PROJECT:

EastMed Pipeline Project

Document Title:	EastMed Greek Section- Environmental and Social Impact Assessment
Document Subtitle	Chapter 10 – Mitigation Measures
Project Document No:	PERM-GREE-ESIA-0010_0_ESIAch10-EN

Document details	
Document title	EastMed Greek Section - Environmental and Social Impact Assessment
Document subtitle	Chapter 10 – Mitigation Measures
Company	IGI Poseidon
Author	ASPROFOS, ERM
Project	EastMed Pipeline Project
Project Document No.	PERM-GREE-ESIA-0010_0_ESIAch10-EN
Date	03/06/2022
Version	00

Document history					
Revision	Author	Reviewed by	Approved by	Date	Status
00	ASPROFOS	ERM	IGI POSEIDON	03/06/2022	For submission to Authorities

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Abbreviations

See Document Map.

1 MITIGATION MEASURES

1.1 Introduction

This Chapter presents the mitigation measures required for the management of the impacts presented in Chapter 9. The mitigation measures are mirroring the impact list and structure presented in Chapter 9.

It is clarified that some mitigation measures are already embedded into the design of the Project. Typical examples include the reduction of the working strip in sensitive areas, route refinement and spatial analysis prior the selection of the project footprint (e.g. location of facilities), or special crossing techniques for specific rivers (e.g. trenchless methods), etc. these are presented nonetheless, in order to present the entire set of commitments (measures) that are in place to minimize impacts from the Project to the natural and anthropogenic environment.

Another important note is the fact that the mitigation measures are presented in groups, per environmental compound. Some mitigation measures are repeated in various environmental compounds (e.g. Landscape Management and Restoration and Erosion Control Plan is applicable for both Landscape and Biodiversity compounds); other measures are simply applicable for more than one environmental compound. In other words, mitigation measures constitute a set of commitments applicable for the entire Project and not only for a specific parameter.

Finally, the Environmental and Social Management and Monitoring Plan is presented in Chapter 11 of the ESIA. It is clarified that details on the locations (spatial correlation) of the mitigation measures are provided in the present chapter and Chapter 11, as and if available. The specific locations (as well as time duration) where the measures will be applied might be adjusted in the framework of the Project's Detailed Design.

1.2 Construction Phase

1.2.1 Introduction

The following sections describe mitigation measures for negative impacts or enhancement measures for positive impacts, during construction phase.

1.2.2 Climatic and bioclimatic characteristics

During construction phase, it is proposed to apply the following good practices to minimize the impact of exhaust fumes from construction activities (see Table 1-1). More details (mitigation measures) on the atmospheric environment during the construction phase are presented in section 1.2.10.

Table 1-1 Mitigation Measures to Address Impact on Climatic and Bioclimatic Characteristics during Construction Phase.

Climatic and Bioclimatic Characteristics		
Impact	Mitigation Measures	Location
Temporary increase of greenhouse gas emissions	1 Driver training for optimal driving, which will result in low vehicle emissions 2 Maintenance of vehicle and vessel equipment. 3 Equipment, vehicle and vessel certifications (eg compliance with EU and Marpol) 4 Turning off the machines if they are to be left inactive for long periods.	All

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During construction phase and according to Sections 9.2.1.2 (Microclimate and Bioclimatic Characteristics) and 9.2.1.3 (Warm or Hot Gas Emissions) no impacts were identified. Therefore, no specific mitigation measures are mentioned except for compliance with European and National legislation on the use of equipment certified with European standards.

1.2.3 Morphological and Landscape Characteristics

The mitigation measures for the impacts on the morphological and landscape features during the construction phase are given in the table below.

Table 1-2 Measures to Address the Impacts on Landscape and Morphology during Construction Phase.

Morphological and Landscape features		
Impact	**Mitigation Measures**	**Locations**
Landscape Modification from Pipeline Construction/ Viewers disturbance from temporary facilities	1 The areas to be used during construction will be fully restored to their former state. The natural terrain, soils and vegetation will be restored as close as possible to their original condition and preferably local materials should be used. 2 Application of working strip width, according to the area type. Specifically, a reduced working strip width in areas with woody vegetation (e.g. forests, shrublands, fruit trees, olive groves, etc.) should be selected. 3 Existing landscape features (e.g. roads, fencing, property boundaries, forest boundaries) will be taken into consideration to select definitive location of temporary facilities and temporary storage of excavation materials and products, in order to minimize visual impacts. 4 Materials and machines will be stored carefully during works, in designated areas within project's temporary facilities. 5 Permanent buildings will be designed to maximize their integration into the landscape. Specifically, permanent buildings will be constructed as per detailed design which is subject to Authorities approval. 6 An Aggregate Management Plan for the management of aggregates will be developed. 7 Micro-modifications (adjustments) of the pipeline route may be performed by EPC Contractor during the construction phase taking into consideration the local conditions to avoid landscape features (e.g. individual trees or clusters) where feasible 8 Temporary fences, obstacles, traffic management and signals will be removed after completion of the works (i.e. as soon as they are not necessary any more). 9 The lighting of materials and work sites will be limited to working hours, with the exception of safety lighting.	All

Morphological and Landscape features		
Impact	Mitigation Measures	Locations
	10 Landscape Management and Restoration and Erosion Control Plan shall be developed which will define, upon communication with the competent authorities, details regarding phytotechnical restoration, reforestation of forest areas (in compliance to L. 4280/2014), erosion control measures, and possible hydroseeding as a measure for protecting top soil and restore the landscape.	
	11 In forests, especially within protected areas, the working strip will be 22 m for 46'' & 48" pipeline, while for 16" pipeline (Megalopolis branch) it will be 14 m.	Forests as defined by forest legislation as amended and in force (L. 998/1979), e.g.: • Hilly Natural (Forest) Landscape • Mountainous Natural (Forest) Landscape • Riparian Natural Landscape
	12 In forest areas (shrublands), the working strip will be 28 m for 46'' & 48" pipeline, while for 16" pipeline (Megalopolis branch) it will be 14 m.	Forest areas as defined by forest legislation as amended and in force (L. 998/1979), e.g.: • Hilly Natural (Shrublands) Landscape • Mountainous Natural (Shrublands) Landscape
	13 In forest and forest areas crossed by the pipeline, a special phytotechnical restoration study will be carried out, as requested and approved by the Forest Authorities. The selection of the species to be planted and the planting scheme will be finalized in consultation with the competent authorities. In any case, the species will be local. The pipeline protection strip (8 m wide) is	Forests and forest areas as defined by forest legislation as amended and in force (L. 998/1979), e.g.: • Hilly Natural (Shrublands) Landscape

Morphological and Landscape features		
Impact	Mitigation Measures	Locations
	excluded, as this will be, according to the regulations, free of deep-rooted trees. 14 The competent authorities will be consulted on whether the working strip may be configured as a fire protection strip, if this is requested and serves the purposes of the stakeholder.	• Hilly Natural (Forest) Landscape • Mountainous Natural (Forest) Landscape • Mountainous Natural (Shrublands) Landscape • Riparian Natural Landscape
	15 Hydroseeding shall be performed in specific areas susceptible to erosion	Forests and forest areas as defined by forest legislation as amended and in force (L. 998/1979), with slopes gradient > 45%, e.g.: • Hilly Natural (Forest) Landscape • Mountainous Natural (Forest) Landscape with slopes gradient > 45%.
	16 A special study of phytotechnical restoration of vegetation and landscape for areas of high landscape sensitivity will be carried out. This study will be customized for each specific location, providing for: i. planting species and appropriate planting scheme ii. plantation of grass and herbaceous species within the working strip, for landscape designing iii. hydroseeding within the working strip	• Monemvasia Castle Town UNESCO site (view of LF3) • Lakopetra touristic establishments (view of LF4) • Coastal Rural Landscape • TIFK “Parapotami Alfeiou” (Alfios‘ Tributaries) (AT1011011) • TIFK “Ekvoli Acheronta and Nekromanteio” (R.

Morphological and Landscape features		
Impact	Mitigation Measures	Locations
		Acheronta Estuary and Necromancer) (AT3010051)

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1.2.4 Geological, Tectonic, Soil-Sediments Characteristics

The following mitigation measures must be adopted during construction phase as described in the table below (see Table 1-3).

Table 1-3 Measures to address the impacts on Geological, Tectonic, Soil-Sediments during Construction Phase.

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
Ggeohazards and seismicity	1 In order to reduce the seismic load due to seismic action, the usual measures include an increase in the wall of the pipe, special construction at the seismic fault crossing locations 2 A special Faults Crossing Study will be prepared during the detail design of the project for the active seismic faults based on their characteristics (e.g. fault type and length, max. displacement, etc). 3 Moreover, the geotechnical data will be evaluated based on the results of the geotechnical campaign, during the detail design of the project, in order to be specified the protection measures that should be applied.	See Annex 8M specifically sites referred in the following tables: • Table M-7: Faults that cut the CCS1 route, including the Megalopolis branch; • Table M-8 : Faults that cut the CCS2 route; • Table M-15: Faults along OSS2/OSS2N; and • Table M-17: Faults along OSS3/OSS3N; • Table M- 18: Geohazards along OSS4.
	4 In areas characterised as of high or moderate liquefaction susceptibility, an additional geotechnical survey must be performed in the next design phase, comprising the performance of a detailed geotechnical investigation program and site-specific studies, focusing on the assessment of the properties of the subsoil layers. Having quantitatively estimated the liquefaction potential, it will be feasible to accurately evaluate the	See Annex 8M specifically sites referred in the following tables: • Table M-11: Liquefaction along CCS1; • Table M-12: Liquefaction along

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	liquefaction induced deformations triggered by strong seismic motions. Thus, adequate mitigation measures will be implemented, if required, by EPC Contractor, in terms of design or installation standards in order to avoid or reduce the risk to an acceptable level.	Megalopolis branch; and • Table M-13:Liquefaction along CCS2.
	For onshore, 1 During the Detailed Design phase of the project, the areas that are prone to landslides, have to be further investigated and analysed. The sequence of the required geological and geotechnical works are outlined in the following steps: i. Step 1: Identification of potential recent and old landslides ii. Step 2: Proposal-Execution of geotechnical investigation iii. Step 3: Extended engineering geological surveys – studies, in scale 1:1,000 (if necessary) iv. Step 4: Slope stability analysis and landslide mitigation measures (if necessary) Geological and geotechnical evaluation of the areas will allow a verification of the potential displacements to be calculated by analytical and/or semi-empirical methods (e.g. Newmark) to assess the final estimation of the land-sliding effect. Slope stability analysis will be performed for static and seismic state, in order to determine failure mechanisms, to ensure adequate stability against failure or extended deformations and to design, if required, stabilization measures. 2 For the slopes that cannot be totally stabilized with usual mitigation measures (i.e. drainage, retaining walls) the verification of pipeline' s integrity will be executed in the framework of SSAD (Seismic Stress Analysis and Design).	See Annex 8M, specifically sites referred in the following tables: • Table M-9: Landslides along CCS1; and • Table M-10: Landslides along CCS2.
	For offshore section 1 Increase of wall thickness; 2 Inspection survey (free span length) after strong earthquake event; 3 Conservative pipeline route selection.	See Annex 8M specifically sites referred in the following tables: • Table M-14: Geohazards along OSS2/OSS2N;

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
		• Table M-15: Faults along OSS2/OSS2N; • Table M-16: Geohazards along OSS3/OSS3N; • Table M-17: Faults along OSS3/OSS3N; and • Table M-18: Geohazards along OSS4.
Soil erosion	1 Storage of the original surface soil resources along pipeline. The appropriate topsoil conservation and separation follows the steps below: i. Heaps of soil will be protected from rain, and will be covered with drapes. Also their height should not exceed 2- 3 m; ii. Deep plowing may take place throughout the working area where morphology allows. iii. Reduction of stockpiling spoil and soil materials close to water bodies; iv. Control of sediment runoff from stockpiles; and v. Installation of diversion drains to intercept uncontaminated surface runoff around facilities and away from construction areas. 2 Original surface contours will be reinstated after construction where practical. 3 Soil restoration techniques will include seeding, hydroseeding, other soil re-vegetation practices and silt curtains, especially at areas of high risk of erosion. Potentially using the hydroseeding method, seed mixtures of endemic species and varieties already present in the section shall be used. 4 Restoration of the construction strip will take place progressively in sections after construction especially promptly in the sites that have high or medium erosion sensitivity in order to reduce erosion risk;	Alongside the working strip, at temporarily facilities, at crossings areas

