

# ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR PRINOS OFFSHORE DEVELOPMENT PROJECT



## Chapter 1 Introduction

## TABLE OF CONTENTS

|            |   |             |
|------------|---|-------------|
| <b>1</b>   | <b>INTRODUCTION</b>   | <b>1-3</b>  |
| <b>1.1</b> | <b>PROJECT TITLE</b>  | <b>1-3</b>  |
| <b>1.2</b> | <b>PROJECT OWNER</b>  | <b>1-3</b>  |
| <b>1.3</b> | <b>PROJECT TYPE AND SIZE</b>  | <b>1-4</b>  |
| 1.3.1      | PLANNED EXTENSION PROJECT   | 1-4         |
| 1.3.2      | POTENTIAL FURTHER DEVELOPMENT PROJECT                                   | 1-5         |
| 1.3.3      | EXISTING FACILITIES   | 1-5         |
| 1.3.4      | CURRENT AND PLANNED OIL AND GAS PRODUCTION                              | 1-6         |
| <b>1.4</b> | <b>GEOGRAPHIC LOCATION AND ADMINISTRATIVE DEPENDENCE OF THE PROJECT</b> | <b>1-7</b>  |
| 1.4.1      | LOCATION  | 1-7         |
| 1.4.2      | ADMINISTRATIVE DEPENDENCE OF THE PROJECT                                | 1-10        |
| 1.4.3      | GEOGRAPHICAL COORDINATES OF THE PROJECT                                 | 1-12        |
| <b>1.5</b> | <b>ASSESSMENT METHODOLOGY AND RISK MITIGATION APPROACH ADOPTED</b>      | <b>1-13</b> |
| <b>1.6</b> | <b>PROJECT ENVIRONMENTAL PERMITTING AND SCREENING</b>                   | <b>1-16</b> |
| <b>1.7</b> | <b>PROJECT ENVIRONMENTAL CONSULTANT</b>                                 | <b>1-18</b> |

### TABLES

|  |      |
|--|------|
| Table 1-1: Prinos field production .....   | 1-6  |
| Table 1-2: Coordinates for existing and planned platforms (WGS 84).....              | 1-12 |
| Table 1-3: Coordinates for existing and planned platforms (WGS 84 UTM 35 North)..... | 1-12 |

### MAPS

|   |      |
|---|------|
| Map 1-1: Location of the Prinos development area in the Gulf of Kavala .....  | 1-8  |
| Map 1-2: Location of Project facilities (planned and existing) .....  | 1-9  |
| Map 1-3: Administrative boundaries of the broader project area and association with the offshore facilities (planned and existing)..... | 1-11 |

## ABBREVIATIONS

|          |   |
|----------|---|
| ALARP    | As Low As Reasonable Practicable                        |
| E&P      | Exploration & Production                                |
| EBRD     | European Bank for Reconstruction and Development        |
| EEC      | European Economic Community                             |
| EIA      | Environmental Impact Assessment                         |
| EIS      | Environmental Impact Study                              |
| ENERGEAN | Energean Oil & Gas S.A.                                 |
| ERM      | Environmental Resources Management Limited              |
| ESIA     | Environmental & Social Impact Assessment                |
| ESMMP    | Environmental and Social Management and Monitoring Plan |
| EU       | European Union  |
| IBA      | Important Bird Areas                                    |
| JMD      | Joint Ministerial Decision                              |
| LDK      | LDK Engineering Consultants S.A.                        |
| NTUA     | National Technical University of Athens                 |
| O&G      | Oil & Gas   |
| PR       | Performance Requirements                                |
| SPA      | Special Protection Area                                 |
| UoA      | University of Athens                                    |
| YPEN     | Ministry of Environment and Energy                      |

# 1 INTRODUCTION

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## 1.1 PROJECT TITLE

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The Project covers existing offshore oil and gas production facilities located in the Gulf of Kavala, North Aegean Sea, Greece, planned extensions to these, as well as potential further development projects currently still being studied. Existing offshore facilities have been in operation since they were developed in the period 1979 to 1981. These facilities were developed to allow production of sour-oil and associated gas from the Prinos field and sweet-gas from the South Kavala field. They were later extended to enable the Prinos North field to be developed. Produced hydrocarbons are partly treated offshore before being transported to shore for full treatment to sales specifications. Transportation is via two submarine pipelines that have been in operation since 1981. The fields and associated licenses are owned by Energean Oil and Gas S.A. and operated by its subsidiary Kavala Oil. The Project Owner for the planned extension is Energean Oil and Gas S.A.

This document is the Environmental and Social Impact Assessment (ESIA) for the Project. This document has been prepared in line with existing Greek legislative requirements (reflecting as appropriate European legislative frameworks and relevant international treaties). The Project Owner is seeking finance for certain elements of the Project (the planned extensions defined below) from the European Bank for Reconstruction and Development (EBRD). The ESIA has therefore also called upon the Performance Requirements (PR's) included in EBRD's 2014 Environmental and Social Policy.

Existing Greek legislation and the Performance Requirements of EBRD differ to a degree in the required approach for presenting EISA's for offshore oil and gas facilities. The structure of this document generally reflects the prescriptive format demanded under Greek legislation. However the approach taken to assessing potential environmental and social impacts, the structure of key sections (for example, those describing the Baseline and Impact Assessments) as well as the inclusion of early stakeholder sessions at the scoping stage, have been driven by the requirement to satisfy EBRD's PR's.

## 1.2 PROJECT OWNER

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The Project Owner (operator) is the company **ENERGEAN OIL & GAS** (Address: 32 Kifisias Ave., PC 151 25, Marousi, Telephone: 2108174200).

