ENVIRONMENTAL IMPACT ASSESSMENT

PROJECT:

NEPTUN DEEP

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OMV Petrom S.A

Romgaz Black Sea Limited

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 5 – DESCRIPTION OF RELEVANT ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

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CHAPTER 5 DESCRIPTION OF RELEVANT ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

The Neptun Deep project involves a series of works and activities carried out both onshore and offshore, throughout the entire life cycle of the project, respectively the stage of construction, operation and decommissioning of the facilities.

As a result, depending on the stage of the project, it is expected to register a series of effects of the works and/or activities carried out on the environmental factors.

In the following, we will present the description of the relevant environmental factors likely to be affected by the proposed project, a description that will be proportional and related to the magnitude of the expected effect, and the focus will be on the analysis of the importance and sensitivity of the environmental factor in relation with impact assessment.

5.1 THE POPULATION

The significant impact, through the implementation of the Neptun Deep project of this component, would involve the registration of the following situations:

- occupying land owned by the local population and/ or reducing their productive quality;
- irreparable alteration or loss of natural resources on which local communities depend;
- changes in the ethnic structure of local communities;
- demographic changes within the local community because of damage or the occurrence of risks aggravated by the implementation of the project (e.g.: significant change in air quality, risk of explosions, soil contamination, water contamination, etc.);
- changes in the economic conditions of the area as a result of the loss of local resources on which local communities depend with the consequence of the closure of several businesses (tourism, public catering, other services, etc.).

The implementation of the Neptun Deep project will take place on land privately owned by OMV Petrom S.A., and as regards the natural gas exploitation and production facilities, they are in the Romanian sector of the EEZ, the Black Sea, the area where the state, through the central authorities, manage natural resources, namely the Romanian Waters National Administration, the National Mineral Resources Agency.

Thus, the project does not involve the permanent or temporary occupation of properties owned by the local population, nor the alteration or irreparable loss of some natural resources on which the local communities depend.

Risks to the population due to the presence of the project must be considered for each stage of the project, i.e. construction, operation and decommissioning in relation to the resident population, tourists, staff working in the project area and its vicinity and the interaction of the likely effects of the Neptun Deep project *offshore* and *onshore* with the population in the area.

The planning, execution and operation of the Neptun Deep project is based on a series of studies and management processes that ensure that the risks associated with the development of the project are acceptable and managed at the lowest possible level.

The Neptun Deep facilities are designed to safely accommodate the range of activities expected to take place, both onshore and offshore.

Offshore installations are operated remotely, requiring periodic visits by maintenance and operations personnel who ensure ongoing maintenance and equipment integrity.

In accordance with the definition of a major accident (Law no. 165/2016), all major hazard risks have been identified for each part of the project, and several individual hazard scenarios and response actions for each have been evaluated in order to ensuring that hazards have been satisfactorily identified and controlled during the detailed design, execution and operation phases, and ensuring that risks are managed to the lowest possible level (ALARP).

5.2 HUMAN HEALTH

The significant impact on this component because of implementing the Neptun Deep project would entail the recording of the following situations:

- Significant impairment of air quality in the onshore implementation area of the project, due to exceeding the maximum permissible concentration of air pollutants, beyond the limit set by air quality protection legislation.
- Recording a noise level above the maximum permissible limit set for residential areas.
- Massive accidental spills leading to the alteration of soil quality and groundwater.
- Major accidents leading to fires and/or explosions that could affect material goods and human health.

It should be noted that in reference to this component likely to be affected by the implementation of the project, only the assessment of the impact of the constructive and operational elements on land of the project can be considered.

Exposure of the population in the vicinity of the onshore area of the project site to local pollutant emissions, such as particulate matter, or to an increase in ambient noise levels, equally determines the impact on human health, with consideration of a **potential** increase of the incidence of various diseases among it.