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	5 Restoration/reinstatement of the working strip to its original state will take place immediately after construction; 6 Silt fences will be placed perpendicular to the slopes and to remain there beyond the end of the pipeline construction activities in order to assist the reinstatement. 7 Promotion and monitoring of natural revegetation processes; 8 Soil replantation practices along the pipeline route. The plants to be used for the restoration shall be defined in the phytotechnical study that shall be approved by the competent Forest Authority.	
Soil compaction	1 Heaps of soil will be protected from rain, out of the dry season, and will be covered with drapes. Also their height should not exceed 2- 3 m; 2 Heavy vehicles will move through the working strip and the main roads. 3 Soil stockpiles will be protected from run-off, out of dry season, e.g. by heavy rainfall, by covering with sheets; 4 Deep plowing will take place throughout the working area where morphology allows.	
Soil Pollution	1 The following topic-specific management plans will be prepared: i. Emergency Response Plan (ERP) ii. Pollution Prevention and Management Plan (PPMP) iii. Waste Management Plan (WsMP) iv. Hazardous Waste and Materials Management Plan (HWsMP) 2 The Contractor of the Project will apply a Pollution Prevention Plan to avoid accidental soil contamination during work; The pollution prevention plan include the following: i. Waste management procedures to ensure works are kept closely in line with the applicable legal framework and best practice principles. All waste will be safely collected, stored and transported separately in appropriate and approved bins and containers. The waste management	

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	procedures will address waste handling, storage and disposal; ii. Potential contamination from fuel, lubricant oils and chemicals will be avoided applying engineering best practice and compliance with local regulations. Specific procedures for water, waste and pollution prevention will be defined; iii. Fuel storage systems will be built above ground and within double-walled tanks or containment bunds. Oil spill prevention and response procedures will be put in place. Fuel temporarily stored along the pipeline working strip and access roads will be correctly banded during construction; iv. Procedures for vehicle/equipment refuelling will be implemented to prevent spillage, including not allowing construction vehicles and equipment to be refuelled outside dedicated areas. Appropriate spill containment equipment will be available at refuelling sites. All drivers will be trained in emergency spill response procedures; v. Washing equipment, vehicles or machinery near or within watercourses will be prohibited. Dedicated areas will be designated for these operations; vi. Non-equipment areas at plant facilities will be graded and sloped to allow uncontaminated storm water to drain naturally via the storm water drains prior to routing offsite vii. Land drainage infrastructure, other networks and facilities disturbed/moved during construction will be reinstated to their former condition 3 In case that polluted soils are found during trench excavation, the following measures should be taken: i. In cases of serious pollution, personal protection measures should be taken for	

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	workers in order to ensure the safety of workers and soil samples should be taken; ii. The contaminated excavated soil will be handled by an authorized waste contractor; iii. Near to any pollution, the duct trench will be covered with impermeable materials. iv. Only appropriately and licensed companies will be used for the transport, recycling and disposal of waste.	
Potential Soil Disturbance and Degradation During Construction	1 Before starting any construction work, topographic and photographic records will be made of the existing condition of the pipeline route and access roads. These records will be used as the standards against which the quality of the restoration work will be judged when construction work will have been completed; 2 Topsoil, which supports plant life and contains seed stock, will be removed from the Working Strip by suitable earth moving equipment and stockpiled in the form of a continuous ridge along the edge of the strip. The topsoil stockpile will be typically no higher than 2 m to prevent degradation of the soil and will be kept free from disturbance to reduce the possibility of physical damage and compaction; 3 Topsoil will be deposited on one side of the working corridor where it will be stored in such a way that it is not mixed with other trenched materials or driven over by vehicles 4 The removed topsoil will be placed back on the working corridor. The original contours of the land will be restored as closely as possible; 5 Attention will be paid to the latter operation on route sections running through arable land and permanently cultivated fields, which are essentially flat with a good pedogenic substrate. Stone removal activities will be performed, where necessary; 6 No machinery will be allowed to leave the working strip or access roadways; and 7 At the end of this phase, a shallow tillage of the soil will be realised through mechanical agitation in	

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	order to aerate the top layer of soil compacted by machinery. 8 Excavated material should be used as much as possible for backfilling purposes.	
Reduced Soil Productivity	1 Mitigation measures described above will help restore soil productivity.	
Sediments diffusion (Offshore Section)	At the landfall locations during dredging, it is proposed to adopt all available measures to reduce the Suspended Sediments Concentrations; based on the results of the Marine Sediment Dispersion Modelling presented in Annex 9D the following indicative mitigation measures proposed: 1 Use Auger dredgers that employ special equipment to move material towards the suction head and use of pumping by piston action to enable the transportation of high-density material; 2 Use disc-cutter dredgers with a cutter head which rests horizontally and rotates its vertical blades slowly; 3 Use scoop/sweep dredgers using special equipment to scrape the material towards the suction intake; 4 When using a trailing suction hopper dredger: optimize trailing velocity, suction mouth and suction discharge and reduce or even eliminate overflow; 5 When using a cutter suction dredger: optimize cutter speed, swing velocity and discharge and employ a special cutter-head design; 6 When using a grab dredger, employ watertight grab/clamshell, use silt screen, limit grab time above water and limit grab dragging on bed; 7 When using a backhoe dredger, use a special bucket for reducing sediment losses and silt screen (applicable for current velocities less than 0.5 m/s).	Landfall locations
Activation of Sediments Pollution (for offshore Section)	1 Use of high efficiency dredging equipment to avoid / minimise sediment loss during dredging and transport 2 Ensure that dredging equipment and vessels are inspected and maintained to prevent loss of dredge spoil during sediment dredging and transport;	Landfall locations

Geological, Tectonic, Soil-Sediments Characteristics		
Impact	Mitigation Measures	Locations
	3 Inspection and monitoring (such as feedback or adaptive monitoring) of dredging activities will be conducted regularly to evaluate the impact of operations, the effectiveness of mitigation measures, and the need for technical adjustments to avoid and minimise impacts to identified sensitive receptors. 4 Special mitigation measures for sediments accidental pollution are presented in Section 10.15.	

Prepared by: ASPROFOS, 2022.

1.2.5 Natural Environment

This section describes the mitigation measures to be applied, in order to mitigate the impacts to natural environment during construction. Some measures have multiple application. For example, mitigation measures for avifauna or protected areas are not limited to the ones presented in the specific sections, but include all other mitigation measures provided for onshore/ offshore biodiversity or for impacts during System Pressure Test (SPT). It must be noted, that some measures might be designed or amended by the project owner and/or the construction contractor, following the results of detail design and special baseline studies and surveys.

1.2.5.1 Onshore biodiversity

The mitigation measures for the impacts on the onshore biodiversity, during the construction phase, are shown in the following table:

Table 1-4 Mitigation measures for the impacts on onshore biodiversity during the construction phase.

Natural Environment – Onshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
Habitat/ Vegetation loss	1 The construction contractor will obtain all required permits from the Competent Authorities, to commence works in forest areas.	Forest areas
	2 All construction activities must be done within a restricted working area.	General application

Natural Environment – Onshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
	3 Establishment of a pre-construction biodiversity baseline from which all mitigation measures will be specified.	General application
	4 Establishment of reduced working strip through forest areas and sensitive areas	Forest areas
	5 Avoidance, where possible, to open new access roads. Upgrade of existing road is recommended.	General application
	6 Temporary construction facilities will be sited on land of low ecological value.	General application
	7 Construction (aggregate and other) materials to be acquired from permitted areas only and not from the surrounding area.	General application
	8 The working zone will be reinstated upon the completion of pipeline backfilling. In forest areas, the reinstatement will be elaborated according to the forest legislation (L. 4280/14 as in force). Itx must be mentioned that an 8m zone will be left without vegetation with rooting system > 1 m, for safety purposes.	Forest areas
	9 In protected areas, the forest vegetation reinstatement will take place by the application of hydroseeding	Forest areas within Natura Areas
	10 An offset of the forest vegetation permanently removed (8m safety zone) may take place, through Reforestation Studies, as per forest legislation (L. 4280/14 as in force).	Forest areas
	11 For the protection of riparian vegetation, trenchless techniques will be applied, where feasible; where open trench is applied, the impact will be mitigated by reducing the width of the trench as far as possible.	General application
	12 Light of fire in the construction site is forbidden. Also, a Firesafety Study for the construction activities and relevant firesafey measures in the working sites, will be in place.	General application
	13 An ecology specialist will be present on site during construction for sensitive areas.	General application
	14 Training on ecological aspects/behaviours will be made available for all workers.	General application
	15 Landscape Management and Restoration and Erosion Control Plan shall be developed which will define, upon communication with the competent authorities, details	In specific areas, as agreed with the Authorities.

Natural Environment – Onshore Biodiversity		
Impact	**Mitigation Measure**	**Location (approximately)**
	regarding phytotechnical restoration, reforestation of forest areas (in compliance to L. 4280/2014), erosion control measures, and possible hydroseeding as a measure for protecting top soil and restore the landscape.	
Fauna Habitat fragmentation	1 All construction activities must be done within a restricted working area. 2 Avoidance to open new access roads. Upgrade of existing road is recommended. 3 An ecology specialist will be present on site during construction for sensitive areas. 4 Training on ecological aspects/behaviours will be made available for all workers. 5 Develop a Biodiversity Management Plan.	General application
Fauna Habitat fragmentation (jackal)	1 Establishment of a pre-construction biodiversity baseline from which all mitigation measures will be specified 2 Develop a Large Mammals Management Plan, including interaction guidelines for employees. This Plan will have applicability in the sections of the pipeline, where the pre-construction biodiversity baseline study will document the presence of large mammals and/or suitable habitats.	• See Table XXX Exact sections to be determined following the results of the pre-construction biodiversity baseline study
Fauna Habitat fragmentation (wolf)	1 Establishment of a pre-construction biodiversity baseline from which all mitigation measures will be specified. 2 Develop a Large Mammals Management Plan, including interaction guidelines for employees. This Plan will have applicability in the sections of the pipeline, where the pre-construction biodiversity baseline study will document the presence of large mammals and/or suitable habitats. 3 No construction of new access roads in areas which have critical habitats for wolf. These areas will be specified in the Large Mammals Management Plan.	• See Table XXX Exact sections to be determined following the results of the pre-construction biodiversity baseline study
Fauna Habitat Fragmentation – freshwater species loss (otter/ fishfauna)	1 For each river crossing a special crossing study will be carried out 2 Whenever possible, open-cut techniques will take place when the water flow is in the lowest level 3 Reduce, as much as feasible, the riparian vegetation clearance.	At rivers where open-cut technique will be used

Natural Environment – Onshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
	4 Reinstatement of the banks and of the river bed will commence immediately after the end of crossing activities. 5 In order to be limited the excavations at the river banks, sheet piles could be installed (instead of bored piles), taking into consideration the geological formations at these areas. 6 Use of silt curtains to prevent the transport of sediment out of the work site during dredging operation on shore crossings, if necessary. 7 A temporary passage across the water body will be constructed in order to keep the flow of water. 8 Sedimentation pools will be constructed. 9 Wherever feasible vehicles and machinery will avoid contact with waters. 10 Technical solutions to minimise sediment plumes, such as placement of protective geotextile screens around building sites close to shore. 11 Establishment of a pre-construction biodiversity baseline from which all mitigation measures will be specified. 12 Implementation of a monitoring program for fauna status after end of construction. 13 A Pollution Prevention and Emergency Spill Response Plan will be established by the construction contractor 14 A pre-construction survey for otters will take place at the river crossings. Based on the findings, specific mitigation measures will be developed by the construction contractor, where necessary. 15 A pre-construction survey for macro-inverterbrates will take place at the water bodies to be crossed by open-cut technique. Based on the findings, specific mitigation measures will be developed. 16 A pre-construction survey for fish will take place at the river crossings. Based on the findings, specific mitigation measures will be developed by the construction contractor, where necessary. 17 Fish and macro-invertebrate species should be carefully removed from the works corridor and translocated within the water body, as much as possible. 18 An ecology specialist will be present on site during construction for sensitive areas.	