The supervisors of this EIA, on behalf of the project owner, are:

- Dr. Steve Moore, Technical Director
- Mr. Vasilis Tsetoglou, HSE Manager

Energean is a private oil and gas Exploration and Production (E&P) company focused on Greece, the wider Adriatic and North Africa, with five licenses in Greece and the Mediterranean. Energean is the only oil & gas producer in Greece with a track record of over 35 years as an offshore and onshore operator of oil & gas assets.

In December 2007, Energean acquired the majority shareholding of Kavala Oil, which held 100% interest in the Prinos Concession Agreement. Kavala Oil has been engaged in offshore exploration activities in the Gulf of Kavala since 1999, when it took over operations from the NAPC consortium, which discovered and developed the Prinos field in the early 1980. The full project history of the concession is reported analytically by the aforementioned description of the concession agreements.

## 1.3 PROJECT TYPE AND SIZE

The extent of the current ESIA is significantly broader than the planned facility extension project that is the subject of funding by the EBRD. The ESIA has been prepared to cover not only these planned extensions, but also all of the existing offshore assets that have been in operation since 1981, as well as potential future extensions that Energean Oil and Gas S.A. is studying, but has not yet committed to implement. Onshore facilities used to treat fluids produced offshore are not included, although they have been described in an attachment, as per EBRD requirements.

For the sake of clarity the following sub-division of assets and projects has been defined. These definitions also provide an explanation as to why they have been included in the current assessment.

### 1.3.1 Planned extension project

The planned extension project is the work scope that is to be funded by EBRD. This comprises:

- The re-entry of nine (9) existing wells on the Prinos Alpha platform and the sidetracking of these to new bottom-hole locations in the Prinos field. These wells target undrained pools of oil in the A, B and C reservoir units.
- The re-entry of one (1) existing Prinos North extended reach well located on the Prinos Alpha platform, with the objective of side tracking it up dip of the existing bottom hole location to allow attic oil reserves to be drained.
- The design, fabrication, installation, commissioning and subsequent operation of a new well-head jacket platform (called “Lamda”) approximately 3.5 km’s north west of the existing Prinos platforms. The Lamda platform will host between 5 and 9 wells that will be drilled into and produce from the Epsilon field. This platform has been designed to

be normally unmanned. All produced fluids are transported to the Prinos Delta platform where existing equipment is used to separate oil, water and gas

- Three (3) sub-marine pipelines that connect Lamda to Prinos Delta. These comprise one 10" pipeline to carry multi-phase well fluids from Lamda to Delta, and two 6" pipelines to carry injection water and lift gas respectively from Prinos Delta to Epsilon
- Between 5 and 9 new wells to be drilled from the Lamda platform into the Epsilon field. These wells will initially be completed as producers with between 2 to 4 being converted after approximately 18 months to water injectors. The range of well numbers planned reflects the uncertainty in recoverable reserves. The designed platform is equipped with 15 slots.

Energean Oil and Gas S.A. commenced this project in late 2014 when it purchased and renovated the Energean Force drilling rig that will be used to undertake all sidetracks and new wells. Sidetracks commenced in September 2015. Currently (early February 2016) the Company is approximately 50% complete with the second of the planned nine (9) Prinos Alpha side tracks.

### 1.3.2 Potential further development project

Energean is currently studying an additional development project that would be implemented following successful completion of the planned extension project defined above. This project would introduce a second new wellhead jacket (identical to Lamda). This platform ('Omicron') would be located between the Prinos North and Prinos reservoirs and used to further develop Prinos North in addition to the Kazaviti discovery. Kazaviti will be appraised by the 3<sup>rd</sup> planned Prinos Alpha sidetrack (well PA-36), allowing a decision to be made on the viability of this potential project subsequently.

Details of the Omicron project and associated wells are included in the ESIA. This project is not currently included in the EBRD finance package. It is covered in the ESIA because Energean Oil and Gas S.A. wishes environmental permits issued by the Greek government to cover this scope.

Also in this additional project would be a campaign to sidetrack up to 5 of the current Prinos Beta wells to new bottom hole locations.

### 1.3.3 Existing facilities

The existing offshore facilities are presented in detail and the environmental and social impacts associated with them fully assessed even though they remain fundamentally unchanged by either the planned or potential further development projects defined above. For minor extensions such as those planned it would not be normal to reassess facilities that have been operating for 35 years and which are covered by valid environmental permits, in such detail. They have been included in the ESIA at the request of the Greek government. After consultation the government has advised that it wishes to grant a new environmental permit which covers all offshore facilities

rather than; i) grant a new permit to cover only the new facilities or, ii) to extend the existing permits to cover the new facilities. As a new permit is to be issued it has requested Energean to prepare a new ESIA for the entire offshore area. This ESIA should also reflect the requirements of the European Offshore Directive, which has yet to be transposed into the Greek legal framework.

With respect to Greek legislation there is no requirement for Energean to include side-tracks of existing wells in the ESIA. These activities are considered operational activities performed on existing wells and hence are covered by existing operational permits. They are included in the ESIA as they form part of the planned extension project to be funded by EBRD. The Greek government considers side tracks as work over activities.

All of the existing facilities have been designed and permitted at an earlier date at throughputs and capacities exceeding those which will be achieved by execution of the planned or the planned plus potential developments. Prinos facilities have been designed for a notional oil throughput of 27,000 bopd. They are currently processing just 3,000 bopd. Expected P50 production rates following the defined projects are tabulated below.

