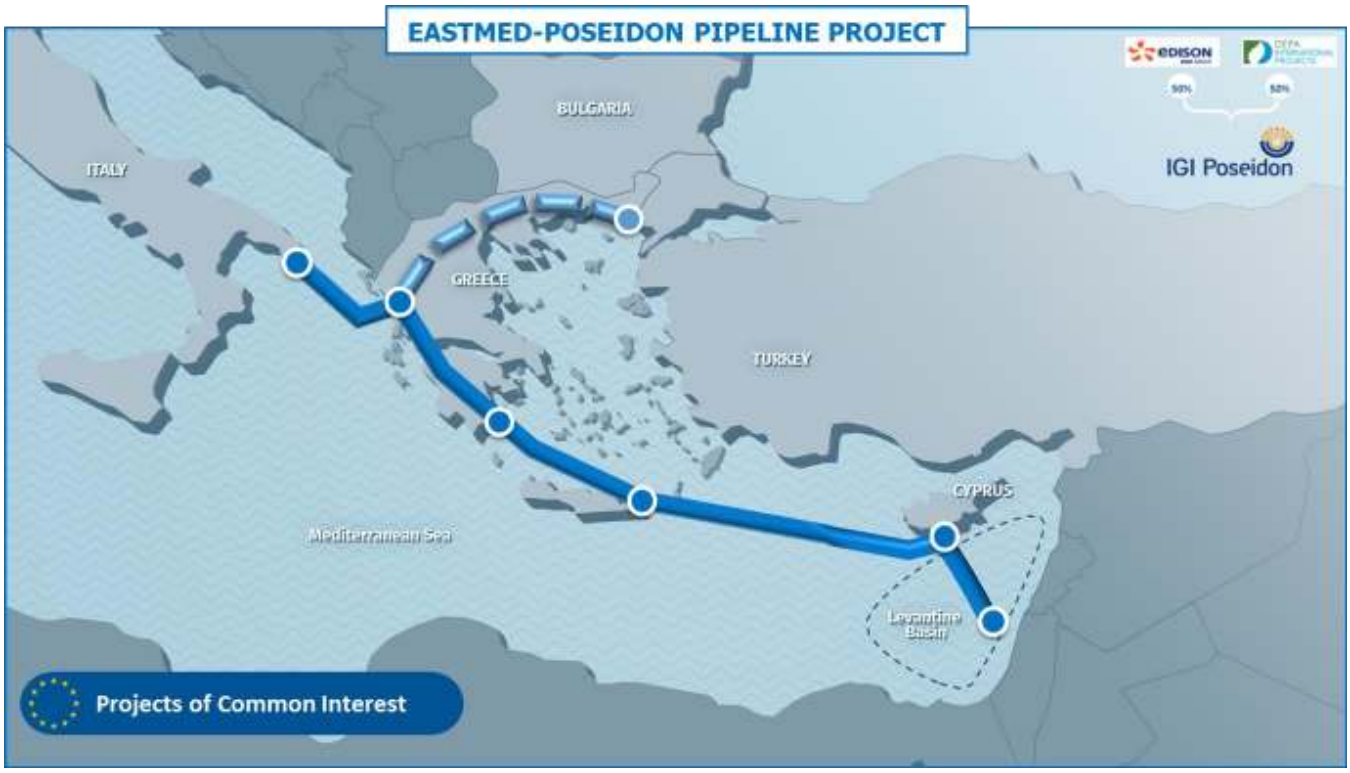
PROJECT:

EastMed Pipeline Project



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Abbreviations

Abbreviation	Description
AA	Appropriate Assessment
C/S	Compressor Station
C-M/S	Compressor and fiscal Metering Station
Contractor	The contractor to which the construction shall be awarded. Currently, it is not defined the manner of awarding or the number of engaged contractors.
EC	European Commission
ECP	EastMed Compression Platform
EIA	Environmental Impact Assessment
EKPAA	National Center for Environment and Sustainable Development
ESIA	Environmental and Social Impact Assessment
ETA	Environmental Terms Approval
EU	European Union
FSA	Field Survey Area
ha	Hectares
HDD	Horizontal Directional Drilling
Investigated project	The EastMed consisting of an Onshore and an Offshore section and associated onshore facilities
IP	Interconnection Point
ITA	Inline Tee Assembly
IUCN	International Union for Conservation of Nature
JMD	Joint Ministerial Decision
kHz	kilohertz
km	Kilometers
LFi	Landfall

Abbreviation	Description
m	meters
MD	Ministerial Decision
MEE	Ministry of Environment & Energy
NCC	Nature Conservation Consultants Ltd.
O&M	Dispatching and Operation & Maintenance Building
OFYPEKA	Organization of Natural Environment and Climate Change
Onshore Stations	• Compressor and Metering Stations at Crete, • Compressor Station at Achaia, • Metering/ Pressure Regulating and Heating Station at Megalopoli.
PGM	Permanent Ground Markers
PIER	Preliminary Environmental Identification Requirements
PPS	Pipeline Protection Strip and Safety Zone (PPS)
Project	Construction and Operation of the EastMed Project
Project Owner	IGI Poseidon: a Company equally owned (50-50%) by DEPA International Projects and Edison, incorporated under Greek law
RCM	Reliability Centered Maintenance
SAC	Special Area of Conservation
SDF	Standard Data Form
SPA	Special Protection Area
SPT	System Pressure Test
WS	Working Strip

1 INTRODUCTION

1.1 Legal framework for the conduction of Appropriate Assessment for the SAC "Oros Arakynthos Kai Stena Kleisouras", GR2310010

According to Greek national legislation Law 4014/2011 an Environmental Social Impact Assessment (ESIA) is required for technical projects belonging to category A1. In case they interfere with Natura 2000 sites a specialized Appropriate Assessment (AA) has to be conducted concerning the entire Natura 2000 site, which becomes an integral part of the projects' ESIA.

The EastMed Pipeline Project has offshore and onshore sections and is directly connecting East Mediterranean resources to mainland Greece via Cyprus and Crete. The Project is being developed by IGI Poseidon (Project Owner), a company based in Athens and equally owned (50-50%) by the Greek company DEPA International Projects S.A. and the Italian company Edison S.p.A.

The ESIA has been prepared on behalf of the Project Owner by the company ERM Italia SpA and the engineering company ASPROFOS Engineering S.A. (member of the HELPE Group of Companies) and in collaboration with renowned, experienced and specialised consultants, in accordance with applicable environmental legislation. The AAs of the Project have been carried out by Nature Conservation Consultants Ltd (NCC), subcontractor of ASPROFOS Engineering S.A.

The present AA concerns the Special Area of Conservation "Oros Arakynthos Kai Stena Kleisouras", GR2310010, focusing mainly on the portion directly crossed by the Onshore section of the pipeline (Figure 2-1).

In the framework of the present AA, NCC established an official communication with the Management Body of Messolonghi Lagoon - Akarnanika Mountain, the responsible Body for the management and protection of the site and requested the most up to date information on habitat, flora and fauna monitoring in the site available from its' biodiversity data-bank.

Category of Appropriate Assessment Study for the site, based on the Annexes of Ministerial Decision 170225/2014

The Greek MD 170225/2014 sets two possible categories of AA described in Annexes 3.2.1. and Annex 3.2.2. In particular:

- An AA falls under the requirements of Annex 3.2.1, when existing biodiversity data for the Natura 2000 site, where the project or portion of the project is proposed to be implemented, are not

recent and/or sufficient, and a detailed biodiversity field survey lasting at least 20 days (for projects of category A1) is required for the collection of biodiversity information.

- An AA falls under the requirements of Annex 3.2.2, when existing biodiversity data for the Natura 2000 site, where the project or portion of the project is proposed to be implemented, are recent, reliable and sufficient and are available from official/public sources, such as the Natura 2000 sites national biodiversity monitoring network and no field survey is required.

The present AA for the Special Area of Conservation (SAC) "Oros Arakynthos Kai Stena Kleisouras", GR2310010, falls under the category set in Annex 3.2.1, since existing data for the sites are not sufficiently detailed to fulfil the requirements of Annex 3.2.2. Thus, a field survey of at least 20 days has to be performed addressing the requirements of Greek legislation, to gather sufficient biodiversity information for the present AA.

The field survey was carried out for an overall period of 21 days between April 2021 and December 2021, including the following activities:

- Collection of field data on fauna species of interest present in the section of the Natura 2000 site close to the pipeline routing by fauna experts;
- Collection of field data on habitats and flora by habitat expert at the same section;
- Collection of additional field data on avifauna species of interest present in the section of the Natura 2000 site close to the pipeline routing by ornithologists;

Field survey results are presented alongside desktop data and clear reference to the data source is made throughout the AA.

1.2 Assumptions, limitations and exclusions

For the preparation of the AA a number of assumptions have been made:

- The assessment was based on Project design data available to date. Reliable assumptions on the following key elements have been made, on the base of existing bibliography on pipeline construction: (a) total duration, (b) specifications concerning the project within the Study Area.
- The AA is in alignment with the ESIA.
- The present AA focused solely on the normal operative conditions of the project. Consequently, emergency and non-routine events, that could potentially affect biodiversity, were not taken into consideration in this AA and will be assessed in the ESIA.
- The decommissioning phase of the project was not taken into account in the present AA, since it is expected to take place in 3-5 decades from today, when all biodiversity parameters will have

to be re-evaluated. Therefore, a new AA will be required for the decommissioning phase after the project end of life.

1.3 Analysis of Institutional / Legal Framework

1.3.1 Plans and projects within Natura 2000 sites

The Natura 2000 network is an EU network of protected areas, whose main objective is the protection of vulnerable and endangered species of animals, plants and habitat types in the EU, and it constitutes the widest biodiversity conservation network worldwide. Based on the Birds and Habitats Directives (2009/147/EC and 92/43/EEC, respectively), every member of the Union declares Special Protection Areas (SPA) and Special Areas of Conservation (SAC), in order to protect the endangered biodiversity of Europe.

The connection between human activities and the protection framework of Natura 2000 sites is clarified in Article 6 of the Habitats Directive. More specifically, for every project or plan that is expected to significantly affect an area, it is noted that:

"*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*".

"*If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted*".

The two Directives have been transposed into the Greek legislation with the following decrees: JMD 37338/1807/2010, JMD 8353/276/2012, JMD 33318/3028/1998, MD 14849/853/2008.

Concerning Article 6 of Directive 92/43/EEC, the L. 4014/2011 and the MD 170225/2014 are defining in detail the implementation of respective provisions. The national legislation includes also the Law 3937/11 "Conservation of biodiversity and other provisions".

Based on the above legal framework, the following are noted:

- The consequences of every project must be examined separately and in accordance with other existing projects or plans in the site,
- The criteria must be based on preserving the integrity of the site, along with keeping in mind the conservation objectives,
- In the case the construction of the project is necessary for overriding public interest, necessary compensatory measures will be taken.

1.3.2 Natura 2000 network in Greece

The national Natura 2000 network has been updated and extended with the JMD 50743/2017, while the Management Bodies for all the Natura 2000 sites are set by the Laws 4519/2018 and 4685/2020. According to Law 4685/2020 the Organization of Natural Environment and Climate Change (OFYPEKA) was established and operates as the successor of the National Center for Environment and Sustainable Development (EKPAA). Among other things, the purpose of OFYPEKA is the implementation of the policy set by the Ministry of Environment and Energy for the management of Natura 2000 protected areas in Greece.

1.3.3 Environmental authorization of activities and projects

According to Law 4014/2011, the environmental authorisation procedure of project and activities that may affect Natura 2000 sites, the preparation of an Appropriate Assessment is foreseen, constituting an integral part of the Environmental and Socail Impact Assessmet.According to the Greek MD 1958/2012 and its subsequent amendments (Greek Decrees MD 20741/2012, MD 65150/1780, MD 173829/2014 and MD 37674/2016), the Projects are classified in two categories: Category A, when they potentially may cause very significant/significant environmental impacts, or in Category B, when they may cause only locally or of no significance environmental impacts.

The content of the Appropriate Assessment was specified by the MD 170225/2014, which includes

- detailed record of natural environment data with emphasis to the protected elements of the Natura 2000 sites and those likely to be affected by the project or activity,
- appropriate assessment and impact assessment,
- mitigation measures for the potential impacts,
- compensatory measures (if needed)
- monitoring program,

- conclusions summary,
- bibliography sources and
- study team.

1.3.4 Classification of the project based on National legislation

The project classification according to National legislation (as amended and in force) is provided in Table 1-1.

Table 1-1 Classification of EastMed according to MD 170225/2014

Legislation	Category	Project Categorization
MD 1958/2011	Group	11 - Transport of energy, fuels and chemical compounds
	No.	1 –Pipelines of national importance or included in European or international networks and associated/ supporting facilities
	Category	A1 – Project and activities that may have very significant impacts on the environment
	Comment	-
STAKOD 08/ NACE Rev.2*	Section	D – Electricity, Gas, Steam and Air Conditioning Supply
	Division	35 – Electricity, gas, steam and air conditioning supply
	Group	35.2 – Manufacture of gas; distribution of gaseous fuels through mains
	Class	35.23
	Description	Trade of gas through mains
JMD 3137/191/Φ.15/2012*	Group	n/a
	Sub-group	n/a
	No.	n/a
	Disturbance class	n/a

** The classification presents the activity most relevant to the Project. The applicable provisions concern also the compressor stations.It is noted that the compressor stations, having a total capacity >50 MW, fall into the provisions of JMD 36060/1155/E.103 regarding "Establishing a framework of rules, measures and procedures for the integrated prevention and control of environmental pollution from industrial activities, in compliance with the provisions of Directive 2010/75 / EU "On Industrial Emissions (Integrated Pollution Prevention and Control)" of the European Parliament and of the Council of 24 November 2010"*

Prepared by: (ASPROFOS, 2021)

2 STUDY AREA – FIELD SURVEY AREA

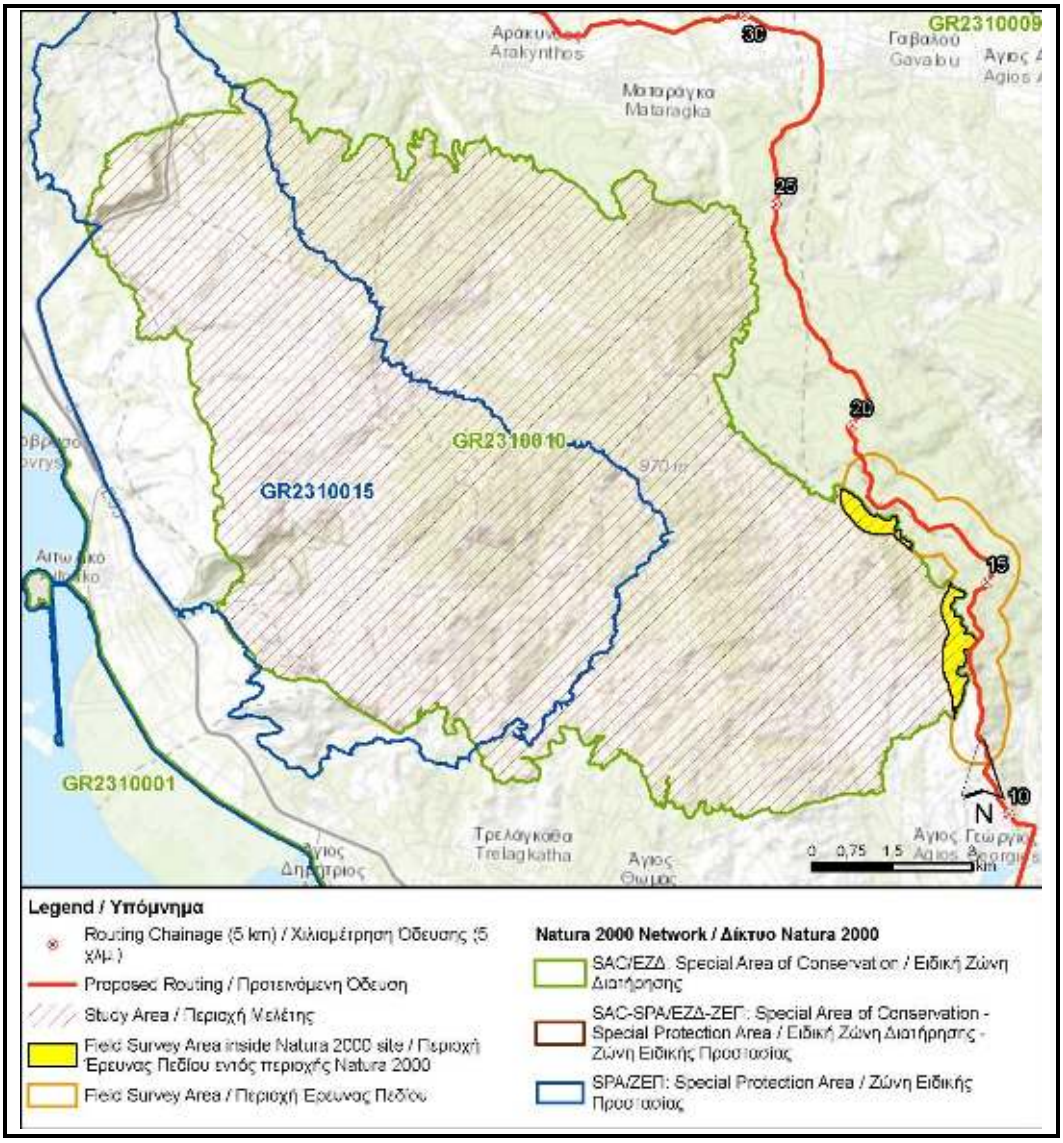
According to the AA specifications (MD 170225/2014) the whole Natura 2000 site, crossed or affected by the project should be defined as Study Area; hence the Study Area for the present AA is the SAC "Oros Arakynthos Kai Stena Kleisouras", GR2310010. As shown in Figure 2-1 the routing of the Onshore pipeline approaches the site at its eastern part, but does not cross it.

According to the National regulatory specifications (MD 170225/2014), the Field Survey Area (FSA) for linear projects (such as the pipeline) is defined as a buffer zone of at least 500m on either side of the linear infrastructure falling within the Study Area. Although the project is not crossing the Study Area, it crosses in close proximity to it (about 10m) and its 500m buffer zone overlaps with the Study Area.

Given that the construction of the project outside the Natura 2000 site may affect the site, a FSA area was considered, that includes also an area outside the Natura 2000 site, covering a total surface area of 755ha, of which 112ha overlap with the Natura 2000 site (0.8% of the site's area) (Figure 2-3).

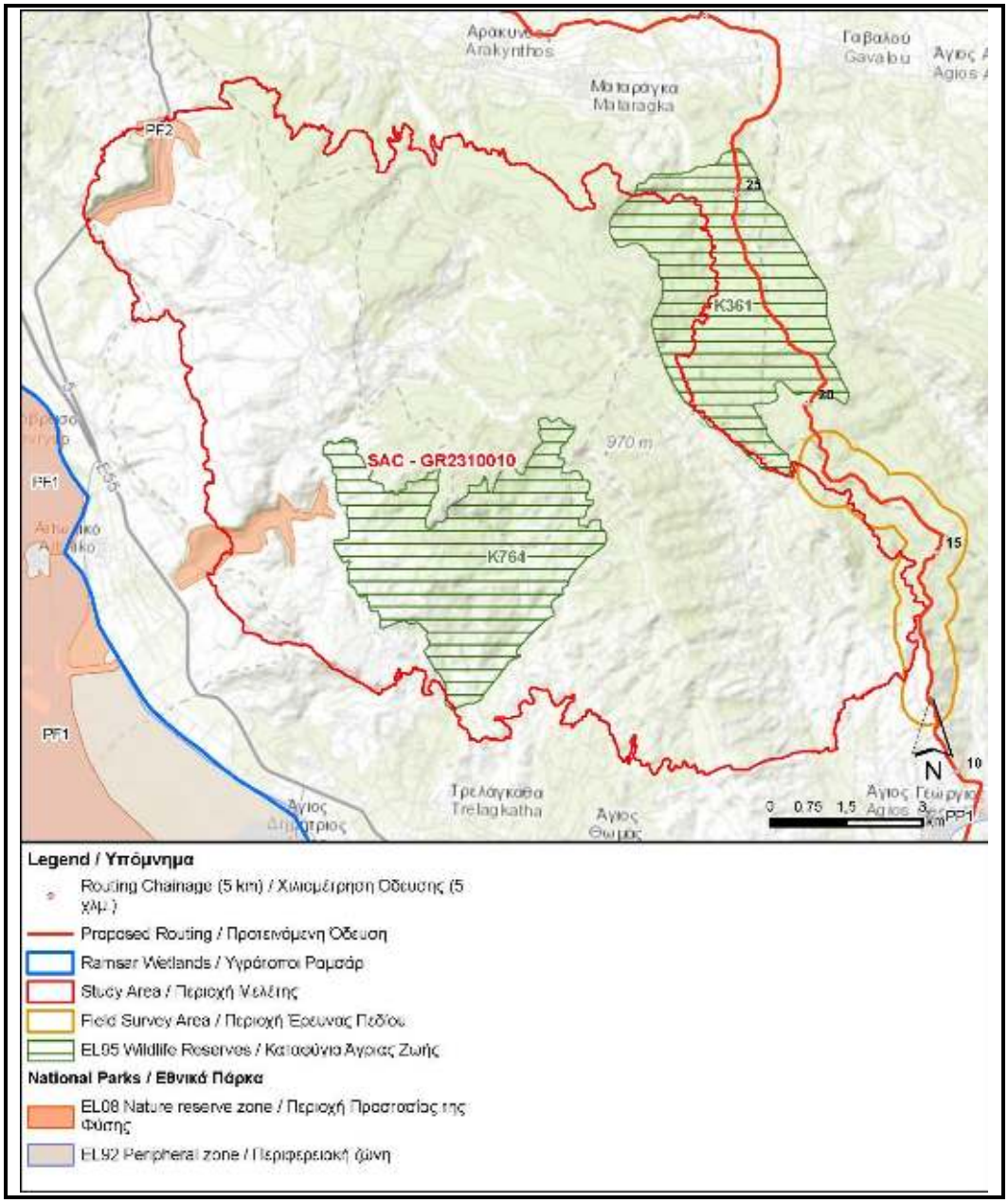
It should also be mentioned that the pipeline crosses the Wildlife Reserve "Oros Arakynthos-Mataragkas-Gavalou" (K361), which overlaps with the Study Area between IP 2088-2116, while it crosses at a distance of 3.8km from the Wildlife Reserve "Asprolithi Dimou Mesolongiou" (K764) (Figure 2-2).

Maps of the Study Area and the Field Survey Area are provided in ANNEX F, Maps 2 and 4 respectively.