Natural Environment – Onshore Biodiversity		
Impact	**Mitigation Measure**	**Location (approximately)**
	19 Training on ecological aspects/behaviours will be made available for all workers.	
	1 For each river crossing a special crossing study will be carried out 2 Reduce, as much as feasible, the riparian vegetation clearance. 3 Wherever feasible, vehicles and machinery will avoid contact with waters. 4 Establishment of a pre-construction biodiversity baseline from which all mitigation measures will be specified. 5 Implementation of a monitoring program for fauna status after end of construction. 6 A Pollution Prevention and Emergency Spill Response Plan will be established by the construction contractor 7 Muds will be properly managed to avoid discharges to the water body 8 Water will be discharged free of any chemicals and so as not to impact water temperature in the river 9 An ecology specialist will be present on site during construction for sensitive areas.	At rivers where trenchless techniques will be used
Fauna species loss (general/ small mammals)	1 Establishment of reduced working strip (22m) through forest areas and sensitive areas	Forest areas
	2 Avoidance, where possible, to open new access roads. Upgrade of existing road is recommended.	General application
	3 Temporary construction facilities will be sited on land of low ecological value.	General application
	4 Pipeline ends shall be covered to prevent fauna species entering the installed segements.	General application
	5 Some type of escape ramps or other structures to cross the working zone will be constructed in order to avoid entrapment of animals	General application
	6 A maximum vehicle speed on all construction sites and along the working zone will be set (the common practice is a 15 - 20 km/hr speed limit), in order to minimize the risk of fauna collisions	General application
	7 An ecology specialist will be present on site during construction for sensitive areas.	Forest areas

Natural Environment – Onshore Biodiversity			
Impact	**Mitigation Measure**		**Location (approximately)**
	8	Training on ecological aspects/behaviours will be made available for all workers.	Forest areas
Fauna species loss/ Disturbance (bats)	1	A pre-construction survey in forest areas where there is a possibility for bat roosting will taken place. Based on the findings, specific mitigation measures will be developed by the construction contractor which may include discouraging of roosting, relocation, etc.	Forest areas
Fauna species loss/ Disturbance (reptiles/ amphibians)	1	A pre-construction inspection for tortoises will take place where it is likely that such populations exist, in order to be removed to nearby safe locations, of similar ecological characteristics.	General application
Fauna species loss/ Disturbance (macro-inverterbrates)	1	A pre-construction survey for macro-inverterbrates will take place at the water bodies to be crossed by open-cut technique. Based on the findings, specific mitigation measures will be developed.	All water bodies crossed by open-cut technique
Disturbance / displacement of fauna (general)	1	All construction activities must be done within a restricted working area.	General application
	2	Establishment of reduced working strip (22 m) through forest areas and sensitive areas	Forest areas
	3	Avoidance, where possible, to open new access roads. Upgrade of existing road is recommended.	General application
	4	Temporary construction facilities will be sited on land of low ecological value.	General application
	5	Based on the results of the Biodiversity Managment Plan, if needed, habitat compensation measures will be considered to replace permanently lost and damaged sensitive (critical) habitats. This may include new habitat creation or restoration of damaged habitats.	General application
	6	All construction activities requiring removal of forest vegetation should be programmed in order to minimize disturbance of species engaging in reproductive activities during late spring.	General application
	7	Directional lighting in order to minimise potential impacts to nocturnal species will be applied.	General application

Natural Environment – Onshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
	8 An ecology specialist will be present on site during construction for sensitive areas.	General application
	9 Training on ecological aspects/behaviours will be made available for all workers.	General application
Disturbance of fauna – terrestrial species (mamals)	1 Develop a Large Mammals Management Plan, including interaction guidelines for employees (see previous lines in this table)	See for jackal and wolf, above.
Disturbance of fauna – freshwater species (otter)	1 A pre-construction survey for otter will take place at rivers's crossings where species might be present. Based on the findings, specific mitigation measures will be developed.	• See Table 9-6 Exact sections to be determined following the results of the pre-construction biodiversity baseline study
Disturbance of fauna – freshwater species (fishfauna)	1 A pre-construction survey for fish will take place at rivers where open-cut techniques will be used. Based on the findings, specific mitigation measures will be developed. This survey will take place to all river crossings.	At rivers where open-cut technique will be used

Prepared by: ASPROFOS, 2022.

1.2.5.2 Offshore biodiversity

The mitigation measures for the impacts on the offshore biodiversity, during the construction phase, are shown in the following table:

Table 1-5 Mitigation measures for the impacts on offshore biodiversity, during the construction phase.

Natural Environment – Offshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
Habitat loss	1 Mooring should be avoided to the extent possible over Posidonia oceanica. If this is not feasible, seagrass-friendly moorings should be installed on meadow clearings, depending on the substrate. Indicatively, screw anchors on sandy patches, dead weight	General application

Natural Environment – Offshore Biodiversity			
Impact		Mitigation Measure	Location (approximately)
	2	moorings on large sandy patches, or bolted anchors on rocky patches. In meadows without clearings but with a well-developed matte, special anchoring can be used (e.g. Harmony P anchors). For that reason, moorings installation must be preceded by a detailed preliminary study.	
	3	Technical solutions to minimise sediment plumes, such as placement of protective geotextile screens around construction sites close to shore.	At LF areas
	4	Use of high efficiency anchors and/ or other appropriate buoying solutions to avoid and minimise anchors and steel cables dragging on the seafloor;	Nearshore
	5	SSS and ROV video inspection of the area selected for anchor positioning; and	Nearshore
	6	Anchor handling with tugboat aimed at avoiding impacts on the seabed	Nearshore
	7	All project vessels shall operate under international standards (MARPOL)	General application
Fauna Species' loss	1	Vessels must maintain speeds of 6 knots at all times to reduce the risk and severity of collision during surveys or transiting to and from survey areas.	Marine Natura 2000 sites (LF3 site)
	2	Litter and other waste material have to be stored and disposed off appropriately. Any environmentally hazardous material used during construction works have to be carefully stored and in accordance with the applicable legislation.	General application
	3	Collection of injured marine wildlife individuals and transfer to wildlife rehabilitation centres, (if possible). At all events get into contact with the nearest Port Police authority to report the incident.	General application
	4	Training on ecological aspects/behaviours will be made available for all workers.	General application
	5	Works can be performed during times of good visibility (e.g., daylight, clear weather conditions) when marine wildlife individuals presence can be sufficiently monitored. Otherwise, monitoring could be performed through other means (e.g. sonars).	Essential habitat areas year-round for seals, during months of high use for marine reptiles.

Natural Environment – Offshore Biodiversity			
Impact		Mitigation Measure	Location (approximately)
	6	On the ship(s) for the shore crossing construction works, there will be a Marine Species Observer (aka Marine Mammals Observer – MMO) so as to inform immediately the ship(s) commander(s) for risks of marine reptile collisions.	General application
	7	Temporary pause of activities if a marine reptile is detected within a 50 m zone from the construction activities vessels.	General application (especially in Marine Natura 2000 sites LF3 site)
	8	For dredging and shore-crossing activities, implement time-constraints and undertake construction works outside the high season of the nesting and hatching period. Details shall be defined within the Biodiversity Action Plan.	Marine Natura 2000 sites (LF3 site)
	9	Develop a Marine Traffic Management Plan, including maximum speed per marine area, notification procedures, anchoring and berthing areas, guidelines for employees, etc.	General application
Risk of collision with marine mammals	1	Collection of injured marine wildlife individuals and transfer to wildlife rehabilitation centres, (if possible). At all events get into contact with the nearest Port Police authority to report the incident.	General application
	2	Training on ecological aspects/behaviours will be made available for all workers.	General application
	3	On the ship(s) for the offshore pipeline laying, there will be a Marine Mammals Observer(s) (MMOs), using Passive Acoustic Monitoring (PAM) system and visual observations, so as to inform immediately the ship(s) commander(s) for risks of mammals' collisions.	General application
	4	Before beginning any noise producing action there should be a dedicated watch to ensure no animals are within a 200 m zone close to the vessels.	General application
	5	Temporary pause of all activities, except for safety related ones, if a marine mammal is detected within a 100 m zone from the construction activities vessels.	General application
	6	Vessels must maintain speeds of 10 knots or less at all times to reduce the risk and severity of collision during work or transiting to and from working areas.	IMMAs/cIMMAs

Natural Environment – Offshore Biodiversity			
Impact		Mitigation Measure	Location (approximately)
	7	Works can be performed during times of good visibility (e.g., daylight, clear weather conditions) when marine wildlife individuals presence can be sufficiently monitored. Otherwise, monitoring could be performed through other means (e.g. sonars).	IMMAs/cIMMAs
	8	Prior to the beginning of the work, AMD[1] should be used to drive away groups or individuals of marine mammals. Only AMDs allowed in the ACCOBAMS area are to be employed (see ACCOBAMS Resolution 4.9, 2010 for cetacean devices).	IMMAs/cIMMAs
Disturbance	1	Implementation of Spill Prevention and Response Plan.	General application
	2	Dredging material should be used as much as possible for backfilling purposes.	In areas where dredging will take place
	3	Application of all measures for mitigating impacts from dredging, which are presented in section 1.2.4.	In areas where dredging will take place
Impacts from underwater noise	1	On the ship(s) for the offshore pipeline laying, there will be a Marine Mammals Observer(s) (MMOs), using Passive Acoustic Monitoring (PAM) system and visual observations, so as to inform immediately the ship(s) commander(s) for risks of mammals collisions.	General application
	2	Before beginning any noise producing action there should be a dedicated watch to ensure no animals are within a 200 m zone close to the vessels.	General application
	3	Temporary pause of all activities, except for safety related ones, if a marine mammal is detected within a 100 m zone from the construction activities vessels.	General application
	4	Vessels must maintain speeds of 10 knots or less at all times to reduce the risk and severity of collision during work or transiting to and from working areas.	IMMAs/cIMMAs
	5	Works can be performed during times of good visibility (e.g., daylight, clear weather conditions) when marine wildlife individuals presence can be sufficiently monitored. Otherwise,	IMMAs/cIMMAs

[1] Acoustic Mitigation Devices. This terminology is employed to include all devices which use acoustics as a means of mitigating interactions between cetaceans and human activities. Usually AMDs encompass Acoustic Deterrent Devices (ADD), developed for cetaceans, and Acoustic Harassment Devices (AHD), conceived for seals.

Natural Environment – Offshore Biodiversity		
Impact	Mitigation Measure	Location (approximately)
	monitoring could be performed through other means (e.g. sonars).	
	6 Prior to the beginning of the work, AMD should be used to drive away groups or individuals of marine mammals. Only AMDs allowed in the ACCOBAMS area are to be employed (see ACCOBAMS Resolution 4.9, 2010 for cetacean devices).	IMMAs/cIMMAs

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1.2.5.3 Impacts on Biodiversity during System Presure Test

The mitigation measures for the impacts on the biodiversity (onshore and offshore), during the System Pressure Test (SPT), are shown in the following table:

Table 1-6 Mitigation measures for the impacts on biodiversity during SPT .

Natural Environment – Impacts on biodiversity during SPT		
Impact	Mitigation Measure	Location (approximately)
Impacts during System Pressure Test (Hydrotesting)	1 The construction contractor will obtain all relative pemits from the Competent Authorities, prior to water abstraction and hydrotest water discharge. 2 A Hydtotesting Plan for each hydrotesting section, plus hydrotesting in above ground facilities (i.e. compressor stations) will be developed by the construction contractor. 3 Hydrotest water will not be discharged in different river body, if possible. 4 Hydrotest water should be free of biocides and oxygen prior of discharge. If any additives have to be used, they will be included in the PLONOR list[2]. 5 The water abstraction from rivers shall be limited to a maximum of 10 % of the run-off rate during the abstraction period. 6 Hydrotest water will be discharged in a maximum rate of 3 m3/s. 7 A fine mesh (hole diameter 5 mm) will be applied to water abstraction to avoid entrainment of small fish.	For the locations selected for hydrotestins (abstraction / discharge)

[2] PLONOR is a list of substances used and discharged offshore which are considered to 'Pose Little or No Risk to the Environment' which was issued by OSPAR.

Natural Environment – Impacts on biodiversity during SPT		
Impact	Mitigation Measure	Location (approximately)
	8 Water discharge back to rivers / streams (or sea, e.g. Patraikos Gulf) will be done through settlement ponds so that any contaminants can settle down prior to discharge and the discharge is also controlled in a way to avoid bank erosion. 9 Water quality will be monitored, as per monitoring plan. 10 An ecology specialist will be present on site during construction for sensitive areas. 11 Training on ecological aspects/behaviours will be made available for all workers.	

Prepared by: ASPROFOS, 2022.