For the avoidance of doubt the existing facilities described are:

- The Kappa platform located on the sweet, non-associated gas field South Kavala
- The 6" pipeline that transports sweet gas and condensate from South Kavala to Prinos Delta
- The 12-slot production jackets Prinos Alpha and Prinos Beta which form part of the bridge linked Prinos complex
- The Prinos Delta platform that contains all offshore processing facilities and which receives oil, gas, water and condensate produced from Prinos, Prinos North and South Kavala fields. Prinos Delta is bridge linked to Prinos Alpha and Prinos Beta as well as the Prinos flare jacket. New risers will be added to Prinos Delta to allow it to receive fluids from Lamda (and potentially Omicron) and send lift gas and water for injection to Lamda.
- The Prinos flare jacket
- A 12" dry-gas pipeline connecting Prinos Delta to the onshore facilities
- An 8" oil pipeline connecting Prinos Delta to the onshore facilities
- A 5.3" pipeline that transfers seet dry lift gas from the onshore facilities to Prinos Delta
- Two 10kVa submarine power cables that transport electricity from the onshore facility to Prinos Delta

### 1.3.4 Current and planned oil and gas production

Current and planned oil and gas production are presented in the table below:

Table 1-1: Prinos field production

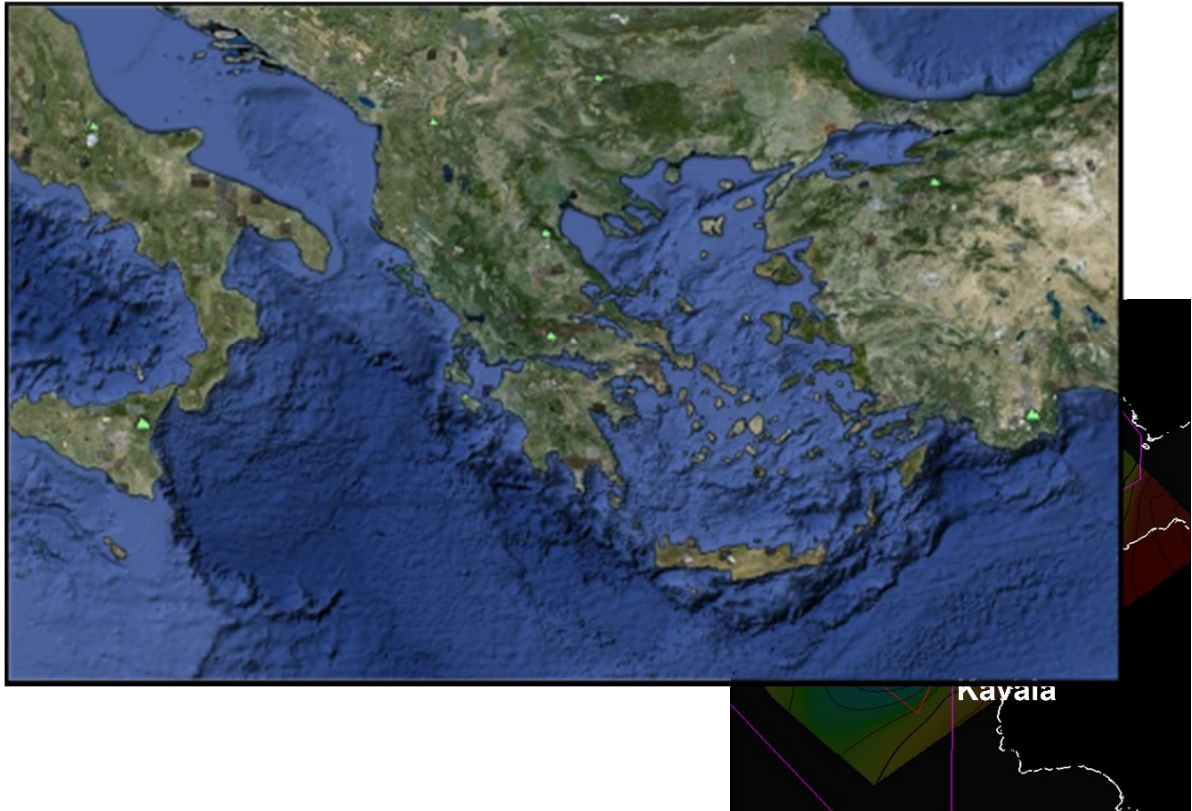
| Type of product                                      | Design capacity | Quantity   |  |   |  |
|--|-----------------|--|--|---|--|
|  |                 | Current production<br>(from existing facilities, Prinos / South Kavala fields) | Peak planned production following Prinos Alpha sidetracks (P50 forecast) | Peak planned production following development of Epsilon field (P50 forecast) | Peak planned production following potential Prinos Beta sidetracks and Omicron platform (P50 forecast) |
| Stabilised crude oil (barrels or bbls/day)           | 27,000          | 3,000  | 10,000   | 14,000  | 20,000   |
| Sour gas export (cubic meters or Nm <sup>3</sup> /d) | 333,000         | 40,000   | 110,000  | 156,000   | 175,000  |
| Sulphur (megatons or MT/day)                         | 478             | 40   | 98   | 86  | 115  |
| Condensates (cubic meters or m <sup>3</sup> /d)      | 265             | 40   | 105  | 115   | 150  |

