromised ability to filter and feed, and physical injury of the filtering apparatus (they get blocked by the suspended material) (Kerr, 1995). The suspended material may also be harmful to larval forms and plankton. At the same time, the extent of the damage will be small because the works are limited in time. Suspended sediments in the water column might decrease the amount of light that penetrates the water with the result that the primary production will be compromised. However, because work will be relatively limited in duration and area, we assume that the injury will be localized and temporary.*
- 3. Acoustic disruption – during construction while the piles are being driven...*

Potential impacts during operations were assessed as follows:

*Offshore installations with a no-fishing zone around them, despite the possible negative impacts during construction, operations, and dismantling, with good management, can contribute to increasing local biodiversity. This increase will come about in response to adding the structure and surfaces that will function as FAD [fish aggregating devices] and an artificial reef (Inger et al., 2006). If a no-fishing zone is not established around the offshore installation, fishery conditions can be expected to deteriorate.*

*The idea that a hard artificial surface can serve as a latching point, stepping stone or springboard for invasive species is gaining wider support among scientists (Ruiz et al., 2009; Rocha et al. 2010). This position is supported by a number of studies*

*conducted recently (Tyrrell and Byers 2007; Glasby et al. 2007; Sheehy and Vik 2010). The presence of hard artificial structures in areas of soft floor could become an attraction point for larval stages of diverse invertebrates including invasive species (Boehlert and Gill, 2010).*

### Marine Mammals and Sea Turtles

Potential impacts from noise produced by laying pipeline, erecting platforms, vessel traffic, and especially inserting pylons during construction, and by gas flowing through pipelines and equipment on platforms during operations, were assessed as follows:

*Impulsive noise, such as arises from driving piles, has a relatively small masking effect, due to the difference in spectral content (i.e. frequencies) between the percussive sound and the sounds used for communication, and because animals can broadcast and receive sounds between impulses. Moreover, cetaceans are able to adapt their communication and vocalization to minimize the masking effect (McIwem, 2006).*

*Auditory trauma caused by noise can be temporary and reversible... or it can be permanent... Pile driving can create two types of harmful situations:*

- *Trauma from a single noise event*
- *Trauma from a protracted series of single noise events.*

*Sea turtle ears are less sensitive than fish ears, but like fish they are limited to lower frequencies. They are most sensitive at 200-400Hz and sensitivity declines sharply at the higher frequencies (DeRuiter, 2010).*

*The upper useable frequency range of turtles is near 1,000Hz and the upper frequency threshold that still produces auditory nerve potential without injuring the ear is approximately 2,000Hz (Weaver & Vernon 1956; Ridgway et al., 1969; Martin et al., 2012).*

### Seabirds and Migratory Birds

Potential lighting and light pollution impacts were assessed as follows:

*Overall, artificial lighting has a negative effect on birds and it should be kept to a minimum. Especially in the open sea, darkness must be viewed as an important component of the natural system, and compromising it must be avoided as far as possible.*

Potential collision impacts were assessed as follows:

*Some collisions are unavoidable. Birds do not expect to run into an artificial obstacle that has been newly constructed, and under stormy or poor vision*

*conditions may collide with the structure. There are, however, several factors that increase the chance of accidental collisions:*

- *Collisions with structures and infrastructure caused by incorrect lighting that blinds the birds, shifts their route, or draws them toward the obstacle.*
- *Collisions with walls and windows made of glass, which mislead the birds by reflecting the sky.*

## 8.2 HABITAT ASSESSMENT

### 8.2.1 *Introduction and Scope*

As described in *Section 7.2.1*, ERM has prepared on behalf of Noble Energy an assessment of habitats in the Project and its area of influence following the criteria of IFC PS 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources. The spatial and temporal boundaries are as introduced in *Section 7.2.2*.

### 8.2.2 *Modified and Natural Habitats*

ERM utilized satellite imagery and manually digitized land cover types based on visual classification. These were delineated within 500 m and 60 m buffers surrounding the proposed pipeline alignment from the landfall to the terminus at the Hagit Power Plant.

Based on publicly available information, the data collected during the environmental and social impact assessments for the Drilling EIA, Production EIA and TAMA EIA, and the delineation of land cover types, ERM assessed the extent of modified and natural habitats.

The onshore portion of the pipeline considered in this assessment begins at the landfall site on Dor Beach and extends inland eastwards and then northwards to the Haifa Refinery. Land uses in the onshore Project area of influence include agricultural uses such as crop and tree production and livestock grazing, fish farms, urbanization and infrastructure (roads, the existing pipeline), recreational uses of the Israel National Trail (a hiking trail that crosses Israel from south to north), uses of Dor beach, and conservation in Mount Carmel National Park, the Ramot Menashe Important Bird Area and Ramot Menashe Biosphere Reserve. The pipeline route crosses part of Mount Carmel National Park at Yokne'am Illit. The Ramot Menashe Important Bird Area and Ramot Menashe Biosphere Reserve are located to the south of Highway 70 from near Bat Shlomo eastwards to Eliakim.

ERM notes that the biodiversity value of some modified habitat may be significant. For example, active fish farms are utilized by water birds while abandoned fish farms have been recolonized by native species typical of

wetlands. Also, agricultural lands may be of importance as foraging habitats for vertebrates.

As noted above, the onshore pipeline will be constructed with existing pipeline rights-of-way and agricultural lands, avoiding impacts to natural habitats. Also, the construction of the pipeline through the beach and coastal dunes habitats will use below-ground directional drilling (HDD) and thus avoid impacts to these habitats.

### 8.2.3 *Critical Habitat Assessment*

Of the different categories that could trigger critical habitat introduced in *Section 7.2.4*), the following have been identified in the nearshore and onshore areas:

#### Endangered and/or Critically Endangered Species

Sea Turtles - Green turtles (*Chelonia mydas*) are listed as Endangered by the IUCN and is known to at least sporadically nest on beaches in Israel (IUCN, 2012). While Israel is not considered an important nesting country at either the scale of the Mediterranean or globally, the Israel Red Book of Vertebrates (Dolev & Perevolotsy, 2002) categorizes green turtles as Critically Endangered at the national level.

The Mediterranean subpopulation of loggerhead turtles was downlisted by the IUCN to Least Concern in August 2015 (Casale, 2015); however, loggerhead turtles are categorized as Critically Endangered by the Israel Red Book. Also, small numbers of leatherback turtles (*Dermochelys coriacea*) have been reported in the waters of the Levant basin but no breeding populations have been identified in the region and these turtles are listed as Vulnerable globally, and thus do not trigger any critical habitat requirements. The IUCN Red List includes the Mediterranean Sea subpopulation of leatherback turtles in the Northwest Atlantic Ocean subpopulation that is categorized as Least Concern (Tiwari *et al.*, 2013).

Based on the available information, the area of influence does not appear to be located in a habitat of significant importance where the loss of such a habitat could potentially impact the long-term survivability of the species. Also, the area does not appear to contain regionally-important concentrations of either of these turtles. However, the national importance of the beaches has been recognized by the Knesset which has passed legislation banning construction of structures within 100 m of beaches as well as banning the driving of vehicles on beaches.

Schreiber's Fringe-fingered Lizard - Schreiber's fringe-fingered lizard (*Acanthodactylus schreiberi* or "SFFL") is listed as Endangered by the IUCN and as Critically Endangered by the Israel Red Book. It is restricted to fragmented sandy habitats (i.e., sand and hamra soils) in the eastern Mediterranean, occupying an area of less than 500 km<sup>2</sup> (Hraoui-Bloquet *et al.*, 2009), including

portions of the Israeli Coastal Plain where the onshore pipeline is located. The Israeli Coastal Plain should be considered Type 1 Criterion 1 critical habitat for this species given that this landscape likely contains more than 10% of the remaining global population). It is important to note, however, that while the landscape is considered critical habitat, much of the habitat is no longer suitable for the SFFL due to past land conversion.

However, recent molecular biological research (Tamar *et al.*, 2014) has proposed that the SFFL is not a single species but rather what is known as a “paraphyletic grouping” of organisms with different origins. The true SFFL was found to be restricted to the island of Cyprus and the populations of coastal Israel were found to belong to a very widely-ranging species known as *Acanthodactylus boskianus*. The study notes that these findings may have “important implications for the conservation of the coastal sand dunes form, which is classified as critically endangered in Israel”. They conclude that given the remarkable example of convergent evolution with the Cypriot SFFL over a very short time in Quaternary-age coastal dune ecosystems, that these populations are unique evolutionary entities that merit special conservation efforts. It is important to note that while the pipeline route passes through coastal dunes habitat, there will be no above-ground activities or disturbance, as the pipeline will be constructed by horizontal drilling below the surface.

As good international practice for pipelines in natural habitats, (for example, The Energy & Biodiversity Initiative’s *Integrating Biodiversity Conservation into Oil and Gas Development*) the potential presence of the SFFL and other terrestrial species of conservation interest in the onshore area of direct impact should be assessed prior to any land clearing or earthmoving activities. Any habitats of SFFL should be avoided if possible and conversion minimized. Habitats converted by the project should be restored. If the lizards are found within proposed work areas, these areas should be avoided if possible and conversion minimized where avoidance is not possible. Lizards should be captured and relocated prior to conversion of any known habitats.

*Mediterranean Subpopulation of the Short-beaked Common Dolphin* - This occupies the nearshore waters, but has been discussed in *Section 7.2*.

*Other Species* - There is a potential for the occurrence of the following widespread Endangered or Critically Endangered birds: Saker falcons, Egyptian vultures, white-headed duck, Balearic shearwaters, and sociable lapwings. However, the area is not known to be of regional or globally significance for any of these species.

Previous Noble Energy assessments note that two endangered plant species can be found in the pond area, perennial glasswort (*Sarcocornia perennis*), and saltmarsh morning-glory (*Ipomoea sagittata*). These are both widespread species globally and not considered Threatened by the IUCN Red List. However, *I.*

*sagittata* is included as Endangered by the *Red Data Book: Endangered Plants of Israel* (Smida *et al.*, 2011), which notes that this species is known at only 12 or 13 sites across Israel. Likewise, *S. perennis* is also listed as Endangered and it was considered to possibly be extinct in Israel except for at the Acre Salt Marsh.

The Tut stream was also identified as a sensitive feature located just to the south of the Hagit site, approximately 590 m downslope of the pipeline terminus. This stream is noted as supporting a fish (*Acanthobrama telavivensis*, IUCN Vulnerable globally) and a newt (*Ommatotriton vittatus*, IUCN LC globally) that are both listed nationally as Critically Endangered by the *Red Book - Vertebrates in Israel* (Dolev & Perevolotsy, 2002). The baseline conditions of these species and their habitats in Tut stream in the reaches potentially affected by the Project should be evaluated prior to any activities that could affect their habitats. The *Red Book* notes that the fish was thought to be extinct in the Tut stream in 1999 and that the newt population in the Ramot Menashe region (immediately south and east of the Project) was the most important in the country.

#### Endemic and/or Restricted-Range Species<sup>vi</sup>

The Flora of Israel include many endemic plant species. For example, a 1985 paper reported that there were 43 endemic plant species in the littoral belt of the Israeli Coastal Plain. Consultation with species experts familiar with the region should be included as part of the Biodiversity Action Plan development process.

Schreiber's fringe-fingered lizard, discussed in *Section 8.2.3* above, as recognized by the IUCN, has a highly restricted range species and the Israeli Coastal Plain should be considered critical habitat for this species.

#### Migratory or Congregatory Species

Sea turtles qualify as congregatory species because they nest in large numbers at a small number of geographically-restricted beaches worldwide. While of national interest, Dor Beach does not qualify as critical habitat based on the sub criterion of being nesting beaches of significant importance and where the loss of such beaches could potentially impact the term-survivability of the species.

Israel, overall, is located within the Mediterranean/Black Sea flyway that connects Europe, Western Asia, and Africa. However, the construction and

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<sup>vi</sup> Restricted-range species: For terrestrial vertebrates, a species which has an extent of occurrence of 50,000 km<sup>2</sup> or less. For marine systems, restricted-range species, the IFC provisionally considers those with an extent of occurrence of 100,000 km<sup>2</sup> or less.

operation of the pipeline will not have any significant impacts on bird migrations or habitats supporting these migrations.

Based on the available information, the Project is not located in any areas that qualify as critical habitat for migratory or congregatory species.

#### Highly Threatened and/or Unique Ecosystems

The Coastal Plain ecosystem of Israel is considered a high conservation priority and the ecoregion known as “Southwestern Asia: Along the coast of the Mediterranean Sea in Turkey, Jordan, Israel, and Syria” is considered to have “Critical/Endangered” conservation status by the World Wildlife Fund.

All freshwater ecosystems in Israel are considered highly threatened and subject to protection. The Tut stream is thus considered a highly threatened ecosystem that has, at least in the past, supported two species of fish and amphibians listed as Critically Endangered in Israel.

The ecoregion known as “Southwestern Asia: Along the coast of the Mediterranean Sea in Turkey, Jordan, Israel, and Syria” is considered by the World Wildlife Fund to contain highly threatened ecosystems due to land use changes and their high levels of endemism.

#### Key Evolutionary Processes

The findings of the research on the evolutionary relationships of fringe-fingered lizards and the rapid evolution of convergent forms in the recent coastal dunes discussed above is an example of evidence for an area demonstrating key evolutionary processes and which should qualify the habitat of the unique evolutionary entity as critical habitat. According to the IFC Guidance Note on PS 6, this criterion is defined by: (i) the physical features of a landscape that might be associated with particular evolutionary processes; and/or (ii) subpopulations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history. These are both demonstrated by the unique populations of the wide-ranging *Acanthodactylus boskianus* that have evolved in the Coastal Plains.

#### Legally Protected and/or Internationally Recognized Areas

Although not specifically criteria for Critical Habitat, many legally protected areas and/or areas recognized internationally for their high biodiversity values may qualify as critical habitats.

The pipeline landfall area is located between two Israeli Marine Protected Areas but it is not anticipated to have any significant impacts on these areas.

There is a 1,000-m Ecological Corridor established along the Mediterranean coastline of Israel.

At Hagit, the pipeline terminus is approximately 850 m north of the boundary of the Ramot Menashe Important Bird Area (IBA), identified in 1994 for its importance for the lesser kestrel (*Falco naumanni*; IUCN category of Least Concern, downlisted from Vulnerable in 2011; (Israel category is Vulnerable) which breed in old buildings at Amiquam (c. 30 pairs) and Bat Shlomo (up to 10 pairs), and whose forage area covers ca. 2,500 ha in surrounding fields (BirdLife International, 2016). Bat Shlomo is approximately 1.3 km south of the pipeline route and the IBA boundary lies approximately 1.9 km south of the pipeline in this zone.

The Ramot Menashe IBA and portions of the surrounding landscape were proposed as a Biosphere Reserve in October 2010 (Avit, 2010) and recognized by UNESCO as a Biosphere Reserve in July 2011 (UNESCO, 2012). The Hagit terminus is located immediately to the west and north of this proposed area. Species of conservation interest include the lesser kestrel, the striped newt, and the tabor oak.

In the area of the town of Yokne'am Illit, the pipeline route crosses part of Mount Carmel National Park, which protects the habitats of the hills to the north and west of the pipeline route.

#### 8.2.4 *Conclusions Regarding Onshore Critical Habitats*

The beaches of the Israel coast may be treated as critical habitats for green turtles and loggerhead turtles given their Israel Red Book status of Critically Endangered and the general importance of beach habitats to national conservation stakeholders. However, the Project will have no impact on these habitats due to the use of horizontal direction drilling in the beach habitats.

The Coastal Plain of Israel is known as habitat for a number of species recognized as Endangered either by the IUCN or Israel national lists which follow IUCN criteria. The coastal dunes habitats are considered critical habitats under the criterion of key evolutionary processes that have resulted in the rapid evolution of unique fringe-fingered lizards. However, the Project will have no impact on these habitats due to the use of horizontal direction drilling in the coastal dunes habitats.

The Tut stream, located to the south of the Hagit Power Plant, has been identified by the TAMA 37/H studies of habitat for nationally-listed Critically Endangered species (*Acanthobrama telavivensis* and *Ommatotriton vittatus*) and thus may be critical habitat if the presence of these species is confirmed.

The above findings suggest that the Project should develop a Biodiversity Action Plan as discussed in *Section 8.2.5* below in order to demonstrate its approach to ensuring compliance with PS 6 requirements for critical habitats.

## 8.2.5 *Recommendations for a Biodiversity Action Plan*

The above findings suggest that the Project should develop a Biodiversity Action Plan (BAP) to demonstrate its approach to ensuring alignment with PS 6 requirements for critical habitats.

IFC PS 6 establishes a series of requirements for all projects located in any type of natural habitat and for activities in critical habitats. These requirements are based on the application of the mitigation hierarchy where avoidance of impacts to biodiversity is the preferred approach and compensation or offsetting should be considered a last resort to address residual impacts after other mitigations have been applied. Stakeholder and expert consultation is another key aspect of the PS 6 approach and the BAP should be developed through this approach. Further details on the recommended BAP for the Leviathan Project is detailed in *Section 12.0*.

## 8.3 *PHYSICAL RESOURCES BASELINE AND IMPACT ASSESSMENT*

### 8.3.1 *Physical Resources Baseline*

The following physical resources are addressed in Chapter 1 (baseline conditions) of the TAMA EIA: Noise. While there is no section on air quality in Chapter 1 of the TAMA EIA, baseline air quality information is provided in Chapter 4 (impact assessment). The TAMA EIA does not describe baseline conditions for water quality, but does assess the impacts of produced water dispersion. Key baseline findings for physical resources are summarized below with text from the TAMA EIA in italics.

#### Noise

The TAMA EIA provides baseline data on noise in the marine environment. The results are summarized as follows:

*Under conditions of calm seas in a sea stage 0 or 0.5, we can expect the dominant noise sources to be ships sailing along the shore. We can expect noise levels of about 80 decibels within frequency ranges of 10-1,000 Hertz. The noise level in the immediate vicinity of a commercial marine vessel may reach 120 decibels within the same range of frequencies.*

#### Air Quality

As mentioned above, the air quality impact assessment in the TAMA EIA includes baseline information on air quality. This information takes the form of a current conditions (i.e., background) scenario in an air quality model. The scenario includes emissions from existing factories and vehicles within 10 km of the Project area, and the model considers particulate, NO<sub>x</sub>, and SO<sub>2</sub> emissions at the Northern and Southern Compounds. The results of the scenario are only

described for particulates at the Northern Compound. These results are summarized as follows:

*The results for point source and vehicle emissions... show that the thresholds were exceeded in the maximum values for average concentrations of maximum 3-hour and second 3-hour relative to environmental and target values by 94% and 88% respectively. When the model was applied to point sources only... no irregular values were recorded (the highest values found were approximately 55% lower relative to the target and environmental values).*

### 8.3.2 **Physical Resources Impact Assessment**

The TAMA EIA assesses potential impacts to physical resources due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events can be found in Section 4.7 (pollution due to leaks), Section 4.1.7 (malfunction cases), and Section 4.8.6 (failure in condensate storage) of the TAMA EIA.

The significance of potential impacts to the physical resources (water, sediment, and air) identified during the baseline surveys are summarized below with text from the Production EIA in italics.

#### Air Quality

Potential impacts from air emissions, including from gas turbines, fired heaters, diesel engines, and flaring, were assessed as follows:

*In conclusion, the environmental impact of natural gas operated facilities and of gas engines (associated with the tested pollutants: particulates, nitrogen oxides, and sulfur dioxide) in the northern and southern compounds is very small to negligible.*

*When venting, most emissions are of methane; flaring produces combustion products so the main gas emitted is carbon dioxide. Methane potentially contributes to the greenhouse effect 25 to 75 times more than carbon dioxide.*

#### Water Quality

Potential impacts from produced water dispersion were assessed as follows:

*Based on a conservative environmental evaluation that builds on results of modeling produced water dispersion, the environmental impact of discharging produced water to sea is expected to be very small. It is reasonable to assume that any influence on marine biota will be limited to the immediate vicinity of the gas treatment platform, within a 250m radius from the platform at the most.*

## 8.4 CULTURAL HERITAGE RESOURCES

### 8.4.1 *Cultural Heritage Baseline*

A desktop survey of known archaeological resources was conducted of the onshore connection for the Leviathan Project, as documented in the “Feasibility Study – Connecting the Leviathan Gas Field to the Main Transmission System” (October 2013). The area surveyed includes the Domestic Gas Sales Pipeline (DGSP), Domestic Condensate Sales Pipeline (DCSP), the Coastal Valve Station (CVS), and the Dor Valve Station (DSV). The survey was conducted as part of Israel’s National Outline Plan 37/H Planning of Gas Treatment Facilities (TAMA 37/H). For the Dor Alternative, the desktop survey identified four archaeological “lots” that intersect the Gas Line Subalternative 1.2, and another three that intersect the wider National Outline Plan 37C.

### 8.4.2 *Cultural Heritage Impact Assessment*

The TAMA EIA assesses potential impacts to cultural heritage sites due to routine and non-routine events. The information provided in this section presents the impact assessment for routine events and Project development. A detailed assessment of potential impacts from non-routine events (i.e., accidental spills) can be found in Section 4.7 of the TAMA EIA.

The significance of potential impacts to the cultural heritage sites during the baseline surveys are summarized below with text from the TAMA EIA in italics.

The TAMA EIA identified the following potential impacts to cultural heritage:

*In coastal entry areas, the HDD method will be used... Using this method, it is possible to reduce the effect on marine and coastal archaeological sites by using a subterranean passage under the declared archaeological sites.*

*Marine pipeline routes can be shifted if they cross an archaeological site or discovery (such as shipwrecks) to avoid possible damage.*

## 9.0 SOCIAL AND HEALTH BASELINE AND IMPACTS

### 9.1 CONTEXT

The EIA documentation completed by, or on behalf of, Noble Energy and the Government of Israel do not discuss or assess potential social and health impacts in great detail. Social-related information for the onshore activities was limited because the final location of the Project's onshore components had yet to be determined for the TAMA EIA. Socioeconomic baseline information for the area is provided in Appendix E of the TAMA EIA but is not used to assess impacts specific to a preferred alternative design for the Leviathan Project. Impacts to tourism (economic displacement) and recreation areas; construction-related impacts associated with workforce, traffic, community health and safety; and security were all raised by the public, in general, as likely areas of impact during the public consultation and disclosure period for the TAMA EIA (under the TAMA 37/H process). However, the comments and concerns were not specific to the final design alternative.

Social-related information discussed in the Production EIA for the offshore activities indicates potential impacts as a result of loss of commercial fishing grounds; disruption to fishing infrastructure and shipping lanes; and damage to third-party infrastructure. The Production EIA also assessed potential onshore health impacts from noise levels and air pollution emitted by construction and operation activities offshore, but assesses this as not expected to significantly impact onshore communities. The Production EIA did note that periodic onshore disturbances will occur as a result of helicopter flights transferring personnel to / from onshore locations to the construction vessels but they will happen only occasionally, with an estimated once a week on average. They will fly in the day and will present only a brief increase in background noise.

The Drilling EIA provides baseline information and an impact assessment of fishermen and shipping lanes. It scopes out mariculture and fish farming activity because there are no such activities within 30 km of the offshore infrastructure. The Drilling EIA did state that recreational (sport) fishing does occur in coastal or nearshore waters, but since the assessment only covered offshore components, recreational fishing was not assessed further.

### 9.2 SCOPE

Recognizing the limitations to the social and health information contained in the EIAs, ERM performed a Social and Health Assessment of the Project on behalf of Noble Energy, which is documented in this section. This section identifies and assesses social risks and impacts across the entire Project, using one methodology, and covers social issues where impacts were deemed to be minimal or were scoped out of the previous impact assessment processes.

The Social and Health Impact section discusses the potential most likely social and community health impacts from onshore and offshore construction and operations of the Leviathan Project, and provides the framework for subsequent development of social and health impact mitigation measures for the entire Project.

ERM's assessment took into consideration guidelines typically followed by OPIC and recommended by the International Finance Corporation's Performance Standards (IFC PS). These guidelines include:

- PS1 which provides guidance on the identification and management of social risks and impacts, stakeholder engagement and public consultation and disclosure;
- PS4 which discusses the identification and assessment of risks and impacts to the health, safety, and security of local communities due to project activities;
- PS5 which relates to physical and economic displacement as a result of project activities; and
- PS7 which requires project proponents to anticipate and avoid adverse impacts on Indigenous Peoples.

It assesses potential social and health related impacts in a comprehensive manner based on the final site selections as follows:

- **Offshore:**
  - Impacts to the livelihoods of deep-sea commercial fishermen (construction and operation); and
  - Impacts to shipping and third party infrastructure as a result of rigs and support vessels (construction).
- **Onshore/Nearshore**
  - Impacts to the livelihoods of nearshore fishermen (commercial, subsistence, and recreation) (construction and operation);
  - Impacts to onshore fish farming (construction and operation);
  - Impacts to agriculture and land use resulting in economic displacement as a result of new condensate (construction phase);
  - Impacts to tourism (potential economic displacement), and recreational areas, including hotels, local businesses, and beach users (construction phase);
  - Impacts to tourism (potential economic displacement) as a result of changes to the landscape (operations phase);
  - Impacts to community health, safety, and security as a result of construction (workforce and traffic).

Each potential impact is described, and a standard social and health methodology is applied to assess significance of these impacts to stakeholders.

Where some of these impacts have been discussed in the Production EIA, TAMA EIA, Feasibility Study, and Drilling EIA, salient details have been noted and the findings summarized.

The positive socioeconomic benefits of the Project on a national scale include macroeconomic improvements through the payment of taxes and royalties; direct and indirect employment opportunities; procurement of local goods and services; domestic gas independence; and reduced greenhouse gas emissions. As these are considered to be positive impacts, they are not assessed further in this document. However, such positive impacts should be taken into consideration when reviewing all project environmental and social impacts collectively.

### 9.3

#### *METHODOLOGY FOR ASSESSING SOCIAL AND HEALTH IMPACTS*

The significance of potential socioeconomic and community impacts is generally evaluated taking into account the magnitude of the change in socioeconomic and community conditions and the vulnerability of affected receptors (i.e. people and communities). The overall approach to the evaluation of impacts lies in the combination of two components that, when analysed together, result in a significance rating of social and health impacts:

Determining the **magnitude** of change in social and community health assets and conditions as a result of the Project; and,

Determining the **vulnerability** of people and communities, a characteristic that underpins their ability to adapt to socioeconomic/cultural or bio-physical changes whilst maintaining their overall livelihood, health status and quality of life.

The evaluation matrix used in this document to assess social and health impacts and assign a significance rating based on vulnerability and magnitude is provided below in *Figure 9-1*.

Potential impacts that were initially evaluated but determined in the assessment process to not be applicable have been scoped out. Background information and assessment details are included for these potential impacts but an impact significance rating is not provided.

FIGURE 9-1: SIGNIFICANCE RANKING MATRIX FOR SOCIAL AND HEALTH ISSUES

			Vulnerability of Receptors		
			Low	Medium	High
			Minimal areas of vulnerabilities; consequently with a high ability to adapt to changes brought by the Project.	Few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Magnitude of Impact	Minimal	Change remains within the range commonly experienced within the household or community	Negligible	Negligible	Negligible
	Low	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.	Negligible	Minor	Moderate
	Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.	Minor	Moderate	Major
	Large	Change dominates over baseline conditions. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.	Moderate	Major	Major

The definitions for the impact significance ratings are provided below:

- **Negligible:** Inconvenience caused, but with no consequences to livelihoods, culture or quality of life.
- **Minor:** Impacts are short term and temporary and do not result in long term reductions in livelihood or quality of life.
- **Moderate:** Adverse impacts that notably affect livelihood or quality of life at household and community level. Impacts can mainly be reversed but some households may suffer long-term effects.
- **Major:** Diverse primary and secondary impacts that will be impossible to reverse or compensate for, possibly leading to long-term impoverishment, or societal breakdown.

It should be noted that the reviewed documents assessed social impacts using different matrices and methodologies which are more environmentally focused. Furthermore, the impact significance rankings for social impacts vary between the documents given the inconsistent methodology and logic. Due to these

factors, social impacts have been evaluated again by ERM using the social and health specific methodology for consistency.

Of the onshore and offshore social and health impacts which were assessed by ERM in this document, the significance was determined to be either minor or negligible, based on the information available at the time of writing. There are no social and health impacts at a moderate or major level that should be of concern to the Project at this time. However, in some cases, recommendations to ensure further alignment with Good International Industry Practice and IFC Performance Standards, as well as to further reduce, mitigate, or monitor future risks, have been provided.

## 9.4 POTENTIAL IMPACTS

### 9.4.1 Discussion of stakeholders

A stakeholder is defined in the IFC Performance Standards as “any individual or group who is affected by a project or may have an interest in or influence over it.” Noble Energy’s construction teams, operational staff, and management have frequent contact with stakeholders related to the other offshore operations. These include national, regional and local government officials, NGOs, media, and various civil society entities. To date, specific community level engagement pertaining to the development of Leviathan field has been completed by the Government of Israel, following the TAMA and permitting processes (see “Summary Mapping of TAMA 37/H for the Leviathan Project in Israel” submitted by ERM on in 2015). However, there are several groups of stakeholders specifically identified in this document (beach users, local businesses, commercial fishermen, recreational fishermen, yachters and sailors) that may require engagement directly by Noble Energy and recommendations for such have been noted. These stakeholder groups are included in Noble Energy’s Stakeholder Engagement Plan.

Noble Energy has confirmed that there are local communities in the vicinity of the onshore Project components (horizontal drilling of pipeline, pipeline corridor and the coastal valve station) which may be impacted by Project activities – including the community of Mushav Dor and Kibbutz Mayan Tzvi. Ongoing communication is focused around potential compensation (to be determined subject to all legal provisions) for land and access necessary to build the onshore components – more specifically at present the CVS and associated roads and laydown areas. Noble Energy’s community engagement teams have been engaging with residents of these communities on an ongoing basis as part of the Project’s Stakeholder Engagement program and land access process. In July 2016, Noble Energy changed the first design of the access road near the fish pond after discussion with Mushav Dor representatives who asked that the access road bypass the fish pond and enters the CVS from south in order to allow for future re-use of the pond.

In different localities than the Project, the TAMA 37/H public consultation process uncovered some general stakeholder concerns about pipelines and rights-of-way (e.g. safety and potential economic displacement as a result of infringements on agricultural land). To mitigate potential risk during the Building Permit process for the pipelines to Hagit and Haifa, Noble Energy is completing stakeholder identification along the pipeline routes, as well as third-party surveys, and will conduct subsequent engagement as part of Noble Energy's compliance with national legislation and best practice for land access for the project.

Noble Energy's operations and construction teams continue to abide by stringent national laws related to stakeholder engagement for offshore work. The company communicates access limitations as a result of exclusion zones and safety buffer zones to sea users; consults with Haifa Port authorities and the various Ministry of Defense interlocutors responsible for sea safety and security; and provides Notice to Mariners to inform the public of planned vessel movements and safety no-go zones around the drilling rigs.

#### 9.4.2 *Offshore*

##### Impacts to the livelihoods of deepsea commercial fishermen (construction and operation)

*Background Information:* The following background information was obtained through document review:

The Production EIA determined there would be no significant impact to the fishing industry as a result of the removal of fishing grounds during installation and pipelaying activities, or due to exclusion zones. The "Production EIA states *"Offshore marine fishing within the scope of this EIA is relatively sparse as a result of water depths and the oligotrophic nature of the environment (UNFAO, 2007)", and "Due to the distance from shore, recreational fishing is not expected in the Application Area (refer to CSA Ocean Sciences Inc. 2016a)."* The residual risk for fisheries was assessed as low.

The Production EIA also assessed the impact to fish populations due to overfishing. Infrastructure such as pipelines and platforms are known to attract marine species including fish as a result of concentrating resources according to the 'attraction' hypothesis. The residual impact was found to be low risk as the subsea infrastructure is unlikely to cause any increased fishing effort.

The Drilling EIA assesses that drill sites are not in known fishing areas, and stringent safety requirements are in place. The Drilling EIA states that, *"All vessels (including fishing boats) will be excluded from a 500-m radius buffer zone around the drilling rigs for safety reasons. Support vessels will monitor this buffer zone and help minimize the potential for other vessels to enter this area. Because the drill sites are not*

*in a known fishing area, it is unlikely that any fishing vessels would be affected by this exclusion."*

The Drilling EIA provides clear instructions regarding access limitations to exclusion zones and that they will be communicated to other sea users, including establishing a 500 m radius safety zone around the drilling rigs, consulting with Haifa Port authorities and providing Notice to Mariners to inform the public of planned vessel movements and the safety zone around the drilling rigs. It discusses use of a standby vessel (e.g., a supply vessel) for safety and security reasons. The residual risk is assessed as low.

Assessment: From a socioeconomic standpoint, the only stakeholder group that could be adversely affected by the offshore work at the LPP and in the Leviathan field is deep-sea fishermen.

Since the offshore work will take place in the Leviathan Field, which is located 140 km from the shore, and taking into consideration the information provided in the Production EIA and Drilling EIA, ERM assesses the number of vessels in the Project area will be limited. However, the few commercial fishermen who historically fish in deep-sea waters near the Leviathan field have areas of vulnerability but may be able to at least adapt in part to the changes in their fishing patterns by relocating outside of the Area of Influence and buffer zones. Their vulnerability is therefore medium. ERM considers that given the occasional nature of this impact, the magnitude of the impact itself will be minimal and affect only a small proportion of fishermen, if any. **Therefore, the significance of the impact is rated as negligible.**

Impacts to shipping and third party infrastructure as a result of rigs and support vessels (construction)

*Background Information:* The following background information was obtained through document review:

The Production EIA provides the following baseline information in regards to shipping: *"Numerous shipping lanes cross Israel's Territorial Waters, although the Leviathan Field, pipeline route and the proposed platform location are not located within any shipping lanes (refer to Figure 2-3). However, shipping lanes do extend westward from Haifa in the direction of the Leviathan Field. Therefore, it is possible that shipping traffic may pass through the area en-route to or from various Mediterranean ports."*

The Production EIA assesses that *"Consistent with international industry practice, Noble Energy will establish a 500 m radius safety exclusion zone around the pipelay vessel and the OCV while it is operating, this will be patrolled by the standby vessel and kept clear of all unauthorized vessels. A standby vessel (capable of housing the entire workforce of the largest vessel) will be dedicated to supporting the pipelay and OCV vessels in order to both enforce the exclusion zone and provide rapid response in the event of an emergency situation occur", and "In order to avoid any unwanted interactions*

*between project vessels and the wider marine traffic of the Eastern Mediterranean, Noble Energy will consult (prior to commencing pipelay activities) with Haifa port authorities and provide notice to mariners to inform the authorities and public of planned vessel movements” and “The authorities and public will also be notified of the implementation of the 500 m radius marine/safety exclusion zones around the pipelay vessel and OCV. All vessel operators must follow applicable maritime navigation rules.”*

Therefore, the impacts on marine transportation and infrastructure due to the physical presence of the pipelay vessel and support/supply vessels were considered unlikely and the residual risk was assessed as low.

The Drilling EIA states that, “*The drilling program will be supported by two MMC 87 Class platform supply vessels operating out of the port of Haifa. Each supply vessel is expected to make three round trips per week between Haifa and the drilling rig(s). The vessels will normally follow the most direct route between the shore base and the drilling rigs, weather permitting. ... It is expected that most of the supply vessel route would be in or near these existing shipping lanes where there is already vessel traffic. Therefore, no interactions with fishing vessels or gear are expected during these trips.*” The Drilling EIA states that the residual risk to shipping and infrastructure is low.

Noble Energy has confirmed that the establishment of safety and security buffer zones around all operations and construction will comprise a 500 m perimeter around infrastructure (e.g., pipelines) and 1.5 km perimeter around the platform.

The ENVID Report asserts that the Project could cause nuisance and increase the risk of accidents as they pertain to shipping lanes, but does not elaborate further. Considering that the area surrounding the operations will be strictly managed and with restricted access, and that the Drilling EIA describes the involvement of high class level vessels and personnel supporting these operations, the risk for accidents will be those similar to typical maritime operations of this nature.

Neither the feasibility study nor the ENVID Report provide an assessment of the identified impacts.

Assessment: ERM has determined that the magnitude of this impact is low considering that any impact would be local, rare, and affect a small proportion of receptors and for a short duration. The vulnerability of shipping and third party infrastructure receptors would also be low. **Therefore, the significance of the impact is rated as negligible.**

### 9.4.3 *Onshore/Nearshore*

Impacts to the livelihoods of nearshore fishermen (commercial, subsistence, and recreation) (construction and operation)

Background Information: The following background information was obtained through document review:

The Feasibility Study took into consideration fishing areas, trawling lines, trawling routes, and sailing routes both nearshore and offshore when recommending which final sites should be selected. The Feasibility Study does not assess impacts related to the above described nearshore fishers.

The TAMA EIA discussed that bottom trawlers usually fish at depths down to 400 m, but the trawl fleet is prohibited from fishing at depths shallower than 15 m. Furthermore, the TAMA EIA discusses but does not rank the impact significance to nearshore fishing.

The Drilling EIA provides baseline information, which states that *“the area south of Hadera is covered mostly by trawlers based in Ashdod and Jaffa ports, and more than 95% of this fishing ground is concentrated on the continental shelf shallower than 110 m. Vessels fish deeper in this area only in late winter when trawling for hake. Southern trawling is always in a north-south orientation, parallel to shore. Fishing regulations forbid the trawl fleet from fishing in depths less than 15 m and other regulations concern minimum landing size of the most common species but are rarely enforced.”*

The Drilling EIA states that *“Due to the distance from shore, recreational fishing is not expected in the Application Area [Leviathan Field]. However, recreational (sport) fishing does occur in coastal waters.”* Furthermore, it states that there are roughly 1,000 kayak owners who fish along the Israeli coast. Additionally, approximately 1,000 free divers engage in the sport of spear-fishing, on a sunny day up to 20,000 Israelis fish with rods from beaches, and several hundred small boats engage in fishing along the coast – although how many are inside the Area of Influence is unknown.

The Production EIA and Drilling EIA assess that due to the water depth and the distance from coastal fishing no impacts are expected from activities offshore. The scope of both of these documents are offshore (beyond the LPP), and these documents do not assess the impacts of nearshore activities.

The Production EIA does assess a release of hydrocarbon at sea which could interact with marine organisms and coastal features such as commercial fishing ports at Akko, Haifa and Dor. In relation to fish and fishing impacts, the Production EIA indicates that *“individual fish species (as well as eggs and larvae) may come into contact with a spill, but population level impacts are extremely unlikely due to the brief duration of a spill event and the relatively small area that would be impacted.”* Also that *“adult fish are far more resilient and effects on wild stock levels have seldom been detected. Free swimming fish are thought to actively avoid oil (ITOPF, 2004)”*.

The Production EIA assessed that *“the aerial extent of any slicks or areas of increased oil in water concentrations have shown to be minor when simulated in OSCAR, as such the overall fraction of Israeli fishing ground impacted by a spill would be minor and as “Offshore marine fishing within the scope of this EIA is relatively sparse as a result of water depths and the oligotrophic nature of the environment (UNFAO, 2007)” any*

residual impact has been assessed as low for fishing, and low for impact to leisure and tourism.

Assessment: Although trawling is practiced on a daily basis year-round in shallow waters, according to interviews with Noble Energy management and the authors of the TAMA EIA, the practice is now illegal due to the destructive negative impacts of this activity on benthic habitats. However, according to other environmental assessments related to other offshore projects in the vicinity, the commercial fishing industry in Israel takes place mostly in shallow water, and there are other fishing methods which are used nearshore apart from trawling. In addition, it is unknown how many of those fishing in the coastal waters using spears, rods, and boats are doing so for subsistence, as opposed to recreation, although the assumption is for recreation.

Although there has been no assessment to rate the impact of the nearshore construction activities (particularly the LPP) on nearshore fishing, ERM assesses that the magnitude of this impact is low considering any impact would be local, rare, affect a small proportion of receptors, and have a short duration. However, the vulnerability of these receptors is considered to be medium because near shore fishers may only be able to partially adapt to losing access to nearshore fishing as a result of construction activities. **Therefore, the significance of the impact (construction) will be minor.**

Although the buffer zones around the LPP will limit nearshore fishing in that area permanently, the magnitude of the impact may decrease over time but the vulnerability of receptors is likely to remain the same. **Therefore, the significance of the impact (operations) will be negligible.**

#### Impacts to onshore fish farming (construction and operation)

Background Information: The following background information was obtained through document review:

The Production EIA discusses that *“Fish farming (aquaculture and mariculture) is the main producer of fish in Israel, accounting for 84 percent of domestic fish production in 2005 (UNFAO, 2007). Aquaculture is usually undertaken onshore using traditional earthen ponds, such activities onshore will not be impacted by development operations offshore [beyond the LPP]”*. While the impacts nearshore are not assessed in the Production EIA it does state that *“Fishing is concentrated along the narrow continental shelf, which, though 50 km wide in the south (along Gaza) narrows to only 10 km in the north (Haifa–Carmel Mountains)”* and *“Mariculture is generally focused in the nearshore environment therefore the physical presence of vessels will not impact the nearshore environment within the scope of this EIA”*.

The Feasibility Study details baseline information for the land access requirements that will be required for the onshore components to connect the terminal to the main transmission system at Dor Beach. It states that for the Dor

beach landing, there are a “series of six inactive fish ponds south of Mushav Dor's residential housing, within the designated agricultural area of the Mushav. The ponds, located between the sandy beach and the railway tracks, are long and narrow, in the north-south direction. The ponds are dry, except for the western pond in which is filled by high groundwater... Fish farming includes a project for breeding grouper fish (known locally as locus fish) in closed structures integrated with open ponds, located in the northern portion of the second pond from the west.”

The Feasibility Study also discusses recent local plans to set aside an area of the fish ponds for agriculture and farm structures. “A new plan was approved for two fish ponds that were active until the end of the 1990s for marine agriculture. Part of the area is designated for crop and greenhouse structures (for greenhouse structures adjacent to each other) and part of the area for open ponds for fish breeding. The plan was approved in January 2013, and the reason for its advancement was to utilize the marine agricultural area for profitable use and to create fish farming areas for the sustenance of those working in the fish sector.

*It appears that there has been a renewal of agricultural activity for breeding fish in ponds. This activity had ceased for many years because of the lack of economic feasibility. The project that was established for intensive breeding of grouper (locus) fish in the western ponds testifies perhaps to the economic practicality for expansion of the activity to additional ponds... The conclusion is that determination of the location for the valve station must be in the third pond from the west, and in such a manner that will allow future development of fish farming activities in the pond and minimize the damage to the pond. The ownership of this site is the Israel Land Authority and is leased by Dor settlement.”*

The Feasibility Study is not an impact assessment and therefore the significance of impacts to onshore fish farming was not rated.

Assessment: As discussed in Section 5.4, Noble Energy's community engagement teams have recent contact with the residents of the communities who operate and/or lease the land which will be impacted by the Dor Beach landing construction and tie-in to the INGL station, as well as the long-term operation of the CVS to be built adjacent to the fish ponds. Ongoing communication is focused around the land access requirements and potential compensation (to be determined subject to all legal provisions) for land and access necessary to build the onshore components. The residents of these communities were consulted during the public consultation and disclosure phase of the TAMA EIA and Noble Energy is now working post-permitting in compliance with relevant local laws to provide compensation in a fair and transparent manner, and the Project follows the Natural Gas Law appeals process, where necessary.

The area that will be impacted in the long-term is relatively small and will only affect those in Mushav Dor and Kibbutz Mayan Tzvi who have land use titles. While construction of access roads and the transport of equipment could affect other fish ponds in the area, it will be short-term and will not have an impact on

any long term plans to develop the onshore fishing industry. Therefore, the magnitude will be low. Although it is unknown how the loss of the ponds will impact the economic livelihoods of those in the affected communities, it is planned that the compensation will offset any negative economic impacts. The vulnerability of these receptors is medium; as it is assessed they will have an ability to partially adapt to the change if compensation provided will be for long-term value of the resource loss. Therefore, **the significance of the impact will be minor.**

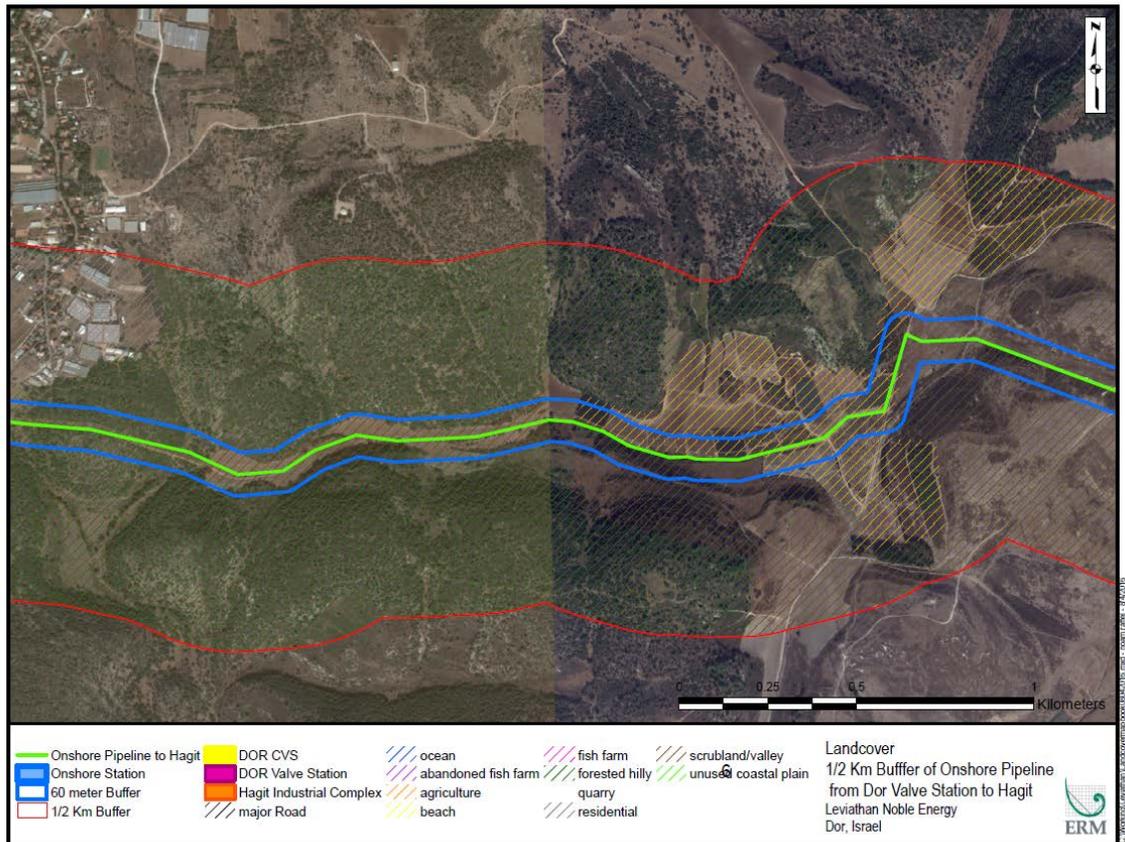
Construction Impacts to agriculture and land use resulting in economic displacement as a result of new condensate pipelines from DVS to Hagit and Haifa

Background Information: The existing impact assessment documentation does not take into consideration the newly planned design of the onshore components from the DVS to Hagit and onto Haifa Refinery. However, the construction will follow the approved TAMA 37/H and other approved TAMA rights-of-way which are covered in the TAMA EIA and generally discussed in the Feasibility Study.

Assessment: Noble Energy is in the process of conducting stakeholder identification and third-party surveying of the land along the pipeline rights-of-way to determine what land will be impacted as a result of the construction works. Ongoing communication will be focused around the land access requirements and potential compensation (to be determined subject to all legal provisions) for land and access necessary to build these onshore components. Noble Energy is committed to working post-permitting in compliance with local laws and IFC PS5 to provide compensation in a fair and transparent manner, and the Project follows the Natural Gas Law appeals process, where necessary.

ERM utilized imagery based analysis to map the social receptors within the 60m buffer zone along the TAMA 37/H and determined that there are a number of agricultural plots which could be potentially impacted by construction (see *Figure 9-2* below for an example of one segment of the route).

FIGURE 9-2: PIPELINE ROUTE FROM DVS TO HAGIT SHOWING 60 M CORRIDOR



While the exact details of the land users is unknown at this time, the construction will be short-term and is unlikely to have an impact on the long-term agricultural livelihoods given that the pipelines will be underground. Therefore, the magnitude will be low. The vulnerability of these receptors is medium; as it is assessed they will have an ability to partially adapt to the change if compensation provided will account for the long-term value of the resource loss (if necessary). Therefore, **the significance of the impact will be minor.**

Impacts to tourism (potential economic displacement), and recreational areas, including hotels and local businesses, and beach users (construction phase)

Background Information: The following background information was obtained through document review:

The Feasibility Study states that for the Dor beach landing, *“Dor Mushav in the Hof HaCarmel Regional Council has some 400 people living in the Mushav. West of the Mushav is a coastal holiday village. ... Dor Beach is a wide sandy beach that is utilized for leisure and vacationing, although it is not an official bathing beach, and does not have beach services. The beach is a spawning area for sea turtles.”* It further states that *“The area of Dor beach and Nachsholim is considered one of the most beautiful and attractive*

*areas in Israel. Leisure and recreational activities characterize the region and include holiday villages, hotel accommodations and other tourist services. The study area is located a little south of the centre of gravity for Israel's beach tourism. Nevertheless, the beach within the study area is a focus of attraction for vacationers who are looking for an open "unofficial" beach."*

In addition, the Feasibility Study discusses a plan for a nature reserve in the Dalia River estuary which could provide future recreational activity that includes visits by tourists, operation of non-motorized sailing vessels along designated routes in the western portion of the northern river basin, as well as hiking and biking tours around the water body. However, it also notes that *"since the landscape signature of the proposed engineering plan [Dor Beach to the INGL station] is the lowest, and since in the area of the proposed route there are no intensive recreational uses that would be liable to create a safety conflict with the pipeline route, it appears that no disturbance or harm would be done to leisure and recreational activities in the area."*

The Feasibility Study is not an impact assessment and therefore the significance of impacts to tourism is not rated.

Assessment: In 2014, ERM conducted a field visit to the Dor Beach and surrounding areas to collect visual socioeconomic baseline data. On the road approaching the Dor Beach area from the main highway, there is a hotel with a fenced-in parking lot, a large horse ranch, the Dor Aquaculture center and warehouses, and the Dor Beach visitor center and parking. On the beach itself, ERM witnessed various other tourism and recreation activities including horseback riding, wildlife tour, bird watchers, beach goes, school camping trips, kayakers and a light aircraft flying the beach at low altitude. In summary, during the off-peak mid-day visit, ERM counted a few tourists at the hotel, several horseback riders, a large school group of over 50 students, and approximately 30 members of a Kayak club.

It was noted that the nearby hotel has many tourism options for using the beach for sunbathing, wildlife viewing and sporting. Guided horseback riding also occurs along the shoreline, up to the ridge, and reaching the fish ponds where construction activities will occur. There is a ranch where the horses are rented on the road leading to Mushav Dor, the beach, and the hotel. The hotel manager said horseback riding is very popular along the beach and the ranch has a good business of renting horses to tourists and hotel guests. A large group of school children and their teachers were also at the beach during the site visit using the beach as a learning environment.

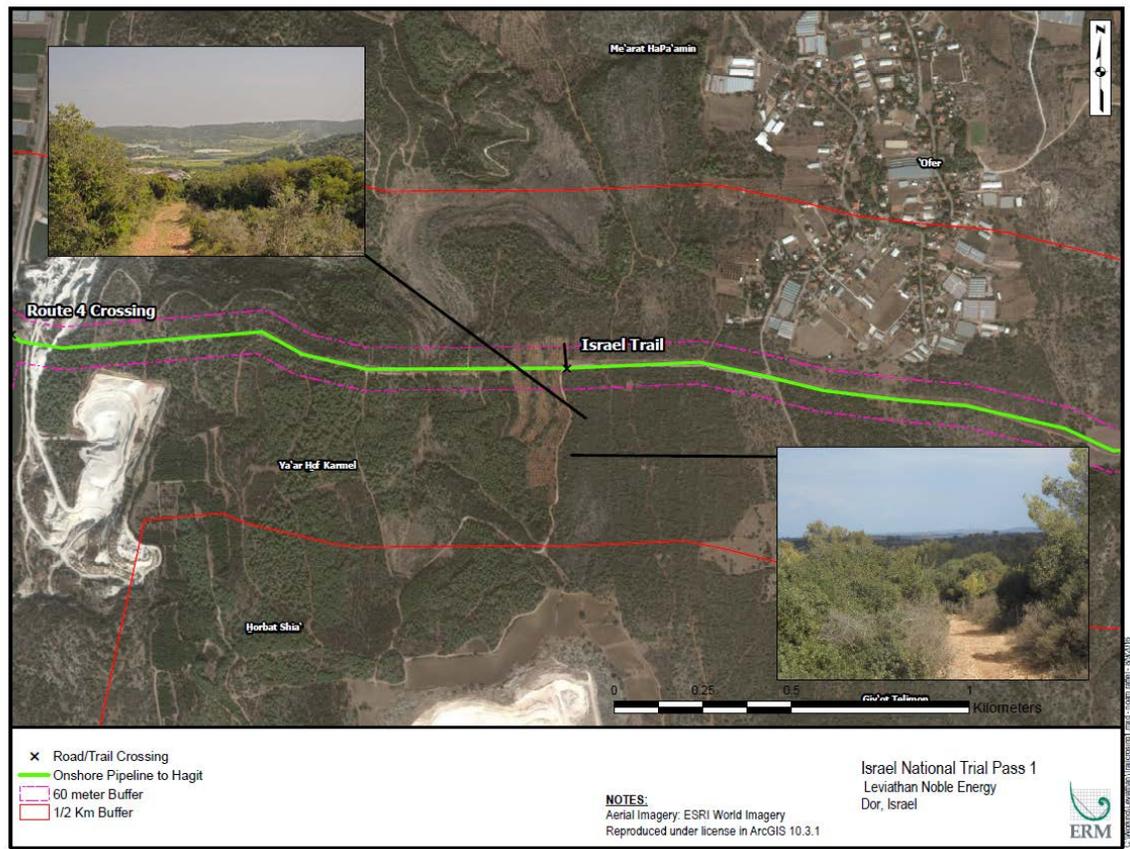
ERM also had a discussion with the local kayak club that had overnighted on Dor Beach. Club members informed ERM staff that there are four national clubs which all frequent Dor beach. They visit the beach for its cultural history (presence of archaeological sites), the ability to camp on the adjacent rock islands, and the wildlife area (turtles, fish, soft coral, and bird watching). The nearest club is based at the Hadera Power Plant to the south. The club often kayaks 4 km out

from the shoreline depending on wave conditions, therefore, it is unlikely that club members will be inconvenienced during construction and operations.