The limit values of air pollutant emissions, according to Law no. 104/2011 on air quality, are as follows:

Table 5.1 Maximum permissible limits of pollutants in the air, according to Law no. 104/2011, on air quality

pollutant	Averaging period	Limit value
Sulphur dioxide (SO_2)	1 h	350 µg/ m^3
	24 h	125 µg/ m^3

pollutant	Averaging period	Limit value
Nitrogen dioxide (NO_2)	1 h	200 µg/ m^3
	1 calendar year	40 µg/ m^3
Carbon monoxide (CO)	Daily maximum value of 8-hour averages	10 mg/ m^3
PM_{10}	1 day	50 µg/ m^3
	1 calendar year	40 µg/ m^3

The health of the population can be significantly affected to the extent that the maximum permissible values are exceeded during a calendar year. As a result, air pollution is a major cause of various diseases and represents the greatest environmental risk to human health.

The effects on human health produced by the main pollutants emitted into the atmosphere are basically the following:

Carbon monoxide exacerbates heart disease symptoms such as chest pain, can cause vision problems, and can reduce mental and physical capabilities in healthy people.

Nitrogen oxides can cause inflammation and irritation of the respiratory tract, being especially dangerous for people with respiratory problems.

Sulphur dioxide leads to the formation of suspended particles, causing breathing difficulties, especially for those who suffer from asthma or heart problems.

Suspended particles have the primary sources the construction sites and unpaved roads, they can also appear as a result of reactions between gaseous chemicals emitted by automobiles. Among the effects of suspended particles are irritation of the respiratory tract, worsening of asthma symptoms and occurrence of arrhythmias.

Ozone occurs due to nitrogen oxides, volatile organic compounds from industrial and automobile emissions, gasoline fumes, chemical solvents, and electrical utilities. It can interfere with some plants' ability to breathe, leading to susceptibility to other environmental factors. In humans, it can reduce lung capacity and cause irritation and inflammation of the respiratory tract. People who suffer from allergies or asthma will experience increased symptoms and more frequent asthma attacks. Small particles are extremely dangerous because there is a possibility that they can enter the lungs and then the blood, causing bronchitis or heart attacks.

Lead comes from the burning of fossil fuels from the operation of equipment. In high concentrations, the presence of lead particles in the air can cause negative effects on human health, with potential repercussions on several systems, contributing to disabilities in children and cardiovascular problems in adults.

As a result of the development of the various activities of the project, variable amounts of primary atmospheric pollutants with the potential to affect local air quality will be emitted.

Within the Neptun Deep project, the sources of pollution associated with the equipment and stages of the project were identified, models were made of the dispersion of pollutants in the air and

reduction measures were identified, so that the impact of the project on air quality and implicitly the impact on the health of the population be reduced and controlled.

Furthermore, noise level modelling was carried out both during the construction and operation phases to estimate the attenuation rate in relation to the distance from sensitive receptors.

Additionally, during the design stage, the risks of accidental pollution and major accidents associated with the operation of the onshore components of the project were identified. These risks were taken into consideration for the implementation of risk reduction measures in the technical project, aiming to bring them down to an As Low As Reasonably Practicable (ALARP) level.

5.3 BIODIVERSITY

The significant impact of the biodiversity present in the protected natural areas with which the project overlaps or borders would imply the registration of the following situations:

- the loss, alteration or degradation of habitats of conservation interest for which the protected natural area was designated;
- the loss of favourable habitats for species of conservation interest within the protected natural area designated for the conservation of these species;
- the loss of the integrity of the protected natural areas with which the project adjoins;
- significant modification of the conservation status or preventing the achievement of a favourable conservation status of the habitats or any species of community interest within the two sites, in the sense established by the specific conservation objectives or the management plan of the Natura 2000 site.
- the significant modification of the relevant descriptors for the biodiversity of the Black Sea established by the Framework Directive - Strategy for the Marine Environment

As the Neptun Deep project involves works in the vicinity of the ROSPA0076 Marea Neagra and ROSAC0273 Zona marina de la Capul Tuzla, it is expected that an impact will be felt on the terrestrial and marine biodiversity components, depending on the implementation stages of the project, as follows:

- the definitive occupation of some land surfaces that may lead to the loss of habitats for feeding, shelter or reproduction of some species;
- the increase in the level of noise and vibrations as a result of the operation of machinery, vehicle traffic, human presence during the construction period, as well as the operation of offshore and onshore installations during the operation period, leading to a disruption of the activity of fauna species;
- the production of mortality of fauna species as a result of traffic and the operation of machinery (*roadkill)*, which may lead to a reduction in the population of some species (birds, chiropterans, invertebrates);
- the definitive and/or temporary occupation of some hard or sedimentary substrate surfaces in the Black Sea, which may lead to the damage of some marine habitats;

- increase in seawater turbidity during offshore operations which may affect marine fauna species;
- changes in the hard and/or sedimentary substrate, which may affect the transfer of particulate organic matter in the food chain;
- the appearance of a barrier effect as a result of the presence of project elements in the location area.