## 1.4 GEOGRAPHIC LOCATION AND ADMINISTRATIVE DEPENDENCE OF THE PROJECT

### 1.4.1 Location

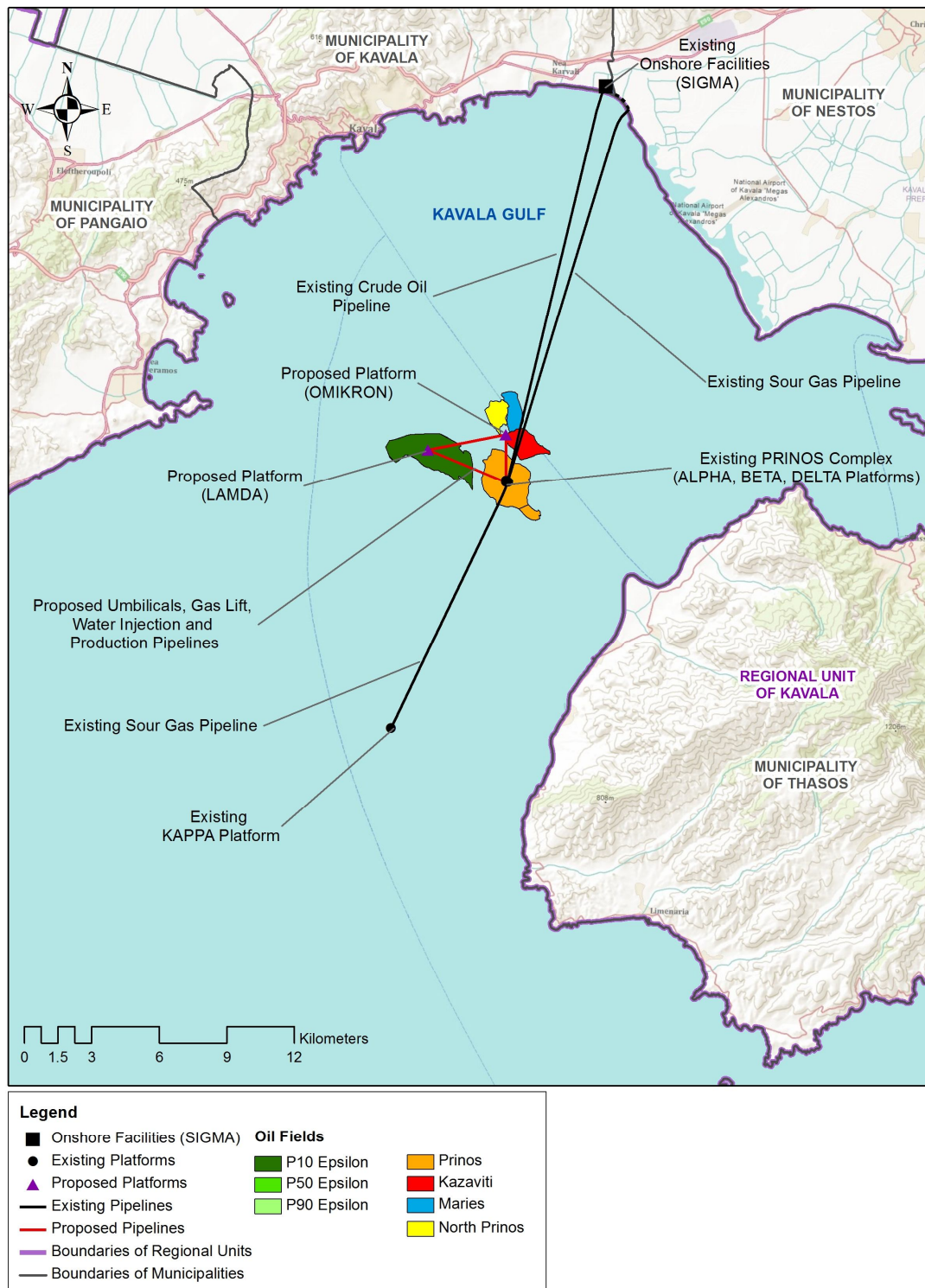
The Prinos facilities and overall development area are located offshore in the Gulf of Kavala, 8 km west of island of Thasos and 18 km south from the main coastline of Kavala. The Gulf of Kavala is part of the Thracian Sea and falls within North East Aegean as presented below.





Map 1-1: Location of the Prinos development area in the Gulf of Kavala.

Existing and new proposed facilities are presented in the map below.