Despite the use of horizontal drilling (HDD) techniques to limit construction impacts onshore during the tie-in to the domestic export pipeline, construction at the beach could impact tourists who come to enjoy the various aspects of the area, and who stay at the hotel and rely on local businesses. ERM assesses that the magnitude of this impact will be low considering it will only occur during the construction phase (several months) and is therefore short-term. The vulnerability of the receptors to adapt to the change caused by the construction will be medium, as they may only be able to adapt in part to the changes in the tourism value of the area as a result of Project activities during construction. Therefore, **the significance of the impact (construction at and around Dor Beach) will be minor.**

It should also be noted that the existing design plans for the new condensate pipelines from the DVS to Hagit within the TAMA 37/H approved rights-of-way cross the Israel National Trail which is a hiking trail that crosses Israel from south to north (see *Figure 9-3* below). The trail is considered a major tourist destination for adventure tour groups; however, it is assessed that the portion of the trail near Hagit which will be impacted by construction of the pipeline is not as traversed as other portions of the trail.

FIGURE 9-3: TAMA RIGHT-OF-WAY AND ISRAEL NATIONAL TRAIL



Without additional information on the trail, ERM assesses that the magnitude of this impact will be low considering it will only occur during the construction phase (several weeks in the specific location) and is therefore short-term. The vulnerability of the receptors to adapt to the change caused by the construction is likely to be medium, as they may only be able to adapt in part to the changes in the tourism value of the area as a result of having to take an alternate route during construction. Therefore, **the significance of the impact (construction at and around the Israel National Trail) will be minor.**

Impacts to tourism (potential economic displacement) and recreation areas as a result of changes to the landscape (operations phase)

Background: The following background information was obtained through document review:

The Feasibility Study states that the Ministry of Environmental Protection regulations require that the eastern boundary of the offshore platform erection be located around 7.5 km from the coastline. [It should be noted that current design of the LPP is 10 km.] It states, *“The landscape architect describes erection of the facility as having high visibility in this area [Dor Beach], which interferes with the view*

*of the open sea, such that it is expected that erection of the facility will have a significant effect on the landscape view. However, the offshore facility is located a considerable distance from the coastline, at least 7.5 km, and it is similar to sailing vessels that fit into the marine expanse, such that the offshore facility will likely become a point of interest. The visibility taken into account is from a number of possibilities – the coastline, population centres along the coast, remote population centres at higher elevations, tourist attractions and infrastructure –roads, highways and railways.”*

In terms of visual impacts as they pertain to the pipeline from Dor Beach to the INGL station, the Feasibility Study provides an analysis of the environmental sensitivity focused on three aspects – nature, landscape and leisure/recreational value. *“The landscape footprint of the valve station is a chain-link fence that is not visible from a distance and the landscape signature of the pipeline is a row of marker columns. This is a negligible landscape signature. The route of the existing gas pipeline is not accompanied by a dirt road, and it may be assumed that the additional pipeline will not require construction of a new service road. In accordance with the outline plan, the pipeline passage will be carried out by HDD drilling that does not require landscape rehabilitation, except for the drilling site.”*

Assessment: The Feasibility Study determined that the buried pipeline from the beach landing to the INGL station will not have any visual effects. Since the CVS in the fish pond will be recessed, it will also not have any effect. The INGL tie in is behind a ridge line so it is also not visible from the main road to the east. The location of the LPP approximately 10 km from the coast will minimize visual impacts. Zikhron and Fureidis Communities (located on the hills approximately 2.6 kilometres to the east of Dor Beach) may be concerned with the LPP permanent change of landscape. Due to the altitude of these communities, visual impacts of the LPP are larger than those to be experienced by beach users, although still not significant.

The magnitude of the impact on certain receptors in affected communities is likely to be medium as the change will be a clearly evident difference from baseline conditions which will affect a substantial area or number of people. It is expected that the vulnerability of the affected communities on the whole will be low as they will be able to adapt to the change. Therefore, **the significance of the impact will be minor.**

#### Impacts to community health, safety, and security, as a result of construction (workforce and traffic)

Background Information: While the Drilling EIA, and to a limited extent the Production EIA, discuss the potential for onshore community health and safety impacts from offshore work, there is no discussion in any of the reviewed document on the potential impacts from onshore activities.

Assessment: The number of offshore construction workers for the offshore portion of Leviathan Project is expected to be commensurate with that of the

previous offshore construction staffing levels and estimated to be approximately 650 workers. These workers will reside offshore on a rotational basis and are not expected to live onshore during the construction phase.

The offshore “Oil Spill Contingency Plan (November 2014)” which has been approved by the government lists the following hospitals as the primary facilities to be contacted and/or used in the event of an emergency: Ichilov Hospital (Tel Aviv); Tel Hashomer (Ramat Gan); Herzeliya Medical Center (Herzeliya); Barzilai Medical Center (Ashdod); Rambam Medical Center (Haifa); Assaf Harofe Medical Center (Ramla); and Ziv Hospital (Safed). These facilities are all significant in size and capable of treating mass casualties if there were a catastrophic event.

For the reasons described above, it is not likely that the offshore workforce would overload the existing health infrastructure, even if there were a catastrophic event, so the magnitude of the impact is considered low. There would be minimal areas of vulnerability so the overall vulnerability rating would also be low. The number of construction workers for the onshore work is expected to be 250 at peak, and 100 on average. These workers, who will most likely be Israeli, will likely be easily absorbed into the region’s health infrastructure with minimal areas of vulnerability. **Therefore, the significance of this impact (overloading existing health infrastructure) is negligible.**

Without knowing the nationalities of the workforce, it is difficult to assess the potential for any disease exposure on the communities in which the workforce will reside and their vulnerability. However, because the change in the number of workers compared to the population is expected to be small for onshore construction workforce, and offshore workers will not be residing onshore, the magnitude of the impact is minimal. **Therefore, the significance of this impact (potential for disease exposure) is negligible.**

There are no anticipated impacts as a result of influx due to the limited nature of the construction work onshore, the transparent hiring mechanisms, and the demographics of Israel’s workforce.

The extent of the construction onshore at Dor Beach is also expected to be minimal (30 workers over a few month period, limited equipment, and vehicular access restricted to dedicated access roads); the potential safety hazards on local communities as a result of Project traffic in the construction phase in this area is minimal. The existing design for the new pipelines to Hagit cross two major roadways (Route 2 and Route 4) but these are also expected to be impacted for a period of days only. **Therefore, the significance of this impact (potential for safety hazards during construction) is negligible.**

Ecosystem services (ESS) are typically defined as the benefits that people obtain from the natural environment, including natural resources that underpin basic human health and survival needs, support economic activities and provide cultural fulfilment.

This Ecosystem Service Scoping and Screening process is designed to ensure that the nexus between humans and the environment are fully understood. The information collected in this process is intended to inform the overarching impact assessment process.

There are four standard categories of ecosystem services: *provisioning, regulating, cultural* and *supporting services*, defined as follows: <sup>(vii)</sup>

- Provisioning services: The goods or products obtained from ecosystems such as food, freshwater, timber, fiber and other goods.
- Regulating services: The benefits obtained from an ecosystem's control of natural processes such as climate, water flow, disease regulation, pollination and protection from natural hazards.
- Cultural services: The non-material benefits obtained from ecosystems such as recreation, spiritual values and aesthetic enjoyment.
- Supporting services: The natural processes such as erosion control, soil formation, nutrient cycling, and primary productivity that maintain other services.

The ecosystem services assessment for the Leviathan Project ("the Project") has been undertaken in keeping with the International Finance Corporation (IFC) 2012 Performance Standards (PS) requirements regarding ecosystem services, widely regarded as current best practice. The IFC PSs require that the assessment considers both potential impacts on ecosystem services and project dependencies on ecosystem services for operation.

The ecosystem services assessment includes the following five steps, each of which aims to address an overarching question:

1. Ecosystem Services Screening: What ecosystem services are present in the Project Area of Influence?

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(vii) Millennium Ecosystem Assessment (MA), 2005.

2. Ecosystem Services Scoping: Which of the ecosystem services present are likely to be impacted or depended on by the Project?
3. Baseline: What is the importance of, and the ability to replace, potentially impacted services for beneficiaries? What is the status and trend of resources affecting key ecosystem services?
4. Impact Assessment: What is the significance of potential impacts on ecosystem services – which are primarily assessed in terms of impacts on affected communities?
5. Mitigation and Management Planning: Using the mitigation hierarchy, how will the Project avoid, minimize or compensate for impacts on ecosystem services? What mitigation and management measures are required to maintain the value and functionality of priority ecosystem services?

The main goal of this document is to advance the supplementary ecosystem services impact assessment for the Project and therefore contains the findings from Steps 1 and 2 (screening and scoping). It should be noted that building environmental credibility and addressing stakeholder engagement concerns as they relate to ecosystem existence value will be covered through the Stakeholder Engagement process as the Project progresses.

### 9.5.1 *ESS Screening*

The objective of screening is to arrive at a comprehensive list of ESS likely to be present in the Project Area of Influence. This step does not attempt to consider the importance of the services to beneficiaries or the likelihood of the Project impacting them; it simply asks whether a service is likely to be present or not. The Project Area of Influence (AoI) includes both the offshore and onshore Project components.

*Table 9-1* presents the ecosystem services screening results for the Project's direct Area of Influence. To complete the first column, information from existing baseline and impact assessment information was reviewed to determine whether an ecosystem service (service to human population in the direct Area of Influence) is known to be present in the Project AoI (+), known to be absent or irrelevant to the AoI (-), or which could exist but have not been mentioned or discussed in relevant Project documents and have therefore been screened as unknown (?). Only those that are present in the AoI (+) have been carried over into the scoping phase. ERM has used professional judgement to determine whether or not to carry over each unknown (?) ecosystem service, based on the likelihood that a service may or may not be existent in the area in cases where there is insufficient data to formally scope out the ecosystem service. An example of this would be to scope out hunting of bushmeat, as it is not a common practice in the area, despite this ecosystem service not being explicitly scoped out in the baseline and impact assessment documents.

TABLE 9-1 LEVIATHAN ECOSYSTEM SERVICE SCREENING<sup>viii</sup>

Ecosystem Service	Description, Examples	Presence in AoI	Scoping
<b>Provisioning Services</b>			
Food: wild-caught fish and shellfish & aquaculture	Fish caught for subsistence or commercial sale; Fish, shellfish, and/or plants that are bred and reared in ponds, enclosures, and other forms of fresh- or salt-water confinement for harvesting	+	Y
Food: wild plants, nuts, mushrooms, fruit, honey	Fruit, nuts, wild plants, etc. collected in natural areas for consumption or sale	?	N
Food: wild meat	Animals hunted for primarily for food (recreational hunting is covered separately under cultural services)	?	N
Food: cultivated crops	Annual and permanent crops grown for subsistence use and commercial sale	-	N
Biomass for livestock production	Sedentary and nomadic livestock farming supported by native forage plants	+	Y
Biomass fuel	Wood, dung and plant matter collected for charcoal, fuel	?	N
Timber and wood products	Wood collected for local use or for sale as timber, wood pulp, paper – wood is used in house construction (importance varies by community) – confirm if locally sourced	-	N
Non- wood fibres and resins	For example, cane, palm, straw, cotton, hemp, twine and rope, natural rubber	+	Y
Freshwater - household use	Freshwater for bathing, drinking, laundry, household use	-	N
Freshwater - irrigation & industry	Freshwater for irrigation or industrial use	?	N
Natural medicines, pharmaceuticals	Natural medicines, biocides, food additives, pharmaceuticals and other biological material for commercial or domestic use	-	N

<sup>viii</sup> Key: Column 1: known to be present in the Project AoI (+), known to be absent or irrelevant to the AoI (-), could exist but have not been mentioned or discussed in relevant Project documents and therefore unknown (?). Column 2: Y = Scope into the Ecosystem Services Assessment; N = Scope out of the Assessment

Ecosystem Service	Description, Examples	Presence in AoI	Scoping
Ornamental resources	Pelts, carved or decorative animal products, live animal trade	?	N
Genetic resources	Genes and genetic information used for animal breeding, plant improvement, and biotechnology	-	N
<b>Regulating Services</b>			
Regulation of air quality	The influence ecosystems have on air quality by extracting chemicals from the atmosphere (i.e., serving as a “sink”) or emitting chemicals to the atmosphere (i.e., serving as a “source”)	+	Y
Climate regulation: global	Vegetated areas sequester CO <sub>2</sub> , with implications for global climate change	-	N
Climate regulation: local	Regulation of temperature, shade air, and quality by vegetated areas	-	N
Regulation of water timing and flows (including flood regulation)	Influence ecosystems have on the timing and magnitude of water runoff, flooding, and aquifer recharge	+	Y
Water purification and waste treatment	Role played by vegetation in the filtration and decomposition of organic wastes and pollutants and the assimilation and detoxification of compounds	-	N
Shoreline protection	Role of natural habitats (e.g. wetlands, beaches, reefs) in protecting crops, buildings, and recreation areas from waves, wind and flooding from coastal storms	-	N
Fire regulation	Regulation of fire frequency and intensity (e.g., dense forest can provide firebreaks)	-	N
Pest regulation	Predators from forests, grassland areas, etc. may control pests attacking crops or livestock	-	N
Disease regulation	Influence ecosystems have on the incidence and abundance of human pathogens	-	N
Erosion regulation	Role of vegetation in regulating erosion on slopes and riparian areas	-	N
Pollination	Birds, insects and some small mammals pollinate certain flora species, including some agricultural crops	?	N
<b>Cultural Services</b>			
Spiritual or religious value	Natural spaces or species with spiritual or religious importance	?	N
Traditional practices	Cultural value placed on traditional practices such as hunting, fishing, crafts and use of natural resources	?	N
Tourism and Recreation	Use of natural spaces and resources for tourism or local recreation (e.g., swimming, boating, fishing)	+	Y
Aesthetic value	Cultural value placed on the aesthetic value provided by landscapes, natural landmarks	+	Y
Educational and inspirational values	Information derived from ecosystems used for intellectual development, culture, art, design, and innovation	?	N

Ecosystem Service	Description, Examples	Presence in AoI	Scoping
Non-use value of biodiversity (e.g. existence, bequest value)	Species and areas valued globally as of high conservation value	+	Y
<b>Supporting Services<sup>ix</sup></b>			
Habitat Provision	Natural spaces that maintain species populations and protect the capacity of ecological communities to recover from disturbances	+	Y
Primary production	Formation of biological material by plants through photosynthesis and nutrient assimilation	-	N
Nutrient cycling	Flow of nutrients (e.g., nitrogen, sulphur, phosphorus, carbon) through ecosystems	-	N
Water cycling	Flow of water through ecosystems in its solid, liquid, or gaseous forms	+	Y
Soil formation	Natural soil-forming processes throughout vegetated areas	-	N

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<sup>ix</sup> Supporting Services are intermediate ecological outcomes that are not directly used but rather support other ecosystem services. Therefore, they are not screened in for direct assessment in the ES Assessment. An exception is made for Habitat Provision, which is sometimes valued as an “end-use” service by stakeholders in addition to its supporting role.

## 9.5.2 *ESS Scoping*

The ecosystem services scoping exercise refines the list of ecosystem services so that the impact assessment considers only those services that will potentially be impacted or depended on by the Project. The level of impact (insignificant through high) will be determined through the impact assessment process, most notably in ERM's Technical Report – PS 6 Habitats Assessment (August 2016) as well as ERM's Social and Health Impact Discussion (updated August 2016). As noted above, the primary output of the scoping exercise comprises a list of potentially impacted ecosystem services to be assessed through the impact assessment process.

The scoping exercise draws upon the existing baseline and impact assessment documents, and the screening results. *Table 9.2* presents the ecosystem services scoping results. Notably, all services identified as existing (+) have been scoped in, while services with insufficient or missing information (?) have been scoped out. However, it is anticipated that natural spaces or species with spiritual or religious importance may exist in the Project AoI, and further information may be collected through stakeholder engagement activities as the Project progresses.

This scoping exercise does not take into account planned mitigation measures. Some of the potential impacts identified here may ultimately be considered not significant, however, the scoping exercise is purposefully inclusive, in order to clearly show the analytical approach used to identify and consider all potential impacts. *Table 9.2* also considers perceived impacts which may be identified through stakeholder consultation as it progresses throughout the life of the Project.

TABLE 9-2: ECOSYSTEM SERVICES SCOPING RESULTS

Service	Description and Examples in the AoI	Beneficiaries (Stakeholders)	ES Linkages (ES that Support this Service)	Project Dependence	Scoped In or Scoped Out	Reasoning / Sources of Impact
<i>Provisioning Services</i>						
Food: wild-caught fish and shellfish & aqua-culture	<p>There are deep-sea and nearshore commercial fishermen in the offshore AoI, as well as nearshore fish farming and fishing-based tourism in the onshore- AoI.</p> <p>There are few deep-sea commercial fishermen although they may be more vulnerable to changes in access to fishing areas than other fishing groups. There is evidence of near-shore fishing, although information is largely unavailable to confirm if this is primarily recreational fishing, or if there are subsistence components to the activity. Onshore, there is a documented strategy for increasing aquaculture in the area, although this does not appear to be notably impacted by the Project.</p>	<p>For offshore: Deep-sea fishermen, although evidence of the number of population to be impacted is not available.</p> <p>Nearshore: Kayakers, free-divers, rod and line fishermen and fishermen from small boats. Extensive fishing, but it is unclear to what extent this is commercial, recreational and to what extent (if any) this is subsistence.</p> <p>Onshore: potential aquaculture farmers, looking to restart previously established industry.</p>	Marine water habitat	No	Scoped In	<p>The Leviathan Field is located approximately 125 km from the shore, where the Production EIA indicates that the development area is “not expected to be utilized significantly by commercial, artisanal or recreational fishermen” – although does not scope them out completely. It is anticipated that shifts to fishing patterns as a result of project-related buffer zones, may have some minor impacts to commercial and/or subsistence fishing.</p> <p>The Production EIA indicates the presence of well over 20,000 fishermen in offshore and near-shore waters, but does not address potential impacts of nearshore activities. The Production EIA assesses a hydrocarbon spill and nearshore fishing (assessed as low).</p> <p>Onshore aquaculture in the Dor region is in the process of being reinvigorated, but is slow, following its abandonment approximately 20 years ago as a result of financial unfeasibility.</p>
Biomass for livestock production - primary production of	According to the Section 4.9 of the TAMA EIA, there is some broad livestock farming that uses onshore low-shrub land for grazing, although the information	Livestock farmers	<p>Pollination</p> <p>Soil quality</p> <p>Pest control</p>	No	Scoped In	<p>Onshore project activities are located on land that overlaps with ecological corridors, and shrub-land that is documented as being used for livestock grazing.</p> <p>Productivity of vegetation can be decreased by</p>

Service	Description and Examples in the AoI	Beneficiaries (Stakeholders)	ES Linkages (ES that Support this Service)	Project Dependence	Scoped In or Scoped Out	Reasoning/ Sources of Impact
forage	does not detail if the agriculture is subsistence or commercial, or the extent of it. The report also does not clarify if the land is public or private, and if livestock farmers would have to pay for additional access to land or brush as a result of the Project.					dust accumulation on leaves and reproduction of flora can be inhibited by dust on flowers, and grazing animals.
Air quality (dust) regulation	Vegetation often captures dust and particulates, and in some cases can serve as a barrier, helping to reduce dust impacts on specific communities or habitats, particularly in the onshore ecological corridor.	Livestock farmers due to reliance on vegetation for their livestock	Tourism	Yes	Scoped In	The Project will generate dust along transport corridors, with potential impacts to air quality and water quality. Existing and newly planted vegetation will reduce dust impacts (Project Dependence), although as stated in the TAMA EIA Section 4.9, depending on the species planted (trees) there could be secondary impacts to biodiversity which address issues such as pollination, pest regulation and erosion regulation (particularly if there are impacts to the shrub-dwelling bird species. Restoration/ revegetation with (locally relevant) native species (excluding the planting of trees) would be considered an ecosystem service mitigation measure. Additional dust and damage to air quality could also impact the experience of tourists in the area close to the Israel National Trail.
Regulation of water timing and flows (including flood control)	Influence ecosystems have on the timing and magnitude of water runoff, flooding, and aquifer recharge  Vegetation influences the hydrological balance by enabling evapotranspiration and infiltration into soils, thereby regulating surface runoff. This can influence	Aquaculture farmers and livestock farmers	Livestock production, aquaculture and tourism	No	Scoped In	The TAMA EIA Section 4.9 discusses the location of the Hagit Facilities in the Tut Spring watershed, reporting that it “may alter the runoff and catchment regime either completely drying up or decreasing the amount of water flowing through the stream and springs feeding it...Moreover, the stream traverses the installation such that the gully can be expected to be physically damaged and

Service	Description and Examples in the AoI	Beneficiaries (Stakeholders)	ES Linkages (ES that Support this Service)	Project Dependence	Scoped In or Scoped Out	Reasoning/ Sources of Impact
	flooding events and erosion as well as water flows in rivers. Major points of concern here is the Tut Stream and Tut Spring watershed where the Hagit Facilities are located.					polluted runoff from the facility might potentially flow downstream." It should be noted that the current pipeline design shows it intersecting with the Israel National Trail a number of times, so concerns about water within that context, may affect tourism.
Tourism and recreation	The Feasibility study identified the Mushav and Dor Beach landing as a draw for local tourism (particularly vacationers and beach tourism). It is considered "one of the most beautiful and attractive areas in Israel". The report also states that the beach is a nesting area for sea turtles which could also serve as a secondary tourism draw. Also, "bird islands" located in adjacent nearshore waters are a tourist attraction.	Local populations  Local small business owners - particularly those associated with fishing, kayaking, free-diving or boating	Aesthetic value  Marine water quality  Regulation of water timing and flows  Habitat provision	Yes	Scoped In	Changes in the quality of water in the Dor and Mushav beach landing area or significant disruptions in flow could affect tourism to the region. Perceived water impacts could also lead to a decline in visitors.  See: Habitat Provision: Turtle nesting areas.  Fishing, kayaking, free-diving and boating activities are all linked to the natural beauty of the area, not to mention the lodging and food-related business onshore. Visible impacts on the ocean and beach habitat could impact visitor enjoyment and ultimately visitor numbers.
Aesthetic value	Cultural value placed on ocean, landscapes with "undisturbed" habitat, and negative reactions to loss of views - likely influenced by overall impression of the Project or industry in general. Of particular importance when considering the condensate pipeline and its proximity to Israel National Trail.	National level interest groups; beach goers	Tourism	No	Scoped In	The Feasibility study discusses the plan for a nature reserve in the Dalia River estuary which could provide future recreational activity that includes visits by tourists, operation of sailing vessels and hiking and biking routes near the water body - which could be undermined by the pipeline route.  Construction impacts and an increased risk of hydrocarbon spill can negatively impact the aesthetic value of the region.
Existence value (non-use)	This service refers to the value people place on protecting species and habitats considered 'iconic' or otherwise having conservation	National and International stakeholders	Habitat Provision  Tourism	No	Scoped In	This is addressed primarily within the context of possible damages to shrub-dwelling birds mentioned in the TAMA EIA, as well as the draw of the beaches, and the recreational

Service	Description and Examples in the AoI	Beneficiaries (Stakeholders)	ES Linkages (ES that Support this Service)	Project Dependence	Scoped In or Scoped Out	Reasoning/ Sources of Impact
	<p>value, such as marine mammals and sea turtles.</p> <p>This is of particular importance near the Israel National Trail, and at Dor Beach.</p>					<p>activities available there.</p> <p>Existence value is a potential impact if a resource is damaged or destroyed (it ceases to exist as it was, in that context), or if access to it (often in the form of tourism) is limited. Measurement of this service would be determined by the duration, extent and reversibility of the impact.</p>
Habitat Provision	Dor Beach is known as a sea-turtle nesting habitat, as well as for the presence of fish, soft coral and bird watching.	N/A (Supporting Service)	Tourism/ Recreation	No	Scoped In	The Project activities adjacent to Dor Beach are sensitive on account of marine-bird and sea-turtles areas - noise, vibration and lighting impacts could impact nesting activities and disorient or otherwise harm young, potentially impacting the species at a local level.

### 9.5.3 *Impact Assessment and Recommendations*

The ecosystem screening and scoping activities have provided a breakdown of services which intersect both social and health, and habitat aspects in the Project AoI. The services identified and scoped in refer broadly to potential impacts on leisure and tourism associated with fishing, hiking and visits to see natural resources (including turtle nesting areas, bird islands and the Israel National Trail, amongst others). These services are as follows:

- Food: wild-caught fish and shellfish & aquaculture;
- Primary production and forage;
- Air quality regulation;
- Regulation of water timing and flows;
- Tourism and recreation;
- Aesthetic value;
- Existence value; and
- Habitat provision.

As stated previous sections, the next step in this process is to ensure that the findings of this study are included in current and ongoing stakeholder engagement activities. It should be noted that while a physical impact may be insignificant or minor, community perceptions of said impact may be greater, and so mitigation of perceived impacts must be addressed on those terms.

Given that none of the potential impacts identified appear to be of notable magnitude, it is anticipated that relevant management actions will be limited to ongoing stakeholder engagement and communication. The Stakeholder Engagement Plan (SEP) offers the vehicle for this on-going engagement.

Within the SEP, engagement activities during construction should incorporate data collection methodologies to evaluate the effectiveness and efficiency of existing impact management plans, and to ensure relevant disclosure to affected groups to manage perceived impacts.

Consultations should include discussions about the status of any “unknown” (?) ecosystem services in order to determine existence. Any additional services scoped in during consultation would then need to be assessed for potential impacts and existing management plans evaluated to confirm if they also address any new impacts.

Stakeholders should continue participating in measurement and evaluation of these management plans to determine relevant and effectiveness.

## 10.0 HUMAN RIGHTS DUE DILIGENCE

### 10.1 INTRODUCTION

ERM, on behalf of Noble Energy, has undertaken a Human Rights due diligence assessment to assist Noble Energy in identifying, understanding, and addressing any significant human rights or social supply chain risks related to the Project. The assessment was performed against the IFC Performance Standards, UN Guiding Principles, and International Labor Organization (ILO) practices utilizing a variety of resources, including but not limited to:

- Danish Institute for Human Rights (DIHR), Human Rights Compliance Assessment Quick Check, 2012;
- IPIECA, Human Rights Due Diligence Process Guide, 2012; and
- Global Compact, Self-Assessment Tool (Human Rights Principle), 2010.

This due diligence focuses on supply chain, security, and labor and working conditions; topics that have the tendency to trigger human rights impacts on oil and gas projects. This voluntary process is complementary to the environmental and social risk and impact identification process, with the purpose of ensuring that the Project does not violate human rights. The Due Diligence process also allows Noble Energy to ensure there is a system in place to proactively monitor potential issues and concerns throughout the Project's lifecycle.

### 10.2 PURPOSE AND GOALS OF DUE DILIGENCE

According to UN Guiding Principles on Business and Human Rights, companies should respect human rights and seek to prevent or mitigate potential human rights issues that may be caused directly by a Company's projects or operations, or by project partners and suppliers. According to IFC Performance Standard 1, *"each of the IFC Performance Standards has elements related to human rights dimensions that a project may face in the course of its operations. Due diligence against these Performance Standards enables companies to address many relevant human rights issues in its project."* The UN Guiding Principles, the IFC Performance Standards and other ILO standards are the benchmark for guiding companies in ensuring respect for human rights.

The goals of this Due Diligence assessment are to:

- Identify, account for, and mitigate (where possible) actual or potential human rights impacts<sup>x</sup>;
- Review policies and processes to manage human rights issues;
- Confirm commitment to respect human rights through a policy endorsed by senior leadership;
- Confirm communication takes place with stakeholders about how issues will be addressed; and
- Confirm a community feedback mechanism is in place to address issues raised by the community.

All project- and company-related documentation was reviewed and interviews were conducted with Noble Energy’s environmental, social, security, safety, and operations teams to assist in the identification of potential Project-related human rights impacts and methods for mitigating or responding to these potential impacts. The interview questions and due diligence focused on the four key areas most germane to the oil and gas industry: 1) Employee and Labor Relations; 2) Provision of Security; 3) Community Engagement; and 4) Supplier Engagement.

The key Project activities related to each of these four areas were benchmarked using the aforementioned standardized and internationally recognized tools. The Due Diligence assessment covered any potential adverse human rights impacts that the Project may cause or contribute to through its own activities, or which may be directly linked to its operations, products, or services by its business relationships (which for the Project, primarily refer to first-tier suppliers and security providers.)

The Due Diligence process recognises that the human rights risks may change over time as the Project evolves. Therefore it is an iterative process whereby business operations and operating context should be examined on a regular basis, especially once the Project moves into the operation phase.

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<sup>x</sup> An “actual human rights impact” is an adverse impact that has already occurred or is occurring. A “potential human rights impact” is an adverse impact that may occur but has not yet done so. Potential impacts are analogous to human rights risks, i.e., the risks that an activity may lead to one or more adverse human rights impacts. An “adverse human rights impact” occurs when an action removes or reduces the ability of an individual to enjoy his or her human rights.

Human rights challenges vary greatly depending on the activities a company is engaged in. Similarly, many countries have vastly different human rights conditions according to government laws and religious or cultural practices. Companies should therefore systematically consider the human rights situation in the country in which they operate, and seek to identify areas where they may risk involvement in human rights violations. Understanding the national context is an important first step in the Human Rights Due Diligence process.

Israel has ratified the main International Human Rights Conventions and Legislation, including the Universal Declaration of Human Rights (1948) / Geneva Convention (1949); however, it is not party to any additional protocols, other than the Optional Protocol on Children in Armed Conflicts. It has also not accepted the jurisdiction of any of the treaty body committees and has expressed important reservations on the conventions it has ratified which relate to its legal obligations, right to religious law and its intention to not become a party. This is in large part due to the fact that Israel has domestically declared a State of Emergency since 1948. The declaration reads that,

*“Since its establishment, the State of Israel has been the victim of continuous threats and attacks on its very existence as well as on the life and property of its citizens. These have taken the form of threats of war, of actual armed attacks, and campaigns of terrorism resulting in the murder of and injury to human beings... The Government of Israel has therefore found it necessary, in accordance with the said Article 4, to take measures to the extent strictly required by the exigencies of the situation, for the defence of the state and for the protection of life and property, including the exercise of powers of arrest and detention.”*

According to the U.S. Department of State’s 2015 Human Rights Report for Israel, as well as the internationally recognised Human Rights Risk Index for 2015 (which assesses 24 key human rights areas, including human security, labor rights, civil and political rights and judicial process), Israel is rated ‘high’ concern in regards to infringements on human rights. While it is not within the role of Noble Energy to pass judgement on the situation in Israel, it is important to understand the human rights related context in which the company operates.

As previously discussed, the Project is not considered high risk from a socio-economic standpoint and there are no significant socio-economic triggers which would necessitate a full Human Rights Impact Assessment. However, recognising that Israel is a country where there are risks concerning human rights commitments on the national level, it is good international industry practice to undertake voluntary Human Rights Due Diligence.

A summary of the potential human rights impacts and recommended mitigations are provided below.

## 10.4 ASSESSMENT

### 10.4.1 *General Policies and Procedures*

During the Due Diligence process, corporate and Project policies, plans and procedures were reviewed to confirm there exists a commitment from senior management to protect and manage human rights. In addition, contractual language was reviewed to confirm that business relationships, including subcontracts and first-tier supplier relationships, are bound by the same policies and procedures.

Noble Energy abides by its Corporate Social Responsibility Policy which outlines the Company's Guiding Principles and commits to human rights by:

*"Recognizing that governments bear primary responsibility for protecting human rights, within our sphere of influence we share the goal of promoting respect for the rights set forth in the Universal Declaration of Human Rights. We are committed to provide security in a manner that is consistent with international human rights, and are guided in this effort by the Voluntary Principles on Security and Human Rights."*

The Policy also states, *"We encourage our business partners to share our commitment to corporate social responsibility."*

These corporate commitments are also explained in similar language in the Master Services Agreement, Purchase Order documentation, and Compliance Questionnaires required for all contractors and suppliers. Through Noble Energy's broader company Compliance and Ethics Program and the company's Code of Conduct, respect for human rights is part of contractual relationships and adhered to in direct business activities.

ERM did not identify any human rights concerns with respect to policies and procedures but supplier and third party relationships should be monitored as the Project progresses.

### 10.4.2 *Labor and Working Conditions*

Workers are an important group of stakeholders who may be subject to a range of direct impacts, potentially both beneficial and adverse, in terms of access to employment, the terms and conditions of that employment, and their health, safety and welfare while working on the Project.

Noble Energy's Global Management System (GMS) provides a framework for establishing performance goals. The GMS incorporates Noble Energy's Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems (OSHMS), such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06, and ANZI Z10 with Environmental Management Systems such as EPA RMP, ISO 14001

and World Bank Group standards and guidelines. The ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the lifecycle of the Project.

The GMS provides for (i) identification of potential hazards to workers, particularly those that may be life-threatening; (ii) provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) training of workers; (iv) documentation and reporting of occupational accidents, diseases, and incidents; and (v) emergency prevention, preparedness, and response arrangements. Noble Energy also has an Emergency Management Plan which provides general direction for activities associated with emergency or disaster situations and is meant to provide the appropriate guidance for strategic thinking and decision-making as it relates to “All Hazards” emergency management planning.

In Israel, Noble Energy has partnered with Rescue One to develop and provide the country’s first oil and gas industry EHS training program (for both employees and contractors). Noble Energy also continues to manage occupational health and safety for direct hire and subcontractor personnel throughout all Project phases in accordance with the appropriate industry-leading US Gulf of Mexico requirements, namely Occupational Health and Safety Administration (OSHA) Regulations pertinent to the offshore Oil and Gas industry. The onshore facilities will be regulated in accordance with relevant Israeli legislation and regulations.

Considering the Project is abiding by the GMS, and also has Project-specific health, safety, and environment processes in place, the Due Diligence process did not identify any potential impacts in relation to Labor and Workforce Health and Safety. There are adequate processes and measures for safe working conditions, which is a primary factor for compliance with human rights.

In terms of other employment practices for workforce compliance with human rights (such as freedom of association and effective recognition of the right to collective bargaining), company policies adhere to international standards and are made available to all Project personnel through the Israel Employee Policy Manual, as well as the employee and contractor language in employment contracts.

The Policy Manual outlines employee rights under national labor and employment law (which also addresses employment discrimination, minimum wage, etc.), including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur. While it does not discuss specific collective agreements, it does provide working conditions and terms of employment which are consistent with best practice and which align with national legislation. Israeli legislation recognizes workers’ rights to form and to join workers’

organizations of their choosing, without interference. Noble Energy, in its commitment to comply with national legislations, does not seek to influence or control these mechanisms.

As part of good international industry practice, Noble Energy provides safe and healthy working facilities for all workers on site, and residential facilities provided to workers are safe and sanitary, meet their basic needs and meet the IFC's guidance for worker accommodations. For other similar construction projects related to Noble Energy's operations in Israel, all workers on sites (including offshore) are provided health and safety training and are provided with adequate protective gear. It is anticipated that Noble Energy will also provide the same for the Project construction staff.

The exact number of offshore workers needed during the construction phase of the Project is estimated to be 650. These workers will work and reside primarily offshore on a rotational basis, and will be provided the same level of protection in terms of their employment, health, safety, and welfare, as is currently in place for Noble Energy's existing operations. During the operational phase, the number of staff offshore will be approximately 55, which is consistent with Noble Energy's other offshore staffing levels (e.g., Tamar Platform and Mari B Platform). Onshore construction staffing levels to build the pipelines leading from nearshore to the DVS are expected to peak at 250 and average 100.

Due to the fact that construction and operations will follow the same aforementioned stringent company labor and working conditions, policies and procedures, there are no anticipated concerns from a Human Rights perspective during construction and operation.

Regarding the right to work, just and favorable conditions of work and right to privacy, companies should have a worker grievance mechanism in place to confirm compliance with Human Rights. Noble Energy has a global worker grievance mechanism, NobleTalk, for review and resolution of concerns submitted from workers. NobleTalk is integrated into contractor orientation/awareness training.

Noble Energy will include language in primary supply contracts and/or scopes of work, which requires contractors to establish a worker grievance mechanism (in line with NobleTalk) and generally support Noble Energy's efforts to align all work with IFC PS, as well comply with relevant national legislation and regulations.

ERM did not identify any human rights concerns with respect to labor and working conditions. The recommendations and requirements are captured in the Labor Management Plan as part of the Environmental and Social Management Framework.

### 10.4.3 *Local Communities*

The site visit to Dor Beach confirmed that there is one local community in the vicinity (within 2 km) of the onshore Project components [horizontal directional drilling (HDD) of pipeline, pipeline corridor, coastal valve station and Dor Valve Station] which may be impacted by Project activities (Mushav Dor) and one community outside the area (Kibbutz Mayan Tzvi) with rights to use land in the area. Separate from this study, ERM evaluated potential social and health impacts for the landfall construction activities at Dor and determined any impacts would be minor in significance, if not negligible. Noble Energy's community engagement teams have frequent contact with the residents of these communities in relation to the small parcel of land on which the coastal valve station will be built and temporary access to an agricultural area adjacent to the beach, which will be necessary to build the onshore components. The residents of Mushav Dor and Kibbutz Mayan Tzvi were consulted during the public consultation and disclosure phase of the EIA by the Government of Israel, and Noble Energy is now working to provide compensation in compliance with local laws.

Also separate from this study, ERM evaluated potential social and health impacts from the potential onshore construction activities from Dor to Hagit and Haifa as part of the planned pipeline expansion. For any stakeholders impacted by land use or access, Noble Energy and the Government of Israel will engage as dictated by applicable legislation and regulations. Furthermore, Noble Energy community engagement teams will disclose construction-related information to neighboring communities and engage in two-way dialogue as the construction progresses.

There is also a likelihood that despite the use of HDD to minimize impact to Dor Beach users, that the onshore construction may still impact tourist and recreation areas (due to construction of access roads, onshore construction vehicles, etc.), as well as in the operations phase (buffer zones around the LPP could limit fishing). Although these potential impacts were assessed as negligible to minor, they could result in the perception of economic displacement for business activities in the area (e.g., fishermen, commercial shippers, and individuals working in the tourism industry). To offset any potential impacts, Noble Energy is assessing the need for mitigation measures in conjunction with its Stakeholder Engagement Plan for the Project.

For the offshore components of the Project, the Production EIA indicates that the LPP will be surrounded by a 1,500 m (radius) marine exclusion zone for which permission to enter must be obtained prior to vessel approach. This means the area will be closed to any fishery activities. During construction, Noble Energy will establish a 500 m radius safety exclusion zone around the pipelay vessel while it is operating, and it will be patrolled by a standby vessel to keep any unauthorized vessels clear of the construction zones. From a socio-economic

standpoint, the only stakeholder group who could be adversely affected by the offshore operations at the LPP is deepsea fishermen (adverse effect on their livelihoods). The LPP is too far from the shore to be impacting recreational users such as kayakers and nearshore fishermen. However, the EIA process determined that there would be no significant impact due to the buffer zones that will be in place, as well as water depths and the oligotrophic nature of the environment which means the baseline level of fishing in the area is already minimal. During construction, the impacts on deepsea and recreational fishermen will be temporary and limited, and therefore minimal. In terms of the impact on illegal trawling practices in the vicinity of offshore construction, the Drilling EIA assessed it would be also minimal.

Noble Energy has advised that it anticipates up to a 1.5 km security buffer (“no-go”) zone around the LPP which could limit nearshore fishing and recreation in that particular area. There could also be landscape and visual concerns which could deter tourists (although unlikely considering the large power plant visible from the beach to the south). These potential issues are also being addressed by Noble Energy through the Stakeholder Engagement Plan and the related Community Feedback Mechanism.

Through the Government of Israel’s extensive public consultation and disclosure process as part of the TAMA 37/H process, there were opportunities for communities to express opinions and objections regarding any Project-related decision affecting their human rights (including, but not limited to, access to resources and livelihoods, perceived burden on local food or water supply, loss of land, pollution of air, or contamination of water.) During these public consultation processes, many of the comments captured in the Government of Israel’s Investigator’s Report (an independent report aimed to address stakeholder comments in the EIA processes) were based on design plans that involved significant onshore components. Due to stakeholder concerns, the design was shifted for all gas processing to be conducted offshore. While some stakeholders were concerned over their security and the implications of expansion of the oil and gas industry on the nation as a whole, these comments were addressed at the national level by the Government of Israel. Noble Energy was not responsible for the outcome of the engagement but is now being proactive with engagement with local communities within the Project’s current Area of Influence.

Noble Energy has committed to the implementation of a Community Feedback Mechanism which will be implemented at the national- and community-level for all its projects in Israel. This Community Feedback Mechanism will enable the company to respond in a timely and appropriate manner to community concerns, and address potential impacts appropriately. With the implementation of the Community Feedback Mechanism and continued stakeholder engagement, ERM does not anticipate any human rights concerns with respect to local communities.

#### 10.4.4 *Supplier Engagement (Social Issues Only)*

The Due Diligence assessment of human rights not only included potential direct impacts caused by Noble Energy construction and operation, but also the activities of other practices associated with the Project. This is particularly important as construction of the offshore components of the Project area will continue to be undertaken primarily by contractors and subcontractors. Furthermore, equipment, parts, and manufacturing contracts have been and will continue to be let by suppliers outside of Israel, which raises the potential risk of harmful child or forced labor within the supply chain, as well as occupational health and safety risks, if not properly managed.

Good international industry practice recommends that companies advise third party suppliers and partners to comply with corporate standards on human rights practices, and reinforce the message with human rights clauses in contractual agreements, regular questionnaires, and on-site monitoring. The requirements set forth by Noble Energy as part of the broader company Compliance and Ethics Program and the company's Code of Conduct, confirm that respect for human rights is part of contractual relationships and is adhered to in all business activities. Noble Energy has also built in clauses which require supplier compliance with the company's efforts to align with IFC PS.

While there are no specific processes in place to monitor the supply chain to ensure there is no use of forced, compulsory, or child labor (either directly or in supply or processing chains), the company does conduct a compliance check of all suppliers to confirm they have had no human rights related infringements in the past. Noble Energy's contractors, subcontractors, and first-tier suppliers are required to adhere to all of Noble Energy's policies as they pertain to human rights. In addition, Noble Energy has also built in contract language which allows the company to audit suppliers' books and records at the company's discretion for human rights related concerns.

Noble Energy has provided a list of its major awards for the Project, primarily for equipment, which includes the type of supplier/manufacturer/third party, value of award, and country of origin/manufacture. Noble Energy is still in the early stages of its tendering process and has not yet made any recommendations on work locations/country of origin. Generally, Noble Energy anticipates that there is a high level of likelihood that the U.S., Europe and Singapore will be involved to some extent for the various major work packages. These countries identified by Noble Energy are of generally at low risk for child and forced labor, and generally have stringent occupational health and safety laws and regulations. Therefore, the Due Diligence assessment did not find any significant potential human rights impacts related to the supply chain. However, Noble Energy should continue to assess its primary supply chain on an ongoing basis with regards to human rights as major first-tier supplier contracts in foreign countries are let. The recommendations and requirements are captured in the

Labor Management Plan as part of the Environmental and Social Management Framework.

ERM did not identify any human rights concerns with respect to supplier engagement.

#### 10.4.5 *Security Provision*

The Due Diligence process examined several factors associated with the provision of private security, following the guidance set forth in the Voluntary Principles on Security and Human Rights.

As outlined by international guidance (Global Compact, 2010), the company is allowed to

*“use security guards to protect its workers and property where this is considered necessary. However, the company should ensure that its security guards, whether directly employed or contracted, behave in accordance with national law and international principles for law enforcement and the use of force. This includes preventing excessive use of force, abuse of power or other human rights abuses by security personnel towards other employees or local communities.”*

The offshore components of the Project once constructed will be protected (on the platform itself) by private security guards contracted by Noble Energy and used on other projects in country. All onshore guards have been trained by Noble Energy in Human Rights, and were contracted through a reputable and world-class international security firm with high standards of training in excessive use of force and abuse of power. Noble Energy also uses its contractual processes to require that provisions are in place for conducting background checks on security staff, as well as monitoring performance. Furthermore, Noble Energy regularly conducts security risk assessments, and establishes security arrangements, including the deployment of private guards, that are proportionate to the security risk.

As dictated by Israeli law, the platform perimeter and offshore construction work is protected by the Ministry of Defense. By law, Noble Energy has no authority to dictate terms or conditions of the protection, or recommend training for public security as it pertains to the Voluntary Principles on Security and Human Rights. While Noble Energy does engage with the relevant authorities so that such security functions are coordinated, the company cannot ensure procedures are conducted in accordance with international human rights principles for law enforcement and the use of force.

The mandatory use of public security offshore does mean there is a heightened level of risk of the security forces infringing upon the rights of local communities and stakeholders, which is outside of Noble Energy’s control. However, the fact that the buffer zones during construction will be temporary, and during operations will remain offshore, the risk of a security incident

involving public security forces is reduced. However, public security force retaliation to a terrorist threat against the facility could still occur.

Noble Energy's Community Feedback Mechanism should be accessible to those who could be affected offshore by public security forces. This will aid the company in monitoring any actual or potential human rights violations which are directly outside of company control.

With the provision of the Community Feedback Mechanism, ERM does not anticipate any human rights concerns with respect to security provision that is within Noble Energy's control.

## 10.5

### CONCLUSIONS

Noble Energy has demonstrated its respect for human rights in a number of ways and is in alignment with internationally recognized best practices. These best practices include seeking to prevent or mitigate potential human rights issues that may be caused directly by the company's operations or by the operations of project partners and suppliers. This has been done through Noble Energy's human rights related policies, procedures and plans, and by embedding these policies, procedures and plans into various management systems (such as the GMS). The company has also expressed its commitment to respect human rights through a policy endorsed by senior leadership, which has also been adopted at the Project level.

In an effort to enhance its human rights performance on the Project, Noble Energy is continuing to embed human rights related mitigations in the form of stakeholder engagement planning and a Community Feedback Mechanism into its operations. An additional benefit of these mitigations will be the establishment of processes to proactively manage any actual or potential human rights issues in the future.

Specific recommendations are summarized in *Section 12.0* where the management and mitigation requirements of the Project are outlined.

## 11.0 CUMULATIVE IMPACT ASSESSMENT

### 11.1 INTRODUCTION

ERM completed a Rapid Cumulative Impact Assessment (CIA) of the Leviathan Project to assess the cumulative impacts of the Project's onshore and offshore components. ERM's main CIA report is attached as *Appendix 3*, and this section provides a summary of the study and its key findings.

The CIA follows the International Finance Corporation's (IFC) Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets (IFC 2013). The methodology used focused on environmental and social components rated as critical by stakeholders and the scientific community - known as Valued Environmental and Social Components or VECs - which are cumulatively impacted by the project under evaluation, by other projects or developments, and by natural environmental and social external drivers.

The objective of the CIA was to assess the cumulative impacts of the Leviathan Project by performing the following steps:

- Identify Valued Environmental and Social Components (VECs) that could be impacted cumulatively considering stakeholder consultations;
- Identify other existing and planned projects and external environmental and social drivers that could cumulatively impact VECs;
- Following the IFC methodology, assess the cumulative impacts on VECs, considering the Project, other projects and external drivers in the area; and
- Recommend a framework for the integrated management of cumulative impacts.

### 11.2 VALUED ENVIRONMENTAL AND SOCIAL COMPONENTS

The reviewed documentation (pertaining to permitting processes and EIAs) as well as ERM's subsequent assessments (including a human rights assessment, and social and health assessment) did not identify any significant negative environmental or socio-economic impacts for the Project. However, concerns were raised during stakeholder consultation processes and for these reasons the following socio-economic VECs were identified for consideration in this CIA:

- Landscape and visual impacts;
- Local employment and economy; and
- Tourism impacts.

In addition, review of the literature and EIA documentation, and stakeholder engagement feedback, has also identified the following environmental VECs:

- Sea turtle habitat and nesting areas; and
- Ramot Menashe Biosphere.

These VECs were selected because these resources were identified as important to stakeholders, would be affected by the Project, and intersect with other developments.

Other resources were not included in the CIA because their impacts were primarily short term and temporary with little potential to overlap in time and space with other proposed developments, were not identified as highly valued resources by stakeholders, and/or would not be significantly impacted by the Project.

It should be noted that the Production EIA includes a cumulative impacts analysis of offshore activities. It indicates that Noble Energy is not aware of any other work programs that will run concurrently with the Project and the planned Tamar south expansion project is expected to be completed prior to the commencement of the installation phase of the Leviathan project. It discusses other anthropogenic sources but suggests that significant cumulative noise and air effects are unlikely.

### 11.3

#### *OTHER DEVELOPMENTS*

The IFC defines cumulative impacts as those impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively the project) when added to other existing, planned, and/or reasonably anticipated future ones (developments). The CIA assessment therefore considers other developments both offshore and onshore, and other external drivers, that will interact with the Leviathan Project. The planned and reasonably defined developments in the vicinity of the Leviathan Project and that may interact were identified.

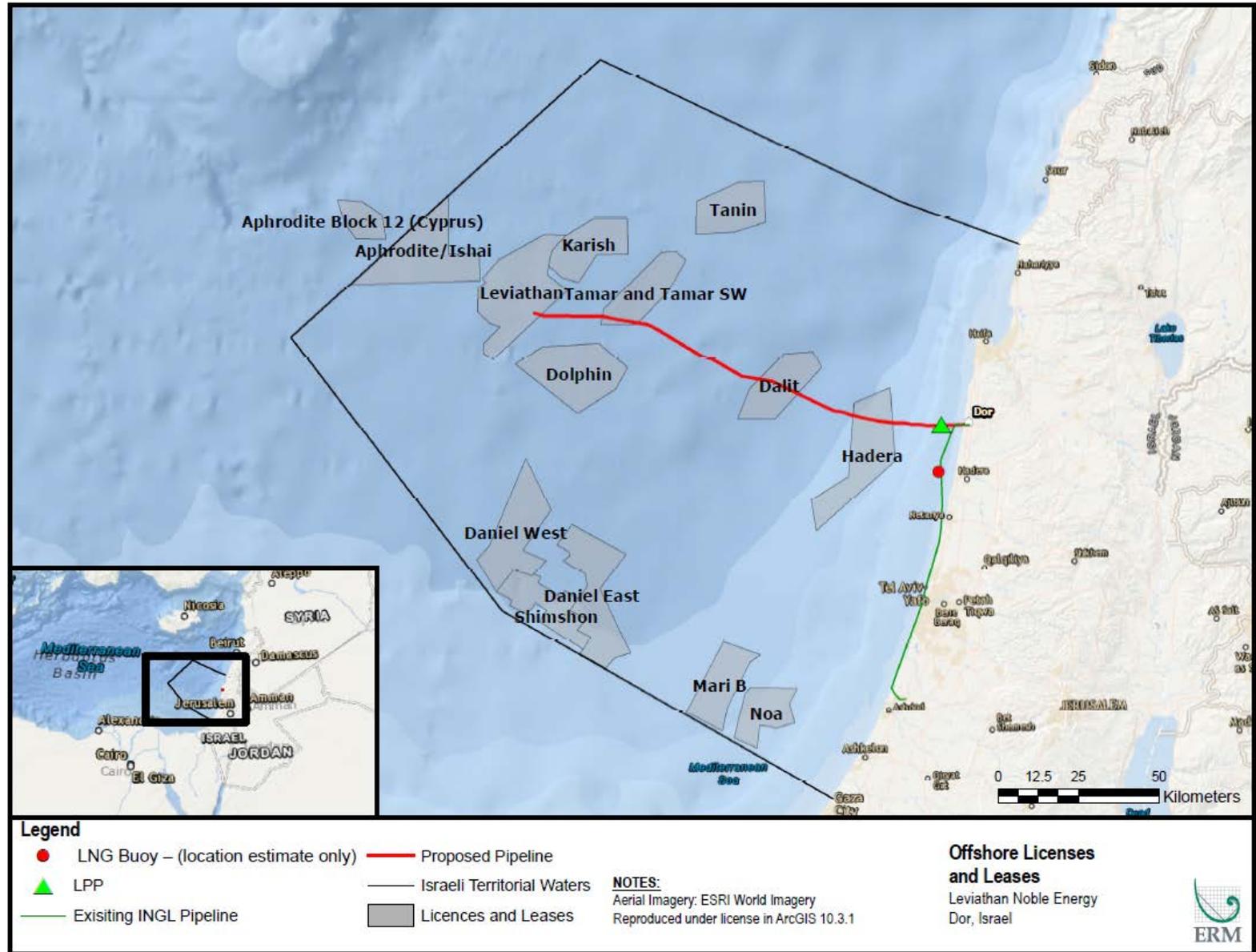
In the Levant Basin of the Mediterranean, Israel's Ministry of Energy estimates volumes of natural gas within the Israeli exclusive economic zone (EEZ) to be 50 Tcf. The Israeli Government has identified ten production leases and several active exploration licences offshore Israel. *Table 11-1* below is a summary of offshore developments in the Levant Basin (noting that Leviathan consists of two leases), which may interact with the Leviathan Project.