1.2.5.4 Impacts on Avifauna – Onshore/ Offshore

The mitigation measures for the impacts on the avifauna (onshore and offshore), during the construction phase, are shown in the following table:

Table 1-7 Mitigation measures for the impacts on avifauna (onshore and offshore) during the construction phase.

Natural Environment – Avifauna		
Impact	Mitigation Measure	Location (approximately)
Impacts on Avifauna (Onshore/ Offshore))	1 In case that forest vegetation clearance will take place during the avifauna breeding period (May – July), a bird nest survey will take place.	Forest areas
	2 Avifauna breeding will be discouraged in the working zone by installing plastic bands which will flutter in the wind, before breeding season starts.	General application

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1.2.5.5 Impacts on Protected Areas – Onshore/ Offshore

The mitigation measures for the impacts on the Protected Areas (onshore and offshore), during the construction phase, are shown in the following table:

Table 1-8 Mitigation measures for the impacts on protected areas (onshore and offshore) during the construction phase.

Natural Environment – Protected Areas		
Impact	Mitigation Measure	Location (approximately)
Impacts on Protected Areas – Natura2000	1 Mitigation measures are defined in the annexed Appropriate Assessements (overlappings are taken into consideration).	See Annex 9E
Impacts on Protected Areas – Wildlife Refuges/ National Parks	1 Impacts on onshore and offshore biodiversity are applicable.	See Table 9 11 Engagement of protected areas with the investigated project during construction phase.

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1.2.6 Anthropogenic Environment

1.2.6.1 Regional Planning – Uses of Land & Sea

1.2.6.1.1 Uses of Land

The mitigation measures for impacts on spatial planning and land use during construction phase are given in the table below. Section 1.2.7.2 is also applicable.

Table 1-9 Mitigation measures in the Uses of Land during construction phase.

Regional Planning – Uses of Land		
Impact	Mitigation measures	Locations
Changes in land uses	1 Selection of proper working strip within which all project related construction activities would take place. Specifically, the following construction strips shall be applied: i. a 38 m wide in agricultural lands ii. a 28 m wide in sparsely vegetated forest areas (transitional woodland areas, moors and heathland) and in systematic tree crops iii. a 22 m wide in forest and forested areas covered by lush vegetation, especially within protected areas. In case the Forest Authorities	General

Regional Planning – Uses of Land		
Impact	Mitigation measures	Locations
	request it, the working strip can be formulated (reinstated) as a fire protection belt. 2 Affected landowners and/or rights-holders are entitled to compensation for reduced income during the recovery period (in accordance with the Livelihood Restorationn Plan). 3 Compensation for orphan land, once recognised, will be based on the same entitlements as the main affected piece of land. 4 Project Owner commits to restore the conditions of the land to the ante-operam status. 5 Through stakeholder engagement and public disclosure, it will be communicated to affected communities along the route that restrictions will apply to building activities in the 40 m and that Spatial Development (high population density buildings) and preventive control in a 400 m corridor to ensure safe operation of both activities. 6 Land owners will receive timely and clear information on timing of construction works in the course of community liaison activities so that they become fully aware of the exact time for start of construction and of the duration of interruption of agricultural activities. 7 The Project Promoter will put in place a grievance process to capture and effectively respond to any stakeholder issues arising from the Project construction phase.	
	8 Landowners'/land users' compensantion measures will be as defined in the Land Acquisition Strategy and Livelihood Restoration Plan.	Permanent facilities
	9 Landowners / land users that are affected by the construction, usage or stewardship of the pipeline, are entitled to total compensation (in principle and where possible, prior to construction): i. For temporary loss of working strip (of 38m, 28m, or 22m wide) during construction period ii. For limitations (such as prohibition of deep rooted species plantation) in the pipeline protection strip (8 m wide), during operation phase	Low or no vegetation areas, Semi-natural areas and areas of systematic arboriculture

Regional Planning – Uses of Land		
Impact	Mitigation measures	Locations
	10 Landowners / land users are entitled of compensation (prior to construction) due to removal of trees and other perennial crops from the working strip 11 Landowners / land users are entitled to compensation (prior to construction) due to yield that shall not be harvested within the working strip, during construction phase.	

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1.2.6.1.2 Uses of Sea

The mitigation measures for impacts on spatial planning and land use during construction phase are given in the table below. Section 1.2.7.2 is also applicable.

Table 1-10 Mitigation measures in the Uses of Sea during construction phase.

Regional Planning – Uses of Sea		
Impact	Mitigation measures	Locations
Fishing areas restrictions	1. Establishment of a 1 km safety exclusion zone around pipelay vessels for navigation safety purposes. 2. While the Project does not foresee any economic displacement impacts to fishermen from routine construction or operations, any unforeseen impacts (through routine or non-routine circumstances) will be compensated in accordance with Greek legal requirements and Internationally Recognised Practice. 3. Through stakeholder engagement and public disclosure, it will be communicated to affected communities close to the landfall sites, that some restrictions will be applied to fishing and navigation activities in the safety exclusion zone. 4. Local Communities and competent Marine/ Port Authorities will receive timely and clear information on timing of construction works in the course of community liaison activities so that they become fully aware of the exact time for start of construction, the duration, location of vessels involved and dimension of safety exclusion zone. 5. As defined in the Framework SEP, the Project Proponent will put in place a grievance process to capture and effectively respond to any stakeholder issues arising from the Project construction phase.	General

Regional Planning – Uses of Sea		
Impact	**Mitigation measures**	**Locations**
Indirect nuisance of aquaculture development and/ or fishing activity	1. Minimize construction duration time 2. Minimize sediments dispersion (see Section 1.2.4)	Offshore section
Increase in marine traffic	1. Establishment of an offshore safety exclusion zone of 1 km around the construction axis 2. Timely communication to competent authorities of construction schedule and location of pipelay vessels for marine traffic to avoid. 3. Information to authorities/ fishermen/ mariners. Navigational warnings 4. Lights, radio communications and other safety devices. 5. Stakeholder engagement and public disclosure to explain need and importance of exclusion zone. 6. Where feasible, optimize the time schedule during the construction in order to minimize the impacts to fishing/shipping areas. 7. Local Communities and competent Marine/ Port Authorities will receive timely and clear information on timing of construction works in the course of community liaison activities so that they become fully aware of the exact time for start of construction, the duration, location of vessels involved and dimension of safety exclusion zone. 8. Vessel routes between the site and the logistic base will be carefully evaluated with the aim to minimise potential interference with the existing naval routes and anchoring areas 9. Develop and Implement a Grievance Mechanism	• Offshore section • Berthing facilities

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1.2.6.2 Structure and functions of anthropogenic environment

1.2.6.2.1 Community Health & Safety

The mitigation measures for impacts on community Health and Safety during construction phase are given in the table below.

Table 1-11 Mitigation measures for the Community Health and Safety during construction phase.

Structure and functions of anthropogenic environment – Community Health and Safety		
Impact / Risk	**Mitigation measures**	**Locations**
Increased pressure on health care	1. IGI POSEIDON will develop a Health & Safety Management policy where it sets out a clear commitment to ensuring the health and safety of all Project personnel encompassing contractor personnel. 2. IGI POSEIDON will adopt EBRD guidelines regarding the provisions of first aid medical facilities at worker construction sites. 3. IGI Poseidon will control access to construction site and fence all temporary facilities, including pipeyards 4. IGI POSEIDON will ensure that signs are put up around work fronts and construction sites advising people of the risks associated with trespassing.	All temporary construction sites and fronts (offshore and onshore)
Increased transmission of infectious diseases	1. IGI POSEIDON will ensure that all project related workers (Company's and any subcontractor directly under Company's supervision of any EPC's Contractors), will abide on a specific Code of Conduct. 2. The Code of Conduct will include guidelines on protection of local community and workforce from potential infectious diseases. 3. IGI POSEIDON will provide training on minimizing distribution of infectious diseases to any person related to the project implementation. This shall be described also in the Code of Conduct. 4. IGI POSEIDON will develop a Health & Safety Management policy where it sets out a clear commitment to ensuring the health and safety of all Project personnel, encompassing contractor personnel. 5. IGI POSEIDON will ensure all workers including contractors and subcontractors undergo regular health check ups. IGI POSEIDON will ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of infectious diseases of concern. *6.* IGI POSEIDON will monitor WHO and National Public Health Organization (EODY) and implement appropriate measures.	Residential areas close to Temporary facilities

Environmental Changes	1. IGI POSEIDON will undertake stakeholder engagement with affected communities and other stakeholders on a range of issues including changes to the visual environment, noise and social concerns. 2. IGI POSEIDON will implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner. Additional, topic specific measures are described in Landscape (1.2.3), Air Quality (1.2.10) and Acoustic Environment (1.2.11) sections.	Residential areas close to Temporary facilities

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1.2.6.2.2 Community Cohesion

The mitigation measures for impacts on community cohesion during construction phase are given in the table below.

Table 1-12 Mitigation measures for the Community Cohesion during construction phase.

Structure and functions of anthropogenic environment – Community Cohension		
Impact / Risk	**Mitigation measures**	**Locations**
Break of urban fabric continuity	1. IGI POSEIDON will ensure that all project related workers (Company's and any Contractors' and their subcontractors' personnel involved in the project will abide on a specific Code of Conduct. 2. IGI POSEIDON will maintain a community relations team that will include one community liaison officer during construction activities. 3. Project update leaflets will be distributed from six months prior to construction until the end of the construction phase. 4. The Grievance Mechanism will be adjusted based on needs to the Project construction phase with the relevant contractor and sub-contractor staff fully aware of their roles in third party grievance resolution process; 5. The Project will release performance reports which will be posted on the project website. 6. Meeting minimum standards for stakeholder engagement and social performance will be expected from the main contractors. 7. Separate meetings will be held with Vulnerable groups identified within the study area prior to construction and during the construction activities in the local area to identify and manage any specific issues. 8. Inform about alternative access routes when roads are blocked during construction. 9. Systematic consultation and involvement of local authorities for all local and regional planning development initiatives likely to be affected by the Project.	• Communities along the project footprint. • Temporary construction sites. • Pipeline construction strip

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1.2.6.3 Cultural heritage

The distance of cultural heritage resources, the consequent impact assessment and the proposed impact mitigation measures are based on the specific, investigated, footprint of the project. Based on the results of the Cultural Heritage Management Plan and further consultation and study of the project, minor adjustments of the piprline route and/or otherl measures may be applied. Indicatively,

it is reported that resources identified at a distance less than 50 m are subject to further study, according to the Cultural Heritage Management Plan.

The mitigation measures for impacts on cultural heritage resources during construction phase are given in the table below. Some measures are general and apply to most projects, as they are mainly international best practice but often stem from national legislation.

Table 1-13 Mitigation Measures for Cultural Heritage during construction phase

Cultural Heritage		
Impact	**Mitigation measures**	**Locations**
All impacts on cultural heritage Resources	1. Appropriate siting of the Project and the relevant facilities (temporary or permanent). 2. All excavation work should be performed under the supervision of the competent Ephorate Authorities, which should be notified in writing by the Project Owner (or Contractor) about their start. 3. Signing a Memorandum of Understanding between the Project Owner and the relevant Competent Authorities (Ministry of Culture. Local Ephorates). In the event that antiquities are found during construction, the works may be temporary suspended until the findings are investigated and / or a local route adjustment is applied. 4. Raise awareness of workers in respect of cultural heritage resources. 5. Develop a Cultural Heritage Management Plan, which will include, among other things, specifications on procedures for chance findings of cultural heritage resources.	All
Direct physical damage	1. Consultation with the competent Greek authorities. 2. Increase the distance of the pipeline axis, if possible. 3. Archaeological delimitation and marking of site boundaries, located and/ or identified within the working strip. 4. Labeling and resource protection. 5. Training staff to respond to Chance Findings. 6. Record the static integrity of the identified sensitive monuments (e.g. arched bridges) close to the project, so that they can be strengthened or stabilized structurally before any work. 7. Limitation of vibrations capable of disturbing the integrity of existing structures.	Declared resources at National Level (CH-LAK-009, CH-LAK-033, CH-LAK-087, CH-PRE-006, CH-PRE-011, CH-PRE-012)

Cultural Heritage		
Impact	Mitigation measures	Locations
Secondary Degradation or Damage	1. Recording of the static integrity of the above ground elements close to the project footprint so that they can be reinforced or stabilized structurally before any work. 2. Limitation of vibrations capable of disrupting the integrity of existing structures. Use of appropriate means to minimize vibration. 3. Vehicles speed limitation. 4. Marking and protection. 5. Dust minimization strategies such as wetting. 6. Small local reroutings, if feasible.	See Table 1 28 Summary of Impacts to Cultural Heritage Resources during Construction Phase.
Nuisance to visitors access	1. Siting of equipment and scheduling of activities so as to prevent restriction to resources access. 2. Alternative access following consultation with users and competent authorities. 3. Timely notification to the public of any inconvenience. 4. In case religious festivals are planned in areas close to active construction fronts, EPC Contractor shall collaborate with stakeholders for optimum planning of construction activities, during religious festivals.	See Table 1 28 Summary of Impacts to Cultural Heritage Resources during Construction Phase.