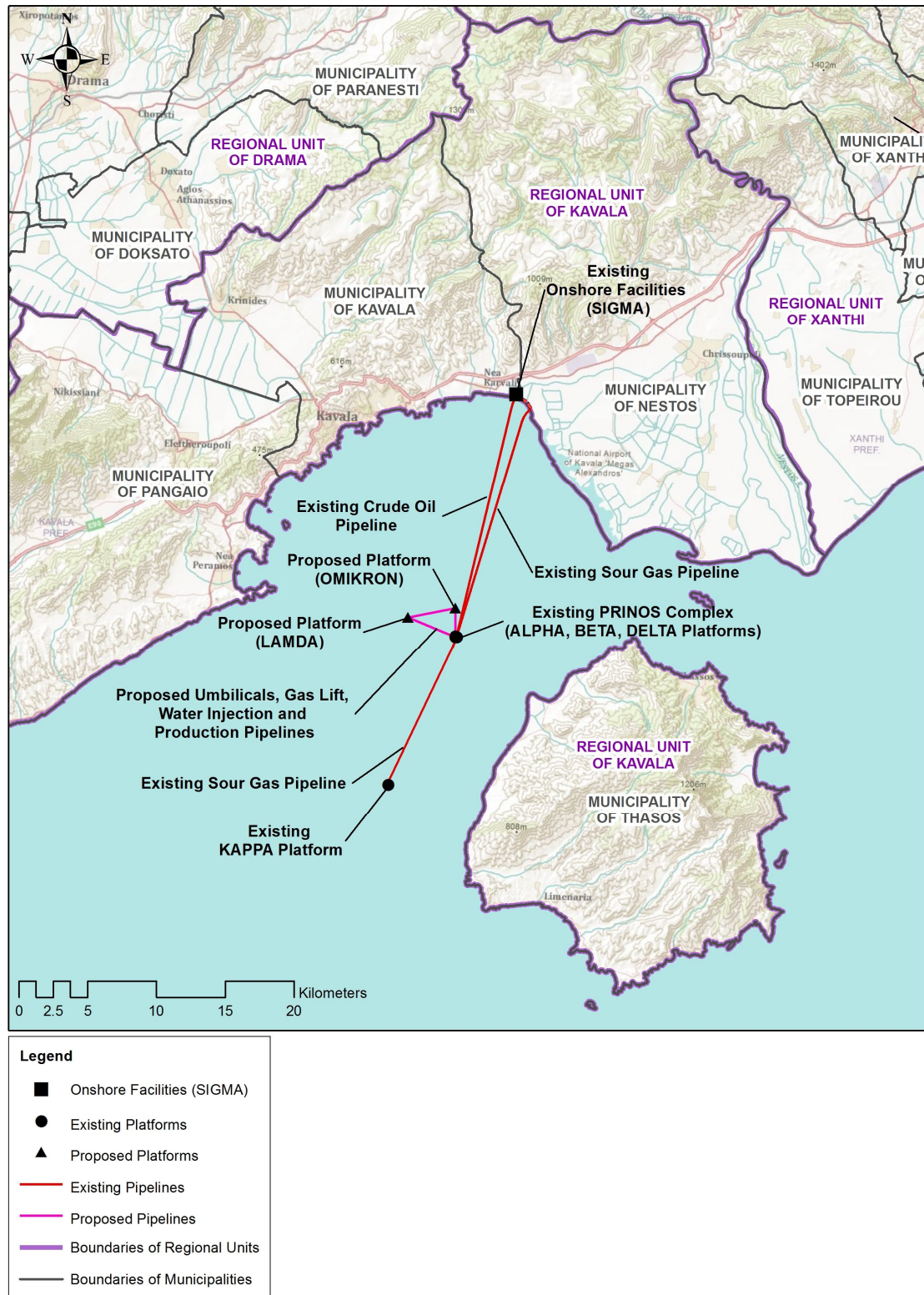


Map 1-2: Location of Project facilities (planned and existing)

### 1.4.2 Administrative dependence of the project

The proposed and existing facilities are located in the East Macedonia and Thrace region, in the southern coastal part of the Regional Unit of Kavala, near the limits of Municipalities of Kavala (on the North), Pangaio (on the North-NorthWest), Nestos (on the North-NorthEast) and Thasos (on the East-SouthEast), following the L.3852/2010 (A' 87) "Kallikratis" Programme.





Map 1-3: Administrative boundaries of the broader project area and association with the offshore facilities (planned and existing)

Associated onshore facilities (Sigma plant) in particular fall within the Municipality of Kavala

bordering with Municipality of Nestos.

### 1.4.3 Geographical coordinates of the project

The coordinates of the concession area are given in the relevant agreements as ratified by the Greek Parliament. The project in discussion as described above is included within those areas. In the following table the coordinates in two coordinate systems (WGS 84 and WGS 84 UTM 35 North) of the platforms are presented (center point of platforms):

Table 1-2: Coordinates for existing and planned platforms (WGS 84)

| Platform        | Lat             | Long            |
|-----------------|-----------------|-----------------|
| <i>Existing</i> |                 |                 |
| Delta           | 24° 29' 50.40"E | 40° 47' 54.92"N |
| Alpha           | 24° 29' 49.62"E | 40° 47' 57.62"N |
| Beta            | 24° 29' 54.41"E | 40° 47' 55.36"N |
| Kappa           | 24° 26' 34.95"E | 40° 42' 03.74"N |
| <i>Planned</i>  |                 |                 |
| Lamda           | 24° 27' 12.97"E | 40° 48' 33.55"N |
| Omikron         | 24° 29' 45.17"E | 40° 49' 06.71"N |

Table 1-3: Coordinates for existing and planned platforms (WGS 84 UTM 35 North)

| Platform        | Lat       | Long       |
|-----------------|-----------|------------|
| <i>Existing</i> |           |            |
| Delta           | 288872.57 | 4519412.81 |
| Alpha           | 288856.70 | 4519496.85 |
| Beta            | 288967.00 | 4519423.89 |
| Kappa           | 283976.50 | 4508715.00 |
| <i>Planned</i>  |           |            |
| Lamda           | 285217.68 | 4520710.41 |
| Omikron         | 288813.30 | 4521630.44 |

## 1.5 ASSESSMENT METHODOLOGY AND RISK MITIGATION APPROACH ADOPTED

As outlined above, the Project covered by the current ESIA is complicated by the need to describe not only the planned extension project but the existing facilities that have been operational for 35 years. The approach that has been adopted is to include in the Base Line Assessment impacts associated with the existing facilities. These facilities have been in permanent operation for close to four decades. In this period the routine impacts associated with them will have over stamped the environmental and socio-economic conditions that existed before their development.

The potential impact of the described extension projects (planned and potential elements together) is then quantified. These extensions are broken into two phases, namely 1) the construction period associated with the installation of the new platform(s) and 2) the operational phase following installation when the new and existing facilities combine to form a new overall production system. The impact of drilling operations (both side-tracks of existing wells and new wells drilled from top-hole) is included in the operational phase assessment. Drilling has already commenced on the Alpha platform and will continue whilst the new platform(s) are constructed and installed as well as after they are in place. As new potential projects are identified and approved drilling operations could continue for many years. Hence it was considered more logical to overlay the impacts from drilling operations onto facility operations rather than consider them within the platform construction phase, which has a very limited duration (with well defined start and stop points).