TABLE 11-1: OFFSHORE DEVELOPMENTS – LEVANT BASIN

Development name	Developer or Operator	Development description	Development phase
Tamar Field (and Tamar SW)	Noble Energy with Delek, Avner, Isramco and Alon)	Discovered in January 2009 and online in 2013.  10 tcf, and deliverability of over 1.1 Bcf/d onshore. Includes a 150km tieback to Tamar Platform located on Mari-B.  Generates more than half of Israel's electricity.	Operational
Mari-B and Noa	Noble Energy and partners (Delek)	Discovered field in 2000 and contains about 2 Tcf gas.  Gas to mainland Israel (Ashdod) from 2004	Operational
Hadera Deepwater LNG Terminal	IEC	LNG buoy located 6 km offshore Israel and capable of accepting up to 600 MMcf/day LNG, to supply LNG to Israel.	Developed
Aphrodite Block 12	Noble Energy, BG (with Avner Oil Exploration and Delek Drilling)	4 Tcf gas field.  Noble Energy has filed a preliminary field development plan in Cyprus for the Aphrodite field located in Block 12, in the EEZ of Cyprus, west of Leviathan.  The Leviathan Development Plan includes a potential tieback of wells. The production flowline, MEG flowline, and umbilical lengths would be approximately 45 km long. Such connection would be designated for export capacities only.	Development
Dalit	Noble Energy	Discovered 2009	Not developed
Karish and Tanin	Noble Energy	Discovery 2012-2013  Sale of fields is underway	Not developed
Shimshon Gas Field (License 332)	AGR/Isramco	First exploration well in 2012 with commercial discovery of natural gas. A detailed development plan was submitted in 2015. Estimated reserves 5 BCM.	Development
Aphrodite/Ishai	AGR/Nammax	In Israeli EEZ and under review. Adjacent to Leviathan.	Development
Daniel East licence and Daniel West licence areas	Isramco (and partners Modiin, IOC, ATP Oil & Gas, Petroleum Services Holdings)	The Og Prospect located within the Daniel East licence, is estimated at 1.1 Tcf (prospective resources).  Daniel West is estimated to contain 7.9 Tcf.	Not developed

*Figure 11-1* below shows all developments in Israel's waters, and the Aphrodite Block 12 project in Cyprus' waters.

FIGURE 11-1: EASTERN MEDITERRANEAN DEVELOPMENTS



As well as offshore developments that may interact with the Leviathan Project, the CIA also identified planned and reasonably defined developments in the vicinity of the onshore Project components.

The development that may interact with onshore Project activities is the INGL Eastern Pipeline development project. Pipeline construction activities and connection activities may intersect spatially with Project works at the Hagit power station. According to development plans the Israel Natural Gas Lines is extending the transmission network to enable the company to respond to the increasing supply and demand for natural gas as a primary energy source - to fuel electric power plants and for the industrial sector.

#### 11.4 *VEC IMPACT ASSESSMENT*

##### 11.4.1 *Landscape and Visual Impact*

Offshore and onshore permanent infrastructure associated with the developments have the potential to result in a cumulative landscape and visual impact and visual impact concerns were raised by community and regulatory stakeholders during the TAMA 37/H public disclosure and consultation process. *Table 11-2* summarizes the VEC.

TABLE 11-2: VEC DESCRIPTION – LANDSCAPE AND VISUAL

Landscape and Visual		
Permanent Onshore Infrastructure		Location and Impact
VEC description	Coastal valve station	Onshore South of Dor. Will be depressed into the landscape so not visible to local communities including the Zikhron and Fureidis communities, or Kibbutz Mayan Tzvi.  It is assumed any future valve station will be depressed into the landscape.
	Pipelines	Will be permanently underground, from offshore to onshore.  The onshore pipeline has no visual impact.  There is provision in TAMA 37/H for additional pipelines. It is expected these pipelines will also be underground.
	Infrastructure for future development under TAMA 37/H at Dor Beach valve station	Future onshore infrastructure for a natural gas tie-in, and/or valve station is unclear; however it is specified in Tama 37H that land is allocated for an additional tie-in station to the national gas transmission grid. The area of the allocated land is 105,000 m <sup>2</sup> and approximately 1,600 m <sup>2</sup> is to be utilized for the Project DVS.  An additional station can be located adjacent to the DVS fence. It is assumed future infrastructure at the valve station will be required to be depressed or partially embedded underground and therefore not visible.
	Infrastructure at Hagit	The project includes an option to install an additional condensate tank adjacent to the Hagit Power Station. No plan has been provided of the final location of the infrastructure, however the land take will be <10% of the area defined in the TAMA 37/H.  It is assumed this defined area will be used for future industrial development, and including for the new Eastern Pipeline from Ramla to Eliakim.
VEC cumulative assessment	<p>There are no anticipated landscape or visual impacts at the Dor Beach or Hagit Power Station site due to this Project. It is assumed future permanent infrastructure associated with natural gas developments will be within existing pre-determined TAMA 37/H boundaries, and buried or embedded into the landscape. Therefore, there are no anticipated visual cumulative impacts at Dor Beach with the future activity planned at Dor Beach.</p> <p>The Project infrastructure at Hagit will be new and potentially imposing; future development at the site will include the Eastern Pipeline from Ramla and terminating at Eliakim and will have an incremental visual cumulative impact for adjacent residents. Mitigation measures are suggested to manage the cumulative impact.</p> <p>It is assumed future offshore infrastructure associated with the development projects will be located at a similar distance from the shoreline, and be restricted in flaring at night, and therefore there are no cumulative impacts anticipated through offshore permanent infrastructure.</p>	
VEC mitigation measures	1.1.1.1.2 Future development owners to design onshore infrastructure so that it is at least partially embedded into the natural landscape	

Landscape and Visual	
Permanent Onshore Infrastructure	Location and Impact
	<p>1.1.1.1.3 Government-led impact management initiatives to consider visual impact at Hagit power station site</p> <p>1.1.1.1.4 Government of Israel to consider visual impact for future offshore Development infrastructure</p>
Construction landscape and visual	
VEC description	<p>The onshore Dor construction worksite will include access roads, laydown areas, construction buffer zones, truck parking areas, and spoil areas. The exact location of these areas has not been provided however the majority of work will be located in the area identified as the 'fish pond' area. There will be no construction activity on Dor Beach itself, and access to the beach will not be constricted. A photo with a mapped overlay has been provided showing the location of the TAMA 'blue zone' at the beach entry. During construction this fenced area will be visible to beach goers.</p> <p>There is provision in the TAMA 37/H for additional development at the Dor Beach site and this activity may take place in parallel to the Project, or after.</p>
VEC Cumulative impact assessment	<p>During the two year onshore construction phase for the Project there will be multiple work sites including road closures and areas which will be fenced off for security reasons causing cumulative impacts during Project construction.</p> <p>The additional area set aside for a future development at Dor Beach may coincide with Project construction or come later - either scenario will result in a cumulative visual impact as a result of construction activities, and warrants mitigation measures to be in place.</p> <p>Visitors to the adjacent and popular Nahsholim Beach (to the North of Dor Beach) will be able to view the construction for the Project. Also note the large power plant visible from Nahsholim Beach to the south.</p>
Mitigation	<p>The assessment has not identified a cumulative impact that is considered significant and in need of mitigation measures, monitoring or management.</p>

#### 11.4.2 *VEC local employment and economy*

The local employment and economy VEC is made up of sub-components of the VEC - offshore deepsea fishing, nearshore and onshore fishing, and onshore employment and businesses at Dor Beach. *Table 11-3* below outlines the VEC description and the cumulative impact assessment for each VEC.

TABLE 11-3: VEC DESCRIPTION – LOCAL EMPLOYMENT AND ECONOMY

Local Employment and Economy			
	Offshore fishing (deep water)	Nearshore and onshore fishing	Onshore employment and economy
VEC description	<p>Security management plans indicate that an exclusion zone of up to 1.5 km around key infrastructure will be in place and therefore closed to fishery activities.</p> <p>A 500 m radius exclusion zone will exist for Project offshore pipelines and Field infrastructure and around the pipelay vessel and the OCV while it is operating; it is assumed this will also be the case for future Developments.</p> <p>The Drilling EIA assessed that drill sites in the Field are not in known fishing areas and therefore would not be impacted by drilling activities or exclusion zones. It is assumed mariculture and fish farming activities do not take place in deep water.</p> <p>Noise from construction and/or pipelaying activities was estimated as being not significant but as possibly causing temporary harm to trawler fishing. It can be expected the same level of noise will be present for future offshore Development activities.</p> <p>Generally, offshore marine fishing is described as relatively sparse as a result of water depths and the oligotrophic nature of the environment (UNFAO, 2007). In total, marine fishing contributed 10 % towards the total domestic fish production in Israel in 2005 (UNFAO, 2007).</p> <p>The Production EIA discusses how oil and gas offshore infrastructure has been observed to attract significant levels of</p>	<p>The TAMA EIA discussed that bottom trawlers usually fish at depths down to 400 m, but trawl fleets are prohibited from fishing at depths shallower than 15 m. It is understood that the Government of Israel has now made trawling illegal. This will impact the economic livelihoods of trawl fishers; however as it is an illegal activity it is not assessed further in the CIA.</p> <p>Fishing is concentrated along the narrow continental shelf offshore Israel and narrows to 10 km in the north (Haifa–Carmel Mountains). Commercial, subsistence and recreational fishers operate in the nearshore area of the Project and along the shorelines of Israel. The Drilling EIA states that <i>“there are roughly 1,000 kayak owners who fish along the Israeli coast, approximately 1,000 free divers engaged in the sport of spear-fishing, and on a sunny day up to 20,000 Israelis fish with rods from beaches, and several hundred small boats engage in fishing along the coast – although how many fish in the area that will be impacted by the Project is unknown.”</i></p> <p>It is unknown how many of those fishing in coastal waters using spears, rods, and boats are doing so for subsistence or for recreation, although the assumption made is it is for recreation.</p> <p>The Feasibility Study details baseline information that will be required for the onshore components to connect the terminal to the main transmission system at Dor Beach. The Feasibility Study determines that the staging areas for carrying out the drilling (for</p>	<p>One local community is in the vicinity of the nearshore and onshore Project components which may be impacted by Project activities (Mushav Dor) and one community outside the area (Kibbutz Mayan Tzvi) with rights to use land in the onshore Project area. There may be some positive economic impact to these communities during the Project construction phase as an average of 100 workers (and peak of 250 workers) will be in the onshore area buying goods and services and contractors may recruit workers from neighboring communities. It is expected with at least one additional development in the same area this will be a cumulative positive impact.</p> <p>The vulnerability of business receptors in Nasholim Beach, immediately north of Dor is low as it is assumed the road closures and other construction impacts will not impact trade to those businesses. The construction of access roads and the transport of equipment could affect other commercial businesses in the immediate area; however the schedule of works with detail on road and rail closures is not yet known and additional construction impacts will be expected with at least one future development in the same Dor Beach area.</p> <p>During the public consultation processes for the Project, many of the comments captured in the Investigator’s Report related to onshore impacts were based on initial design plans that included significant onshore components. Due to stakeholder concerns, the design was shifted for all gas processing to be conducted offshore</p>

<b>Local Employment and Economy</b>			
	<b>Offshore fishing (deep water)</b>	<b>Nearshore and onshore fishing</b>	<b>Onshore employment and economy</b>
	marine species (including fish) from surrounding habitats. This 'attraction' hypothesis can be considered detrimental to fishers as sparsely distributed resources can be concentrated in the area of the infrastructure making them inaccessible to fishers. This will be the case where an exclusion zone exists.	HDD) will be located within the area of the fish ponds, and the mud of the horizontal drilling will be dispersed in the area of the fish ponds (or evacuated to an organized approved site). The TAMA 37/H allows for additional staging and construction in the fish pond area.	thereby reducing onshore impacts. It is assumed future Development gas processing infrastructure will also be sited offshore.
VEC cumulative assessment	<p>The stakeholder groups that could be adversely affected by offshore activities including the LPP are deepsea fishers (with an adverse effect on their livelihoods); however, the number of fishing relying on fishing in these areas is low.</p> <p>In this CIA, consideration of the offshore fishers was assessed to include future developments. The environmental impact documentation indicates the potential social impacts on deepsea fishers will be negligible and offshore fishers could likely adapt to the exclusion zones. In considering the number of future developments and likely associated permanent infrastructure with from 500 m and up to 1.5 km exclusion zones, the ability of deep sea fishers to adapt is reduced. ERM considers that the combination of the current exclusion zone, increasing number of offshore activities with exclusion zones possibly in areas of greater fish concentration, additional pipeline construction activities, and increased vessel movements, that there will be reduced availability of waters to deep sea fishers which warrants cumulative impact mitigation measures.</p>	<p>Fishers could be adversely affected by nearshore activities, as it is expected the future development in the Dor Beach area will be similarly located and include similar activities, such as pipelaying and drilling, restricting fishing.</p> <p>It is likely that exclusion zones may be in place for up to 2 years during Project construction, the 500 m exclusion zone will be in place permanently, and similarly for future nearshore and onshore activities through the TAMA 37/H process at the same nearshore and onshore sites. Whilst the extent of nearshore fishing remains unclear, and there is an assumption the majority of fishing is for recreation and not for subsistence, for fishers in this area the Project activities (e.g. pipelaying and HDD activities) represent an additive cumulative effect and the fishers may be vulnerable to the reduction of available area for nearshore fishing if they are unable to relocate to other coastal areas. It is understood kayakers do not venture beyond about 5 km from shore and therefore will not be impacted by an exclusion zone offshore infrastructure placed at the same distance as the LPP.</p> <p>Noble Energy's community engagement teams are in contact with the residents of the communities who operate and/or lease the fish</p>	The onshore activities, particularly for the fish pond area and local businesses have been assessed as not representing a cumulative impact requiring additional mitigation primarily because future development in the Dor Beach area will be within the 'blue zone' and it is expected these projects will manage impacts similarly to Noble. Furthermore, the operations phase for this Project and any future developments in the area will not impact businesses in the area.

Local Employment and Economy			
	Offshore fishing (deep water)	Nearshore and onshore fishing	Onshore employment and economy
	<p>In addition, future development offshore infrastructure may attract significant levels of marine species (including fish) from surrounding habitats constituting a concern of fishers across the offshore region and impinge on their catch. The (up to) 1.5 km exclusion zones around offshore infrastructure may exacerbate the issue. Even if this is a technically unproven environmental impact the perception of a cumulative impact of multiple offshore platforms may elevate concerns.</p> <p>The Project is identified as a contributor to this potential cumulative impact, but in a minor way.</p>	<p>pond area.</p> <p>In consideration of the planned additional nearshore and onshore development in the area and the impact on nearshore fishers at Dor Beach cumulative mitigation measures are warranted.</p>	
VEC mitigation measures	<p>The Project will be a minor contributor to the potential cumulative impacts, however as a proactive step Noble Energy's Community Feedback Mechanism will provide potentially affected communities with a means to express their concerns and voice their opinions during the construction phase. Noble Energy will also notify communities of buffer zones and other Project-related information which could affect the livelihoods of sea users nearshore in advance of construction and/or operational activities.</p> <p>From a broader cumulative impact management perspective, some suggestions for government and broader stakeholder consideration include:</p> <ul style="list-style-type: none"> <li>• Coordinate additional research into offshore fishing areas, economic fishing practices, and the socio-economic impact of exclusion zones during construction and operations, at the level of Levant Basin (multiple project impacts); and</li> <li>• Coordinate baseline assessment of nearshore commercial fishing along nearshore area to better understand the short-term (construction) and long-term impacts of exclusion zones.</li> </ul>		

### 11.4.3 Tourism

Dor Beach attracts tourists from Israel and elsewhere. It is a popular beach for multiple users. This VEC is assessed below in *Table 11-4*. A number of tourism sector businesses and tourist groups were identified and are listed here alongside a general description of the VEC, tourism cumulative impacts assessed and mitigation measures.

TABLE 11-4: VEC DESCRIPTION – TOURISM

Tourism		
	Tourism operator or user group	Potential impact
VEC description - businesses	Dor Beach Island Reserve	May have restricted access to Dor Beach during construction or be impacted by noise.
	Wildlife and Nature Tours (www.northern-wind.com)	This is the primary tour operator in the area and partnered with the Nahsholim Resort. May perceive loss of customers as a result of construction.
	Nahsholim Seaside Resort (www.nahsholm.co.il) Sells tourism options that utilize the beach for wildlife viewing and sports activities	May perceive a loss of customers during construction activities as a result of reduced access, noise, visual impact.
	Kayaking clubs Kayakers launch from Dor Beach and travel up to 5 km offshore. Clubs frequent Dor Beach and camp on the adjacent rock islands, and wildlife area. The nearest club is based at Hadera Power Plant.	May have reduced access to Dor Beach and to near shore kayaking areas. Construction noise may impact their enjoyment of kayaking, fishing and camping on the nearby islands.
	Dor Ranch (Horseback Riding located east of Dor Mushav) Horses are rented from a ranch on the road leading to Dor, the beach and the hotel. Guided horseback riding takes place on the shoreline, up to the ridge, and to the fish pond.	Will lose access to riding areas during construction, and possibly during operations (fish pond area).
	Recreational fishers, Dor Beach	May lose access to Dor Beach area during construction due to restricted areas; noise impacts will reduce fishing enjoyment and catch.

Tourism		
	Tourism operator or user group	Potential impact
	Birdwatchers (Dor)	May perceive impact to bird nesting or visiting due to construction impacts (e.g. noise).
VEC description	<p>The Dor Beach is a highly used area for multiple tourism users. These tourists use the beach area and engage in activities that draw upon businesses and resources of the area.</p> <p>The nearshore and onshore Dor Beach site will be impacted by Project and future development site works and civil construction activities. During construction period there will be noise, dust, and traffic impacts.</p> <p>Traffic congestion/delays and additional accidents due to increased vehicle traffic on community roadways around Dor may impact on tourism in the area. Construction activities adjacent to the beach (although HDD but still visible onshore and offshore) could impact the number of tourists and visitors who come to enjoy the beach.</p> <p>The TAMA 37/H makes land available for a second owner to connect with the INGL transmission line and/or build a valve station to connect to the Israeli power infrastructure, alongside the Leviathan DVS. This development may occur in parallel, or soon after Project construction activities.</p>	
VEC Cumulative impact	<p>Cumulative construction activities as a result of this Project and at least one future development could reduce the attractiveness of the area to tourists due to the likely impacts to be experienced during construction, particularly traffic movements.</p> <p>Construction during this project will be for about 2 years, and it is likely future construction for a second natural gas connection at Dor Beach will also be of two years duration. If this second development takes place in parallel or at a later date, the impact of the construction activities could reduce tourism in the area and cumulatively impact businesses that benefit from tourism. As the businesses are relatively small in scale and rely on this local tourism trade, there will be a potentially negative cumulative impact. This warrants mitigation measures to manage this VEC.</p>	
Mitigation Measures	<p>Noble Energy has already sought to minimize impacts and disruption as much as possible through its construction selection methods such as the use of horizontal directional drilling to construct infrastructure under the beach area. Noble Energy will also provide advanced notification to tourism businesses and users during construction to ensure impacts are minimized.</p> <p>If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>	

#### 11.4.4 *Sea turtle nesting at Dor Beach*

In the EIA documentation, the majority of environmental impacts are ranked as low significance and the Project is assessed as having a low ability to exert a significant cumulative impact upon marine ecological VECs. Nevertheless, *Table 11-5* considers the potential for the Project and other developments to generate a cumulative impact upon sea turtles at Dor Beach due to stakeholder concern regarding disturbance to sea turtle nesting areas to the north of Project.

TABLE 11-5: VEC DESCRIPTION – TURTLE NESTING

Sea turtle nesting area	
VEC description	<p>Sea turtle species are known to be present in the Project area of influence, including the loggerhead turtle, green turtle and leatherback turtle (IUCN, 2012) and in the Eastern Mediterranean. The TAMA EIA states that for the period 1993-2008, a “medium number of layings has been documented (40-80)” along the Israeli coastline. Sea turtles have the greatest hearing sensitivity at low frequencies that coincide with those produced by typical Project vessels and are therefore potentially at risk from the installation operations (Ketten, 2005).</p> <p>Based on the available information, the area of influence does not appear to be located in a habitat of significant importance where the loss of such a habitat could potentially impact the long-term survivability of the species. Also, the area does not appear to contain regionally-important concentrations of either of these turtles. However, the national importance of the beaches of the Dor area as turtle nesting habitats should be assessed with national stakeholders.</p>
VEC Cumulative impact	<p>The Project has planned to minimize impacts on the beach area through its construction selection methods such as the use of horizontal directional drilling. The duration of activities is also short-term and the area of beach to be disturbed by the Project is minimal, therefore Project impacts upon sea turtles are not anticipated. Whilst Project impacts are likely to be insignificant, additional development activity in the same area, as anticipated under Tama 37/H will result in cumulative impact due to the likely extended duration of impact, or intensity of impact if the activities are in parallel.</p>
Mitigation Measures	<p>If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>

#### 11.4.5 *Ramot Menashe Biosphere Reserve*

The landscapes south and east of the Hagit site, adjacent to the existing power station, were recognized by UNESCO in 2011 as the Ramot Menashe Biosphere Reserve. The Megiddo Regional Council objected to the construction of facilities at the Hagit site noting that it “is in the heart of a biosphere reserve that should be conserved” (Investigator’s Report, pp. 106, 186), likewise, residents from Bat Shlomo also mentioned the Biosphere Reserve in their opposition to the onshore project. *Table 11-6* summarizes the VEC.

TABLE 11-6: VEC DESCRIPTION – RAMOT MENASHE BIOSPHERE RESERVE

<b>Ramot Menashe Biosphere Reserve</b>	
VEC description	<p>At Hagit, the Project pipeline terminus is approximately 850 north of the boundary of the Ramot Menashe Important Bird Area (IBA), identified in 1994 for its importance for the lesser kestrel (<i>Falco naumanni</i>; IUCN category Least Concern, downlisted from Vulnerable in 2011; Israel category is Vulnerable) which breed in old buildings at Amiquam (c. 30 pairs) and Bat Shlomo (up to 10 pairs) and whose forage area covers approximately 2,500 ha in surrounding fields (BirdLife International, 2016). Bat Shlomo is approximately 1.3 km south of the Project pipeline route and the IBA boundary lies approximately 1.9 km south of the Project pipeline in this zone.</p> <p>The Ramot Menashe IBA and portions of the surrounding landscape were proposed as a Biosphere Reserve in October 2010 (Avit, 2010) and recognized by UNESCO as a Biosphere Reserve in July 2011 (UNSECO, 2012). The Hagit terminus is located immediately to west and north of this proposed area. Species of conservation.</p> <p>The Tut stream as a sensitive feature located just to the south of the Hagit site, approximately 590 m downslope of the pipeline terminus. This stream is noted as supporting a fish (<i>Acanthobrama telavivensis</i>, IUCN Vulnerable globally) and a newt (<i>Ommatotriton vittatus</i>, IUCN LC globally) that are both listed nationally as Critically Endangered by the Red Book - Vertebrates in Israel (Dolev &amp; Perevolotsy, 2002). The baseline conditions of these species and their habitats in Tut stream in the reaches potentially affected by the Project should be evaluated prior to any activities that could affect their habitats. The Red Book notes that the fish was thought to be extinct in the Tut stream in 1999 and that the newt population in the Ramot Menashe region (immediately south and east of the Project) was the most important in the country.</p> <p>At least one future development is to occur in the same defined area at Hagit - the new Eastern Pipeline from Ramla to Eliakim.</p>
VEC Cumulative impact	<p>The Investigator’s Report mentions that development within the Biosphere Reserve is limited by restrictions on land use and that most development is to the south of the reserve. It also mentions that there were plans for the expansion of a turkey farm near the Hagit site that were rejected because the planned area was in the reserve and that the Project would damage the farmer’s ability to sustain his farm.</p> <p>The impacts of the construction of the pipeline will be greatest during construction. After construction, the pipeline will be below ground and the RoW will be of low visibility and no affect the aesthetic landscape value of the Biosphere Reserve and its surroundings.</p> <p>The INGL Eastern Pipeline development project includes plans for pipeline construction activities and connection activities will intersect spatially with Project works at the Hagit power station. This new pipeline would be constructed from the south from Regavim and through the Ramot Menashe Biosphere Reserve. Precise construction schedule information is not available; however, however at this stage it is not expected that development will occur in parallel with the Project. In addition the TAMA/37H also allows for an additional parallel pipeline in the same TAMA corridor.</p> <p>The cumulative impact is therefore expected to be minimal.</p>
Mitigation	Project-level environmental and social management will address any

**Ramot Menashe Biosphere Reserve**

Measures

individual impacts the Project and future projects may have on the Biosphere Reserve. If however it is found that development schedules overlap, the relevant proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.

## 12.0

### MITIGATION AND MANAGEMENT

*Section 5.0* has introduced Noble Energy's current approach to managing environmental and social performance of the Project. It identifies policies, procedures and plans that Noble Energy already has in place, and also Project-level commitments that have been made. This section on mitigation and management is complementary to *Section 5.0* and describes the additional commitments and requirements that Noble Energy will adhere to as the Project develops further.

Noble Energy has committed to a comprehensive management and mitigation framework to manage potential environmental and social risks and impacts. These include management systems, management and action plans, as well as a series of other commitments. This section summarizes Noble Energy's commitments covering:

- Mitigation measures as already described in the EIA documents;
- Environmental and Social Management Plans; and
- Environmental and Social Management System.

It also presents the recommendations from the cumulative impact assessment summarized in *Section 11.0*.

## 12.1

### MITIGATION MEASURES

The Drilling EIA, Production EIA, and TAMA EIA describe the mitigation measures that Noble Energy will implement in order to minimize the E&S impacts of the Project. These mitigation measures are summarized below.

### 12.1.1

#### *Biological and Physical Mitigation Measures*

Table ES-2 of the Drilling EIA identifies the biological and physical mitigation measures listed below (listed by aspect and then resources affected).

##### Drilling Discharges (treated cuttings)

- Water quality/fish, sediment quality, and benthic communities:
  - Selection of low-toxicity mineral oil-based mud (MOBM); and
  - Use of thermomechanical cuttings cleaner (TCC) to minimize MOBM retention on cuttings.
- Benthic communities:
  - Background monitoring survey conducted to verify there are no deepwater coral or other hard bottom communities present.

##### Other Discharges (sanitary waste and gray water, organic waste, cooling water, desalination brine, deck drainage, and ballast water)

- Water quality/fish:
  - Compliance with International Convention for the Prevention of Pollution from Ships marine pollution (MARPOL) requirements.
- Fish/benthic communities:
  - Noble will operate in accordance with guidelines developed by International Petroleum Industry Environmental Conservation (IPIECA) and International Organization of Oil & Gas Producers (OGP) (2010) to increase awareness of alien invasive species (AIS) risks and to prepare and plan for, avoid, and monitor for ballast impacts throughout the project life cycle. Drilling rigs will have a Ballast Water Management Plan and be equipped with an International Maritime Organization (IMO) approved ballast water management system.

#### Light Hazards (artificial lighting on drilling rigs and support vessels)

- Sea turtles, seabirds and migratory birds, and pelagic fish:
  - To the extent practicable without compromising safety or work performance, lighting in open deck areas will be shielded (oriented downward) to minimize excess light emissions into the environment.

#### Helicopter Traffic (between shore base and drilling rig)

- Marine mammals, sea turtles, and seabirds and migratory birds:
  - Maintain recommended minimum altitudes when flying over sensitive coastal habitats such as parks and preserves.

#### Marine Debris (accidentally lost overboard)

- Water quality, sediment quality, benthic communities, marine mammals, sea turtles, and seabirds and migratory birds:
  - Noble Energy's waste management procedures and rig operator's Garbage Management Plan will minimize the potential for accidental loss of items overboard.
- Water quality, sediment quality, and benthic communities:
  - Post-drilling remotely operated vehicle (ROV) survey to ensure the seafloor is clear of equipment and debris.

#### Air Emissions (from drilling rig and from support vessels and helicopters)

- Air quality:
  - Routine maintenance and inspection of engines and generators; and
  - Compliance with MARPOL Annex VI regulations including the use of low sulfur fuel, and meeting the NO<sub>x</sub> emission limits under Regulation 13 of Annex VI.

#### Air Emissions (from flaring during production tests)

- Air quality:
  - Use of high-efficiency burner to minimize air pollutants from incomplete combustion.
- Water quality:

- Use of high-efficiency burner to minimize “fallout” of oil droplets; and
- Treatment of effluent to meet standards prior to discharge.

Accidental Spills (fuel spill from the drilling rig)

- Air quality, water quality, marine mammals, sea turtles, seabirds and migratory birds, fish, and coastal habitats:
  - Spill prevention measures;
  - Drilling rig Shipboard Oil Pollution Emergency Plan (SOPEP); and
  - Oil Spill Contingency Plan (OSCP) (including protection of nesting beaches and coastal habitats).

Accidental Spills (condensate spill from a blowout)

- Air quality, water quality, sediment quality, benthic communities, marine mammals, sea turtles, seabirds and migratory birds, and fish:
  - Spill prevention measures; and
  - OSCP (including protection of nesting beaches and coastal habitats).

Table ES-2 of the Production EIA identifies the biological and physical mitigation and control measures listed below (listed by activity and then resources affected).

Submarine Production Infrastructure and Transmission/Supply Pipeline

- Installation of flowlines, transmission pipelines, and associated subsea infrastructure
  - Benthic communities:
    - Optimization of the size of foundations and removal of any non-permanent construction aids;
    - Minimize trenching and backfilling; and
    - Use of dynamically positioned (DP) vessels precludes anchor damage.
- Preparation for installation of transmission pipelines
  - Benthic communities:
    - Localized impact at limited locations along the 117 km route; and
    - No sensitive protected habitat recorded in application area or near pipeline route corridor.
- Presence of subsea production systems and pipelines
  - Benthic communities:
    - Seabed survey;
    - Minimal footprint associated transmission pipelines; and
    - Seafloor currents are very low - not expected to be an environmental issue.
- Pre-commissioning and commissioning (cleaning, gauging, hydrotesting, dewatering and drying) infield flowlines and transmission pipelines
  - Benthic communities:
    - Use of inhibitors will be minimized as practicable;
    - Selection of chemicals that are classified as pose little or no risk (PLONOR) where practicable;

- Proposed chemicals are Gold rated under the Offshore Chemical Notification Scheme (OCNS) and thus present a low environmental hazard; and
  - Permits to be obtained for discharge of hydrotest water.
- Subsea control valve operation
  - Benthic communities and sediment quality:
    - Water based hydraulic fluid;
    - Discharge volumes estimated to be low;
    - Approved low toxicity fluids preferred; and
    - Dose-related Risk and Effect Assessment Model (DREAM) modeling conducted.
- Subsea pipeline design
  - Benthic communities and sediment quality:
    - Control in design through application of industry standard procedures;
    - Areas of instability will be engineered and designed to withstand spanning strain on pipeline; and
    - Areas of instability will be monitored post installation.

#### Sea Pollution Event by Oil Based on Extreme Scenarios

- Pipeline gas and hydrocarbon inventory
  - Water quality and marine flora and fauna:
    - Oil Spill Response Plan (OSRP);
    - Pipeline designed to industry standards;
    - Production Management System (PMS) and controls system programmed to minimize potential release inventory; and
    - Marine exclusion zone around the LPP.

#### Noise

- Infield gathering manifold
  - Marine fauna:
    - Suction piling.
- Construction/installation and support vessels
  - Marine fauna:
    - Pipelay vessel utilizing DP will be travelling at a slow speed; and
    - Reduce vessel speeds upon coastal approach, particularly if activities are conducted during sea turtle nesting seasons.
- Installation logistical support helicopters
  - Marine fauna:
    - Standard aviation procedures and regulations.

#### Nature and Ecology

- Pre-commissioning and commissioning (cleaning, gauging, and hydrotesting) infield flowlines and transmission pipelines
  - Sea water quality and marine organisms:

- Material will be returned to the surface within pig receivers and disposed of appropriately onshore;
  - Use of inhibitors will be minimized as practicable;
  - Selection of chemicals that are PLONOR where practicable;
  - Proposed chemicals are Gold rated under the OCNS, and thus present a low environmental hazard;
  - Permits for discharge of hydrotest water; and
  - Pre-cleaning of pipe prior to discharge.
- Vessel Presence
  - Fish, marine mammals, sea turtles, and seabirds:
    - Minimize excess lighting and orient downward; and
    - All lighting to be Safety of Life at Sea (SOLAS) compliant; and
    - Minimize lighting requirements as far as practicable.
- Construction/installation, commissioning, and support vessels and helicopters
  - Marine mammals, sea turtles, and seabirds:
    - Installation vessels will generally operate at very slow speeds;
    - Communication between vessel masters upon sighting of a marine mammal and marine and coastal birds;
    - Vessel speed and distance restrictions upon sightings; and
    - Helicopter altitude requirements.
- Construction/installation and vessel discharges
  - Water quality and marine flora and fauna:
    - MARPOL 73/78.
- Ballast water discharges
  - Benthic communities:
    - Controlled discharge under permit;
    - Maintenance and classification of vessels; and
    - Adherence to IMO and MARPOL 73/78 standards.
- Subsea control valve operations
  - Water quality and marine flora and fauna
    - Water based hydraulic fluid;
    - Discharge volumes estimated to be low; and
    - Approved low toxicity fluids preferred.
- Cumulative impacts
  - Air quality:
    - MARPOL 73/78.
  - Benthic communities
    - Controlled discharge under permit;
    - Maintenance and classification of vessels; and
    - Adherence to IMO and MARPOL 73/78 standards.

### Hazardous Materials

- Waste management
  - General:

- Waste handling, treatment, and disposal will be in accordance with the WMP.
- Marine biota:
  - Gold chemicals under the OCNS;
  - Optimize and manage discharge rate at LPP to mitigate adverse impact on marine environment; and
  - Optimal rate can be determined through modeling.

Section 5.1 of the TAMA EIA identifies the biological and physical mitigation measures listed below (listed by subsections/topics).

#### Project Implementation Stages

- General
  - The technological option will be proposed by the supplier within the building permits framework and will be approved by the Natural Gas Authority. The range of technological options spans maximal onshore processing to maximal offshore processing. Gas entry pressure from sea to shore should not exceed 100 bars.

#### Preventing Marine Pollution and Handling Pollution Incidents

- General
  - The plan of action and the measures to be taken in case of leakage of oil or other substances, including procedures and timetables for action, will be submitted by the plan developer at the building permit stage and be approved by the relevant governmental authorities.
  - A plan for handling marine oil pollution incidents due to leakage of condensate or operating fuel will be formulated per Ministry of Environmental Protection guidelines and will include, as is customary for pollution incident contingency plans, a definition of forces and tasks and a list of action methods and means per stage of incident handling, in accordance with the nature of the incident, communication and reporting procedures, and coordination with other action plans (plans of the relevant local authorities and the National Contingency Plan for Preparedness and Response to Incidents of Oil Pollution at Sea).

#### Preventing Air Pollution

- General
  - Theoretical technology for reducing torch emissions. A technology that returns the emission gases to the system should be used (e.g., a flare gas recovery unit, or FGRU).
  - Theoretical technologies for reducing emissions from fuel-burning facilities (liquid or gas). The emission rates of all installations that emit flue gases should be brought into conformity with the emission rates noted in ALUFT 2002 or any other up-to-date standard to be adopted by the Ministry of Environmental Protection. In addition to the

- guideline calling for compliance with standards, the best available means of reducing emissions should be installed at these installations.
- Theoretical technologies for reducing fugitive emissions. As part of the routine operation of the flue gas facility, there could potentially be fugitive emissions from the equipment and from the connections between pipes. In order to reduce these emissions the following measures should be taken: welding as many of the connections as possible; ongoing maintenance of connector and valve sources; operating leak-detecting control systems in conformance with the guidelines in the relevant BREF documents; and reduction of generator use and preference for electricity from the local power station or from the national power grid.

### Preventing Degradation of the Natural Landscape

- General
  - Before deciding on the final pipeline corridor route, the developer must conduct a ground survey of habitats with an emphasis on exposed rocky substrate. One should avoid, insofar as possible, bringing the pipeline through and/or near areas of exposed rocky substrate.
  - In order to lower the risk of harming rocky habitats in the coastal entry area of Michmoret, the possibility should be considered of moving the pipeline's exit point westward from the rocky area, should this be technologically feasible.
  - It will be prohibited, while the pipeline is being laid, to place anchors in the exposed rocky areas that constitute a major habitat.
  - Vessels that carry out the construction work must comply with procedures for loading and releasing sailing ballast.
  - Before product water begins to flow into the marine environment, chemical and biological background monitoring must be conducted, in coordination with the Ministry of Environmental Protection.
  - In order to measure the environmental impacts, a plan for continuous monitoring of chemical and biological parameters must be drawn up, in coordination with the Ministry of Environmental Protection.
- Light pollution
  - The use of lights should be kept to a minimum, both in terms of lighting duration and in terms of intensity.
  - The lights should be focused on the facility, not beyond it, and glare should be prevented by the use of down-facing light fixtures (full cutoff).
  - Shortwave, narrow-spectrum lighting should be used – avoid using white light.
  - Use of discontinuous and shortwave lighting is recommended.

- Marking lights: Insofar as possible, use flashing rather than continuous flights with light flashes that are short relative to the intervals between flashes.
- The lighting plan should be backed up by photometric mapping that shows how light is dispersed around the facility and confirms that no lighting is distributed beyond the necessary area.
- Check how the light is distributed beyond the plan area and present means of reducing/minimizing its effects, in accordance with Israel Nature and Parks Authority (INPA) approved design principles.
- Monitoring: facility operation should be accompanied by monitoring to determine the number of birds harmed by the facility and adjustments should be made if critical times for bird mortality are found. The monitoring program should be based on the past experience of similar platforms abroad.
- Preventing bird collisions
  - It is recommended that the use of glass in the structure's façade be minimized. If glass must be used, it should be screened from the outside by something non-reflective (e.g., curtains or external screens, painted windows, or densely-packed adhesives).
  - In any instance of overhead cables the cables should be marked by appropriate means, such as reflectors, in coordination with the INPA.

#### Control and Processing of Leaks

- General
  - Processing facility: During ongoing facility maintenance an observer should be posted to survey the immediate environment and confirm that there are no leaks outside the facility.

#### Visual Handling of the Site

- Minimizing the installation's visibility
  - During the facility's engineering design process, the compound's contours and the ratio between installations will be examined, and the installations' dimensions will be limited to the minimum necessary per existing standards and technologies, so as to limit the installations' contours and impact on the skyline.
  - Lighting outside the facility: When designing the lighting, make sure that the external facility walls facing the coast (whether parallel or diagonally) are not illuminated directly, except for flashing collision-avoidance lights for air and sea craft. The facility's internal lighting should be directed low, not skyward.

#### Provisions for the Collection, Handling, and Removal of Sewage, Brine, and Product Water

- Sanitary sewage

- Sanitary sewage will be treated on the platform to the accepted standard before being discharged to the sea.
- Industrial sewage
  - At the building permit stage, when the platform location and anticipated condensate composition are known, a treatment plan will be drawn up for various different scenarios in which condensate or operating fuel is discharged into the sea. The plan will address the outcomes of models forecasting the fate of these substances in different meteorological-oceanographic situations.
  - Due to the anticipated effects of a condensate spill incident at sea, it is preferable that a decision be made in favor of onshore storage and processing, in any offshore-onshore mix to be determined.
  - During system initialization, a one-time removal of pressure-check water is necessary. The anticipated water composition should be noted and permission obtained to discharge it to sea, per the Prevention of Sea Pollution from Land-Based Sources Law and its provisions.

#### Safety of the Buildings and Installations in Seismic Terms

- General
  - In order to develop the platform's seismic design, a site response survey should be carried out as noted in Appendix E to Amendment 5 to Standard 413, with consideration of the following guidelines: i) a seismic-tectonic analysis should be conducted in order to determine the seismic load level at the top of the hard rock layer for the reference scenarios defined in standards relevant to the rigs (i.e., Extreme Level Earthquake or Abnormal Level Earthquake per the American Petroleum Institute [API] standard); ii) The amplification factors will be determined on the basis of site-specific information to be collected as part of the soil survey; iii) the results of the soil survey and the site-response survey will be used to calculate the soil liquefaction potential; and iv) the worst-case reference scenario will have a repeat time of at least 2,500 years, so that the seismic design can meet Ministry of Environmental Protection requirements.
  - Design of the platform to withstand seismic loads will be carried out in accordance with the guidelines set forth in the API/International Organization for Standardization (ISO) platform standards, and/or in the guidelines included in the international standards for platforms "Design of Offshore Steel Structures, General (LRFD Method" (DVN-OS-C101), and/or in accordance with comparable standards in the field.
  - With the aid of a three-dimensional model and dedicated software, the dynamic behavior of the platform and the foundations should be calculated in light of anticipated seismic loads. The model should also

take into account the soil property changes during seismic activation (i.e., soil liquefaction).

- Non-structural components that are not subject to SI 413 Part 2 will be designed in accordance with the international standards mentioned in the Israeli standard, by default per the U.S. standard ASCE/SEI 7-10.
- Emergency systems (e.g., control and firefighting) should be designed in accordance with rigorous seismic standards. The system components should, at the very least, be able to withstand an earthquake whose repeat time is 2,500 years.
- At the subsoil investigation stage we should also assess/rule out the presence of superficial methane in the subsurface, as has been found elsewhere on the continental shelf. The consequences of the gas layer and its byproducts in terms of ground and platform stability should be assessed, and appropriate engineering solutions developed.
- The platform should be designed to be tsunami resistant. The issue of tsunamis is not explicitly addressed in platform standards but falls into the category of wave and flow loads that the standards take into account. Tsunami waves a few meters high are expected at the relevant distances from the coast and depths. Scenario-based analysis may be conducted at the designer's discretion to assess the nature of the waves anticipated at the specific point where the platform will be built.
- A soil survey should be conducted to identify discontinuities that could reflect activity along the platform pipeline route. Should such discontinuities be found, the pipeline should be designed to withstand the potential strains.
- The design should include a local earthquake warning system, address future connection to a national earthquake and tsunami warning system, and set forth the automatic and non-automatic actions to be taken when a warning is received from the system.
- The team that prepares the plan for the building permit stage should include an earthquake engineer who is familiar with current practices in the field and the body of knowledge that has been amassed regarding the seismic design of facilities subject to this plan, in light of past incidents in which facilities of these kinds were exposed to seismic forces.

#### Instructions for Noise Reduction

- Construction stage
  - At the detailed design stage and as a condition for obtaining a building permit, the project developer should submit an Acoustic Appendix for the gas processing facility, to be prepared by a recognized acoustic consultant.
  - The Acoustic Appendix will include a list of the dominant noise sources at the construction stage and the anticipated noise levels with

an emphasis on sheet piling, but also addressing other works and work-supporting seacraft.

- The Acoustic Appendix will re-examine current marine mammal and sea turtle harm and nuisance thresholds, which will be updated as needed.
- The Acoustic Appendix will include a timetable for performing the work, including a list of the tools to be operated at each stage, the locations at which they will be operated, and the amount of time per day that the tools will be operated in the field.
- During the sheet piling period, observers skilled at detecting whales and sea turtles will be employed in shifts. At least 20 minutes before the start of hammer operation, the observer will survey with binoculars, from a high platform, the area around the sheet pile, to a radius of at least 500 meters.
- The sheet pile driver should be operated in soft start mode for 20 minutes. The degree to which the original noise intensity is reduced during soft start, compared with maximum intensity, should be determined on the basis of data provided by the manufacturer in the Acoustic Appendix.
- Should a marine mammal or sea turtle be observed during full operation in the vicinity of the sheet piling site, they should be documented, but there is no need to halt work.
- Actual noise measurements should be carried out at measured distances from the sheet piling so as to validate theoretical spatial noise reduction calculations.
- Operation stage
  - Maximum measures should be taken to control noise and to minimize noise transmission from the platform to the marine environment.

#### Rehabilitation of the Offshore Seabed Environment

- General
  - While the pipeline is being laid, material that piles up during excavation should be put back for coverage as soon as possible.

#### Sealing and Monitoring Pipeline Leaks (gas and fuel)

- General
  - The gas pipeline is made of steel with cathodic protection coating.
  - Pressure control systems for the pipeline and facility components should be installed that give warning of unplanned drops in pressure.
  - A plan for leak detection via continuous measurement of pipeline engineering parameters should be prepared (rate of flow, pressure, etc.).
  - A plan for periodic pipeline testing should be drawn up, to include periodic equipment-based marine surveys (e.g., an underwater camera mounted on a floating device and controlled from the survey ship).

- A plan should be prepared for internal inspection of the pipeline via an intelligent diagnostic pig that will obtain information on the state of the pipe, corrosion, irregular pipe shape, etc.

### 12.1.2 *Social Mitigation Measures*

Table ES-2 of the Drilling EIA identifies the social mitigation measures listed below (listed by aspect and then resources affected).

#### Vessel Traffic (between shore base and drilling rig)

- Fishing activities:
  - Provide Notice to Mariners in advance of proposed activities.

#### Safety and Protection Zones (500 meter buffer zone around drilling rig)

- Fishing activities and marine transportation system and infrastructure:
  - Provide Notice to Mariners in advance of proposed activities.
- Marine transportation system and infrastructure:
  - Use standard navigation markings.

#### Accidental Spills (fuel spill from the drilling rig)

- Fishing activities and marine farming, marine transportation and infrastructure, and coastal infrastructure:
  - Spill prevention measures;
  - Drilling rig SOPEP; and
  - OSCP (including notification procedures and protection of fishing and marine farming areas and coastal infrastructure).

#### Accidental Spills (condensate spill from a blowout)

- Fishing activities and marine farming, marine transportation and infrastructure, and coastal infrastructure:
  - Spill prevention measures; and
  - OSCP (including notification procedures and protection of fishing and marine farming areas and coastal infrastructure).

Table ES-2 of the Production EIA identifies the social mitigation and control measures listed below (listed by activity and then resources affected).

#### Sea Pollution Event by Oil Based on Extreme Scenarios

- Pipeline gas and hydrocarbon inventory
  - Fishing and shipping industry, leisure users and tourists, and industrial secondary users:
    - OSRP;
    - Pipeline designed to industry standards;
    - PMS and controls system programmed to minimize potential release inventory;
    - Marine exclusion zone around the LPP; and
    - Notification to marine users in the instance of a spill.

### Fisheries

- Construction, installation, and support vessels
  - Fisheries:
    - 500 meter exclusion zone; and
    - Communication with Port Authorities.

### Safety and Protection

- Construction, installation, and support vessels
  - Marine users:
    - Communications with Port Authorities; and
    - Notification to authorities and the public of a 500 meter radius safety exclusion zone around the pipelay vessel and the offshore construction vehicle (OCV) while it is operating.

Section 5.1 of the TAMA EIA does not identify any specific social mitigation measures, although several of the biological and physical mitigation measures listed above have social components.

In addition to the EIA mitigation measures above, ERM also developed a set of management and mitigation measures pertaining to the potential social and health impacts identified in *Section 9.0*. These are:

### Deepsea commercial fishermen (construction and operation)

- Commercial fishermen should continue to be a stakeholder group included in the Stakeholder Engagement Plan.
- Seasonal considerations for fishermen should also be understood and included in conversations with stakeholders to be conducted by Noble Energy as part of the engagement process.
- Continue notifications of buffer (no-go) zones and other Project related information which could affect the livelihoods of sea users in advance of construction and/or operations activities.

### Shipping and third party infrastructure as a result of rigs and support vessels (construction)

- Continue notifications of buffer zones and other Project related information which could affect sea users in advance of construction and/or operational activities.

### Livelihoods of nearshore fishermen (commercial, subsistence, and recreation) (construction and operation)

- Nearshore fishermen (as well as nearshore recreational sailors and yachters) should continue to be stakeholder groups included in the Stakeholder Engagement Plan.

- Seasonal considerations for fishermen should also be understood and included in conversations with stakeholders to be conducted by Noble Energy as part of the engagement process.
- Continue notifications of buffer zones and other Project related information which could affect the livelihoods of sea users nearshore in advance of construction and/or operational activities.

#### Onshore fish farming (construction and operation)

- Consider the potential for compensation in line with relevant national legislation and regulations, and continue stakeholder engagement with affected communities.
- Provide access to the Community Feedback Mechanism so that affected communities have a means to express their concerns and voice their opinions during the construction phase.
- Develop a Livelihood Restoration Framework consistent with Israeli law and good international industry practice as set out in the IFC PS 5 (Land Acquisition and Resettlement), and Noble Energy internal guidelines and norms.

#### Agriculture and land use resulting in economic displacement as a result of new condensate pipelines from DVS to Hagit and Haifa

- Consider the potential for compensation in line with relevant national legislation and regulations, and continue stakeholder engagement with affected communities.
- Provide access to the Community Feedback Mechanism so that affected communities have a means to express their concerns and voice their opinions during the construction phase.
- Develop a Livelihood Restoration Framework consistent with Israeli law and good international industry practice as set out in the IFC PS 5 (Land Acquisition and Resettlement), and Noble Energy internal guidelines and norms.

#### Tourism (potential economic displacement), and recreational areas, including hotels and local businesses, and beach users (construction phase)

- Engage with the resort and tour operators in the area to inform them of the construction schedule and activities in advance. Include these groups in the Stakeholder Engagement Plan.
- Inform bird watching groups, horseback riding companies, kayak clubs, and other organized recreation groups of any potential impacts to the beach area and construction times so they can adjust their plans if necessary.

- Engage with kayak groups, and other potential sea going recreational groups who travel nearshore to Dor Beach, to determine how the HDD construction affects the patterns of kayakers who traverse along the coast.
- Engage with Ministry of Tourism to discuss potential short-term impacts to access along the Israel National Trail and alternates routes, as well as potential for notification to hikers.

Tourism (potential economic displacement) and recreation areas as a result of changes to the landscape (operations phase)

- Engage with those potential communities affected by the permanent change in landscape.

Community health, safety, and security, as a result of construction (workforce and traffic)

- Noble Energy has stringent occupational health and safety programs and training programs which could be mandated to educate the workforce on risks associated with communicable diseases and conduct of the workforce in communities, if necessary.
- The contractor assigned to the onshore work at Dor Beach and pipelines to Hagit should conduct appropriate traffic management planning with proper mitigations (speed limits, driver training, signage, etc.) in place during the construction phase to avoid safety impacts on local communities.

### 12.1.3 *Cultural Heritage*

Table ES-2 of the Drilling EIA identifies the cultural heritage mitigation measures listed below (listed by aspect).

Seafloor Disturbance and Drilling Discharges (treated cuttings):

- 305 meter avoidance zone for potential wreck sites and 31 meter avoidance zone for other sonar contacts.

Accidental Spills (fuel spill from the drilling rig):

- Spill prevention measures;
- Drilling rig SOPEP;
- OSCP (including protection of coastal archaeological sites); and
- 305 meter avoidance zone for potential wreck sites and 31 meter avoidance zone for other sonar contacts.

Table ES-2 of the Production EIA identifies the cultural heritage mitigation and control measures listed below (listed by activity and then resources affected).

Cultural and Heritage Sites

- Subsea installation

- Cultural heritage:
  - 305 meter avoidance zone for potential wreck sites and 31 meter avoidance zone for other sonar contacts.

Section 5.1 of the TAMA EIA identifies the cultural heritage mitigation measures listed below (listed by subsections/topics).

#### Antiquity and Heritage Sites

- General
  - All work within areas recognized as antiquity sites should be coordinated and performed only upon receipt of written authorization from the Israel Antiquities Authority, as mandated, and subject to the instructions of the Antiquities Law, 5738-1978.
  - Advance archaeological assessments should be performed along the route (supervision, test cuts, test excavation/sample rescue excavation, rescue excavation) per conditions set by the Antiquities Authority and at the developer's expense.
  - Should antiquities be discovered that justify preservation/removal of the find per the Antiquities Law, 5738-1978 or the Antiquities Authority Law, 5749-1989, the developer will, at their expense, perform all of the actions necessary for preservation of the antiquities.
  - The Israel Antiquities Authority does not undertake to permit development or construction activity of any kind in the area or any portion of it even after testing/excavation should unique antiquities be discovered in the area that entail preservation of the ancient remains on site. Such permission should also not be regarded as exemption of the remains from the Antiquities Law but rather consent in principle only.

#### **12.1.4 Human Rights**

In an effort to enhance its Noble Energy is continuing to embed human rights related mitigations in the form of stakeholder engagement planning and a Grievance Mechanism. An additional benefit of these mitigations will be the establishment of processes to proactively manage any actual or potential human rights issues in the future. Specific recommendations are summarized below:

- Noble Energy should continue proactive stakeholder engagement with local communities and properly address any concerns pertaining to human rights issues.
- Noble Energy should continue its assessment and monitoring of its primary supply chain on an ongoing basis with regards to human rights; especially as major first-tier supplier contracts in foreign countries are let.
- The Community Feedback Mechanism should be accessible to those who could be affected offshore by public security forces. This will aid the

company in monitoring any actual or potential human rights violations which are directly outside of company control..