5.4 WATER

As we presented in **Section 4.3 – Description of the water environmental factor,** no surface water courses (rivers, streams or lakes) were identified in the project location area, the nearest registered water course being located 5 km away Southwest, the nearest lake being located 3.6 km North.

The Black Sea is located approx. 60 m from the eastern limit of the project's land site, and in terms of groundwater, there is an overlap with 3 bodies of groundwater, namely *RODL10 Dobrogea de Sud*, *RODL04 Cobadin – Mangalia*, and *RODL06 Platforma Valaha*.

The offshore section of the project is found in the coastal water body BLK_RO_RG_CT and the marine water body BLK_RO_RG_MT01.

Thus, from the perspective of the water environmental factor, a significant impact on groundwater or sea water, as a result of project implementation, would imply one of the following situations:

- the production of massive accidental discharges of pollutants on the ground that can migrate into the water table;
- accidental discharges of pollutants into seawater as a result of a major accident;
- significant damage to the ecological state of water bodies BLK_RO_RG_MT01_marine waters and BLK_RO_RG_CT - coastal waters.

The stage of construction works in the onshore location area of the project involves the use of a consistent number of machines and transport vehicles, the handling of construction materials. For fuel supply, a tank with a capacity of 7.5 m^3 installed in the pre-assembly NGMS and CCR area is provided.

During the period of operation, it is not necessary to use and/or handle fuels, or other hazardous chemicals within the onshore facilities of the project.

The risk of a massive accidental pollution of hydrocarbons or other hazardous chemicals on the ground, migrating into the water table, is unlikely.

The stage of offshore construction works as well as the stage of operation of natural gas exploitation and production facilities involve a series of operations with vessels (platform installation vessels, GPP, drilling platform - MODU) for the operation of which fuel supply is required (Diesel marine), thus there is a potential risk in terms of accidental hydrocarbon pollution.

At the same time, the risk of accidental hydrocarbon pollution was also identified in the event of a major accident (collision between ships, or between ships in transit and the Neptun Deep production facility). The spatial extent and the direction of movement of the pollution film were the subject of a study [1], considering a volume of 300m^3 MGO as well as the conditions specific to the winter and summer seasons.

For the management of environmental aspects, the prevention and response in the event of the occurrence of events that could affect the environment, OMVP developed the Neptun Deep Environmental Management Plan, the environmental risks being identified and evaluated also within the Report on Major Hazards associated with the exploitation/production facility (RoMH – Report of Major Hazards).

The contractors selected for the execution phase of the project will have the obligation to develop specific environmental management plans for the Neptun Deep project in order to demonstrate compliance with the policies and environmental management system of OMVP, as well as with the requirements of national and international legislation.

Prevention, intervention, and response measures in case of accidental pollution as well as in case of major accident in the onshore and offshore location area of the project are detailed in **Chapter 9.**

Both in the construction stage and in the operation stage of the offshore section of the Neptun Deep project, works and operations were identified that are likely to produce effects with an impact on the water environment factor.

Thus, during the construction stage, the execution of the tunnelling works with the exit shaft and the trench for the installation of the production pipeline, are likely to produce a local, temporary increase in seawater turbidity.

Also, downhole discharge of water-based drilling fluid resulting from drilling the first 2 sections of the production wells will lead to local, temporary changes in chemical parameters of water.

These localized and temporary changes in the chemical parameters of the water can also be recorded because of the disturbance of the sedimentary layer in the working area, causing the resuspension of nutrients and other chemical compounds retained in the sediments.

Effects on the water environmental factor will be felt during the commissioning and actual operation of the Neptun Alpha platform, because of the planned discharge of effluents into the sea.

The planned discharge of effluents into the sea will be done in compliance with the maximum limits allowed according to legal regulations and the conditions established by the notices and authorizations issued by the competent authorities in the field of environmental and water protection.