As outlined in the section where the existing and planned facility extensions are described in detail, it is clear the new facilities represent a very minor cumulative addition to the overall operational complexity of the area. Environmental and Socio-economic impacts of the existing facilities have been managed successfully over the last 35 years by a system of controls implemented by Kavala Oil staff. The ESIA examines these controls to determine whether they are sufficient to manage the increased complexity as well as any new hazards introduced by the planned and potential extensions. Plans to extend established control systems to mitigate risk from the additional facilities are described where such extensions are necessary. New mitigations are similarly outlined.

Energean has consciously built into the design of the extension facilities specific features that help mitigate risks both in the construction and operational phases of the project. A novel sub-structure design has been adopted. This allows the total platform to be assembled onshore in a location designed for such industrial activities. As a result the installation time offshore is reduced from 6 to 8 weeks to a matter of days. The size of the installation fleet is similarly reduced. The need for permanent offshore manning is avoided. Clearly environmental risk during construction is driven by the extent of the marine fleet required. Another benefit of the selected design is the significant reduction in offshore noise. Energean has selected to use suction piles rather than

conventionally driven piles to hold the new structure in place. This avoids weeks of pile driving activities and the associated noise.

The selected design also provides risk reduction benefits in the operational phase. The topside facilities and sub-marine pipelines have all been designed to withstand the maximum closed in pressure of the wells. This means that when operating at normal conditions the corrosion allowance available is significantly increased. This reduces the calculated frequency of losses of integrity and hence introduction of hydrocarbons into the environment. In addition this conservative approach has also removed the need for a permanently lit flare on the new platforms. Flares clearly introduce significant environmental impact. They are a source of continuous emissions and light pollution. They also represent a significant leak path to introduce liquid hydrocarbons into the environment if process systems fail. The planned and potential new facilities do not need a flare due to the conservative approach taken to rating of process pipework and the avoidance of vessels.

Energean has also selected to link the new facilities to the Delta complex by submarine power cables rather than equip them with diesel powered generators. The selected approach increases initial capex but reduces emissions by allowing efficiently generated power from the public network to be employed rather than lower efficiency locally generated electricity. This approach also reduces noise and local emissions and avoids the need to transfer diesel onto the satellites.

The new facilities have been designed to be unmanned, with control achieved from Delta. Visits will be limited to 2 per week, rather than 3 per day as at the existing facilities. This reduces marine traffic and hence associated environmental impacts. Clearly it also removes the need for additional employment with corresponding negative socio-economic consequences.

The analysis performed in the ESIA has demonstrated that the routine risks associated with the new facilities can be managed at a level that is as low as reasonably practical (ALARP). The most significant risk associated with the new facilities is that associated with potential accidental releases. The only source of a significant spill associated with the new facilities is from a blow-out whilst the new wells are being constructed. The frequency or consequence of other typical leak types has been mitigated, for example:

- Carry over from the flare knock-out drum: no flare is required by design
- Rupture of topside equipment/vessels or mal operation: no vessels are included in the main process system; topside hydrocarbon inventory is limited to 6 m<sup>3</sup> by design. All surface equipment is rated to 235 bar – 215 bar higher than normal operational pressures
- Rupture of the multiphase export line from Lamda (Omicron) to Delta: line is rated to 235 bar and buried to avoid external impacts; system has been designed to allow internal inspection; liquid volume in export line limited to approximately 50 m<sup>3</sup> by use of small diameter and by multiphasing with produced gas

Oil spill modelling has investigated the potential consequences of significant oil spills associated with:

- A blow out from one of the new wells being drilled on Lamda platform;

- A leak while loading processed crude to an oil tanker.
- A large diameter hole in the main export line that takes crude from Delta to Sigma

The location and size of this latter spill has been determined from an analysis of Major Hazards. The worst case scenario is seen to be damage from a fishing trawler at the point just before the pipeline is buried. This point is at a distance of 7 km from Delta. Beyond this point the oil line is buried and hence safeguarded from external impacts that could lead to a large spill. Corrosion related damage in the buried section would result in small leaks that would be detected immediately during routine inspection activities. As the Gulf of Kavala is flat calm for about 40% of the time (summer and winter) detecting minor sheens is very easy and rapid. Shallow depths allow repairs to be affected with routine diving operations that are on call 24 hrs per day.

The Gulf of Kavala benefits from benign weather conditions that largely mitigate the consequences of significant oil spills. Wind speeds are below a “light breeze” for 35% of the time in December and 49% of the time in June. Hence for most of the year a leak, as modelled, moves very slowly. Strong winds (above “strong breeze”) occur for only 1.25% of the time. All such periods are in the winter months. Average wind speeds in directions that could carry oil to shore are between 2.1 and 4.0 m/s in the winter and 2.4 and 3.4 m/s in the summer. These light onshore winds blow for around 25% of the time. Stronger offshore winds (5 to 7.5 m/s on average) dominate for the rest of the period. Winds to the nearest land fall (the tourist beaches on the islands of Thasos) blow for less than 7% of the time and average 2.2 m/s year round. Energean holds oil spill response equipment which can be mobilised to site in 3 hours maximum due to the near shore location. The calm conditions and low winds make booming and skimming activities very effective.

To keep the number of scenarios to a manageable level the areas of particular sensitivity need to be identified and scenarios that look at how these areas could be impacted defined. In this framework the following locations have been defined:

- The coast between Nea Peramos and Nea Karvali – this coast line contains the historic port of Kavala, a number of tourist beaches (to the west and east of Kavala), the commercial port at Fillippos, small industrial based marine facilities (Fertiliser plant, Sigma water intake and loading buoys, Refined product intake buoys).
- The coast between the Sigma plant and the mouth of the delta of the Nestos river – this coast falls under numerous protection provisions (part of Natura 2000, SPA, National park, Ramsar wetlands, IBA). Moreover, it holds a number of small-scale fish farming enterprises. The impact on this coastline would be most significant from the late spring through to the end of summer.
- The north and North West coast of the island of Thasos - Thasos is a major tourist destination. Whilst many of the main beaches are on the east and south of the island there are a number of popular tourist locations on the coast immediately adjacent to Energean’s offshore facilities (Rachoni, Prinós, Kalarachi etc.).