## 12.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

### 12.2.1 *Introduction*

ERM, on behalf of Noble Energy, has prepared an Environmental and Social Management Plan (ESMP) Framework for the Project. The ESMP Framework will supplement the Project's six Environmental Management and Monitoring Plans (regulatory EMMPs) that will be prepared as a requirement of the Israeli legislative framework. Each regulatory EMMP is required specific to work packages (see *Table 12-1* below). The EMMPs are driven by the required building permits, and Noble Energy will be submitting six different building permits (two to date have been submitted). The ESMP Framework will focus on capturing additional commitments made by Noble Energy including:

- Management and monitoring commitments outside of Israeli territorial waters (beyond 12-mile boundary), since these are not mandated as part of the regulatory EMMPs; and
- Commitments to align the Project with the IFC PS, which are additional to the regulatory EMMP requirements.

As the Project progresses through design and prior to construction, Noble Energy will develop the necessary management and monitoring plans to appropriately manage environmental, health and safety and social issues. It is the intention that this ESMP Framework will be integrated with the regulatory EMMP requirements to produce a single overall management document for ease of understanding and implementation. This will be undertaken through the following steps:

- i. Noble Energy will prepare the regulatory EMMPs (which will be in Hebrew), and these regulatory EMMPs will be submitted for Government approval and sign-off (two to date have been submitted); and
- ii. In parallel, an ESMP document will be created that incorporates both the regulatory EMMPs and the requirements of this ESMP Framework. This ESMP document will be the actionable document that Noble Energy and its partners and contractors will be responsible for implementing. This will also be in Hebrew.

### 12.2.2 *Environmental Management and Monitoring Plan*

Under the requirements of TAMA/37/H, Noble Energy is committed to preparing and implementing six regulatory EMMPs for planning the construction and operation of the Project facilities. Detailed instructions for the requirements and structure of the regulatory EMMPs have been developed by

the Israeli Government based on the environmental impact studies that have been performed under the TAMA process. *Appendix 4* attaches the Guidelines for the regulatory EMMPs.

### Regulatory EMMP Requirements

Some of the pertinent requirements and expectations of the regulatory EMMPs are:

- It will cover the extent of Noble Energy operations onshore and in the near-shore area up to the 12 nautical mile boundary which defines the extent of Israeli waters.
- The EMMP documents set out the guiding principles for the environmental management and monitoring of all components of the Project during the stages of construction, operation and dismantling.
- The EMMP shall contain an explanation and a detailed description of the Project and how the relevant environmental areas will be integrated into the project as a whole.
- The EMMP shall apply the guiding principles of:
  - Wherever possible, negative impacts on humans, nature and the environment, shall be avoided.
  - Use of the best available technology (BAT) with the aim of increasing the advantages of the project.
- The principles of operation and the guidelines regarding the environmental aspects of the Project are based on the existing and accepted environmental policy and standards, including requirements of:
  - Statutes, standards, provisions and conditions set by the appropriate authorities in Israel.
  - The stipulations of financing entities (if any).
  - The stipulations, standards and policy of the Licensee.
  - Undertakings made during the consultation period.
- Environmental management of the entire project is considered to be an integral part of the system of managing the project; therefore an efficient environmental management system must be set up in accordance with ISO 14001 or some other identical standard. The EMMP must constitute an integral part of the environmental management system.
- Monitoring constitutes an integral part of the regulatory EMMPs.

### Scope of Regulatory EMMPs

The regulatory EMMPs are required based upon the following building permits (*Table 12-1*) that Noble Energy is submitting:

TABLE 12-1: REGULATORY EMMPs

Regulatory	Permit Application(s) Covered
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EMMP No.	
1	Civil #1 – Initial Site Development Civil #3 – Onshore Civil Works and Foundations
2	Civil #2 – Platform Jacket, Structure, and Foundation Mechanical #1 – Platform Process Equipment
3	Pipeline #6 – Condensate Pipeline from Beach to Quarry Pipeline #4 – NG Pipeline from Beach to DVS
4	Pipeline #7 – Condensate Pipeline from Quarry to Hagit
5	Pipeline #3 – NG Pipeline from Platform to Beach Pipeline #5 – Condensate Pipeline from Platform to Beach Pipeline #2 – Pipelines and Umbilicals from 12 NM Boundary to Platform
6	Civil #4 – Hagit Terminal Civil Works Mechanical #2 – Hagit Terminal Process Equipment and Facilities

Each regulatory EMMP will need to address, including through individual management plans, the following topics as detailed in the guidelines contained in *Appendix 4*:

- Air emissions;
- Discharges into the sea;
- Discharges and prevention of leaks into soil, groundwater, and surface water;
- Safety and hazardous materials;
- Geological and seismic risks;
- Waste;
- Noise and lighting;
- Landscape integration and restoration; and
- Natural assets.

#### ESMP Additional Focus Areas

As described, the regulatory EMMPs are a regulatory requirement for Noble Energy, and their scope has been defined through the TAMA process. Noble Energy acknowledges that this scope for environmental and social management and monitoring needs to be expanded to cover the broader requirements of Noble Energy and its partners, which go beyond the Israeli legislative requirements. Therefore this ESMP Framework has been developed to help supplement the regulatory EMMPs by addressing:

- Management and monitoring of Noble Energy offshore activities beyond 12 nautical miles where substantial parts of the Project lie;
- Project alignment with the IFC PS and the requirements of OPIC; and
- Management of stakeholder, community and social issues.

The above items form the basis of this ESMP Framework, and are detailed further in the following sections.

### 12.2.3 Offshore Activities

The Project design consists of both offshore and onshore components. The offshore components include a subsea production system connecting high-rate subsea wells to a fixed offshore platform and three dedicated pipelines, one for gas, one for condensate (running from the platform to a coastal valve station) and one for gas exports to regional markets. The onshore components include a Coastal Valve Station (CVS), onshore gas and condensate pipelines, the Dor Valve Station (DVS), and condensate transport and storage infrastructure. The onshore and near shore project components have been assessed under the TAMA process, and in turn the management and monitoring needs are defined through the EMMP guidelines described.

The Drilling and Production EIAs identify where mitigation and management plans are needed. A number of these mitigation and management plans fall outside of the 12 nautical mile boundary that defines Israeli waters. Noble Energy has committed to a series of management needs for these offshore components beyond 12 nautical miles. These are summarized below in *Table 12-2*, and these items will be developed into appropriate management and monitoring plans at the appropriate stage of project development.

TABLE 12-2: ASPECTS THAT WILL BE DEVELOPED INTO MANAGEMENT PLANS

Additional Management and Monitoring Commitments	
Pipelines and Submarine Systems (from Production EIA)	Drilling, Production Tests, and Completion (from Drilling EIA)
<ul style="list-style-type: none"> <li>• Handling of Hazardous Materials</li> <li>• Solid Waste</li> <li>• Reduction and Prevention of Harm to the Seafloor, Seawater and the Coastline</li> <li>• Preservation of Fauna and Flora, including Pelagic Species</li> <li>• Preventing or Reducing Noise Impacts</li> <li>• Protection and Maintenance of Transmission/Supply Pipelines</li> <li>• Management of Safety and Protection Zones</li> <li>• Emergency Procedures</li> <li>• Geological and Seismic Risks</li> <li>• Monitoring</li> <li>• Decommissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Reducing Air Contaminant Emissions</li> <li>• Handling of Hazardous Materials</li> <li>• Waste Treatment and Removal</li> <li>• Drilling Mud and Cuttings</li> <li>• Other Discharges</li> <li>• Reduction and Prevention of Harm to Seafloor, Seawater and the Coastline including Marine Ecology, Cultural and Heritage Sites, Fishing, and Marine Farming</li> <li>• Preservation of Fauna and Flora, Including Pelagic Species</li> <li>• Preventing/Reducing Light Hazards</li> <li>• Measures for Preventing or Reducing Noise</li> <li>• Emergency Procedures</li> <li>• Geological and Seismic Risks</li> </ul>

	<ul style="list-style-type: none"> <li>• Drilling and Production Test Performance</li> <li>• Safety and Protection Zones</li> <li>• Monitoring</li> <li>• Periodical Reporting and incident notification</li> <li>• Changes in Development Plan</li> </ul>
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The Drilling EIA provides detailed descriptions of three management plans, as well as initial comments on others as follows:

- ***Oil Spill Contingency Plan (OSCP)***: Noble Energy has a corporate OSCP that describes the company’s response capabilities and the methods it would use to mitigate the impacts of spills. The OSCP addresses: procedures for assessing and monitoring an unintentional release and for predicting its movement in the marine environment; identification of resources at risk; shoreline protection methods; waste and debris removal and disposal procedures; dispersant use and monitoring plan; incident reporting and notification procedures; response team organization; required equipment, supplies, and services, and their availability; and training and exercise procedures. The OSCP utilizes a three tier classification of incident response, in which Tier 1 is local, Tier 2 is regional, and Tier 3 is national/ international. This classification is aligned with the International Petroleum Industry Environmental Conservation Association’s (IPIECA) Guide to Tiered Preparedness and Response (see Section ES.2). Tables ES-2 and 4-30 indicate that the OSCP should include measures to mitigate potential impacts from fuel spills from the drilling rig and condensate spills from a blowout to the following resources: air quality; water quality; marine mammals; sea turtles; seabirds and migratory birds; fish; fishing activities and marine farming; culture and heritage sites; marine transportation and infrastructure; and coastal habitats and infrastructure. Noble Energy will update the Oil Spill Contingency Plan (OSCP) to reflect Leviathan drilling activities.
- ***Shipboard Oil Pollution Emergency Plan (SOPEP)***: The drilling rig contractor will implement oil spill prevention methods as part of its Shipboard Oil Pollution Emergency Plan (SOPEP). The SOPEP will include measures to mitigate potential impacts from oil spills from the drilling rig to the following resources: air quality; water quality; marine mammals; sea turtles; seabirds and migratory birds; fish; fishing activities and marine farming; culture and heritage sites; marine transportation and infrastructure; and coastal habitats and infrastructure.
- ***Emergency Response Plan (ERP)***: The EIA states that Noble Energy will develop an ERP to describe the actions to be taken in the event of emergencies, including those involving hazardous materials and earthquakes. The EIA also states that drilling rig contractors will be

required to have their own ERPs. These plans must be applied to manage wellsite emergency situations for safe evacuation, escape, and rescue of wellsite personnel.

- ***Ballast Water Management Plan:*** The drilling rigs will have a Ballast Water Management Plan developed and implemented by the drilling rig contractor, and will be equipped with an IMO-approved ballast water management system to minimize the potential for introducing aquatic invasive species.
- ***Waste Management Plan:*** The risk of solid waste being lost overboard (where it could pose a potential harm to the seafloor or to the coastline) will be minimized through Noble Energy's waste management procedures and the drilling rig operator's Garbage Management Plan as required by MARPOL Annex V and Israel Regulation. Waste management will be evaluated during a performance assessment on the drilling rigs at least once during the drilling program. Waste tracking documentation and related monitoring activities will be conducted per the Waste Management Program that will be prepared.
- ***Marine Environment Background Monitoring Plan:*** Noble Energy is planning to conduct post-drilling environmental monitoring in the Leviathan Field to include sampling of seawater, sediments, and infauna.
- ***Chemical Use Plan:*** Noble Energy will conduct a performance assessment at least once during the drilling of each well to confirm compliance with the discharge monitoring and reporting requirements on the drilling rigs. These include barite certificates, SDSs for all chemicals listed in the Chemical Use Plan and the chemicals inventory, among others.
- ***Offshore Discharge Program:*** Documentation of all discharges and related monitoring activities will be conducted as part of daily monitoring activities on the drilling rig(s) and per the Offshore Discharge Program that will be prepared.

The Production EIA describes and mentions a number of management plans:

- ***Waste Management Plan (WMP):*** This plan will identify (1) the types of waste generated and (2) management procedures for each waste stream. The Plan will detail appropriate waste contractors to be used to confirm the waste is being correctly documented, transported, processed and disposed of in accordance with applicable legislation. In addition, the plan will require contract vessel operators to maintain a Waste Record Book, submit monthly reports of waste sent to shore, complete Controlled Waste Transfer Notes, and carry out Waste Management Duty of Care audits. The plan will also provide guidance on: waste minimization and prevention; identification and segregation of waste materials at source; recycling and reuse of suitable materials; and treatment and disposal of specific waste streams. The EIA states that there will also be vessel-specific WMPs, which will include provisions for segregating waste on-

board, having secure areas for the storage of hazardous waste and recycling/reuse where practicable and will include written procedures for collection, storage, processing and disposal of waste, including the use of any relevant equipment fitted on-board. The plans will align with the requirements of MARPOL 73/78.

- **Hydrotest Water Disposal Plan:** This plan will be developed to include the regulatory expectations and will describe the mitigation measures to be adopted to minimize environmental risks from hydrotest water disposal. This may include a quantitative modeling assessment if appropriate.
- **Ballast Water Management Plan:** Ballast water will be managed according to IMO Guidelines and will be detailed in a Ballast Water Management Plan.
- **Emergency Factory Plan (No. 145-13-EHSR-EPP-PA-T3):** This is an existing corporate document that includes Noble Energy's Oil Spill Response Strategy in the event of a loss of containment from a Noble Energy asset. The plan provides a system of preparedness and tactics for responding to an oil pollution incident in the Mediterranean Sea.
- **Construction Management Plan:** Exact measurements of acceptable weather conditions and sea state will be formerly agreed prior to any construction activities and documented within a Leviathan Development Project dedicated Construction Management Plan. The plan will also include oil and chemical spill prevention procedures and emergency response procedures in case of a fire. The EIA refers to two additional plans in the same context as the Construction Management Plan, an Operational Management Plan and a Decommissioning Plan.

The OSCP, SOPEP, and ERP will be applicable across the offshore assets, and similarly the Hydrotest Water Disposal Plan and the Ballast Water Management Plan will similarly be project-wide.

#### 12.2.4 *Alignment with the IFC PS*

In addition to meeting regulatory requirements, Noble Energy is committed to aligning the Project with the IFC Performance Standards, as well as the associated requirements of OPIC. A number of items have been identified that need to be integrated into the project's EMMPs to achieve IFC PS alignment and these aspects are summarized below.

The following aspects will be integrated by Noble Energy into its management and monitoring plans, where applicable:

- A stated intent to align with the IFC PS;
- Reference and linkage to Noble Energy's management system and associated policies;

- Demonstrate that an IFC-aligned mitigation hierarchy is being followed - that is to prioritize avoidance and where avoidance is not possible to minimize and where residual impacts remain, provide options for compensation/offset of risks and impacts to people and the environment (where technically and financially feasible);
- Discuss intent on implementation of the best available technology (BAT);
- Identify instances where a third party (e.g. government) or supplier will be in charge of mitigating the impact/risk and indicate how Noble Energy will monitor and supplement these efforts, as necessary;
- Explain the organizational capacity and competency to implement the management and monitoring commitments;
- Discuss management of change; and
- Describe roles, responsibilities, processes and training needs.

The World Bank Group (WBG) has produced a series of health, safety and environmental (HSE) guidelines that deal with different industries and sectors. Of direct relevance to the Project are the following:

- Environmental, Health and Safety General Guidelines, April 30, 2007 (<http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>);
- EHS Guidelines: Offshore Oil and Gas Development, June 5, 2015 ([http://www.ifc.org/wps/wcm/connect/f3a7f38048cb251ea609b76bcf395ce1/FINAL\\_Jun+2015\\_Offshore+Oil+and+Gas\\_EHS+Guideline.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/f3a7f38048cb251ea609b76bcf395ce1/FINAL_Jun+2015_Offshore+Oil+and+Gas_EHS+Guideline.pdf?MOD=AJPERES)); and
- EHS Guidelines: Onshore Oil and Gas Development, April 30, 2007 (<http://www.ifc.org/wps/wcm/connect/4504dd0048855253ab44fb6a6515bb18/Final%2B-%2BOnshore%2BOil%2Band%2BGas%2BDevelopment.pdf?MOD=AJPERES&id=1323153172270>).

These three documents provide guidance and performance expectations for projects and alignment with them is a requirement of the IFC PS. Noble Energy is committed to meeting these requirements and as shown in *Table 12-3*, a number of supplementary requirements have been identified that go above and beyond the regulatory EMMPs.

*TABLE 12-3: WBG EHS GUIDELINES – SUPPLEMENTARY REQUIREMENTS TO THE EMMP*

Topic (as per EMMPs)	Supplementary Requirements from Offshore and Onshore Guidelines
Air emissions	Specific guidance and performance requirements covering: <ul style="list-style-type: none"> <li>• <u>General</u>: Annual quantification of significant greenhouse gas (GHG) emissions (&gt;100,000 tons CO<sub>2</sub> equivalent per year) and implementation of methods to reduce</li> </ul>

	<p>fugitive emissions.</p> <ul style="list-style-type: none"> <li>• <u>Exhaust Gases</u>: Compliance with the General EHS Guidelines for small combustion source emissions with a capacity of up to 50 MWth and the EHS Guidelines for Thermal Power for combustion source emissions with a capacity of greater than 50 MWth.</li> <li>• <u>Venting and Flaring</u>: Implementation of measures consistent with the Global Gas Flaring and Venting Reduction Voluntary Standard, avoidance of continuous venting, design of new facilities to avoid routine flaring, implementation of good practices if flaring is the only viable solution, use of an efficient flare system rather than venting in the event of an emergency, minimizing flaring events as a result of equipment breakdowns and facility upsets, and estimating flaring volumes for new facilities.</li> <li>• <u>Well Testing</u>: Avoidance of the flaring of produced hydrocarbons during well testing (especially near communities and environmentally sensitive areas for onshore) and minimizing the volume of hydrocarbons for tests if flaring is the sole option available for the disposal of test fluids.</li> <li>• <u>Fugitive Emissions</u>: Consideration and implementation of methods for controlling and reducing fugitive emissions in the design, operation, and maintenance of offshore facilities, and avoiding the use of open vents in tank roofs by installing pressure relief valves (onshore).</li> </ul>
Wastewaters	<p>Specific guidance and performance requirements covering:</p> <ul style="list-style-type: none"> <li>• <u>Produced Water</u>: Evaluation and implementation of feasible alternatives to the management and disposal of produced water, consideration of geological and technical aspects to avoid leakage of the disposed water to the seabed or shallow confined aquifers when disposal wells are the adopted solution, establishing mitigation targets for produced water if none of these options is technically feasible and disposal to sea is the only feasible option, consideration of treatment technologies including combinations of gravity and/or mechanical separation and chemical treatment, and potentially a multistage system typically including a skim tank or a parallel plate separator followed by a gas flotation cell or hydrocyclone, availability of a sufficient treatment system backup capability for continual operation if an alternative disposal method should fail, consideration of means to reduce the volume of produced water where disposal at sea is necessary, and careful selection of production chemicals to minimize environmental hazards related to residual chemical additives in the water stream.</li> <li>• <u>Flowback Water</u>: Evaluation and integration into the operational design of feasible alternatives for the management and disposal of flowback water.</li> <li>• <u>Hydrostatic Testing Water</u>: Consideration of pollution prevention control measures in managing hydrotest waters and preparation of a hydrotest water disposal plan if the discharge of hydrotest waters to the sea is the only feasible alternative for disposal.</li> <li>• <u>Cooling Water</u>: Consideration of antifoulant chemical dosing to prevent marine fouling of offshore facility cooling water systems and selection of the cooling water discharge depth to maximize mixing and cooling of the thermal plume so that the temperature is within 3 degrees Celsius of ambient seawater temperature at the edge of the defined mixing zone or, if the mixing zone is not defined, within 100 meters of the discharge point.</li> <li>• <u>Desalination Brine</u>: Consideration of the mixing of brine from the potable water system with cooling water or other effluent streams.</li> <li>• <u>Other Waste Waters</u>: Appropriate treatment measures for sewage, food waste, ballast and storage displacement water, bilge waters, and deck drainage water.</li> </ul>
Discharges and prevention of leaks	<p>Specific guidance and performance requirements covering:</p> <ul style="list-style-type: none"> <li>• <u>Spills</u>: Compliance with the General EHS Guidelines and additional spill prevention and control measures specific to offshore oil and gas facilities.</li> <li>• <u>Spill Response Planning</u>: Preparation of a Spill Response Plan (SRP) and the capability to implement the plan. The SRP should address potential oil, chemical, and fuel spills from offshore facilities and support vessels (including tankers) and pipeline ruptures and leaks, and should clearly define the storage and maintenance instructions for Tier 1 spill response equipment and relevant routine inspection,</li> </ul>

	testing, and exercises
Safety and hazardous materials	<p>Specific guidance and performance requirements covering:</p> <ul style="list-style-type: none"> <li>• <u>Hazardous Materials Management</u>: Design facilities to reduce the exposure of personnel to chemical substances, fuels, and products containing hazardous substances, prepare a procedure for the control and management of radioactive sources used offshore, and monitor locations where NORM may precipitate as scale or sludge in process piping and production vessels, facilities, and/or process equipment that have been taken out of service for maintenance.</li> <li>• <u>Occupational Health and Safety</u>: Consideration of OHS and major hazard issues as part of a comprehensive risk assessment, designing offshore facilities to eliminate or reduce the potential for injury or risk of an accident, basing OHS risk management on application of risk assessment principles to identify hazards, risks, and controls, development of a formal Permit to Work (PTW) system, equipping offshore facilities first-aid providers and the means to provide short-term remote patient care, installation of an alarm system that can be heard throughout the offshore facility, and compliance with the General EHS Guidelines for the management of physical hazards common to all industries and specifically related to hazards from rotating and moving equipment, exposure to noise and vibration, electrical hazards, hot work, working with heavy equipment, confined space entry, working at heights, and the general working environment.</li> <li>• <u>Fire and Explosion Prevention and Control</u>: Compliance with guidance in the General EHS Guidelines, limit potential ignition sources and put in place adequate separation distances between potential ignition sources and flammable materials, and implement appropriate fire and explosion prevention and control measures for offshore facilities.</li> <li>• <u>Air Quality</u>: Comply with the General EHS Guidelines, have adequate ventilation in closed or partially closed spaces, equip facilities with a reliable system for gas detection that allows the source of release to be isolated and the inventory of gas that can be released to be reduced, and install monitors and set them to activate warning signals whenever detected concentrations of H<sub>2</sub>S exceed 7 milligrams per cubic meter.</li> <li>• <u>Hazardous Materials</u>: A procedure for the control and management of radioactive sources used offshore should be prepared, along with a designated shielded container for storage when the source is not in use. The container should be locked in a secure store that is used exclusively for this purpose.</li> <li>• <u>Well Blowouts</u>: A BOP system should be installed that can be closed rapidly in the event of an uncontrolled influx of formation fluids and that allows the well to be circulated to safety by venting the gas at surface and routing oil so that it may be contained. The BOP system design, maintenance, and repair should be in general compliance with international standards. Contingency plans should be prepared for well operations and should include identification of provisions for well capping in the event of uncontrolled blowout (providing indication of the tools, equipment, and intervention time required) and identification of spill recovery measures.</li> <li>• <u>Emergency Preparedness and Response</u>: Offshore facilities should establish and maintain a high level of emergency preparedness for the response to incidents is effective and without delay. This should include an emergency response team, training of personnel, frequent emergency preparedness drills, and an emergency response plan.</li> <li>• <u>Community Health and Safety</u>: A comprehensive assessment addressing potential hazards to local communities and to the environment is required. Based on the findings of the assessment, adequate measures to avoid or control the hazards should be taken and should be factored into emergency planning.</li> </ul>
Waste Management	<p>Specific guidance and performance requirements covering:</p> <ul style="list-style-type: none"> <li>• <u>Drilling Fluids and Drilled Cuttings</u>: Disposal of spent Non-aqueous drilling fluids (NADF) by discharge to the sea must be avoided. Disposal options for water-based drilling fluids (WBDF) should be evaluated. When discharge to sea is the only alternative, a drilled cuttings and fluid disposal plan should be prepared. Guidance for the treatment and disposal of fluids and cuttings shipped to shore is provided in the EHS Guidelines for Onshore Oil and Gas Development. Pollution prevention and control measures should be considered. Drilling fluids to be discharged to sea</li> </ul>

	<p>(including as residual material on drilled cuttings) are subject to tests for toxicity, barite contamination, and oil content provided in Table 1 of Section 2 of the Offshore EHS Guidelines.</p> <ul style="list-style-type: none"> <li>• <u>Produced Sand</u>: Whenever practical, produced sand removed from process equipment should be transported to shore for treatment and disposal, or routed to an offshore injection disposal well if available. Direct discharge to sea is not good practice. If discharge to sea is the only demonstrably feasible option, then the discharge should meet the guideline values in Table 1 of Section 2 of the Offshore EHS Guidelines.</li> <li>• <u>Completion and Well Work-Over Fluids</u>: Feasible disposal options should be considered, including ship them to shore to the original vendors for recycling, inject in a disposal well, or ship onshore for treatment and disposal. If discharge to sea is the only demonstrably feasible option, spent acids should be neutralized before treatment and disposal, and the fluids should meet the discharge levels in Table 1 of Section 2 of the Offshore EHS Guidelines.</li> <li>• <u>Naturally Occurring Radioactive Materials (NORM)</u>: NORM-containing sludge, scale, or equipment should be treated, processed, isolated, and/or disposed of according to good international industry practices</li> </ul>
Noise and lighting	<ul style="list-style-type: none"> <li>• <u>Noise guidelines</u>: Environmental parameters that determine sound propagation in the sea are site specific, and different species of marine life have different hearing sensitivities as a function of frequency. An impact assessment should be conducted to (i) identify where and/or when anthropogenic sound has the potential to create significant impacts and (ii) determine what mitigation measures, if any, are appropriate.</li> </ul>

### 12.2.5 Biodiversity and Habitats Management

IFC PS 6 establishes a series of requirements for all projects located in any type of natural habitat and for activities in critical habitats, which are detailed above in *Section 7.2*. These requirements are based on the application of the mitigation hierarchy where avoidance of impacts to biodiversity is the preferred approach and compensation or offsetting should be considered as a last resort to address residual impacts after other mitigations have been applied.

It is important to recall that the identification of critical habitats is independent of any Project impacts and based on the nature of the biodiversity values of the landscapes and ecosystems within with a project is located. The extent of the actions required to achieve net gains for biodiversity values will be proportionate to the level of any Project-related impacts. For example, when considering critical habitats for sandy-habitat endemics, the Project will not impact the coastal dunes as it will use horizontal directional drilling. Any meaningful measure to improve on-the-ground conservation of coastal dunes should be considered a net gain for coastal dunes biodiversity.

The Project-level BAP should:

- Be prepared in advance of any Project-related activities with the potential to impact the biodiversity values for which critical habitats are identified.
- Be developed, where appropriate, in consultation with relevant stakeholders. This consultation should occur during at least the initial development of the draft BAP and then include disclosure of the Final BAP.

- Will detail the approach to implementing the mitigation hierarchy.
- Address, as applicable, achieving net gains, which as defined by PS 6 are “additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated.”
- Include monitoring and evaluation of the implementation and effectiveness of mitigation measures and management controls.

Include monitoring and evaluation of the implementation and effectiveness of mitigation measures and management controls.

## 12.2.6 *Social Management Plans*

Noble Energy has undertaken a number of social studies and assessments to ensure a comprehensive approach to managing social issues. This has resulted in a number of social management plans being developed and these are described below.

### Stakeholder Engagement Plan

Noble Energy has developed a Stakeholder Engagement Plan (SEP) in accordance to the IFC’s PS 1- *Assessment and Management of Environmental and Social Impacts*. It identifies stakeholders (i.e., government entities, communities, suppliers, etc.) and maps their respective level of interest and influence in the Project. It then establishes appropriate modes of engagement.

The SEP pays particular attention to disadvantaged and vulnerable groups of people. As part of the SEP, a Community Feedback Mechanism will be launched, which is designed to:

- Receive and register complaints and concerns;
- Respond to the stakeholder and address their concern; and
- Provide, track and document responses.

SEPs are evergreen documents and should be updated periodically to reflect the on-going developments of the Project. For more information, please refer to the *Stakeholder Engagement Plan* (September 2016).

### Chance Find Procedure

In accordance to the IFC’s PS 8- *Cultural Heritage*, ERM, on behalf of Noble Energy, developed a Chance Find Procedure. It outlines the following:

- Construction monitoring;
- Identification, assessment, and treatment of potential chance finds;
- Record keeping;
- Cultural heritage training program; and
- Site protection.

For more information, please refer to the *Chance Find Procedure* (September 2016).

### Labor Management Plan

ERM, on behalf of Noble Energy, developed a Labor Management Plan in accordance to the IFC's PS 2- *Labor and Working Conditions*. The plan describes the methods, measures, and procedures that have been established to:

- Achieve compliance with Israeli labor legislation and alignment with international labor requirements;
- Carry out recruitment, employment and training for direct, indirect and subcontracted workers in a fair and transparent manner, consistent with good international industry practice; and
- Achieve local and national employment targets.

For more information, please refer to the *Labor Management Plan* (September 2016).

### Livelihood Restoration Management Framework

In accordance to the IFC's PS 5- *Land Acquisition and Involuntary Resettlement*, ERM, on behalf of Noble Energy, developed a *Livelihood Restoration Management Framework* as part of the SLIP. The *Livelihood Restoration Management Framework* identifies communities and individuals who might be adversely impacted by the Project, assesses this impact on them in relation to livelihoods, and proposes mitigation measures to:

- Compensate potential losses to communities and/or individuals based on the merits of each case and subject to all legal provisions;
- Provide development benefits to those affected; and
- Manage other displacement impacts of the Project.

For more information, please refer to the *Livelihood Restoration Management Framework* (September 2016).

*Appendix 2* contains a copy of the Stakeholder Engagement Plan, and *Appendix 5* contains copies of the Antiquities Management Plan; Labor Management Plan and Livelihood Restoration Management Framework.

## **12.2.7 Environmental Monitoring Plans**

Noble Energy will be required under the Israeli offshore guidelines to develop a comprehensive monitoring plan.

Noble Energy intends to structure its Environmental Management Plans in alignment with its Environmental and Social Management System (ESMS), which will integrate with their Global Management System (GMS) and Quality Assurance System (QA). Details of these plans are described below and annexed where noted.

#### Global Management System (GMS)

The Global Management System (GMS) provides a framework for establishing performance goals and incorporates Noble Energy's Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems, such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06 and ANZI Z10 with Environmental Management Systems such as EPA RMP, ISO 14001 and World Bank Group standards and guidelines. Other country and project-related processes and procedures (e.g. ERP, SEMS, Safety Plan, OSRP) are aligned with Noble Energy's corporate commitments. Noble Energy has a risk mapping system under the GMS which aligns with PS1 management program components (see GMS Brochure in *Appendix 1*).

#### Safety and Environmental Management System (SEMS)

Noble Energy has a Safety and Environmental Management System (SEMS) for all operations to comply with best industry practice as well as to meet regulatory requirements. The SEMS will be part of an Operations Management System (OMS) that will incorporate elements of Noble Energy's occupational safety and health systems as well as an Environmental Management System. Social and health related management and monitoring as it pertains to OHS is also covered under the aforementioned systems and plans, and Noble Energy also operates a Safety Plan across its operations which aligns with Israeli requirements and international standards.

Under Noble Energy's SEMS, the company will be responsible for ensuring that all contractors meet environmental and health and safety standards. This is part of Noble Energy's ISN review of these contractors prior to awarding contracts.

The cumulative impacts have overall been assessed as minimal, although some specific potential impacts associated with the VECs described have been assessed and could occur as a result of multiple, concurrent and overlapping developments. A cumulative impact management framework is summarized below which captures the main recommendations of this study – comprising those that are specific to Noble Energy and those that should be collaborative

activities involving future project proponents and owners, government and other stakeholders.

The identified mitigation measures related to this Project are captured in *Table 12-4* below, and presents those recommended measures that are the responsibility of Noble Energy, and those that are not the responsibility of Noble Energy, but rather require a collaborative approach with other developers stakeholders and government.

**TABLE 12-4: CUMULATIVE MITIGATION MEASURES AND MANAGEMENT RESPONSIBILITY**

Mitigation measures - Noble Energy	Mitigation measures - collaborative
Landscape and Visual	
The assessment has not identified a cumulative impact that is considered significant and in need of mitigation measures, monitoring or management.	
Employment and Economy	
The Project will be a minor contributor to the potential cumulative impacts, however as a proactive step Noble Energy's Community Feedback Mechanism will provide potentially affected communities with a means to express their concerns and voice their opinions during the construction phase. Noble Energy will also notify communities of buffer zones and other Project-related information which could affect the livelihoods of sea users nearshore in advance of construction and/or operational activities.	From a broader cumulative impact management perspective, some suggestions for government and broader stakeholder consideration include: <ul style="list-style-type: none"> <li>• Coordinate additional research into offshore fishing areas, economic fishing practices, and the socio-economic impact of exclusion zones during construction and operations, at the level of Levant Basin (multiple project impacts); and</li> <li>• Coordinate baseline assessment of nearshore commercial fishing along nearshore area to better understand the short-term (construction) and long-term impacts of exclusion zones.</li> </ul>
Tourism	
Noble Energy has already sought to minimize impacts and disruption as much as possible through its construction selection methods such as the use of horizontal directional drilling to construct infrastructure under the beach area. Noble Energy will also provide advanced notification to tourism businesses and users during construction to ensure impacts are minimized.	If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.
Turtle nesting	
Project impacts are likely to be insignificant based on current construction plans.	If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on

Mitigation measures - Noble Energy	Mitigation measures - collaborative
	parallel or concurrent activities to try and minimize impacts.
Ramot Menashe Biosphere Reserve	
Project-level environmental and social management will address any individual impacts the Project and future projects may have on the Biosphere Reserve.	The cumulative impact is expected to be minimal. If however it is found that development schedules overlap, the relevant proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.

# **Appendix 1: Overview of Noble Energy's GMS**



ADVANCING EHS  
LEADERSHIP  
*through*  
GLOBAL  
TEAMWORK

## POLICY

Noble Energy is committed to conducting its business in a manner that protects the environment, health and safety of all employees and the public. Noble Energy's commitment is to maintain a culture that fosters the development of a safe, efficient and environmentally sound workplace. We will comply with all applicable laws and regulations and apply reasonable standards where laws and regulations do not exist. Through continuous EHS stewardship, we strive to minimize injuries and incidents while protecting the environment.

## PRINCIPLES

### *Leadership*

demonstrated through high expectations and personal ownership, responsibility and accountability for EHS performance

### *Performance*

promoted through positive interaction with people and our environment on a daily basis to achieve excellence

### *Excellence*

advanced through genuine care and compassion for your fellow man and the environment leading to a strong EHS culture

### *Culture*

fostered through interpersonal relationships, teamwork and common beliefs; communicated repeatedly, consistently and accurately

## VISION

Demonstrate leadership in Safety and Environmental Management, continuously decreasing the risk of injury, illness and environmental impact.

## VALUES

### INTEGRITY

We are committed to conducting our business with integrity, respect and ethical standards.

### TEAMWORK

We are committed to supporting and implementing a team-oriented work environment, ensuring cooperation, communication and professionalism.

### PROCESS

We will continuously challenge existing ideas and best management practices to provide high EHS standards in all of our operations.

### ACCOUNTABILITY

We will provide a fair appraisal of our safety and environmental activities and foster a culture that encourages individual responsibility for safety and environmental leadership in each organizational unit.



## 14 KEY ELEMENTS

In order to achieve excellence in our operations, Noble Energy and its operated affiliates must consistently and equitably implement the effective application of quality, commercially viable and corporately sustainable operations. Noble believes that the protection of our personnel, our neighbors and our surrounding environment are vital to the future integrity of both the corporation and the industry that supports it. To this end, Noble has established a Global Environmental Health and Safety Management System (GMS). This GMS incorporates Noble's legal requirements and best practices into an umbrella framework within a model that integrates elements from both Occupational Safety and Health Management Systems (OSHMS) such as: OSHA PSM, API RP 75 & 75L, OHSAS 18001, ILO OSH 2001, CSA Z1000-06 and ANZI Z10; with Environmental Management Systems (EMS) such as: EPA RMP, ISO 14001 and World Bank.





P R E P A R E  
\* \* \* \* \*

PREPARE

## I. MANAGEMENT COMMITMENT AND EMPLOYEE PARTICIPATION

Noble Energy's management is committed to, and provides leadership and resources for, protecting the health, safety, environment and social aspects of our business. We maintain high ethical standards as a responsible corporate citizen. Noble's management is committed to the implementation of our GMS and to the establishment of clear and consistent expectations of how we will conduct our business responsibility worldwide. In addition to Noble's Safety, Health, and Environmental Protection Policy, the company's Code of Business Conduct includes the following related policies:

- The Workplace Safety Policy, which reflects the company's commitment to maintain a safe workplace that is free from recognized hazards
- The Violence in the Workplace Policy, which reflects the company's commitment to prohibit verbal or written threats of violent behavior, as well as acts of violent behavior, in the workplace
- The Firearms and Weapons Policy, which reflects the company's commitment to prohibit employees, other than authorized security personnel, from carrying firearms or other weapons on the company's premises
- The Prohibited Substances Policy, which reflects the company's commitment to prohibit employees from the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance, or being under the influence of a prohibited substance without medical authorization while on the company's premises or while performing services for the company.

Noble Energy will assign and notify each employee of the GMS responsibilities inherent to their job position, periodically measure performance and recognize the worker's achievement of goals, objectives and targets. To assist employees in realizing their EHS responsibilities and provide opportunities for continual improvement, the following programs and initiatives have been established:

- **Stop Work Authority:** Any person engaged in operations on a Noble Energy facility, whether an employee or a contractor, has the authority and responsibility to “stop work” to preserve the safety of personnel, protection of the environment and compliance of government regulations.
- **EHS Champions:** Area specific operations personnel dedicated to improving EHS initiatives and compliance with EHS policies on a daily basis
- **(NSC) Noble Safety Council:** Dedicated representatives from various areas of operations who meet quarterly to share safety related experiences, issues and concerns and serve as advisory to management in the fostering of a safe and healthful workplace
- **(NEC) Noble Environmental Council:** Dedicated representatives from varies areas of operations who meet quarterly to share environmental related experiences, issues and concerns and serve as advisors to management in the fostering of an environmentally responsible workplace
- **Area Safety Committees:** Dedicated employees committed to working together towards the improvement of EHS performance within a specific area or region. Representatives from each local committee serve on the Noble Safety Council and Noble Environmental Council
- **GMS Rewards Program\*:** The company depends heavily on the elements of our GMS in the fostering of a safe and healthful workplace. Management of change (MOC), pre-start-up review, risk analysis, Standard Operating Procedures (SOP), Job Risk Analysis (JRAs), near-miss reporting and training are all examples of initiatives that require active participation. In support of these initiatives, the company maintains a participation program. Earned points are accumulated on a quarterly basis to an online company store and may be redeemed for merchandise bearing the company logo and your recognition as a “Leader in Safety.”

- Kid's Poster Contest: At Noble we value our employees as our most important asset. In order to promote safety and health, both on the job and off, we created a kid's safety poster contest for the children, grandchildren, nieces and nephews of our employees to encourage safety in our homes. The top three entries are published in the quarterly EHS Newsletter.
- Why I Work Safe Program: Each quarter, employees have the opportunity to submit a photograph along with a brief description that best represents why they work safely. The top three entries are published in the Quarterly EHS Newsletter.
- Quarterly EHS Newsletter: Quarterly newsletter generated within Noble that highlights EHS news, activities, new initiatives, employee involvement and seasonal considerations

## II. LEGAL ASPECTS AND DOCUMENT CONTROL

Noble Energy identifies and complies with all regulations in each country where it conducts business. In the absence of host country regulations, Noble Energy applies best industry practices.

Retention of records, reports, and documentation is specified by this GMS, maintained in compliance with Noble Energy's Records Retention Policy and may be maintained in one or more of the following formats: electronic, imaged, paper, or radiographic.

## III. SAFE WORK AND OPERATION PRACTICES

Noble Energy has developed Safe Work and Operating Practices for its personnel. Third-party contractors will follow their own Safe Work and Operating Practices, which must meet the general requirements of Noble's Safe Work and Operating Practices. These Practices include company plans, procedures and strategies implemented for the protection of personnel and the environment. They are periodically reviewed to support continual improvement and include applications such as:

- Standard Operating Procedures (SOP)- A written set of instructions that provide direction, improve communication, reduce training time and improve operational efficiency
- Job Risk Analysis (JRA) - A method that can be used to identify, analyze and record the steps involved in performing a specific job, the existing or potential safety and health hazards associated with each step, and the recommended action(s)/procedure(s) that will eliminate or reduce these hazards and the risk of a workplace injury or illness

- Safe Work and Operating Practices;
- Hazardous Communication Program  
(online Noble MSDS database @ [www.eservice.msds.com](http://www.eservice.msds.com))
- Lockout / Tagout Program
- Respiratory Protection Plan
- H2S Management Plan
- Fleet Safety Management Plan
- Dive Safety Plan

#### **IV. PROCESS SAFETY AND ENVIRONMENTAL INFORMATION**

Risks inherent to an operation are evaluated using industry best practice assessment methods. Risks identified are reduced to the most feasible level at the design stage and managed in accordance with risk severity in the operation stage.

- Facilities or appropriate field offices will maintain information on the significant environmental aspects and related actual or potential impacts associated with their work and the environmental benefits of improved performance.

#### **V. EMERGENCY PREPAREDNESS AND COMMUNITY AWARENESS**

Noble Energy develops and implements incident management plans at each of its operations and also at the corporate level in order to coordinate each of its facilities. The plans contain provisions for dealing with anticipated emergencies and clearly assign authority and duties to ensure that responses to emergencies are timely and effective. Plans include:

- Business Continuity Plan
- Incident Management Plans
- Oil Spill Contingency Plans
- Spill Prevention, Control and Countermeasure Plans
- H2S Contingency Plans
- Hurricane Evacuation Plans
- Coast Guard Emergency Evacuation Plans



E X E C U T E  
.....

EXECUTE

## VI. SAFETY AND ENVIRONMENTAL TRAINING

All personnel at Noble Energy operated facilities are trained to perform their functions in a manner to protect personnel, the environment, and equipment. Contractors are responsible for providing training for their employees prior to beginning work at Noble Energy facilities and for providing adequate training documentation or verification. A variety of training methods are applied including:

- (CBT) Computer Based Training: A collection of general safety awareness programs chosen to educate employees in the general risks associated within the oil & gas industry and to meet specific regulatory training requirements.
- (SST) Site Specific Training: Site Specific Training is identified for each district through an assessment survey, area risk analysis, job safety analysis, near-miss reports, incident reports, employee input, or regulatory requirements.
- Safety Alerts / Did You Knows: Documents occasionally distributed to communicate safety and environmental information
- Field Safety Orientation: Safety orientation provided once each calendar year prior to personnel gaining access to a Noble Energy field location

## VII. CONTRACTOR SAFETY MANAGEMENT

Noble Energy is committed to a safe, healthful and environmentally responsible work environment and recognizes the impact that our contractors can have toward achieving EHS excellence. It is intended that contractors work under conditions and pursuant to rules that are at least as protective as those governing Noble Energy's employees. It is not intended that Noble Energy take control of a contractor's safety program or relieve any contractor of their safety responsibility. Noble Energy has developed a separate Contractor Safety Management Plan to achieve compliance with this element of the GMS that includes the evaluation of contractor safety performance prior to contract award through the ISNworld Contractor Database.

“Contractor Safety Program Assessment” maintained through ISN Software Corporation @ <http://www.isnworld.com>.

## VIII. PRE-START-UP REVIEW

Noble Energy conducts pre-start-up reviews before the start-up of new facilities or new equipment that have undergone major modifications or prior to major projects (e.g. shutdown/turnarounds) through the use of Noble's Energy's checklist and electronic-based management system. The goal of pre-start-up reviews is to verify EHS design application of equipment prior to commissioning and to ensure full communication of schedule, tasks and potential associated risks to all personnel involved in the start-up of a project/task/operation. Pre-start-up reviews are specific to each case, but confirm the following:

- Construction and/or equipment are in accordance with the design specifications
- EH&S operating and emergency response procedures are in place
- Training for emergency response procedures has been completed
- Applicable permit requirements are completed and received
- A hazard review has been performed and the recommendations have been resolved
- A pre-start-up safety review has been performed by employees with familiar with the operation
- EH&S information is current
- Documentation is in place (P&ID's, Management of Change Program and Standard Operating Procedures)

## IX. MANAGEMENT OF CHANGE

Noble Energy maintains procedures to identify and control risk associated with change and to maintain the accuracy of safety and environmental information. Changes are managed using an electronic MOC system to review risk associated with change actions including:

- The organization
- Personnel
- Systems
- Permitting
- Procedures
- Equipment
- Products
- Materials
- Chemicals

## X. RISK ASSESSMENT AND MANAGEMENT

A risk assessment program has been developed with the goal of reducing injuries and minimizing the consequences of uncontrolled releases and other environmental / safety incidents. With regard to existing Noble Energy operated facilities, risk analysis requirements are met by ensuring that facilities meet or exceed applicable standards of country, federal, state and local regulatory agencies including Noble's Safe Work Practices Manual. Where regulatory requirements do not exist or apply, requirements are applied using reasonable standards based on specific risk assessment. Risk management controls are identified during risk assessments and integrated into Safe Work and Operating Procedures. Periodic EHS compliance audits will be conducted in order to ensure compliance with identified applicable regulatory requirements and implemented management and control measures. Audit action items are maintained and tracked to completion through the Risk Analysis Manager (RAM) electronic database. Specific audits include:

- EHS Regulatory Compliance
- Risk Analysis Audits
- PSM Audits
- Rig/Workover Audits
- Environmental Audits



V E R I F Y  
\* \* \*

## XI. PERFORMANCE MONITORING AND MEASURING

Noble Energy establishes performance monitoring and measurement requirements for each aspect of its operations that have a potential to impact the health, safety, environment or sustainability of its business. Noble informs employees of their responsibilities with regard to managing risks and supporting Noble Energy in meeting its goals, objectives, targets and compliance requirements. Requirements include:

- Safety performance
- Worker health risk exposure
- Air/water releases (e.g. in accordance with permit requirements); and
- Compliance audits.

## XII. INCIDENT REPORTING ANALYSIS AND CORRECTIVE ACTION

All EHS incidents occurring at a Noble Energy facility (e.g. injuries, illnesses, asset damage, environmental damage, spills, near misses and community complaints) are reported to the Operations Management, regardless of the event's seriousness. Incidents are properly analyzed for cause and evaluated for corrective action in order to minimize recurrence and provide for the consistent protection of personnel health and safety, the environment and sustainability. All corrective actions identified during investigations, inspections, reviews, surveys and/or audits are documented within the Risk Analysis Manager (RAM) electronic database and tracked through completion in order to support continual improvement.

## XIII. MANAGEMENT SYSTEM COMPLIANCE AUDITS

Noble Energy conducts periodic self-audits of its GMS. The findings of any such audits are used to adjust and improve the GMS as necessary. Self-Assessments conform to the following:

- That all GMS program elements are in place
- That the GMS program includes necessary elements to meet the safety and environmental objectives of Noble Energy
- That each GMS program element is being effectively implemented



P E R F O R M

#### XIV. OPERATIONAL INTEGRITY AND CONTINUAL IMPROVEMENT

Noble Energy or its contractors design, procure, construct and install all critical equipment in accordance with Noble Energy's standard specifications or other specifications that are acceptable to Operations Management. Noble Energy's program for assurance of quality, mechanical and operational integrity of critical equipment may cover the following areas: design, procurement, fabrication, installation, maintenance, and inspection testing.

PERFORM







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## **Appendix 2: Stakeholder Engagement Plan**



**noble energy**  
**mediterranean ltd.**  
*a subsidiary of noble energy, inc.*

## Leviathan Development

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REV	DATE	OWNER	DESCRIPTION	CHECKER	APPROVER
			Noble Energy Mediterranean Ltd.		
			Stakeholder Engagement Plan Pre-Construction Phase		
			Doc. No. LEV-PM-NEM-REG-PLN-XXXX		

# Noble Energy - Leviathan Project Stakeholder Engagement Plan Pre-Construction Phase

September 2016

(For External Disclosure)

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**DISCLAIMER:** This document has been created and is submitted as part of the application made by NOBLE ENERGY INTERNATIONAL LTD for OPIC's political risk insurance for the Leviathan project; The sole purpose of this document is to demonstrate alignment with applicable lender standards; This document is not intended to create nor does it create any legally binding obligation and/or commitment by NOBLE ENERGY INTERNATIONAL LTD or any of its subsidiaries or affiliates towards any third parties under applicable laws, including, without limitation, US and Israeli laws.

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## ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
SEP	Stakeholder Engagement Plan
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standard
TAMA	Government of Israel "National Outline Plan"
NPC	National Planning Committee
EIA	Environmental Impact Assessment
GoI	Government of Israel
MoEP	Ministry of Environmental Planning
EP	Equator Principles
CFM	Community Feedback Mechanism
INGL	Israel National Gas Line
KPI	Key Performance Indicator

## GLOSSARY

<b>Terms</b>	<b>Description</b>
Stakeholder	Any individual or group who is affected by a project or may have an interest in, or influence over it.
Consultation	The process of sharing information, ideas and concerns in a two-way dialogue between project proponents and stakeholders, allowing stakeholders to express their views, and for these to be considered in the decisions about project planning and implementation.
Disclosure	The process of publishing and making information available in various ways (such as on the internet, in paper form or in press announcements).
Engagement	General term for activity including both disclosure and consultation.
Grievance	Formal, notified complaint by people who feel they have been adversely affected by project-related activities.
Community Feedback Mechanism	Process of recording and addressing feedback and grievances so that they can be tracked through to a resolution.

## 1.0 INTRODUCTION

### 1.1 OVERVIEW

This document is the Stakeholder Engagement Plan (SEP) for the Noble Energy Leviathan Project in Israel (“the Project”). The SEP sets out the approach that the Project will follow to implement an engagement program with stakeholders over the life of the Project. A stakeholder is defined by the International Finance Corporation (IFC) as *“any individual or group who is affected by a project or may have an interest in, or influence over it. This may include individuals, businesses, communities, local government authorities, local nongovernmental and other institutions, and other interested or affected parties.”* The SEP focuses on engagement with external stakeholders.

The SEP is a ‘living’ document and is being developed progressively, with updates issued as the Project moves through the various phases of planning and implementation. This update corresponds to the pre-construction phase of the Project.

The SEP is organized as follows:

- Section 1 provides background information about the Project and outlines the objectives of stakeholder engagement;
- Section 2 outlines the national and international requirements for stakeholder engagement;
- Section 3 provides an overview of the local context, and describes how stakeholders are identified and the methods and tools used to support engagement;
- Section 4 summarizes stakeholder engagement undertaken to date, by the Government of Israel and Noble Energy in the pre-construction phase;
- Section 5 provides the program for ongoing and future engagement;
- Section 6 describes roles, responsibilities and resources for stakeholder engagement;
- Section 7 explains the ways in which stakeholders can contact Noble Energy, including the grievance mechanism for the Project; and
- Section 8 describes the monitoring and reporting of stakeholder engagement activities.

It should be noted that Noble Energy has been active in Israel for over 18 years and stakeholder engagement related to other projects and in the normal course of doing business has been ongoing. This SEP does not attempt to capture and document such engagement, but is instead focused on recent past, present and future engagement related specifically to the Project. As this is a ‘living’ document, it may be updated when conditions change or before the commencement of any new phase of the Project’s development.

## 1.2 BACKGROUND AND OBJECTIVE OF STAKEHOLDER ENGAGEMENT

### 1.2.1 *Background*

Noble Energy Mediterranean, Ltd and its Co-Venturers are developing a gas production and transportation system connecting the Leviathan gas field to the Israeli gas market infrastructure off the northern coast of Israel. The gas field is located roughly 130 km west of Haifa in waters 1,700 m deep in the Levantine Basin, a rich hydrocarbon area in one of the world's larger offshore gas finds of the past decade. The current planned activities consist of both offshore and onshore components. The offshore components include a subsea production system connecting high-rate subsea wells to a fixed offshore platform and three dedicated pipelines, one for gas, one for condensate (running from the platform to a coastal valve station) and one for gas exports to regional markets. The onshore components include a coastal valve station (CVS), onshore gas and condensate pipelines, and the Dor Valve Station (DVS). The gas pipeline departing from the DVS will connect to the INGL grid. The condensate line will depart the DVS and continue to its destination at the refinery in Haifa.

### 1.2.2 *Objectives*

Noble Energy is committed to a transparent and respectful dialogue with stakeholders throughout the life of the Project. The activities of engagement are guided by good international industry practice, as well as all applicable laws and regulations in Israel.

In Noble Energy's commitment to comply with good international industry practice, and more specifically, the International Finance Corporation's Performance Standards (IFC PS), the Project has developed a Stakeholder Engagement Plan. This is aligned with IFC PS1 which states that:

*"The client [company] will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities. Where applicable, the Stakeholder Engagement Plan will include differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable. When the stakeholder engagement process depends substantially on community representatives, the client will make every reasonable effort to verify that such persons do in fact represent the views of Affected Communities and that they can be relied upon to faithfully communicate the results of consultations to their constituents."*

The objectives of stakeholder engagement, outlined in this SEP, are to:

- Promote the development of respectful and open relationships between stakeholders and Noble Energy in the pre-construction and future phases;

- Identify Project stakeholders and understand their interests, concerns and influence in relation to Project activities, particularly during the construction phase;
- Provide stakeholders with timely information about the Project, in ways that are appropriate to their interests and needs, and also appropriate to the level of expected risk and potential adverse impacts;
- Support alignment with financing standards and guidelines for stakeholder engagement, as necessary in the pre-construction phase; and
- Record and resolve any grievances that may arise from Project-related activities through a Community Feedback Mechanism.