[1] OMV Petrom SA – Neptun Deep Project, Oil Spill Modelling Report, January 2023 (document reference: ND-D-OP-00-EN-REIS-0001-0001).

The presence of the production pipeline in seawater will lead to the release of metal ions from the sacrificial anodes, which are made of an aluminium alloy, being installed for anti-corrosion protection of the pipeline.

The sacrificial anode corrosion process on seawater gas pipelines is an essential part of pipeline cathodic protection techniques. The sacrificial anode is a specially designed component to prevent corrosion of underwater metal pipes. This anode is made of a more electrochemically active metal than the pipe material and is designed to be gradually consumed by corrosion instead of the pipe. Anodes gradually erode in water, releasing zinc, aluminium, and cadmium ions.

The release of metal ions (aluminium, zinc, cadmium) into the water throughout the life of the pipeline will undergo a slow process of sedimentation in the substratum of the seabed, which will retain these compounds.

The effect on the water will be felt throughout the pipeline's life cycle, thus being considered long-term. It is expected that these effects will be felt in the immediate vicinity of the anodes, but the concentrations of metal ions are insignificant compared to the existing level of these metal compounds (aluminium, cadmium, zinc) in the sea water.

Despite all that, cathodic protection using sacrificial anodes is an effective and widely used method to prevent corrosion of underwater gas pipelines in the marine environment.

It is estimated that by releasing the metal ions into the water they will have a low concentration, the effect on the water quality being localized and, in any case, with a low impact, compared to the impact that the actual erosion of the pipeline would have on the quality the water.

5.5 SOIL AND LAND USE

A significant impact on soil and land use would involve one of the following situations:

- the accidental discharge of pollutants onto the soil, which may contaminate the soil and thus lead to physical degradation and loss of productive capacity of local community lands;
- the impossibility of rehabilitating contaminated land in the event of an accidental spill.

At the level of onshore working areas, a series of changes will affect the soil, such as: removal of topsoil and soil compaction.

No negative effects on the soil are expected during the operation period. These could only occur as a result of accidental pollution in the area dedicated to NGMS and CCR, as a result of a faulty manipulation in the fuel supply of the backup Diesel generator, used in situations where the electricity supply is not active. The risk of accidental pollution has a low probability. Prevention, intervention, and response measures in case of accidental pollution in the project location area are detailed in **Chapter 9.**

The implementation of the project will involve changes regarding the final use of some land areas owned by OMV Petrom S.A.This aspect will not affect, however, the use of the lands located in the vicinity of the project's onshore location, which will have the same destination as at present.

5.6 SEDIMENTS

A significant impact on the sediments would require the registration of the following situations:

- a significant water damage that will indirectly lead to a significant sediment damage as a result of major accidents;
- retention / accumulation / adsorption in sediments of some chemical substances contained in effluents at values exceeding the maximum allowed concentration, toxic for the aquatic environment.

At the offshore site of the project, it is expected that the sedimentary layer will undergo a series of changes during the construction period of the project.

The construction activities, specifically the microtunneling works, the digging of the trench for laying the gas production pipeline, the filling of the exit chamber with excavated material, the actual drilling of the production wells, the discharge of the drilling fluid based on water, will lead to a physical change of the sedimentary substrate and implicitly of the bathymetry in the working areas.

Also, a physical disturbance of the sediments is expected as a result of the suspension and re-sedimentation process, which may lead to a slight modification of the sedimentary profile and, implicitly, of the bathymetry in the area dedicated to the works.

In both situations, the changes in the bathymetry of the working area will not cause any relevant change in the water depth, which would contribute to significant changes in the benthic communities or in the basic physical-chemical conditions for aquatic life.

In the operational stage of the project, the presence of underwater systems (pipeline, manifolds, flowlines, and umbilical systems from the platform) can lead to potential changes in deep water dynamics and, as a result, an indirect, local impact on sediment quality due to the suspension rate and re-sedimentation from the immediate vicinity of underwater systems.

It is also possible to experience a change in sediment quality as a result of the release rate of metal ions into the water from the galvanic, anti-corrosive cathodic protection of the production pipeline.

Cathodic protection is a technique used to prevent corrosion of underwater pipelines by using sacrificial anodes, which are usually made of an aluminium alloy. During this process, the anodes gradually erode in the water, releasing zinc, aluminium, and cadmium ions into the environment.