## 1.6 PROJECT ENVIRONMENTAL PERMITTING AND SCREENING

All Prinos field facilities and operations have undergone a series of environmental licensing and permit dating back in 1997. In more detail:

- The current productive offshore facilities were first licensed with JMD 80994/07-02-2002 issuing environmental terms for the project till 31.12.2010. This Decision was renewed and modified under Decision 46781/1283/12-08-2013 from General Director of Environment and is valid till 12.08.2023;
- The exploration drilling programme of KAVALA OIL was granted an environmental permit with JMD 108879/27.10.2006 that was further renewed with JMD 68098/1880/10-12-2013 until 10-12-2023;
- The onshore facilities were first licensed with Decision 31218/19.09.1997 signed by General Director of Ministry of Environment, Urban Planning and Public Works (ex Ministry of Environment, Climate Change and Energy) and General Director of Ministry of Development; it is noted that this decision was issued for North Aegean Petroleum Co EPE<sup>1</sup>. Following the issuance of Law 2779/99 (ratification of the Agreement 2779/99 between the Greek State and KAVALA OIL S.A.<sup>2</sup>) in 1999, Decision 47628/11.10.2000 modified environmental terms (Decision 31218) regarding the company's trade name. In 2003, the project's environmental terms were renewed - modified with Decision 96213/80994/07.02.2003. Finally, in 2013 with Ministerial Decision 213450/05-12-2013 signed by YPEKA, environmental terms governing onshore project were modified and renewed for ten (10) years viz till 05-12-2023.

As noted in other parts of the document, the onshore facilities are not included in the scope of work of the present ESIA.

According to Ministerial Decision 1958/13-01-2012 "Classification of public and private works fall into categories and subcategories. In accordance with Article 1(4) of Law 4014/2011" the Project belongs to Group 5 "Mining and similar activities", Serial Number 7 "Pumping of hydrocarbons and exploratory drilling in search of hydrocarbons" and is included in Subcategory A1 since all works of this activity belong to this subcategory.

Category A1, classifies the projects that may have significant effect to the environment, and therefore:

- A detailed Environmental Impact Statement (EIS or EIA) is required as per the specifications set out by JMD 170225/2014 (Annex 2);
- The competent authority that issues the permit is the Ministry of Environment and

<sup>1</sup> North Aegean Petroleum Co EPE was founded on December 1976 as operator for the project's activities in Greece.

<sup>2</sup> KAVALA OIL S.A. was comprised of two companies: EUROTECH SERVICES (sharing 67%) and the ASSOCIATION OF EMPLOYEES (sharing 33%).

Energy (YPEN) and particularly Department of Environmental Licensing (DIPA) as per L.4014/2011;

- An A1 project permitting procedure is set out in Article 3 of L.4014/2014;
- The consultation authorities during the EIS process are predefined in JMD 1649 /45/2014.

The environmental permitting procedure for the Project is defined by the Law 4014/2011 as described below. The contents and the level of detail of the Environmental Impact Assessment study are set out in the Joint Ministerial Decision (JMD) 170225/2014 depending on the Project's classification. This process and the requirements for EIA are aligned with the EU EIA Directive, which has been transposed into Greek legislation.

The EIA process:

- Impact Assessment: the applicant shall provide an EIA of the project to the Ministry of Environment and Energy (YPEN), Directorate of Environmental Permitting (DIPA);
- Check for Completeness: DIPA/YPEN will check the EIA for completeness and may request additional information, prior to distributing for consultation;
- Statutory Consultation: opinion/response from the Central Authorities or other competent Ministries, Regional Authorities and various organizations (the consultees are predefined by the JMD 1649/45/2014 for each project type and category);
- Public Consultation: the project is presented to the Regional Council during an open hearing where people can express their views
- Decision on Approval of Environmental Conditions: DIPA/YPEN will consider the results of the consultation (statutory and public) and will issue its decision, co-signed by other competent Ministries
- Publication of Decision: publication of the decision through the relative Regional Council.

Following consultation with the Greek authorities, it has been agreed that the EIA will be prepared so as to also cover the operation of the existing facilities in the Prinos offshore area since the operations of the new and old offshore facilities will be operationally interlinked.

For completeness, the facilities associated with the depleted South Kavala gas field are included, although these are not linked to the planned new facilities; South Kavala facilities are connected to the existing Delta platform. Although depleted, gas is produced intermittently and Energean is looking at methods to further increase gas and condensate production whilst the Greek authorities formalize plans for converting this field into a strategic gas storage project.

The onshore facilities are covered by a detailed Environmental Impact Assessment, which was renewed and reapproved by the Greek authorities in 2013, (213450/5/12/2013, General Secretariat of Environment, YPEKA – currently YPEN). The existing offshore facilities are also covered by an EIA, which was renewed and reapproved by the Greek authorities in 2013 (46781/12/8/2013).

Appropriate Assessment is mandatory if a development extends into a Natura 2000 area and this assessment usually takes the form of a Special Ecological Study in Greece. The Special Ecological Study considers the potential impacts of a project on a Natura 2000 area (Article 6 of

Directive 92/43/EEC – the Habitats Directive). Specifically, it takes into account the conservation objectives of the protected area, focuses on the consequences of the project under licensing in the area, and examines whether the integrity of this region is compromised. None of the proposed facilities extend into a Natura 2000 area. One of the existing pipelines to shore does cross a Natura 2000 area and therefore a Special Ecology Survey has been undertaken.