Although the SEP is specific to Noble Energy's activities in the pre-construction phase of the Project, in order to provide context, a detailed description of the Israeli regulatory requirements are provided below. A TAMA (Hebrew acronym for "Tochnit Mit'ar Artzit") is a "National Outline Plan" created by the National Planning Committee (NPC) by virtue of the Planning and Building Law, and approved by the Government. These National Outline Plans are important because they provide instructions for planning, allocate land for relevant usages, and in some particular cases enable building permits. The Israeli Law and its subordinate regulations provide a legal foundation for conducting Environmental Impact Assessments and other requirements for environmental analysis.

TAMA 37 / H is the detailed plan which, among other things, outlines the Government of Israel's environmental and social requirements for the Leviathan Project. TAMA 37 / H requires the preparation of an Environmental Impact Statement following the guidelines prepared by the Israeli Ministry of Environmental Protection (MoEP). This TAMA 37 / H requirement was addressed by the GoI through the preparation of an Onshore and Offshore EIA.<sup>i</sup> TAMA 37 / H allows for right of public participation in the decision making process. Public hearings were therefore held at both a regional and local level to review the findings of the environmental studies as they progress through the conceptual and design development phases. Local committees considered the development once the National Permit was approved and they are responsible for the issue of local permits for the construction of the facilities.

At the request of the Government of Israel, these environmental assessments and consultation activities were conducted independently of Noble Energy, which was only involved insofar as it provided necessary documentation and fulfilled information requests. The outcome of the public consultation and disclosure process was the eventual selection of offshore sites for all gas production and the least obtrusive design for the onshore landing, including a Coastal Valve Station and connection of the offshore pipelines with the existing domestic export pipeline at an existing INGL facility near Dor Beach.

---

<sup>i</sup> The Onshore EIA prepared by Lerman Associates comprises: Leviathan Development EIA (Onshore) RE1- Chapter C-E, Marine (June 2013); Leviathan Development EIA (Onshore) RE2- Chapter C-E, Land, Hagit Site (June 2013); Leviathan Development EIA (Onshore) RE3- Chapter A-B, Marine, (November 2012); and Leviathan Development EIA (Onshore) RE4- Chapter B, Land, (October 2012).

While the potential for socioeconomic impacts are greater in the onshore component of the Project (although expected to be only negligible to minor in significance), there is still a possibility that offshore activities may have environmental, socioeconomic and health impacts that could be of concern to stakeholders. Therefore, this SEP outlines principles that should apply to both onshore and offshore activities.

## 3.0 *STAKEHOLDER ANALYSIS*

### 3.1 *LOCAL CONTEXT OVERVIEW*

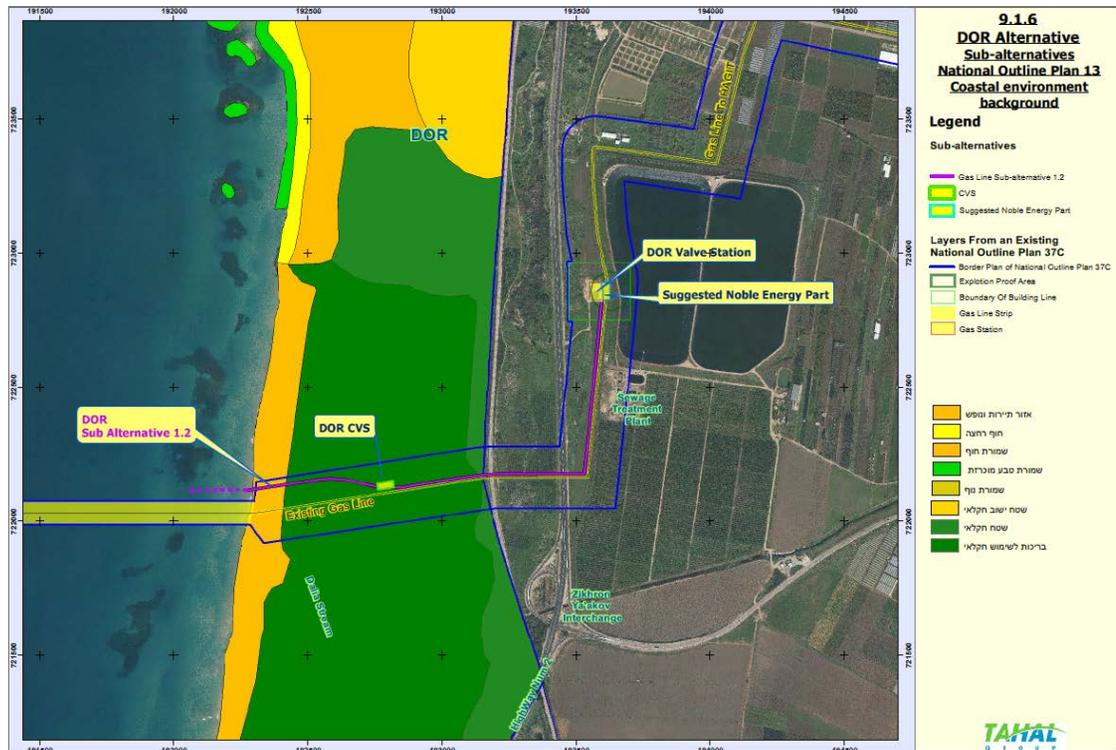
Extensive stakeholder engagement pertaining to the Leviathan development has been completed by the Government of Israel through the TAMA. Through the permitting processes stakeholders as well as land-holders, have the right to object. Additionally, Noble Energy frequently engages with stakeholders at all levels, from national and regional authorities to local community representatives.

Noble Energy's construction teams, operational staff, and management have frequent contact with stakeholders related to Leviathan as well as other offshore operations occurring in Israel. These include national, regional and local government officials, the media, and various civil society entities. Noble Energy's operations and construction teams continue to abide by stringent national laws related to stakeholder engagement for offshore work (detailed in later sections).

The onshore activities during construction will take place within 2 km from the Dor Beach landing, located in Dor, which is part of the Hof HaCarmel Region (See Figure 1 below). Construction activities will take place over a course of several months and will include horizontal drilling located approximately 1 km off the coast of Dor Beach (as to not disrupt Dor Beach users), to tie into an existing domestic export pipeline at an existing INGL facility. The construction of a small Coastal Valve Station (CVS) will also take place to the east of the beach, adjacent to inactive fish ponds. The Dor Valve Station (DVS) will be constructed adjacent to the INGL facility. The onshore gas and condensate pipelines will be approximately 2 km long and will connect the CVS to the DVS. These two subsurface pipelines will be trenched and backfilled, and built within an existing pipeline right-of-way through a corridor previously delineated by TAMA 37/H.

At present, the Project is considering the use of both existing, independent pipeline systems and the construction of new pipelines to transport the condensate from the DVS to the Haifa Refineries.

In addition to these existing and planned pipelines, the Project will consider the development of a devoted 6-inch condensate pipeline to link Dor and the Haifa refinery in the future.



**FIGURE 1: PROJECT ALTERNATIVES (SOURCE: LEVIATHAN FIELD DEVELOPMENT PLAN: REGULATORY EXECUTION PLAN, NOBLE ENERGY 2016)**

Pre-construction, Noble Energy’s most critical phase of stakeholder engagement addresses land access and potential compensation. Therefore, the primary stakeholders for the onshore work are those living in Moshav Dor as well as Kibbutz Mayan Tzvi who have land use titles to the inactive fish ponds. The Ein Ayala quarry is also a primary stakeholder, since it has title to the land that will be accessed for the gas station.

The construction of the valve stations and the temporary use of access roads and the transport of equipment could create impacts (construction related noise, traffic congestion, etc.) to the local communities and business, but these are expected to be short-term and minor in significance. Regardless, Noble Energy plans to continue to proactively engage with locals in the area, including residents of Moshav Dor and Kibbutz Mayan Tzvi, the Ein Ayala quarry, beach users, local businesses, fishing groups, recreational groups, and other nearshore sea users, to inform them of construction related activities. Some construction and operation permits, like Building permits, also require a public consultation and disclosure period, which is managed by the authorities as dictated by national and regional regulations. See Appendix B for further details of these engagements.

Stakeholders for the Project have been identified by Noble Energy by drawing on the local knowledge of Noble Energy staff, particularly those with stakeholder engagement responsibilities; and as documented in various environmental and social impact assessment reports.

The table below lists the stakeholders at the time of writing. The mapping process allows Noble Energy to better understand the type of engagement which is best suited for each stakeholder, depending on their level of interest in and influence on the Project (dynamic communication, constant engagement, information purposes only, etc.) during the pre-construction phase. These methods of engagement are discussed further in Section 3.3.

It is helpful to group stakeholders based on common interests and characteristics. Noble Energy uses a number of 'stakeholder categories' to help structure activities for stakeholders of the Project, including a summary of the anticipated interest of these groups with respect to the Project (e.g., potential impacts, benefits, concerns) and how they have been engaged to date. This information is provided in Table 1 as well as in subsequent sections.

**TABLE 1: STAKEHOLDER CATEGORIES AND IDENTIFICATION**

Stakeholder Category	Interest in Project	Stakeholders Identified to Date
<b>National Government</b>	National authorities have an interest in the EIA and permitting procedures, particularly in terms of ensuring compliance with Israeli regulations, emergency and safety. Leads participatory exercises in emergency response. In addition to their regulatory role, government departments have specific interests in topic areas such as cultural heritage, transport and fisheries.	Ministry of Environmental Protection (MoEP); Ministry of Energy, National Infrastructure and Water Resources (MNIEWR; National Park Authority; Israel Antiquity Authority (IAA); Ministry of Defense
<b>Regional Government</b>	Local and regional authorities have a general interest in the potential impacts and benefits to their respective communities. Provides permits for Project activities and business licenses for operations of onshore facilities.	Northern District Authority; Haifa District Authority, Hof HaCarmel Regional Council; Megido Regional Council
<b>Regional Associations</b>	Regional associations may be interested in data from the Project's numerous marine surveys, as well as the potential effects on the marine environment or ecology.	Regional Environmental Association
<b>Local Government</b>	Provides permission for access into and helps facilitate engagement with local communities.	Yoqneam municipality
<b>Local Communities and General Public</b>	Local communities may be affected by impacts related to traffic, noise, and	Kibbutz Mayan Tzvi, Moshav Dor, the towns

	environmental changes, as well as changes to land use and access (including the beach). They may also be able to benefit through employment and business opportunities, or local improvements such as gas supply.	of Fureidis (predominately Arab community), Zikhron Yakov, Ramot Nenashe, Bath Shlomo, and Yoqneam Tivon
<b>Land and Resource Users and Rights Holders</b>	The Project will only affect the land currently used by two communities.	Kibbutz Mayan Tzvi, Moshav Dor
<b>Local Businesses</b>	Local businesses may experience or perceive impacts to their businesses as a result of construction. May also be interested in access to new business opportunities as a result of the Project.	Nahsholm Seaside Resort, Dor Ranch, Dor Aquaculture, Ein Ayala quarry
<b>Community Services and Infrastructure</b>	Community service and infrastructure providers are interested in how the Project might impact community services and infrastructure development plans. This may include direct impacts (e.g., on road infrastructure or water mains) or indirect impacts (e.g. increased strain on local services due to use by Project workforce).	Local Hospitals (such as Ichilov Hospital in Tel Aviv and Rambam Medical Center in Haifa).
<b>Marine Area Users</b>	Fishermen and fisheries organizations (including fishing businesses) may be interested in potential project impacts on fishing activities and livelihoods, including access to fishing areas. They will most likely, however, be concerned about unplanned events (e.g., fuel spills). Recreational marine area users could be interested in how the safety no-go zones will impacts their access, as well as related safety concerns.	Local kayak clubs; fishing and environmental organizations (such as EcoOcean Marine Research and Education, the IsraFish Association, the Israel Fishing Forum, Israel Sport Fishing and Israeli Project for Maintenance Management of Fishing in the Mediterranean Sea)
<b>Local and International NGOs</b>	NGOs (including local, national and international NGOs, as well as other community based organizations) may be interested in a diverse set of issues, ranging from protection of the environment and archaeological assets, to potential impacts on tourism and other industries related to offshore activities.	Zalul, Kachol Veyarok
<b>Media</b>	Journalists and other representatives of the media are often interested in ensuring that clear and transparent information about the Project is communicated to the national population.	Channel 1; Channel 2; Channel 10; Channel 33 (Arab-speaking viewers) daily national prints (Yedioth Aharonot, Maariv, Haaretz, TheMarker, Israel Hayom, Globes), local media (Hamoshavot Magazine, Yedioth Hadera, Mynet Hadera, Local Hadera).

		various radio and website outlets
<b>Academic or Research Organizations</b>	Academic and research organizations may be interested in data from the Project's numerous marine surveys, as well as the potential effects on the marine environment or ecology, marine cultural heritage and environmental protection. These organizations may also be interested in local content and training programs.	Israel Limnological and Oceanographic Institute; Marine Pollution Services

### 3.3

#### *DISCLOSURE AND ENGAGEMENT METHODS AND MATERIALS*

The engagement process encourages meaningful participation by stakeholders. Noble Energy will employ a range of methods and channels for disclosing information in order to tailor disclosure to the interests and needs of the various stakeholder groups and will also produce materials appropriate for specific stakeholders and types of engagement. This may include typical disclosure and engagement methods, such as:

- Local Newspaper Articles, Radio, Television Pieces, or Digital Media - Used to convey information to local audiences about proposed Project activities and progress (particularly relevant for any future offshore construction work).
- Internet/Website - Used to promote information or invite stakeholder queries and comments via email.
- Community Feedback Dedicated Line - Used by the public to obtain information, ask questions or report grievances.
- Public Education, Outreach - use the general public and media outreach efforts as described in Section 4 to raise awareness on key issues of the Project, specifically.

The stakeholder engagement process includes two-way targeted engagement related to specific potential Project impacts, such as impacts to land use to construct the Coastal Valve Station, fishing, tourism, or recreational activities. The environment and social impact assessment reports prepared have assessed the majority of the residual environmental and social operational impacts of the Project to be of low or of no significance. However, engagement activities will continue to be organized around specific topics of interest and known concerns of stakeholders, such as notification of offshore safety zones (which are controlled by the Ministry of Defense and overseen by the Navy) for fisherman and onshore construction schedules.

Feedback mechanisms are adapted to suit the needs and preferences of different stakeholders and their physical locations. Noble Energy has a Community Feedback Mechanism which is located on their in-country website in Hebrew

and provides a dedicated email and phone number for Project-related feedback (discussed in Section 7).

A table which provides the primary Public Consultation and Disclosure Efforts by the Government of Israel during the design and permitting phases (2010 to 2014) is provided in Appendix A.

A table which provides the Project-related stakeholder Engagement which has been conducted by Noble Energy to date in the pre-construction phase (4Q2014 to present) is provided in Appendix B.

It should be noted, and as previously discussed, Noble Energy engages with a myriad of stakeholders in the course of daily operations for all in-country projects and operations as a part of doing business in Israel. These daily interactions are not included in this SEP unless they pertain directly to the Leviathan Project in the pre-construction phase.

For example, Noble Energy engages with the media on a regular basis in an effort to educate the public on the offshore oil and gas industry, as well as on the positive benefits of natural gas to both the economy and the population. Noble Energy also partakes in regular engagement with local businesses, suppliers and government organizations as part of its commitment to help build the capacity of Israel's oil and gas sector, in general. This includes, but is not limited to, the following activities:

- Partnerships with local colleges, including the Noble-Ruppin center for Energy Professions, focused on capacity building in the oil and gas sector, with over 350 students so far.
- Cooperating with the Israeli Government to establish a local content platform to help supply chain, operations and drilling departments seek business opportunities with local companies.
- Sponsoring a Contractor Safety Seminar to impart knowledge about working with Noble Energy in a way that ensures safe working environments.
- Partnering with the Israeli Government, which continues Noble Energy's ongoing efforts to maintain a strategic relationship with local industry and the government entities involved. Includes capacity-building conferences and other events with Israeli industry and government representatives in order to integrate Israeli knowhow and technologies into the global oil and gas industry and to create a robust Israeli industry.
- Partnering with MadaTech, Israel's National Museum of Science, Technology, and Space, for continued support of the Noble Energy Science Park which brings science to life and draws visitors from a cross-section of Israeli society.

- Partnering with Hezkek Lataasiya, a unique program that provides professional training in the energy and natural gas fields for at-risk high school students across Israel.
- Partnering with Taasiyeda, an enrichment program that provides 7<sup>th</sup>-8<sup>th</sup> grade youth with hands-on knowledge related to natural gas and its application. The project takes place all across Israel.
- Supporting the Shiur Acher program, which encourages volunteers to use their own fields of expertise to teach lessons to students from disadvantaged homes.
- Partnering with the Jewish Agency's Youth Futures program, which provides community-based mentoring for at-risk pre-teens and adolescents to develop their academic and social skills.

Noble Energy plans to continue engaging with stakeholders on issues related to the Project. The current consultation processes focus on construction permitting and approvals, continuous adherence to health and safety procedures, and land access. During the pre-construction phase, the Project team is continuing to engage with the following stakeholders:

**National and Regional Levels**

- IMC EMMP inter-ministerial committee – Noble Energy engages as it pertains to reviews and comments on the Project’s Environmental Management and Monitoring Plan.
- Ministry of Environmental Protection – Noble Energy engages as it pertains to permits during both the construction and operations phases (such as excavation dumping, discharge, air emission and toxin permits).
- Ministry of Energy and Water Resources – Approves the development plan, Safety Management Plan, and provides permits for drilling and operations in the EEZ. Noble Energy also coordinates with them for offshore surveys and construction work.
- Ministry of Defense and Ministry of Transport-Administration of Shipping and Ports – Noble Energy provides information on offshore activities as necessary for the government to further coordinate and disclose to marine sea users.
- Israeli Antiquities Authority – Noble Energy coordinates on pre-construction surveys offshore (in the territorial waters) and onshore for cultural heritage.
- Regional Councils- Noble Energy engages as it pertains to permits for some Project-related activities.
- Media – Noble Energy continually engages as it pertains to educating the public on the Project and the oil and gas industry in general.

**Regional Associations**

- Regional Environmental Association – Noble Energy informs and coordinates on environmental issues.

**Local Level**

- Moshav Dor – Noble Energy is in discussion with Moshav Dor in a transparent manner for consent to conduct field surveys necessary for land estimation and appraisal for the small parcel of land (fish pond), which is currently used by the community, but will be required for the

Project. Mushrav Dor is drafting a Memorandum of Understanding (MoU) to cover the terms of the field surveys.

- Mayan Tzvi – Noble Energy continues to coordinate with the community in a transparent manner on potential compensation (subject to all legal provisions) and land access.
- Ein Ayala quarry – Noble Energy continues to coordinate with the Ein Ayala quarry in a transparent manner on the potential compensation for and access to the small parcel of land for the gas station and right of way for the condensate pipeline.
- District Authorities – Noble Energy coordinates on building permits for onshore and offshore construction activities.
- Community Service Providers– Noble Energy engages with and coordinates regarding health, safety, and emergency response, as well as on compliance with local regulations.

Stakeholder identification along the pipeline routes is underway, and subsequent engagement will be conducted in compliance with relevant national legislation. Noble Energy is utilizing the engineering firm which was retained by INGL, which was the first entity to build pipelines close to the TAMA 37/H approved pipeline corridor (under TAMA 37/C).

Furthermore, stakeholder engagement planning regarding public consultation during the construction phase is ongoing. This is expected to include information disclosure to beach and sea users related to construction plans and schedules, including buffer zones (which are controlled by the Ministry of Defense and overseen by the Navy) and safety protocols. Two-way consultation sessions with the few local businesses in the Dor Beach area will also occur prior to construction to ensure feedback of relevant concerns (such as those related to traffic or noise) are incorporated into construction management protocols and plans, if necessary.

Noble Energy has staff and resources devoted to managing and implementing the company's Stakeholder Engagement Program. The program is managed by Noble Energy Israeli community affairs and stakeholder engagement management teams, in consultation with Noble Energy Social Performance and Communication and Government Relations staff at headquarters. The primary local Israeli staff members responsible for stakeholder engagement at all levels as they pertain to the environmental and social components of the Project include:

- EHSR Manager
- Operations Manager
- Health and Safety Manager
- Environmental Manager
- Security Advisor
- Director of Corporate Affairs
- Regulatory Affairs Director
- Government and Regulatory Affairs Manager
- Regulatory Analyst
- Construction and Engineering Manager
- Human Resources Manager
- Media Relations Advisor
- Corporate Social Responsibility Coordinator

## 7.0 *CONTACT WITH NOBLE ENERGY FOR THE LEVIATHAN PROJECT*

### 7.1 *FEEDBACK PROCESS*

Stakeholders can contact Noble Energy at any time by letter, phone, fax, or email. Contact information is available on the company's website, and is included in external publications and communications (including reports, leaflets, letters, emails, etc.). Communications with Noble Energy can be conducted in Hebrew, English, or Arabic, as necessary.

Stakeholders are invited to provide feedback about the Leviathan Project. This will allow Noble Energy to monitor how the Project is doing, and will help to identify areas of improvement. Noble Energy will treat all types of feedback with professional consideration and respect, and base its responses on open and honest communication.

### 7.2 *COMMUNITY FEEDBACK MECHANISM*

Noble Energy understands that it must have in place its own communications and grievance redress procedure directly related to the Project's pre-construction, construction and operations phases. Noble Energy is establishing a Community Feedback Mechanism (CFM) to address any feedback and grievances associated with Project activities in good faith through a transparent and impartial process.

Specific objectives of the Community Feedback Mechanism are to:

- help Noble Energy identify issues and concerns early, so that they can be addressed quickly and proactively;
- continuously improve Project performance; and
- demonstrate Noble Energy's commitment to meaningful stakeholder engagement, and respect for local opinions and concerns.

The CFM provides opportunities for the receipt, investigation, and resolution of complaints at the Project level during the pre-construction through operations phases. Stakeholders will be notified about the CFM in an appropriate manner, and contact details associated with the CFM will be placed at the entrances to construction and operations worksites (as is done at other Noble Energy project sites). A dedicated telephone number and email option for public enquiries and feedback are currently published on Noble Energy's website at [http://www.nbl.co.il/he/%D7%A6%D7%95%D7%A8\\_%D7%A7%D7%A9%D7%A8](http://www.nbl.co.il/he/%D7%A6%D7%95%D7%A8_%D7%A7%D7%A9%D7%A8).

Noble Energy will use the CFM as a component of the broader stakeholder engagement activities, including monitoring and reporting. A member of the Media Relations team has been assigned as the person in charge of managing the CFM, including the internal processes for grievance resolution.

## 8.0 *MONITORING AND REPORTING*

### 8.1 *MONITORING*

It is important to monitor stakeholder engagement to ensure that consultation and disclosure efforts are effective, in particular that stakeholders have been meaningfully consulted throughout the process.

Monitoring will cover:

- consultation activities conducted with government authorities and non-governmental stakeholders;
- the effectiveness of the engagement processes by tracking feedback received from engagement activities; and
- any grievances received.

### 8.2 *TRACKING STAKEHOLDER ENGAGEMENT ACTIVITIES*

Future tracking of stakeholder engagement will be used to assess the effectiveness of the Project's stakeholder engagement activities. Indicators for tracking will include, among others:

- place and time of formal engagement events and level of participation including by specific stakeholder categories and groups (e.g. women);
- number of comments by topic and type of stakeholder, and details of feedback provided through the CFM or other means (office visits, emails, phone calls etc.);
- numbers and types of grievances and the nature and timing of their resolution;
- recording and tracking commitments made to stakeholders; and
- community attitudes and perceptions of Noble Energy's activities pertaining to the Project based on media reports and stakeholder feedback.

## 8.3 *PROJECT REPORTING*

### 8.3.1 *Internal Reporting*

Reports on stakeholder engagement efforts will summarize all activity for the period and provide a summary of issues raised and how they have been addressed. Potential issues include timeliness of responses and mitigation and measures taken to address grievances, and analysis of trends in key performance indicators (KPIs). These may include:

- total numbers of stakeholders engaged according to stakeholder category;
- numbers of comments and queries received according to topic and responses;
- issues raised and levels of support for and opposition to the Project; and
- numbers of grievances lodged.

### 8.3.2 *External Reporting*

The SEP will be reviewed on a regular basis and revised as needed to reflect completed engagement activities and future engagement plans. Noble Energy anticipates providing information to stakeholders that will focus on non-routine activities, after an unplanned event or incident (if one occurs), or if there is any change to company structure or practice.

*APPENDIX A*

*PRIMARY PUBLIC CONSULTATION AND DISCLOSURE  
EFFORTS BY THE GOVERNMENT OF ISRAEL (DESIGN AND  
EIA PERMITTING PHASES)*

<b>Date</b>	<b>Stakeholders Present</b>	<b>Purpose</b>	<b>Outcome</b>
2010	Public hearing with the steering committees for 50 district councils	To discuss the 25 potential onshore gas processing terminal sites as part of the Scoping Process and Alternatives Analysis in the Leviathan Development design phase	Utilization of objections and concerns when evaluating the final sites
October 2011	Public hearing with heads of municipalities (including Fureidis)	Further discussion on potential onshore gas processing terminal sites	Utilization of objections and concerns when evaluating the final sites
November 2011	25 public forums, representing all districts within which a potential terminal site was located; district councils; government officials (including Furadis)	Further discussion on potential onshore gas processing terminal sites	Utilization of objections and concerns when evaluating the final sites to narrow the list to 14 potential sites
July 2012	Meetings with local officials	Discuss the status of design and the determination to select 5 locations as final potential sites	
October 2012	30-day public consultation period for EIA Chapters A and B	Garner public feedback on 5 potential sites	Two onshore sites at Hagit and Meretz decided as final potential locations
May – June 2013	30-day public consultation period for EIA Chapters C, D and E	Garner public feedback on 2 potential sites	Move into independent Investigator’s phase
February to April 2014	15-day period of public hearings involving 100 project opponents, including regional planning and building boards and representatives of the district planners from the North, Haifa, Central and Tel Aviv districts	To hear the views of opponents and allow project proponents to discuss the objections	Amongst a series of recommendations made in the report (which was submitted and made public in May 2014) and based on public consultation, the decision was made to move all onshore components, except tie in to the main domestic pipeline systems at Dor, to offshore.

*APPENDIX B*

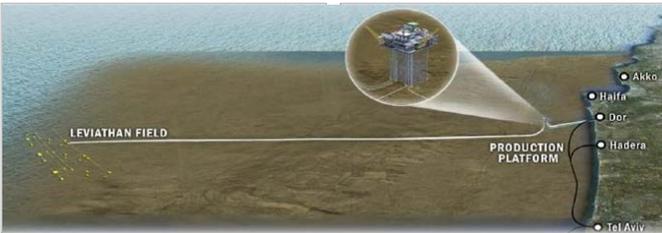
*PROJECT-RELATED STAKEHOLDER ENGAGEMENT BY  
NOBLE ENERGY TO DATE (PRE-CONSTRUCTION)*

Date of engagement	Stakeholder Level	Stakeholders Present	Company representatives present	Type of activity	Purpose of activity / comments from stakeholders
4Q2014	Local	Dor General Secretary	Engineering & Construction Manager; Regulatory Analyst; Statutory consultant	Introduction meeting	Introduction of Leviathan Project and the need to execute field surveys ASAP.
4Q2014	Local	Mayan Tzvi members	Engineering & Construction Manager; Regulatory Analyst; Statutory consultant	Introduction meeting	Introduction of Leviathan Project and the need to execute field surveys ASAP.
4Q2014	Regional, Local	Hof HaCarmel Regional Council members	Engineering & Construction Manager; Regulatory Analyst; Statutory consultant	Introduction meeting	Introduction of Leviathan Project and the need to execute field surveys ASAP.
4Q2014	National, Regional, Local	MoEP, MEWR, MOI (NPC), Haifa Natural Gas Licensing Authority, Lerman Architect	Engineering & Construction Manager; Regulatory Analyst; Environmental Specialist	Visit to Platform	Arranged by Noble Energy to introduce the offshore project components to the Haifa district Licensing Authority and for initiating coordination with MEWR and MoEP.
4Q2014	National, Regional	MoEP, MEWR	A total of 47 individuals participated in the exercise, including 30 Noble Energy employees from Israel and Houston, and 17 contractors from Marine Pollutions Services (MPS), Marine Ties, and OSRL	Full scale emergency response exercise	To test the Israel Incident Management Team's (IMT) ability to deploy shoreline protection resources in case of an unintentional release of hydrocarbons.
4Q2014	National	Lerman Architects	Noble Energy EHS staff from Houston; ERM (E&S consultant)	Coordination meeting	Review details related to the TAMA process and stakeholder engagement comments pertaining to TAMA 37/H
1Q2015	Local	Dor General Secretary	Project Engineer	Coordination meeting	Presenting NE Surveys Execution Plan submitted on Dec-31-2014.
1Q2015	Local	Mayan Tzvi members	Regulatory and Statutory team members	Consultation meeting	Approval for land survey and appraisal work for the small parcel of land (fish pond) required by Project
1Q2015	Regional, Local	Hof Carmel Regional Council	Project Engineer and Project Manager	Coordination meeting	Presenting NE Surveys Execution Plan submitted on Dec-31-2014.

		members			
10-May-16	Regional	Head of Hof Carmel Regional Council	Houston Project Manager, Israel Project Manager	Introduction meeting	Introduction of Leviathan Project
23-Jun-16	Regional	Head of Hof Carmel Regional Council	Israel Country Manager, Israel Project Manager	Coordination meeting	RoW (right of way) expectations and coordination
14-Jun-16	Regional	General Manager of Haifa MoEP	EHS, Israel Project Manager	Introduction meeting	Introduction of Leviathan Project
10-May-16	Regional	Haifa DA	Houston Project Manager, Israel Country Manager, Israel Project Manager; Regulatory Analyst; Environmental Specialist	Introduction meeting	Introduction of Leviathan Project
8-May-16	Local	Local Reps (NGO)	Israel Country Manager, Israel Project Manager; EHS Manager	Introduction meeting	Introduction of Leviathan Project focused on the condensate issue including Q&A
26-Jun-16	Local	Dor General Secretary	Permitting Coordinator, Israel Project Manager	Introduction meeting	Initial site development building permit application coordination
3-Jul-16	Local	Ein Ayala Quarry Manager- Land holders	Permitting Coordinator, Israel Project Manager	Land holders negotiation	Civil #1 introduction
3-Jul-16	Local	Ma'ayan Zvi Rep - Land Holders	Permitting Coordinator, Israel Project Manager, Permitting Analyst	Land holders negotiation	Civil #1 introduction
4-Jul-16	Local	Dor Reps	Land consultant, Israel project manager Permitting analyst, lawyer	Land holders negotiation	Civil #1 introduction
5-Jul-16	Regional	Hof HaCarmel Regional Council-Engineer	Project Engineer, Israel Project Manager	Coordination meeting	Civil #1 introduction
7-Jul-16	Regional	Megido Regional Council and Concerns Citizens Leadership	Permitting Coordinator, Israel Project Manager, Permitting Analyst, Project Engineer, Environmental Manager,	Public participation	Introduction of Leviathan Project, focused on Hagit Terminal including Q&A

			Environmental Consultants		
10-Jul-16	Local	Tivon- Head of Municipality, and the Municipality Senior Engineer.	Israel Project Manager; Project Engineer	Introduction meeting	Introduction of Leviathan Project
11-Jul-16	Regional	Haifa DA Steering Committee	Israel Project Manager; Permitting Coordinator, Israel Project Manager Permitting Analyst, Environmental Manager	Introduction meeting	Introduction of Leviathan Project
18-Jul-16	National, Regional	The Society for the Protection of Nature in Israel Reps.	Israel Project Manager; Environmental Manager, Project Environmental Specialist	Introduction meeting	Introduction of Leviathan Project

## **Appendix 3: Rapid Cumulative Impact Assessment**



Prepared For:

Noble Energy



## *Cumulative Impact Assessment, Leviathan Gas Project, Israel*

September 2016

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## Cumulative Impact Assessment, Leviathan Gas Project

September 2016

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## LIST OF ACRONYMS AND ABBREVIATIONS

EHS	Environment, health, and safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ESIA	Environmental and Social Impact Assessment
GHG	Greenhouse gas
GIS	Geographic Information System
IFC	International Finance Corporation
MBSA	Migratory Bird Treaty Act
NGO	Nongovernmental organization
TAMA 37/H	Israel's national outline plan – planning for gas treatment facilities
Tcf	Trillion Cubic Feet
TPC	Third-Party Consultant

## 1.0 INTRODUCTION

Environmental Resources Management, Inc. (ERM) has been retained by Noble Energy to complete a Cumulative Impact Assessment (CIA) of the Leviathan Project (the Project) as part of a Supplemental Lender Information Package (SLIP). The purpose of the SLIP is to assist lenders in their decision making processes by providing them documentation—beyond which Noble Energy has already produced—to demonstrate Project alignment with applicable lender standards, namely the International Finance Corporation’s Environmental and Social Performance Standards and EHS Guidelines (IFC PS), the World Bank Group’s Environmental, Health and Safety Guidelines and the Multilateral Investment Guarantee Agency’s (MIGA) Policy on Environmental and Social Sustainability.

The CIA follows the International Finance Corporation’s (IFC) Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets (IFC 2013). Its proposed approach is applicable to private sector project developers in emerging markets, identifying the most significant cumulative impacts through a methodology known as rapid cumulative impact assessment. This methodology focuses on environmental and social components rated as critical by stakeholders and the scientific community - known as Valued Environmental and Social Components or VECs - which are cumulatively impacted by the project under evaluation, by other projects or developments, and by natural environmental and social external drivers (IFC 2013).

The basis of the Project assessed is described further in Section 4, the main findings and recommendations are provided in Sections 5 and 6.

### 1.1 OBJECTIVES

The objective of this CIA is to assess the cumulative impacts of the Project by performing the following steps:

- Identify Valued Environmental and Social Components (VECs) that could be impacted cumulatively considering stakeholder consultations;
- Identify other existing and planned projects and external environmental and social drivers that could cumulatively impact VECs;
- Following the IFC methodology, assess the cumulative impacts on VECs, considering the Project, other projects and external drivers in the area; and

Identify specific actions that Noble Energy can undertake, and also present suggestions for a broader framework that government and stakeholders can work together on to encourage integrated management of cumulative impacts.

## 1.2 SCOPE

This CIA assesses the most relevant cumulative impacts generated by the Project together with the other developments or projects, and external drivers on VECs within the Project area. The CIA is based on information generated by Noble Energy, Israeli Government departments, and information available in the public domain. The identification of VECs incorporates the contribution and the concerns of stakeholders and groups on the basis of the information gathered during the consultation process to develop TAMA 37/H and environmental review documents.

## 1.3 DEFINITIONS

Definitions of the key terminology of CIA and the IFC methodology (IFC 2013) are presented below:

- **Cumulative Impact:** Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of Project Stakeholders.
- **CIA:** Process to identify and evaluate cumulative impacts.
- **Rapid CIA:** Methodology proposed by the IFC for a preliminary assessment carried out by a private developer that includes a desk-based review of publicly available information and consultation with key stakeholders.
- **Other Developments:** Existing, planned, or reasonably expected future developments, projects and/or activities affecting VECs. These could include energy, infrastructure, manufacturing activities.
- **External Drivers:** Sources or conditions that affect or cause physical, biological, or social stress on VECs such as natural environmental and social drivers, human activities, and external stressors. These can include climate change, population influx, natural disasters or deforestation, among others. They are less defined and planned than the Other Developments.

- **Valued Environmental and Social Component (VEC):** Those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities<sup>i</sup>. May include:
  - Physical features, habitats, wildlife populations (e.g., biodiversity, water supply);
  - Ecosystem services (e.g., water supply, carbon sequestration);
  - Natural processes (e.g., water and nutrient cycles, microclimate);
  - Social conditions (e.g., health, economics, life-ways); or
  - Cultural heritage or cultural resources aspects (e.g., archaeological, historic, traditional sites).
- VECs reflect public concern about social, cultural, economic, or aesthetic values and scientific concern of the professional community. They are considered the ultimate recipients of cumulative impacts.

#### 1.4 ORGANIZATION OF THIS CIA

The remainder of this proposal is structured as follows:

- Section 1.0: Introduction
- Section 2.0: Methodology
- Section 3.0: Project area of influence and VECs
- Section 4.0: Project description and other developments
- Section 5.0: Impact assessment on VECs
- Section 6.0: Cumulative impacts management

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<sup>i</sup> IFC, Performance Standard 1 - ERM has defined Affected Communities as Project Stakeholders

## 2.0 *METHODOLOGY*

This CIA follows the methodology established by the IFC's Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (IFC 2013). The methodology is consistent with IFC Performance Standards (PS), especially PS 1 - Assessment and Management of Environmental and Social Risks and Impacts and PS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012).

The steps followed are described below (Sections 2.1 through 2.5). The process is iterative and therefore steps, although sequential, were revised and adjusted in the process of information collection and analysis.

### 2.1 *DETERMINATION OF SPATIAL AND TEMPORAL BOUNDARIES*

The spatial delimitation of the CIA was established taking into consideration:

- i. the geographical area of all components of the Project;
- ii. the extension of selected VECs; and
- iii. the extension of the impacts from the Project, other projects, and external drivers.

Temporal delimitation for the assessment was established taking into account the status and expected timeline of the Project and the other identified projects.

### 2.2 *IDENTIFICATION OF VECs, OTHER PROJECTS AND EXTERNAL DRIVERS*

To be included in a CIA, an environmental and social component must first be demonstrated to be valued by some identifiable stakeholder group and the VEC must be reasonably expected to be affected by both the project under evaluation and some combination of other developments and external drivers.

To establish the value or importance of receptors, information was gleaned from stakeholder feedback collected by the Government of Israel during the public consultation and disclosure phase of the TAMA EIA, consultation undertaken by Noble Energy's construction teams, operational staff, and management, and stakeholders identified in the Stakeholder Engagement Plan. The stakeholder groups identified include:

- National, regional and local government officials;
- Non-government organizations;

Beach users, local businesses, commercial and recreational fishers, kayakers and other recreational ocean users; and  
Local communities and landowners in the vicinity of onshore Project components.

A review of available information identified past, existing, and future developments and other external drivers that are located within the geographic and temporal boundaries of the CIA. The major sources of Project information used to identify developments and external stressors are listed below.

**TABLE 2-1: PROJECTS & PUBLICLY AVAILABLE INFORMATION**

Document	Text Reference
Environmental Impact Assessment for Installation, Operation and Maintenance of Pipelines and Submarine Systems for Leviathan Field Development, prepared by Genesis (July 2016)	Production EIA
National Outline Plan (NOP) 37/H- For Natural Gas Treatment Facilities: Environmental Impact Assessment-Marine Environment prepared by Lerman, June 2013  <ul style="list-style-type: none"> <li>• Chapters 1-5</li> <li>• Appendices A, C, D, E, F, H, L, M, N, and P</li> <li>• Appendix 2: Best Available Technique for Gas Treatment</li> </ul>	TAMA EIA
Environmental Impact Report for Production Drilling, Production Tests, and Completion-Leviathan Field, prepared by CSA (March 10, 2016 - replaces draft version from December 2014)	Drilling EIA
Israel's National Outline Plan 37/H (TAMA 37/H) Planning of gas treatment facilities: ENVID Report (May 2013)	ENVID Report
"Investigator's Report" - Receiving and Treating Natural Gas from Offshore Discoveries to the National Transmission System (May 2014)	Investigator's Report
Leviathan Regulatory Execution Plan: Chapter 1 TAMA37/H "Conceptual Document" (March 2016)	TAMA Conceptual Document
Social and Health Impact Discussion, Leviathan Project in Israel (ERM, August 2016).	Social and Health Impact Discussion

### 2.3 DESCRIPTION OF VEC CONDITION

Based on publicly available information and the data collected during the environmental and social impact assessment, the baseline conditions of the selected VECs are briefly described.

The VEC impact assessment (Section 5.0 below) provides information on the VEC baseline, their impacts (cumulative impacts and sources of pressure) and an indication of their viability and sustainability. As the Project is in planning and approval phase, the selection and detail of some project components is not finalized, and a full socio-economic baseline for existing project design was not developed. In these instances detail from other sources such as external publications, observations and advice provided by the Project team, or knowledge of subject matter experts, for similar international projects and VEC resilience is used.

#### 2.4 *ASSESSMENT OF CUMULATIVE IMPACTS ON VECs*

The IFC defines cumulative impacts as those impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively the project) when added to other existing, planned, and/or reasonably anticipated future ones (developments).

This assessment considers those VECs that will experience residual impacts (i.e. following mitigation) associated with the Project. VECs, for which the direct Project impact is deemed insignificant, or not identified by stakeholders, are not included in the CIA. Where VECs have been assessed in environmental impact documentation with an impact that is 'low' or 'negligible'<sup>ii</sup>, they are not assessed in the CIA. For VEC residual impacts defined as 'minor' or 'moderate' – these are subject to further evaluation to see if there is scope for cumulative impacts to be generated. In addition, and for this Project, social and health impacts have not always been assessed and in these instances the CIA will include a discussion and assessment of cumulative impacts.

#### 2.5 *CUMULATIVE IMPACT MANAGEMENT FRAMEWORK*

Since the cumulative impacts identified will result from the actions of multiple developments and the actions of multiple stakeholders, the responsibility for their management will usually be a combination of Project mitigation, and a collective response including developers, government and/or community stakeholders. Management of cumulative impacts therefore will not rest solely with Noble Energy.

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<sup>ii</sup>Various methodologies of risk and impact have been used across multiple Project impact assessments. The terms 'low', 'not significant' and 'negligible' are the terms most used in the risk assessment to indicate the lowest residual risk ranking.

IFC establishes good practices for managing cumulative impacts by the private sector, as follows:

Effective application of the mitigation hierarchy (anticipate and avoid, minimize, manage, and compensate/offset) in the environmental and social management of the specific contributions of a project to expected cumulative impacts, and

Identify opportunities where a multi-stakeholder collaborative approach (through engagement, leverage and contribution) in the implementation of the management measures that are beyond the capacity and responsibility of the private project developer.

Mitigation and management actions are included in Section 6.0, and include recommendations for Noble Energy, other developers, or collaborative and government-led measures.

## 2.6

### *LIMITATIONS*

IFC's rapid cumulative impact assessment methodology takes into consideration the limitations that a private developer may face carrying out this type of analysis. These limitations, applicable to this CIA, include:

- (i) incomplete information about other developments and activities (information is not always available in the public domain);
- (ii) uncertainty with respect to the implementation of future developments;
- (iii) lack of regional or local strategic plans;
- (iv) limited baseline information on VECs;
- (v) incomplete stakeholder outreach; and
- (vi) Project in planning phase with some components still under review.

### 3.0 **PROJECT AREA OF INFLUENCE AND VALUED ENVIRONMENTAL AND SOCIAL COMPONENTS**

According to the IFC Performance Standards, the Area of Influence (AoI) for the Project will include all physical elements, aspects and facilities that are likely to generate environmental and/or social risks and impacts. These elements, aspects and facilities which define the area of influence for the Project include the following:

- Those directly managed, operated or owned by the project owner or contractors, which are a component of the Project;
- Those associated with unplanned but predictable developments that may occur at a different time or location (for this CIA, unplanned events associated with hydrocarbon spills are not included in CIA due to their very low probability of occurring);
- Those resulting in indirect impacts on biodiversity or ecosystem services upon which livelihoods are dependent;
- Associated facilities that are not funded as part of the project but would not exist without the Project;
- Those which contribute to cumulative impacts on areas or resources with other existing, planned or reasonable defined developments; and
- Includes the project construction, commissioning, and operational phases.

The spatial boundaries have been defined using:

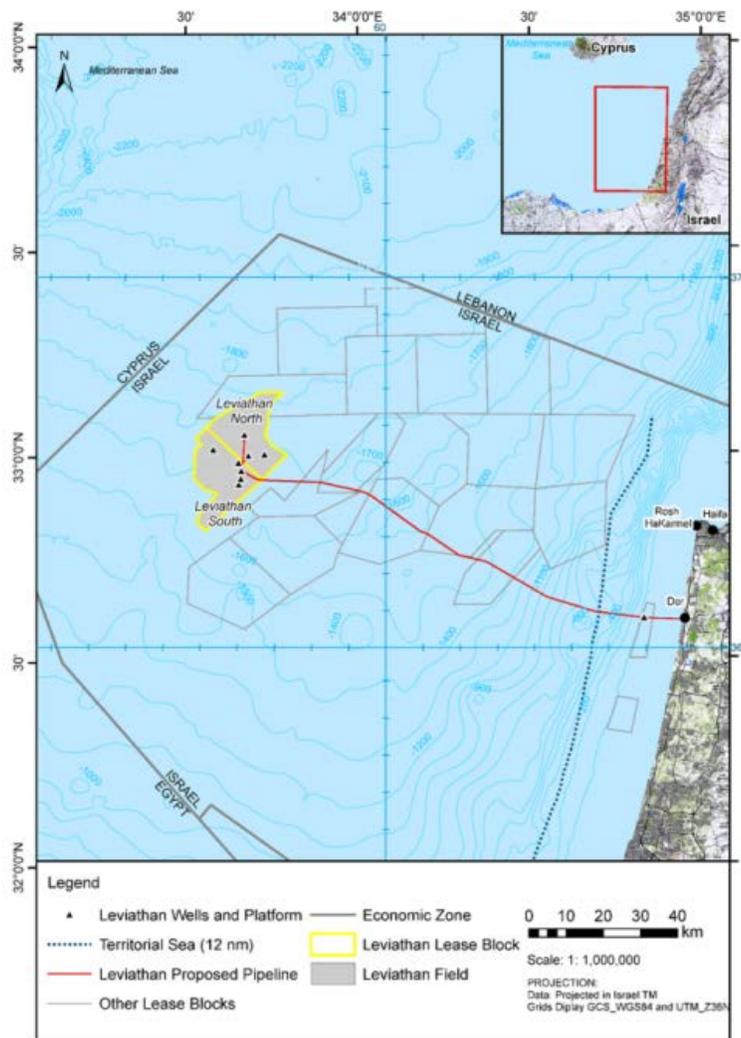
- The approved activities and locations included in TAMA 37/H;
- The EIA documents produced; and
- Feedback from stakeholders during the TAMA and subsequent stakeholder engagement processes.

Figures 4.1 – 4.5 below provides an overview of the Project offshore and onshore components, and TAMA land allocations. These broadly define the spatial boundaries of the Project; however they may vary depending upon the characteristics of the potentially impacted VEC. Also see Section 4.0 (Project description and other developments) which defines the Project characteristics and other developments in more detail.

### 3.1 TEMPORAL AND SPATIAL BOUNDARIES

The Project production life has been defined as “anticipated to exceed 30 years”; this provides the extent of the temporal boundary of the project<sup>iii</sup>. Noble Energy has advised a target of Q4 2019 for first gas and in order to achieve this target it is expected that the subsea production system will be installed and commissioned between Q1 and Q4 2019. The schedule outline provided by the Project team for onshore activities indicates onshore construction (including HDD, CVS, DVS) commencing Q1 2017 and continuing through to Q1 2019. See Figure 3-1 and figures 4-1 – 4-5 below.

**FIGURE 3-1: OFFSHORE PROJECT LOCATION**



<sup>iii</sup> As the project operational phase is expected to extend beyond 30 years, the degree of uncertainty of impacts into the future extends. There is also a lack of information provided on decommissioning activities and thus the decommissioning phase has been scoped out of the CIA.

The reviewed documentation (pertaining to permitting processes and EIAs) as well as ERM's subsequent assessments (including a human rights assessment, and social and health assessment) did not identify any significant negative environmental or socio-economic impacts for the Project. However, concerns were raised during stakeholder consultation processes and for these reasons the following socio-economic VECs were identified for consideration in this CIA:

Landscape and visual impacts;  
Local employment and economy; and  
Tourism impacts.

In addition, review of the literature and EIA documentation, and stakeholder engagement feedback, has also identified the following environmental VECs:

Sea turtle habitat and nesting areas; and  
Ramot Menashe Biosphere.

These VECs were selected because these resources were identified as important to stakeholders, would be affected by the Project, and intersect with other developments.

Other resources were not included in the CIA because their impacts were primarily short term and temporary with little potential to overlap in time and space with other proposed developments, were not identified as highly valued resources by stakeholders, and/or would not be significantly impacted by the Project.

It should be noted that the Production EIA includes a cumulative impacts analysis of offshore activities. It indicates that Noble Energy is not aware of any other work programs that will run concurrently with the Project and the planned Tamar south expansion project is expected to be completed prior to the commencement of the installation phase of the Leviathan project. It discusses other anthropogenic sources but suggests that significant cumulative noise and air effects are unlikely.

## 4.0 PROJECT DESCRIPTION AND OTHER DEVELOPMENTS

### 4.1 LEVIATHAN PROJECT

The Leviathan Project (the Project) will comprise both offshore and onshore components and includes:

- Offshore gas production fields (wells and infield flow lines; 140 km offshore);
- Gathering lines (115 km long);
- Leviathan Production Platform (LPP) (10 km offshore);
- Offshore gas and condensate pipelines;
- Aphrodite export tieback lines;
- Coastal Valve Station (CVS);
- Two onshore pipelines (2 km long);
- Dor Valve Station (DVS) to be built next to the INGL station;
- Planned onshore condensate pipelines to Haifa Refineries; and
- Potential option for 10,000 m<sup>3</sup> API 650 buffer tank to be built at the Hagit station.

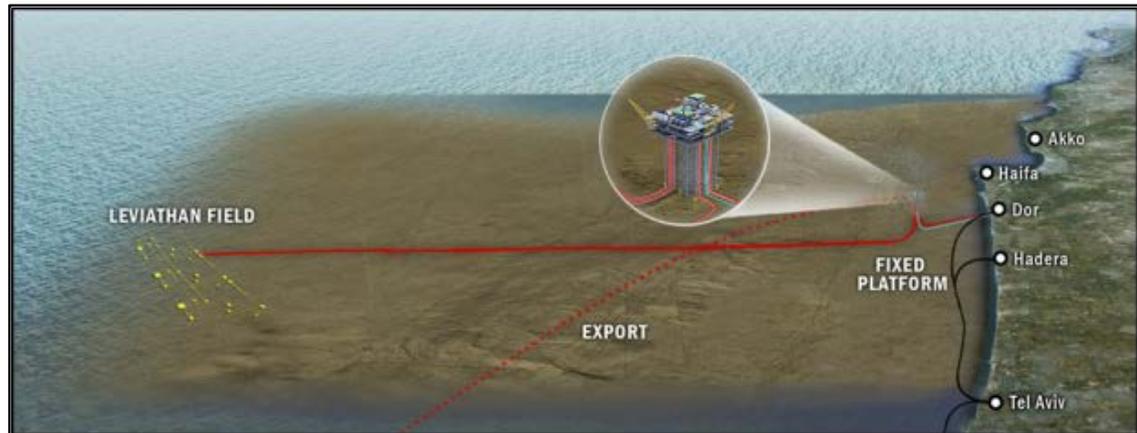
#### 4.1.1 Offshore Components

Two subsea wells have already been drilled in the Leviathan field. The Project's short term plans call for drilling and completing six new wells and completing the two previously drilled wells for a total of eight initial production wells. Full field development will include the drilling and operation of an estimated 29 high-rate subsea wells. The gas will flow from multiple subsea wells through infield flow lines to a subsea manifold. The manifold will be connected to the offshore platform by approximately 115km of gathering lines. In addition to the gathering lines, the offshore platform will be connected to the field via umbilical lines which will provide electrical power, communications, chemicals, and hydraulic control fluid to the field.

The Leviathan Production Platform (LPP) will be located within an area designated in Israel's National Outline Plan 37/H Planning of Gas Treatment Facilities (TAMA 37/H), in water approximately 86 m deep and 10 km offshore of Dor, Israel. The LPP will consist of two modules: the Domestic Supply Module and the Regional Export Module. The LPP will have permanent onboard accommodation facilities suitably sized and outfitted to support onboard operations, including living quarters, power generation, emergency power generation, safety systems, a heat medium, a cooling medium, fresh/potable water, sewage, instrument/plant air, and nitrogen. Two pipelines will run from the LPP to the onshore pipeline system: the Domestic Gas Sales

Pipeline (DGSP) and the Domestic Condensate Sales Pipeline (DCSP). These two pipelines will connect to the onshore pipelines at the CVS and will be constructed using Horizontal Directional Drilling (HDD) techniques. Figure 4-1 is a representation of the offshore system.