The release of metal ions (aluminium, zinc, cadmium) into the water throughout the life of the pipeline will undergo a slow process of sedimentation in the substratum of the seabed, which will retain these compounds.

The spatial extent of sedimentation around the production pipeline, where metals released into the seawater will accumulate and add to the natural aluminium, zinc, and cadmium content, depends on the local pattern of currents and erosion/sedimentation.

The amount of aluminium, zinc and cadmium released from the anodes of the cathodic protection system of the pipeline is negligible compared to the sedimentation sources of the metals, namely naval traffic, shipyards, and ports, along with alluvial transport by sea currents.

As such, the release of these chemical compounds into seawater will not result in an overall increase in the concentration of these metals in seawater, so they do not pose an increased risk to sediment quality or benthic fauna.

Another possible change in the quality of the sediments in the area of the production platform results from the discharge into the sea of the produced water, at a depth of 90 m, through the discharge caisson.

The potential impact on sediments results indirectly from the possibility of accumulation on the sedimentary substrate of the remains of chemical substances contained in the effluent discharged through the caisson of the production platform.

The effluent stream from the operation is a constant discharge that will be represented by: reservoir water separated from gas production on the production platform, plus residual chemicals added to protect facilities and aid processing, and a content of fine to very fine sand particles, in small quantities.

The probes can be shut down and restarted several times a year. Some restarts will be cold starts in which case methanol is injected to prevent hydrate formation. The methanol used for the restarts will mix with the full production well flow and will be discharged along with the reservoir water.

Sedimentation refers to the process by which particles or suspended substances in water are deposited on the seabed, forming sediments. Chemicals can be carried by water currents and settle on the seabed in certain areas or favourable conditions. This sedimentation can involve biodegradable and non-biodegradable substances.

It is important to understand that these mechanisms may vary depending on the specific characteristics of water-soluble substances and the marine environment. Also, factors such as temperature, pH, and water oxygen level and sediment composition can influence the biodegradation and sedimentation of substances.

5.7 AIR

The significant impact of the AIR environmental factor would involve:

- significant impact on air quality with the long-term exceeding of the values of the maximum allowed concentrations of atmospheric pollutants provided for by the Air Quality Law no. 104/2011;
- the impossibility of maintaining the measures regarding the Air Quality Maintenance Plan at the level of Constanța county, regarding the project implementation area.

The air environment factor is likely to be affected only during the construction period of the project, as a result of:

- carrying out activities within the site organization for onshore works, which may affect air quality by generating specific pollutant emissions from the combustion of fuel in the engines of machinery and vehicles;
- the release of dust and the increase in emissions of specific pollutants as a result of the handling of construction materials (mineral aggregates, earth, etc.) and the traffic carried out within the site organization and the entire onshore site of the project
- the use of vessels for specific operations of building offshore facilities and drilling production wells

During operation, activities at sea and on land are reduced in intensity, the air environment factor being likely to be affected as a result of:

- air emissions released from the flare system of the Neptun Alpha platform;
- emissions released from the main energy production generators;
- naval traffic for the quarterly maintenance works of the Neptun Alpha platform;
- maintenance work performed on the NGMS systems (depressurization of the pipes inside the NGMS), performed once every 4 years.
- abnormal operating situations, which require emergency depressurization of the pipes inside the NGMS.

An impairment of the air environment component is also taken into account in the event of a fire, major accident or disaster risk, the risks being identified and evaluated accordingly in **Chapter 9.**

5.8 CLIMATE

A significant impact on climate and climate change would require one of the following to occur:

- the implementation and operation of the project lead to the generation of higher mass flows of greenhouse gas emissions than in the initial conditions;
- the implementation and operation of the project lead to the occurrence of particularly serious natural hazards;
- creating favourable conditions for the occurrence of natural hazards with particularly serious consequences.

Neptun Deep project falls under the category of projects for which the calculation of the carbon footprint is required, according to Table 2 from the COMMUNICATION FROM THE COMMISSION - Technical Guidance on the climate-proofing of infrastructure in the period 2021-2027, (2021/C 373/01) - Natural Gas Transport Infrastructure Projects.