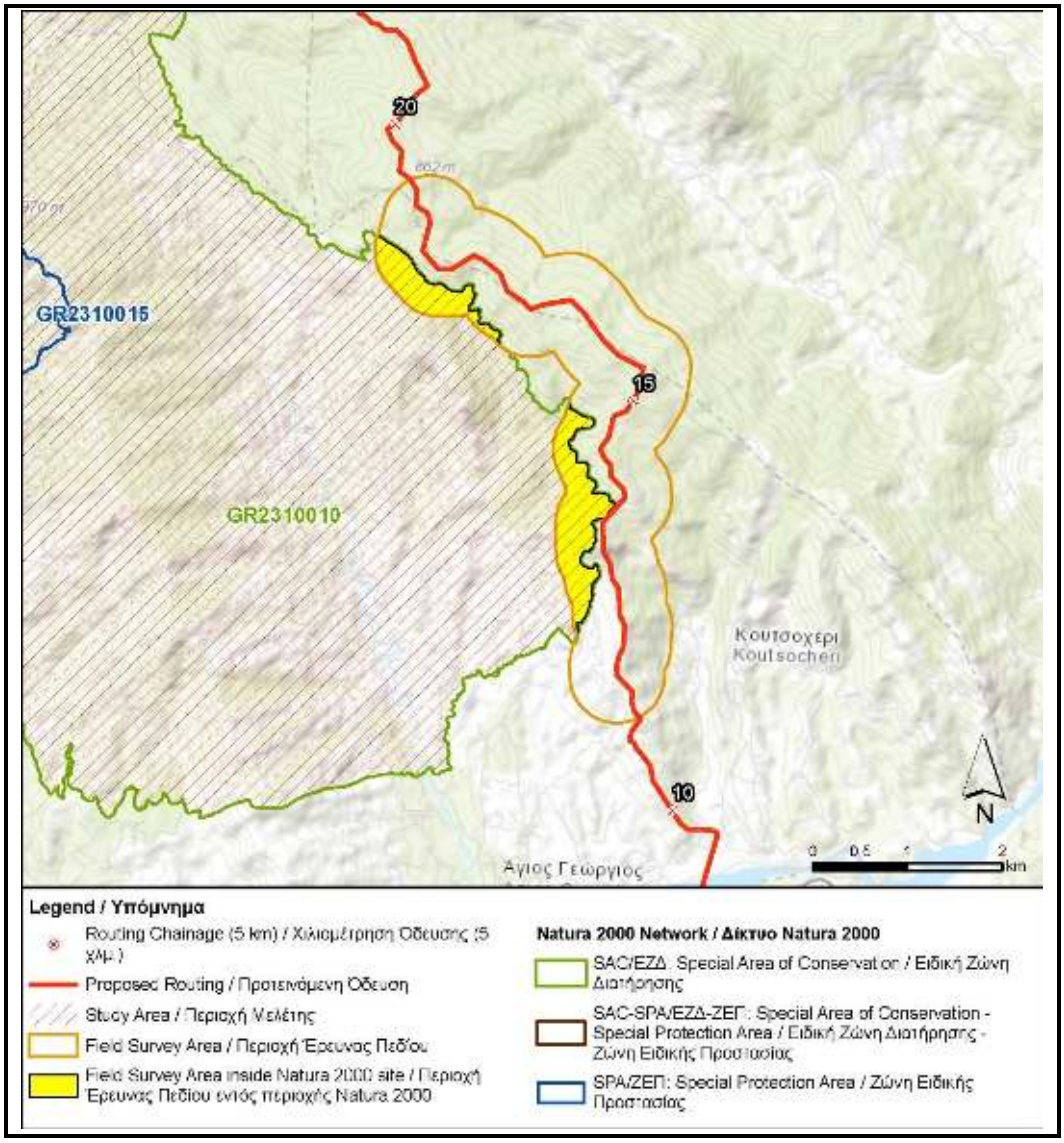
Prepared by: (NCC, 2021)

Figure 2-1 Study Area (red hatch) and Field Survey Area (orange). Pipeline routing in red



Prepared by: (NCC, 2021)

Figure 2-2 Protected areas of the broader area, crossed by the pipeline. Pipeline routing in red



Prepared by: (NCC, 2021)

Figure 2-3 Field Survey Area (in yellow the FSA part within the SAC). Pipeline routing in red

3 CURRENT STATUS OF NATURAL ENVIRONMENT

According to the specifications of MD 170225/ 2014, the characterization of the current status of the natural environment should include the description, recording and analysis of elements of the natural environment of the Study Area, as well as its conservation status.

The present section focuses on the whole SAC ecosystem providing data on existing baseline conditions of the Natura 2000 site. Information on the FSA is provided based on fieldwork collected data.

3.1 Description, Recording and Analysis of the Study Area Natural Environment

The analysis of the current status of the natural environment in the Study Area has been based on data derived from the literature, enriched by the findings of the dedicated field surveys performed for the development of this AA.

In particular, for the purpose of the present document, a literature review of published references and a desktop review of data available from existing databases were carried out for the Study Area. The main bibliographic sources of information used include:

- The Standard Data Form of SPA Area GR2310010 (2020).
- The most recent reports on the implementation of Directives 92/43/EEC and 2009/147/EC, including habitat mapping.

In addition, the results of the following studies were also considered:

- Action Plans for species at National and European level.
- The most recent Red Data Books (national, European, international).

3.1.1 Short description of the Study Area

The Study Area is the Special Area of Conservation "Oros Arakynthos Kai Stena Kleisouras", GR2310010, which is located within the administrative limits of the Region of Western Greece covering an area of 13,303.06 hectares. The area is managed by the Management Body of Messolonghi Lagoon - Akarnanika Mountains. The Study Area includes two small parts of the National Park of the Messolonghi-Aitoliko Lagoon, lower reaches and estuaries of Acheloos and Evinos rivers

and Echinades islands. Furthermore, it overlaps with the Wildlife Reserve "Asprolithi Dimou Mesolongiou" and partially with the Wildlife Reserve "Oros Arakynthos-Mataragkas-Gavalou".

The site consists of large cliffs on the southwestern flanks of a largely forested mountain which borders the wetlands of Aitoliko-Mesolonghi. It is an ecological connection between the wetland and the continental mountainous area. The topography of this site is unusual. There are precipitous rocks, gorges and slopes of high altitude which act as refuges for many birds, especially for raptors. A plant species of priority is also housed, namely *Centaurea niederi* which is distributed in Greece only on Mt. Arakynthos and on the rocky slopes of the surrounding hills of Mavra Vouna, at the forest of Strofilia and the marshes of Lamia in NW Peloponnisos. The site hosts some remnant clusters of deciduous oaks with dominant species *Quercus ithaburensis* subsp. *macrolepis*.

The site is important due to its large cliffs (at the southwestern flanks of a largely forested mountain) which border the wetlands of Aitoliko-Mesolonghi. These cliffs together with the adjacent wetland are ecologically connected and they could be considered as a whole. Concerning birds of prey, the most important parts of the site are the southern and southwestern slopes of Mt. Arakynthos as well as the Kleisoura gorge, since these areas neighbour the extensive wetland system of Aitoliko, Mesolonghi and the Evinos river estuary, all of which constitute hunting areas of high productivity for these birds. The aesthetic value of its impressive landscape is also very high.

The map of the Study Area is provided in ANNEX F, in Map 2.

3.1.2 Detailed description of the Study Area

3.1.2.1 Habitat types and Flora

The Natura 2000 site hosts 10 habitat types of Annex I of Directive 92/43/EEC. Most of the area is covered by forests, mainly by oaks. The rest of the area is covered by maqui, garrigues, phryganas etc. Table 3-1 provides the spatial extension of each habitat identified in the Study Area, as well as their percentage with respect to the whole Natura 2000 site area, as provided by the habitat map of the site (Ministry of Environment, 2018).

No priority habitat type of Annex I of Directive 92/43/EEC has been recorded.

It should be noted that one species of Annex II of Directive 92/43/EEC, *Centaurea niederi*, has been recorded.

Table 3-1 Habitat types found at the Study Area

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
Habitat types included in the SDF				

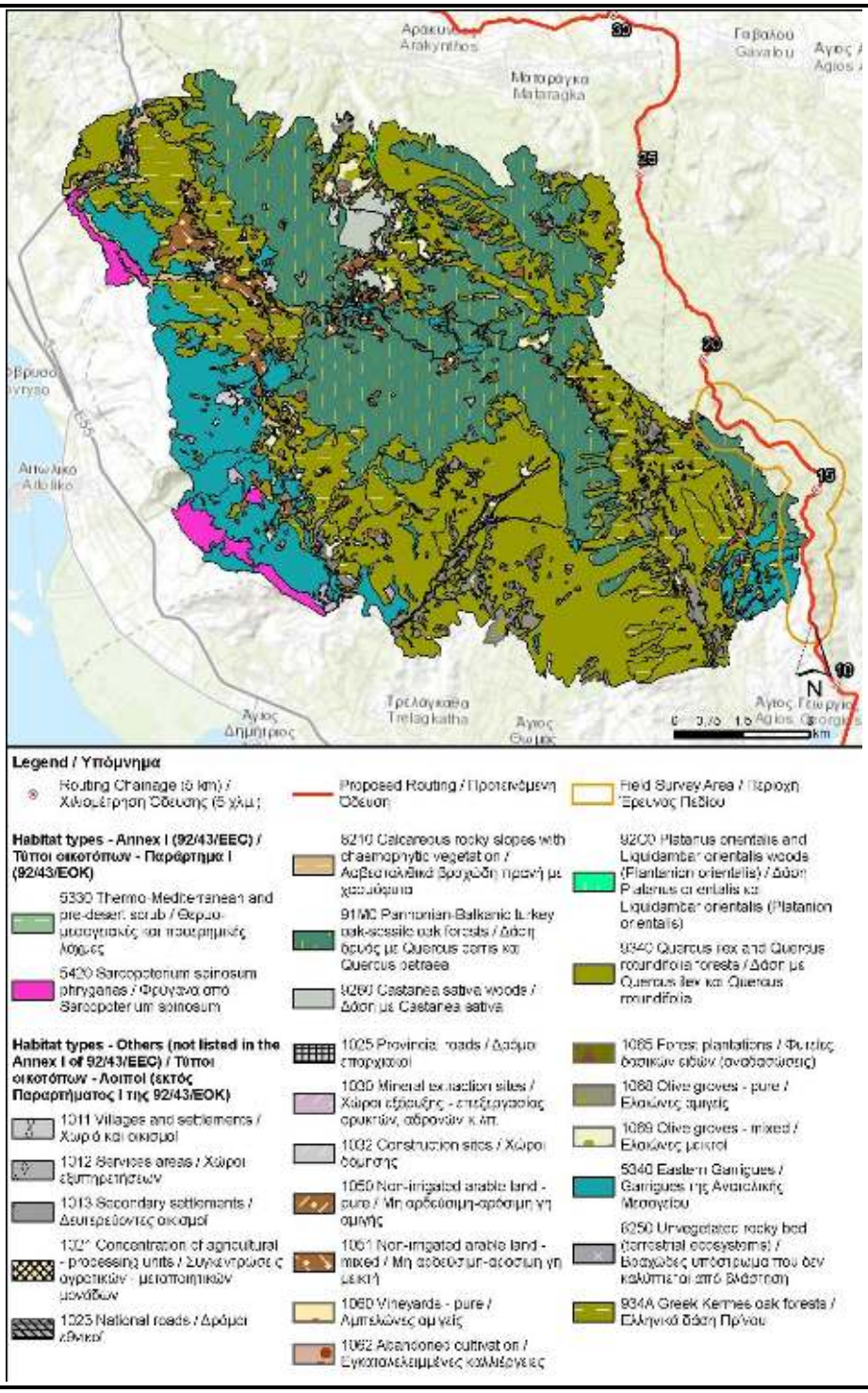
Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
91M0	Pannonian-Balkanic turkey oak – sessile oak forests	3,913.41	29.42%	HD: Annex I
9340	*Quercus ilex* and *Quercus rotundifolia* forests	3,482.88	26.18%	HD: Annex I
5420	*Sarcopoterium spinosum* phryganas	223.33	1.68%	HD: Annex I
9260	*Castanea sativa* woods	146.35	1.10%	HD: Annex I
8210	Calcareous rocky slopes with chasmophytic vegetation	117.51	0.88%	HD: Annex I
92C0	*Platanus orientalis* and *Liquidambar orientalis* woods (*Platanion orientalis*)	31.44	0.24%	HD: Annex I
5330	Thermo-Mediterranean and pre-desert scrub	5.11	0.04%	HD: Annex I
3290	Intermittently flowing Mediterranean rivers of the Paspalo-Agrostidion	0	0.04%	HD: Annex I
5150	Bracken fields	0	0.04%	HD: Annex I
9540	Mediterranean pine forests with endemic Mesogean pines	0	0.04%	HD: Annex I
Other habitat types				
934A	Greek Kermes oak forests	2,313.97	17.39%	Of national importance
5340	Eastern Garrigues	1,570.09	11.80%	Of national importance
1068	Olive groves - pure	470.03	3.53%	
1051	Non-irrigated arable land - mixed	321.56	2.42%	
1069	Olive groves - mixed	215.62	1.62%	
1050	Non-irrigated arable land - pure	196.53	1.48%	
1062	Abandoned cultivation	70.89	0.53%	
1011	Villages and settlements	49.51	0.37%	
1065	Forest plantations	46.52	0.35%	
1025	Provincial roads	41.27	0.31%	
1030	Mineral extraction sites	22.84	0.17%	
8250	Unvegetated rocky bed (terrestrial ecosystems)	20.92	0.16%	

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
1032	Construction sites	14.20	0.11%	
1013	Secondary settlements	12.37	0.09%	
1012	Services areas	8.51	0.06%	
1060	Vineyards - pure	3.82	0.03%	
1023	National roads	3.36	0.03%	
1021	Concentration of agricultural/processing units	1.01	0.01%	

Note: HD: Habitats Directive

Prepared by: (NCC, 2021)

In Map 3 in ANNEX F the habitat type coverage at the Study Area is presented.



Prepared by: (NCC, 2021)

Figure 3-1 Habitat type coverage at the Study Area

3.1.2.2 Fauna

The Natura 2000 site is ecologically connected with the wetlands of Mesolonghi. The species for which the site has been designated are 4, namely 2 mammal (*Canis lupus, Lutra lutra*), 1 reptile (*Mauremys rivulata*) and 1 amphibian species (*Bombina variegate*). The species are residents in the site, the two mammal species are present in the area, while the two amphibian and reptile species are considered rare. ANNEX A of the present AA presents the species included in the SDF of the site, as well as their presence in the site, population and conservation assessment.

All above species are protected under the Habitats Directive and are included in Annexes II and IV. *Lutra lutra* has been characterized as Near Threatened worldwide (IUCN), while at national level 3 species are Endangered or Vulnerable. ANNEX B of the present AA provides information concerning the threat status of the species included in the SDF of the Study Area based on the most up to date bibliographic sources.

ANNEX A of the present AA provides also information concerning other species of interest included in the SDF.

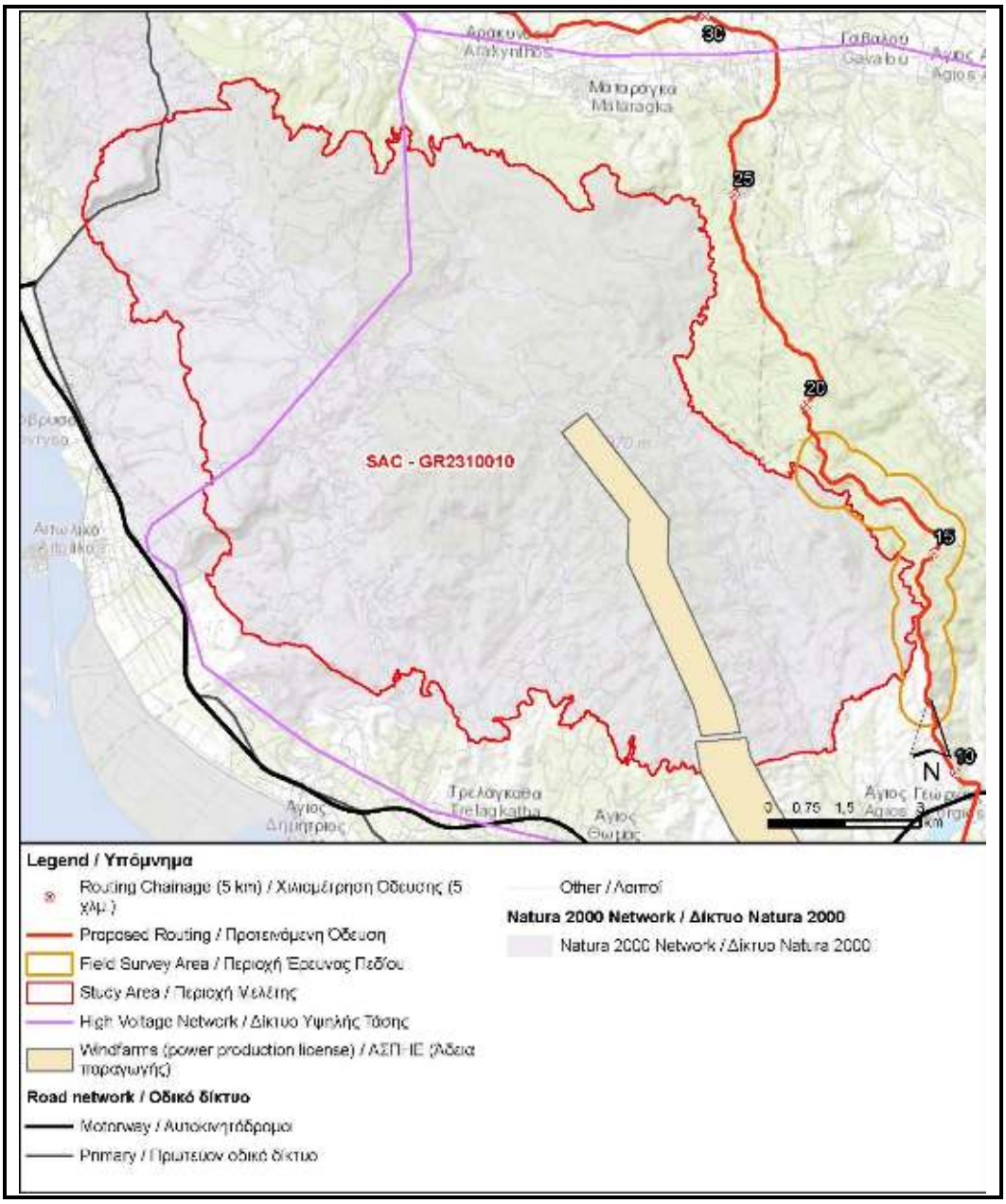
3.2 Other projects – potential cumulative impacts

The following broad categories of types of third-party projects that is likely to have direct or indirect synergy with EastMed Pipeline Project: (a) other linear projects, namely pipelines, roads, power lines, (b) other energy projects and (c) other major projects.

The existence or planning of third-party projects that may act cumulatively with the current project was investigated within the Natura 2000 site.

The Natura 2000 site has a few existing and planned projects and infrastructures, namely

- the national road network (E951) as well as
- the local road network crossing the western area of the site, in quite a distance from the pipeline.
- one wind park project under permitting process, which is located at a considerable distance (>2,7 km) from the FSA and the pipeline axis.
- one line of the high voltage network.



Prepared by: (NCC, 2021)

Figure 3-2 Main other project at the Study Area

3.3 Description, Recording and Analysis of elements of Natural Environment in the Field Survey Area

3.3.1 Field survey methodology

According to the MD 170225/2014 for Category A1 projects implemented within SACs or outside but potentially affecting them, falling under the category set in Annex 3.2.1, field work *"[...] will have to cover the ecological requirements of an annual cycle for each species and habitat type (depending on the seasonal presence of the habitat types listed in Annex I and of the species listed in Annex II of the Directive 92/43/EC […])"*, unless otherwise stated. Field work should last at least 20 days.

In light of the above, a total of 21 days of field work have been conducted (timing provided in Table 3-2); more specifically:

- 14 days of field work were conducted during April 2021 (spring survey)
- 5 days of field work were conducted during May 2021 (summer survey)
- 2 days of field work were conducted during December 2021 (winter survey)

and included the following activities:

- Field data collection for mammals, such as *Canis lupus* and bats within the FSA and suitable areas in its close proximity, by mammal experts. It was estimated that the potential use of the FSA by other important species not included in the SDF should also be investigated.
- Field data collection for reptiles and amphibians within the FSA, by a herpetofauna expert.
- Field data collection for habitats and flora with a focus on important habitats and habitats that are suitable for the identified fauna species, by habitat expert.
- Field data collection has also been carried out for other elements of biodiversity in the Natura 2000 site, such as birds, contributing to the conservation of the ecological integrity of the Natura 2000 site and the ecological coherence of the Natura 2000 network.

Table 3-2 Timetable of the Field work days

Group	Date	No of field work person-days
General site assessment	21/05/2021	1
Habitats, Flora	26/05/2021	1
Wolf	25-26/04/2021 24/05/2021 20/12/2021	10
Bat species	25/04/2021 24/05/2021	3

Group	Date	No of field work person-days
Reptiles – Amphibians	25/04/2021	2
Avifauna	25/04/2021	4
	Total	21

Prepared by: (NCC, 2021)

The field work methodological approach aimed at:

- Recording of all habitat types within the FSA and location of important flora species.
- Recording all fauna species within the FSA in all the main and secondary habitats of the site.
- Focusing the study on the sensitive species listed in the Annexes (92/43/EEC).
- Focusing on colonies, breeding and resting sites, rendezvous points etc. of important fauna species for the SAC.

For the organization of the field work, a series of factors were considered for optimal recording of species of interest and include:

- The adequacy of existing data from literature.
- The knowledge and experience of the experts concerning the area.
- The size, relief and accessibility of the area.
- The homogeneity, extent and diversity of the types of vegetation.

3.3.1.1 Field survey methodology for Habitats/flora

The purpose of the survey on habitat types is to locate important habitat types, identify important flora species by mapping their habitats in order to describe their coverage and population respectively. The research techniques used are the interpretation of satellite images and on site-landscape verification. The existing habitat mapping (Ministry of Environment, 2018) for the Natura 2000 site was utilized as baseline.

Verification in the field refers to the survey of the FSA with the systematic visit and recording of all the environmental resources encountered by the field researcher. By this process:

(a) the existing mapping of habitat types is confirmed, necessary modifications are being made and details are recorded which are not visible in the satellite images or aerial photographs, and

(b) important flora species are being identified and their habitat is investigated to assess their spread and population.

Specifically, for the habitat types and flora, an on-the-spot investigation was carried out (Figure 3-8) to check all possible microenvironments and taking into account the Braun-Blanquet method (1964), which is based on the distinction between vegetation types and then habitat types.

The existing mapping was considered as sufficient and no changes were made for the FSA.

3.3.1.2 Field survey methodology for Fauna

Regarding mammals, according to standardized national and international protocols, although a variety of different monitoring techniques is available, Foot Line Transects were carried out at the FSA, both during day and night. The main goal is to record direct and indirect observations that denote species' presence in the area. Direct observation refers to visual contact with an individual, which is an immediate index of the species' presence within the FSA. Indirect observation refers to recording of surrogate parameters which denote nonetheless, the species' presence in the area, such as prey left-overs, nests, scats, footprints, hair, acoustic verifications, howls, and more (Sutherland 2006). More specifically, the methodology for some species is detailed in the following paragraphs:

Regarding *Canis lupus*, point inspections and random transects were carried out (Figure 3-8), in search of signs of the species presence or reproduction within the FSA. Furthermore, other areas of possible interest/sensitivity in proximity were also inspected. The surveys were conducted both during day and night. During the day the signs of presence expected to be found were tracks and scats, whereas during the night hours, the surveys focused mainly in direct observation of the animals or hearing them vocalize as the species is usually more active during night hours. Due to the poor road network in the area, the FSA was impossible to approach, so the point inspections were carried out as close as possible to the FSA. Random transects were carried out to approach the pipeline routing, or in adjacent areas of interest where wolf presence was expected, due to habitat suitability. In total, inspections were carried out at four (4) points and surveys along four (4) transects.