**FIGURE 4-1: OFFSHORE PROJECT COMPONENTS**



Source: Leviathan North and South Field Development Plan, Noble Energy 2016

#### 4.1.2 Onshore components

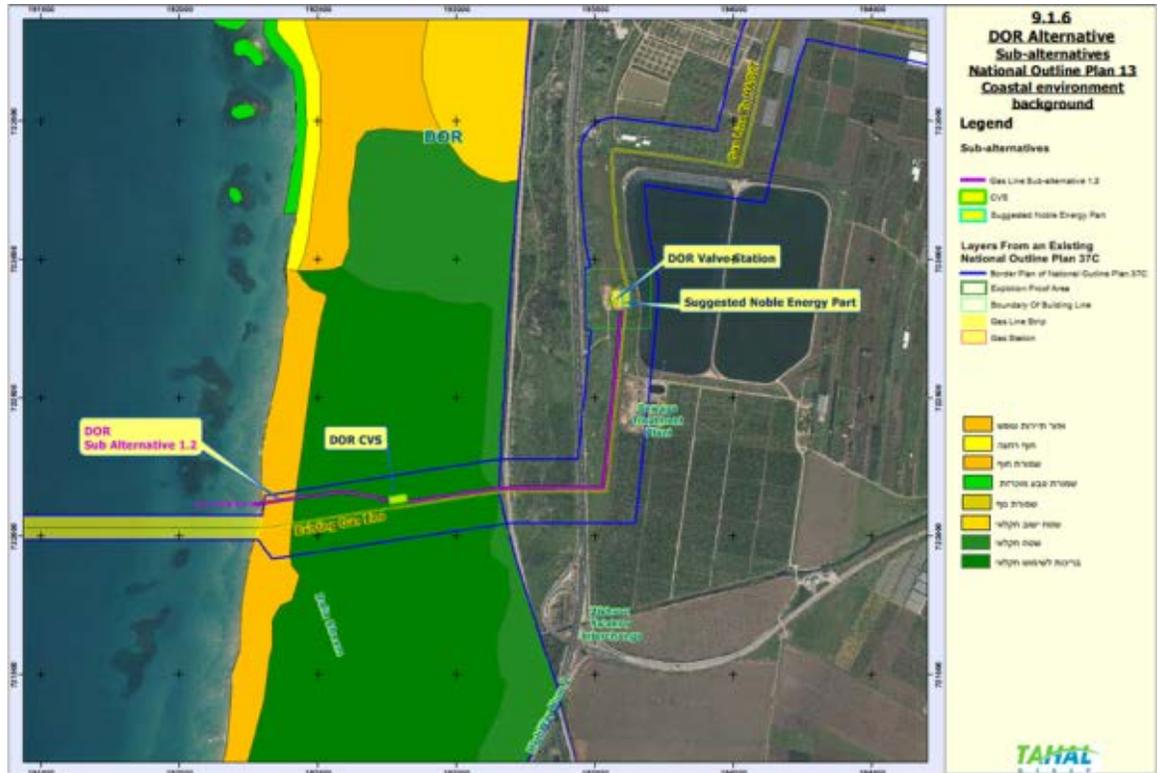
The onshore components include the Coastal Valve Station (CVS), the Dor Valve Station (DVS), onshore gas and condensate pipelines, and condensate transport infrastructure.

The CVS will be built approximately 450 m from the shoreline where the offshore gas and condensate pipelines terminate 450 m east of the beach front. The location of the CVS has previously been determined by the TAMA 37/H. The CVS will consist of subsurface segmenting valves to separate the offshore condensate and gas pipelines to corresponding onshore pipelines. The onshore gas and condensate pipelines will be approximately 2 km long and will connect the CVS to the DVS. These two subsurface pipelines will be trenched and backfilled and built within an existing pipeline right-of-way through a corridor previously delineated by the TAMA 37/H. The gas and condensate pipelines will both have two major transportation crossings: Coastal Road #2 and the Haifa-Tel Aviv railway. Both pipelines will be buried for the entire route between the two stations, while maintaining a cover of 2 m over the gas pipe as required by TAMA 37/H.

The DVS will be an unmanned facility built adjacent to an existing Israel National Gas Lines (INGL) station in Dor. The gas pipeline from the DVS will tie-into the INGL system in the INGL station. The condensate pipeline will tie-in to existing fuel and crude oil pipeline systems approximately 6 km away at the Nascholim valve pit. From the valve pit the condensate can be routed to

refineries or existing pipeline systems. Figure 4-2 illustrates the locations of the onshore components from the offshore pipeline landfall to the DVS.

**FIGURE 4-2: ONSHORE PROJECT**



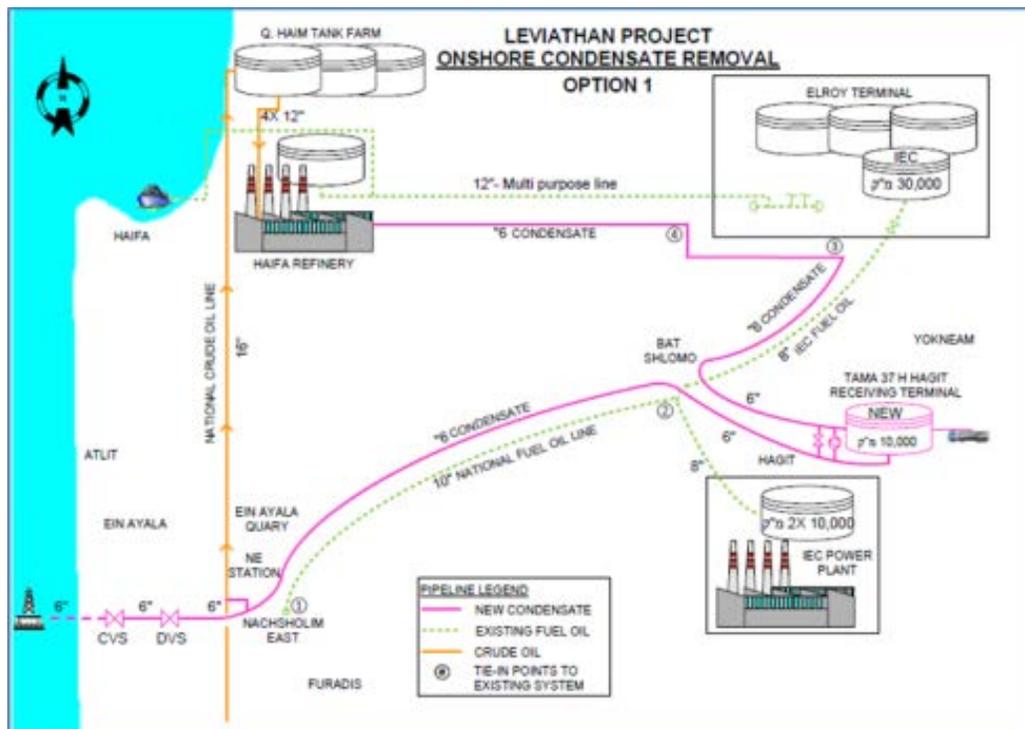
Source: Noble Energy, 2016

At present, the Project is considering the use of both existing, independent pipeline systems and the construction of new pipelines to transport the condensate from the DVS to the Haifa refineries, as shown in Figures 4-3 and 4-4. In addition to these existing and planned pipelines, the Project will consider the development of a devoted 6-inch condensate pipeline to link Dor and the Haifa refinery in the future.

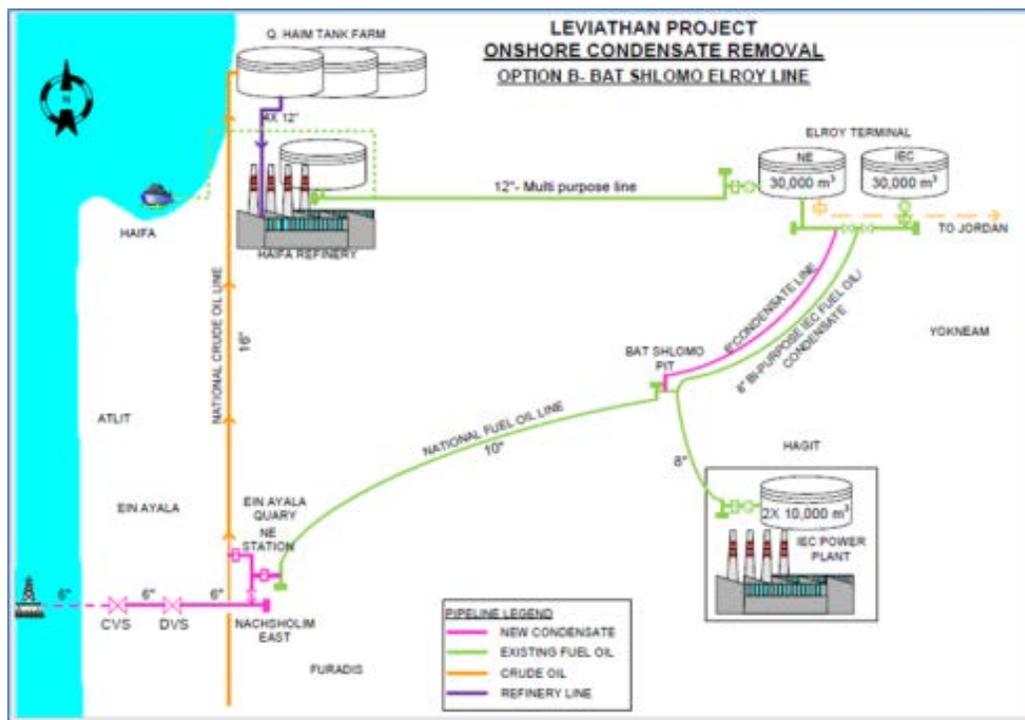
For the condensate transportation system, if the need should arise, the Project has tentative plans to construct a 10,000 m<sup>3</sup> API 650 buffer tank to be built at the Hagit station. In addition to the storage tank, a pumping station and emergency truck loading station will also be built at the Hagit station.

All of the planned condensate pipelines and storage facilities described above from the Dor coast to the Hagit station are located within the boundary of the TAMA 37/H. The existing pipelines and storage tanks from the Hagit station to the refineries are located within the boundaries of existing TAMAs.

**FIGURE 4-3: SCHEMATIC DRAWING OF THE CONDENSATE REMOVAL SYSTEM - BACKUP ALTERNATIVE THROUGH STORAGE TANK AT HAGIT**



**FIGURE 4-4: SCHEMATIC DRAWING OF THE CONDENSATE REMOVAL SYSTEM - BACKUP ALTERNATIVE THROUGH AN ADDITIONAL LINE HAGIT - ELROY**





According to Project schedules at the time of writing, construction at Dor Beach is expected to commence in Q1 2017 and will finish late 2018/early 2019. Initial site development for the CVS will take at least 6 months; the CVS will take about 1.5 years construction (including civil, concrete, piping, and electrical works), and the DVS (and minor activities at the quarry site – small gas station and condensate pipeline) will take about 12 months. The three sites will be worked on concurrently.

#### **4.1.3 *Supply base Haifa***

Haifa is the largest city in northern Israel and is a major seaport and Haifa Bay is a center of heavy industry, petroleum refining and chemical processing. Haifa was formerly the western terminus of an oil pipeline from Iraq via Jordan. Israel relies heavily on sea-based transport of goods and Haifa is one of the busiest ports in the Mediterranean.

Noble Energy has an existing supply base in Haifa at the Israel Shipyards, located in Haifa Bay which currently supports Noble Energy's existing offshore activities – drilling, maintenance, and storage of spare parts for subsea operations. Noble Energy vessels tie to a dock which is under their full control. During project construction, Noble Energy will use this supply base and Port to support the offshore Project construction activities, with supply vessels originating from here. In addition, helicopter operations and transfers will operate from the Haifa Airport which is less than 1 km from the shipyards with a frequency of about 1 helicopter flight/week. The Haifa Port and shipping channel is very active currently and for this reason, and in consideration of the advised vessel movements through designated shipping lanes, the Haifa supply base as a source of cumulative impact has been excluded from further discussion in this CIA.

### **4.2 *OTHER DEVELOPMENTS***

This section defines the planned and reasonably defined developments in the vicinity of the Project. If the Project is able to interact with such developments (temporally and spatially), the Project has the potential to create a potential cumulative impact. Information has been obtained from the Project stakeholder engagement, Project documentation, and from a desktop review of Government of Israel documentation, and review of open literature.

#### **4.2.1 *Offshore Developments***

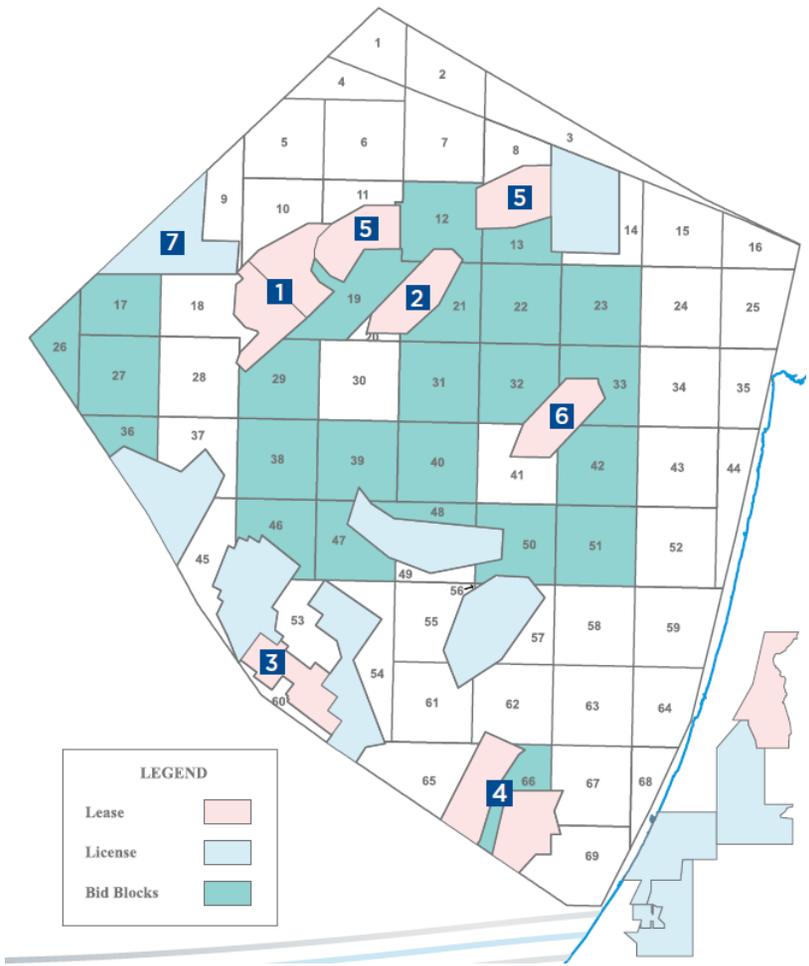
The Levant Basin province in the Eastern-most region of the Mediterranean is one of the largest oil and gas discoveries in recent history. Israel's Ministry of

Energy estimates volumes of natural gas within the Israeli exclusive economic zone (EEZ) to be 50 Tcf. The Israeli government has produced an outline of the status of oil and gas exploration and development in Israel's waters including the EEZ (Figure 4.6, below), which shows field discovery dates, and estimated reserves and production dates. They indicate there are ten production leases (noting that Leviathan consists of two leases) and several active exploration licences offshore Israel.

**FIGURE 4-6: STATUS OF EXPLORATION AND DEVELOPMENT**

**ISRAEL'S FIRST OFFSHORE BID ROUND - BLOCK DELINEATION**

- |   |   |
|---|---|
| <p><b>1 LEVIATHAN GAS FIELD</b><br/>                 Discovered - 2010<br/>                 Operator - Noble Energy<br/>                 Estimated Reserves- 500 BCM (2C)<br/>                 Status - Under development<br/>                 Water Depth - 1650 m</p> | <p><b>5 KARISH AND TANIN GAS FIELDS</b><br/>                 Discovered - 2012-2013<br/>                 Operator - Noble Energy<br/>                 Estimated Reserves - 55 BCM (2C)<br/>                 Status - Awaiting development<br/>                 Water Depth - 1750 m</p>                                   |
| <p><b>2 TAMAR AND TAMAR SW</b><br/>                 Discovered- 2009<br/>                 Operator - Noble Energy<br/>                 Estimated Reserves - 282 BCM (2P)<br/>                 Status - Producing<br/>                 Water Depth - 1680 m</p>          | <p><b>6 DALIT GAS FIELD</b><br/>                 Discovered - 2009<br/>                 Operator - Noble Energy<br/>                 Estimated Reserves- 8 BCM (2C)<br/>                 Status - Not developed<br/>                 Water Depth - 1380 m</p>   |
| <p><b>3 SHIMSHON GAS FIELD</b><br/>                 Discovered - 2012<br/>                 Operator - AGR/Isramco<br/>                 Estimated Reserves - 5 BCM (2C)<br/>                 Status - Under development<br/>                 Water Depth - 1100 m</p>    | <p><b>7 APHRODITE/ISHAI GAS FIELD</b><br/>                 Discovered - 2012<br/>                 Operator - AGR/Nammax<br/>                 Estimated Reserves- 7-10 BCM (2C)<br/>                 (Israeli side, under review)<br/>                 Status - Not developed<br/>                 Water Depth - 1700m</p> |
| <p><b>4 MARI B AND NOA GAS FIELDS</b><br/>                 Discovered - 1999-2000<br/>                 Operator - Noble Energy<br/>                 Status - Produced 25 BCM since 2004<br/>                 Water Depth - 235 m, 790 m</p>                             |   |



Source: <http://energy.gov.il/subjects/oilsearch/documents/israeli%20gas%20opportunities.pdf>

The table 4-1 below is a summary of offshore developments in the Levant Basin, which may interact with this Project.

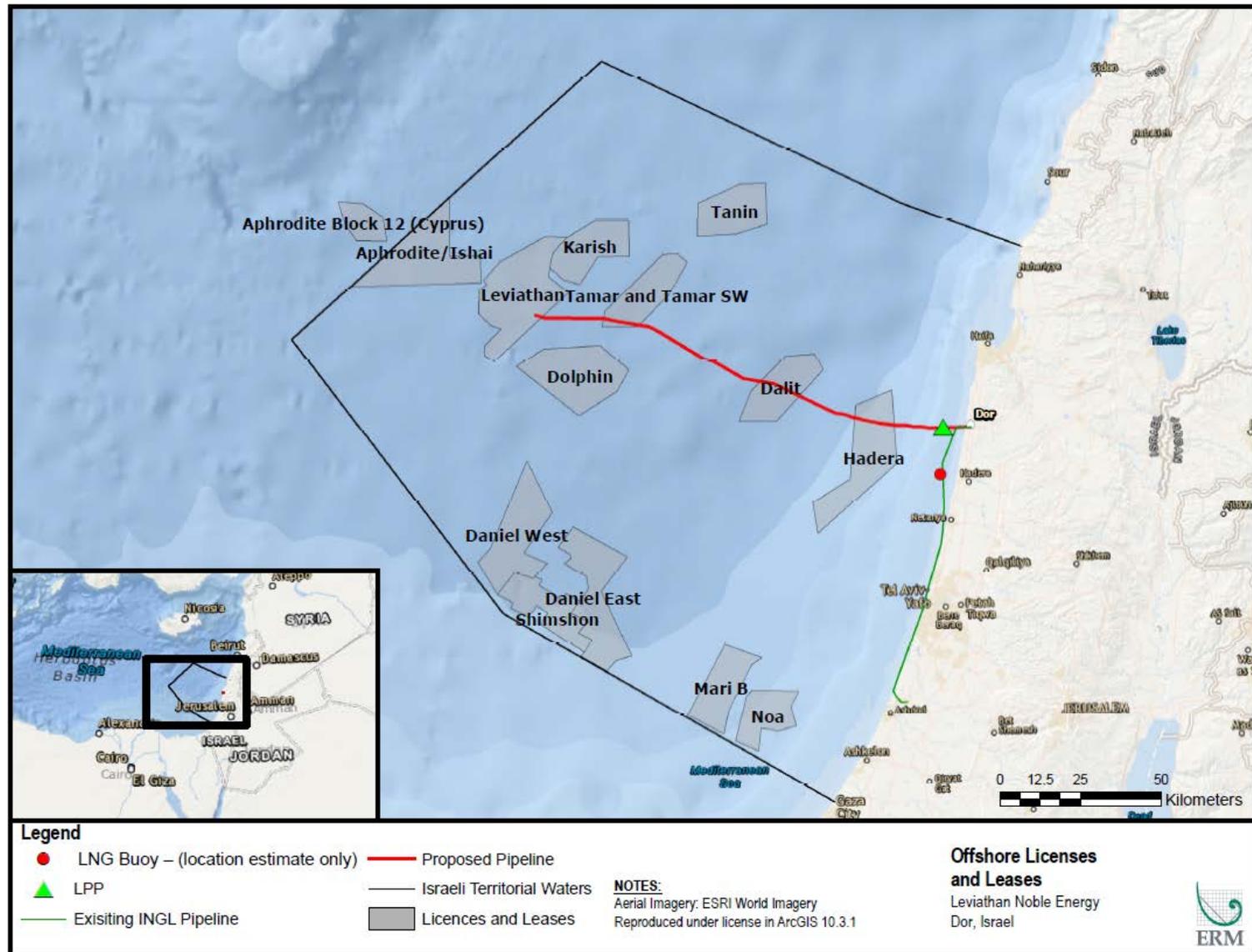
**TABLE 4-1: OFFSHORE DEVELOPMENTS - LEVANT BASIN**

Development name	Developer or Operator	Development description	Development phase
Tamar Field (and Tamar SW)	Noble Energy with Delek, Avner, Isramco and Alon)	Discovered in January 2009 and online in 2013.  10 tcf, and deliverability of over 1.1 Bcf/d onshore. Includes a 150km tieback to Tamar Platform located on Mari-B.  Generates more than half of Israel's electricity.	Operational
Mari-B and Noa	Noble Energy and partners (Delek)	Discovered field in 2000 and contains about 2 Tcf gas.  Gas to mainland Israel (Ashdod) from 2004	Operational
Hadera Deepwater LNG Terminal	IEC	LNG buoy located 6 km offshore Israel and capable of accepting up to 600 MMcf/day LNG, to supply LNG to Israel.	Developed
Aphrodite Block 12	Noble Energy, BG (with Avner Oil Exploration and Delek Drilling)	4 Tcf gas field.  Noble Energy has filed a preliminary field development plan in Cyprus for the Aphrodite field located in Block 12, in the EEZ of Cyprus, west of Leviathan.  The Leviathan Development Plan includes a potential tieback of wells. The production flowline, MEG flowline, and umbilical lengths would be approximately 45 km long. Such connection would be designated for export capacities only.	Development
Dalit	Noble Energy	Discovered 2009	Not developed
Karish and Tanin	Noble Energy	Discovery 2012-2013  Sale of fields is underway	Not developed
Shimshon Gas Field (License 332)	AGR/Isramco	First exploration well in 2012 with commercial discovery of natural gas. A detailed development plan was submitted in 2015. Estimated reserves 5 BCM.	Development
Aphrodite/Ishai	AGR/Nammax	In Israeli EEZ and under review. Adjacent to Leviathan.	Development
Daniel East licence and	Isramco (and partners	The Og Prospect located within the Daniel East licence, is estimated at 1.1 Tcf	Not

Development name	Developer or Operator	Development description	Development phase
Daniel West licence areas	Modiin, IOC, ATP Oil & Gas, Petroleum Services Holdings)	(prospective resources). Daniel West is estimated to contain 7.9 Tcf.	developed

The Figure 4-7 below shows all developments in Israel's waters, and the Aphrodite Block 12 project in Cyprus' waters.

FIGURE 4-7: EASTERN MEDITERRANEAN LEASES



## 4.2.2 Nearshore/Onshore Developments

The following planned and reasonably defined developments have been identified in the vicinity of the nearshore and onshore Project components (See Table 4-2). Onshore includes the gas and condensate pipelines connecting the LPP to the CVS, the CVS, the area set aside for the pipeline connecting the CVS to DVS, the DVS next to the INGL station, the onshore pipelines and the area of the 10,000 m<sup>3</sup> tank at the Hagit power station.

**TABLE 4-2: NEARSHORE/ONSHORE DEVELOPMENTS**

Developer and project name	Description of Development	Interaction with Project		
		Spatial	Temporal	Scoped in/out of CIA
Eastern Pipeline Israel Natural Gas Lines Ltd (INGL)	The INGL Development plan includes a 90 km/ 36" Eastern Pipeline between Ramle and Eliakim.  INGL is also exploring the possibility of natural gas exports, and establishing a strategic storage gas reservoir.	Eliakim is at the Hagit power plant site.  Interaction likely.	Construction of Eastern Pipeline has commenced and may coincide with construction schedule for Leviathan onshore work at Hagit.	Scoped in
IEC  Owns and operates 17 power station sites including the 1.4MW power station at Hagit	A draft recommendation of the Yogev Committee (proposing electricity reform) is "IEC will sell certain power stations and in parallel construct and/or convert existing power stations".  As at Q1 2016 no detail as to which power stations will be sold, converted to gas or constructed.  Q1 2016 financial statements major project list shows major capital projects to 2018. Power plant works not at Hagit.	Conversion of coal plants to gas not defined.  No plan for Hagit power plant upgrades or major project work.	Timing of major project work defined for Q1 2016 in Israel does intersect with Project construction.	Scoped out
Edeltech Group and Zorlu Enerji  Power plant	Leviathan Partners have agreed with Edeltech the sale of 16 Bcm of Leviathan gas, for 18 years, to power plants they plan to build in Israel.	Location of future power plants is not defined; unclear if will interact.	Expect construction timing in line with receiving Leviathan gas	Scoped out
IPM Be'er Tuvia  Power Plant	Leviathan signed deal to supply up to 473 Bcf gas for 18 years.	South Israel, approx. 60km West of Jerusalem and about 20	Construction likely in line with Leviathan	Scoped out

Developer and project name	Description of Development	Interaction with Project		
		Spatial	Temporal	Scoped in/out of CIA
(IPM) Power plant (413 MW)	IPM in advanced process to build a power plant at the Be'er Tuvia industrial zone. The plant will supply electricity and energy consumption of different consumers at the Be'er Tuvia industrial zone.	km East of Ashdod. Will not interact spatially.	development	

Based on the assessment table of onshore projects, above, the Development that may interact with onshore Project activities is the INGL Eastern Pipeline development project. Pipeline construction activities and connection activities will intersect spatially with Project works at the Hagit power station. Figure 4-8 below shows a schematic overview of the INGL transmission grid and the future INGL Eastern pipeline (in yellow).

**FIGURE 4-8: FUTURE INGL EASTERN PIPELINE**



Source: INGL

The National Transmission Network of Israel Natural Gas Lines is the main artery for natural gas transmission in Israel. The natural gas transmission network in Israel currently includes four main trunklines serving the western, central, northern and southern regions of Israel.

According to the existing plans for network development, the transmission network will be able to transmit between 10 and 15 billion cubic meters (BCM) of natural gas (from the receiving terminals to the customers) per year, and approximately 1.8 million cubic meters per hour. The Northern Trunkline interfaces with this Project: it extends from Dor-Elyakim-Tel Kashish-Haifa, and Tel Kashish - Alon Tavor. According to development plans the Israel Natural Gas Lines is extending the transmission network to enable the company to respond to the increasing supply and demand for natural gas as a primary energy source - to fuel electric power plants and for the industrial sector.

### 4.3

#### *EXTERNAL DRIVERS*

Following the discovery of significant volumes of natural gas resources off the coast of Israel, the demand for electricity generation based on natural gas, and gas sector development, has increased. The Government of Israel has recognized that natural gas is and will increasingly make a significant contribution to the further development of the energy, industry and transportation spheres in Israel. The Government has indicated through TAMA 37/H that the conversion of the energy industry in Israel to use of natural gas from discoveries as soon as possible is an important environmental, economic and strategic interest.

The TAMA 37/H is a National Outline Plan and establishes the planning infrastructure to allow transmission of natural gas from gas discoveries, treating gas and transmitting it to the national transmission system in a way that will enable a regular and continuous supply of gas while maintaining maximum redundancy for Israel's energy economy and additional consumers. The TAMA 37/H is an enabling plan - to enable conversion of a considerable portion of the bundle of fuels in the Israeli energy industry to natural gas. The plan includes treatment systems that comprise both offshore and onshore areas, intended for receiving facilities and gas facilities for gas that is transmitted from offshore drilling sites. It includes an option for future expansion of gas facilities, both offshore and onshore, in accordance with projections and the development of demand for additional sources of gas supply, and includes the option to implement different natural gas treatment methods that combine a variety of mixtures for both offshore and onshore treatment, and options for future expansion of the gas facilities - all within the plan's "blue line area". The plan includes that two license holders can transmit gas along the natural gas transmission alignment (treated) of INGL.

Figure 4-9 below shows the expected continued increase in demand for natural gas and a transition to natural gas reaching an estimated 60% in 2027 and 68% in 2040. In 2030, natural gas consumption during peak demand is meant to be 80%. This will require significant infrastructure.

**FIGURE 4-9: EXPECTED CONTINUED INCREASE IN ISRAELI DEMAND FOR NATURAL GAS**



Source: Ministry of National Infrastructures, Energy and Water Resources

In news reports of a visit to INGL (March 2016), the Minister of National Infrastructure, Energy and Water Resources, shared progress of the Eastern Natural Gas Pipeline and additional INGL development programs, driven by the offshore natural gas developments, including:

- Natural gas export from Tamar reservoir to Jordan using the Southern Pipeline, being constructed near Sodom and expected to start operating during 2017 and the Northern Line, which will be constructed near Beit She'an and is currently in its advanced planning stages;
- A project for establishing a natural gas trade system, which permits selling gas surplus among system clients;
- An option to provide an initial solution for developing CNG-based transportation through construction of a natural gas station for refueling vehicles - in the first stage for buses and trucks;

- A plan for subterranean storage of natural gas; and
- A plan for building a marine facility for quick connection of new gas fields.

In 2016 it was announced that the Israeli Energy Ministry is planning to conduct bid rounds on open blocks in the Levant Basin. In 2013 Israel adopted a Gas Export Policy allowing export 50%-100% of newly discovered natural gas reservoirs, and various options are being considered to support export are being considered including pipelines to Egypt, Jordan, Cyprus, Greece and Turkey.

The Natural Gas Authority in the Ministry of Energy and Water Resources is promoting the distribution of natural gas to smaller consumers as well. In the future low-pressure natural gas infrastructures will be developed, which will make it a readily available and accessible source of energy for small industrial plants and for businesses such as hotels and restaurants etc. These projects are driven by the accelerated growth in the use of natural gas in Israel which is expected to continue in the coming years. Growth has increased from 5.2 BCM in 2010, and expected to increase to 12.5 BCM in 2020, and to 18 BCM by 2030, of which 85% will go to electricity generation and to industry.

## 5.0 *IMPACT ASSESSMENT ON VECS*

### 5.1 *VEC: LANDSCAPE AND VISUAL*

Offshore and onshore permanent infrastructure associated with the developments identified in Section 4.2 above, has the potential to result in a cumulative landscape and visual impact and visual impact concerns were raised by community and regulatory stakeholders during the TAMA 37/H public disclosure and consultation process.

The Leviathan Production Platform is situated 10 km west of Dor Beach. The original plan was for a PRMP to be located 7.5 km offshore which was visible and was raised as a stakeholder concern. The Project has since been modified to an LPP further out to sea (10 km) and in addition the Government has required that the offshore facility does not undertake flaring, for security reasons.

**TABLE 5-1: VEC DESCRIPTION – LANDSCAPE AND VISUAL**

Landscape and Visual		
Permanent Onshore Infrastructure		Location and Impact
VEC description	Coastal valve station	Onshore South of Dor. Will be depressed into the landscape so not visible to local communities including the Zikhron and Fureidis communities, or Kibbutz Mayan Tzvi.  It is assumed any future valve station will be depressed into the landscape.
	Pipelines	Will be permanently underground, from offshore to onshore.  The onshore pipeline has no visual impact.  There is provision in TAMA 37/H for additional pipelines to enter through the 'blue-line' area (see Figure 5-1a below). It is expected these pipelines will also be underground.
	Infrastructure for future development under TAMA 37/H at Dor Beach valve station	Future onshore infrastructure for a natural gas tie-in, and/or valve station is unclear; however it is specified in Tama 37H that land is allocated for an additional tie-in station to the national gas transmission grid. The area of the allocated land is 105,000 m <sup>2</sup> and approximately 1,600 m <sup>2</sup> is to be utilized for the Project DVS.  An additional station can be located adjacent to the DVS fence (figure 5-1b). It is assumed future infrastructure at the valve station will be required to be depressed or partially embedded underground and therefore not visible.
	Infrastructure at Hagit	The project includes an option to install an additional condensate tank adjacent to the Hagit Power Station. No plan has been provided of the final location of the infrastructure, however the land take will be <10% of the area defined in the TAMA 37/H.  It is assumed this defined area will be used for future industrial development, and including for the new Eastern Pipeline from Ramla to Eliakim.
VEC cumulative assessment	<p>There are no anticipated landscape or visual impacts at the Dor Beach or Hagit Power Station site due to this Project. It is assumed future permanent infrastructure associated with natural gas developments will be in the 'Blue Line' (Figure 5.1 a), that is, within existing pre-determined TAMA 37/H boundaries, and buried or embedded into the landscape. Therefore, there are no anticipated visual cumulative impacts at Dor Beach with the future activity planned at Dor Beach.</p> <p>The Project infrastructure at Hagit will be new and potentially imposing; future development at the site will include the Eastern Pipeline from Ramla and terminating at Eliakim and will have an incremental visual cumulative impact for adjacent residents.</p>	

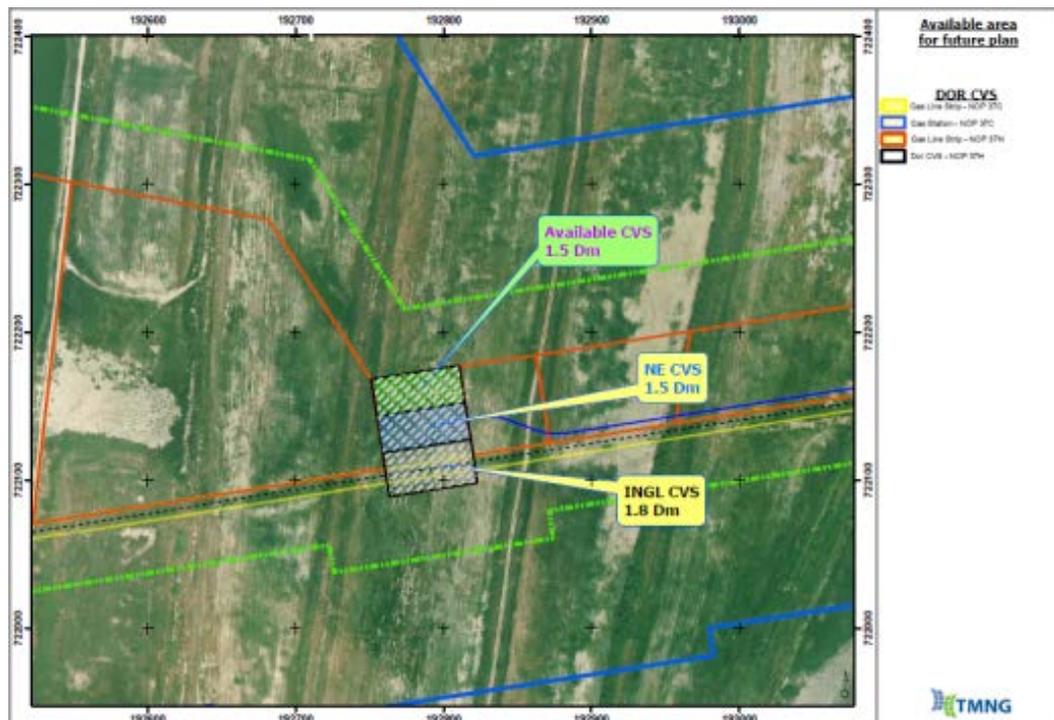
Landscape and Visual	
Permanent Onshore Infrastructure	Location and Impact
	<p>Mitigation measures are suggested to manage the cumulative impact.</p> <p>It is assumed future offshore infrastructure associated with the development projects identified in Section 4 will be located at a similar distance from the shoreline, and be restricted in flaring at night, and therefore there are no cumulative impacts anticipated through offshore permanent infrastructure.</p>
VEC mitigation measures	<ul style="list-style-type: none"> <li>• Future development owners to design onshore infrastructure so that it is at least partially embedded into the natural landscape</li> <li>• Government-led impact management initiatives to consider visual impact at Hagit power station site</li> <li>• Government of Israel to consider visual impact for future offshore Development infrastructure</li> </ul>
Construction landscape and visual	
VEC description	<p>The onshore Dor construction worksite will include access roads, laydown areas, construction buffer zones, truck parking areas, and spoil areas. The exact location of these areas has not been provided however the majority of work will be located in the area identified as the 'fish pond' area. There will be no construction activity on Dor Beach itself, and access to the beach will not be constricted. A photo with a mapped overlay has been provided showing the location of the TAMA 'blue zone' at the beach entry (see Figure 5.1 below). There will be drilling in the shaded area identified in Figure 5.2 below and the public will be excluded from this area for safety purposes. During construction this fenced area will be visible to beach goers.</p> <p>There is provision in the TAMA 37/H for additional development at the Dor Beach site and this activity may take place in parallel to the Project, or after.</p>
VEC Cumulative impact assessment	<p>During the two year onshore construction phase for the Project there will be multiple work sites including road closures and areas which will be fenced off for security reasons causing cumulative impacts during Project construction.</p> <p>The additional area set aside for a future development at Dor Beach may coincide with Project construction or come later – either scenario will result in a cumulative visual impact as a result of construction activities, and warrants mitigation measures to be in place.</p> <p>Visitors to the adjacent and popular Nahsholim Beach (to the North of Dor Beach) will be able to view the construction for the Project. Also note the large power plant visible from Nahsholim Beach to the south (see Figure 5-2 below).</p>
Mitigation	<p>The assessment has not identified a cumulative impact that is considered significant and in need of mitigation measures, monitoring or management.</p>

**FIGURES 5-1A AND B: ALLOCATED LAND FOR THE COASTAL VALVE STATION ACCORDING TO TAMA 37H AND LOCATION OF LEVIATHAN AND FUTURE CVS**

Figure 5-1a



Figure 5-1b



**FIGURE 5-2: NAHSHOLIM, LOOKING SOUTH TOWARDS DOR BEACH**



5.2

*VEC LOCAL EMPLOYMENT AND ECONOMY*

The local employment and economy VEC is made up of sub-components of the VEC - offshore deepsea fishing, nearshore and onshore fishing, and onshore employment and businesses at Dor Beach. The Table below outlines the VEC description, the cumulative impact assessment for each VEC, and mitigation recommendations.

**TABLE 5-2: VEC DESCRIPTION – LOCAL EMPLOYMENT AND ECONOMY**

Local Employment and Economy			
	Offshore fishing (deep water)	Nearshore and onshore fishing	Onshore employment and economy
VEC description	<p>Security management plans indicate that an exclusion zone of up to 1.5 km around key infrastructure will be in place and therefore closed to fishery activities.</p> <p>A 500 m radius exclusion zone will exist for Project offshore pipelines and Field infrastructure and around the pipelay vessel and the OCV while it is operating; it is assumed this will also be the case for future Developments.</p> <p>The Drilling EIA assessed that drill sites in the Field are not in known fishing areas and therefore would not be impacted by drilling activities or exclusion zones. It is assumed mariculture and fish farming activities do not take place in deep water.</p> <p>Noise from construction and/or pipelaying activities was estimated as being not significant but as possibly causing temporary harm to trawler fishing. It can be expected the same level of noise will be present for future offshore Development activities.</p> <p>Generally, offshore marine fishing is described as relatively sparse as a result of water depths and the oligotrophic nature of the environment (UNFAO, 2007). In total, marine fishing contributed 10 % towards the total domestic fish production in Israel in 2005 (UNFAO, 2007).</p> <p>The Production EIA discusses how oil and</p>	<p>The TAMA EIA discussed that bottom trawlers usually fish at depths down to 400 m, but trawl fleets are prohibited from fishing at depths shallower than 15 m. It is understood that the Government of Israel has now made trawling illegal. This will impact the economic livelihoods of trawl fishers; however as it is an illegal activity it is not assessed further in the CIA.</p> <p>Fishing is concentrated along the narrow continental shelf offshore Israel and narrows to 10 km in the north (Haifa–Carmel Mountains). Commercial, subsistence and recreational fishers operate in the nearshore area of the Project and along the shorelines of Israel. The Drilling EIA states that <i>“there are roughly 1,000 kayak owners who fish along the Israeli coast, approximately 1,000 free divers engaged in the sport of spear-fishing, and on a sunny day up to 20,000 Israelis fish with rods from beaches, and several hundred small boats engage in fishing along the coast – although how many fish in the area that will be impacted by the Project is unknown.”</i></p> <p>It is unknown how many of those fishing in coastal waters using spears, rods, and boats are doing so for subsistence or for recreation, although the assumption made is it is for recreation.</p> <p>The Feasibility Study details baseline information that will be required for the onshore components to connect the terminal to the main transmission system at Dor Beach.</p>	<p>One local community is in the vicinity of the nearshore and onshore Project components which may be impacted by Project activities (Mushav Dor) and one community outside the area (Kibbutz Mayan Tzvi) with rights to use land in the onshore Project area. There may be some positive economic impact to these communities during the Project construction phase as an average of 100 workers (and peak of 250 workers) will be in the onshore area buying goods and services and contractors may recruit workers from neighboring communities. It is expected with at least one additional development in the same area this will be a cumulative positive impact.</p> <p>The vulnerability of business receptors in Nasholim Beach, immediately north of Dor is low as it is assumed the road closures and other construction impacts will not impact trade to those businesses. The construction of access roads and the transport of equipment could affect other commercial businesses in the immediate area; however the schedule of works with detail on road and rail closures is not yet known and additional construction impacts will be expected with at least one future development in the same Dor Beach area.</p> <p>During the public consultation processes for the Project, many of the comments captured in the Investigator’s Report related to onshore impacts were based on initial design plans that included significant onshore components. Due to</p>

<b>Local Employment and Economy</b>			
	<b>Offshore fishing (deep water)</b>	<b>Nearshore and onshore fishing</b>	<b>Onshore employment and economy</b>
	<p>gas offshore infrastructure has been observed to attract significant levels of marine species (including fish) from surrounding habitats. This 'attraction' hypothesis can be considered detrimental to fishers as sparsely distributed resources can be concentrated in the area of the infrastructure making them inaccessible to fishers. This will be the case where an exclusion zone exists.</p>	<p>The Feasibility Study determines that the staging areas for carrying out the drilling (for HDD) will be located within the area of the fish ponds, and the mud of the horizontal drilling will be dispersed in the area of the fish ponds (or evacuated to an organized approved site). The TAMA 37/H allows for additional staging and construction in the fish pond area.</p>	<p>stakeholder concerns, the design was shifted for all gas processing to be conducted offshore thereby reducing onshore impacts. It is assumed future Development gas processing infrastructure will also be sited offshore.</p>
<p>VEC cumulative assessment</p>	<p>The stakeholder groups that could be adversely affected by offshore activities including the LPP are deepsea fishers (with an adverse effect on their livelihoods); however, the number of fishing relying on fishing in these areas is low.</p> <p>In this CIA, consideration of the offshore fishers was assessed to include future developments. The environmental impact documentation indicates the potential social impacts on deepsea fishers will be negligible and offshore fishers could likely adapt to the exclusion zones. In considering the number of future developments and likely associated permanent infrastructure with from 500 m and up to 1.5 km exclusion zones, the ability of deep sea fishers to adapt is reduced. ERM considers that the combination of the current exclusion zone, increasing number of offshore activities with exclusion zones possibly in areas of greater fish concentration, additional pipeline construction activities, and increased vessel movements, that there</p>	<p>Fishers could be adversely affected by nearshore activities, as it is expected the future development in the Dor Beach area will be similarly located and include similar activities, such as pipelaying and drilling, restricting fishing.</p> <p>It is likely that exclusion zones may be in place for up to 2 years during Project construction, the 500 m exclusion zone will be in place permanently, and similarly for future nearshore and onshore activities through the TAMA 37/H process at the same nearshore and onshore sites. Whilst the extent of nearshore fishing remains unclear, and there is an assumption the majority of fishing is for recreation and not for subsistence, for fishers in this area the Project activities (e.g. pipelaying and HDD activities) represent an additive cumulative effect and the fishers may be vulnerable to the reduction of available area for nearshore fishing if they are unable to relocate to other coastal areas. It is understood kayakers do not venture beyond about 5 km from shore and therefore will not be impacted by an exclusion zone offshore infrastructure placed at the same distance as the LPP.</p>	<p>The onshore activities, particularly for the fish pond area and local businesses have been assessed as not representing a cumulative impact requiring additional mitigation primarily because future development in the Dor Beach area will be within the 'blue zone' and it is expected these projects will manage impacts similarly to Noble. Furthermore, the operations phase for this Project and any future developments in the area will not impact businesses in the area.</p>

Local Employment and Economy			
	Offshore fishing (deep water)	Nearshore and onshore fishing	Onshore employment and economy
	<p>will be reduced availability of waters to deep sea fishers which warrants cumulative impact mitigation measures.</p> <p>In addition, future development offshore infrastructure may attract significant levels of marine species (including fish) from surrounding habitats constituting a concern of fishers across the offshore region and impinge on their catch. The (up to) 1.5 km exclusion zones around offshore infrastructure may exacerbate the issue. Even if this is a technically unproven environmental impact the perception of a cumulative impact of multiple offshore platforms may elevate concerns.</p> <p>The Project is identified as a contributor to this potential cumulative impact, but in a minor way.</p>	<p>Noble Energy's community engagement teams are in contact with the residents of the communities who operate and/or lease the fish pond area.</p> <p>In consideration of the planned additional nearshore and onshore development in the area and the impact on nearshore fishers at Dor Beach cumulative mitigation measures are warranted.</p>	
VEC mitigation measures	<p>The Project will be a minor contributor to the potential cumulative impacts, however as a proactive step Noble Energy's Community Feedback Mechanism will provide potentially affected communities with a means to express their concerns and voice their opinions during the construction phase. Noble Energy will also notify communities of buffer zones and other Project-related information which could affect the livelihoods of sea users nearshore in advance of construction and/or operational activities.</p> <p>From a broader cumulative impact management perspective, some suggestions for government and broader stakeholder consideration include:</p> <ul style="list-style-type: none"> <li>• Coordinate additional research into offshore fishing areas, economic fishing practices, and the socio-economic impact of exclusion zones during construction and operations, at the level of Levant Basin (multiple project impacts); and</li> <li>• Coordinate baseline assessment of nearshore commercial fishing along nearshore area to better understand the short-term (construction) and long-term impacts of exclusion zones.</li> </ul>		

## 5.3

## VEC: TOURISM

Dor Beach attracts tourists from Israel and elsewhere. It is a popular beach for multiple users. This VEC is assessed below. A number of tourism sector businesses and tourist groups were identified and are listed here alongside a general description of the VEC, tourism cumulative impacts assessed and mitigation measures.

**TABLE 5-3: VEC DESCRIPTION - TOURISM**

<b>Tourism</b>		
	<b>Tourism operator or user group</b>	<b>Potential impact</b>
VEC description - businesses	Dor Beach Island Reserve	May have restricted access to Dor Beach during construction or be impacted by noise.
	Wildlife and Nature Tours (www.northern-wind.com)	This is the primary tour operator in the area and partnered with the Nahsholim Resort. May perceive loss of customers as a result of construction.
	Nahsholim Seaside Resort (www.nahsholim.co.il)  Sells tourism options that utilize the beach for wildlife viewing and sports activities	May perceive a loss of customers during construction activities as a result of reduced access, noise, visual impact.
	Kayaking clubs  Kayakers launch from Dor Beach and travel up to 5 km offshore. Clubs frequent Dor Beach and camp on the adjacent rock islands, and wildlife area. The nearest club is based at Hadera Power Plant.	May have reduced access to Dor Beach and to near shore kayaking areas. Construction noise may impact their enjoyment of kayaking, fishing and camping on the nearby islands.
	Dor Ranch (Horseback Riding located east of Dor Mushav)  Horses are rented from a ranch on the road leading to Dor, the beach and the hotel. Guided horseback riding takes place on the shoreline, up to the ridge, and to the fish pond.	Will lose access to riding areas during construction, and possibly during operations (fish pond area).
	Recreational fishers, Dor Beach	May lose access to Dor Beach area during construction due to restricted areas; noise impacts will reduce fishing enjoyment

Tourism		
	Tourism operator or user group	Potential impact
		and catch.
	Birdwatchers (Dor)	May perceive impact to bird nesting or visiting due to construction impacts (e.g. noise).
VEC description	<p>The Dor Beach is a highly used area for multiple tourism users. These tourists use the beach area and engage in activities that draw upon businesses and resources of the area.</p> <p>The nearshore and onshore Dor Beach site will be impacted by Project and future development site works and civil construction activities. During construction period there will be noise, dust, and traffic impacts.</p> <p>Traffic congestion/delays and additional accidents due to increased vehicle traffic on community roadways around Dor may impact on tourism in the area. Construction activities adjacent to the beach (although HDD but still visible onshore and offshore) could impact the number of tourists and visitors who come to enjoy the beach.</p> <p>The TAMA 37/H makes land available for a second owner to connect with the INGL transmission line and/or build a valve station to connect to the Israeli power infrastructure, alongside the Leviathan DVS. This development may occur in parallel, or soon after Project construction activities.</p>	
VEC Cumulative impact	<p>Cumulative construction activities as a result of this Project and at least one future development could reduce the attractiveness of the area to tourists due to the likely impacts to be experienced during construction, particularly traffic movements.</p> <p>Construction during this project will be for about 2 years, and it is likely future construction for a second natural gas connection at Dor Beach will also be of two years duration. If this second development takes place in parallel or at a later date, the impact of the construction activities could reduce tourism in the area and cumulatively impact businesses that benefit from tourism. As the businesses are relatively small in scale and rely on this local tourism trade, there will be a potentially negative cumulative impact. This warrants mitigation measures to manage this VEC.</p>	
Mitigation Measures	<p>Noble Energy has already sought to minimize impacts and disruption as much as possible through its construction selection methods such as the use of horizontal directional drilling to construct infrastructure under the beach area. Noble Energy will also provide advanced notification to tourism businesses and users during construction to ensure impacts are minimized.</p> <p>If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>	

5.4

VEC: SEA TURTLE NESTING AT DOR BEACH

In the EIA documentation, the majority of environmental impacts are ranked as low significance and the Project is assessed as having a low ability to exert a significant cumulative impact upon marine ecological VECs. Nevertheless, the section below considers the potential for the Project and other developments to generate a cumulative impact upon sea turtles at Dor Beach due to stakeholder concern regarding disturbance to sea turtle nesting areas to the north of Project.

The Production EIA indicates there will be a small, *incremental increase in noise as a result of the additional vessels that will be on site during the development* and the deep water in which the vessels will operate, and means the potential for significant negative impacts of noise resulting from the increase in vessel numbers and movements is low. Sound levels produced offshore are predicted to be too low to cause significant disturbance or injury and impacts are likely to be limited to temporary avoidance of the area of operation with low potential for population-level impacts. Offshore noise impacts on sea turtle nesting, including for future developments, is therefore excluded from this VEC.

TABLE 5-4: VEC DESCRIPTION - TURTLE NESTING

Sea turtle nesting area	
VEC description	<p>Sea turtle species are known to be present in the Project area of influence, including the loggerhead turtle, green turtle and leatherback turtle (IUCN, 2012) and in the Eastern Mediterranean. The TAMA EIA states that for the period 1993-2008, a “medium number of layings has been documented (40-80)” along the Israeli coastline. Sea turtles have the greatest hearing sensitivity at low frequencies that coincide with those produced by typical Project vessels and are therefore potentially at risk from the installation operations (Ketten, 2005).</p> <p>Based on the available information, the area of influence does not appear to be located in a habitat of significant importance where the loss of such a habitat could potentially impact the long-term survivability of the species. Also, the area does not appear to contain regionally-important concentrations of either of these turtles. However, the national importance of the beaches of the Dor area as turtle nesting habitats should be assessed with national stakeholders.</p>
VEC Cumulative impact	<p>The Project has planned to minimize impacts on the beach area through its construction selection methods such as the use of horizontal directional drilling. The duration of activities is also short-term and the area of beach to be disturbed by the Project is minimal, therefore Project impacts upon sea turtles are not anticipated. Whilst Project impacts are likely to be insignificant, additional development activity in the same area, as anticipated under Tama 37/H will result in cumulative impact due to the likely extended duration of impact, or intensity of impact if the activities are in parallel.</p>
Mitigation Measures	<p>If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and</p>

Sea turtle nesting area	
	plan together on parallel or concurrent activities to try and minimize impacts.

5.5

VEC: RAMOT MENASHE BIOSPHERE RESERVE

The landscapes south and east of the Hagit site, adjacent to the existing power station, were recognized by UNESCO in 2011 as the Ramot Menashe Biosphere Reserve. The Megiddo Regional Council objected to the construction of facilities at the Hagit site noting that it “is in the heart of a biosphere reserve that should be conserved” (Investigator’s Report, pp. 106, 186), likewise, residents from Bat Shlomo also mentioned the Biosphere Reserve in their opposition to the onshore project.