The European Bank of Reconstruction and Development (EBRD) is currently considering providing financing for the Project and therefore the EIA has taken into consideration the EBRD's environmental and social requirements. These are the EBRD's Performance Requirements (PR) which form part of the EBRD's Environmental and Social Policy of 2014. As per the Policy, the Project is categorised as A and requires a full Environmental and Social Impact Assessment and disclosure thereof for a minimum of 60 days prior to a financing decision. Rather than producing separate EIA documents, one for permitting and one for financing, the Project has produced an ESIA that serves both purposes and which is supported by various additional documents which together form the ESIA disclosure package. Similarly the Project will combine permitting and financing disclosure requirements. The biggest difference between a permitting EIA in the EU and an ESIA to EBRD standards is a more detailed consideration of social issues in addition to environmental issues. Furthermore the EBRD requires engagement with stakeholders as early in the ESIA process as possible.

## 1.7 PROJECT ENVIRONMENTAL CONSULTANT

This ESIA was prepared by LDK Engineering Consultants S.A., holder of an Advisory Committee on Designs (GEM) Degree 27 "Environmental Studies".

The following team participated in the preparation of this assessment:

| Name                     | Background, expertise               | Position   |
|--------------------------|-------------------------------------|--|
| Costis Nicolopoulos      | Environmental engineer, MSc         | Head of LDK Environment, principal, project director           |
| Evie Litou               | Chemical engineer, MSc, AIEMA       | Principal ESIA / process consultant                            |
| Foteini Tsafou           | Environmental Engineer, MSc         | Senior ESIA consultant   |
| Thomas Kollias           | Environmental Scientist, MSc        | Senior ESIA / O&G / social / stakeholder engagement consultant |
| Eleni Avramidi           | Environmental Engineer, GIS Analyst | Senior ESIA/GIS consultant                                     |
| Xenofontas Bakouras      | Environmental Engineer, MSc         | Senior ESIA consultant   |
| Aliki Panou              | Marine Biologist                    | Senior marine mammal consultant                                |
| Dimitra Evaggelakopoulou | Environmental Engineer, MSc         | Junior ESIA/ O&G/ social / stakeholder engagement consultant   |

| Name             | Background, expertise             | Position                        |
|------------------|-----------------------------------|---------------------------------|
| Eleni Giamakidou | Geography, Nature Management, MSc | Junior ESIA, ecology consultant |

The following scientists - associates participated as associate experts:

| Name                        | Background, expertise              | Position  |
|-----------------------------|------------------------------------|---|
| Prof. Dr. Nikolas Markatos  | Chemical engineer, PhD, NTUA       | Principal risk / safety expert  |
| Prof. Andreas Boudouvis     | Chemical engineer, NTUA            | Principal risk, scientific coordinator                                      |
| Dr Michalis Christolis      | Civil engineer, DEA, NTUA          | Principal risk / safety expert  |
| Dr. Despoina Karadimou      | Chemical engineer, PhD             | Computational modeling expert   |
| Dr Ioannis Andreou          | Chemical engineer, NTUA, PhD       | Principal risk / safety expert  |
| Dr. Theopisti Lymberopoulou | Chemist, chemical engineering, PhD | Principal pollution assessment / laboratory analysis                        |
| Prof. Artemis Nikolaidou    | Marine biologist, UoA              | Principal marine biologist expert   |
| Sergio Carlos Garcia Gomez  | Benthic ecologist                  | Senior marine invertebrate biologist expert                                 |
| Elizabeth Arevalo Corillo   | Marine biologist                   | Field expert – laboratory analysis / species identification                 |
| Aglaia Legaki               | Marine biologist                   | Field expert  |
| Spyros Aravantinos          | Marine biologist                   | Field expert – laboratory analysis / species identification                 |
| Kalliopi Sigala             | Marine biologist                   | Ecological quality analysis   |
| Dimitris Poursanidis        | Marine biologist                   | Senior marine biologist – special ecological study                          |
| Jacob Fric                  | Physicist, bird ecologist          | Ornithologist expert – special ecological study                             |
| Kostas Mylonakis            | Diver                              | Ecotopes / species cartography, documentation (underwater photo log, video) |

Moreover Environmental Resource Management (ERM Ltd) has also been engaged providing high overview and advisory services in order to align the requirements towards the Greek State and the EBRD requirements, as well as bringing international offshore O&G experience to the present ESIA team.

The following ERM team participated in the preparation of this assessment:

| Name                | Background, expertise                              | Position  |
|---------------------|--|---|
| Nicola Lee          | Environmental assessment & management MSc          | Partner, project director   |
| Elena Amirkhanova   | Geography MSc                                      | Partner, social/stakeholder engagement expert                         |
| Roderick Ellison    | Environmental impact assessment MSc BSc CEnv MIEMA | Principal ESIA Consultant, impact assessment/mitigation/ESMMPs expert |
| Shana Westfall      | Chemical engineer                                  | Senior ESIA Consultant  |
| Esmeralda Francisco | Sociologist, urban policy & planning MSc           | Senior consultant, impact assessment & planning                       |

In addition, ERM has been the appointed consultant for matters related to the Directive 2013/30/EU (safety of offshore oil and gas operations) and, in particular, for the results of the major accidents prevention studies and plans, the responsibility for the preparation of the studies and plans.

The following team participated in the preparation of this assessment:

| Name        | Background, expertise         | Position          |
|-------------|-------------------------------|-------------------|
| Rob Steer   | Risk and safety expert        | Partner           |
| David Caine | Mechanical engineer MEng, MBA | Senior Consultant |