Along the route, interviews to local inhabitants, shepherds, and hunters were conducted, in order to collect data about jackal and wolf presence in the area of concern (recent sightings, hearings, road-kill sightings or confirmed damage to livestock). Due to complications in relation with the spread of the pandemic (Covid-19) in Greece in the period when the visits were held, interviews were difficult to achieve and thus the sample was small.

Simulated howling surveys were also carried out at selected locations. Both wolves and jackals respond to playback calls of howling individuals of their species. This behavior lies mostly in the territorial nature of both, howling is a way to repel an intruder off, of their territory. During howling surveys, the researcher takes advantage of this behavior and by emitting (vocally or using a sound amplifier) simulated wolf/jackal howls respectively, inducts a response from the local group of

animals. The howling method is the most effective method to monitor the population of both canids in an area, but it is not as efficient year-round. The period with the higher response rates for wolves is mid-June to August, jackals also respond more that period but in general tend to be more vocal and easily inducted to howl. Given the period of the field surveys (March to May) the howling method has not been applied extensively, as wolves and jackals should not be disturbed in that period (gestation period) and additionally have the lowest response rates to playback calls. In total, howling surveys were carried out at four (4) points.

Regarding bat species, passive acoustic bat recording was conducted (Figure 3-8), in April 2021, stationary for about 2 hours from 30 min before sunset at 1 location and during one transect line for about 30 min. The recordings were not conducted very close to the planned route of the pipeline due to practical reasons (difficult to approach the target area). For the recordings, SM4BAT-FS bat recorders were used with UU2 microphones on a 3m pole for the stationary recording and on 2m pole for the transect (Figure 3-3).

The recorded sound files were organized and scanned for bat calls with the software bcAdmin (Version 3.6.24) and the found bat calls were identified automatically with the batIdent (Version 1.5) that is specifically trained for European bat species (both software from EcoObs GmhH, Nuremberg, Germany). BatIdent identifies each sequence on a species or group level with a probability of correctness. Since automatic species identification has always a risk of misidentification (e.g. Russo & Voigt, 2016), the dubious in identification recordings were also checked manually using bcAnalyse 3 Pro Standalone (EcoObs GmhH, Nuremberg, Germany) to assist the correct identification to species or species group. Manual identification was based on the Greek Bat Call Library, developed by Papadatou (Papadatou 2006; Papadatou et al. 2008), Georgiakakis (Georgiakakis 2009) and Kafkaletou-Diez (2017) and maintained in the Natural History Museum of Crete, University of Crete, Greece.

Apart from the above-mentioned fieldwork, information on bat roosts and bat presence in the area was collected from the Greek Bat Database held on Natural Museum of Crete, University of Crete, Greece and contacting local people and speleologists. Settlements such as old buildings that were spotted along the pipeline proposed route, were visited –when possible– and checked for bats.

Reference: (NCC, 2021)

Figure 3-3 The microphone on the 3m pole (red pole on the right of the photo) that is connected with the SM4BAT-FS recorder at Arakynthos mountain.

Reference: (NCC, 2021)

Figure 3-4 Small building at Arakynthos area where signs of bats (faeces) were found and bats were also spotted during the transect recording to fly in the area.

Regarding amphibians and reptiles, three different methods have been used (Figure 3-8); line transects have been selected in order to have visually contact with amphibians and reptiles, as well as refugia and habitat searching. These methods are mostly used for the detection and record of amphibians and reptiles during both day and night. As extra data, frequent used roads were checked within or close to the FSA, in order to locate roadkills.

Regarding avifauna, field work has been carried out (Figure 3-8) using the following methods: (a) Look and see, (b) Point counts, (c) Vantage Points and (d) Line transects. The fieldwork has been carried out by using binoculars, spotting scopes and zoom cameras to record birds and their habitats in FSA. Field experts searched on a wider area than the FSA for species of interest, identified possible or

confirmed breeding of birds within the FSA and recorded individuals of various species singing, defending breeding territories or simply passing over the area.

3.3.2 Detailed description of the Field Survey Area

3.3.2.1 Habitat types

Based on field work observations at the FSA, apart from crops (code 1050), some natural Greek habitat types of national importance were recorded, dominated by garrigues of east Meditterranean (code 5340) representing evergreen shrublands dominated by *Quercus coccifera* and Greek forests of kermes oak (code 934A) representing evergreen forests dominated by *Quercus coccifera*. The habitat types included in Habitats' Directive Annex I Pannonian-Balkanic turkey oak- sessile oak forests (code 91M0) and *Quercus ilex* and *Quercus rotundifolia* forests (code 9340) were also identified (Table 3-3).

In the FSA habitat types appear in spots and are affected by extensive livestock settlements and wildfires. Due to intense grazing and wildfires many xerothermic and adapted to wildfires species occur such as *Cistus creticus*, *Erica arborea,* etc.

Table 3-3 Area (in ha) and Percentage (%) of the habitat types per Area of Interest

Code	Habitat type	Study Area	FSA	FSA%	WS	WS%	PPS	PPS%
91M0[1]	Pannonian-Balkanic turkey oak –sessile oak forests	3,913.41	77.37	1.98%	-		-	
9340[1]	*Quercus ilex* and *Quercus rotundifolia* forests	3,482.88	0.00	0.00%	-		-	
934A[2]	Greek Kermes oak forests	2,313.97	1.93	0.08%	-		-	
5340[2]	Eastern Garrigues	1,570.09	32.63	2.08%	-		-	
1050	Non-irrigated arable land - pure	196.53	0.47	0.24%	-		-	

Notes: FSA: Field Survey Area, WS: the Working Strip as planned by the project, PPS: the Pipeline Protection Strip (4 m on each side of the pipeline axis). Percentages refer to cover compared to the total area of the habitat types in the Study Area. [1]: habitats listed in Annex I of Directive 92/43/EEC, [2]: habitats of national importance

Prepared by: (NCC, 2021)

It is important to note that the working strip is not crossing the Study Area, thus either its habitat types.

The main habitat types present within the FSA are presented briefly below.

Pannonian-Balkanic turkey oak- sessile oak forests (code 91M0)

The habitat type 91M0 includes all the oak forests (the dominant species are *Quercus frainetto, Q. cerris, Q. pubescens* και *Q. petraea*) of the Balkan Peninsula.

In the FSA, the 91M0 habitat type has a limited extend, dominated by *Quercus frainetto*. Several species are found on the understory, including *Quercus coccifera, Pteridium aquilinum, Dorycnium herbaceum* and others. The habitat type is mainly at risk from inappropriate forest management.

Reference: (NCC, 2021)

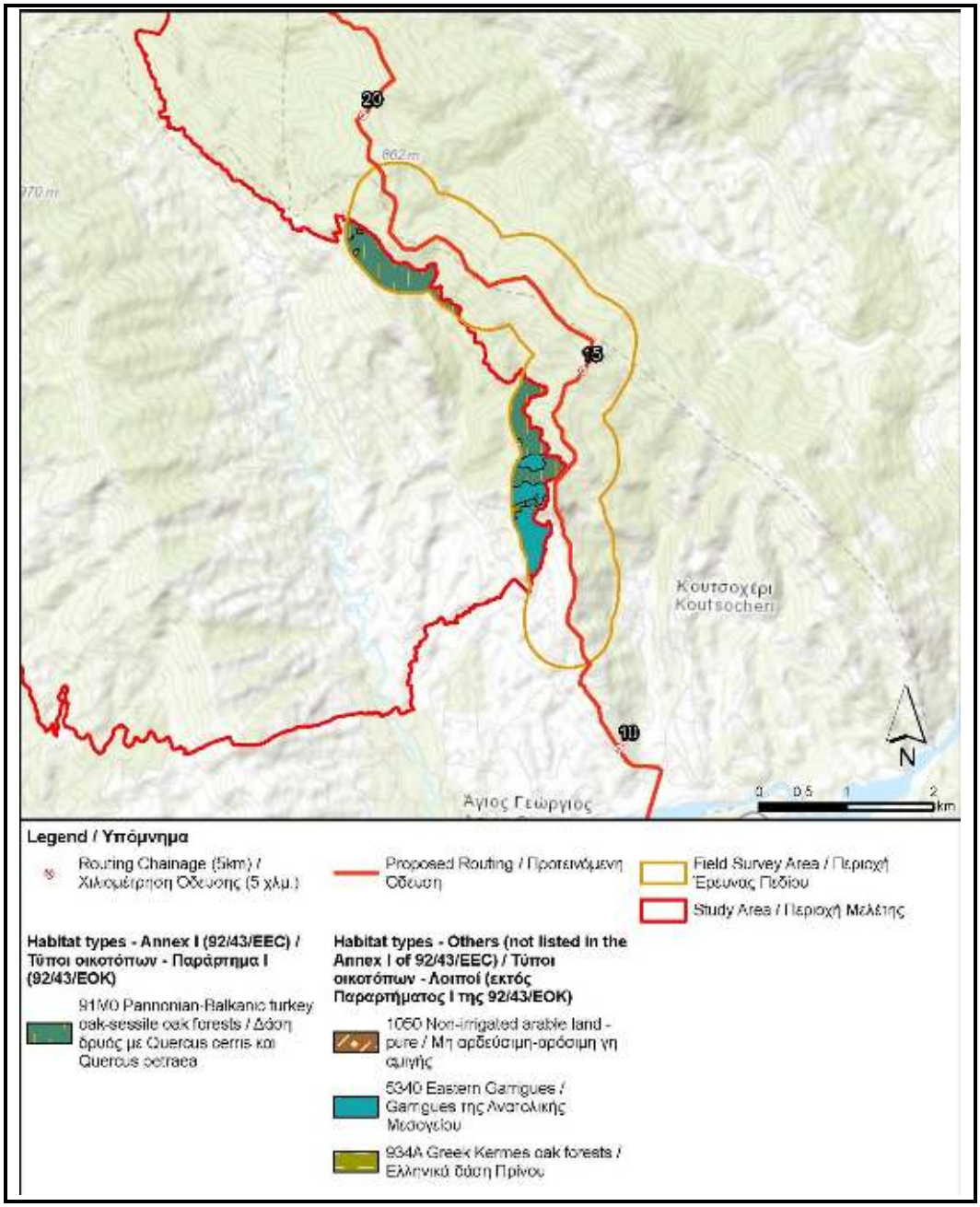
Figure 3-5 Pannonian-Balkanic turkey oak- sessile oak forests (code 91M0) mixed with evergreen shrubs

Quercus ilex and *Quercus rotundifolia* forests (code 9340)

Habitat type 9340 includes tall shrubs or *Quercus ilex* forests.

In the FSA, the habitat type has limited spread, marginally in the buffer zone. In addition to *Quercus ilex* there are many other woody species in the area, including *Quercus coccifera, Arbutus unedo, Cotinus coggygria* and others. The habitat type is relatively common in Greece and does not seem to face any particular threats, except from wildfires.

The mapping of habitats for the FSA has been carried out by the habitat expert and is provided in Figure 3-6.



Prepared by: (NCC, 2021)

Figure 3-6 Habitat type coverage at the Field Survey Area

3.3.2.2 Flora

No significant plant species were identified during field sampling in May and June 2021 performed in the FSA. Table 3-4 presents a detailed list of flora species identified in the FSA during field work.

Table 3-4 Flora species of the FSA

Family	Taxon
Anacardiaceae	*Pistacia lentiscus* L.
Apiaceae	*Bupleurum falcatum* L.
	Daucus carota L.
Asteraceae	*Crepis setosa* Haller f.
	Sonchus asper (L.) Hill
Boraginaceae	*Myosotis incrassata* Guss.
Caryophyllaceae	*Silene italica* (L.) Pers.
	Stellaria media (L.) Vill.
Cistaceae	*Cistus creticus* L.
Convolvulaceae	*Convolvulus althaeoides* L.
Dennstaedtiaceae	*Pteridium aquilinum* (L.) Kuhn
Ericaceae	*Arbutus unedo* L.
	Erica arborea L.
Fabaceae	*Astragalus monspessulanus* L.
	Onobrychis aequidentata (Sm.) d'Urv.
	Vicia villosa subsp. *varia* (Host) Corb.
	Dorycnium herbaceum Vill.
	Genista sericea Wulfen
	Securigera securidaca (L.) Degen & Dörfl.
	Ononis pusilla L.
	Trifolium angustifolium L.
	Trifolium arvense L.
	Trifolium campestre Schreb.
	Trifolium hirtum All.
Fagaceae	*Quercus coccifera* L.
	Quercus ilex L.
	Quercus frainetto Ten.
Hypericaceae	*Hypericum perforatum* L.
Lamiaceae	*Micromeria juliana* (L.) Rchb.
	Teucrium capitatum L.
Oleaceae	*Phillyrea latifolia* L.

Family	Taxon
Pinaceae	*Pinus halepensis* Mill.
Plantaginaceae	*Plantago afra* L.
Poaceae	*Avena sterilis* L.
	Hordeum murinum L.
	Aegilops triuncialis L.
	Briza media L.
Rosaceae	*Pyrus spinosa* Forssk.
Violaceae	*Viola* sp.

Prepared by: (NCC, 2021)

3.3.2.3 Fauna

3.3.2.3.1 Mammals – Bats

No previous information on bats within this Natura 2000 site is available. However, the topography of the site with rocks, cliffs and gorges might permit the presence of potholes. Potholes are often roosting sites for bats, such as *Myotis* and *Rhinolophus* species. Some remnant clusters of deciduous oaks are also reported. Such old trees may host bats, especially of the genus *Myotis*.

At least 8 bat taxa (Table 3-5) were recorded during the fieldwork. *Myotis* species were recorded, but due to the high overlap of the call parameters between several species, it was not possible to identify the *Myotis* calls in species level. The recorded *Myotis* calls could be possibly attributed to one or more of the following species: *Myotis aurascens, M. bechsteinii* or *M. blythii*. *Rhinolophus blasii*, which usually roosts in caves and underground sites, were also recorded. Among the rest of the species that were recorded, there are some with status of least concern (e.g. *Hypsugo savii, Tadarida teniotis*) but also some for which data are deficient (e.g. *Pipistrellus* species). Due to the high overlap in call parameters, it was impossible to distinguish with safety *Pipistrellus nathusii* from *P. kuhlii,* therefore the last two species are grouped. Also, there are probably more than one species of the group Nyctaloid (*Nyctalus* spp., *Eptesicus* spp., *Vespertilio murinus*), but their identification only from calls is ambiguous.

No specific roosts have been identified within the area that was inspected. A small building had signs (feces) of bats, however no bats were observed. From the amount of feces seen on the floor, the number of bats is not expected to be high (probably <5) and possibly it is used only as a temporary roost.

Table 3-5 Bat species that were recorded at the FSA during field surveys.

Code	Species
5365	*Hypsugo savii*
	Myotis spp.
	Nyctaloid
1309	*Pipistrellus pipistrellus*
5009	*Pipistrellus pygmaeus*
	Pipistrellus kuhlii / P. nathusii
1306	*Rhinolophus blasii*
1333	*Tadarida teniotis*

Note: *Nyctaloid*: *Nyctalus* spp. or *Eptesicus* spp.
Prepared by: (NCC, 2021)

3.3.2.3.2 Mammals – Canis lupus

Canis lupus presence was not confirmed directly (animal observation) or indirectly (scats, tracks, howling) during the field surveys, however based on an interview, *Canis lupus* permanent presence in the area was affirmed, while damage to livestock herds was stated as common for the period 2020-2021. The rough estimation of the site where damage on local livestock has been recorded according to the interviewee's descriptions is presented in Figure 3-8.

Reference: (NCC, 2021)

Figure 3-7 View from the end of Transect 1 and of the ravine south to point 3.

The area, especially in the segment IP2060-2113 - including the FSA - and the broader area of at least 2km from the pipeline routing are characterized by an intricate relief profile that creates a network of ravines. The abundance of ravines and smaller streams in the area form a permanent natural water source for local wildlife. Unfragmented densely vegetated ravines, provide an **extremely suitable habitat as homesite** for *Canis lupus* reproduction (Figure 3-8), especially if food sources are available in the area too (wild ungulates, livestock). Furthermore, human disturbance in the area is negligible. Low human disturbance in addition to low density and traffic of forest roads further increase the area fitness as possible homesite for the species (Iliopoulos et al, 2013). Especially regarding forest roads in Greece, *Canis lupus* highly selects (65%) homesite areas at a distance of at least 300 m from them (Iliopoulos et al, 2013).

Due to habitat suitability as a *Canis lupus* homesite, confirmed species presence (from interviews) and according to available data about the area, it can be assumed that at least one group of the species is permanently present in the area and is probably using it as a breeding area.

3.3.2.3.3 Amphibians and Reptiles

During the field survey no reptile species of interest for which the Natura 2000 site has been designated were observed. The species which are included in the Annexes II and IV of the Habitats

Directive, but not the SDF, and were observed within the FSA are three lizard species: *Mediodactylus kotschyi, Lacerta trilineata* and *Podarcis taurica.*

3.3.2.3.4 Birds

The bird species of interest that have been observed are *Gyps fulvus*, *Circaetus gallicus* and *Leiopicus medius*, all species included in Annex I of the Birds Directive.

3.3.3 Key findings

The main findings of interest are summarized as follows:

- *Habitat types*: The FSA concerns mainly forested areas, and includes two habitat types of Annex I of the Habitats Directive, namely 91M0 and 9340.
- *Plant species*: No species of interest were found within the FSA and *Centaurea niederi* is not expected within the FSA, as it is not within its distribution range.
- *Mammal species*: Although *Canis lupus* was not observed in the area, based on interviews the presence of the species in the area was confirmed. The segment at IP2060-2113 and its broader area of at least 2km from the pipeline routing is characterized as extremely suitable habitat as homesite for the species. Many bat species were also observed using the aerial area for feeding, while large trees, such deciduous trees that were observed, may be used as roosting sites mainly by *Myotis* species.
- *Reptile/amphibian species*: Several species of interest were found within the FSA.
- *Bird species*: At the area three birds of interest were observed.

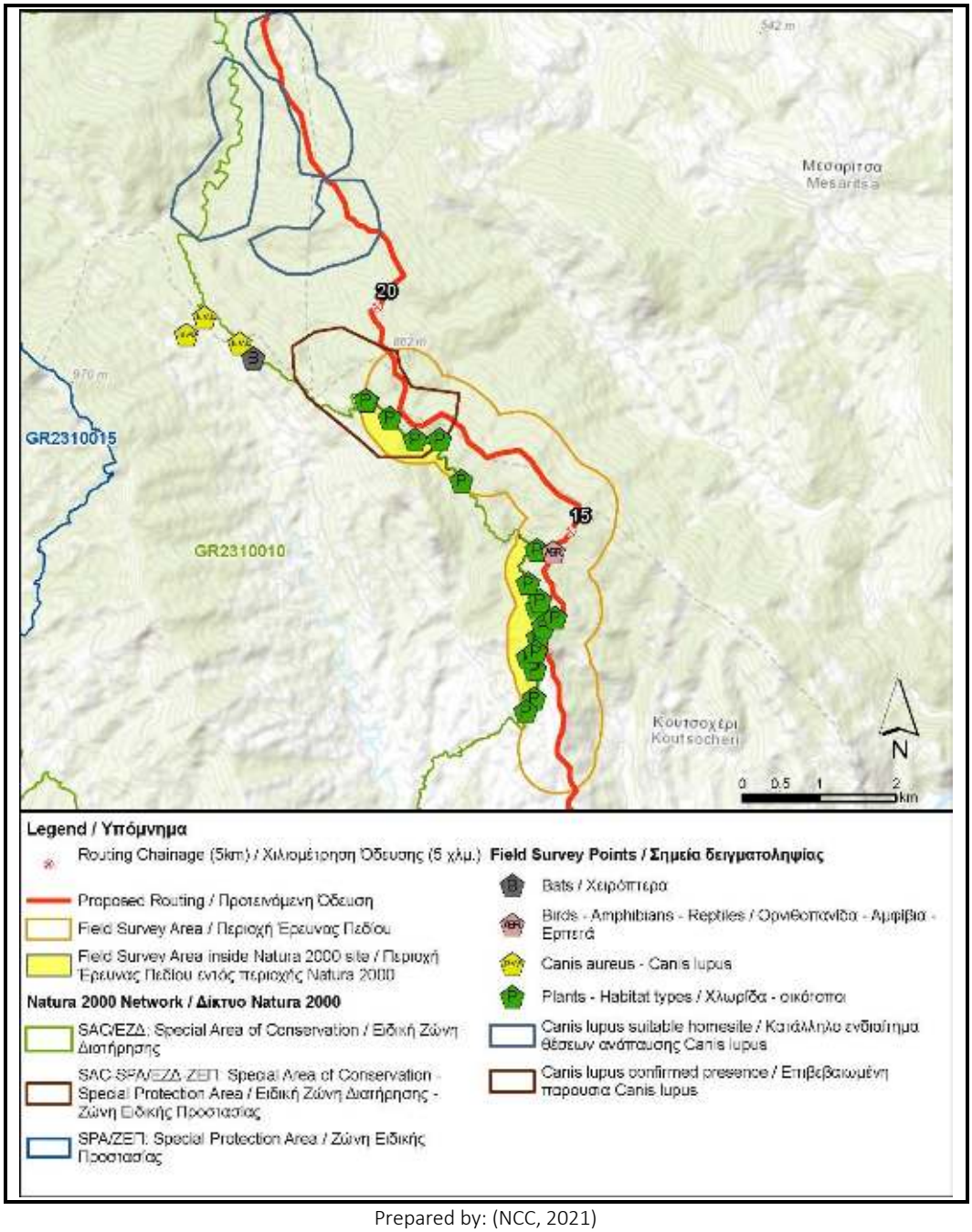
In Table 3-6 the species of interest recorded during fieldwork at specific segments of the pipeline routing are presented.