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1.2.7 Socio-economic Impacts

1.2.7.1 Demography

According to Section 9.2.7.4, no impacts are assessed on demographics from the project during construction phase. Therefore, no specific mitigation measures are provided.

1.2.7.2 Economy – Employment

According to Section 9.2.7.2 during construction phase, the impacts are positive in terms of financial transactions that will be made locally and or regionally. Table 1-14 summarizes the mitigation and/ or enhancement measures for all assessed impacts on Economy - Employment.

Table 1-14 Mitigation/ Enhancement for Economy – Employment during construction phase

Socio-economic Environment – Economy and Employment		
Impact	**Mitigation Measures**	**Locations**
Employment opportunities (direct and/ or indirect)	1. IGI Poseidon will ensure that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender; 2. IGI Poseidon will provide clear information on the number of open positions throughout the Social Study Area; and 3. Contracts clearly defining working hours, pay, and other terms of employment will be stipulated with each employee prior to work commencement 4. The Contractor shall select also workforce from the local community, as appropriate. 5. The Project Owner will implement project-specific vocational training programs in the project areas. These programs can be organized in cooperation with local authorities and other local bodies and organizations. 6. The Project Owner will develop explicit strategy to ensure that all members of vulnerable groups will not suffer any loss of livelihood means. 7. The Project will provide clear information for the number and skills requirements concerning employment opportunities. 8. In the process of selecting permanent staff, locality will be taken into consideration.	• Population centres (cities or villages) close to temporary and permanent facilities • Along the working strip
Economic impact of taxes, fees and local transactions	1. Optimizing contract opportunities with local companies, as appropriate. 2. Affected businesses are entitled to compensation at replacement value for the lost income if applicable	In the entire study area
Economic impact on agricultural sector (income)	1. Restoration framework for the means of livelihood which reliably determines the compensation (prior to construction) to be paid to the eligible farmers due to loss of income from the crops. Compensation will include at least financial compensation for all growing seasons that will be lost due to occupation of the working strip and construction works (usually one growing season). 2. Compensation measures for affected agricultural workers, including vulnerable groups, will be as defined in the Land Acquisition Strategy and Livelihood Restoration Plan. 3. Affected land and asset owners are entitled to the restoration of all assets to its pre-project condition	Along project footprint (onshore section)

Socio-economic Environment – Economy and Employment		
Impact	Mitigation Measures	Locations
	and/or the total costs to restore all damaged assets to pre-project conditions; 4. Compensation (prior to construction) for orphan land, once recognised, will be based on the same entitlements as the main affected piece of land 5. Gather forest products (e.g. timber) in appropriate areas to be collected by residents and users of forests, after consultation with the competent authorities 6. Develop and implement a Grievance Mechanism 7. Develop a Land Acquisition Strategy 8. Develop a Livelihood Restoration Plan	
Economic impact on fishing sector (income)	1. Establishment of an offshore safety exclusion zone of 2 km around the construction axis, as will be agreed with the competent authorities. 2. Restoration framework for the means of livelihood which reliably determines the compensation (prior to construction) to be paid to the eligible fishers due to loss of income. 3. Compensation measures for affected fishing workers, including vulnerable groups, will be as defined in the Land Acquisition Strategy and Livelihood Restoration Plan. 4. Timely communication of construction schedule and location of pipelay vessels for third party vessels to avoid. 5. Information to authorities/fishermen/mariners. Navigational warnings, including lights, radio communications and other safety devices. 6. Stakeholder engagement and public disclosure to explain need and importance of exclusion zone. 7. Where feasible, optimize the time schedule during the construction in order to minimize the impacts to fishing/shipping areas. 8. All Project vessels will have Health, Safety and Environmental management systems in place in accordance with international regulations (MARPOL) 9. Develop and implement a Grievance Mechanism 10. Develop a Livelihood Restoration Plan	• OSS2/OSS2N • OSS3/OSS3N • OSS4 (offshore section)
Economic impact on tourism sector (income)	1. Where possible minimize the time needed for construction activities 2. Ensure engagement with tourism operators during all project phases and in particular during construction, as	• LF3 • LF4 • LF5

Socio-economic Environment – Economy and Employment		
Impact	Mitigation Measures	Locations
	defined in the Framework SEP, to evaluate potential impacts on the project schedule. 3. Construction schedule to avoid high touristc season, as much as possible. 4. Clear and timely information will be provided to tourism operators on the exact timing of construction works, so that they are fully aware of the time of start and the period of duration of construction 5. Affected land and asset owners are entitled to the restoration of all assets to its pre-project condition or the total costs to restore all damaged assets to pre-project conditions; 6. More Mitigation Measures about landscape at Section 1.2.3 7. More Mitigation Measures about noise at Section 1.2.11 8. Develop and implement Grievance Mechanism 9. Develop a Land Acquisition Strategy 10. Develop a Livelihood Restoration Plan	

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1.2.7.3 Socio-economic Impact on Quality of Life

See corresponding Section 1.3.7.3, during operation phase.

1.2.7.4 Deriving Development Trends from the Project

See corresponding Section 1.3.7.4, during operation phase.

1.2.8 Technical Infrastructures

The following table shows the proposed measures to address the potential impacts of the pipeline on technical infrastructures in onshore, nearshore and offshore section during construction phase. Implementation and adjustment of mitigation measures is subject to the EPC Contractor.

Table 1-15 Mitigation Measures to Address Impact on Technical Infrastructures during Construction Phase.

Technical Infrastructure		
Impact	**Mitigation Measures**	**Locations**
Road Network		
• Increase in traffic • Traffic delays • Traffic regulation • Increase in the likelihood of accidents • Damage to road infrastructure	1 Obtaining relevant crossing permit from competent authority 2 Preparation of traffic studies where necessary 3 Compliance with Highway Code 4 Establishment of strict speed limits 5 Placing of traffic lights and signage where necessary 6 Compliance with the legal framework for heavy vehicle traffic 7 Traffic arrangements, bypasses in open cut crossings 8 Road restoration after completion in case of damage	• Crossings of the pipeline with roads • Road network (highways, primary and secondary road network, local roads) used to access to the construction sites • Entry/exit traffic at construction sites
Railway Network		
• Subsidence • Halt of train service	1 Obtaining relevant crossing permit from competent authority 2 Monitoring of ground level during drilling operations 3 Temporary suspension of train passage during drilling to prevent accidents in case of subsidence. 4 Technical inspection with the railway Company, at the end of the drilling activity.	Crossings with railway network
Airport Facilities		
Potential small increase in air transport	Positive impact, no mitigation measures assessed	Local airports
Port Facilities, Marine Traffic and Submarine Cables		
• Potential damage of existing infrastructure • Disturbance of vessels and fishing shelters	1 Elaboration of a (Marine) Traffic Management Plan 2 Establishment of speed limits for project vessels 3 Restoration of infrastructure in case of damage	• Local ports • Offshore route

Technical Infrastructure		
Impact	**Mitigation Measures**	**Locations**
Wastewater Treatment		
Increased waste water for disposal in WWTPs	1 Preparation of Waste Management Plan 2 Disposal of wastewater in the nearest treatment plant	• Construction sites • Construction vessels
Solid Waste Management sites		
Increased solid waste for disposal	1 Preparation of Waste Management Plan 2 Placing of buckets on construction sites 3 Separation of recyclable materials and disposal in recycling plants	Onshore and Offshore section
Watering & Irrigation Network		
Potential damage to the network	1 Obtaining relevant crossing permit from competent authority 2 Interruption of supply network if and where necessary 3 Restoration in case of damage	Onshore section

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1.2.9 Correlation with anthropogenic pressures in the environment

The present section tabulates the mitigation measures per environmental parameter, mirroring structure of section 9.

The table below presents the proposed measures to address the potential impacts of the pipeline concerning the correlation of the new project with the existing anthropogenic environmental pressures during the construction phase.

Table 1-16 Mitigation Measures to Address Impact on man-made pressures on the environment during Construction Phase.

Man-Made Pressures in the Environment		
Impact	**Mitigation Measures**	**Location**
Fishing Activities		
Restriction of fishing activities.	1 Where feasible, optimize the time schedule during the construction in order to minimize the impacts to fishing/shipping areas. 2 Information to authorities/ fishermen/ mariners. Navigational warnings	Width of Exclusion Safety Zone.

Man-Made Pressures in the Environment		
Impact	**Mitigation Measures**	**Location**
	3 Lights, radio communications and other safety devices on board. 4 Consultation with communities to explain need and importance of exclusion zone, potential compensation for loss of livelihoods (if any) 5 Elaboration of a Social Management Plan 6 Develop and implement a Grievance Mechanism	
Exploitation of Natural Resources		
• Potential need of large amount of aggregates, suitable for backfilling works. • Potential discard of excavation materials, unsuitable for backfilling works	1 Materials sourced and disposed of with sustainable procurement principles and from as close as possible to the project so as to minimise impacts of production and transport 2 Identify beneficial uses or opportunities for recycling construction spoil and other waste wherever possible 3 Waste management plan and system to be implemented 4 Environmental and social management plan	Along the pipeline route
Forest Areas		
Complete clearance of the working zone from vegetation	1 Development of a phytotechnical study of the restoration of the vegetation after the installation of the pipeline. 2 Implementation and monitoring of the forest vegetation restoration process.	Pipeline routing through forest areas.
Agricultural crops		

Man-Made Pressures in the Environment		
Impact	Mitigation Measures	Location
• Partial loss of agricultural resources • Loss of agricultural land at station construction sites.	1 Compensation for loss of agricultural income and permanent loss of trees by the owner of the Project 2 Appropriate restoration of agricultural land after installation. 3 Implement a Land Easement and Acquisition Strategy (LEAS) and a Land Access Plan (LAP). 4 Implement a land restoration plan to ensure, to the extent possible, previous use and users returning on completion of construction. 5 Purchase of all necessary land for the installation of the project's main onshore facilities	• Pipeline routing through agricultural land and especially through deep-rooted crops. • Construction sites for compressor andmetering stations and valves.

Prepared by: ASPROFOS, 2022

1.2.10 Impacts on Air Quality

During construction phase, it is proposed to apply the following good practices to minimize the dust generated and the emissions of exhaust fumes from construction activities (see Table 1-17). Generally, the applicable best practices in construction sites include wetting of workplaces and road accesses with water, and cleaning of vehicles.

Table 1-17 Mitigation Measures to Address Impact on Air Quality during Construction Phase.

Air Quality		
Impact	Mitigation Measures	Location
Temporary increase of dust emissions	1. Dusty Vehicles will be washed to remove any materials from the body and wheels immediately before leaving a construction area or temporary facilities 2. Vehicles carrying soil or materials from/to the construction sites will be covered to minimise entrainment by the wind 3. Vehicle speed to be limited, especially during the dry season 4. The unpaved accesses routes, in sensitive areas (close to settlements or relevant natural areas), will be kept clear or sprayed with water to maintain the entire road surface wet. This measure is recommended to be applied during the dry months. 5. Watering for dust suppression, depending on soil type, in the work zone and on dirt roads that lie <200 m away from the settlements.	All

Air Quality		
Impact	Mitigation Measures	Location
Temporary exhaust emissions to the atmosphere (NOx, PM2.5, SO_2 ,VOCs ,CO, HAPS)	1. Maintenance of vehicles, machinery and vessels. 2. Driver training for optimal driving, which will result in low vehicle emissions. 3. Equipment, vehicle and vessel certifications (eg compliance with EU and Marpol). 4. Turning off the machines if they are to be left inactive for long periods. 5. Selecting fuels without low sulphur for marine vessels to reduce SOx emissions associated with the Project. 6. Periodic maintenance of equipment and machinery used. 7. Establishment of Traffic Management Plan.	

Prepared by: ASPROFOS, 2022.