It is assumed that the entire gas production resulting from the exploitation of the deposits in the Neptun IX Perimeter will be used for the production of electric power, aiming to reduce the emissions resulting from the burning of fossil fuels at coal-fired power plants or other fossil fuels.

Neptun Deep project has a credible greenhouse gas (GHG) trajectory until 2050, in relation to the climate goals for 2030 and 2050, namely:

- For the year 2030, the CO2 equivalent emissions resulting from the existence of the Neptun Deep project represent 1.14% of the amount of CO2eq established according to the RO Neutral Scenario;
- For the year 2050, the CO2 equivalent emissions due to the Neptun Deep project will be "0".
- The greenhouse gas emissions generated by the project are limited in accordance with the overall objectives of Romania for 2030 and 2050, with the GHG emissions for the established stages (2030 and 2050) falling within the planned reduction trajectory.

In the design stage, adequate solutions were also considered and implemented for adapting the project to climate changes.

5.9 MATERIAL GOODS

A significant impairment of this component would require the registration of the following situations:

- damage to local resources or changes in market conditions following the implementation of the project, which may lead to the closure of businesses and financial losses among the local community;
- damage incurred to the health of protection zones with severe regime, those with restriction regime and the hydrogeological perimeters, by the construction works of the project;
- the occurrence of major accidents accompanied by explosions and/or fires that would spread and affect the material assets of the local community.

The implementation and operation of the project under normal operating conditions is not of a nature to affect material assets.

The "Materials" environmental component could only be affected in accidental situations. The risks of accidents with repercussions on the Material Assets have been described and evaluated accordingly in Chapter 6.

5.10 CULTURAL HERITAGE

A significant impairment of this component would require the recording of situations such as:

- partial or total damage to an archaeological site or historical monument designated at national level or in the UNESCO heritage.

In the area established for the execution of construction works, both on land and at sea, there are no archaeological sites or historical monuments from the cultural heritage, although it represents an area with archaeological potential.

The identification and positioning of cultural heritage elements located in the vicinity in relation to the project elements were the subject of archaeological field research studies. Through the opinions obtained from the competent authorities (Ministry of Culture, Constanța County Directorate of Culture), the maintenance of some safety zones was established.

5.11 THE LANDSCAPE

A significant impact on the landscape as a result of the construction and operation of the project would involve situations in which permanent or long-term changes occur in areas such as:

- areas of landscape importance designated at national and/or international level, which can be altered by the intervention of the works and the existence of the project in the operating stage;
- the alteration of landscape areas in an excellent state of conservation (traditional landscapes) with a high level of aesthetic, cultural and natural value.

The implementation of the project is likely to bring local changes in the current landscape of the land area of the proposed site, which, however, does not have a high landscape value.

Landscaping elements are provided by the technical construction project, in order to reduce the visual impact, namely: planting a perimeter curtain of trees and shrubs around the NGMS and CCR premises, covering with grass of the land surfaces under where the gas production pipeline is laid.

5.12 INTERACTION BETWEEN ENVIRONMENTAL FACTORS

It is well known that environmental factors influence the health of humans and other organisms, having a determining role in almost every aspect of life, from health to a more or less decisive role in the survival of species.

Thus, climate, soil (sediments), air and water quality are the most important environmental factors in maintaining ecosystems and human health.

The interaction of the project's effects with the environmental factors according to the stage of the project is presented in the table below:

Table 5.2 Matrix of interaction of environmental factors as a result of project effects

Environmental factor with which it interacts		**Environmental factors potentially affected**								
	Population and human health	**Biodi-versity**	**The water**	**Soil and - land use**	**Sedim ents**	**Air**	**Climate**	**Mater ial goods**	**Cultural heritage**	**Landsca pe**
Population and human health		x	x	x	x	x	x	x	x	x

Environmental factor with which it interacts		Environmental factors potentially affected								
	Population and human health	Biodi-versity	The water	Soil and - land use	Sedim ents	Air	Climate	Mater ial goods	Cultural heritage	Landsca pe
Biodiversity	-		x	-	x	-	x	-	-	-
The water	-	x		x	x	x	x	-	-	-
Soil and land use	-	-	-		-	x	x	x	-	-
Sediments	-	-	x	-		-	x	-	-	-
Air	-		-	-	-		x	-	-	-
Climate	-	-	-	-	-	x		-	-	-
Goods	x	-	-	-	-	-	x		-	-
Cultural heritage	-	-	-	-	-	-	-	-		-
Landscape	-	-	-	x	-	-	-	-	-	

Some of these relationships between environmental factors potentially affected by project activities and relevant environmental factors may be direct and immediate, while others occur as a result of an indirect effect, as shown in the table below.