Table 3-6 Species of interest recorded during fieldwork

IP	Species of interest
2075-2080	*Circaetus gallicus, Gyps fulvus, Leiopicus medius* *Lacerta trilineata, Mediodactylus kotschyi, Podarcis taurica*
2081-2084	*Myotis spp., Hypsugo savii, Pipistrellus pipistrellus, Pipistrellus pygmaeus, Rhinolophus blasii, Tadarida teniotis*

Note: *: outside the FSA

Prepared by: (NCC, 2021)



Prepared by: (NCC, 2021)

Figure 3-8 (a) Field Survey locations for the survey of habitats, fauna groups of Annex II and IV (Directive 92/43/EEC), carried out within the FSA, and (b) Sensitive areas for *Canis lupus*

3.4 Status of natural environment

3.4.1 Conservation objectives of habitats/species

The Conservation objectives have been specified through the project "Assessment of the conservation status of species and habitat types in Greece". The overall conservation objectives proposed for each habitat type of Annex I of Directive 92/43/EEC and for each species of Annex II of Directive 92/43/EEC are directly relevant to the assessment of the Degree of Conservation at the Natura 2000 site as impressed in the Natura 2000 descriptive database of the country. Therefore:

- For each Habitat type listed in Annex I of Directive 92/43/EEC (with a significant presence in the Natura 2000 site) for which the Degree of Conservation has been assessed as A, the Overall Conservation Objective is proposed to be the maintenance of the Degree of Conservation A,
- Similarly for each species of fauna and flora of Annex II of Directive 92/43/EEC for which the Degree of Conservation has been assessed as A, the Overall Conservation Objective is proposed to be the assurance of Degree of Conservation A.
- For each Habitat type of Annex I of Directive 92/43/EEC (with a significant presence in the Natura 2000 site) for which the Degree of Conservation has been evaluated as B, the Overall Conservation Objective is proposed to be the maintenance of the Degree of Conservation B in the short term, in 2 six-year periods, and the achievement of Degree of Conservation A in the long term, ie 4 six-year periods (in line with EU standards for "long-term"/"short-term" concepts of the national reference reports of Article 17 of the Habitats Directive).
- Similarly, for each species of fauna and flora of Annex II of Directive 92/43/EEC for which the Degree of Conservation has been evaluated as B, the Overall Conservation Objective is proposed to be the maintenance of Degree of Conservation B in the short term and the achievement of Degree of Conservation A in the long term.
- For each habitat type of Annex I of Directive 92/43/EEC (with a significant presence in the Natura 2000 site) for which the Degree of Conservation has been assessed as C, the Overall Conservation Objective is proposed to be the achievement of Conservation Status B in the short term.
- Similarly, for each species of fauna and flora in Annex II of Directive 92/43/EEC for which the Degree of Conservation has been assessed as C, the Overall Conservation Objective is proposed to be the achievement of Degree of Conservation B in the short term.

For the Habitat types of Annex I of Directive 92/43/EEC, for species listed in Annex II of Directive 92/43/EEC for which the Degree of Conservation has been identified as unknown, a prerequisite for setting conservation objectives is to collect more data through research and monitoring programs.

The specific Conservation Objectives are provided in ANNEX C.

3.4.2 Conservation status of habitats, flora and fauna species

According to the SDF of the SAC, the area hosts significant percentage (2-15%) of the total national area covered by the habitats 91M0 and 9340. The representativity of the natural habitats in the Natura 2000 site is good to excellent. Their conservation status varies from excellent to good, while for most of the habitats the status is excellent. The overall value of the site for the conservation of the habitats is indicated as good for all the habitats.

Concerning the species included in the SDF, the SAC hosts high percentage (15-100%) of the national population of *Centaurea niederi,* while for the other species of concern the site hosts a low percentage of their national population. The conservation status of *Centaurea niederi* is excellent, while for the other species is good to average or reduced. The only species on its margins of distribution is *Canis lupus*. The overall value of the site for the conservation of the species is assessed as significant, while for the species *Centaurea niederi* as excellent.

Detailed information is provided in ANNEX A.

3.4.3 Threats/Pressures

According to the SDF of the SAC, the main threats are of medium magnitude. Transportation and service corridors have a negative impact within the Natura 2000 site. Both within and around the site, the construction and operation of roads and motorways and the removal of hedges or scrub are considered as threats, as well as the genetic pollution of wildlife with domestic animals or other.

3.4.4 Ecological functions

The Study Area consists one of the most important ecosystems due to its peculiar morphology and species habitats and taxa. The Natura 2000 site consists of large cliffs (at the southwestern flanks of a largely forested mountain) which border the wetlands of Aitoliko-Mesolonghi, which are ecologically connected with the wetland and therefore function as a significant overall ecosystem, providing different habitats suitable for species of great importance. The site also provides suitable and important areas for birds of prey, in the southern and southwestern slopes of Mt. Arakynthos as well as the Kleisoura gorge, since these areas neighbour the extensive wetland system of Aitoliko, Mesolongi and the Evinos river estuary, which constitute hunting areas of high productivity for these birds. To this mean the site functions towards the ecological connectivity of the surrounding areas of ecological value and importance.

3.4.5 Site development trends

Site development trends refer to the evolution trends of the site's natural environmental elements which are present and recorded within the Study Area under the assumption that no construction for the project would take place in the region.

For the Study Area human activities have been moderate and gently merged in the site, while other natural elements of the biotic and abiotic environment (eg morphology, climate, topology, species, habitats, vegetation cover, etc.), have in combination formed the existing dynamics of the site. These natural environmental elements, especially morphology which provided to the site its peculiar morphology, as well as the aesthetic value of its impressive landscape, have shaped current development trends, which involves ecotourism (promote the site as an area of great aesthetic and ecological value).

4 PROJECT OVERVIEW

4.1 Introduction

This section provides an overview of the proposed project and its associated components, as well as it further outlines the project's constructional and operational requirements.

Apart from this general project description, Section 4.5 provides a more detailed description of the project interfaces with the specific Natura 2000 site.

The EastMed Pipeline Project aims to transport gas directly from the eastern Mediterranean fields to the European Natural Gas System via Greece.

EastMed consists of a Southern Line and a Northern Line to deliver gas from Israeli and Cypriot sources, respectively, through Peloponnese and Western Greece, to the Poseidon Pipeline Project in north-west Greece. Upstream of Crete these two lines are designed to work complementarily as well as independently, foreseeing infrastructure in Cyprus dedicated to each line. Thanks to this, the system is highly flexible, contributing to security of supply. The EastMed Pipeline Project comprises the following main components:

A. Southern Line of EastMed (Israel → Cyprus/Crete → SE Peloponnese):

- Transports gas from Israeli sources directly from the EastMed Compression Platform (ECP) in Israeli waters to a compression and metering station in Crete (CS2/MS2) and from there to the mainland Greece and the Poseidon Pipeline Project,
- Delivers gas to Cyprus for domestic consumption through a subsea Inline Tee Assembly (ITA) and a branch pipeline from the subsea ITA to Cyprus (OSS1 comes from Israeli platform to ITA, OSS1a from ITA to a Metering and Pressure Reduction Station (MS1a/PRS) in Cyprus and OSS2 from ITA to Crete);

B. Northern Line of EastMed (Cyprus → Crete → SE Peloponnese):

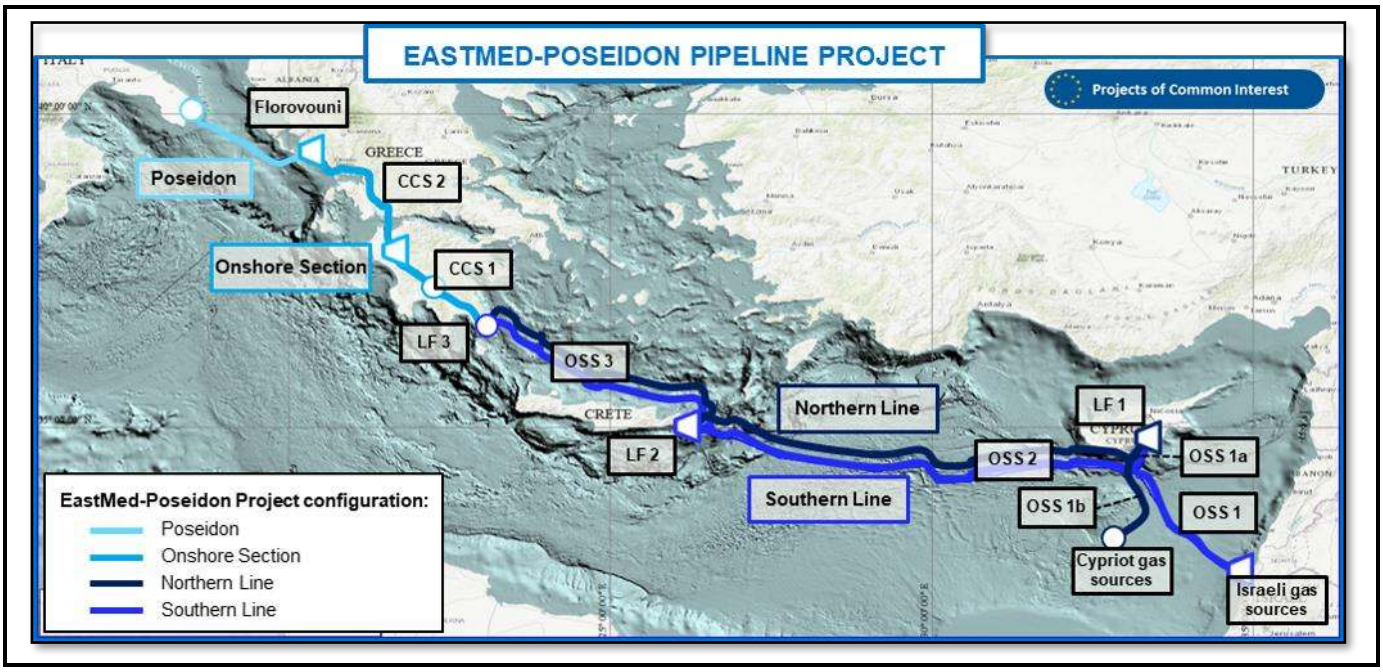
- Delivers dry gas originating from one or more of the Cypriot offshore gas discoveries to the compression and metering stations in Cyprus (CS1/MS1) first, through OSS1b and then in Crete (CS2/MS2N), through OSS2N and from there to the mainland Greece and Poseidon Pipeline Project, as referred in the next paragraph;

C. Combined System of EastMed (Crete & mainland Greece → Poseidon Pipeline Project):

- At LF3 the gas flow streams from two pipelines will be combined into a single large-diameter pipeline (CCS1-OSS4-CCS2) for transportation to the Poseidon Pipeline Project Compressor Station at Florovouni[1] in north-west Greece,
- Combination of the Southern and Northern flow streams will require additional compression along the CCS1 section in Peloponnese (CS3).

The 'Northern and Southern Lines' are shown in Figure 4-1 where the 'Southern Line' and 'Northern Line' are indicated in blue and dark blue, respectively. The onshore single large diameter pipeline of the 'Combined System' (i.e., CCS1 and CCS2) is shown in light blue[2].

A more comprehensive visualization of the crossing with the Natura 2000 sites is provided in Map 1 of ANNEX F.



Prepared by: (EastMed, 2020)

Figure 4-1 EastMed Onshore and Offshore sections - overview

[1]Compressor Station of the Poseidon Pipeline Project system at Florovouni in north-west Greece belongs to another project with the same owner and has received environmental permitting through a separate procedure (ETA: ΥΠΕΝ/ΔΙΠΑ/35872/2373/07-06-2019, ΑΔΑ: ΩΠΝ34653Π8-4Ι9)

[2] Light blue line also includes the small offshore section of the Combined System that crosses Patraikos Gulf, i.e., OSS4.

The **EastMed Onshore Section in Greece** includes the following:

- The Compressor and Metering Stations in Crete (CS2/MS2 and CS2/MS2N) together with the relevant small onshore sections to and from landfall site LF2;
- The onshore section of the 48" pipeline that crosses Peloponnese (CCS1) from landfall site LF3 (SE of R.U. Laconia) to landfall site LF4 (NW of R.U. Achaia on the south coast of the Patraikos Gulf);
- The Megalopoli's Branch line that is foreseen to connect CCS1 with the National System at Megalopoli's area (Perivolia area). The pipeline will have a diameter of 16";
- LF4 (Landfall site in the NW of R.U. of Achaia, close to Lakopetra beach, NW Peloponnese area)
- The offshore section of the 46'' pipeline that crosses the Patraikos Gulf (OSS4) from landfall site LF4 to landfall site LF5 (SW of R.U. Etoloakarnania);
- LF5 (Landfall site in the SW of R.U. of Elotoakarnania, close to Evinochori settlement, SW Sterea Ellada)
- The onshore section of the 48" pipeline that crosses Western Greece (CCS2) from landfall site LF5 (south-west of R.U. Etoloakarnania) to the installation site of the Poseidon Pipeline Project compressor station at Florovouni , in R.U. Thesprotia;
- The Metering and Pressure Reduction Station (MS4/PRS4) in Megalopoli (start of Megalopoli's Branch);
- The Heating Station in Megalopoli in the same plot as MS4/PRS4;
- The compressor station CS3 at R.U. Achaia in Peloponnese; and
- The Dispatching and Operation and Maintenance Centre (O&M) in the R.U. of Achaia.

Along the onshore section, Scraper Stations – SS (in total seven[3]) and Block Valve Stations - BVS (fifteen in total) will be installed as per the current Project design. BVSs will be placed at distances of approximately 30 km. A Landfall Station (LS) (four in total) will be installed near each landfall site.

For the section starting at landfall site LF3 in south-east Peloponnese to the Poseidon Pipeline Project's compressor station at Florovouni (sections CCS1, OSS4 and CCS2), the design pressure of

[3] It is clarified that 1 Scraper station will be located within the MS4/PRS4 and Heating Station at Megalopoli area, 1 Scraper station will be located within the future CS3, in the R.U. of Achaia, and 4 Scraper Stations will be located within the same plot as the Landfall Stations, bundling permanent facilities of the project as much as possible. The seventh SS concerns the Megalopoli's Branch.

the Project is 100 barg while the maximum operating pressure (MOP) is considered equal to 95 barg. For the Megalopoli's Branch line, the design pressure is 80 barg while the MOP is equal to 75 barg.

The **EastMed Offshore Section in Greece**, includes the following:

- OSS2 and OSS2N (the part of the Offshore Section from Cyprus to Crete under Greek jurisdiction): Subsea trunk lines from the start of the Greek Offshore Section to Crete;
- LF2 (Landfall site in Crete): the nearshore and coastal crossing section in the area of Crete;
- OSS3 and OSS3N (Crete to Peloponnese): Subsea trunk lines from Crete to Peloponnese; and
- LF3 (Landfall site in Peloponnese): the nearshore and coastal crossing section in the area of Peloponnese.

The Greek Offshore Section of the Project includes two (i.e., twin) pipelines at an average distance of approximately 100 m. Near the landfall site, the two pipelines approach each other to enter the same shore crossing cofferdam. Up to the landfall site, pipelines will be simply laid on the seabed with the pipelines gradually buried only near the coast.

In more detail:

- OSS2 (in Greece) will have an approximate length of 390 km, a diameter of 26''and a transfer capacity of 11 BSCM/yr;
- OSS2N (in Greece) will have an approximate length of 390 km, a diameter of 26'' and a transfer capacity of 10 BSCM/yr; and
- OSS3 and OSS3N will have a diameter of 28'' and transfer capacity of 10.5 BSCM/yr each, along an approximate length of 430 km.

Once both lines become operational, the EastMed project will transport a combined total flow rate of 21 BSCM/yr to the EastMed Onshore Section.

The design pressure of the OSS2 and OSS2N sections is 363 barg, while the MOP is considered equal to 345 barg. The design pressure of the OSS3 and OSS3N sections is 231 barg, while the MOP is equal to 220 barg. From a technical point of view, the two pipelines (Southern and Northern) are independent but also parts of a unique project system, and from an environmental point of view, they should be considered as one for most environmental and social parameters. Therefore, unless a clear distinction is necessary, the term "**Line OSS2/OSS2N**" is introduced to describe pipelines OSS2 and OSS2N as one integrated pipeline system across the south Cretan Sea (from the middle of the sea straits between Greece and Cyprus to the designated landfall in Crete); similarly, the term "**Line OSS3/OSS3N**" is used for the OSS3 and OSS3N pipelines across the South Aegean Sea from the landfall in Crete (LF2) to the designated landfall in SE Peloponnese (LF3).

4.2 Pipeline Construction and Pre-commissioning

4.2.1 Construction Overview

The basic method of constructing gas onshore pipelines is generally known as the spread technique, which is an "open cut" method and is widely used throughout the world. A typical sequence for onshore pipeline construction is illustrated in Figure 4-2.

Prepared by: (ASPROFOS, 2021)

Figure 4-2 Typical Pipeline Construction Sequence

This method can be broken down into several phases:

- Route survey and layout;
- Working strip preparation (clearing, grading, topsoil stripping);
- Trench excavation;
- Pipeline handling, Hauling and stringing;
- Pipeline bending;
- Pipeline welding and weld testing, applying field joint coating;
- Pipeline laying;
- Backfilling;
- Hydrotest and

- Reinstatement.

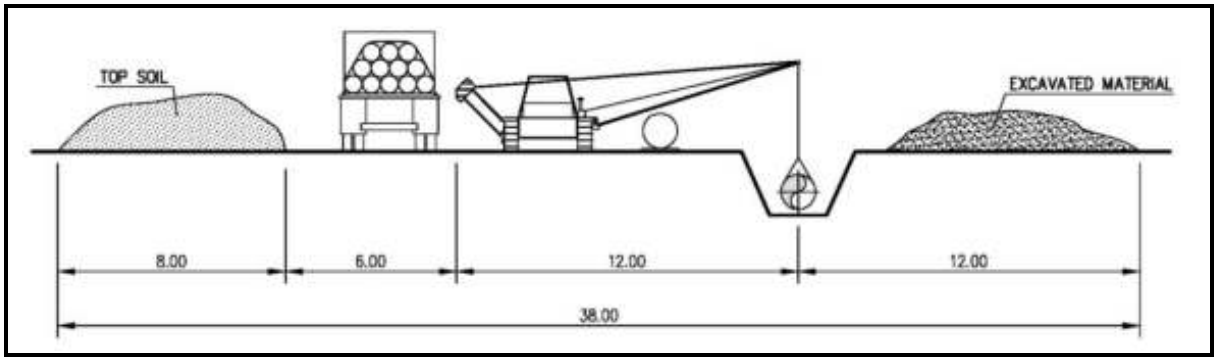
A survey control system in the form of permanent ground markers (PGM) will be installed. A subcontractor will tie all survey works into this control system and confirm the accuracy of the PGM control system.

The work includes removal of all trees, bushes, hedges and other obstacles from the construction working strip. A restricted working strip shall apply where there are physical constraints or where contractor chooses to reduce the working strip to benefit particular operations. A larger working strip may be necessary where a particular operation may benefit from additional space. The working strip should be set up before work commences.

4.2.2 Onshore Construction Methods

4.2.2.1 Marking and Clearance of Working Strip

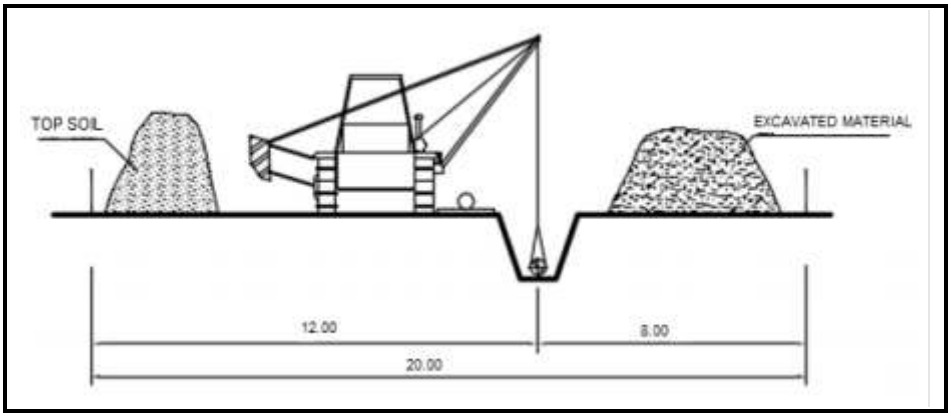
The working strip is the temporary corridor along the pipeline where construction takes place. It must be wide enough to allow all activities to be carried out safely whilst providing sufficient room to store topsoil and trench material separately and keeping crop loss to the farmer to a minimum. The width of the working strip is proportional to the diameter of the pipeline to be installed. It follows that the greater the pipe diameter, the greater the extracted trench material that has to be stored. The width of the working strip is also determined by the size of the heavy machinery needed to safely lift and lower pipe into the trench and dig the trench. The width of the working strip in open country for pipelines with nominal diameter (ND) 48'' and 46'' will be 38 m.



Source: (Design Basis Memorandum – Pipeline and Facilities)

Figure 4-3 Regular Working Strip in Open Country for Pipeline ND 48" and 46"

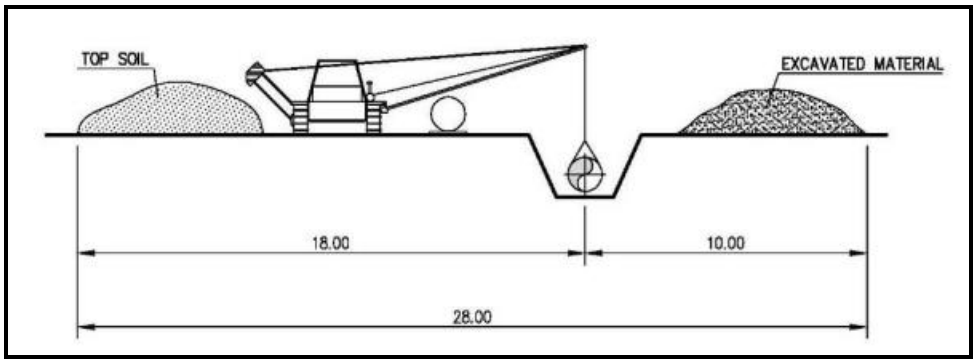
The width of the working strip in open country for pipeline of ND 16'' will be 20 m.



Source: (Design Basis Memorandum – Pipeline and Facilities)

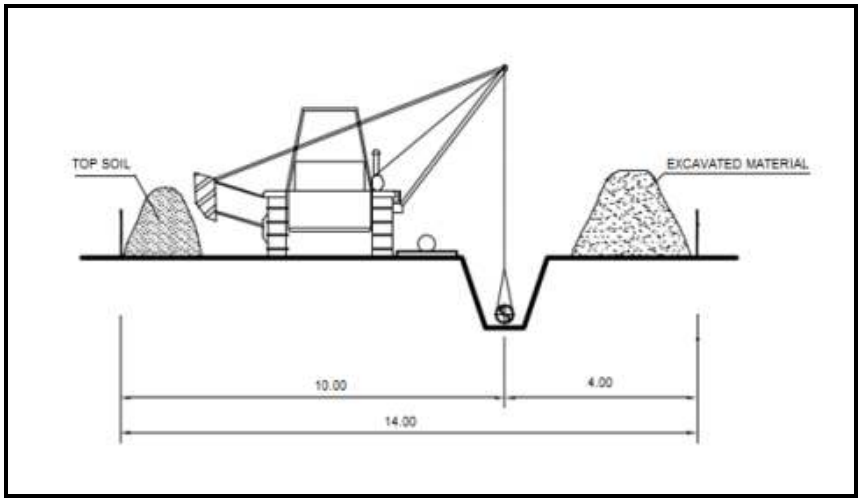
Figure 4-4 Regular Working Strip in Open Country for Pipeline ND 16”

The width of the spread zone along areas planted with permanent crops (e.g., vineyards, olive trees, etc.) for pipeline with ND 48’’ and 46’’ will be reduced to 28 m and for pipeline with ND 16’’ will be reduced to 14 m in order to minimise impacts on the plantations.