TABLE 5-5: VEC DESCRIPTION - RAMOT MENASHE BIOSPHERE RESERVE

Ramot Menashe Biosphere Reserve	
VEC description	<p>At Hagit, the Project pipeline terminus is approximately 850 north of the boundary of the Ramot Menashe Important Bird Area (IBA), identified in 1994 for its importance for the lesser kestrel (<i>Falco naumanni</i>; IUCN category Least Concern, downlisted from Vulnerable in 2011; Israel category is Vulnerable) which breed in old buildings at Amiquam (c. 30 pairs) and Bat Shlomo (up to 10 pairs) and whose forage area covers approximately 2,500 ha in surrounding fields (BirdLife International, 2016). Bat Shlomo is approximately 1.3 km south of the Project pipeline route and the IBA boundary lies approximately 1.9 km south of the Project pipeline in this zone.</p> <p>The Ramot Menashe IBA and portions of the surrounding landscape were proposed as a Biosphere Reserve in October 2010 (Avit, 2010) and recognized by UNESCO as a Biosphere Reserve in July 2011 (UNESCO, 2012). The Hagit terminus is located immediately to west and north of this proposed area. Species of conservation.</p> <p>The Tut stream as a sensitive feature located just to the south of the Hagit site, approximately 590 m downslope of the pipeline terminus. This stream is noted as supporting a fish (<i>Acanthobrama telavivensis</i>, IUCN Vulnerable globally) and a newt (<i>Ommatotriton vittatus</i>, IUCN LC globally) that are both listed nationally as Critically Endangered by the Red Book - Vertebrates in Israel (Dolev &amp; Perevolotsy, 2002). The baseline conditions of these species and their habitats in Tut stream in the reaches potentially affected by the Project should be evaluated prior to any activities that could affect their habitats. The Red Book notes that the fish was thought to be extinct in the Tut stream in 1999 and that the newt population in the Ramot Menashe region (immediately south and east of the Project) was the most important in the country.</p> <p>At least one future development is to occur in the same defined area at Hagit - the new Eastern Pipeline from Ramla to Eliakim.</p>
VEC Cumulative	The Investigator’s Report mentions that development within the Biosphere Reserve is limited by restrictions on land use and that most development is to

<b>Ramot Menashe Biosphere Reserve</b>	
impact	<p>the south of the reserve. It also mentions that there were plans for the expansion of a turkey farm near the Hagit site that were rejected because the planned area was in the reserve and that the Project would damage the farmer's ability to sustain his farm.</p> <p>The impacts of the construction of the pipeline will be greatest during construction. After construction, the pipeline will be below ground and the RoW will be of low visibility and no affect the aesthetic landscape value of the Biosphere Reserve and its surroundings.</p> <p>The INGL Eastern Pipeline development project includes plans for pipeline construction activities and connection activities will intersect spatially with Project works at the Hagit power station. This new pipeline would be constructed from the south from Regavim and through the Ramot Menashe Biosphere Reserve. Precise construction schedule information is not available; however, however at this stage it is not expected that development will occur in parallel with the Project. In addition the TAMA/37H also allows for an additional parallel pipeline in the same TAMA corridor.</p> <p>The cumulative impact is therefore expected to be minimal.</p>
Mitigation Measures	<p>Project-level environmental and social management will address any individual impacts the Project and future projects may have on the Biosphere Reserve. If however it is found that development schedules overlap, the relevant proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>

6.0

**CUMULATIVE IMPACTS MANAGEMENT FRAMEWORK**

The cumulative impacts have overall been assessed as minimal, although some specific potential impacts associated with the VECs described have been assessed and could occur as a result of multiple, concurrent and overlapping developments. A cumulative impact management framework is summarized below which captures the main recommendations of this study – comprising those that are specific to Noble Energy and those that should be collaborative activities involving future project proponents and owners, government and other stakeholders.

The identified mitigation measures related to this Project are captured in Table 6-1 below, and presents those recommended measures that are the responsibility of Noble Energy, and those that are not the responsibility of Noble Energy, but rather require a collaborative approach with other developers stakeholders and government.

**TABLE 6-1: CUMULATIVE MITIGATION MEASURES MANAGEMENT RESPONSIBILITY**

Mitigation measures - Noble Energy	Mitigation measures - collaborative
Landscape and Visual	
The assessment has not identified a cumulative impact that is considered significant and in need of mitigation measures, monitoring or management.	
Employment and Economy	
The Project will be a minor contributor to the potential cumulative impacts, however as a proactive step Noble Energy’s Community Feedback Mechanism will provide potentially affected communities with a means to express their concerns and voice their opinions during the construction phase. Noble Energy will also notify communities of buffer zones and other Project-related information which could affect the livelihoods of sea users nearshore in advance of construction and/or operational activities.	From a broader cumulative impact management perspective, some suggestions for government and broader stakeholder consideration include: <ul style="list-style-type: none"> <li>• Coordinate additional research into offshore fishing areas, economic fishing practices, and the socio-economic impact of exclusion zones during construction and operations, at the level of Levant Basin (multiple project impacts); and</li> <li>• Coordinate baseline assessment of nearshore commercial fishing along nearshore area to better understand the short-term (construction) and long-term impacts of exclusion zones.</li> </ul>
Tourism	
Noble Energy has already sought to minimize impacts and disruption as much as possible	If future construction activities are proposed in the Dor Beach area by Noble Energy

Mitigation measures - Noble Energy	Mitigation measures - collaborative
<p>through its construction selection methods such as the use of horizontal directional drilling to construct infrastructure under the beach area. Noble Energy will also provide advanced notification to tourism businesses and users during construction to ensure impacts are minimized.</p>	<p>and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>
Turtle nesting	
<p>Project impacts are likely to be insignificant based on current construction plans.</p>	<p>If future construction activities are proposed in the Dor Beach area by Noble Energy and/or other developers, proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>
Ramot Menashe Biosphere Reserve	
<p>Project-level environmental and social management will address any individual impacts the Project and future projects may have on the Biosphere Reserve.</p>	<p>The cumulative impact is expected to be minimal. If however it is found that development schedules overlap, the relevant proponents should seek to coordinate and plan together on parallel or concurrent activities to try and minimize impacts.</p>

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**Appendix 4:**  
**Environmental Monitoring and Management Plan**  
**(EMMP) Guidelines**

# **TAMA /37/H**

## **Receiving and Processing of Natural Gas from Offshore Discoveries through to the National Conduction System**

Guidelines for Preparing an Environmental Management and  
Monitoring Plan- Appendix

**July 2014**

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## 1. Preface

This Appendix constitutes instructions for the preparation of an Environmental Management and Monitoring Plan (hereinafter: EMMP) for planning the construction and operation of the facilities under the provisions of NOP/37/H Receipt and Treatment of Natural Gas from Offshore Discoveries to the National Transmission System. These instructions are based on the environmental impact studies done in the context of NOP/37/H.

The Plan shall be comprised of documents, each of which relates to a defined area of the environment, in accordance with the instructions in this Appendix. Each of the EMMP documents shall contain an explanation and a detailed description of the project and how the planned development that the licensee is advancing in the area of the Plan will be integrated into the project as a whole.

The EMMP shall contain provisions and guidelines regarding the steps that must be taken as of the planning stage, in order to reduce the hazards of gas treatment, including the means, methods and mechanisms for implementing such steps<sup>1</sup>. The guiding principle is that it is necessary, wherever possible, to avoid negative impacts on humans, nature and the environment, as a result of current operations and/or of accidents, and to minimize such. That is via proper planning, the choice of chemicals and materials, operation and maintenance strategies, and monitoring.

The principles of operation and the guidelines regarding the environmental aspect of the gas treatment project are based on the existing and accepted environmental policy and standards, including requirements of:

- \* Statutes, standards, provisions and conditions set by the appropriate authorities in Israel.
- \* The stipulations of financing entities (if any).<sup>2</sup>
- \* The stipulations, standards and policy of the Licensee.
- \* Undertakings made during the consultation period.
- \* International standards and provisions which may be updated from time to time.

Updated standards must be relied upon unless otherwise decided and it is necessary to note which standards the advancement of the planning and development was based upon. Actions under other acceptable standards shall be effected only after receipt of the consent of the Ministry for Environmental Protection.

Use of the best available technology (BAT) will be the guiding principle, with the aim of increasing the advantages of the project and adopting criteria for procedures acceptable in the West for all components of the project.

The practice of implementation of EMMPs is acceptable, implemented and well-known around the world, inter alia in work of this kind relating to gas facilities, and the guidelines set out below are based on international experience and knowledge in similar projects.

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<sup>1</sup> This requirement accords with the requirement in the guidelines for the environmental impact survey to the effect that the Environmental Management and Monitoring Plan must contain, inter alia, an action plan for the prevention and treatment of leaks (with an emphasis on cooperation between the various persons, including civilian and military systems), and guidelines regarding the various monitoring systems (air, hazardous materials, seawater, etc.), which must be constructed and operated, including details of the emergency procedures in the event of fire, leak or emission of contaminants into the environment. The Environmental Management and Monitoring Plan must comply with this requirement in full.

<sup>2</sup> Where international financing entities take part in the financing of a gas treatment project, they might require compliance with their own specific standards as a condition of receipt of the financing.

The environmental instructions in the EMMP must include, at the very least, the requirements set out below, and additional requirements, if any, by the Natural Gas Licensing Authority and the Ministry for Environmental Protection.

## **2. Environmental Management Framework**

Environmental management of the entire project, with an integrated view of the onshore and offshore treatment facilities, is considered to be an integral part of the system of managing the project. Therefore, an efficient environmental management system must be set up in order to ensure that protection of the environment is of supreme importance throughout the lifetime of the project.

As background for the submission of the EMMP documents, the entrepreneur must set out how the environmental management system will be set up to address each of the EMMP documents and to integrate them into the environmental management and monitoring system. The environmental management system will show how the environmental requirements are set, planned, implemented, documented, and where necessary, updated, such as the “Plan-Do-Check-Act” (PDCA) cycle in ISO 14001.

The environmental management system must be developed in accordance with ISO 14001 or some other identical standard, and it must include the following components:

- \* Requirements and criteria for environmental functioning.
- \* Planning of an environmental management system
- \* Checking of performances
- \* Verification of performances
- \* Constant improvement of the process
- \* Collection of data and experience

The Environmental Management and Monitoring Plan and any other auxiliary environmental management plans must constitute an integral part of the environmental management system, and must be implemented in the project management system.

The EMMP shall serve as a tool for managing impacts, including dealing with unexpected outcomes or events. Emphasis must be placed on prevention or control of impacts at the time of their occurrence. There are six main stages to this process:

- \* Implementation of measures for the reduction of hazards at the correct time, manner and place.
- \* Monitoring of impacts that are expected to be significant.
- \* Assessment of the efficacy of the measures for reduction of hazards, with an emphasis on actions not tried in the past, or on innovative technology.
- \* The taking of immediate steps where impacts threaten to exceed the environmental standards, to harm protected or designated territories, etc.
- \* Updating the instructions for the implementation of measures to reduce hazards in accordance with the conclusions of previous stages.
- \* Update of the monitoring plan from time to time on the basis of the monitoring findings.

Responsibility for implementation of the EMMP rests on the licensee.

Unexpected events must be prepared for, both by preparing appropriate shelf plans and by periodically drilling them. The shelf plans will include real time reporting to the relevant supervisory authorities, and actions with external authorities and entities in order to deal with the incident. These plans will be updated where necessary.

The Licensee shall define roles, areas of responsibility and powers for the purpose of implementation of the EMMP.

### **The Environmental Management and Monitoring Plan (EMMP)**

The EMMP documents set out the guiding principles for the environmental management and monitoring of all components of the natural gas treatment facilities during the stages of construction, operation and dismantling. The EMMP documents must contain a response to questions and requirements relating to the project as a whole. In addition, each of the EMMP documents must contain, where necessary, a link to the specific environmental management documents and/or other documents which jointly constitute the environmental management framework for the gas treatment project.

Monitoring constitutes an integral part of the environmental management plan and ensures its efficiency. The purpose of monitoring is to ensure realization and to illustrate the efficiency of the Plan, and thereby to make it possible to execute the components of the plan at the right time. There are several goals of monitoring:

- \* Strict compliance with the management instructions as defined in the EMMP.
- \* Follow-up of performance of the actions described in the monitoring Plan.
- \* Assessment of the efficiency of the actions taken – did the steps achieve the desired result in terms of prevention or reduction of the environmental impacts.

If exceptions or other deficiencies come to light during the course of monitoring, the person responsible must formulate and plan additional steps.

### 3. Evaluating Risks and Determining Means to Prevent or Reduce Impacts

The environmental management plan (EMMP) will detail the means for reducing damages for actions that create environmental impacts considered as undesirable or unacceptable. Unacceptable impacts should always be prevented or reduced to acceptable levels. For the purpose of classifying severity, the license holder will prepare and present a matrix of the risks for environmental impacts and safety risks for approval by the competent authorities, in accordance with the example in Figure 1.

Degree of severity	Ramifications				Probability (in rising order)			
	Health	Property	Environment	Public image	A	B	C	D
					Unlikely (remote chance)	Low probability (low chance)	Periodic (possible)	High probability (likely)
					Occurred in the search and production industry	Occurred in the operating company	Occurred several times a year in the operating company	Occurred several times a year on the site itself
<b>Risks Matrix</b>								
0	No injuries	No damage	No impact	No impact	Management for ongoing improvement			
1	Slight injury	Slight damage	Slight impact	Slight impact				
2	Moderate injury	Moderate damage	Moderate impact	Limited impact	Does not meet threshold conditions			
3	Severe injury	Local damage	Local impact	Substantial impact				
4	One fatality	Serious damage	Serious impact	Severe national impact	Taking steps to reduce risks	Does not meet threshold conditions		
5	Several fatalities	Severe damage	Severe impact	Severe international impact				

**Figure 1: Example of a Risk Matrix for Classifying the Severity of Environmental Impacts**

In the framework of the EMMP, the following information should be detailed for each action or activity in the facility or during the process of its establishment liable to influence the environment:

- Description of the action or activity and the accompanying impact
- Description of the means (actions) for reducing the damage to be taken by the license holder or the contractors
- Definition of competency ensuring full implementation of the necessary actions
- Timetable for performance of the actions
- Parameters to be monitored in order to ensure the effectiveness of the actions
- Standards to be met
- Monitoring in order to ensure that the actions for reducing the damage were implemented fully or that additional actions are required
- Documenting the actions and reporting after their completion

The EMMP will be prepared in such a manner that it can be summarized by means of tables such as the example in Table No. 1 below.

**Table 1: Means for Reducing Environmental Damages**

<b>Action and impact</b>	<b>Means for reducing damage</b>	<b>Authority</b>	<b>Timetable</b>	<b>Monitoring, documentation, and reporting Including detailed parameters</b>	<b>Ongoing actions</b>

### **3.1 Framework Conditions – Implementation of BAT**

Implementing best available technique (BAT<sup>3</sup>) constitutes a guiding principle for minimizing environmental impacts. The following are details of the issues for

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<sup>3</sup> BAT is detailed in item 2 and appendix D of Directive 96/61/EC of the European Council (IPPC Directive).

which the relevant best available technique should be implemented and included in the analysis of options:

- Prevent accidents and reduce the ramifications on the environment as much as possible
- Consumption of raw materials (including water), their characteristics and energy efficiency
- Prevent or minimize the overall impact of emissions on the environment and the risks thereof
- Characteristics, impacts, and scopes of relevant emissions
- Need to prevent damage to natural resources and biodiversity in onshore and offshore environments
- Use of waste-reduced technology
- Use of less hazardous materials
- Increase the return and recycling of materials and waste, insofar as possible
- Use operating processes or methods tried successfully on an industrial scale
- Use innovative technologies and technological improvements
- Period of time required for implementation of BAT

## **4. Details of Environmental Issues and Procedures**

### **4.1 General**

Reducing anticipated negative impacts during the project's establishment and operation will be effected by taking actions that can be classified as follows:

- Preventing or minimizing impacts prior to their occurrence by means of restricting the scale or timing of the action and its implementation.
- Preventing or reducing the impacts over time by means of proper maintenance and/or the preparation of plans for emergencies liable to occur during the course of the project.
- Handling impacts by means of rehabilitation or restoration of the affected environment.
- Compensating for impacts by means of an equivalent, consistent, or identical replacement to the environmental damage.
- Increasing beneficial impacts by means of additional special actions.

The following are details of the main issues, detailing for each issue instructions to be drafted, defined, and included in the EMMP, as well as additional instructions according to the findings and recommendations of the environmental impact survey.

### **4.2 Emission of Pollutants into the Air**

#### **4.2.1 General**

Emission of pollutants into the air includes in particular carbon dioxide (CO<sub>2</sub>), Nitrogen oxides (NO<sub>x</sub>), methane, and non-methane volatile organic compounds (NMVOC). Emissions from combustion engines will meet the requirements of the Clean Air Act regarding emission values and the regulation process established in the law.

Smaller engines will meet the emission values detailed in Ta Luft 2002, in accordance with ministry policy, and best available technique (BAT) will be used, or any other updated standard as adopted by the Ministry of Environmental Protection. The EMMP will prefer planning approaches and technologies that will reduce the emission of pollutants into the air for the construction phase and the operations phase, with an emphasis on reducing the emission of pollutants as part of the planning process and by means of

increasing energy efficiency in accordance with the content of Section 4 above.

#### **4.2.2 The Construction Works**

During the construction there are unique processes that cause emission of pollutants into the air. The EMMP will address known measures for reducing air pollution nuisance, and these measurements will be adopted during the course of the construction works with the goal of reducing the emission of pollutants into the air.

In areas where nuisances are liable to be caused, the EMMP will include means for minimizing the nuisances by adopting one or more of the existing means to be approved by the supervisor in the Ministry of Environmental Protection, such as: directing vehicular traffic to planned travel routes only, restricting their travel in the site area, supervising the discharge/disposal of material, rinsing tires, and covering earth piles with sheets.

#### **4.2.3 Energy Management**

The EMMP will establish monitoring and analysis procedures for the electricity and heating requirements of the various systems throughout the life of the facility and for the energy sources, as a means of reducing energy consumption and increasing the efficiency of electricity production and use, with the goal of reducing the emission of pollutants into the air.

The EMMP will include a summary of the planned measures for increasing energy efficiency and will summarize the details in the manner shown in a table according to the example of Table 1.

- The EMMP will detail methods for reducing energy use and restricting rates of emission of pollutants from energy sources using the best available means.

#### **4.2.4 Point source Emissions**

##### **4.2.4.1 Reducing the Emission of Pollutants**

The EMMP will determine means ensuring that during the use of combustion equipment, such as gas turbines, engines, and boilers, measures are to be adopted that reduce as far as possible the emission of pollutants in general and NO<sub>x</sub> in particular.

##### **4.2.4.2 Flaring and Venting**

The EMMP will determine the planning of the system in such manner as to reduce the need for flaring or venting. Emission gases

are to be flared rather than released in order to reduce the emission of greenhouse gases (GHG) into the air, provided that this action does not deviate from the safety requirements. The facility will include a system for recycling emission gases (FGRU – flare gas recovery unit) preventing the emission of gases in a routine situation.

#### **4.2.4.3 Storage and Movement of Liquids**

The EMMP will determine the planning of offshore and onshore storage terminals and loading systems for minimum emissions of volatile organic compounds (VOC).

#### **4.2.5 Fugitive Emissions**

Fugitive emissions and cold vents are all hydrocarbon gases (CH<sub>4</sub> and NMVOC). The principal sources of these emissions are:

- Leaks from valves and flanges.
- Emissions from release systems under atmospheric pressure (if any).
- Emissions from various diffuse systems, such as from the extinguishing flare.

The EMMP will determine the planning of the system in such manner as to minimize the emission into the air of hydrocarbon gases from the various sections. Gases will be stored or returned into the system, if the pressure level and safety considerations permit this. The EMMP will determine the manner of documenting deviations in technical, economic, and environmental aspects. The EMMP will undertake a selection of the valves, flanges, and seals based on proper considerations in order to reduce gas leaks and fugitive emissions and means to processes leaks of steam from containers and vessels.

#### **4.2.6 Summary of Planned Means to Reduce Emissions**

The EMMP will include details of the planned means to reduce emissions and a summary of the details in tables such as Table 1 above.

The EMMP will be based on a model for dispersal of pollutants into the air adapted to the proposed development works and to the proposed development as detailed, in accordance with instructions to be given by the Ministry of Environmental Protection.

The planned means in the EMMP for the reduction of emissions required in the facility will include, among other aspects, implementation of the following instructions:

#### 4.2.6.1 Integration of Technologies to Reduce Emissions from Flares

- Use of technologies for recycling emission gases in order to reduce and prevent emissions from the flare – FGRU.
- Use of technologies to reduce emissions from facilities including the combustion of fuels (liquid or gas).
- Restriction rates of emission from all facilities emitting combustible gases in accordance with the rates of emission in the standards accepted by the Ministry for Environmental Protection and adopting means to reduce the best available means for reducing emissions.

#### 4.2.6.2 Use of Technologies to Reduce Fugitive Emissions

- The EMMP should detail the manner of reducing fugitive emissions from equipment and joints in the pipelines.

### **4.3 Discharges into the Sea**

Discharges into the sea may include produced water, as defined in the NOP, drainage water, cooling water, sanitary sewage / gray water, and leachates from inspection processes, drainage, and the initial use of pipelines.

The objectives are:

- To prevent the discharge of the most hazardous materials in terms of the properties of the materials.
- To prevent or reduce discharge of less hazardous materials.

If materials are discharged, the environmental impact must be evaluated in accordance with the proposed development using the models authorized by the Ministry for Environmental Protection for examining oil leaks and offshore oil, fuels, and toxic or environmentally hazardous materials, spills events. According to the findings of these models and the conclusions emerging from their analysis, a plant-wide contingency plan/OSRP is to be drafted for incidents involving the leakage of fuel and oil and the EMMP should be updated accordingly.

The goal of the EMMP is to reduce the environmental risk from these discharges. If additives with potential to be discharged into the sea are to be used throughout the life of the project, the most environmentally-friendly options should be used. Regarding all discharges into the sea, the EMMP will include the board's authorization of the granting of permits as stated in the Prevention of Sea Pollution Law (Placement of Waste), 5743-1983.

#### **4.3.1 Treatment of Chemicals / Leaks**

The EMMP will include an action plan for various scenarios (including offshore accidents) and means to be adopted in the event of leaks of oils and other materials, including procedures for handling leaks with timetables for action.

The plan for responding to different scenarios involving leaks of liquids into the sea will relate, among other aspects, to the results of models for forecasting the fate of these materials (in various meteo-oceanographic situations). The plan will be drafted in accordance with Ministry for Environmental Protection guidelines.

#### **4.3.2 Pressure Test Water**

The EMMP will detail the expected composition of water during initial operation of the system and the manner of disposal of pressure test water. A permit is to be obtained for its discharge into the sea in accordance with the relevant laws.

#### **4.3.3 Summary of Planned Means for Reducing Discharge into the Sea**

The EMMP will include a summary of the planned means for reducing discharges into the sea and will summarize details in tables according to the example of Table No. 1 above, with reference to the relevant information in the EMMP and in the required technical documents.

The EMMP will include the detailed actions to be undertaken in accordance with the findings of the required complementary models for dispersion of pollutants and the conclusions derived therefrom.

### **4.4 Discharges and Prevention of Leaks into Soil, Groundwater, and Surface Water**

It should be ensured that only unpolluted surface water is discharged outside the receiving terminal.

The EMMP will include details of the planned means for preventing discharge into the soil, including in accordance with the following instructions:

#### **4.4.1 Prevention of Soil Pollution in the Construction Phase**

4.4.1.1 Preparing an Environmental Hydrological Document for the Worksite

4.4.1.2 Details of means for protecting the soil and groundwater both in the sites and in pipelines cross-sections, such as sealing operational zones against permeation of water, installing containments under equipment containing hazardous materials, etc.

4.4.1.3 Details of means for protecting pipelines against leaks to the grounds in areas of which the pipelines passage through a protective radius zone.

#### **4.4.2 Preventing Soil Pollution during the Routine Operational Stage**

4.4.2.1 Processing Chemicals

The EMMP will detail –

- Planning of storage facilities for chemicals to reduce the risk of leaks.
- Procedure for handling leaks.
- Means for collecting and removing hazardous waste that cannot be recycled or returned to a designated container.

The means proposed in the EMMP must meet the valid requirements at the time regarding the processing of chemicals.

4.4.2.2 Processing leachates

The EMMP must present the manner of processing of leachates and gray water.

4.4.2.3 Monitoring Systems to Prevent Leaks

The EMMP must detail:

- The systems for controlling pressure on the pipelines and the facility components.

- A plan for detecting leaks by means of continuous measurement of engineering parameters in the pipelines (flow rates, pressures, etc.).
- A plan for periodic examinations of the offshore and onshore pipelines.

#### **4.4.3 Preventing Soil Pollution in Localized Areas**

##### **The EMMP will address localized soil pollution as follows:**

4.4.3.1 In area cells 203-205 (the Meretz wastewater treatment plant area) a historical survey will be undertaken to examine pollution of the soil and groundwater in the wwtp area. In accordance with the survey results and the authorization of the Ministry for Environmental Protection it will be decided whether it is necessary to implement a soil/water survey and to take subsequent actions,.

4.4.3.2 In area cells 200-202 (Hagit site) a detailed hydrogeological survey will be undertaken in a radius of 500 m from the facility. The survey will include drillings to locate shallow groundwater levels and the installation of observation pipelines for monitoring the levels in order to evaluate the risk to the groundwater level, following damage to underground water carriers. Monitoring will be undertaken whenever work is executed below the natural surface and will continue for one year, or through the end of the hydrological year following completion of these works, whichever is the later. If damage is caused to the filling aquifer of the wells and to moist habitats as the result of the execution of the plan, an interface for ecological-hydrological compensation will be arranged to revive the flow regime in the appropriate quantities and qualities. All this will be undertaken in coordination and authorization of the Nature and Parks Authority and the Drainage Authority.

4.4.3.3 In the pipeline strip in the section to the north of Emek Hefer Industrial Zone a detailed hydrogeological survey will be undertaken to examine the impact of the expected works on the forest pool and to present solutions for minimizing possible damage.

4.4.3.4 In the framework of coordinating infrastructures, special protective means will be established for the liquefied hydrocarbon and glycol lines within the overlap area with protective radius C of Carmel Coast drilling 2, or alternatively

the relocation of drilling, in coordination and the authorization of the Ministry of Health, Mekorot, and the Water Authority.

4.4.3.5 The EMMP will also address the following aspects of the onshore receiving terminals, among others:

A. All tanks will be installed in impervious containers (dayks) such as concrete coated with a leak-resistant material suitable for materials held in the base or an HDPE canvas with a width of 2.5 mm. That is to prevent permeation of the materials held therein

B. For condensate containers, double containing (a double floor) is also to be installed.

C. MSDS and quantities to be held in the facility are to be provided, for all hazardous materials and chemicals that will be held at all times.

D. In addition to the “working liquids of engineering tools,” there are additional liquids in the treatment facility that have the potential to pollute soil and are liable to do so, such as condensate, anti-freeze materials, and hazardous materials, and overflow is to be trained and rinse off from the areas collected and treated.

E. Response procedures are to be prepared for emergency events of various types ensuring a rapid response to pollution and incalculable as well as training, and exercise system. These are to be presented to the Prevention of pollutants from fuels coordinator in the Industrial wastewater division of the Ministry for Environmental Protection.

F. If use is made of water cannons during a leak in a manner liable to pollute the soil, than soil surveys are to be undertaken in accordance with the instructions of the Industrial wastewater, Fuels and Polluted Soil Division in the Ministry for Environmental Protection.

G. Drainage systems are to be planned with appropriate inclines, as well as a collection system for leachates and polluted surface water.

H. The facilities are to be covered, as far as possible and clean surface water separated from polluted water.

Polluted surface water and leachate are defined as “industrial wastewater.”

I. Systems with commands are to be installed for the closure of valves, insofar as relevant, for the pipelines in the event of a leak incident.

J. Monitoring systems are to be installed for the detection of leaks (pressure control system for the pipelines and other components with alert on an unplanned fall in pressure) and ongoing monitoring of flow rates and pressures in the pipelines at the highest existing level of sensitivity with BAT.

K. Checks of sealing and propriety are to be undertaken for all containers and pipelines at a frequency of once every three years.

L. Monitoring:

1. In the non-saturated media, monitoring means are to be installed, as well as monitoring wells for groundwater in the facility.

2. Alongside residential homes and sensitive uses at a distance of less than 100 m from the supply pipelines, means are to be installed for the active monitoring of soil gas.

#### **4.4.4 Summary of Planned Means for Reducing Leaks into the Soil, Groundwater Pollution, and Processing of Surface Water**

The EMMP will include details of the planned means for preventing leaks into the soil, groundwater pollution, and processing of surface water and will summarize the details in tables in accordance with the example of Table 1 above.

### **4.5 Safety and hazardous materials**

#### **4.5.1 Safety**

All cautionary measures must be taken to avoid incidents that will have an effect on the environment and to reduce their impact. The EMMP shall include a risk assessment using a method such as a Hazard & Operability Study (HAZOP), quantitative risk assessment (QRA) and similar standard techniques in the sphere of risk assessment in general, and fuel products production and processing

in particular. Additionally, the license holder must have an emergency plan.

With regard to an onshore pipeline, compliance is required with the criteria for personal and general safety as required under I.S. 5664 Part 2. If necessary, based on the criteria of the standard, a QRA must be conducted to ensure compliance with the individual risk criteria of  $1e-6$ /year and with the standard group risk criteria of the Ministry of Environmental Protection when the survey is conducted.

#### **4.5.2 Hazardous materials**

The use of hazardous substances must be reduced as far as possible, and priority should be given to less dangerous materials to the extent feasible. When hazardous materials are used, one must use the best available techniques to reduce the risk to humans and the environment. Compliance with statutory requirements regarding the handling of hazardous substances is mandatory.

Among other things, the facility must meet the conditions set forth in the Hazardous Substances Law 5753-1993, including conditions to avoid a loss of containment (for example, by storing materials in containment pallets approved by the Ministry of Environmental Protection), and the conditions set forth in the Business Licensing Regulations – Hazardous Industries, 5753-1993, including a plant package and emergency procedures, keeping skills and trained personnel to handle an emergency incident, and proper emergency equipment for handling such incidents.

Furthermore, the facility must observe separation distances from public receptors at all times, in accordance with the guidelines of the Director-General of the Ministry of Environmental Protection in the document entitled, “Director-General’s Circular: Policy for Separation Distances from Stationary Sources of Risk” issued in June 2011, or as updated at the time of the building permit application is submitted. Additionally, and after the facility has met the separation distances, the EMMP shall also include a detailed risk management plan as set forth in the 2005 “Guidelines for Managing Risks from Stationary Sources” of the Ministry of Environmental Protection, or any document that updates or replaces it.

Compliance with relevant international standards must be ensured, such as the Seveso II Directive – where the requirements of the Ministry of Environmental Protection are, for the most part, identical to those set forth in this standard.

The Business Licensing Regulations (Hazardous Industries), 5753-1993 require annual reports that include:

- A description of the types of substances, their quantities and how they will be used;
- Details of changes in the manufacturing system;
- Storage of materials: Storage conditions, types of packaging, means for separating substances, maintenance of storage facilities and means of access.
- Safety measures on site, including warnings, neutralization means, protective clothing and equipment, fire detection and firefighting systems.
- Annual emissions into the environment, including effluents and their composition.

Incidents and malfunctions that took place. – The EMMP shall state the means for minimizing risk, including:

- Installing means for detecting gas leaks, such as a pressure control system, ultrasound detectors, gas detectors with two levels of warning – to warn of a gas leak at Action Level LEL 10%, and an action level that activates engineering means to control the gas leak.
- Installing devices to control gas leaks, such as ESD (emergency shut down) valves, releasing gas to a flame and/or vent, water canons, means for collecting and handling VOC gases, and so on.
- Installing means to prevent the spill and dispersal of liquids, such as storage containers for liquids in accordance with relevant regulations and authorities, level gauges to warn of excess levels in storage tanks, containment enclosures, excess flow valves (EFV), use of specially-designed pipeliness, such as the smart hose to prevent spills when unloading chemicals from containers or when loading containers.
- Means to prevent fires and the spread of fires, such as: foam-based firefighting systems connected to IR detectors in the condensate containment enclosures, automatic firefighting systems for the condensate containers, foam cannons around containers of flammable liquids, water spray cooling systems on the condensate

containers, use of devices to prevent static electricity and/or avoid electrostatic discharge in accordance with I.S. 60079 Part 32 and NFPA 77, or the standard defined by the Natural Gas Authority, categorizing the site by explosive limits according to the relevant standards – ATEX, NEC – and the use of explosive-protection gear according to I.S. 60079 or a standard defined by the Natural Gas Authority.

- Employing means to prevent ignition from random sources on the street, such as a traffic light or obstacle on the roads near the site at a distance of at least 1 km. from both sides of the site that can be operated manually, and using gas detector warnings at the second warning level.
- Preparing a plan for the treatment of H<sub>2</sub>S, in cases where the quantity of H<sub>2</sub>S in the reservoir exceeds 8 ppm.
- Ensure receipt of a poisons permit for hazardous substances at the facility, and compliance with the conditions of the poisons permit as set forth by the relevant authorities including the Ministry of Environmental Protection, Home Front Command, firefighting service, Regulations for Business Licensing of Hazardous Industries, etc. These conditions include, among others, containment pallets in accordance with the requirements of the Ministry of Environmental Protection and if necessary, in accordance with the technical specifications of the Home Front Command, emergency procedures and the factory file for handling emergency incidents relating to hazardous materials and fire, a risk assessment as required by the fire department; and by compliance with the guidelines of the fire department for preventing fires and handling fires, for example, detectors and water and foam canons, and establishing and training emergency teams.

#### **4.5.3 Summary of the means for reducing safety hazards and hazardous materials**

The EMMP shall include a summary of the means planned to manage and reduce risk, both onshore and offshore, and will summarize the details as shown in Table 1, above.

#### **4.6 Means for reducing geological and seismic risks**

The EMMP shall determine the design of the various facilities on the basis of geotechnical reports and site response reports, so that the facility's design is based on seismic and geological-geotechnical data that are suited to the site's conditions.

##### **Instructions for the building permit stage – general.**

The EMMP shall include and set forth:

- Automatic and manually-operated mechanisms (for example, valve shut off in systems with hazardous substances) in the facilities' planning that will respond to advance warnings of earthquakes or tsunami. Local warning devices will be installed, taking into consideration future connection to national earthquake and tsunami warning systems.
- Maximum design in the event of earthquakes should be for an earthquake with a return period of at least 2500 years in order to comply with the Ministry of Environmental Protection's guidelines for the seismic planning of facilities with hazardous materials.

##### **4.6.1 Additional conditions for receiving terminals and infrastructure strip**

- The EMMP shall include a land acceleration survey in accordance with the guidelines of I.S. 413, as this shall apply to the different parts of the facility, or those of the relevant international standard. The seismic design of the facility or its relevant parts shall be based on the findings of the survey and will be presented as part of the EMMP.
- The EMMP shall include a subsoil assessment to define areas of the plan where there is potential for liquefaction. In these areas the EMMP shall define the means for preventing damage due to liquefaction, such as using flexible connections and methods for improving soil characteristics to reduce / remove the potential for liquefaction.
- Should it arise during the subsoil assessment that conditions are such that there is a potential for landslides (among others, in the wake of artificial changes that have been planned / executed on the soil surface), the EMMP shall define suitable means according to local conditions.

#### **4.6.2 Additional conditions at facilities and offshore pipelines:**

In order to prepare the engineering planning of the facilities and execute the EMMP, the following surveys shall be performed and guidelines should be included according to accepted standards, and the following requirements shall be met:

A. A specific land survey of seismic parameters. The survey shall be carried out based on the guidelines of ASCE-7-05, Chapter 21 (Appendix E of Amendment 5 of Standard 413), while meeting the following requirements.

- Seismotectonic analysis to determine the seismic load on the bedrock as a result of a maximum considered earthquake. Such earthquakes (considering return period and recurrence interval) are considered in the relevant codes for building offshore platforms. Planning in case of the maximum considered earthquake must be one with a return period of at least 2500 years in order to comply with the guidelines of the Ministry of Environmental Protection regarding seismic planning of facilities with hazardous substances.

- Amplification factors, response spectrum and degree of sensitivity to liquefaction will be taken into account on the basis of the geotechnical characteristics measured during the soil assessment.

B. Seismic planning must comply with the provisions of the ISO / API codes for platforms and/or the detailed instructions set forth in DNV-OS-C101 – Design of Offshore Steel Structures, General (using the LRFD method).

C. Using dynamic 3D models of seismic load on the platform, taking into consideration dynamic changes in the geotechnical stability of the soil during loading (for example, liquefaction).

D. Soil assessment and surveys (e.g., geophysical survey, test bores) to characterize and map out the layer of methane gas known to appear in various locations in the shallow subsoil along the Israeli continental shelf, and related land failure. The foundations of the offshore platform must be designed such that that will be able to withstand loads resulting from these phenomena, if any, at the development platform.

E. Live lines and emergency systems must be designed according to conservative seismic parameters. Their components must be able to withstand, without failure, a seismic level load with a repeat period of 2500 years.

F. The platform design must take into account loads as a result of a tsunami.

G. The soil assessment along the pipeline trench must be planned such that it will be possible to identify any discontinuity. If any potential for discontinuity is found, suitable mechanisms must be installed on the pipeline to meet the expected static / dynamic distortions.

H. Non-structural components and elements that are not subject to I.S. 413 Part 2 shall be designed according to the international standards mentioned in the Israeli Standard, and the default shall be the American standard ASCE / SEI 7-10.

#### **4.6.3 Summary of planned means to reduce geological and seismic risks**

The EMMP shall include a summary of the means being designed to handle and reduce geological and seismic risks, both onshore and offshore, and will summarize them as described in Table 1, above.

#### **4.7 Waste**

The term “waste” includes waste from the production process, consumer trash, scrap metal, used chemicals, etc. This waste is defined as hazardous or non-hazardous, depending upon its composition and source.

A waste management plan must be prepared for the treatment and removal of waste, which include a definition of the various types of waste, separation into hazardous waste and non-hazardous waste, separate collection, treatment, accumulation, storage, transportation and removal.

The EMMP shall present means for reducing the production of waste and maximizing the scope of recycling, reprocessing and reusing. Waste treatment measures should be carried out in the following order: Reuse – useful application – burning and heat recovery – burial at a controlled site.

When the flow of waste is defined as hazardous waste – the requirements set forth in Section 5.7.2 below must also be met.

The EMMP must define criteria for categorizing waste in accordance with the criteria of the Ministry of Environmental Protection (for example,

Business Licensing Regulations – Removal of hazardous waste, 5751-1990) and relevant international criteria (such as the UN's Orange Book). The EMMP shall set forth rules and procedures for the safe handling of all types of hazardous and non-hazardous waste and liquid waste, taking into account environmental, health and safety considerations and subject to statutory requirements.

#### **Summary of means planned to reduce hazardous and non-hazardous waste**

The EMMP shall include a summary of the means planned to reduce both hazardous and non-hazardous waste and will summarize these according to Table 1 above.

These types of summary tables will be prepared to coordinate requirements, instructions and actions – for the construction stage, operations stage and emergencies (including accidents).

### **4.8 Noise and lighting**

When planning the facility actions must be incorporated to reduce noise hazards, unnecessary underwater noise and lighting, and the steps to be taken to isolate these hazards must be detailed. Lighting should not be reduced if this contradicts safety or security considerations.

#### **4.8.1 Guidelines for reducing noise during the construction stage and during ongoing operations**

The EMMP shall include an acoustic document approved by the Ministry of Environmental Protection. This document shall include:

##### Guidelines on reducing the effects of noise in the onshore environment

- The acoustic document will include a list of the dominant sources of noise at the terminal.
- The noise criterion to be used in the acoustic document shall be an overall noise level of LAeq=40dB inside a residential building. This level includes all mechanical environmental noise sources to which the regulations apply.
- In any case where the noise levels calculated exceed the aforesaid criterion noise level, means for reducing noise so that it meets the criterion shall be presented.
- The acoustic document shall include time frames for performing works including details of the tools to be used at

each stage, the place where these will be used and the period of time they will be used in the area each day.

- The acoustic document shall include the acoustic characteristics of the tools that will be used at the site and expected noise calculations at each stage of work. When the works commence the contractor shall present documents indicating that all of the tools he plans on using meet the requirements of the Noise Prevention Regulations (Unreasonable noise from building equipment), 5739-1979.

- The level for the noise criterion for construction work is a value that is 20 dB higher than the maximum noise level defined in the provisions of the Noise Prevention Regulations (Unreasonable noise), 5750-1990 outside a structure. The licensee will be required to meet this noise level and take reasonable measures (for example, using quieter tools of the same type, use of portable noise barriers, etc.).

- The acoustic document shall include noise calculations for all of the work stages based on information regarding the tools, their location outside, period of time they will be used, noise barriers and dispersal of the noise.

- The noise level shall not exceed  $L_{Aeq}=85$  dB at a distance of 1 meter from the equipment (if it is believed this level will be exceeded, it will be necessary to consider the demand that the gas turbines be covered with an acoustic canopy).

- “Unusual operations” such as releasing gas through flare will be carried out only during the day, to the extent this is possible.

#### Guidelines for reducing noise when constructing the offshore facilities and pipeline

- The acoustic document shall include a list of the dominant sources of noise at the receiving terminals. The EMMP must details the means to be used to prevent injury to marine mammals and sea turtles, both during construction work and during the facility’s operation.

#### **4.8.2 Lighting**

The EMMP shall include a lighting plan based on photometric mapping that presents the dispersal of light around the facility, showing that the lighting is not excessive.

The plan must examine the dispersal of light outside the areas of the facilities and means to reduce and minimize its effects shall be presented, based on design principles coordinated with the National Parks Authority, including:

- Reducing the use of lighting, both in terms of time used and strength, to the extent possible.
- Focusing the lights towards the facility rather than outward, and ensuring that the light is not blinding by using full cutoff lights that are focused downward.
- Using lights with a short wavelength and narrow spectrum and avoiding, as much as possible, white light.
- Indicator lighting – using blinking lights with as short an interval as possible between flashes of light.
- Lighting the onshore gas terminals – if necessary, the possibility of using alternative means will be investigated to reduce the impact of the lighting, such as night vision cameras / detectors.

#### **4.8.3 Summary of means planned to reduce noise and lighting hazards**

The EMMP shall include a summary of the means planned to reduce noise and lighting hazards, using Table 1 as presented above, displaying the guidelines set forth above and the means for operating accordingly.

### **4.9 Landscape integration and restoration**

#### **4.9.1 Visual treatment – construction stage**

The EMMP should include a landscape document prepared by a certified landscape architect and supervised by an ecologist, that details the measures to be taken at the plan borders and beyond, in order to reduce the facilities' impact on the landscape (including valve terminals and the location of offshore platforms). The document shall include cross-sections and simulations, detailed instructions regarding finishing, use of flora, etc.

The landscape document shall address the following issues:

##### Landscape integration and reducing the facilities' visibility

The EMMP will include means for landscape integration and reducing the visibility of onshore terminals, *inter alia*, by making use of natural topography, batteries, finishing materials that

integrate well with the environment, burial underground, landscape camouflage using plants, etc.

#### Reducing landscape damage as a result of preparation works

The EMMP will examine and details the means for minimizing landscape damage. The detailed engineering planning for the Hagit site shall take into account the landscape damage that will be caused from exposing the chalk layers due to soil preparation works, and will investigate the best means for obscuring this, such as using finishing materials that will quickly form a natural patina and help integrate the exposed areas into the environment, using technologies to rehabilitate quarry walls such as spraying them with seeds of local plants, and designing the quarry walls with suitable inclines.

#### General guidelines to minimize damage when laying the pipeline

- Location of staging areas and temporary access roads should take into account landscaping and ecological considerations.
- Guidelines for minimizing damage to flora in the pipeline trench, including uprooting / moving trees only in the area of the pipeline trench and the work area.
- Guidelines to prevent damage as a result of vehicle traffic.
- Guidelines to preserve and replace the layer of topsoil in work areas and temporary roads.
- Guidelines for rehabilitating the work area, staging areas and temporary access roads.

Supervision of construction and landscape rehabilitation in the area of national parks and nature reserves shall be carried out by the National Parks Authority. Supervision of landscape rehabilitation in other areas shall be carried out by the relevant local board.

The licensing authority might decide on a professional body to supervise landscape rehabilitation works.

#### **Summary of the means planned to reduce the effects on the landscape, appearance and open areas**

The EMMP shall include a summary of the means being planned to reduce the effects on the landscape, appearance and open areas, based on Table 1 as presented above, and shall include the guidelines set forth above and how they will be met.

## 4.10 Natural assets

### 4.10.1 Construction stage

#### 4.10.1.1 Onshore environment

The EMMP shall address the following issues:

- Preventing damage to natural assets and ecosystems.
  - Means for rehabilitating natural habitats based on the ecological characteristics of the different areas.
  - Handling and monitoring the establishment of invasive flora along the pipeline route, including advance actions before work begins and long-term monitoring for five years, according to a plan to be coordinated with the National Parks Authority.
  - Hydrological assessment of the expected impact in Nahal Tut and the wells in the area (see more under Section 5.5.3).
  - To the extent possible, avoid using reinforcement cables at the facility near water reservoirs to prevent injury to birds.
  - Examine the option of an underground passageway for crossing the segment between Road 2 and the railroad tracks along the Mikhmoret route.

#### 4.10.1.2 In areas for landscape preservation, as marked on the plan blueprints

- The work area will be reduced to the minimum possible with the possibility of moving the alignment, with the flexibility permitted by the plan's instructions.
- The EMMP will include a survey of unique flora during the relevant season along the route of the works, and will also include guidelines for collecting bulbs and seeds of the unique species for future rehabilitation. A survey of adult trees will also be performed.

- Staging areas will be located only in the area of the infrastructure strips, to the extent possible. The EMMP will pay special attention to areas 230-232 and 255-256 (Hof Gedor reserve, the area of the dunes in Sharon park and the Nahal Alexander reserve), and guidelines will be defined with regard to temporary fences / signs for the work area to prevent damage to sensitive areas.
- In areas 232, 256 and 258 at the segment between Road 2 and the railroad track, the EMMP shall define guidelines such that new roads will not be built for supervising and monitoring the railway pipeline; rather the supervision along this segment shall be carried out on foot.

#### 4.10.1.3 Offshore environment

- To determine the final alignment of the pipeline corridor in the offshore environment, the EMMP shall include a survey of habitats on the sea floor to be carried out by an expert marine biologist with an emphasis on exposed rocky substrates. To the extent feasible, avoid placing the pipeline in areas of the exposed rocky substrate and/or adjacent to them.
- In order to reduce the risk of possible damage to the rocky habitat near the entrance to the Mikhmoret coast, examine the possibility of placing the pipeline exit point as far to the west as possible from the rocky area, if this is technologically feasible.
- When the pipeline is being placed avoid, to the extent possible, the placement of anchors in exposed rocky areas that serve as valuable habitats.
- The EMMP shall state that all material collected as part of excavating the offshore pipeline will be replaced as soon as possible.
- As relevant, the EMMP shall defined instructions regarding construction works so that they comply, to the extent possible, with the demands set forth in the “Environmental Guidelines for Carrying Out Offshore Works” published by the

Ministry of Environmental Protection and its updates.

#### **4.10.2 Preventing injury to birds**

- The EMMP shall define instructions to avoid, to the extent possible, placing aboveground cables near water reservoirs where birds might be injured. If these are set up, they must be marked in accordance with instructions of the National Parks Authority.
- With regard to offshore terminals, the EMMP shall instruct to reduce as much as possible the use of glass in the structure's outer layer. If glass must be used, it must be coated from the outside to prevent reflection.

#### **4.10.3 Summary of means to prevent injury to natural assets**

The EMMP shall include a review and summary of all the means planned to reduce damage to nature, based on Table 1. The EMMP will include instructions and guidelines relating to these and the means for their implementation.

## **5. Monitoring and tracking**

### **5.1 Content and approach**

As part of the EMMP the licensee must prepare a monitoring, tracking and reporting plan, to be approved by the Natural Gas Licensing Authority and the Ministry of Environmental Protection, in conjunction with the Ministry of National Infrastructures, Energy and Water Resources.

The monitoring plan prepared as part of the EMMP will examine the effectiveness of the guidelines included in the EMMP and compliance with all relevant contractual and/or legal obligations and requirements. The monitoring plan will include background data, monitoring during the construction stage, monitoring during the operations stage, and monitoring following the dismantling stage. Duration and periods of monitoring will be set by the Ministry of National Infrastructures, Energy and Water Resources and the Ministry of Environmental Protection. The plan will define requirements for documenting monitoring results and reporting these to relevant entities. In cases of deviations, the monitoring plan will follow up on the effectiveness of preventive measures and the means required in the management plan.

The monitoring plan and the results will be made public.

The monitoring report covering the level of performance and effectiveness of the monitoring plan on the basis of systematic data collection and analysis, will be sent to the competent authorities (Natural Gas Licensing Authority, Ministry of National Infrastructures, Energy and Water Resources, Ministry of Environmental Protection and other relevant authorities). On the basis of the results of these monitoring reports and with the approval of the aforesaid authorities, the licensee will take the necessary steps to ensure that the goals of the environmental policy, plans, processes and procedures are implemented correctly and are proving to be effective.

## **5.2 Parameters for monitoring**

The plan must describe the spheres and parameters to be monitored, including methods and frequency. Monitoring should be performed on emissions, hazards and effects. Monitoring of effects should be based on technology, scientifically valid, repeatable, and should rely on measurements that are repeated periodically regarding environmental changes so as to enable a comparison between the situation before the project and afterwards. Monitoring requirements must be formulated carefully in accordance with the SMART model, but avoid “over-monitoring” as the monitoring process is likely to be expensive, particularly in connection with ecological effects.

Some major issues that need to be considered include:

- Setting priorities for monitoring effects.
- Preparing a suitable monitoring plan for each effect identified.
- The expected time frame for each monitoring plan.
- Defining the entity that would handle the collection, comparison, analysis and interpretation of the data; if necessary measures should be recommended to prevent or reduce unwanted effects.
- Response plan in case the monitoring results deviated from permitted levels.
- Cost of executing the recommended monitoring plan.

### **5.2.1.1 Pipeline monitoring**

The EMMP will include tests along the onshore pipelines in hydrologically sensitive areas, such as protective radii and wells.

The EMMP should include instructions for periodically documenting the bathymetries along the underwater pipelines; reporting on unique morphological phenomena (exposed pipelines, development of ravines, etc.) along the pipeline or nearby; and reporting on any covering or protective action performed.

#### **5.2.1.2 Monitoring leachates from the facility**

The EMMP should include a plan for sampling leachates. The parameters being measured shall be approved by the Ministry of Environmental Protection on the basis of detailed plans and compliance with all the requirements and standards that are valid at that point in time, for example, the Public Health Regulations (Quality standards for effluents and rules for treating wastewater) 5770-2010, and according to the proposed Water Regulations (Preventing water pollution) (Farms and fuel tanks) 5764-2004, Section 21.A.

#### **5.2.1.3 Monitoring birds at marine installations**

The EMMP shall include a plan for monitoring bird migrations during the fall migratory period. The monitoring plan will include an assessment of the number of birds injured because of the facility, and will make necessary adjustments at critical times when bird mortality is high. The monitoring plan will be written on the basis on experience gather at similar offshore terminals around the world.

#### **5.2.1.4 Environmental monitoring**

The EMMP must include an ongoing monitoring plan for chemical and biological parameters, to be coordinated with the Ministry of Environmental Protection and the National Parks Authority, to measure environmental impacts. Furthermore, the EMMP will have to meet the monitoring rules set forth in the most recent version of the document entitled, "Guidelines for Marine Monitoring to Examine the Impact of Gas and Oil Production and Exploration Activity on the Marine Environment" published by the Ministry of National Infrastructures, Energy and Water Resources and the Ministry of Environmental Protection.

### **5.3 Reporting requirements**

The EMMP must define a format for reporting monitoring results in accordance with the requirements set forth in the law, the licenses and environmental monitoring system and monitoring management program. This is also valid with regard to advancing the activities and methods decided upon regarding their environmental effectiveness (that is, that the actual reduction of hazards corresponds with the projected reduction). If necessary, additional environmental aspects can be monitored if there are indications of risks or there is concern in this regard.

**Appendix 5:  
Antiquities Management Plan;  
Labor Management Plan; and  
Livelihood Restoration Management Framework**



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RECORD OF AMENDMENT			
REVISION	SECTION	PARAGRAPH	DESCRIPTION OF CHANGE

DOCUMENT HOLDS RECORD			
REVISION	SECTION	PARAGRAPH	DESCRIPTION OF HOLD

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## 1.0 BASELINE CONDITIONS

GEMS conducted a remote sensing survey of the Leviathan Field. The survey delineated 397 unidentified side-scan sonar contacts. Of these, 38 were interpreted to represent possible cultural resources. GEMS recommended implementation of a 305 meter archaeological avoidance or investigation via a Remotely Operated Vehicle (ROV) for these 38 sites. GEMS recommended implementation of a 31 meter shallow hazard avoidance for the remaining 359 contacts.

A desktop survey of known archaeological resources was conducted of the onshore connection for the Leviathan Project, as documented in the “Feasibility Study – Connecting the Leviathan Gas Field to the Main Transmission System” (October 2013). The area surveyed includes the Domestic Gas Sales Pipeline (DGSP), Domestic Condensate Sales Pipeline (DCSP), the Coastal Valve Station (CVS), and the Door Valve Station (DSV). The survey was conducted as part of Israel’s National Outline Plan 37/H Planning of Gas Treatment Facilities (TAMA 37/H). The desktop survey identified four archaeological “lots” (4403/0, 27628/0, 5930/0, and 39285/0) at Dor.