Table 5.3 Presentation of the effects of the interaction between environmental factors

Environmental factor	Interaction with	Interactions / relationships
Population and human health	Goods	Human health and population are in close connection with material goods to the extent that human health, and implicitly the population, are affected, there is the potential for loss of value of material goods (devaluation of material goods, non-cultivation of land).
Biodiversity	Population and human health	Affecting marine biodiversity leads to a decrease in fishing resources, and the occupational activities corresponding to these resources
	The water	Algal blooms as a result of water eutrophication lead to a decrease in oxygen concentration and, as a consequence, effects on marine fauna and flora species
The water	Population and human health	Water quality has a direct influence on human health.
	Biodiversity	Water quality is important to flora and fauna, both terrestrial and marine, directly influencing their specific habitats.

Environmental factor	Interaction with	Interactions / relationships
	Sediments	The quality of sea water indirectly influences the quality of sediments as a result of the sedimentation process of suspensions in the water column.
Soil and land use	Population and human health	Population can be affected by land use change. Human health can be affected as a result of the significant damage to the soil and therefore the change in its productive quality.
	The water	The severe contamination of the soil leads to an indirect damage, through infiltration, of the underground water
	Landscape	Changes in land use influence the local landscape
Sediment	Population and human health	The relationship is indirect by affecting marine biodiversity, which constitutes commercial and consumption resources for the population
	Biodiversity	A change in the quality of the sediments leads to an impairment of the benthic organisms as well as the demersal fauna
	The water	The relationship is indirect as a result of the suspension of sediments, the increase in the concentrations of the physical and chemical parameters of the water and. Consequently, modification of water quality indicators.
Air	Population and human health	Air quality is important to the local community. In the context of the proposed project, the main issues are related to dust (resulted from both the construction and operation phases) along with gaseous pollutant emissions and the impact of air quality on the local community and residents of the adjacent area.
	The water	The relationship is indirect, the damage to the water environment factor can be produced by the introduction of pollutants from the air into the body of water, through precipitation.
	Ground	The relationship is indirect, the damage to the soil environmental factor can occur as a result of precipitation (acid rain) and the deposition of dust with high concentrations of pollutants.
	Climate	Air emissions increase the concentration of greenhouse gases.
Climate	Population and human health	Climate change leads to extreme temperatures, floods, extreme natural phenomena, fire events that can directly affect the population
	Biodiversity	Climate change leads to extreme temperatures, floods, extreme natural phenomena that can directly affect biodiversity
	The water	Climate change leads to extreme temperatures, floods, extreme natural phenomena that can directly affect water as a result of excessive evaporation, the load of floods produced by floods, increase in water temperature, production of high waves, change in salinity level, etc.

Environmental factor	Interaction with	Interactions / relationships
	The soil	Climate change leads to extreme temperatures, floods, extreme natural phenomena (drought, torrential rains that can lead to landslides) that can directly affect the soil; Climate change leads to accelerated soil erosion; Climate change is leading to accelerated coastal erosion.
	Sediments	The relationship is indirect, due to the potential of affecting sea water (increasing the level of nutrients in the water, increasing the amount of alluvium, changes in the salinity level of the water, changing the morphology of the sedimentary substrate as a result of the action of waves and sea currents
	Air	Change in air quality (increase in the concentration of greenhouse gases)
	Goods	Damage/ destruction of material goods as a result of extreme phenomena
Material goods and natural resourses	The population	The damage to material goods leads to a decrease in the standard of living of the population as well as socio -economic relations as a result of the reduction of the values of the material goods owned by it.
	Soil and land use	Damage to material assets (e.g. disasters resulting in the destruction of homes), can lead to soil pollution and damage to land use
Cultural heritage	The population	The damage to the cultural heritage leads to the loss of the cultural identity of the local population
Landscape	Population and human health	Affecting the landscape leads to a visual impact that can affect the population and human health