Source: (Design Basis Memorandum – Pipeline and Facilities)

Figure 4-5 Reduced Working Strip (with Topsoil Stripping) for Pipeline ND 48” and 46”

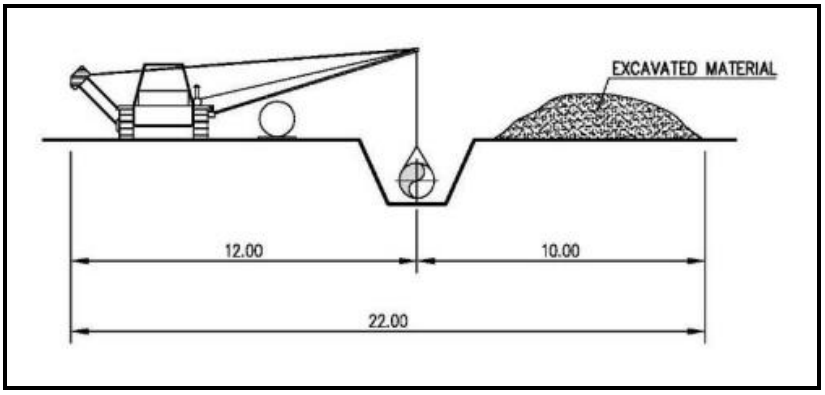


Source: (Design Basis Memorandum – Pipeline and Facilities)

Figure 4-6 Reduced Working Strip (with Topsoil Stripping) for Pipeline ND 16”

The width of the working strip for construction of pipelines with ND 48” and 46” inches can be reduced to 22 m in forest and mountainous areas where there is usually no need for top soil storage and to 28 m in areas with permanent plantations (with topsoil stripping).

For pipelines with ND 16’’ the regular working strip (in open country and agricultural areas planted with annual crops) is 20 m which is reduced to 14 m in areas planted by permanent plantations and without topsoil stripping (forest areas).



Source: (Design Basis Memorandum – Pipeline and Facilities)

Figure 4-7 Reduced Working Strip (without Topsoil Stripping) for Pipeline ND 48” and 46”

The areas where this reduced working strip will be applied will be carefully defined in order to reduce the impacts of the pipeline construction along these areas as much as possible, as well as to minimise

impacts on the construction progress (e.g., delays) and to ensure that all activities along the reduced zone will be safely executed.

Furthermore, the width of the working strip will be increased when a trenchless construction method is applied at crossings of major infrastructure or rivers in order to accommodate relevant equipment for construction works (e.g., horizontal directional drilling (HDD), direct pipe, microtunnel, boring method).

Table 4.1 Summary of Working Strip width

Diameter of the pipelines (inches)	Regular Working Strip (m)	Reduced Working Strip (m)	Reduced Working Strip without Topsoil Stripping (m)	Boring methods (Area Required) (m^2)	HDD (Area Required) (m^2)
48 and 46	38	28	22	45 x 50 and 45 x 30 (each side)	100 x 100
16	20	14	14	40 x 40 and 40 x 20 (each side)	100 x 100

Source: IGI Poseidon, 2021

4.2.2.2 Topsoil Stripping

Topsoil will be removed by means of suitable earth moving equipment (such as excavators and loaders) from the entire surface of the area, with the only exception being the areas designated for topsoil storage. The average depth of the topsoil strip to be removed is 0.2 m but this will be adapted to local soil conditions. The topsoil removed will be stockpiled within the area for temporary storage until site reinstatement.

4.2.2.3 Grading

As described above the working strip must provide sufficient working space for pipeline fabrication and for simultaneous vehicle movements. Therefore, the delineated strip will be graded by specified equipment such as bulldozers and graders to the required width.

4.2.2.4 Trenching

The pipeline will be buried underground within a trench for its entire length and protected against corrosion by a cathodic protection system. The required trenching works will be mainly undertaken

by excavators or jack-hammers. The standard soil covers of the buried onshore pipeline (measured from top of pipe) shall be at least 1 m.

4.2.2.5 Blasting

The use of explosives might be considered necessary at the following Natura 2000 areas. They could speed up the construction, decreasing construction duration and consequently nuisance to sensitive receptors.

Table 4-2 Indicative locations where explosives might be used during construction within protected areas

Pipeline Segment	From KP	To KP	Length (m)	Engaged Natura 2000 site
CCS1	21.348	21.845	497	SPA - GR2540007
CCS2	211.308	213.142	1,834	SPA – GR2120006

Prepared by: (ASPROFOS, 2021). Based on ESIA baseline soil classification

4.2.2.6 Backfill

The assembling of the pipeline will be carried out in a standard way with a construction spread that moves along the pipeline corridor. Most of the excavated soil will be used to backfill the pipeline trench. Excess soil will likely be spread out and contoured along the route in agreement with competent authorities and landowners/ users and according to further engineering studies.

4.2.2.7 Clean Up and Restoration

The clean up and restoration will be carried out in a specified way with a construction spread that moves along the pipeline corridor.

The removed topsoil will be placed back on the working strip so as the area to be restored as closely as possible to its original condition. Land will be stabilized where necessary and progressively restored with native vegetation, where possible. All machinery, equipment, tools, etc will be removed.

4.2.2.8 Indicative Schedule

The estimated total duration of the Onshore pipeline construction activities is 36 months.

On top of that, duration of the construction depends on the difficulties imposed by the baseline conditions, e.g., morphology, geotechnical issues, land uses, etc. Based on experience from other similar projects in dimensions constructed in Greece (i.e., with similar baseline conditions) the indicative construction rates (in terms of project progress, per construction activity) are:

- 400 m/day, in agricultural areas (in plain areas, 600 m/ day may be achieved)
- 200 m/day, in hilly or intense relief areas, of tree crops or natural vegetation
- 100 m/day, in mountainous areas, more often than not covered with natural vegetation (in rocky areas, 75 m/day or even smaller may be constructed).

4.2.3 Pressure Testing during Construction (Hydrotesting)

The condition of the pipeline at the start of pre-commissioning is determined by performing a system pressure test (SPT). SPT options include:

- Conventional SPT using water (e.g., hydrotesting); and
- Replacement of the SPT with other means that ensure that the overall safety level of the pipeline system for which the test is to be replaced is equal to or better than that of an equivalent system that implements the SPT- this option is applicable only to the offshore pipeline sections and under specific conditions.

The above ground facilities of the project (e.g., compressor, metering, pressure regulating, heating stations) are not subject to this procedure since these facilities include equipment that has been pre-tested during its manufacturing.

4.2.3.1 Hydrotest Concept

Hydrotesting (or hydrostatic testing) is the most common method for testing pipeline integrity and checking for any potential leaks prior to commissioning. The test involves placing water inside the pipeline at a certain pressure for a certain time to confirm pipeline strength and tightness.

The activities to be carried out before and after the hydrotest are repeated here:

- Before hydrotest:
  - Flooding and cleaning,
  - Gauging;
- During hydrotest:

- Leak detection;

- After hydrotest:
  - Dewatering,
  - Drying,
  - Purging.

Pressurisation is achieved during a hydrotest by pumping water into the pipeline section being tested. According to DNV-OS-F101, the system pressure test should be 1.15 times the design pressure with a hold period of 24 hrs. Pressurisation is then carried out with a high pressure pump.

After the pipeline has been filled and pressurised, and all the necessary parameters have been measured, the pipeline is dewatered and dried.

- Flooding, Cleaning and Gauging. After the pipeline is initially flooded, it will be cleaned and gauged. Typically, cleaning and gauging are performed as a single operation together with flooding. Cleaning involves sending a series of pigs through the pipe section to remove any debris (typically weld slag and pipe mill scale, where the latter is expected only in a very limited amount due to the internal coating) from inside the pipeline. One pig bounds the air and water, and another series of pigs can be used to clean the internal pipe-wall. Clean water is pumped in front of the pig train to moisten the debris. Pipeline internal gauging is used to ensure the inner diameter of the pipeline is free from obstructions and excessive ovality. A gauging pig is equipped with a device to determine its location in case it does not reach the pig receiver. If a gauging pig becomes stuck in the pipeline it is freed, the pipe defect is located and eliminated, and the gauging operation is repeated. An alternative gauging method could be used that will pinpoint any defect. Gauging can be performed with an electronic calliper tool for this purpose, optionally combined with a geometry pig to confirm the pipeline geometry as built. The gauging and geometry pigs may be run in the same train as the flooding and flushing pigs; pig speed for this operation should be between 0.3 m/s and 1 m/s. The pipeline system configuration should be designed to allow for pigging in forward or reverse direction. This is achieved by barred tees, lock-open check valves, eliminating non-piggable wye pieces, and designing the pig receivers so that they can also be used as launchers. This philosophy provides benefits during pre-commissioning and possible future repair scenarios;
- Dewatering. The recommended method for dewatering is to use compressed air. This method uses compressed air to drive a pig train through the pipeline while displacing the hydrotest water. The pig train consists of multiple compartments separated by pigs. Some are filled with fresh water to flush the salt from the pipe wall, and some are filled with air. The air is oil free and dry

with a dewpoint of at least -65°C at atmospheric pressure and an oil content no greater than 0.01 ppmW;

- Drying and Purging. The dewatering pig train leaves a small film of water, approximately 0.05 mm thick, in the pipe. The absence of water in the pipeline is necessary in order to prevent the possible formation of methane hydrate. The drying method is air drying which usually employs swabbing pigs to help spread out the water so that it has a larger surface area in order to be more easily collected; and
- Discharge/Disposal Options. Following successful testing, the used water is discharged back into a receiving water body after having passed a sedimentation pool, through which the water will flow very slowly. These pools are sized to provide a retention time of 5 minutes, which is considered enough time to allow the solid particles to be cleaned out of the pipe, to settle and remain in the bottom of the pond. The discharge rate after finalisation of hydrotests will follow the same rules as applicable for abstraction. Hence the same water bodies will be taken into consideration for discharge. Environmental effects are expected to be minimal or negligible when discharge rates are under 10% of the receiving river flow. Discharged water will be free of any chemicals, or, if it is necessary to add any chemical substances (especially at the offshore sections), they will be from the PLONOR list. The contractor for hydrotesting will obtain written approvals from the local authorities and landowner(s) where the hydrotest water will be discharged; water will not be returned to any watercourse without permission of the appropriate local authorities.

4.2.3.2 Pre-Commissioning with SPT Replacement (only applicable to offshore sections under specific conditions)

The aim of the REPLACE methodology is to provide a robust basis for replacing the SPT with other means that ensure that the overall safety level of the pipeline system for which the test is to be replaced is equal to or better than that of an equivalent system that implements the SPT.

Consideration of SPT replacement starts early in the design timeline and continues through the offshore pipeline installation phase. The methodology describes the REPLACE activities to be undertaken in each phase of the project.

4.2.3.2.1 REPLACE plan

The REPLACE plan describes the actions required to ensure that all prerequisites, requisites and additional safeguards identified in the FMECA are implemented and documented to demonstrate

compliance to stakeholders and authorities. The REPLACE plan is maintained throughout the Project lifecycle and is updated as the technical definition and execution plans develop.

Should the SPT be replaced (i.e., from REPLACE option), the pre-commissioning procedure changes. Certain steps can be omitted, and additional safeguards will be taken on board. In that case, the typical pre-commissioning procedure consists of the following (sequential) activities:

- Pressurising. The pipeline will be pressurised using dry air to create back pressure ahead of the cleaning and gauging pig train, which will be introduced in the system in the next step. Back pressure is necessary to ensure the pig-train speed can be controlled on steep slopes. The required back pressure will be assessed in detailed design. The size of the compressor spread determines the time needed for the pressurisation phase. Upon completion of the pressurising step, the pipeline is filled with dry air at elevated pressure;
- Cleaning and gauging. Cleaning and gauging activities are, ideally, conducted using a single pig run—a second run may be necessary if too much debris is found in the pig train's last slug after the first run. The pig train will consist of a series of pigs with clearing and gauging (CG) functionalities. The series of pigs will be separated by slugs of monoethylene glycol (MEG), not by slugs of water. MEG is hygroscopic and will absorb condensed water in the pipeline. For this reason, MEG inhibits against hydrates and is a so-called "hydrate-control fluid". The pig train will be propelled by a large slug of nitrogen (with a high purity of, for instance, 95%) of several tens of kilometres followed by ultra-dry air. Now the pipeline is chemically conditioned and a drying step is no longer needed. Upon completion of the pig run, the system is filled with dry air at elevated pressure;
- Depressurisation. After successful receipt of all pigs (see the above CG step), the pipeline system will be depressurised by venting to atmospheric pressure from both ends of the pipeline. Upon completion of the depressurisation, the system is filled with dry air at ambient pressure; and
- Nitrogen purging. Next, the system will be purged with a nitrogen-rich gas mixture of very high purity (e.g., 98%) to avoid an explosive gas–air interface. The mixture is pumped into the pipeline at low pressure to displace the air contents. Once the oxygen level measured at the outlet is sufficiently low, nitrogen purging is halted. Upon completion of nitrogen purging, the pipeline system is filled with inert gas, slightly above ambient pressure. This means that pre-commissioning has been completed and the system is ready to receive hydrocarbon gas.

This REPLACE Methodology was successfully used in TurkStream and Nord Stream 2 Pipeline projects, removes the need for seawater and the risk associated with lateral buckling concerning the conventional method. This procedure can be amended if necessary, depending on specific project requirements.

4.2.3.3 EastMed System Pressure Test Response

Each offshore pipeline, comprising the Greek section of the EastMed Pipeline Project has been assessed individually in accordance with the REPLACE methodology.

Based on the System Pressure Test Replacement Study (E780-00225-Ev32A-TDR-00055, Rev.02), it has been concluded that, for OSS2, OSS2N, OSS3 and OSS3N project components, it is beneficial not to pressure test the system applying the conventional hydrotesting SPT because of the risk associated with lateral buckling. For the remaining Project components, conventional SPT is applied.

Hydrotest sections will have a length up to 9 km each. It is estimated that approximately 50 hydrotests will be carried out for CCS1, 38 for CCS2 and 2 for Megalopoli Branch.

Each hydrotest will be completed in 7-10 days.

Pre-commissioning of the offshore OSS4 section is expected to require a total of 11 days. Similarly, the pre-commissioning of the other offshore project components is expected to require a total of 57 to 84 days. Pre-commissioning will be finished before commissioning activities.

4.2.3.4 Water Abstraction Sources for Conventional SPT

As far as the onshore pipeline segment, inland water sources with larger amounts of water flow have been considered for water abstraction and discharge. Water reservoirs will not be used as a source for testing water. For the offshore and nearshore segments, the most likely option is the use of sea water.

Table 4-3 shows the potential water sources identified along the pipeline route and the volumes required for hydrotesting for each main section.

The timing for hydrostatic testing activities will consider the seasonal changes of river flows and the reduced flows during the summer months.

The quantity of water used for hydrotest, considering the complete onshore section, is approximately 600,490 m^3. This volume of water is the maximum that could be used. However, it is best international practice to transfer water between hydraulic test sections and re-use it as much as possible so the final volume is expected to be much smaller.

The contractor for the hydrotest will obtain written approvals from local authorities and landowner(s) or users regarding hydrotest water abstraction and disposal.

Table 4-3 Water Requirements for Hydrotest Sections

Pipeline Spread		Water Source	Approx. Volume Required (m^3)	Pipeline Section
From KP	To KP			
				Short Onshore Section at Crete
0	50	Evrotas	54,900	CCS1
50	100	Evrotas	54,900	CCS1
100	130	Evrotas	32,940	CCS1
130	150	Alfeios	21,960	CCS1
150	200	Alfeios	54,900	CCS1
200	250	Pineiakos Ladonas	54,900	CCS1
250	300	Pineiakos Ladonas - Pineios	50,500	CCS1
			18,451	OSS4
0	35	Evinos	38,430	CCS2
35	55	Water Canal of Trichonida	21,960	CCS2
55	70	Acheloos	16,470	CCS2
70	135	Arachthos & Louros	71,370	CCS2
135	200	Louros	71,370	CCS2
200	233	Louros & Acherontas	36,234	CCS2
0	4	Alfeios	492	Megalopolis Branch
4	9.8	Alfeios	713.4	Megalopolis Branch

Source: (IGI Poseidon, 2021)

As the conventional SPT approach involves the use of water (either inland or sea), it should be noted that inland water providing the compliance of its physicochemical characteristics with what was described earlier does not pose any risk to pipeline integrity. The water used needs to be free of contaminants and not aggressive (pH between 5 and 8), and no additives, corrosion inhibitors or chemicals are envisaged to be used.

This is not the case with sea water due to its corrosive behavior. The following options exist regarding seawater composition for hydrotesting purposes:

Filtered seawater (50 micron) + UV sterilisation. Use of chemicals is not envisaged considering that the water residence time should be fewer than 30 days. If the use of chemicals or other additives is deemed unavoidable, these substances will be included in the PLONOR list. The PLONOR list is a list of substances that are deemed to pose little or NO risk (PLONOR) to the environment. The list has been developed by the OSPAR committee (known as Oslo – Paris committee) for protection of the marine environment. All chemicals or mixtures on the PLONOR list are allowed to be discharged into the sea in accordance with international industry standards.

4.2.3.4.1 Discharge and Disposal of SPT Mediums

Conventional SPT includes discharge and disposal of large quantities of hydrotesting water.

Water for the onshore sections will be discharged back into a receiving water body after having passed a sedimentation pool, through which the water will flow very slowly. These pools are sized to provide a retention time of 5 minutes, which is considered enough time to allow cleaning the solid particles out of the pipe to settle and remain in the bottom of the pond. The discharge rate after finalisation of hydrotests follow the same rules as applicable for abstraction. Hence the same water bodies will be taken into consideration for discharge. Environmental effects are expected to be minimal or negligible when discharge rates are under 10% of the receiving river flow. Discharged water will be free of any chemicals.

In any case:

- The discharge is performed in a controlled manner according to local environmental approvals. An assessment of the likely dispersion rate and extent should be evaluated as part of the pre-commissioning design activities during the EPIC stage of the project; and
- Prior to discharging the hydrotest fluids, samples are collected and analysed on-site to ensure compliance with permits and other regulations before being discharged to the open sea.
- The discharge point will be selected based on:
- Results of dispersion analysis;
- Application of diffuser; and
- Assurance of efficient dispersion into environment.

Continuous discharge is considered possible by developing a discharge plan taking into account the spread capacity of the entire discharge system.

4.3 Operation maintenance

Detailed operating procedures for the pipeline system will be developed. These procedures will precede the operation of the pipeline. A system for collecting information from third party activities will be operational.

The pipeline is monitored and controlled from the control room. The monitoring system is SCADA (System Control and Data Acquisition). During operation, leak detection is performed through continuous measurements of pressure and flow rate at the inlet and outlet of the stations and the pipeline. If a leak is detected, the deactivation system is activated. In order to be able to carry out an internal inspection, scrapper stations will be installed.

4.3.1 Maintenance

4.3.1.1 Pipeline Maintenance

The pipeline system will be monitored and maintained to ensure that it shall remain adequate and operational as designed, constructed and tested throughout its life-time and also in order to minimize environmental and human hazards. In general, pipeline monitoring, operational inspections and monitoring of operating conditions shall be performed in order to address any problems and to enable their repair in a short period of time. Maintenance planning shall be performed through a combination of modern management techniques, information systems and innovative technical analyzes in order to minimize any risk associated with the operation of the installation and equipment in the long run. The integration of scheduled maintenance will be a major component of the project development and will be implemented throughout the operation of the pipeline system.

Pipeline inspection and maintenance work during operation include the following parameters:

- Pipeline monitoring
- Supervision of the alignment possibly with road vehicles
- Inspections of special intersections
- Monitoring the population and activities of third parties adjacent to the pipeline
- Installation of the cathodic protection system
- Control and monitoring investigations
- Functional inspections and accreditation of the installation and equipment
- Maintenance of installation and equipment at predetermined intervals

The pipeline will be cleaned on a regular basis to confirm the geometry of the pipeline as well as after possible damage or after seismic phenomena.

4.3.1.2 Maintenance of Compressor Stations and Metering Stations

The maintenance strategy is based on the preventive maintenance, the program defined in the Maintenance Plan and the inspection / testing program. In the subsequent operation, the maintenance program follows the Reliability Centered Maintenance (RCM) principle where maintenance activities are based on the recorded reliability and fault database of the plant equipment.

No significant gas leaks occur during the maintenance of the metering stations.

4.4 Decommissioning of the Project

The expected service lifetime of the two pipeline systems is 50 years. It may be possible that life expectancy of the Project is increased as technology further develops during its operation. Nevertheless, it is expected that at some point the pipelines and the facilities will be decommissioned.

Any decommissioning activities will be subject to permitting requirements applicable at that time and subject to consultation with affected owners and stakeholders of affected properties and structures. A plan covering all relevant items will be prepared and approved before any decommissioning works. The plan will also include an assessment of the environmental impacts of the proposed decommissioning technique and proper mitigation measures.

The Project is designed for a lifetime up to 50 years. Project components may be modified and upgraded over the years, and various measures may be taken to increase the life expectancy of the Project. However, at some time in the future the maintenance of the project will become economically unfavourable and the technology obsolete; consequently, the Project will be demobilised.

The plant and equipment will be dismantled or cut into manageable sections, wiring and electronic boxes removed and handled in accordance with national legislation. Steel sections will be carted away for reuse or reprocessing. Building structures, including pits and culverts, and paved surfaces on the site are demolished, and the used building materials are transported to an approved waste disposal site if they cannot be recycled.

Finally, the area is reinstated by contouring the site to its original slope and undulation, and any scrub and vegetation are planted. The reinstatement will be planned and drafted in co-operation with the relevant authorities, whose approval shall be in hand prior to commencement of any fieldwork. A few years thereafter, the site should appear to be mingling in with the general landscape, and any traces from Project operations would not be detectable.

More specifically, a detailed plan for the decommissioning phase will be submitted to competent authorities for approval in advance of the planned date of end of operation activities, providing details of all necessary activities, in compliance with international best available dismantling practices and technologies available at the time of the execution of the plan.

The current approach foresees that the decommissioning procedure will consist of removal of the pipeline. In specific sections where the removal operation would not be technically feasible or would cause a more adverse impact on the natural or socioeconomic environment than the abandonment underground, the pipeline will be left buried (e.g., OSS4 or other sections of the onshore components of the Project). Nevertheless, regarding the offshore sections, it is expected that at some point the offshore pipeline should be decommissioned. At that point activities will be undertaken in accordance with prevailing legislation, in liaison with the relevant regulatory authorities and taking into account international best practices. This can be expected, for instance, in trenchless crossing sections. In these cases, the section will be made inert by filling up the pipe with appropriate concrete conglomerates or mixtures (in order to prevent collapse of empty pipeline), provided that the section is welded with caps.

Pipeline decommissioning, like the commissioning of a new pipeline, will be performed through a number of sequential phases that will allow occupation of limited areas at a time, progressively forwarding through the route. The impacts are expected to be similar to the ones evaluated for the construction phase (in a reverse chronological order).