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## 2.0 AVAILABLE REGULATORY GUIDANCE

### 2.1 Israel’s Antiquities Law

Operations within Israel’s 12-mile territorial sea fall under the purview of Israel’s Antiquities Law (1978). If archaeological materials are located in Israel’s territorial sea, the law requires Noble notify the Director General of the Israel Antiquities Authority within 15 days of the discovery. The Antiquities Law defines an antiquity as:

- any object, whether detached or fixed, which was made by man before the year 1700 of the general era, and includes anything subsequently added thereto which forms an integral part thereof;
- any object referred to in paragraph (1) which was made by man in or after the year 1700 of the general era, which is of historical value, and which the Minister has declared to be an antiquity; or
- zoological or botanical remains from before the year 1300 of the general era” (Israel Antiquities Authority, 1978).

Any discovered antiquity immediately becomes the property of Israel and the operator must “discontinue the operations for 15 days from the date of delivery of the notification unless during that period he receives permission from the Director to continue the work” (Israel Antiquities Authority, 1978).

To contact the Director of the Antiquities:

Director General  
Mr. Israel Hasson  
Email: [ortal@israntique.org.il](mailto:ortal@israntique.org.il)  
Phone: 02-6204601

### 2.2 IFC Performance Standard 8

The principal international standard for the protection of cultural heritage is the IFC Performance Standard (PS) 8 (Cultural Heritage) (IFC 2012). The objective of PS 8 is to “protect cultural heritage from the adverse impacts of project activities and support its preservation...[and] promote the equitable sharing of benefits from the use of cultural heritage.” PS 8 defines cultural heritage as:

- i. tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values;
- ii. unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and
- iii. certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

PS 8 differentiates between replicable, non-replicable, and critical cultural heritage, which are defined as follows:

- Replicable Cultural Heritage: Defined as “tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures.

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Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.”

- **Non-replicable Cultural Heritage:** Includes “(i) cultural heritage [that] is unique or relatively unique for the period it represents; or (ii) cultural heritage [that] is unique or relatively unique in linking several periods in the same site.”
- **Critical Cultural Heritage:** Includes “(i) the internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation.”

The preferred mitigation measure for all cultural heritage impacts is avoidance. When this is not possible, PS 8 provides the following mitigation hierarchy (from preferred to least preferred) for replicable cultural heritage:

- Minimize adverse effects and implement *in situ* restoration measures;
- Restore the functionality of the cultural heritage in a different location;
- Permanent removal of historical and archaeological artifacts following national laws and internationally recognized practices by competent professionals; and
- Compensation for the loss of cultural heritage.

The removal of non-replicable cultural heritage should only take place if there is no technically or financially feasible alternative and the benefits of the project outweigh any heritage losses. The removal of critical cultural heritage should only take place in “exceptional circumstances” and after extensive consultation with affected communities and other stakeholders.

PS 8 also requires the development and implementation of chance find procedures. Chance finds are defined as “tangible cultural heritage encountered unexpectedly during project construction or operation,” and a Chance Find Procedure is defined as “a project-specific procedure that outlines the actions to be taken if previously unknown cultural heritage is encountered.” The requirement is a recognition of the fact that no survey, regardless of methodology, is sufficient to ensure that all archaeological resources are identified in a project area, and that there is therefore always the potential for the inadvertent discovery of cultural heritage during ground-disturbing construction or operational activities.

According to the IFC Guidance Note 8, the Chance Find Procedure should “include record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds. It is important that this procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority, as well as any agreed consultation procedures. The procedure should be incorporated into the Management Program and implemented through the client’s Environmental and Social Management System.”

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### 3.0 ROLES AND RESPONSIBILITIES

This CHMP identifies the requirements, processes, and procedures for alignment with the cultural heritage laws and guidelines outlined in Section 4. Noble Energy has the ultimate responsibility for AMP compliance, but responsibilities regarding the Cultural Heritage Program (i.e., AMP implementation) are divided between Noble Energy and Contractors. This section outlines the responsibilities of both regarding the protection of cultural heritage.

#### 3.1 Noble Energy Roles and Responsibilities

Noble Energy’s roles and responsibilities are as follows:

- Include cultural heritage in the Leviathan Project’s Environmental Impact Assessment process;
- Involve cultural heritage specialists in preconstruction planning;
- Design the Leviathan Project components to avoid or minimize impacts to cultural heritage;
- Obtain cultural heritage permits in advance of construction, if required, and comply with permit restrictions or requirements;
- Develop and implement a Chance Find Procedure (outlined in this plan);
- Verify chance finds made by Leviathan Project personnel;
- Notify the IAA of verified chance finds and coordinate with them regarding treatment (legally required only for chance finds found within Israeli territory);
- Issue cultural heritage related stop works, permits to resume activity, and other related instruction to Contractors;
- Develop and implement a Cultural Heritage Training Program (outlined in this plan) to include cultural heritage and chance finds awareness and Chance Find Procedure training for relevant Leviathan Project personnel;
- Develop and implement a Site Protection Program (outlined in this plan) to include the installation of permanent marking around cultural heritage sites outside of but near the Leviathan Project area; and
- Monitor and verify Contractor compliance with this AMP and other cultural heritage related documents.

#### 3.2 Contractor Roles and Responsibilities

Contractor roles and responsibilities are as follows:

- Follow the guidance in this AMP, Leviathan Project EIA commitments, Israeli laws and regulations, and international standards for cultural heritage;
- Stop work in the case of a chance find and report to Leviathan Project site management and cultural heritage specialists (Noble Energy takes responsibility for government notification);
- Enforce any cultural heritage related stop works or activity restrictions;
- Ensure that relevant personnel receive training on the identification of chance finds and on the Chance Find Procedure (outlined in this document);
- Participate in Leviathan Project meetings where cultural heritage issues will be considered; and
- Comply with instruction aimed at minimizing impacts to cultural heritage sites and construction delays (special construction techniques or machinery, special site protection measures).

Contractors will recognize that where documents such as this AMP specify the actions and responsibilities of the Leviathan Project, the Contractors will generally be bound to the same requirements. For instance, where the Leviathan Project is required to undertake internationally

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recognized practices in respecting national government guidance, Contractors are required to apply such good practices to all of its project activities as well. Contractors will generally be expected to defer to Noble Energy to undertake any engagement with national authorities or stakeholders, unless explicitly asked by Noble Energy to undertake this engagement.

### 3.3 Cultural Heritage Team Staffing and Organization

Noble Energy and Contractors have responsibility for the implementation of the AMP. Key roles and responsibilities are presented below.

**Leviathan/Noble Energy E&S Manager** – This position has overall responsibility for the implementation and administration of the Cultural Heritage Program; that is, the Environmental and Social (E&S) Manager is responsible for ensuring that Noble Energy delivers on all requirements outlined in this document. This is an office-based position reporting to the Leviathan Project Management.

**Cultural Heritage Specialist** – This position is responsible for conducting preconstruction cultural heritage investigations and implementing the Construction Monitoring Program, Chance Find Procedure, Cultural Heritage Training Program, and Site Protection Program. Depending upon construction activities and task allocation, it may be necessary for the Leviathan Project to provide more than one Cultural Heritage Specialist (CHS). The CHS will be an on-call consultant and report to the E&S Manager.

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**4.0 CHANCE FIND PROCEDURE**

**4.1 Cultural Heritage Monitoring Program**

Noble Energy will implement a cultural heritage monitoring program for all ground disturbing activities in consultation with national level authorities and other key stakeholders. The purpose of this monitoring is to:

- Identify, record, and protect cultural heritage that was not identified during baseline studies and other preconstruction cultural heritage investigations (i.e., chance finds); and
- Protect cultural heritage identified during baseline studies and other preconstruction cultural heritage investigations (i.e., known resources).

The program will utilize “passive” cultural heritage construction monitoring. Passive cultural heritage monitoring will be conducted by all Noble Energy and Contractor staff during their daily activities. Relevant Project staff will receive training in the identification of potential chance finds and the chance find procedures and will be responsible for reporting any potential chance finds.

**4.2 Identification, Assessment, and Treatment of Potential Chance Finds**

Chance finds can be made by anyone on the Leviathan Project, including archaeologists, architectural historians, non-cultural heritage site workers, and visitors or guests. The types of cultural heritage listed below that are the most likely to be encountered during construction are listed below.

- Underwater cultural heritage, including:
  - Shipwrecks or parts thereof;
  - Artifacts from debris fields associated with shipwrecks; and
  - Near shore inundated prehistoric or historic terrestrial archaeological features and artifacts.
- Terrestrial cultural heritage, including:
  - Features associated with human occupation, such as middens, hearths, and structural remains including temples, fortifications, habitations, walls, and monuments;
  - Prehistoric or historic human remains found in formal graves, cemeteries, or as isolated occurrences;
  - Artifacts, whole or partial, including ceramic vessels, ground and chipped stone artifacts, glass, metal, textiles, and human-modified plant and animal remains; and
  - Paleontological resources, including fossilized plant or animal remains or their impressions.

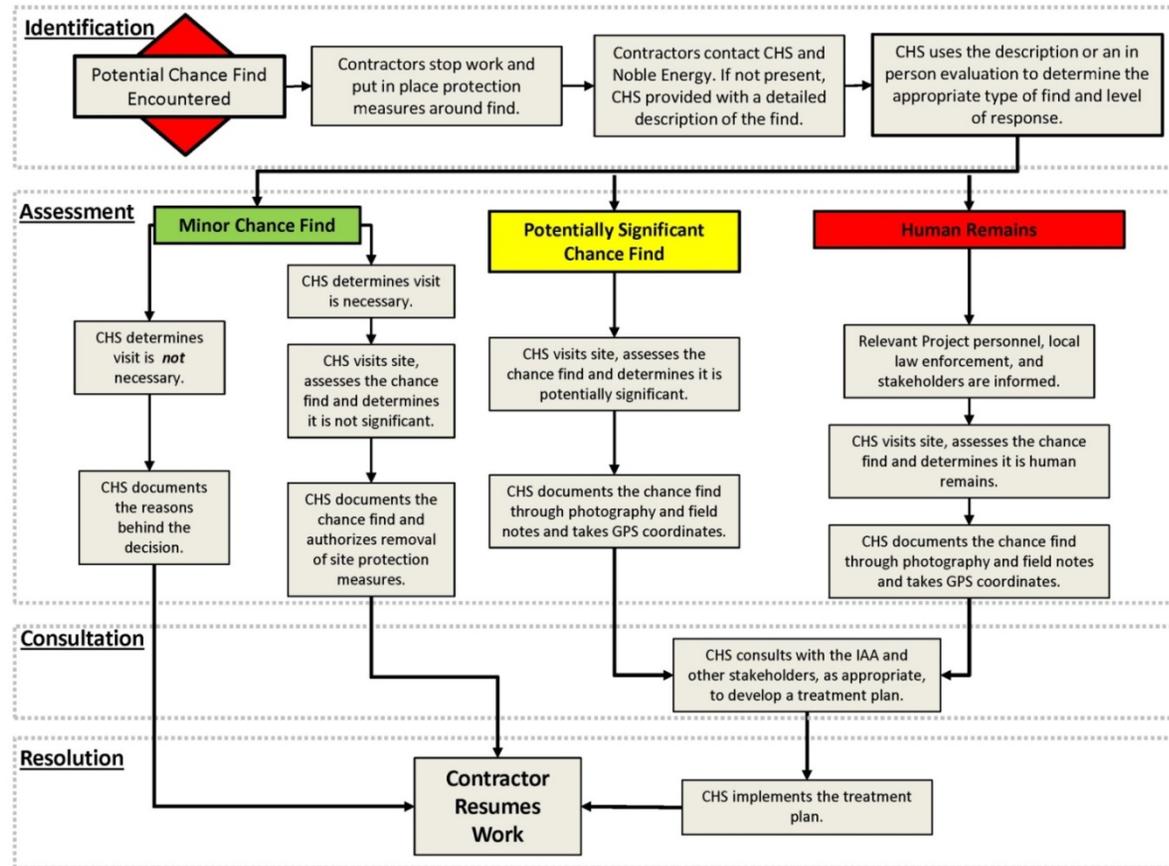
The Chance Find Procedure will use a multi-tiered approach for identifying, assessing, and resolving potential chance finds. The purpose of this approach is to empower an on-call CHS to resolve minor chance finds without necessitating consultations with national level authorities and minimize construction delays by allowing for the quick resolution of non-significant finds by a CHS in the field. The defining characteristics of each chance find tier and the processes for assessing them and determining if consultation is required will be developed in consultation with the IAA and other cultural heritage stakeholders, as appropriate. A preliminary three-tiered chance finds hierarchy is presented in Table 1. All potential chance finds identified by Project personnel will be reported to a CHS who will determine if the potential find is a chance find and assign it to a chance finds tier. Figure 1 provides a detailed description of the Chance Find Procedure.

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**Table 1: Three-tiered Chance Find Hierarchy.**

Chance Find Type	Characteristics	Evaluation Process
Minor Chance Finds	Objects that do not constitute artifacts under Israeli law (e.g., modern objects).	Construction work will stop in the area of the find. The potential find will be reported to Noble Energy (if found by a Contractor) and a CHS within 24 hours. The CHS will determine if a site visit is necessary. If a CHS determines a site visit is necessary, the find will be documented and collected/resolved in the field by the CHS. Construction activities will then resume in the area.
Potentially Significant Chance Finds	Objects that constitute artifacts under Israeli law (e.g., potentially significant historic or prehistoric objects).	Construction work will stop in the area of the find. The potential find will be reported to Noble Energy (if found by a Contractor) and a CHS within 24 hours. The CHS will then conduct a site visit. If the find is determined to represent a potentially significant chance find, the CHS will develop a treatment plan. If the find is made within the territory of Israel (onshore or within territorial waters), the find will be reported to the IAA within 15 days and the CHS will consult with the IAA regarding the treatment plan. If the find is made outside of Israel territorial waters, it will be reported to the IAA per Noble Energy policy (although not legally required). After notification, the IAA will be consulted to develop a treatment plan. Construction works will resume in the area upon completion of the treatment plan.
Human Remains	Modern, historic, or prehistoric burials, isolated human remains, and/or associated features and/or artifacts (i.e., grave goods).	Construction work will stop in the area of the find. The potential find will be reported to Noble Energy (if found by a Contractor) and a CHS within 24 hours. The CHS will report the find to stakeholders, including local, regional, or national law enforcement agencies. The CHS will initiate consultation with the IAA and other stakeholders (e.g., potential descendent communities), as appropriate, to develop a treatment plan. Construction works will resume in the area upon completion of the treatment plan.

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Artifacts collected in connection with chance finds should be minimized. Terrestrial chance finds retained because they are accidentally unearthed or broken free of their soil matrix should be retained. A terrestrial chance find that has broken free of its soil matrix should be retained by the Contractor or Noble Energy personnel who uncovered the find. Precise notation of the original location of the find, with photographs taken of its original context, should be taken by the Contractor or Noble Energy personnel who uncovered the find. Artifact photos and site photos may be useful for consultation regarding chance finds and should be taken as soon as possible. Details of how artifacts should be collected and stored and what notes and photographs should be taken at the time of discovery will be provided in the Cultural Heritage Training.

Artifacts and associated notes and photographs taken by any Leviathan Project personnel should be given to a CHS as part of the CHS evaluation of the find. Artifacts recovered from Israeli territory belong to the Israeli government, and the CHS will be responsible for giving them to the IAA. Treatment plans to be considered for terrestrial chance finds include preservation in place through avoidance or specialized construction techniques, collection after recordation, and rescue excavations in advance of additional construction work if avoidance is not possible. Only after all treatment work is agreed and any required excavations are carried out is Project activity allowed to resume in the area.

Underwater chance finds retained because they are accidentally brought to the surface should be immediately placed in a container filled with sea water from the area of the chance find and maintained there indefinitely, as exposure to the air can cause artifacts that have been underwater to decompose or oxidize very rapidly. Placing artifacts in a container filled with sea water from the area of the chance find will be the responsibility of the Contractor or Noble Energy personnel. Artifact photos should be taken as soon as possible. Artifacts and associated notes and photographs taken by any Leviathan Project personnel should be given to a CHS. Details of how artifacts should be collected and stored and what notes and photographs should be taken at the time of discovery will be provided in the Cultural Heritage Training.

Artifacts found in Israeli territorial waters (12 nautical miles out) belong to the Israeli government, and a CHS will be responsible for giving them to the IAA. For underwater chance finds not brought to the surface, preservation in place through avoidance or specialized construction techniques is the preferred treatment plan, as rescue excavation of underwater archaeological sites is costly and time consuming. For underwater chance finds accidentally brought to the surface, the preferred treatment plan is recordation and conservation (e.g., electrochemical cleaning of metal artifacts).

### 4.3 Record Keeping

In order to align the Chance Find Procedure with IFC PS 8 guidance regarding record keeping, the CHS and Noble Energy and Contractor non-cultural heritage staff will maintain records on chance finds and the implementation of treatment plans. These will include:

- Monthly reports summarizing reporting period activities, including chance finds identified, the results of any chance find assessments, internal and external communications and instructions, and supporting photographic documentation (or other reference materials as appropriate); and

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- Any additional reports prepared to fulfill specific requirements of the IAA.

#### 4.4 Cultural Heritage Training Program

Relevant Leviathan Project personnel will receive training and demonstrate competency in the identification of chance finds and chance find procedures (i.e., actions that are required in the case of a potential chance find). This training will be incorporated into the overall induction process for Noble Energy and Contractor personnel, and will include a quick reference handout. The Project will maintain records of all Cultural Heritage Training provided to Project personnel.

All employees must be aware that it is illegal and forbidden to disturb or remove cultural heritage objects offsite for personal gain. To support the training process, Noble Energy will develop training materials for use in the overall induction process.

#### 4.5 Site Protection Program

Known cultural heritage sites will be protected from Leviathan Project-related damage. This includes sites identified in advance of construction activities and those found during construction (i.e., chance finds). Sites may be located in Leviathan Project areas or adjacent to them. Site protection measures may include warning signs, physical barricades, or other visual indicators of areas of high cultural heritage sensitivity. In some cases, it may be necessary to modify construction techniques to protect sites in work areas. Site information will be provided to Leviathan Project personnel in written and verbal form in official transmittals, meetings, and tool box talks as appropriate to ensure that known cultural heritage sites are protected.

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## 5.0 REFERENCES

International Finance Corporation, 2012, IFC Performance Standards on Environmental and Social Sustainability, Effective January 1, 2012.



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## Leviathan Development

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			Draft Labor Management Plan		
			Doc. No. LEV-PM-NEM-REG-PLN-XXXX		

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## 1.0 INTRODUCTION

### 1.1 OVERVIEW

The Leviathan Labor Management Plan describes the methods, measures, and procedures that have been established and will be utilized by the Project in order to:

- Achieve compliance with applicable Israeli labor legislation and regulations and alignment with international labor requirements;
- Confirm that recruitment, employment and training for direct, indirect and subcontracted workers are carried out in a fair and transparent manner, consistent with good international industry practice as set out in:
  - IFC Performance Standard 2 (Labor and Working Conditions);
  - Overseas Private Investment Corporation (OPIC) Environmental and Social Policy Statement and Guidance; and
  - Noble Energy internal guidelines and norms.
- Help achieve local and national employment targets.

The Noble Energy Human Resources Department is responsible for implementation of the Labor Management Plan.

### 1.2 OBJECTIVES

Workers are an important group of stakeholders who may be subject to a range of direct impacts, potentially both beneficial and adverse, in terms of access to employment, the terms and conditions of that employment, and their health, safety and welfare while working on the Project.

The specific objectives of the Labor Management Plan are to:

- Outline the applicable standards for hiring, employment, training and labor management;
- Describe Noble Energy plans and procedures for national and local recruitment, hiring, employment, working conditions and training;
- Assign roles and responsibilities;
- Establish monitoring and reporting procedures; and
- Determine training requirements.

### 1.3 SCOPE

This Labor Management Plan is part of the suite of Management Plans that have been developed for all phases of the Leviathan Project, and falls within the Leviathan Environmental and Social Management Framework. The Labor Management Plan addresses labor-related aspects, including those that pertain to hiring and training of personnel to support development of the Leviathan wells, platforms, pipelines and processing plants, and ancillary facilities.

The Labor Management Plan covers both employment at the Project sites managed by Noble Energy, and contractors and direct supply chain companies.

## 2.0 *STANDARDS*

Noble Energy has committed to applying its corporate policies to the Project, which include commitments to abide by the International Labor Organization's Declaration of Fundamental Principles and Rights at Work. Noble Energy's corporate policies also include a global grievance mechanism (Noble Talk), Code of Conduct, and Israel Employee Policy Manual, which apply to all Project employees as hiring is initiated. In addition, Noble Energy complies with Israeli laws, which have strict labor and working conditions requirements (including those related to forced labor and exploitative labor.) These are discussed further below.

### 2.1 *INTERNAL STANDARDS*

Noble Energy's Global Management System (GMS) provides a framework for establishing performance goals. The GMS incorporates Noble Energy's Legal Requirements and Best Practices, integrating elements from both Occupational Safety and Health Management Systems (OSHMS), such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06, and ANZI Z10 with Environmental Management Systems such as EPA RMP, ISO 14001 and World Bank Group standards and guidelines. The ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the lifecycle of the Project.

The company's Israel Employee Policy Manual also provides broad guidance and will be discussed in greater detail in Section 3.1: Key Principles.

### 2.2 *LEGAL FRAMEWORK*

As of 1992, the Knesset (Israeli Parliament) passed two important basic laws: the Basic Law on Human Dignity and Freedom and the Basic Law of Freedom of Occupation. These laws set out constitutional rights, as well as clauses intended to make these rights inalienable.

The Human Dignity and Freedom law is the basis for what has been established since then on the topics of equality, freedom of association, right to equal opportunity at the workplace and other social rights.

The Freedom of Occupation law was established to protect workers from certain types of work, and included rights associated with non-compete clauses in employment contracts, rights of freedom of movement for workers and workers' rights to choose their workplace.

Other notable labor laws implemented in Israel include but are not limited to those presented in Appendix A.

### 2.3

#### *INTERNATIONAL CONVENTIONS AND STANDARDS*

In Israel, international standards, including ILO conventions adopted by Israel and EU standards, are used by the government as guidelines, although they are not binding.

Israel has been a member of the International Labor Organization (ILO) since 1949. The country ratified the 'core' ILO Conventions, i.e. the eight conventions that have been identified by the ILO's Governing Body as fundamental to human rights at work. Appendix B illustrates the status of Israel's ratification of the applicable ILO Conventions.

### 2.4

#### *IFC PERFORMANCE STANDARDS*

The Project's policies, plans and procedures will be consistent with OPIC's Environmental and Social Policy Statement, which adopts, as a standard for the environmental and social review process, the International Finance Corporation's (IFC) Performance Standards on Social and Environmental Sustainability and Industry Sector Guidelines, and any subsequent revisions to those standards.

IFC Performance Standard (PS) 2 is specific to labor and working conditions and is the primary standard to which this Labor Management Plan and its implementation will be held to, with some notable overlap with IFC PS 1 on Assessment and Evaluation of Environmental and Social Risks and Impacts. PS2 requires that Project proponents identify and assess labor-related risks and impacts, and develop measures for the promotion of fair treatment, non-discrimination, and equal opportunity of workers, including those engaged by third parties (i.e., contractors) and in the primary supply chain. Vulnerable categories of workers may require special measures for their protection. This standard also establishes expectations regarding safe and healthy working conditions, and the prevention of forced labor and exploitative child labor.

### 3.0 *MANAGEMENT PROTOCOLS*

#### 3.1 *HUMAN RESOURCES POLICY AND PROGRAM*

Noble Energy's Israel Employee Policy Manual outlines employee rights under national labor and employment law (which also addresses employment discrimination, minimum wage, etc.), including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur.

Furthermore, Noble Energy has specific policies in place intended to maximize beneficial impacts of the Leviathan Project and to minimize or mitigate its potential adverse impacts, including:

- A hiring policy that prioritizes Israeli citizens and regional and local residents for employment, thus enhancing socio-economic benefits in communities closest to operations;
- Stakeholder engagement efforts to address potential negative impacts on the workforce; and
- Specific anti-discrimination policies and grievance management procedures.

The key principles associated with labor management are presented below (hiring, terms of employment, anti-discrimination and grievances, workers accommodation, unions and collective bargaining, and contractor and supply chain management) and alignment with IFC PS2 is generally discussed for each of the topics.

As the Project progresses, direct workers, contractors, and sub-contractors will be trained on the substance of Noble Energy's corporate policies and their responsibilities regarding their implementation.

#### 3.2 *HIRING*

Leviathan's Project teams generate employment forecasts for the relevant positions required for their departments. Departments are responsible for drafting detailed job descriptions, identifying whether the vacancies are categorized as skilled, semi-skilled or unskilled, and specifying the number of personnel required and the expected duration of employment. Vacancies are published broadly within the local communities, without putting limitations on demographics of candidates.

Discrimination in relation to recruitment and employment on the grounds of race, gender, age, disability, sexual orientation, or religious or political beliefs is not permitted under any circumstances.

The Leviathan Project does not permit informal approaches for employment at any site or office and all recruitment is managed through a formal recruitment

process. To enforce this requirement, Leviathan implements the following measures:

- Leviathan and Project Contractors will recruit solely from the designated recruitment locations/offices and not via informal requests, approaches or solicitations from community members, relatives of currently employed personnel and other job seekers, either in the camps or at the work sites;
- All recruitment information distributed will clearly state that individuals appearing at the job site or at other non-official recruitment venues elsewhere that have not previously been screened and approved by Leviathan will not be hired;
- Lists of “preferred individuals” will not be accepted; and
- Leviathan does not employ or work with any informal mediation individuals who claim to recruit the Project workforce. There is no fee associated with submitting an application for a job with Leviathan.

### 3.3

#### *WORKING CONDITIONS AND TERMS OF EMPLOYMENT*

Leviathan defines two main categories of employees for its workforce:

- Permanent Employees; and
- Part-time Employees.

All recruitment information and employment contracts will specify an employee category and duration of the employment term.

Permanent Employees represent the Project personnel who have indefinite employment appointments. Leviathan has introduced position grades, defined in the relevant Human Resource documentation, that cover the range of skilled, semi-skilled and unskilled workers. The Israel Employee Policy Manual states relevant terms of employment, including references to rights and responsibilities, compensation, benefits, limitations, vacations, sick days and overtime pay.

A contract workforce will be hired for a specified term for particular task assignments and are a large part of the workforce. These contractor positions typically fall into three subcategories: skilled, semi- skilled, and non-skilled.

Basic eligibility requirements for employment are as follows:

- All applicants must be at least 18 years old on the date of hire for all positions; age must be confirmed with at least one piece of identification (government issued identification including birth certificate, passport, drivers’ license, or local identification including medical certificate or registration certificate), and must be presented at the time of application for photocopying. Under no circumstances will Leviathan or any Project staff keep identifications.
- All applicants must complete an application form detailing all applicable experience related to the minimal (required) and desirable qualifications;

- Citizens convicted of an illegal act and currently serving sentences are not eligible;
- Medical clearance to be fit for work.

Noble Energy management has confirmed that there are no worker accommodations or camps on site required for the Project, and workforce for the offshore components will remain offshore on a rotational basis. It is anticipated that if worker accommodations should become required in the future, Noble Energy will provide them in a manner consistent with the principles of non-discrimination and equal opportunity.

### 3.4 *WORK CONTRACTS, WORKING HOURS AND VACATION*

Contracts of employment shall be in writing and may be for a fixed or indefinite term. All employees will receive a copy of their employment agreement, which will at a minimum, address the following: job title, job duties, basic salary and labor conditions, provided by the Israel Employment Policy Manual.

Basic working hours will be in compliance with Israeli Labor Law, which is a 43 hour regular work week. All relevant attendance and leave requirements are set out in individual employment contracts and other relevant Human Resources documentation.

The Israel Employee Policy Manual outlines employee rights under national labor and employment law, including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur. It does not discuss applicable collective agreements, but does provide reasonable working conditions and terms of employment.

### 3.5 *ANTI-DISCRIMINATION POLICIES AND GRIEVANCE MANAGEMENT*

Noble Energy is enforcing a comprehensive Anti-Discrimination and Harassment Policy to cover the entire workforce. This policy ensures that all employees are treated fairly, with dignity and respect, and have equal employment opportunities.

The system also includes a Fair Treatment Policy, which provides employees with an authorized process for raising concerns to senior management, covering any issues that are work related, that affect an employee or contractor, or that an employee deems unfair. Such concerns may relate (but are not limited) to the following:

- The decision of a manager;
- The behavior of another employee, manager, or contractor; and
- The application of a company policy.

Noble Energy will include language in primary supply contracts and/or scopes of work, which requires contractors to establish a worker grievance mechanism (in line with NobleTalk) and generally support Noble Energy's efforts to align all work with IFC PS, as well as comply with national regulations. Noble Energy will discuss any notable red flags with contractors on a regular basis, and contractors will provide evidence of having appropriately investigated and addressed any grievances put forward. Contractors will be made aware of NobleTalk, and its use will be integrated into contractor orientation/awareness training of key systems.

### 3.6 *UNIONS AND COLLECTIVE BARGAINING*

The right to negotiate collectively at different levels (including project staff and contractors) is recognized under Israeli law. Company policies adhere to international standards and are made available to all Project personnel through the Israel Employee Policy Manual, as well as the employee and contractor language in employment contracts, thereby addressing workforce compliance with human rights (such as freedom of association and effective recognition of the right to collective bargaining).

While it does not discuss specific collective agreements, the Israel Employee Policy Manual does provide information on working conditions and terms of employment, which are consistent with best practice and align with national legislation. Israeli legislation recognizes workers' rights to form and to join workers' organizations of their choosing, without interference. Noble Energy, in its commitment to comply with national legislations, does not seek to influence or control these mechanisms.

### 3.7 *OCCUPATIONAL HEALTH AND SAFETY (OHS)*

Noble Energy's GMS provides a framework for establishing performance goals and incorporates Noble Energy's legal requirements and best practices, integrating elements from occupational safety and health management systems such as OSHA PSM, API RP 75 and 75L, OHSAS 18001, BS 8800, ILO OSH 2001, CSA Z1000-06 and ANZI Z10 with environmental management systems such as EPA RMP, ISO 14001 and World Bank Group standards and guidelines. Additionally, activities will comply with relevant Israeli regulations and standards. The ongoing process of identification, assessment and control of safety and environmental risks will continue throughout the lifecycle of the Project.

The GMS provides for:

- Identification of potential hazards to not only workers, but also to visitors, communities, and assets;
- Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- Training of workers;

- Documentation and reporting of occupational accidents, diseases, and incidents; and
- Emergency prevention, preparedness, and response arrangements.

Occupational health and safety for direct hire and subcontractor personnel throughout all Project phases is managed in accordance with the appropriate US Gulf of Mexico requirements, namely Occupational Health and Safety Administration (OSHA) Regulations pertinent to the offshore Oil and Gas industry, as well as Israeli OHS regulations – whichever of the two is most stringent. The onshore facilities will be regulated in accordance with Israeli regulations.

Line-managers will continue to adopt OHS practices for the entire Project that meet the EHS Guidelines (e.g., applicable Israeli IIOSH, US Gulf of Mexico requirements and OSHA regulations, which follow international best practice for the oil and gas industry).

### 3.8 *CONTRACTOR AND SUPPLY CHAIN MANAGEMENT*

#### 3.8.1 *General Terms and Conditions*

Noble Energy has committed to requiring that major contractors and suppliers selected to support the development of Leviathan adhere to Noble Energy’s environmental and social standards by providing detailed information on environmental and social requirements to all companies invited to tender for construction, installation and supplier contracts.

Additionally, Noble Energy specifies during the bidding process that contractors’ environmental, health and safety capability may be evaluated as part of the award process. All major contractors and suppliers who work on a Noble-controlled site will be required to present detailed EHS information as part of their terms and conditions.

Noble Energy’s Code of Conduct applies not only to employees, but to contract staff, vendors, service providers and agents. Noble Energy requires all major contractors and suppliers to act ethically and consistently with the Code when conducting business on the company’s behalf.

Noble Energy includes language in major contractor and supplier contracts and/or scopes of work, which requires contractors to establish a workers grievance mechanism (in line with NobleTalk) and generally support Noble Energy’s efforts to align all work with IFC PS, as well comply with national regulations.

#### 3.8.2 *Contractor Management*

In addition to having a contractual obligation to implement the measures set out in the existing Noble Energy GMS, Project contractors are also being made responsible for implementing any additional measures relevant to the

contractor's scope of work that are identified through the EIA process. Noble Energy requires the EMMP and EIAs be incorporated into the Project Execution Plan, and that major contractors are responsible for adhering to the Noble Energy GMS requirements, including provisions recognized in the EIA and formalized in the Project EMMPs.

The focus of contractor monitoring will be to confirm that employment arrangements do not contravene applicable Israeli Law or international standards and to monitor the working and living conditions at Project work sites and in any worker accommodation camps.

### 3.8.3 *Supply Chain Management*

All suppliers to the Project will be expected to comply with Israeli labor standards, applicable ILO standards and applicable human rights standards including the standards, stipulated in the Voluntary Principles on Security and Human Rights, and Security Personnel Requirements of the IFC Performance Standards.

For example, major contracts, such a fabrication and installation, include the following standards:

- **Supplier Standards for Employment:** As a minimum, Noble Energy contracts require major contractors to maintain and implement policies to comply with Israeli laws and regulations, and prohibit the employment of forced, bonded or child labor, with a process for assuring compliance.
- **Supplier Standards for Human Rights:** As a minimum, the Noble Energy contracts require major contractors to maintain and implement policies that respect the rights set forth in the Universal Declaration of Human Rights and the International Labor Organization's (ILO) Declaration on Fundamental Principles and Rights at Work.
- **Supplier Standards for Health and Safety:** As a minimum, the Noble Energy major contractors are required to maintain responsibility for all Health, Safety and Environment (HSE) and demonstrate strong organizational commitment to responsible HSE management and elimination of workplace injuries and illnesses, with a process for obtaining assurance on compliance with those policies, both internally and externally, by regular audits, reviews and reports.
- **Supplier Standards for Community Relations:** As a minimum, Noble Energy contracts require major contractors to respect the cultural values and traditions of communities where Noble Energy operates, especially those of indigenous peoples recognized by the laws of the applicable jurisdiction. Suppliers are encouraged to share in our commitment to strive to be a positive force in local communities in which Noble Energy operates.

## 4.0

### *TRAINING*

For other similar construction projects related to Noble Energy's operations in Israel, all workers on sites (including offshore) are provided health and safety training, any necessary job-specific training and are provided with adequate protective gear. It is anticipated that Noble Energy will also provide the same for the Project construction staff. Additional training includes:

- A full breakdown of the processes and means of accessing the workforce grievance mechanism known as Noble Talk (including a segment on anonymity and non-retaliation);
- A review of Noble Energy's Zero Injury policies including "Stop Work Authority";
- Rights and responsibilities as an employee including benefits; and
- Additional training for community-facing employees, including staff involved in recruitment, grievances, and social investment on engagement and communication practices.

## 5.0 *MONITORING AND KEY PERFORMANCE INDICATORS*

### 5.1 *PERSONNEL DATABASE AND RECORDS SYSTEMS*

The Human Resources Department is responsible for maintaining a record of all personnel employed. Contractors are required to maintain a similar record system and to share it with Noble Energy or to make it available for inspection.

The Leviathan Human Resources Department maintains a Personnel Database that contains information on each employee, covering his/her terms of employment, and is updated to track changes as they occur. Such data include:

- Project Worker Status (Local/National/Expatriate);
- Personal details (as appropriate);
- Pre-Employment Screening Data (e.g., Job Application, Health-Related Data, Skills Testing, Interview Records, Information Verification, etc.);
- Employment Date;
- Job Classification and Wage History;
- Certifications;
- Attendance/Leave Data;
- Job Performance Evaluations and Skill Advancement/Promotion History;
- Disciplinary or Termination Data; and
- Training Records.

The Human Resources Department also maintains an inventory of all recruitment processes and employment documentation arising on the site including at least the following:

- Recruitment Conducted;
- Local/national recruitment and employment targets and their fulfilment;
- How the recruitment, employment and personnel database is being maintained;
- Training conducted/provided to staff and planned;
- Interviews and selection processes;
- Job descriptions and selection criteria;
- Information dissemination regarding employment, including vacancy announcements;
- Operation of recruitment offices;
- Equities and inequities in recruitment process (e.g. gender, ethnicity, age); based on the statistics related to demographical composition of the workforce;
- Employee grievances and actions taken;
- Cases of corruption and disciplinary actions taken; and
- Working conditions and related issues.

## KEY PERFORMANCE INDICATORS

Contractors shall document and report on a quarterly basis to the Project Human Resources teams on the implementation of this Labor Management Plan during the construction phase.

Human Resources and training data are to be provided to the Human Resources Department by the relevant Project Departments and Contractors. The Human Resources Department will facilitate this through regular notifications to the relevant personnel with a Human Resources collection spreadsheet.

**TABLE 1: KEY PERFORMANCE INDICATORS - LABOR MANAGEMENT**

<i>KPI</i>	<i>Target</i>	<i>Monitoring Measure</i>
Local/national recruitment and employment	All workforce targets in compliance with any Investment Agreement, if applicable	Number of staff/personnel employed from Project Area of Influence, and percentage of total project workforce  Number and breakdown of positions occupied by local staff, by the level and type of technical skill and duration of employment (temporary and permanent)  Number of local employees who received professional or vocational training
Fairness of hiring and employment	Zero child and forced/bonded labor  Increased hiring and employment of women  Decreased number of workplace grievances	Gender breakdown of staff based on type of work (administrative, technical, support)
Quality of workplace conditions	Zero Lost Time Injuries  100% Health and Safety training  100% of Contractor Management Plans reviewed and approved by Noble Energy  100% Stop Work Authority training	Number of incidents/accidents/ near misses occurred at the workplace, including within Contractors Remit  Number and frequency of Health and Safety audits conducted on Site  Number and frequency of emergency drills conducted on site

*APPENDIX A:*

*Israel's Pertinent Labor Laws*

<i>Pertinent Labor Laws</i>	
Discharged Soldiers (Reinstatement in Employment), 5709-1949;	Minimum Wage Law, 5747-1987;
Hours of Work and Rest Law, 5711-1951;	Male and Female Workers (Equal Retirement Age) Law, 1987;
Annual Leave Law, 5711-1951;	Employment (Equal Opportunities) Law, 5748-1988;
Apprenticeship Law, 5713-1953;	Single Parent Family Law, 1992;
Protection of Youth Labor Law, 5713-1953;	Absence Because of a Child's Sickness Law, 1993;
Employment of Women Law, 5714-1954;	Absence Because of a Parent's Sickness Law, 1993.
Wage Protection Law, 5718-1958;	Employment of Employees by Manpower Contractors Law, 1996;
Labor Inspection (Organization) Law, 5714-1954;	Amendment to the Foreign Workers (Prohibition of Unlawful Employment and Assurance of Fair Conditions) Law, 1991;
Severance Pay Law, 5723-1963;	Protection of Employees (Exposure of Offences of Unethical Conduct and Improper Administration) Law, 1997
Collective Agreement Law, 5717-1957;	Prevention of Sexual Harassment Law, 5758-1998;
Male and Female Workers (Equal Pay) Law, 5724-1964;	Equal Rights for Persons With Disabilities Law, 1998
Settlement of Labor Disputes Law, 5717-1957;	Absence Because of a Spouse's Sickness Law, 1998;
Labor Courts Law, 5729-1969;	Advanced Notice of Discharge and Resignation Law, 2001;
Work Safety Ordinance (New Version), 5730-1970;	Notice of Basic Employment Terms Law, 2002
Sick Pay Law, 5736-1976;	

*APPENDIX B:*

*Israel's Ratification of the ILO Core  
Conventions*

<b>Convention</b>	<b>Date</b>
<b>C029</b> - Forced Labor Convention, 1930 (No. 29)	07 Jun 1955
<b>C087</b> - Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	28 Jan 1957
<b>C098</b> - Right to Organize and Collective Bargaining Convention, 1949 (No. 98)	28 Jan 1957
<b>C100</b> - Equal Remuneration Convention, 1951 (No. 100)	09 Jun 1965
<b>C105</b> - Abolition of Forced Labor Convention, 1957 (No. 105)	10 Apr 1958
<b>C111</b> - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	12 Jan 1959
<b>C138</b> - Minimum Age Convention, 1973 (No. 138) <i>Minimum age specified: 15 years</i>	21 Jun 1979
<b>C182</b> - Worst Forms of Child Labor Convention, 1999 (No. 182)	15 Mar 2005
<b>C081</b> - Labor Inspection Convention, 1947 (No. 81)	07 Jun 1955
<b>C122</b> - Employment Policy Convention, 1964 (No. 122)	26 Jan 1970
<b>C144</b> - Tripartite Consultation (International Labor Standards) Convention, 1976 (No. 144)	21 Jan 2010
<b>C001</b> - Hours of Work (Industry) Convention, 1919 (No. 1)	26 Jun 1951
<b>C009</b> - Placing of Seamen Convention, 1920 (No. 9)	19 Jun 1969
<b>C014</b> - Weekly Rest (Industry) Convention, 1921 (No. 14)	26 Jun 1951
<b>C019</b> - Equality of Treatment (Accident Compensation) Convention, 1925 (No. 19)	05 May 1958
<b>C020</b> - Night Work (Bakeries) Convention, 1925 (No. 20)	26 Jul 1951
<b>C030</b> - Hours of Work (Commerce and Offices) Convention, 1930 (No. 30)	26 Jun 1951
<b>C048</b> - Maintenance of Migrants' Pension Rights Convention, 1935 (No. 48)	16 Jan 1963
<b>C052</b> - Holidays with Pay Convention, 1936 (No. 52)	22 Aug 1951
<b>C053</b> - Officers' Competency Certificates Convention, 1936 (No. 53)	19 Jun 1969
<b>C077</b> - Medical Examination of Young Persons (Industry) Convention, 1946 (No. 77)	23 Dec 1953
<b>C078</b> - Medical Examination of Young Persons (Non-Industrial Occupations) Convention, 1946 (No. 78)	23 Dec 1953
<b>C079</b> - Night Work of Young Persons (Non-Industrial Occupations) Convention, 1946 (No. 79)	23 Dec 1953
<b>C088</b> - Employment Service Convention, 1948 (No. 88)	21 Aug 1959
<b>C090</b> - Night Work of Young Persons (Industry) Convention (Revised), 1948 (No. 90)	23 Dec 1953
<b>C091</b> - Paid Vacations (Seafarers) Convention (Revised), 1949 (No. 91)	30 Mar 1953
<b>C092</b> - Accommodation of Crews Convention (Revised), 1949 (No. 92)	21 Aug 1980
<b>C094</b> - Labor Clauses (Public Contracts) Convention, 1949 (No. 94)	30 Mar 1953
<b>C095</b> - Protection of Wages Convention, 1949 (No. 95)	12 Jan 1959
<b>C097</b> - Migration for Employment Convention (Revised), 1949 (No. 97)	30 Mar 1953

<b>C101</b> - Holidays with Pay (Agriculture) Convention, 1952 (No. 101)	14 Jul 1953
<b>C102</b> - Social Security (Minimum Standards) Convention, 1952 (No. 102) <i>Has accepted Parts V, VI and X</i>	16 Dec 1955
<b>C106</b> - Weekly Rest (Commerce and Offices) Convention, 1957 (No. 106) <i>The Government has declared that the Convention also applies to persons employed in the establishments specified in Article 3, paragraph 1(b), (c) and (d).</i>	19 Jun 1961
<b>C116</b> - Final Articles Revision Convention, 1961 (No. 116)	24 May 1963
<b>C117</b> - Social Policy (Basic Aims and Standards) Convention, 1962 (No. 117)	15 Jan 1964
<b>C118</b> - Equality of Treatment (Social Security) Convention, 1962 (No. 118) <i>Has accepted Branches (c), (e) to (g) and (i)</i>	09 Jun 1965
<b>C133</b> - Accommodation of Crews (Supplementary Provisions) Convention, 1970 (No. 133)	21 Aug 1980
<b>C134</b> - Prevention of Accidents (Seafarers) Convention, 1970 (No. 134)	21 Aug 1980
<b>C136</b> - Benzene Convention, 1971 (No. 136)	21 Jun 1979
<b>C141</b> - Rural Workers' Organizations Convention, 1975 (No. 141)	21 Jun 1979
<b>C142</b> - Human Resources Development Convention, 1975 (No. 142)	21 Jun 1979
<b>C147</b> - Merchant Shipping (Minimum Standards) Convention, 1976 (No. 147)	06 Dec 1996
<b>C150</b> - Labor Administration Convention, 1978 (No. 150)	07 Dec 1979
<b>C160</b> - Labor Statistics Convention, 1985 (No. 160) <i>Acceptance of all the Articles of Part II has been specified pursuant to Article 16, paragraph 2, of the Convention.</i>	21 Jan 2010
<b>C181</b> - Private Employment Agencies Convention, 1997 (No. 181)	04 Oct 2012



**noble energy**  
**mediterranean ltd.**  
*a subsidiary of noble energy, inc.*

## Leviathan Development

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REV	DATE	OWNER	DESCRIPTION	CHECKER	APPROVER
			Noble Energy Mediterranean Ltd.		
			Draft Livelihood Restoration Management Framework		
			Doc. No. LEV-PM-NEM-REG-PLN-XXXX		

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## 1.0 INTRODUCTION

### 1.1 OVERVIEW

The Livelihood Restoration Management Framework is designed to demonstrate that Noble Energy is complying with relevant Israeli legislation and regulations that are associated with land acquisition, compensation and livelihood restoration efforts for the Leviathan Project (the “Project”). Furthermore, the framework also demonstrates that Noble Energy is in alignment with relevant International Standards, including International Finance Corporation (IFC) Performance Standards on Social and Environmental Sustainability and the Overseas Private Investment Corporation (OPIC) Environmental and Social Policy Statement.

This framework is part of the suite of Management Plans that have been developed for all phases of the Project, and falls within the Project’s Environmental and Social Management Framework. The Livelihood Restoration Management Framework addresses all aspects which will move people from land or prevent access to land they have been using for livelihood activities, irrespective of the individuals or community’s rights to access that land, as a result of the development of the Project, including wells, platforms, pipelines and processing plants, and ancillary facilities. This framework interacts with a broad number of other established Management Plans, including but not limited to: Stakeholder Engagement Plan and Labor Management Plan.

The Project will not require physical resettlement but economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of permanent land acquisition for the coastal valve station will occur. It is also anticipated at this point in the design and permitting phase that temporary economic displacement in agricultural areas will occur as a result of the construction of pipeline rights-of-way. Economic displacement resulting from loss of access for fishermen in offshore contexts is also under evaluation by the Project.

### 1.2 OBJECTIVES

The Livelihood Restoration Management Framework describes the methods, measures, and procedures that have been established and will be used by the Project in order:

- To avoid, and when avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation (based on the merits of each case and subject to all legal provisions) for loss of assets and (ii) ensuring that resettlement activities are implemented with the appropriate disclosure of information, consultation and informed participation of those affected; and

- To ensure that land acquisition and any social or economic displacement are carried out in a fair and transparent manner, consistent with good international industry practice as set out in the IFC PS 5 (Land Acquisition and Resettlement), and Noble Energy internal guidelines and norms.

For the purposes of this plan, the following IFC PS5 definitions are used:

- **Involuntary resettlement** - refers to both physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood as a result of project-related land acquisition and/or restrictions on land use.)<sup>1</sup>
- **Livelihood** - the full range of means that individuals, families and communities utilize to make a living, including wage-based income, agriculture, fishing, foraging, other natural resource-based livelihoods; and
- **Land acquisition** - includes both outright purchases of property and acquisition of access rights such as easements or rights of way.

### 1.3

#### SCOPE

OPIC requires that a Project's policies, plans and procedures be consistent with OPIC's Environmental and Social Policy Statement, which are based on the IFC's Performance Standards (PS).

Specifically, IFC PS 5 is the primary standard to which this Plan and its implementation will be held to, with some notable overlap with IFC PS 1 on Assessment and Evaluation of Environmental and Social Risks and Impacts. IFC PS1 focuses on the protection of the quality of life felt by Project Affected Communities, and looks to prevent negative impacts, and appropriately compensate and maximize the benefits associated with any potential impacts.

IFC PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land.

Given that Noble Energy has a commitment to ensure the activities associated with the Project are compliant with International Standards, this document is

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<sup>1</sup> Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

intended to define Leviathan's responsibilities in terms of Israeli legal requirements and IFC PS 5. Furthermore, it will also outline the responsibilities of the government in the land acquisition and resettlement process.

## 2.0 *KEY PRINCIPLES*

### 2.1 *IFC STANDARDS*

IFC PS 5 applies to physical and /or economic displacement resulting from the following types of relevant land-related transactions:

- Land rights or land use rights acquired through negotiated settlements with property owners or those with legal rights to the land if failure to reach settlement would have resulted in expropriation or other compulsory procedures;
- Project situations where restrictions on land use and access to natural resources cause a community or groups within a community to lose access to resources usage where they have established usage;
- Project situations requiring evictions or blocked access of people occupying or using land without formal, traditional or recognizable usage rights; and/or
- Restriction on access to land or use of other resources including communal property and natural resources such as marine and aquatic resources, freshwater, hunting and gathering grounds and grazing and cropping areas.

### 2.2 *ISRAELI LEGISLATION*

The Israeli legal system has extensive legislative requirements pertaining to land with which the Project must comply, including but not limited to provisions within the:

- Petroleum Law;
- Land Ordinance - Purchase for Public Needs;
- Planning and Building Law; and
- The Natural Gas Sector Law.

Specifically, entitlement to compensation and a clear mechanism for claiming compensation is defined in several articles which deal differently with permanent land taking for above ground gas installations and with temporary taking for construction of subterranean gas installations, as are eligibility requirements and definitions of landowners, lessees and lawful possessors. The Natural Gas Sector Law details how the license holder must bear the costs of compensations in both cases.

It should be noted that to begin with, one of the objectives of TAMA 37/H (which defines the locations of the Project components) was to minimize

involuntary resettlement, and that the Project involves no physical displacement whatsoever.

Noble Energy as the project proponent is responsible for leading on all steps in the process according to the governing legal provisions.

As part of Noble Energy's economic resettlement planning and implementation, it has established a process and specific actions to identify activities that could lead to economic displacement of individuals or groups. These actions include:

- Considering alternative designs to avoid or minimize economic displacement;
- Identifying persons to be economically displaced by the Project, and those eligible for compensation and assistance;
- Identifying the status of economically displaced persons according to their legal rights or claim to land;
- Following legislative requirements and processes, to establish eligibility and candidacy requirements;
- Following legislative requirements and processes, and a negotiation process with those affected, to determine adequate compensation, based on the merits of each case and subject to all legal provisions; and
- Engagement with affected parties.

While Israeli law does provide terms for complementary means of addressing potential physical or economic displacement through alternative land provision, such land-for-land opportunities are not applicable to the Project. However, Noble Energy is considering future social investment opportunities and has a local hiring plan and continues to explore opportunities to assist individuals or communities based on their specific needs, skills and interests.

#### ***STATUS OF COMPENSATION, BENEFITS AND LIVELIHOOD RESTORATION***

At this point in the Project, Noble Energy is still in the data collection, initial stakeholder engagement detailed in Section 2.

Noble Energy has completed a Land Survey for the Dor Beach area and held various initial consultations with affected stakeholders in Moshav Dor to discuss and negotiate terms of the compensation, timing and other mitigation and management actions.

On August 10, 2016, Noble Energy submitted the Building Permit Application for initial sites development for the stations in Dor area, and appended the Land Survey as well as a list of affected land owners.

Noble Energy will submit subsequent applications for various project components in a staged approach, including for:

- the CVS, DVS and Quarry foundations (anticipated November 2016);
- DVS to a valve pit located next to Ein Ayala Quarry components (anticipated October 2016); and,
- Planned onshore condensate pipelines (anticipated in 2017).

Land surveys for these areas by professional assessors with vast experience and expertise in natural gas projects are being undertaken first, as well as identification of stakeholders and land owners.

It should be noted that Noble Energy is utilizing the engineering firm which was retained by INGL which was the first entity to build pipelines close to TAMA 37/H approved pipeline corridor (under TAMA 37/C). Lessons learned from INGL will be applied to Noble Energy's compensation process to enhance engagement activities, and avoid objections and delays wherever possible.

A critical component of any livelihood restoration plan is the stakeholder engagement processes that align the existing commitments with appropriate disclosure of information, consultation and the informed participation of those affected.

Considering the possibility for both temporary and permanent economic displacement anticipated for this Project, it is important to understand that appropriate management of livelihood restoration may have consequences to the Project's relationship with communities. To this end, this Livelihood Restoration Management Plan will overlap broadly with the existing Stakeholder Engagement Plan as engagement continues to be an important component in identifying any potential gaps in the identification, acquisition and compensation processes.

As established in IFC PS 5, Community Engagement, particularly in the contexts of disclosure and consultation are requirements for alignment with this standard. As stated in Section 2, the TAMA process, which was already completed, had a built-in public consultation and disclosure process, and legislation allows for objections and claims to be submitted through the National Planning Council and affect the final version of the TAMA. The Building Permit Application process also has a legally established disclosure procedure, which enables land owners and other stakeholders to ensure, that the building permit aligns with the TAMA and relevant regulations, and bring forward reservations, specific interests and considerations, which are in the scope of the District Authority throughout the Building Permit Approval process. These processes for engagement, disclosure and consultation, as well as the continuous engagement the Noble Energy holds with affected stakeholders, are in alignment with IFC PS 5.

Noble Energy will also monitor its Community Feedback Mechanism for any grievances related to land use and access and compensation and take appropriate actions in concert with the government to address such grievances.