1.2.11 Acoustic Environment

The following measures are recommended to reduce, regulate and limit acoustic and vibration impacts from the construction of the proposed Project:

Table 1-18 Mitigation Measures to Address Impact on Acoustic Environment during Construction Phase.

Acoustic Environment		
Impact	Mitigation Measures	Location
Noise from Construction works	1 Onshore and nearshore construction works (including preparatory activities) will be performed between the hours of 06:00 and 22:00 (exceptions only for activities requiring continuous operation, e.g. HDD or System Pressure) 2 Mechanical equipment, including noise-suppression devices, should be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with a suitable muffler in good repair 3 Health and safety requirements for use of warning systems must be followed; 4 Turning off of equipment, including vehicles, when not being used. 5 All vehicular movements to and from the site to only occur during the scheduled normal working hours, unless approval has been granted by the relevant authority. Details shall be provided in the Traffic Management Plan.	All

Acoustic Environment		
Impact	Mitigation Measures	Location
	6 In areas, where blasting and hammering is going to perform near standing buildings (at a distance of 200 m from the pipeline axis), a Pre-Construction Conditions Assessment of the structure	
	7 Where construction activities must occur outside of the above hours (hydrostatic pressure testing of the pipeline) on-site noise monitoring will be undertaken to ensure the alignment with EMMP;	In locations of hydraulic test and pre-commissioning test equipment installation
	8 Ensure that all construction activity incorporates techniques for the control of noise to noise-sensitive land uses in the vicinity; 9 If work is to be conducted in a residential area or other noise-sensitive location, use the lowest-noise work practices and equipment that meet the requirements of the job, as far as reasonably possible; 10 Fit all pneumatic tools to be operated near a residential area with an effective silencer on their air exhaust port, as far as reasonably possible; 11 Install less noisy movement/ reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive sites, as far as reasonably possible; 12 Where possible, no vehicle associated with the work shall be left standing with its engine idling in a street adjacent to any residential area; 13 Use of best practice explosion techniques (i.e. mats, micro-charges etc.) in proximity of sensitive receptors;	Recommended in all positions. Imposed in the positions specified in Table 9 45, Table 9.46, Table 9.47 and Table 9.48
	14 Notification/ engagement of stakeholders regarding scheduling of blasting or hammering activities near sensitive areas. Additional noise monitoring, during blasting or hammering activities near sensitive receptors, should be applied if required	Protected Areas
	15 Mitigation measures for impacts to offshore biodiversity are applicable (see section 1.2.5.2). Indicatively, the following are repeated: i. During the construction works there will be a Marine Mammal Observer, on each pipelaying vessel, so as to inform immediately the ship commander. ii. Temporary pause of activities if a marine reptile is detected within a 50 m zone from the construction activities vessels.	General application

Acoustic Environment		
Impact	Mitigation Measures	Location
	iii. Temporary pause of activities if a marine mammal is detected within a 100 m zone from the construction activities vessels.	
	16 Prior to the beginning of the work, Acoustic Mitigation Devices (AMDs) should be used to drive away groups or individuals of marine mammals. Only AMDs allowed in the ACCOBAMS area are to be employed (see ACCOBAMS Resolution 4.9, 2010 for cetacean devices).	IMMAs/ cIMMAs

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1.2.12 Electromagnetic Fields

According to Section 9.2.11, no impacts were identified during the construction phase. Therefore, no special mitigation measures are reported.

1.2.13 Water Resources

The mitigation measures for the impacts on water resources during construction phase are given in the table below. Some measures are generic and are applied for avoidance of all possible impacts, whereas some are specifically aimed to avoid and/or mitigate the mechanisms causing specific impacts. The chosen mitigation measures are mainly international best practice but also often stem from national legislation.

Table 1-19 Mitigation Measures to Address Impact on water resources during Construction Phase.

Water Resources		
Impacts	Mitigation Measures	Location
Surface Water Systems		
All	1 Monitoring, among others, of the specific construction works by Environmental Supervisor 2 Implementation of Environmental Information - Awareness Programs for all project personnel. 3 Water Management Plan to identify and manage any surface and/or groundwater pumping needs and to manage surface water runoff. 4 Waste Management Plan of Hazardous Waste and Materials 5 Pollution Prevention and Response Plan.	All

Water Resources		
Impacts	Mitigation Measures	Location
	6 All machines will be checked for leaks before starting. 7 For each river crossing a special crossing study will be carried out which will include management details and leakage prevention of bentonite	
	8 Vehicles will be prohibited from driving through watercourses. 9 Portable bridges may be used to prevent contact of vehicles and equipment with surface water. 10 The maximum permissible speed for vehicles shall be 20 km/h within a short distance (100 m) of surface water. 11 Wherever possible, contact of machinery with surface water will be avoided. 12 Appropriate scheduling of construction work during periods of low flow or preferably during dry conditions . 13 Flood and erosion control measures will be implemented.	SWS where the open excavation method will be applied
Modification of morphology	1 The waters to be disposed off by drainage, if discharged into SWB, shall be disposed off in a way so as to minimize the physical effects on the morphology of the channel, e.g. without turbulent flows and with sediment levels lower than those of the receiving waters.	All
	2 Restoration of the morphology and physical functions of the SWB where this is feasible with modern, environmentally friendly techniques. 3 The riverbed will be restored as much as possible to its original conditions and will be stabilized to minimize the risk of erosion. 4 Excavation materials will be temporarily stored so they can be reused for restoration of the same area. If additional materials are required, they will be procured from the wider region. 5 In order to be limited the excavations at the river banks, sheet piles could be installed (instead of bored piles), taking into consideration the geological formations 6 Maintaining temporary passages across water courses so as to ensure at least the unobstructed minimum ecological flow. 7 The removal of vegetation of the banks will be avoided and/ or minimized as much as possible. Minor route changes will be made so as to avoid significant riparian vegetation.	SWS where the open excavation method will be applied
	8 In the horizontal directional drilling, special measures will be taken to contain drilling residues and of bentonite.	SWS where the trenchless crossing method will be applied

Water Resources		
Impacts	Mitigation Measures	Location
	9 All possible sources of water take-off should have a minimum flow of 3 m3/s. 10 Discharge of hydraulic test water in such a way (location, height and rate of discharge) so as to minimize physical effects on recipient morphology. Maximum run-off rate 3 m3/s.	SWS of water collection & discharge for the needs of hydraulic testing
Impact on qualitative conditions	1 Measures shall be taken to prevent escape from the working area, for example with sandbags and settling tanks or cisterns to reduce the load from suspended sediments in water. Alternatively, water can be filtered using a suitable membrane, such as geotextile, to clean the water before disposal. 2 During the crossing of rivers by an open excavation method, safety distances for machinery and piles of earth material from rivers will be maintained	SWS where the open excavation method will be applied
Impact on qualitative conditions	1 Prior to disposal, the water will be checked to ensure that its quality complies with local and international requirements for waste water disposal. On-site processing (e.g. filtering) will be performed if necessary. 2 Quality of the hydraulic test waters will be monitored prior to discharge to ensure zero risk to the aquatic recipient. 3 Development of a Pollution Prevention and Response Plan for avoidance of any pollution of water bodies that might occur due to an accident as a result of leakage of hydrocarbons/combustibles and for the response to such a leakage.	SWS where the trenchless crossing method will be applied
Impact on qualitative conditions	1 Use of silt curtains to prevent the transport of sediment out of the work site during dreging operation on shore crossings, if necessary.	Coastal Surface Waters
Impact on the availability of water resources	1 Minimization of water consumption associated with construction activities. 2 A Water Management Plan will be developed to analyze the measures to be implemented so as to minimize water consumption throughout the construction and trial operation phases.	Inland SWS
Impact on the availability of water resources	1 Discharges of water from drainage operations will take place following agreement and approval by the competent authorities. 2 Wherever possible, water will be reused in downstream sections in order to minimize fresh water pumping needs. 3 The surface water sources with the largest amounts of water flow have been taken into consideration for water pumping.	SWS of water collection & discharge for the needs of hydraulic testing

Water Resources		
Impacts	Mitigation Measures	Location
	4 Water take-off will be limited to a maximum of the 10% of the flow during the period of water intake, and in any case it will not affect the minimum ecological run-off of the river.	
Accidental pollution	1 Disposal of liquid oils and fuels as well as of any kind of waste on the ground or underground is prohibited. 2 Carrying out construction vehicles maintenance work within the construction site is prohibited. 3 A Waste Management Plan will be established including specific instructions to avoid disposal of solid or liquid waste in water systems. 4 Establishment of a Management Plan for Hazardous Waste and Materials, so as to stablish the procedures for handling chemicals. 5 Preparation of a Pollution Prevention and Response Plan to avoid any pollution of water bodies. 6 The resulting packaging waste should be temporarily stored and delivered to licensed management bodies in accordance with the applicable legislation. 7 Periodic inspections should be carried out and an immediate response should be made in case escape or leakage is identified. 8 All areas for which there is a risk of leaks or spills during machinery or vehicle storage, maintenance or refuelling, and areas where materials with polluting potential will be stored will be bounded. Bounded areas will be designed to contain at least a 110 % of the largest storage tank plus 10% of the aggregate volume of all storage tanks within the bounded area. 9 Hazardous substances will be stored within impermeable bounded areas to protect groundwater from pollution by accidental spills.	All
Accidental pollution	1 Operate all vessels in accordance with national and international standards (e.g. MARPOL) 2 Development of a fuelling/bunkering procedure for machinery, generators, etc. on vessels 3 All oil/fuel or chemical products shall be stored in bounded or contained sites within the vessels. 4 An oil & chemical spill contingency prevention Plan should be developed and enforced before beggining of activities 5 Chemical handling procedures should be developed and enforced 6 Oil & Chemical spill response kit to be made available on vessels (where applicable) 7 Preparation of Waste Management Plan, including waste water 8 HSE training of all on-site personnel on environmental awareness and oil & chemical spill prevention and response	Coastal Surface Waters

Water Resources		
Impacts	Mitigation Measures	Location
	9 Adoption of the Best Environmental Practices (BEP)	
Ground Water Systems		
All	1 Any required discharge of water will take place after the necessary permits from the competent authorities have been obtained. 2 Full restoration of drainage characteristics (e.g. soil structure) of the soil damaged during construction will be carried out. 3 An assessment will be carried out to assess drainage and irrigation networks within the work area. This will facilitate the assessment to be made of any damage caused during construction and rehabilitation (such as adding or replacing drainage pipes) that need to be approached appropriately.	All
Impact on quality	1 Carrying out construction vehicles maintenance work within the construction site is prohibited if it involves handling of hazardous or toxic material. 2 Disposal of oil, fuel, or any kind of waste on the ground or in the subsoil is prohibited.	All
Accidental pollution	1 Development of a Pollution Prevention and Response Plan to avoid any pollution of water bodies that may occur from an accident as a result of fuel leakage and for the response to such a leakage. 2 Hazardous substances shall be stored in areas with impermeable layers (e.g. geotextile, concrete slabs, etc) to protect groundwater from pollution due to accidental spills.	All

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1.2.14 Wave Conditions – Oceanographic Characteristics – Coastal Mechanics

During construction phase, it is proposed to apply the following good practices to minimize the coastal mechanics impacts which may occur during installation of cofferdams or causeways at landfalls locations from construction activities (see Table 1-20). Generally, a Coastal Engineering study may have to be prepared, and followed during the construction phase. In addition, the time of the construction works in the LFs locations should be minimised.

Table 1-20 Mitigation Measures to Address Impact on Wave Conditions – Oceanographic Characteristics – Coastal Mechanics during Construction Phase.

Wave Conditions – Oceanographic Characteristics – Coastal Mechanics		
Impact	Mitigation Measures	Location
Coastal mechanics impacts which occurs during installation of cofferdams or causeways	1. Preparation of a Coastal Engineering study, if deemed necessary, where the specific wave patterns in the LFs locations will be determined and the depth of influence will be estimated. 2. Application of the best common practices in construction sites, according to the coastal engineering study..	LFs
	1 Not to prolong the execution time of the following tasks in the LF2, LF3 locations i. Pre-lay dredging ii. Post-lay backfilling iii. Bund Construction	LF2,LF3
	1 Not to prolong the execution time of the following tasks in the LF4, LF5 locations i. Pre-lay dredging ii. Post-lay backfilling iii. Cofferdam installation	LF4,LF5

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1.2.15 Risks to human health, cultural heritage and / or the environment, mainly due to accidents or disasters

The present section tabulates the mitigation measures per environmental parameter, mirroring structure of section 9.