In line with the principles concerning the permanent above-ground facilities, the decommissioning procedure will consist of removal of the structures and reinstatement of the area in a reasonable time frame in order to the return to the previous conditions of the area where this is possible. Of course, the first priority is to reuse materials; some components, though, cannot be reused and they are recycled to the extent possible. Other components are managed as excavation, demolition, construction waste.

4.5 Description of the project interferences with the Natura 2000 site

The current Appropriate Assessment concerns the part of the project that crosses close to the Study Area (Natura 2000 site: GR2310010). There will be no working strip within the Study Area.

During construction

- The working strip will be outside the Study Area and of 28m width.

- It is estimated that a few weeks will be required for the completion of the work in the area.
- Blasting is not expected to be used.
- It should be noted that no construction activities will take place during night.

During operation/maintenance

- Outside the Study Area, an 8m wide pipeline protection strip (PPS) will be maintained along the pipeline.

Table 4-4 Pipeline Working Strips

Project phase	Working Strip	Width (m)
Construction and pre-commissioning	General working strip	38
	Working strip with construction/environmental constraints	28
Operation and maintenance	Pipeline protection strip	8

Reference: (ESIA Project Description)

5 APPROPRIATE ASSESSMENT

According to the requirements of Article 6 of the Directive 92/43/EEC, the guidelines of the European Commission for the Appropriate Assessment and the MD 170225/2014 a series of procedural and substantive safeguards are set out, that must be applied to plans and projects that are likely to significantly affect a Natura 2000 site. In this framework the procedure of the AA is designed to:

- Fully assess the impacts of plans and projects that are likely to have a significant effect on a Natura 2000 site.
- Ascertain whether an adverse effect on the integrity of the site can be ruled out. If such is not the case, the plan or project can only be approved if mitigation measures or planning conditions can be introduced that remove or minimize the adverse effects on the site so that its integrity is not affected.
- Provide a mechanism for approving - in exceptional circumstances - plans or projects for which it cannot be ascertained that they will not adversely affect a Natura 2000 site even after the introduction of mitigation measures, when these plans of projects in the absence of alternative solutions are judged to be of overriding public interest.

5.1 Appropriate Assessment Methodology

This section describes the appropriate assessment methodology that will be applied so as to assess in an appropriate manner the potential significant impacts that may be determined by the project to the qualifying features and integrity of Natura 2000 sites. To this aim the methodology was based on the provisions and criteria of MD 170225/2014 with slight modifications so as to fullfill the purpose of the assessment and be in line with the directions derived from the methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

The significance of the potential impacts has been assessed considering the following characteristics:

- Duration,
- Spatial extent of the impact,
- Frequency of occurrence or timing with significant ecological periods,
- Intensity of the expected impact on ecological functions of habitats, species and ecosystems,
- Reversibility, either naturally or through implementation of measures to prevent and mitigate impacts.

Furthermore, the vulnerability/sensitivity of the habitat or species (receptor) to changes caused by the project and its capability to recover are taken into account, always considering how tolerant and

fragile the habitat or species is and the value, in terms of environmental conservation and ecology, of the receptor affected including species, populations, communities, habitats and ecosystems.

The significance of the impact was assessed in two steps: (a) taking into consideration the value and sensitivity of habitats and species, and the intensity of the impact on them; and (b) incorporating the frequency of occurrence or timing with important ecological periods.

In cases where a site supports habitats or species for which the potential impact differs, the scoring system uses a "weakest link" approach. This means that scores are based on the "worst" case.

Table 5-1 Assessment of impact Intensity towards the recipient of Habitats/Species of interest

Impact Intensity	Recipient: Habitats/Species of interest
High	• The project (either alone or in combination with other projects) may adversely affect the integrity of a habitat, by substantially changing in the long term its ecological features, structures and functions, across all or most of the area, that enable it to sustain the habitat, complex of habitats and/or the population levels of species that makes it important. • Affects an entire population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) will not return that population or species, or any other population or species depending on it, to its former level within several generations*. A large magnitude impact affecting the species may also adversely affect the integrity of the site, habitat or ecosystem. A secondary impact of large magnitude may also affect a subsistence or commercial resource use (e.g. fisheries) to the degree that the well-being of the user is affected over a long term.
Medium	• The habitat's integrity will not be adversely affected in the long term, but the effect is likely to be significant in the short or medium term to some, if not all, of its ecological features, structures and functions. The habitat may be able to recover, through natural regeneration and restoration, to its state at the time of the baseline study. • Affects a portion of a population and may bring about a change in abundance and / or distribution over one or more generations*, but does not threaten the integrity of that population or any population dependent on it. A medium magnitude impact may also affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting its overall integrity. The size of the consequence is also important. A medium magnitude impact multiplied over a wide area will be regarded as large. A short term effect upon the well-being of resource users may also constitute a secondary medium impact.
Low	• Neither of the above applies, but some minor impacts of limited extent, or to some elements of the habitat, are predicted but the habitat will readily recover through natural regeneration. • Affects a specific group of localized individuals within a population over a short time period (one generation* or less), but does not affect other trophic levels or the population itself.

*Note: Generations of the animal/plant species under consideration.

Prepared by: (NCC, 2021)

Table 5-2 Assessment of impact Intensity towards value and sensitivity of resource/recipient, frequency of occurrence and reversibility.

Impact Intensity	Value and sensitivity of resource/recipient	Frequency	Reversibility
High	The receptor has little capacity to balance the changes without substantially altering its current state or is important at national or international level. For the classification the value of the species habitat affected is also taken into consideration.	The activity is continuous or/and takes place during critical life-stages or seasons for wildlife, e.g. bird nesting season.	The implementation of mitigation measures will reverse the effect by 100%.
Medium	The receptor has moderate ability to balance changes without significantly altering its current state or is of high importance. For the classification the value of the species habitat affected is also taken into consideration.	The activity is expected to be carried out for long periods of time during construction and will continue during operation or/and takes place during early or late breeding stages.	The implementation of mitigation measures will reverse the effect only partially and over 50%.
Low	The receptor is tolerant to change without harming its features, is of low or local importance. For the classification the value of the species habitat affected is also taken into consideration.	The activity will occur sporadically at irregular intervals or/and outside critical life-stages or seasons for wildlife.	The implementation of mitigation measures will reverse the effect only partially and up to 50%.
Negligible		The activity will occur once and outside critical life-stages or seasons for wildlife.	
Irreversible			There is no reasonable chance of action being taken to reverse it.

Prepared by: (NCC, 2021)

Table 5-3 Assessment of the impact's magnitude towards the value of the resource and the intensity of the impact

Magnitude of impacts		Intensity		
		Low	Medium	High
Value/ sensitivity of receptor	Low	Negligible	Low	Medium
	Medium	Low	Medium	High
	High	Medium	High	High

Prepared by: (NCC, 2021)

Table 5-4 Assessment of the overall significance of the impact, with the frequency taken into account

Overall significance of impact		Impact's magnitude with regard to the value of the receptor and intensity			
		Negligible	Low	Medium	High
Frequency	Negligible	Negligible	Negligible	Negligible	Low
	Low	Negligible	Negligible	Low	Medium
	Medium	Low	Low	Medium	High
	High	Low	Low	High	High

Prepared by: (NCC, 2021)

An assessment of the residual impact (impact that can not be mitigated and thus irreversible) has also taken into account the reversibility that may arise from the implementation of measures to prevent or mitigate the impacts of the project on habitats and species.

Table 5-5 Assessment of the residual impact, with the reversibility of the impact taken into account

Residual impact		Overall significance of impact			
		Negligible	Low	Medium	High
Reversibility	High	Negligible	Negligible	Low	Low
	Medium	Negligible	Negligible	Low	Medium
	Low	Negligible	Low	Medium	High
	Irreversible	Negligible	Medium	High	Critical

Prepared by: (NCC, 2021)

Table 5-6 Impact significance definitions

Significance	Definition
Critical	Unacceptable. It is not subject to mitigation, alternatives should be identified.
High	Significant. Impacts with a "High" significance are likely to disrupt the function and value of the resource/receptor, and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
Medium	Significant. Impacts with a "Moderate" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the resource or receptor, although the overall function and value of the resource or receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
Low	Detectable but not significant. Impacts with a "Low" significance are expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the resource or receptor. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
Negligible	Not Significant. Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.

Prepared by: (NCC, 2021)

5.2 Assessment of Impacts

The present impact assessment evaluated impacts, taking into consideration the implementation of adequate mitigation measures and environmental planning aimed at reducing and where possible preventing environmental impacts as presented in Section 6. Final residual impact is also estimated. A typical example is the selection of the trenchless underground passage of the pipeline at some Natura 2000 sites, in order to minimize impact on sensitive habitats and species. Mitigations measures are therefore presented alongside the assessment and presented in detail in Section 6.

In this framework, the potential impacts concerning the construction and operation of the project were assessed with regards to the technical characteristics, the special natural characteristics and the current environmental conditions of the site, with emphasis on the protected elements, the ecological integrity of the Study Area and the overall consistency of the Natura 2000 network.

For the section of the project under assessment, given the characterization of the area of interest as SAC for the Natura 2000 network, the following evaluation indicators were used:

(a) loss and fragmentation of habitat type coverage,

(b) loss and fragmentation of species of interest habitat,

(b) disturbance/displacement of species of interest, as well as

(c) direct loss of species of interest.

The examination of the above indicators can provide information on the impact of the project and on whether the project may:

- Cause delay or disrupt the progress in meeting the conservation objectives of the Natura area concerned;
- Reduce the size of the species population or affect the conservation status of their habitats or fragment them or affect the balance between species or affect their degree of isolation;
- Cause changes to vital parameters within the Natura 2000 site;
- Interact with anticipated or expected physical changes.

as required by the MD 170225/2014.

The chapter includes an initial screening of species and habitat types, followed by the estimation of the impacts of the project on the selected species related to (a) the pipeline construction and pre-commissioning, (b) the pipeline operation, (c) cumulative impacts, while possible impacts to other important species are also presented. Finaly, the alternative scenarios are examined.

5.2.1 Species / habitat type screening

In respect to habitat types, the habitats that were taken into consideration for the appropriate assessment are those included in the FSA, namely Pannonian-Balkanic turkey oak –sessile oak forests (91M0) and *Quercus ilex* and *Quercus rotundifolia* forests (9340). The rest of the EU habitats within the Study Area are not taken into consideration, as due to the nature of the project activities and its location they are not expected to be at risk of affection, direct or indirect.

In respect to the fauna species a screening was carried out concerning the species included in Table 3.2. of the SDF that could be potentially be affected by the project, based on field observations and bibliographic data. The species for which the Natura 2000 site has been designated and could potentially be affected by the project is *Canis lupus*. The rest of the species are directly related to the

presence of water and are too attached to aquatic habitats. As in the FSA no rivers, streams or other wetlands exist, they are not expected to be present.

Their ecological requirements are presented in ANNEX D.

Table 5-7 Species of interest expected or observed within the FSA

Group	Code	Species	Presence	Observed during fieldwork	Annex of Habitats Directive / IUCN / Greek Red List
Annex II (92/43/EEC) species of the Study Area - Reported in chapter 3.2 of the site's SDF					
M	1352	*Canis lupus*	p		II;IV|LC|VU

Note: p: permanent (Source: SDF) , II, IV: Annexes of Habitats Directive, LC: Least Concern, VU: Vulnerable

Prepared by: (NCC, 2021)

Furthermore, the sensitivities of the species of concern, namely species of the Annexes II and IV of the Habitats Directive and of Annex I of the Birds Directive, that are not among the qualifying features for the site, but were considered to probably be present in the area or were observed during fieldwork, are taken into consideration for the proposal of good practices also for their protection and are presented in Table 5-8.

Table 5-8 Other species expected or observed within the FSA

Group	Code	Species	Presence	Observed during fieldwork	Annex of Habitats & Birds Directive / IUCN / Greek Red List
Other important Annex IV (92/43/EEC) species of the Study Area - Reported in chapter 3.3 of the site's SDF					
R	1251	*Lacerta trilineata*	p	X	IV|LC|LC
R	1248	*Podarcis taurica*	p	X	IV|LC|LC
Other important Annex II and IV species of the Study Area not included in the site's SDF					
M	5365	*Hypsugo savii*		X	IV|LC|LC
M	1309	*Pipistrellus pipistrellus*		X	IV|LC|DD
M	5009	*Pipistrellus pygmaeus*		X	IV|LC|DD
M	1306	*Rhinolophus blasii*		X	II;IV|LC|NT
M	1333	*Tadarida teniotis*		X	IV|LC|LC

Group	Code	Species	Presence	Observed during fieldwork	Annex of Habitats & Birds Directive / IUCN / Greek Red List
R	6958	*Mediodactylus kotschyi*	p	X	IV|LC|LC
B	A080	*Circaetus gallicus*		X	I|LC|NT
B	A868	*Leiopicus medius*	p	X	I|LC|-

Note: p: permanent, I: Annex of Birds Directive, II, IV: Annexes of Habitats Directive, LC: Least Concern, NT: Near Threatened, DD: Data Deficient

Prepared by: (NCC, 2021)

5.2.2 Pipeline Construction and Pre-commissioning

The project will not cross the Study Area, but the adjacent forested areas with open trenching. The construction is expected not to exceed a few weeks.

During the preliminary design special care was taken in order:

- to avoid crossing of the Study Area (the Natura 2000 site) by the project in an attempt to minimize any potential impact of the project to the site and the Natura 2000 network in general.
- to prevent or minimize any potential impact during project construction. More specifically, a series of measures have been taken in order to minimize the potential impact to biodiversity, including (a) no use of blasting, (b) minimization of construction works during night and (c) application of reduced working strip when environmental constraints apply.

The potential impacts have been assessed taking into consideration measures adopted during preliminary design phase and the pre-condition that the construction works within and in the vicinity of the Study Area will take place outside the main breeding period (April-August), following the provisions of the EU Habitats Directive and of national legislation.

Habitat type coverage loss, deterioration, fragmentation: **Negligible**

The pipeline will cross outside the Study Area. As a result, the habitat types of interest 91M0 and 9340 are not expected to be affected by vegetation clearance. The habitats may be affected by any potential accidental abandonement of garbage or aggregates.

Table 5-9 General impact characteristics for habitats and flora

Receptor	Nature	Extent	Duration
91M0 9340	Negative. Deterioration due to garbage.	Local	Short-term. The impact is expected only during the construction period.

Prepared by: (NCC, 2021)

The value of the receptor is high as it concerns two habitat types, which are listed in Annex I of the Habitats Directive. The intensity of the potential pollution due to garbage/aggregates is low, while the frequency is estimated to be low and as a result the overall impact low.

As appropriate mitigation measures can be applied in order to avoid and prevent those impacts, the reversibility of the impact is medium and the residual impact negligible. The mitigation measures proposed include the appropriate storage and disposal of litter and other waste material or any environmentally hazardous material.

The Conservation Status and the Conservation Objectives of the two habitat types, 91M0 and 9340, present in the Natura 2000 site, are not expected to be affected.

Habitat loss, deterioration, fragmentation: **Medium**

The pipeline is crossing an area outside the Study Area (the Natura 2000 site) that is characterized by densely unfragmented areas. According to the Roadless map of Greece (Kati et al., 2020) the segment in concern is located in an area characterized by low fragmentation. It is extremely suitable as a homesite area for *Canis lupus*.

The crossing of the pipeline from this area will cause habitat fragmentation and semipermanent loss of *Canis lupus* highly suitable homesite-reproduction areas along the pipeline section between IP2060-2113, which could lead to reduction of the overall fitness of the local population of the species.The value of the receptor is high as it concerns a species listed in Annex II of the Habitats Directive and included in the SDF. The intensity of the impact is high. The frequency is medium. Based on the above the impact is estimated to be high.

The reversibility will be low for the parts of the forested areas as the fragmentation will not be reversed, while for the parts that are grasslands the reversibility is high. However, the implementation of mitigation measures could reverse the impact through micro-siting and the avoidance of the *Canis lupus* homesite. As a result, the residual impact is medium. Micro-siting concerns a short distance, due to technical reasons. However, it should be mentioned that , according to the Association ACHLI that is active in Portugal participating in the construction of wind farms and

in parallel the conservation of *Canis lupus*, a mitigation measure during pre-construction phase is setting a buffer of 1 km radius around known wolf breeding sites as no-construction area.

The Conservation Objectives concerning the species' habitat quality and coverage are expected to be affected.

Loss of Individuals: **Negligible**

At the FSA and its vicinity no plant species of conservation interest were found and no impacts are expected. Furthermore, no streams are present and as a result no species related to aquatic habitats are expected.

During construction, increase of the vehicle traffic is expected in the area and as a result traffic accidents involving individuals of *Canis lupus* cannot be excluded resulting in the injury or death of individuals of the species of concern. The increase in traffic is estimated to be about 200 vehicle movements per day. In addition, if time constraints are not met and the species gets disturbed during sensitive periods (April to August) it may abandon its litter/denning sites or try to move them elsewhere, risking injury and death of the pups.

Canis lupus may also be attracted by the presence of garbage and food remains, increasing habituation of the species to humans, which may lead to increase of conflict.

Table 5-10 General impact characteristics for loss of individuals - fauna

Receptor	Nature	Extent	Duration
Canis lupus	Negative. Potential loss of individuals	Local, at the broader area of the working strip and the surrounding area	Short-term. The impact is expected only during the construction period. (few weeks)

Prepared by: (NCC, 2021)

The value of the receptor is high, while the intensity of the impact is low, as it could potentially affect only localized individuals within a population over a short time period and the frequency is also low, as the construction period will last a few weeks and outside sensitive periods for the species. Based on the above the impact is estimated to be low.

As appropriate mitigation measures can be applied in order to prevent accidental roadkills, the reversibility of the impact is medium and the residual impact negligible.

The Conservation Status and the Conservation Objectives, concerning the population density and distribution for the *Canis lupus* are not expected to be affected.

Disturbance: Medium

Disturbance is mainly related to mammal species, which may be affected by increased human presence, vehicle movement and construction work carried out. As the pipeline routing crosses many ravines, in these areas the noise from construction activities (hammering and grading) is expected to propagate in a longer distance (even >1km) and thus disturbance effects to local wildlife could be afflicted in a larger area than the buffer zone of 500m.

Canis lupus is extremely sensitive to newly inducted disturbance in previously undisturbed areas (as is the case of the segment IP 2060-2113) especially in relation to their homesite selection and can be temporarily displaced from the area. Permanent consequences can be them abandoning a previously highly suitable and traditionally selected area even if the disturbance ceases (Iliopoulos Y., personal communication). The most crucial parameters that affect abandonment of homesites are the severity and duration of the disturbance (Paquet and Darimont, 2002). If time constraints are not met and wolves get disturbed during sensitive periods (April to August) they may abandon their litters/denning sites or try to move them elsewhere, risking injury and death of the pups.

As *Canis lupus* is mainly nocturnal and feeds during dawn, dusk and night, light pollution at the working strip will also induce disturbance.

Table 5-11 General impact characteristics for disturbance - fauna

Receptor	Nature	Extent	Duration
Canis lupus	Negative. Animals may be disturbed.	Local, at the broader area of the working strip.	Short-term. The impact is expected only during the construction period.

Prepared by: (NCC, 2021)

The value of the receptor is high as it concerns a species, which are listed in Annex II of the Habitats Directive. The intensity of the impact is medium, as it could potentially affect portion of the population and may change abundance over one or more. The frequency is low, as the construction, according to the construction speed rate will be a few weeks, which is a short period of time, while it will take place outside the breeding season. Based on the above the impact is estimated to be medium.

Although appropriate mitigation measures can be applied in order to prevent disturbance, mainly during night, the reversibility of the impact is low and the residual impact medium.

The Conservation Status and the Conservation Objectives, concerning the distribution, for the *Canis lupus* is expected to be affected.

Changes in the general ecosystem of the Study Area: **Medium**

It is expected that the project will cause changes to the vital defining aspects that determine how the site functions as a habitat or ecosystem. The project is expected to change the balance between key species or reduce the diversity of the site. As the impact to *Canis lupus* is considered to be high, it is estimated that changes to the dynamics of the relationships that define the structure and/or function of the site are to be expected through the displacement of the species. Finally, the project will not interfere with predicted or expected natural changes to the site.

5.2.3 Operation and Maintenance

During operation and maintenance the PPS will be maintained free of wood vegetation and operation will not include any regular human or vehicle presence.

Habitat type loss, deterioration, fragmentation: **Negligible**

The maintenance of the PPS at the forested areas will not allow the regeneration of the forest at those locations. As the PPS is even smaller than the working strip and outside the Study Area the impact is estimated to be negligible.

Species habitat loss, deterioration, fragmentation: **Medium**

The existence of the PPS will lead to fragmentation of *Canis lupus* habitat and a previously roadless area and reduction of its suitability. As denning sites might be bisected during construction, therefore they potentially will no longer be selected.

Table 5-12 General impact characteristics for species habitat loss - fauna

Receptor	Nature	Extent	Duration
Canis lupus	Negative. Habitat is expected to remain fragmented.	Local, at the broader area of the working strip.	Permanent for forested and with shrubland areas inside the PPS.

Prepared by: (NCC, 2021)

The value of the receptor is high as it concerns a species, which are listed in Annex IV of the Habitats Directive. The intensity of the impact is high. The frequency is high, as the fragmentation of the habitat will be permanent. Based on the above the impact is estimated to be high.

Appropriate mitigation measures can be applied in order to restore partially the habitat fragmentation and also ensure the avoidance of PPS use by local users or other, the reversibility of the impact is medium and the residual impact medium.

Loss of Individuals: **Not applicable**.

(No loss of individuals is expected during operation.)

Disturbance: **Low**

Due to the maintenance of the PPS the accessibility of the area will increase and human presence may increase also, including vehicle movement, recreational activities, hunting. This will lead to disturbance of *Canis lupus*.

Table 5-13 General impact characteristics for species disturbance - fauna

Receptor	Nature	Extent	Duration
Canis lupus	Negative. Disturbance.	Local, at the broader area of the working strip.	Periodical

Prepared by: (NCC, 2021)

The value of the receptor is high as it concerns a species, which are listed in Annex II of the Habitats Directive. The intensity of the impact is medium, as it could potentially affect portion of the population and may change abundance over one or more. The frequency is low, as the disturbance will be sporadical. Based on the above the impact is estimated to be medium.

As appropriate mitigation measures can be applied in order to prevent disturbance, mainly during night, the reversibility of the impact is medium and the residual impact low.

Table 5-14 Assessment of impacts

Phase	Threat	Receptor	Nature	Extend	Duration	Intensity	Value of the receptor	Frequency	Overall importance	Reversibility	Residual impact (current footprint)
Construction	Habitat type loss, deterioration, fragmentation	Habitat types	Negative	Local	Short term	Low	High	Low	Low	Medium	Negligible
	Species habitat loss, deterioration, fragmentation	Fauna	Negative	Local	Short term	High	High	Medium	High	Medium	Medium
	Loss of individuals	Fauna	Negative	Local	Short term	Low	High	Low	Low	Medium	Negligible
	Disturbance	Fauna	Negative	Local	Short term	Medium	High	Low	Medium	Low	Medium
Operation	Habitat type loss, deterioration, fragmentation	Habitat	Negative	*No impact expected*							
		Fauna	Negative	Local	Short term	Medium	High	High	High	Medium	Medium
	Loss of individuals	Fauna	Negative	*No impact expected*							
	Disturbance	Fauna	Negative	Local	Short term	Medium	High	Low	Medium	Medium	Low

Prepared by: (NCC, 2021)

5.2.4 Sensitivities of other species

As presented in Table 5-8, other species included in the Annex II and IV of the Habitats Directive and of Annex I of the Birds Directive were also observed in the FSA.