No relevant impacts and mitigation measures have been evaluated, as no major accidents due to the project are expected during the construction phase.

Table 1-21 Mitigation Measures to Address Impact to human health, cultural heritage and / or the environment, mainly due to accidents or disasters during Pre-Construction Phase.

Risks to human health, cultural heritage and / or the environment, mainly due to accidents or disasters		
Impact	Mitigation Measures	Location
General	1 Conservative pipeline routing is the primary mitigation measure. 2 Route optimization according to the detail design, as mentioned in section 8.15. (i.e geohazard design program etc)	All pipelay route

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1.3 Operation phase

1.3.1 Introduction

The following sections describe mitigation measures for negative impacts or enhancement measures for positive impacts, during operation phase.

1.3.2 Climatic and bioclimatic

During operation phase, it is proposed to apply the following good practices to minimize the impact of exhaust fumes from operation activities (see Table 1-22). More details (mitigation measures) on the atmospheric environment during operation phase are presented in section 1.3.10.

Table 1-22 Mitigation Measures to Address Impact on climatic and bioclimatic characteristics during Operation Phase.

Climatic and Bioclimatic Characteristics		
Impact	Mitigation Measures	Location
Change in Greenhouse Gas Emissions	1 Regular maintenance of the Equipment 2 Monitoring of main emission sources (generators, turbines) - according to Environmental Monitoring Plan 3 Adoption of Best Available Techniques (BAT) for air pollutant	Compression Stations CS2/MS2 - CS2/MS2N and CS3

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During the operating phase and in accordance with Sections 9.3.1.2 (**Microclimate and Bioclimatic Characteristics**) and 9.3.1.3 (**Warm or Hot Gas Emissions**) no impacts were identified. Therefore, no specific mitigation measures are mentioned except for compliance with European and National legislation on the use of equipment certified with European standards.

Due to the nature of the impacts on climatic characteristics deriving from the operation of Project facilities, the main mitigation measure foreseen for the Project consists of the use of the best available technologies for the equipment and machinery.

1.3.3 Morphological and Landscape Characteristics

The mitigation measures for the impacts on the morphological and landscape features during the operation phase are given in the table below.

Table 1-23 Measures to address the impacts on Landscape and Morphology during Operation Phase.

Morphological and Landscape features		
Impact	**Mitigation Measures**	**Locations**
Landscape Modification from PPS (incl. restored temporary facilities)	1 Monitoring of plant restoration for at least 3 years after the completion of planting works. In case of unsatisfactory regeneration, plantings will be repeated and / or other corrective actions will be carried out, which will be agreed with the competent authorities. These actions will burden the project budget. 2 Maintaining pipeline protection strip free of deep-rooted species development (annual plants are excempted) and/or any other provisions of the operation Plans. 3 Maintenance of the pipeline protection strip as a fire protection zone if requested by the competent authorities.	Forests and forest areas as defined by forest legislation as amended and in force (L. 998/1979), e.g.: • Hilly Natural (Forest) Landscape • Mountainous Natural (Forest) Landscape • Monemvasia Castle Town UNESCO site (view of LF3) Landscapes of high sensitivity, i.e.: • Monemvasia Castle Town UNESCO site (view of LF3) • Lakopetra touristic establishments (view of LF4) • Coastal Rural Landscape • TIFK "Parapotami Alfeiou" (Alfios' Tributaries) (AT1011011) • TIFK "Ekvoli Acheronta and Nekromanteio" (R. Acheronta Estuary and Necromancer) (AT3010051)
Viewer nuisance	1 Appropriate lighting design to minimize light diffusion	Locations of permanent building installations

Morphological and Landscape features		
Impact	Mitigation Measures	Locations
	2 Use of lighting equipment that minimizes the upward diffusion of light or glare to the recipients. 3 Perimetric tree planting to contribute to the visual concealment and landscape concealment (if possible and in accordance to any safety distances). 4 Buildings will be designed (including the use of appropriate materials and colours. 5 Elements with greater visibility are the vent and stacks that, depending on authorities' regulations in terms of security for civil or military aviation, could be marked with typically coloured white/red aircraft warning painting or, if possible, with other colours defined to limit their visibility and landscape impact	
Seabed morphology (Bathymetry) modification	1 Local adjustments to avoid seabed intervention areas, e.g. rocky outcrops, cliffs, can be considered. 2 Selection of appropriate seabed intervention method according to water depth and ecological constraints, where necessary, in the deep water sections.	Specific locations to be determined upon finalization of DMS and prior of construction phase begin.

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1.3.4 Geological, Tectonic, Soil-Sediments Characteristics

The following table shows the proposed measures to address the potential impacts of the pipeline on onshore, nearshore and offshore sections during operation phase.

Table 1-24 Measures to address the impacts on Geological, Tectonic, Soil-Sediments during Operation Phase.

Geological, Tectonic, Soil-Sediments		
Impact	Mitigation Measures	Locations
Activation of Geohazards	1 Periodic inspection to identify areas of instability as well as the design of stabilization measures. More generally, the measures which will be provided in the slope stability study, that is carried out as part of the basic design of the Project, will be applied 2 At the locations of active faults crossings inspection survey after strong earthquake event (if any) will be applied.	See Annex8M, specifically sites referred in the following tables: • TableM-9 Landslides along CCS1; • Table M-10: Landslides along CCS2;

Geological, Tectonic, Soil-Sediments		
Impact	Mitigation Measures	Locations
	3 Inspection surveys for onshore and offshore section of pipeline (during lifetime) are necessary	• Table M-11: Liquefaction along CCS1; • Table M-12: Liquefaction along Mgalopolis branch; • Table M-13: Liquefaction along CCS2; • Table M-14: Geohazards along OSS2/OSS2N; • Table M-15: Faults along OSS2/OSS2N; • Table M-16: Geohazards along OSS3/OSS3N; • Table M-17: Faults along OSS3/OSS3N • Table M-18: Geohazards along OSS4
Potential Contamination of Soil	1 Mitigation measures for potential contamination from fuels, lubricant oils and chemicals are related to engineering best practice and compliance with local regulations for water management, waste management and in general to prevent any kind of pollution. 2 Development and adoption of: i. Water Management Plan; ii. Waste Management Plan; and iii. Pollution Prevention Plan	All Main Stations

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1.3.5 Natural Environment

This section describes the mitigation measures to be applied, in order to mitigate the impacts to natural environment during operation. Some measures have multiple application. It must be noted that some measures will be specified following the results of special studies and surveys.

1.3.5.1 Onshore biodiversity

The mitigation measures for the impacts on the onshore biodiversity, during the operation phase, are shown in the following table:

Table 1-25 Mitigation measures for the impacts on onshore biodiversity, during operation phase

Natural Environment – Onshore biodiversity		
Impact	**Mitigation Measure**	**Location (approximately)**
Vegetation / flora less	1 Maintenance of the reforestation done for the offset of the forest vegetation permanently removed (8m safety zone) will take place, as per approved Reforestation Studies, as per forest legislation (L. 4280/14 as in force).	Forest areas
	2 Training on ecological aspects/behaviours will be made available for all workers.	General application
	3 Development of a Biodiversity Action Plan for operation	General application
Habitat fragmentation	1 Development of a Biodiversity Action Plan for operation	General application
	2 Implementation of a monitoring program for assessing fauna status during operation. The monitoring program will be detailed in the Biodiversity Action Plan	Applied in section defined in the Biodiversity Action Plan
	3 Training on ecological aspects/behaviours will be made available for all workers.	General application
Disturbance / displacement of fauna	1 Development of a Biodiversity Action Plan for operation	General application
	2 Implementation of a monitoring program for assessing fauna status during operation. The monitoring program will be detailed in the Biodiversity Action Plan	Applied in section defined in the Biodiversity Action Plan
	3 Implementation of noise mitigation measures for the operation of compressor stations, as applicable.	Compressor stations areas
	4 Noisy maintenance activities along the pipeline will be scheduled, where feasible, outside faunal sensitive periods	General application

Natural Environment – Onshore biodiversity		
Impact	Mitigation Measure	Location (approximately)
	5 Training on ecological aspects/behaviours will be made available for all workers.	General application
Protected Areas	1 Mitigation measures for habitat loss are defined in the annexed Appropriate Assessements.	See Annex 9E

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1.3.5.2 Offshore biodiversity

The mitigation measures for the impacts on the offshore biodiversity, during the operation phase, are shown in the following table:

Table 1-26 Mitigation measures for the impacts on offshore biodiversity, during Operation phase

Natural Environment – Offshore biodiversity		
Impact	Mitigation Measure	Location (approximately)
Impact by the operation of offshore pipeline	1 During periodic pipeline inspections with the use of ROV along the entire offshore route, biodiversity development will be also recorded.	General application

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1.3.6 Anthropogenic Environment

1.3.6.1 Regional Planning – Uses of Land & Sea

1.3.6.1.1 Uses of Land

The mitigation measures for impacts on spatial planning and land use during construction phase are given in the table below. Section 1.3.7.2 is also applicable.

Table 1-27 Mitigation measures in the Uses of Land during operation phase.

Regional Planning – Uses of Land		
Impact	Mitigation measures	Locations
Changes in land uses	1. Establishment of statutory regulated safety/ control zones: i. Pipeline Protection Strip (8 m corridor – 4 m on each side of the pipeline axis)	General

Regional Planning – Uses of Land		
Impact	Mitigation measures	Locations
	ii. Building Control Strip (40 m corridor – 20 m on each side of the pipeline axis) iii. Preventive Spatial Development Control Strip (400 m corridor – 200 m on each side of the pipeline axis) 2. Compensation for loss of crops/dameges in case of entry in the 8m zone 3. Through stakeholder engagement and public disclosure, it will be communicated to affected communities along the route that restrictions will apply to building activities in the 40 m and that Spatial Development (high population density buildings) and preventive control in a 400 m corridor to ensure safe operation of both activities. 4. Systematic engagement with local authorities in order to cover the entire range and all levels of local and regional planning which will be affected by the Project. 5. Develop and implement a Grievance Mechanism .	

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1.3.6.1.2 Uses of Sea

The mitigation measures for impacts on spatial planning and land use during construction phase are given in the table below. Section 1.2.7.2 is also applicable.

Table 1-28 Mitigation measures in the Uses of Sea during operation phase.

Regional Planning – Uses of Sea		
Impact	Mitigation measures	Locations
Marine traffic (berthing restrictions)	1. Establishment of a 500 m Berthing Safety Zone, i.e. restriction of whatsoever berthing within a 250 m radious around the pipeine axis, if and as requested by the competent authorities. 2. Information to authorities/ fishermen/ mariners. Navigational warnings 3. Stakeholder engagement and public disclosure to explain need and importance of exclusion zone. 4. Development and implementation of a Grievance Mechanism	Offshore section

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1.3.6.2 Structure and functions of anthropogenic environment

1.3.6.2.1 Community Health & Safety

The mitigation measures for impacts on community Health and Safety during operation phase are given in the table below.

Table 1-29 Mitigation measures for the Community Health and Safety during operation phase.

Structure and functions of anthropogenic environment – Community Health and Safety		
Impact / Risk	**Mitigation measures**	**Locations**
Environmental Changes	1. IGI POSEIDON will develop an Emergency Responce Plan where it will set out clear instructions and action plan in case of accidents/ risk of accidents 2. IGI POSEIDON will fence permanent facilities 3. IGI Poseidon will undertake an educational programme for its employees, as well as for local inhabitants, on the prevention and avoidance of accidents. 4. IGI POSEIDON will ensure that signs are put up around permanent facilities advising people of the risks associated with trespassing. 5. IGI POSEIDON will implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner. Additional, topic specific measures are described in Landscape (1.3.3), Air Quality (1.3.10) and Acoustic Environment (1.3.11) sections.	Closest communities to project footprint.s

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1.3.6.2.2 Community Cohesion

No impacts on community cohesion during operation phase are assessed; hence no mitigation measures are necessary. However, some best practices to be implemented also for the investigated project are given in the table below.

Table 1-30 Mitigation measures (best practices) for Community Cohesion during operation phase.