Among the species are also bird and bat species using old trees as nesting or roosting sites respectively. They are sensitive to felling of those trees, as it may lead to the destruction of this important for them habitat.

Reptiles are active specific period of the years and hibernate underground. During construction, increase of vehicle traffic may lead to accidental roadkills, while hibernating individuals at the working strip may be accidentaly killed during construction works. Open trenches may act as traps mainly for reptiles and amphibians.

Concerning disturbance, as bats are mainly nocturnal and feed during dawn, dusk and night, light pollution at the working strip will induce disturbance to some species, as well as to bird species, mainly during their night movements and migration. The bird species are expected to be disturbed and avoid the area of the working strip during construction.

5.2.5 Cumulative impacts

It is well established that pipelines, power lines and roads can form a linear intrusion in natural areas leading to habitat loss, fragmentation, and to the creation of barriers to movement of terrestrial species. As mentioned above the Natura 2000 site has some significant existing and planned projects and infrastructures, namely the national road network (EO5, E951) as well as the local road network crossing the western area of the Natura 2000 site, in a distance from the pipeline, and a line of the high voltage network. There is also one under permitting wind park project, which is located at a distance (>2,7 km) from the FSA and the pipeline axis.

The routing of the EastMed pipeline is not traversing the site, as it crosses in close proximity to it (about 10m) and its 500m buffer zone overlaps with the SAC. Thus, the project is not expected to imply cumulative impact concerning the habitat types of the site.

However, the current routing traverses an important area for the qualifying feature, *Canis lupus*, habitat, even though it is outside the protected area. In combination with the foreseen wind farm project, which is also planned within this unfragmented area of the broader area, it is estimated that cumulative impact will occur for the species.

On the other hand, no cumulative impacts are expected to the site in case of the suggested rerouting takes place.

5.2.6 Alternative scenarios

Detailed description of alternative scenarios is given in the relevant chapter (Chapter 7) of the ESIA. Three scenarios have been examined in this AA, namely the current routing, the alternative routing examined by the ESIA and the Do-nothing scenario.

Scenario 1: Current routing.

The current routing, as described above is estimated to have medium impact to the qualifying features of the SAC, although crossing outside the Natura 2000 site.

Scenario 2: Do-nothing Scenario.

In the case of the do-nothing scenario, there would be no pipeline construction, which would have the effect of negligible effects for all types of impacts. However, the implementation of the project would result in a number of significant positive impacts, namely: enhancement of competition in the energy market and of EU security of supply, broadening of the Southern Gas Corridor, developing of natural gas resources within the EU or close border sources, ensurance of supply of natural gas to areas of Greece that do not have access to the National Network, support of the transitory phase to renewable sources.

Scenario 3: Alternative routing.

The alternative scenarios that have been examined by the ESIA are OSS4-Alt1 and OSS4-Alt2, which include an alternative landfall at Patraikos Gulf and alternative routing from the landfall towards inland, avoiding the whole area of densely unfragmented areas of Arakynthos mountain.

Although this alternative scenario is expected to not induce any impact to the Study Area and *Canis lupus*, as the routing crosses at great distance and also does not fragment the unfragmented area of Arakynthos mountain, in the frame of the ESIA it has been rejected due to sensitivities and technical difficulties at other areas of this routing, as well as the landfall.

As a conclusion, the best alternative scenario is the current routing, taking into consideration the proposed mitigation measures in the area that will lead to negligible impact.

5.3 Conclusions of Impact Assessment on conservation objectives and ecological integrity of the Natura 2000 site

Taking into consideration the above assessment and the current status of the ecological characteristics of the Study Area and the construction and functional requirements of the Project, it is concluded that the implementation of the proposed project (in case no re-routing will be applied) is expected to:

- Cause delay or disrupt the progress in meeting the conservation objectives of the Natura 2000 area concerned.
- Affect the conservation status of their habitats or fragment or affect the balance between species or affect their degree of isolation, but not reduce the size of the population of protected species
- Cause changes to vital parameters (e.g. terrain, water surface network) that contribute to the function of the Natura 2000 site.
- Interact with anticipated or expected physical changes.

Given the above, it is concluded that the implementation and operation of the proposed project, based on the current design, will have medium impact on the protected species and therefore on the conservation objectives of the Natura 2000 site.

6 MITIGATION MEASURES OF POTENTIAL IMPACTS

Mitigation measures are proposed as precaution for the avoidance or reduction of potential adverse impacts. In this context the aim is to prevent, minimize and neutralize any negative impacts of the project and they are an integral part of its implementation specifications.

In this context the most vulnerable points and sections of the pipeline routing were highlighted and the areas where measures should be implemented to prevent/minimize impacts are presented in the following Table (Table 6-1).

It is noted the impact assessment presented in the above section, assessed residual impacts after the implementation of the management and mitigation measures listed below.

Table 6-1 Impact, mitigation measures proposed and significance of residual impact

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
Construction Phase						
Construction activities close to *Canis lupus* areas of high suitability should be avoided from mid-March (preparation of the den site by pregnant females) till end of August (increased mobility of wolf pups).	X	X			2060-2113	Medium
Investigation of micro-siting.	X	X	X		2060-2113	
Habitat types loss / Species habitat loss, degradation or fragmentation						
Already foreseen by the project: The topsoil will be carefully stored and no construction materials will be taken from the surrounding environment unless approved by the responsible authority.	X				2060-2113	Medium
Already foreseen by the project: Establishment and marking of working strip and use of existing infrastructure and roads.	X					
Restoration of habitat by planting. The planting material (seeds and stems) should be preferably collected before the construction from the area.				X		

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
Decrease of working strip from 38m to 28m (and to 22m where possible).			X			
Access road upgrading will follow existing tracks and trails where possible			X			
Loss of individuals						
Limiting of vehicle speed (limits will be established at the Traffic Management Plan)	X	X	X		2060-2113	Negligible
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, always within the working strip, and in accordance with the applicable legislation.	X					
Collection of injured individuals and transfer to wildlife rehabilitation centres.		X				
Pre-construction survey along the route for potential presence of dens.	X					
Disturbance						
Avoidance of dusk-dawn work.		X			2060-2113	Medium
Usage of lights to minimum, for safety reasons, and directional lighting.	X		X			
No upgrade of existing forest roads should take place.		X	X			
Access to the working area will only be allowed to site staff.		X	X			
No garbage or food remains will be left at the working strip.	X					
All impacts						
Ecological awareness/behaviour training should be provided to all personnel.	X	X	X		2060-2113	Medium
Establishment of a Fire Risk Prevention Plan	X					
Construction work must be supervised by fauna and habitat experts and monitoring of	X					

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
fauna will take place immediately before and during construction period, to carry out preventive conservation measures by the pipeline environmental team when/if required. The Management Body will be timely informed for the specific ecological work.						
A Biodiversity Action Plan (BAP) will be implemented for the Natura 2000 site. The BAP should foresee direct collaboration with the local Management Body of the protected site.	X	X	X	X		
Operation Phase						
Installation and regular maintenance, in collaboration with the Forestry authority, of bars to avoid entrance at PPS of vehicles.	X	X			2060-2113	Medium
Contracting vigilance personal to avoid traffic circulation	X	X				
Maintenance activities close to *Canis lupus* areas of high suitability should be avoided from mid-March (preparation of the den site by pregnant females) till end of July (increased mobility of wolf pups).	X	X				
Implementation of management measures inside the pack territory affected by the project and at a regional level (Please see below)				X		
A Biodiversity Action Plan (BAP) will be implemented for the Natura 2000 site. The BAP should ensure a close collaboration of the ecological monitoring team with the management Body of the protected area..				X		

Prepared by: (NCC, 2021)

The implementation of management measures concern the funding of a series of measures that would be implemented for the improvement of the conservation status of *Canis lupus* inside the pack territory affected by the project by the Management authorities of the site and/or NGOs in cooperation with the management Authorities. This measures could include:

- Improve habitat suitability and refuge conditions (for both wolves and wildprey)
- Reduce human disturbance and human-cause mortality, including mitigation of roadkills in known hotspots
- Increase wild prey availability
- Promote damage prevention measure
- Promote public awareness and education

The measures should be included in the Biodiversity Action Plan and be planned and specified through consultation with the involved stakeholders.

The majority of the aforementioned mitigation measures are expected to benefit also other species observed in the area.

In the following table (Table 6-2) good practices are presented which, along with the mitigation measures, would benefit those species, as well as the species of interest with distribution outside the Study Area.

Table 6-2 Good practices proposed for other species and areas outside the Study Area

Good Practices	Efficiency				IP
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration	
Construction Phase					
Loss of individuals					
At trenches, plugs will be incorporated every 100 m and daily fauna retrieval will be conducted if required. Where appropriate, temporary or permanent provisions for fauna to cross the working strip/ roads using underpasses, tunnels or other measures should be installed.	X				2045-2080
Pre-construction survey at the working strip prior to construction initiation by a herpetologist, for the relocation of tortoises or other reptiles to nearby locations.	X				
Collection of injured individuals and transfer to wildlife rehabilitation centres.		X			

Good Practices	Efficiency				IP
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration	
Pre-construction survey along the route for along the route prior to construction in order to survey potential presence of important hibernating species or nests.	X				
Fauna species should not be caught or killed during construction.	X				

Prepared by: (NCC, 2021)

Information concerning monitoring of the efficiency of the mitigation measures is provided in Section 8.

7 COMPENSATORY MEASURES

Compensatory measures, as described in Article 6 (4) of the EU Habitats Directive and incorporated into the Greek Law 4014/2011, are the "last resort" and are only used when a decision has been taken to proceed with a project or plan that could have negative impacts on the integrity of Natura 2000, because there are no alternatives and the project has been judged to be of overriding public interest.

Based on the guidelines for the interpretation of the European Directive 92/43/EEC, compensatory measures have to be considered only when a significant negative impact on the integrity of a Natura 2000 site is found.

Since no high negative impact on the integrity and conservation objectives of the investigated Natura 2000 site is assessed in the present Appropriate Assessment, no compensatory measures are proposed.

8 MONITORING PROGRAM

The implementation of a monitoring program is considered particularly important, during both (a) the construction phase of the pipeline, as well as (b) the operation and maintenance phase. It consists of two parts (a) monitoring the state of the species and habitats of interest and (b) monitoring the implementation of the mitigation measures.

8.1 General Monitoring Criteria

During construction

During construction phase, a "pre-construction" team composed by specialized field experts-scientists will monitor/survey (walkover) before construction initiation. Main goal for the team is to survey potential presence of important species, features and parameters that may need specific handlings (e.g. breeding species, important species, injured individuals, young individuals, important sites, etc.). This will ensure that any site-specific issues will be highlighted before construction and appropriate measures will be taken before construction activities initiation.

Post construction

After construction has been finalized, a monitoring program during the operation of the project must be conducted for at least 3 years. Given the scale of the project, it is necessary to implement such monitoring follow-up in order to establish the effectiveness of the applied mitigation measures and record any possible changes/impacts to the natural environment and its components due to the project function. During the operation phase, monitoring actually has an ancillary role to observe the follow-up situation, and record some meta-status that may need attention.

Main goal of monitoring activities

The main aim of these two monitoring stages, is to be ableto record the actual stage and status of fauna species, in-situ, with a pre-construction preceding team, then in real-time during the construction process, and eventually once the construction is over to record the post-construction situation, impact and effect of mitigation measures, and natural environment elements' status in the recovery phase.

Basic axis for monitoring implementation

There are four basic axes upon which the monitoring will be designed and carried out: (a) Important species of concern that must be studied in each respective protected area, (b) Period (season-month and time of the day) of the monitoring implementation, (c) Guidelines for monitoring implementation

depending on each biological group which is studied, and (d) Biological and environmental parameters recorded during monitoring process.

All four axes are analytically described in the paragraphs below.

8.2 Monitoring Program for the Study Area

The implementation and monitoring of the mitigation measures proposed will be foreseen and included in the Environmental Management System of the project and their details will be defined by the Environmental Management Plan. An Environmental Monitoring Plan will be prepared, while a Biodiversity Management Plan will be included as an integral part of it. The Environmental Monitoring Plan shall be submitted to the competent authorities that will monitor its implementation by the contractor.

The monitoring will focus on (a) the presence of the species in the area and its use during construction in order to estimate the actual impact of the activities to the species in terms of loss of habitat, loss of individuals and disturbance and the efficiency of the mitigation measures in order to provide information for the assessment of the need for modifications in the construction timing or finetuning of mitigation measures etc. and (b) the presence of the species and the use of the area after the construction in order to estimate the long-term impacts of the project to the Natura 2000 site.

Furthermore, the monitoring will also focus on the collection of all necessary information on (a) the confirmation of the mitigation measures' implementation and (b) the effectiveness of the mitigation. A series of indicators representative of the effectiveness of the mitigation measures (Key Performance Indicators - KPIs) will be defined and monitored. The effectiveness of the one-off measures will be measured once, i.e. after their implementation.

All above information will feed the procedure of the periodic adjustment of the mitigation program, while annual reports of the monitoring program should be submitted to central, regional and local authorities responsible for environmental supervision.

Species for which monitoring should focus on, during construction and in post-construction surveys.

The species that should be monitored is *Canis lupus*.

Monitoring during construction

Foot line transects is one of the most common, simple and low-cost technique to monitor mammals that can cover many species' survey. The main goal is to record direct and indirect observations that

denote species' presence in the area. Direct observation refers to visual contact with an individual, which is an immediate index of the species' presence. Indirect observations refer to recording of surrogate parameters which denote nonetheless, the species' presence in the area, such as dens, holes in the ground, prey left-overs, nests, scats, footprints, hair, scratches on wood trunks, acoustic verifications, howls, and more. It is advisable to also use night surveys with vocal mimicry and responses recording.

During construction it is advisable to have both a monitoring process 3-4 days before construction reaches at the surveyed, whereas experts should also follow the working crews in-situ during construction. Permanent line transects should be applied. In case of direct observation of animals on the project area, evaluation of the situation should take place on a case by case basis.

Monitoring during operation and maintenance phase

After the construction is finalized, the monitoring phase of the "post-construction" period will be conducted for a total of 3 years, except if during monitoring and assessment it is estimated that a shorter period can be sufficient. The main axis of its implementation is the same as presented in the above section of construction monitoring phase.

9 CONCLUSIONS

The present Appropriate Assessment concerns the onshore section of the EastMed pipeline, which crosses the Special Area of Conservation (SAC) "Oros Arakynthos Kai Stena Kleisouras", GR2310010. It has been prepared as a necessary and integral part of the Environmental and Social Impact Assessment of the project.

The present AA followed the specifications described in Annex 3.2.1 of the MD 170225/2014, concerning the AA of projects and activities located within Natura 2000 sites that are not subject to specific conditions. Bibliographical data were collected and field surveys of a total duration of 21 days were carried out in 2021.

The present AA provided a detailed ecological description of the Study Area with special emphasis in the Field Survey Area (a strip of 500 m either side of the proposed routing). In particular, the AA assessed the potential impacts of the project to the populations and distribution of protected species and the ecological functions of the site, and identified suitable mitigation measures to ensure that the proposed project will not harm the ecological integrity of the site and the connectivity of the Natura 2000 network.

The expected residual impact to ecosystems and species of the Study Area are estimated as medium and are mainly related to *Canis lupus* and (a) loss of extremely suitable homesite habitat of the species, (b) potential loss of individuals, due to increase of vehicle traffic and (c) disturbance due to construction works.

Concerning cumulative impacts, the main linear infrastructures are at a distance over 2km from the routing. However, cumulative impacts are estimated to occur due to a planned wind farm that will also contribute in the loss of the unfragmented area of Arakynthos vital for *Canis lupus*.

Despite the consideration of the precautions provided in the AA, it can not be ruled out with certainty that the Special Area of Conservation (SAC) "Oros Arakynthos Kai Stena Kleisouras", GR2310010, of the Natura 2000 network, and its ecological integrity will be affected by the Project.

The present AA proposes measures for mitigation of the impacts on the local biodiversity, in order to minimize project impacts to the site. The avoidance of the breeding period of *Canis lupus*, as well as the investigation of micro-siting in order to increase the distance from the identified homesite are the key measures, while the implementation of management measures inside the pack territory affected by the project and at a regional level for the benefit of the species is also proposed to be included in the Biodiversity Action Plan. Also good practices for other species are proposed.

The present AA also provides guidelines on the monitoring program to be carried out during construction alongside the executions of construction works, and during the pipeline operation for at least three years.

10 STUDY TEAM

Name		Role
Tasos Dimalexis	Dr. Biologist	Project Coordinator Site assessment
Margarita Tzali	Environmental Engineer, MSc	Project Manager AA compilation
Alexandra Kontou	Environmentalist, MSc	AA compilation
Vassilis Goritsas	Environmentalist, MSc	Data management/Map production
Jakob Fric	Physicist	Development of databases / Data management Field worker: Mammal field survey
Giorgos Fotiadis	Dr. Forester	Habitat expert Field survey, Preparation of texts, Mapping
Apostolos Christopoulos	Environmentalist MSc, Phd candidate in Biology	Herpetofauna/Avifauna expert Field survey, Preparation of texts
Irini Antoniadi	Biologist, MSc	Wolf/Jackal expert Field survey, Preparation of texts
Ioanna Salvarina	Dr. Biologist	Bat expert Field survey, Preparation of texts
Aliki Dakari	Biologist	Invertebrate expert Preparation of texts
Thanos Kastritis	Dr. Oceanographer	Field worker: Mammal field survey
Giannis Rousopoulos	Environmentalist MSc	Field worker: Avifauna field survey

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ANNEX A SDF DATA

Table ANNEX-1Habitat types present on the site and assessment for them

Code	Population		Assessment			
	Cover (ha)	Data quality	Repres.	Rel.surf.	Cons.	Global
5330	5.106	G	A	C	A	B
5420	223.335	G	A	C	A	B
8210	117.516	G	A	C	A	B
91M0	3,913.412	G	B	B	B	B
9260	146.350	G	A	C	A	B
92C0	31.443	G	A	C	A	B
9340	3,482.875	G	A	B	A	B
3290	-	G				
5210	-	G				
9540	-	G				

Prepared by: (NCC, 2021)

Definition:

Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

Degree of representativity of the natural habitat type on the site (Representativity): A= 'excellent representativity', B= 'good representativity, C= 'significant representativity', D= 'non-significant presence'

Area of the site covered by the natural habitat type in relation to the total area covered by that natural habitat type within the national territory (Relative surface): A=15%-100%, B=2%-15%, C=0%-2%.

Degree of conservation of the structure and functions of the natural habitat type concerned. and restoration possibilities (Conservation Status): This criterion comprises three sub-criteria: i) degree of conservation of the structure, ii) degree of conservation of the functions, iii) restoration possibility / A = 'excellent conservation' (= excellent structure, independent of the grading of the other two sub-criteria, = structure well conserved and excellent prospects independent of the grading of the third criterion), B = 'good conservation' (= structure well conserved and good prospects independent of the grading of the third sub-criterion, = structure well conserved and average/maybe unfavourable prospects and restoration easy or possible with average effort, = average structure/partially degraded, excellent prospects and restoration easy or possible with average effort, = average

structure/partially degraded, good prospects and restoration easy), C = 'average or reduced conservation' (= all other combinations)

Global assessment of the value of the site for conservation of the natural habitat type concerned (Global assessment): A = 'excellent value', B =' good value', C = 'significant value'

Table ANNEX-2Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Group	Code	Species Name	Population						Assessment			
			Type	Min	Max	Unit	Abund.	Data Quality	Pop.	Cons.	Isol.	Global
A	1193	*Bombina variegata*	p				R	DD	C	B	C	C
M	1352	*Canis lupus*	p				P	M	D	C	B	C
M	1355	*Lutra lutra*	p				P	M	C	C	C	C
P	1780	*Centaurea niederi*	p	9,500	9,500	i	R	G	A	A	C	A
R	2373	*Mauremys rivulata*	p				R	DD	C	B	C	C

Prepared by: (NCC, 2021)

Definitions:

Group: A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles

Type: p = permanent, r = reproducing, c = concentration, w = wintering

Unit: i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)

Abundance categories (Cat.): C = common, R = rare, V = very rare, P = present

Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor'

Size and density of the population of the species present on the site in relation to the populations present within national territory (Population): the ratio of the population in the site / population in the national territory: A: 15%-100%, B=2%-15%, C=0%-2%, D=non-significant population

Degree of conservation of the features of the habitat which are important for the species concerned and possibilities for restoration (Conservation). This criterion comprises two sub-criteria: i) degree of conservation of the features of the habitat important for the species, ii) restoration possibilities. A = conservation excellent (= elements in an excellent condition, independent of the grading of the possibility of restoration), B = good

conservation (= elements well conserved independent of the grading of the possibility of restoration), C = average or reduced conservation (= all other combinations)

Degree of isolation of the population present on the site in relation to the natural range of the species (Isolation). A: population (almost) isolated, B: population not-isolated, but on margins of area of distribution, C: population not-isolated within extended distribution range

Global assessment of the value of the site for conservation of the species concerned. A: excellent value, B: good value, C: significant value.

Other species

There are also 19 other species of importance for the area included in the SDF, of which 7 are amphibians, 2 mammals and 9 reptiles, of which 18 included in the National Red Data Lists and International Conventions, while 12 are listed in Annex IV of the Habitats Directive. There are no endemic species. For further detail please refer to the SDF.

ANNEX B THREAT STATUS

Table ANNEX-3Threat and Protection status of Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC

Group	Code	Species Name	IUCN (2020)	Greek Red Data Book (2008)	Endemic - Greek Red Data Book (2008)	Habitats Directive Annex II	Habitats Directive Annex IV	Bern Convention	Bonn Convention	CITES	Observed during field work
A	1193	*Bombina variegata*	LC	LC		Y	Y	II			
M	1352	*Canis lupus*	LC	VU		Y-EXCP	Y-EXCP	II		I/II	
P	1780	*Centaurea niederi*	VU	VU		Y	Y	I			
M	1355	*Lutra lutra*	NT	EN		Y	Y	II		I	
R	2373	*Mauremys rivulata*		LC		Y-CTC	Y-CTC	III			

Prepared by: (NCC, 2021)

Definitions:

Group: A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles

Threat categories according to IUCN's Red List of Threatened Species (2020.1) (http://www.iucnredlist.org/): EX: Extinct, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient, NE: Not Evaluated

Red Data Book of Rare and Threatened Plants of Greece (2009): EX: Extinct, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient, NE: Not Evaluated, (): temporary category

Threat categories according to the Red Data Book for Endangered Animals of Greece (2009): EX: Extinct, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient, NE: Not Evaluated

Habitats Directive (92/43/EC). Annex II: core areas of their habitat must be protected under the Natura 2000 Network and the sites managed in accordance with the ecological requirements of the species, Annex IV: strict protection regime must be applied across their entire natural range within the EU, both within and outside Natura 2000 sites.