Structure and functions of anthropogenic environment – Community Cohension		
Impact / Risk	Mitigation measures	Locations
Break of urban fabric continuity	1. IGI POSEIDON will ensure that all project related workers (Company's and any contractor directly under Company's supervision), will abide on a specific Code of Conduct. 2. IGI POSEIDON will mantain a community liaison officer during the operation phase. 3. The Project will release performance reports which will be posted on the project website. 4. Consultation with local Spatial and Building authorities for all local and regional planning development initiatives in the wider area of the Project. 5. Develop and implement a Grievance Mechanism. The grievance mechanism will remain in place and updates will be regularly communicated to all stakeholders (possible through posting on Owner's website) Additional, topic specific measures are described in Sections 1.3.6.1.1, 1.3.7.2, 1.3.7.3 and 1.3.7.4.	• Communities along the project footprint. • Communities close to Major Stations.

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1.3.6.3 Cultural heritage

No impacts on cultural heritage resources are assessed during operation phase; hence no mitigation measures are necessary.

1.3.7 Socio-economic Impacts

1.3.7.1 Demography

According to Section 9.3.7.1, no impacts are assessed on demographics from the project during operation phase. Therefore, no specific mitigation measures are provided.

1.3.7.2 Economy - Employment

According to Section 9.3.7.2 during operation phase, the impacts are positive in terms of financial transactions that will be made locally or regionally and the economic impact on fisheries. However, in the following table, the right steps will be described to enhance the positive impacts. On the contrary, there are negative impacts (Minor). No impacts on tourism are assessed, but some mitigation measures, deemed appropriate, are presented. Below is Table 1-31 with the mitigation and enhancement measures.

Table 1-31 Mitigation/ Enhancement Measures for Impact on Economy – Employment during operation phase.

Socio-economic Environment – Economy - Employment		
Impact	**Mitigation Measures**	**Locations**
Employment opportunities (direct and/ or indirect)	1. The Project will provide clear information for the number and skills requirements concerning employment opportunities. 2. In the process of selecting permanent staff, locality will be taken into consideration.	• Population centres (cities or villages) close to temporary and permanent facilities • Along the pipeline protection strip
Economic impact of taxes, fees and local transactions	See Table 1-14	Greece, Europe
Economic impact on agricultural sector (income)	See Table 1-14	Tree crops along the pipeline route
Economic impact on fishing sector (income)	1. Monitoring/ surveillance of marine biodiversity dynamic along the offshore pipeline. 2. Development and implementation of a Stakeholder Consultation and Grievance Management Mechanism Additional measures are presented in Table 1-14.	OSS2/OSS2N, OSS3/OSS3N, OSS4 (offshore section)
Economic impact on tourism sector (income)	1. In case that tourism/ sport interest in diving expeditions is expressed, the Company will cooperate to set up safety procedures. Additional measures are presented in Table 1-14.	• LF3 • LF4 • LF5

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1.3.7.3 Socio-economic Impact on Quality of Life/ Land Value

1.3.7.3.1 Quality of life

Table 1-32 Mitigation measures for Quality of Life.

Socio-economic Environment – Quality of Life		
Impact	**Mitigation measures**	**Locations**
Quality of life	1. Consultation with local authorities for all local and regional planning development initiatives likely to be affected by the Project. 2. Affected land owners and/or right holders are entitled to compensation (in accordance with the Livelihood Restoration Plan).	• Population centres and development areas within the entire Spatial Development Control Strip, i.e. 200 m of the axis of the pipeline. This includes all safety/ control zones. • Fishing Shelters and Port Authorities

Prepared by: ASPROFOS, 2022.

1.3.7.3.2 Value of Land

Table 1-33 Mitigation measures for Value of Land.

Socio-economic Environment – Value of Land		
Impact	**Mitigation measures**	**Locations**
Value of Land	1. Affected land owners and/or right holders are entitled to compensation (in accordance with the Livelihood Restorationn Plan)	Population centers and development areas within the entire Spatial Development Control Strip, i.e. 200 m of the axis of the pipeline. This includes all safety/ control zones.

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1.3.7.4 Deriving Development Trends from the Project

According to Section 9.3.7.4 during operation phase, the impacts are positive in terms of deriving development trends from the project. In the following table, the right steps will be described to enhance the positive impacts. Sections 1.2.6.2, 1.2.7.2, 1.3.7.2 and 1.3.7.3 are also applicable.

Table 1-34 Enhancement Measures for Development Trends.

Socio-economic Environment – Deriving Development Trends		
Impact	**Mitigation Measures**	**Locations**
Development Trends at National/ Regional Level	1. In the process of selecting permanent staff, locality will be taken into consideration. 2. Systematic consultation and involvement of Regional Authorities for all regional planning development initiatives likely to be affected by the Project. 3. Close collaboration with Megalopoli's SDAM board for maximization of potential interactions and partnerships 4. In case that tourism/ sport interest in diving expeditions is expressed, the Company will cooperate to set up safety procedures. 5. Project Owner will publicize implementation of the project in Greece, emphasizing support of local communities/ businesses in its implantation.	All engaged Regions

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1.3.8 Technical Infrastructures

The following table shows the proposed measures to address the potential impacts of the pipeline on technical infrastructures in onshore, nearshore and offshore section during operation phase.

Table 1-35 Mitigation Measures to Address Impact on Technical Infrastructures during Operation Phase.

Technical Infrastructure		
Impact	**Mitigation Measures**	**Locations**
Road Network		
Limited Increase in traffic	1 Establishment of Traffic Management Plan 2 Elaboration of traffic study for the entry-exit point of stations	• Road network • Entry – exit points of stations
Port Facilities, Marine Traffic and Submarine Cables		
Potential Damage of existing cables	1 Monitoring of cables by competent authority	Offshore route, crossing with cables
Wastewater Treatment		
Wastewater generation	1 Waste disposal plan shall include provisions for waste originated from equipment maintenance	Project stations

Technical Infrastructure		
Impact	Mitigation Measures	Locations
	2 Oily and sanitary wastewater treatment within compressor stations	
Sanitary Landfill Sites		
Solid waste generation	1 Separation of recyclable materials and disposal in recycling plants 2 Elaboration of a disposal plan for equipment maintenance	Project stations
High Pressure Natural Gas Pipelines		
Positive impact in national energy infrastructure	1 Positive impact, no mitigation measures assessed	Project stations

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1.3.9 Correlation with anthropogenic pressures in the environment

The table below presents the proposed measures to address the potential impacts of the Project concerning its correlation with the existing anthropogenic environmental pressures during the operation phase.

Table 1-36 Mitigation Measures to Address Impact on man-made pressures on the environment during Operation Phase.

Man-Made Pressures in the Environment		
Impact	Mitigation Measures	Location
Forest Areas		
Complete clearance of the PPS from vegetation	1 Monitoring of the vegetation restoration for at least 3 years, and/ or as agreed with the competent authorities.	Pipeline routing through forest areas.
Agricultural crops		
• Partial loss of agricultural resources • Loss of agricultural land at the areas of permanent facilities.	1 Appropriate restoration of agricultural land after installation and maintenance of plant land on the surface	• Pipeline routing through agricultural land and especially through areas with deep-rooted crops. • Areas of permanent facilities

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1.3.10 Impacts on Air Quality

In general, impacts on air quality during the operation phase comes from Compression Stations. Table 1-37 summarizes the mitigation measures during the project's operation phase. However, it must be noted that according to JMD 29457/2005 (harmonization of the EU Directive 2008/50/EC) operational emissions NO_X, CO, CO_2 will need to be monitored and sent to the relevant Greek authority for information.

Table 1-37 Mitigation Measures to Address Impact on Air Quality during Operation Phase.

Air Quality		
Impact	**Mitigation Measures**	**Location**
Pollution from NOX emissions	1. Regular maintenance of the equipment 2. Installation of NOx, SOx and CO emission monitoring systems, according to the proposed Monitoring Plan. 3. Periodic air quality monitoring in the area of the compressors during the period 6-12 months after operations start to verify compliance to statutory limits.	• Compression Stations; • Nearest sensitive recipients.
Changes in Greenhouse Gas Emissions	1. State of the art equipment (energy generation equipment in CS's) 2. Adoption of Best Available Techniques (BAT) for air pollutants.	Compression Stations

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1.3.11 Acoustic Environment

The mitigation measures embedded in the design of the compressor stations are specifically focused on noise control measures inside the CS3 and CS2/CS2N plants-buildings and are related to the major noise emitting equipment.

Table 1-38 Mitigation Measures to Address Impact on Acoustic Environment during Operation Phase.

Acoustic Environment		
Impact	**Mitigation Measures**	**Location**
Noise from Pipeline operation works	1. Application of appropriate sound insulation measures to equipment inside the Compression Stations so as to comply with legislative limits within residential areas. 2. Vegetation planting in the fence line of the compressor stations is also applicable as a noise screening measure.	Compression stations

Acoustic Environment		
Impact	Mitigation Measures	Location
	3. Noise monitoring will be performed at the compressor stations fence line according to national legislation and at the closest sensitive receptor, if and as required 4. Any maintenance event that could cause temporarily noise nuisance to the local population will be timely notified, providing necessary and easy to comprehend appropriate information.	

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1.3.12 Electromagnetic Fields

According to Section 9.3.11, no impacts were identified during the operation phase. Therefore, no special mitigation measures are reported.

1.3.13 Water Resources

The mitigation measures for impacts on groundwater resources during operation phase are given in the table below.

Table 1-39 Mitigation Measures to Address Impact on water resources during Operation Phase.

Water Resources		
Impacts	Mitigation Measures	Location
Surface Water Systems		
Accidental pollution	1. Periodic inspections should be carried out and an immediate response should be made in the event of discharge or leakage. 2. Development of a Pollution Prevention and Response Plan for avoidance of any pollution of water bodies that might occur due to an accident as a result of leakage of hydrocarbons/combustibles and for the response to such a leakage.	All
Accidental pollution	1. A Waste Management Plan and a Hazardous Waste and Material Management Plan will be prepared to avoid the disposal of solid or liquid waste in water systems. 2. Open drainage system for collecting rainwater and/or contaminated fluids and dispatching them to an oil separator prior to their final disposal.	Measuring and Compression Stations
Ground Water Systems		

Water Resources		
Impacts	Mitigation Measures	Location
Accidental pollution	1. Development of a Waste Management Plan and a Waste Management Plan for Hazardous Waste and Materials.	All
	2. Development of Emergency Response Plan (ERP) where the specific actions and procedures to be carried out in emergency situations that occur during project operation are identified. 3. Development of a Pollution Prevention and Response Plan to avoid any pollution of water bodies that may occur from an accident as a result of hydrocarbon leakage and for the response to such a leakage. 4. Periodic groundwater quality monitoring. 5. Open drainage system for collecting rain and/or contaminated fluids and dispatching them to an oil separator before they are finally disposed off.	Measuring and Compression Stations

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1.3.14 Wave Conditions – Oceanographic Characteristics – Coastal Mechanics

During the operation phase no effects are expected to Wave Conditions-Oceanographic characteristics-Coastal Mechanics, therefore no mitigation measures are required.

1.3.15 Risks to human health, cultural heritage and / or the environment, mainly due to accidents or disasters

The table below presents the proposed measures to address the potential impacts of the pipeline concerning the risks to human health, cultural heritage and / or the environment, mainly due to accidents or disasters during the operation phase.

Table 1-40 Mitigation Measures to Address Impact to human health, cultural heritage and / or the environment, mainly due to accidents or disasters during Operation Phase.

Risks to human health, cultural heritage and / or the environment, mainly due to accidents or disasters		
Impact	**Mitigation Measures**	**Location**
General	1. Safety studies (including QRA) 2. Emergency Response Plan 3. Pollution prevention and combating plan 4. Project Health and Safety Management Plan 5. Land Easement and Acquisition Strategy (LEAS) and Land Access Plan LAP) 6. Cultural Heritage Management Plan 7. Community, Helath, Safety and Security Management Plan 8. Installation of appropriate signs and fencing, where applicable. 9. Inspection Program	All pipelay route
Shipping Interaction		
Gas cloud at the sea surface after pipeline failure (small leak/ rupture).	1. As-built coordinates will be comunicated to authorities for inclusion of the pipeline on sea charts	Along the offshore route.
Geohazards – Seismic Activity		
Jet Fire / Fireball	1. Adequate distance at least 200m from areas of high population density. 2. Increased class location, as dictated in the Greek technical regulation (see section 6.3.2.5)	• EastMed onshore CCS1b KPs 289-299-300, Near LF4 • EastMed onshore CCS2 KPs 28-29-30, Between villages Gavalou (population 1018) and Grammatikou (population 802)

Prepared by: ASPROFOS, 2022.