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). I: Appendix I – Strictly Protected Flora Species, II: Appendix II - Strictly Protected Fauna Species, III: Appendix III – Protected Fauna Species

Convention on the conservation of migratory species of wild animals (CMS, Bonn Convention). I: Appendix I – Endangered migratory species, II: Appendix II – Migratory species conserved through Agreements

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). I: Appendix I - endangered species of animals and plants, which CITES generally prohibits international trade of their specimens, II: Appendix II - species of animals and plants which are not directly threatened with extinction, but may be listed in Annex I if their trade is not controlled.

ANNEX C SITE SPECIFIC CONSERVATION OBJECTIVES

Specific conservation objectives

3290, 5210, 5330, 5420, 8210, 9260, 9340, 9540, 91M0, 92C0:

The General Conservation Objectives apply to these habitat types

Centaurea niederi:

Species distribution greater than the Favorable Reference Value (FRV) or at least equal to it, i.e. ≥ 25 cells 1x1 km. Species population greater than the Favorable Reference Value (FRV) or at least equal to it, i.e. ≥ 8,400-9,800 individuals.

Mauremys rivulata:

Recording the species presence in Natura 2000 site. On habitat quality see general conservation objectives for the Natura 2000 site in relation to the species' habitat conservation degree. Prefers permanent freshwater ecosystems.

Testudo hermanni:

Average population density in areas with suitable habitat greater than or equal to 4 ind./ha. Conservation of suitable habitat at a percentage of >50% in 122 cells of 1x1km grid in the Natura 2000 site. Recording of the species presence in 143 cells of 1x1km grid in the Natura 2000 site. On the habitat quality, see general conservation objectives for the Natura 2000 site in relation to the species' habitat conservation degree.

Bombina variegata:

Conservation of suitable habitat at a percentage of > 50% in the Natura 2000 site. Record the presence of the species in the Natura 2000 site. On the habitat quality, see general conservation objectives for the Natura 2000 site in relation to the species' habitat conservation degree.

Lutra lutra:

Average density 1 ind./35km^2. Presence of the species in each 5x5 cell of its distribution within the Natura 2000 site. Permanent presence of the species in at least 6 5x5km cells within the Natura 2000 site. The suitable habitat should cover a significant part of the area of the 10x10 cells of the species distribution within the Natura 2000 site (> 50%). On the habitat quality, see general conservation objectives for the Natura 2000 site in relation to the species' habitat conservation degree. The species is found in riparian zones of rivers and lakes provided that natural riparian vegetation exists.

ANNEX D ECOLOGICAL REQUIREMENTS

Table ANNEX-4Ecological requirements, threats and state in Greece and the Study Area of Species assessed by the AA ([1]:Papamichael et al. 2015, Ioannidis et al. 2015, [3]: SDF)

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
Annex II (92/43/EEC) species of the Study Area - Reported in chapter 3.2 of the site's SDF						
1352	*Canis lupus*	Undisturbed areas	Areas with wild or domesticated ungulates	Ungulate availability reduction, habitat fragmentation, poisoning	Resident, continental Greece	D

Prepared by: (NCC, 2021)

ANNEX E PHOTOGRAPHIC DOCUMENTATION

Study Area

Note: The photographs provide an overview of the Natura 2000 site and come from the photographical archive of NCC Ltd.

Photographs	
	
	
	

Photographs	
	

Prepared by: (NCC, 2021)

Field Survey Area

Note: Photographs of the FSA have been taken from the referred sampling plot corresponding to the IPs mentioned in the table and are illustrated in ANNEX F, Map 6.

IP	Photograph	Sampling Plot	Filename / Date
2076		ABR32	JPEG_20210425163845526.jpg
2076		ABR32	JPEG_20210425163815742.jpg

IP	Photograph	Sampling Plot	Filename / Date
2076		ABR32	JPEG_20210425163859723.jpg

Prepared by: (NCC, 2021)

ANNEX F MAPS

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Proposed Routing / Προτεινόμενη Όδευση
- Proposed Routing (offshore) / Προτεινόμενη Όδευση (θαλάσσιο τμήμα)
- Study Area / Περιοχή Μελέτης

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
0A	9/1/2022	ISSUED FOR REVIEW	NCC Ltd	PiM	Client

Contract No:
Αρ. Συμβολαίου: project code

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
WKID: 3857 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ
IGI Poseidon

ENGINEER/CONSULTANT
ΜΗΧΑΝΙΚΟΣ/ ΜΕΛΕΤΗΤΗΣ
Asprofos engineering
ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2310010"

Map n°:	*STUDY AREA: NATURA 2000 SITES CROSSED BY ONSHORE EASTMED PIPELINE / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ: ΠΕΡΙΟΧΕΣ NATURA 2000 ΠΟΥ ΤΕΜΝΕΙ Ο ΑΓΩΓΟΣ EASTMED*	
M1-N05 S07		
Scale/ Κλίμακα: 1:2.500.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ 0A
Size/ Μέγεθος A3	Company's DWG No/Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/Section 11.1.1

Sheet/ Φύλλο

Document Name: Map1_PROJECT_ver3.1_2022.01.09

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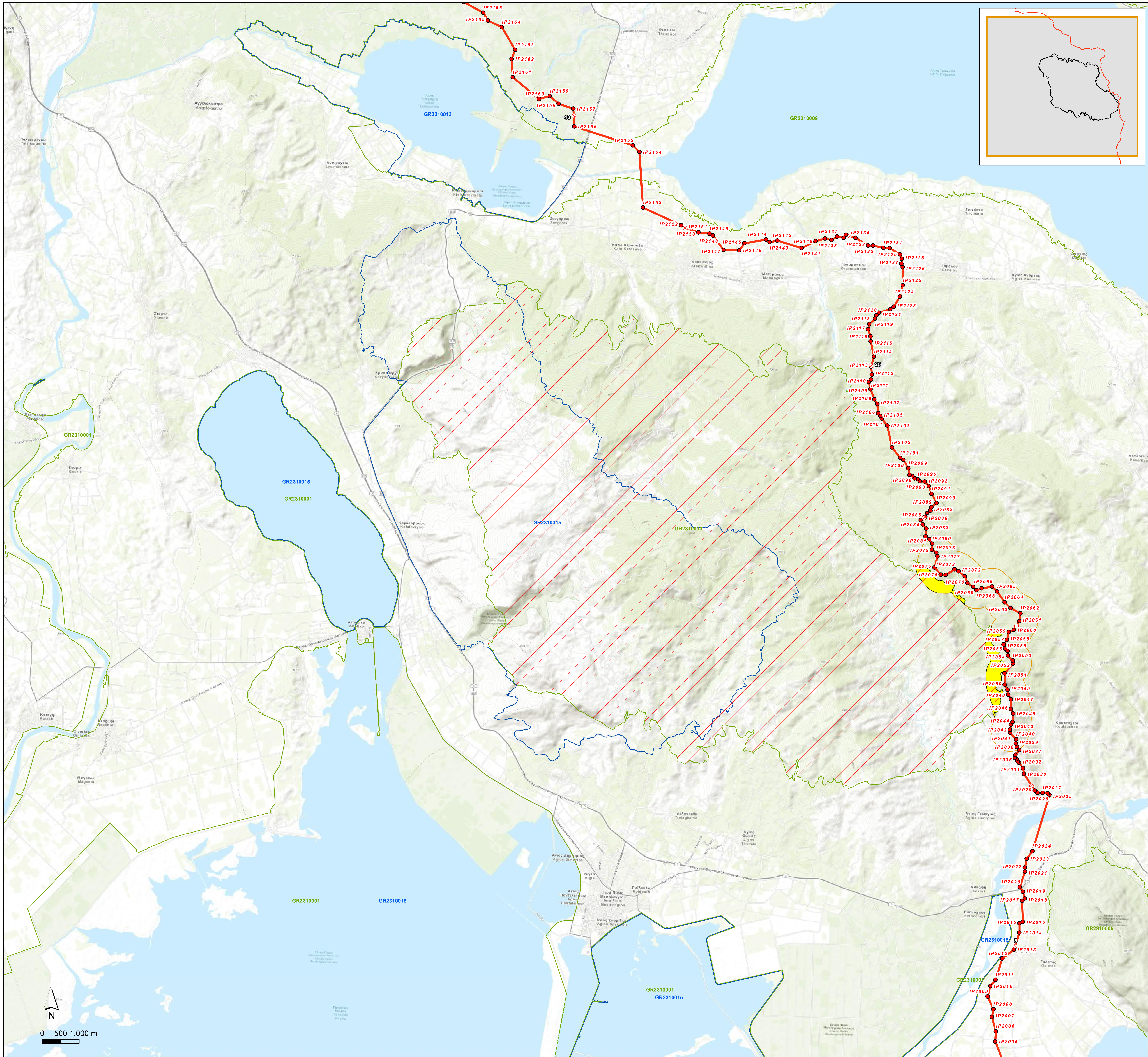


REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M2-N08 S07A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310010" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310010" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- ⊗ Routing Chainage (5km) / Χιλιομέτρηση Όδευσης (5 χλμ.)
- ● Route IP / Κορυφή Όδευσης
- Proposed Routing / Προτεινόμενη Όδευση
- Study Area / Περιοχή Μελέτης
- Field Survey Area inside Natura 2000 site / Περιοχή Έρευνας Πεδίου εντός περιοχής Natura 2000
- Field Survey Area / Περιοχή Έρευνας Πεδίου

Natura 2000 Network / Δίκτυο Natura 2000

- SAC/ΕΖΔ: Special Area of Conservation / Ειδική Ζώνη Διατήρησης
- SAC-SPA/ΕΖΔ-ΖΕΠ: Special Area of Conservation - Special Protection Areas / Ειδική Ζώνη Διατήρησης - Ζώνη Ειδικής Προστασίας
- SPA/ΖΕΠ: Special Protection Areas / Ζώνη Ειδικής Προστασίας

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
0A	22/2/2022	ISSUED FOR REVIEW	NCC Ltd	PjM	Client

Contract No: / Αρ. Συμβολαίου: project code

Coord. Syst.: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
WKID: 2100 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/ CONSULTANT: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

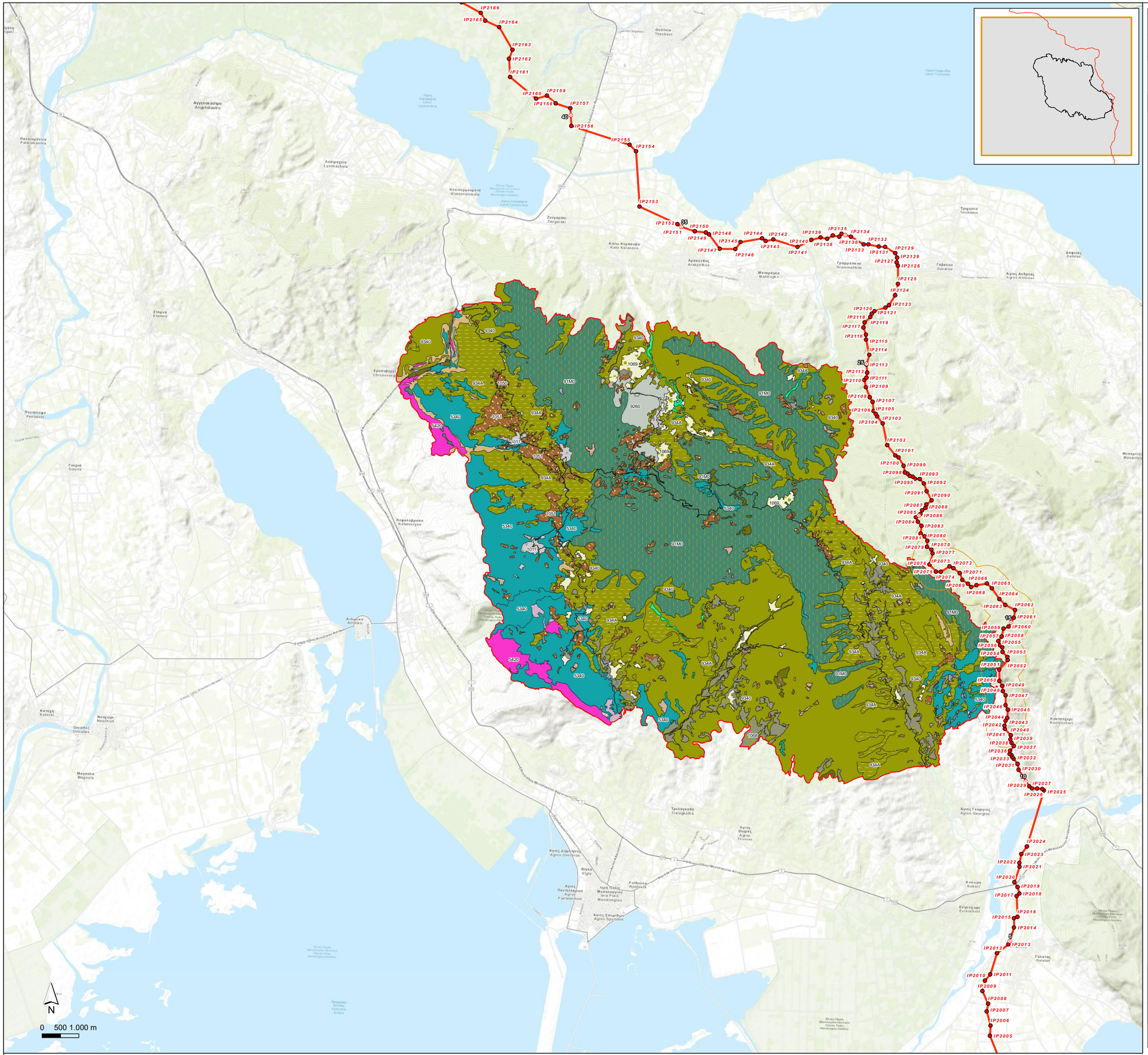
DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2310010"

Map n°:	
M2-N08 S07A01	*STUDY AREA / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*

Scale/Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/Αναθ
1:50.000			0A
Size/Μέγεθος	**Company's DWG No/ Αρ. Σχ. Εταιρείας:**	**Engineer's DWG No/ Αρ. Σχ. Μελετητή:**	**Sheet/Φύλλο**
A1	-	AUT-11727500-STU-XXX/ Section 11.1.1	1 of 1

Document Name: Map2_STUDY_AREA_ver3.1_2021.01.09_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N08 S07A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310010" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310010" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Routing Chainage (5km) / Χιλιομέτρηση Όδευσης (5 χλμ.)
- Route IP / Κορυφή Όδευσης
- Proposed Routing / Προτεινόμενη Όδευση
- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Study Area / Περιοχή Μελέτης

Habitat types - Annex I (92/43/EEC) / Τύποι οικοτόπων - Παράρτημα I (92/43/EOK)

- 5330 Thermo-Mediterranean and pre-desert scrub / Θερμο-μεσογειακές και προερημικές λόχμες
- 5420 Sarcopoterium spinosum phryganas / Φρύγανα από Sarcopoterium spinosum
- 8210 Calcareous rocky slopes with chasmophytic vegetation / Ασβεστολιθικά βραχώδη πρανή με χασμόφυτα
- 91M0 Pannonian-Balkanic turkey oak-sessile oak forests / Δάση δρυός με Quercus cerris και Quercus petraea
- 9260 Castanea sativa woods / Δάση με Castanea sativa
- 92C0 Platanus orientalis and Liquidambar orientalis woods (Plantanion orientalis) / Δάση Platanus orientalis και Liquidambar orientalis (Platanion orientalis)
- 9340 Quercus ilex and Quercus rotundifolia forests / Δάση με Quercus ilex και Quercus rotundifolia

Habitat types - Others (not listed in the Annex I of 92/43/EEC) / Τύποι οικοτόπων - Λοιποί (εκτός Παραρτήματος Ι της 92/43/ΕΟΚ)

- 1011 Villages and settlements / Χωριά και οικισμοί
- 1012 Services areas / Χώροι εξυπηρετήσεων
- 1013 Secondary settlements / Δευτερεύοντες οικισμοί
- 1021 Concentration of agricultural - processing units / Συγκεντρώσεις αγροτικών - μεταποιητικών μονάδων
- 1023 National roads / Δρόμοι εθνικοί
- 1025 Provincial roads / Δρόμοι επαρχιακοί
- 1030 Mineral extraction sites / Χώροι εξόρυξης - επεξεργασίας ορυκτών, αδρανών κ.λπ.
- 1032 Construction sites / Χώροι δόμησης
- 1050 Non-irrigated arable land - pure / Μη αρδεύσιμη-αρόσιμη γη αμιγής
- 1051 Non-irrigated arable land - mixed / Μη αρδεύσιμη-αρόσιμη γη μεικτή
- 1060 Vineyards - pure / Αμπελώνες αμιγείς
- 1062 Abandoned cultivation / Εγκαταλελειμμένες καλλιέργειες
- 1065 Forest plantations / Φυτείες δασικών ειδών (αναδασώσεις)
- 1068 Olive groves - pure / Ελαιώνες αμιγείς
- 1069 Olive groves - mixed / Ελαιώνες μεικτοί
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 8250 Unvegetated rocky bed (terrestrial ecosystems) / Βραχώδες υπόστρωμα που δεν καλύπτεται από βλάστηση
- 934A Greek Kermes oak forests / Ελληνικά δάση Πρίνου

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
0A	28/2/2022	ISSUED FOR REVIEW	NCC Ltd	PIM	Client

Contract No.
Αρ. Συμβολαίου:

Coord. Syst.: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
WKID: 2100 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/ CONSULTANT: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

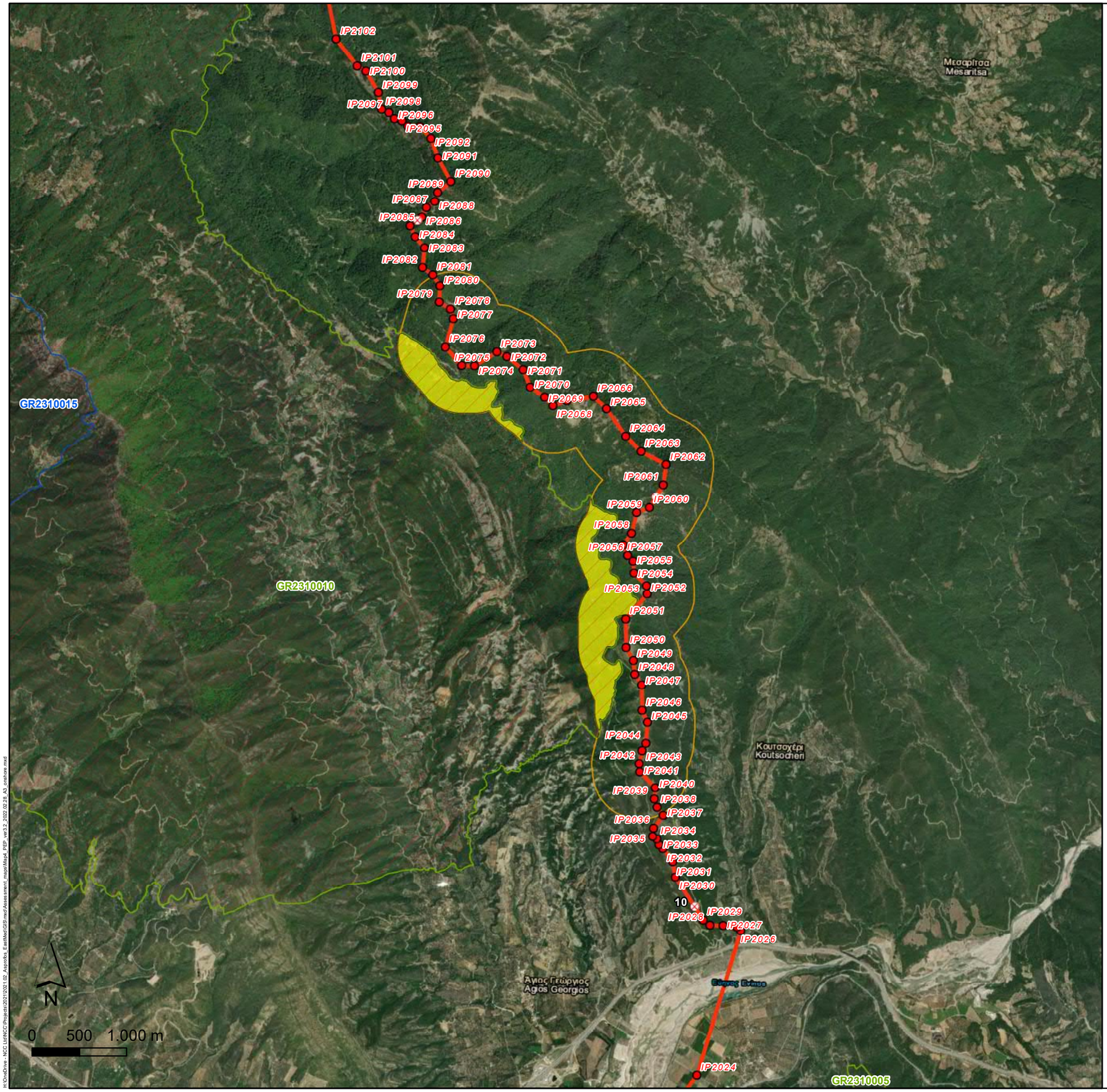
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310010"

Map n°:	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE STUDY AREA / ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*	
M3-N08 S07A01		
Scale/Κλίμακα: 1:50.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/Αναθ 0A
Size/Μέγεθος: A1	Company's DWG No/Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1
		Sheet/Φύλλο 1 of 1

Document Name: Map3_HABITATS-OXE_ver3.1_2022.02.14_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2310010"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2310010"
ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Routing Chainage (5km) / Χιλιομέτρηση Όδευσης (5 χλμ.)
- Route IP / Κορυφή Όδευσης
- Proposed Routing / Προτεινόμενη Όδευση
- Study Area / Περιοχή Μελέτης
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Natura 2000 Network / Δίκτυο Natura 2000

- SAC/ΕΖΔ: Special Area of Conservation / Ειδική Ζώνη Διατήρησης
- SAC-SPA/ΕΖΔ-ΖΕΠ: Special Area of Conservation - Special Protection Area / Ειδική Ζώνη Διατήρησης - Ζώνη Ειδικής Προστασίας
- SPA/ΖΕΠ: Special Protection Area / Ζώνη Ειδικής Προστασίας

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
0A	28/2/2022	ISSUED FOR REVIEW	NCC Ltd	PiM	Client

Contract No:
Αρ. Συμβολαίου:

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
WKID: 3857 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/CONSULTANT ΜΗΧΑΝΙΚΟΣ/ ΜΕΛΕΤΗΤΗΣ: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310010"

Map n°: M4-N05 S07A01	*FIELD SURVEY AREA / ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*	
Scale/ Κλίμακα 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ 0A
Size/ Μέγεθος A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1 / Sheet/ Φύλλο 1 of 1

Document Name: Map4_PEP_ver3.2_2022.02.28_A3_onshore

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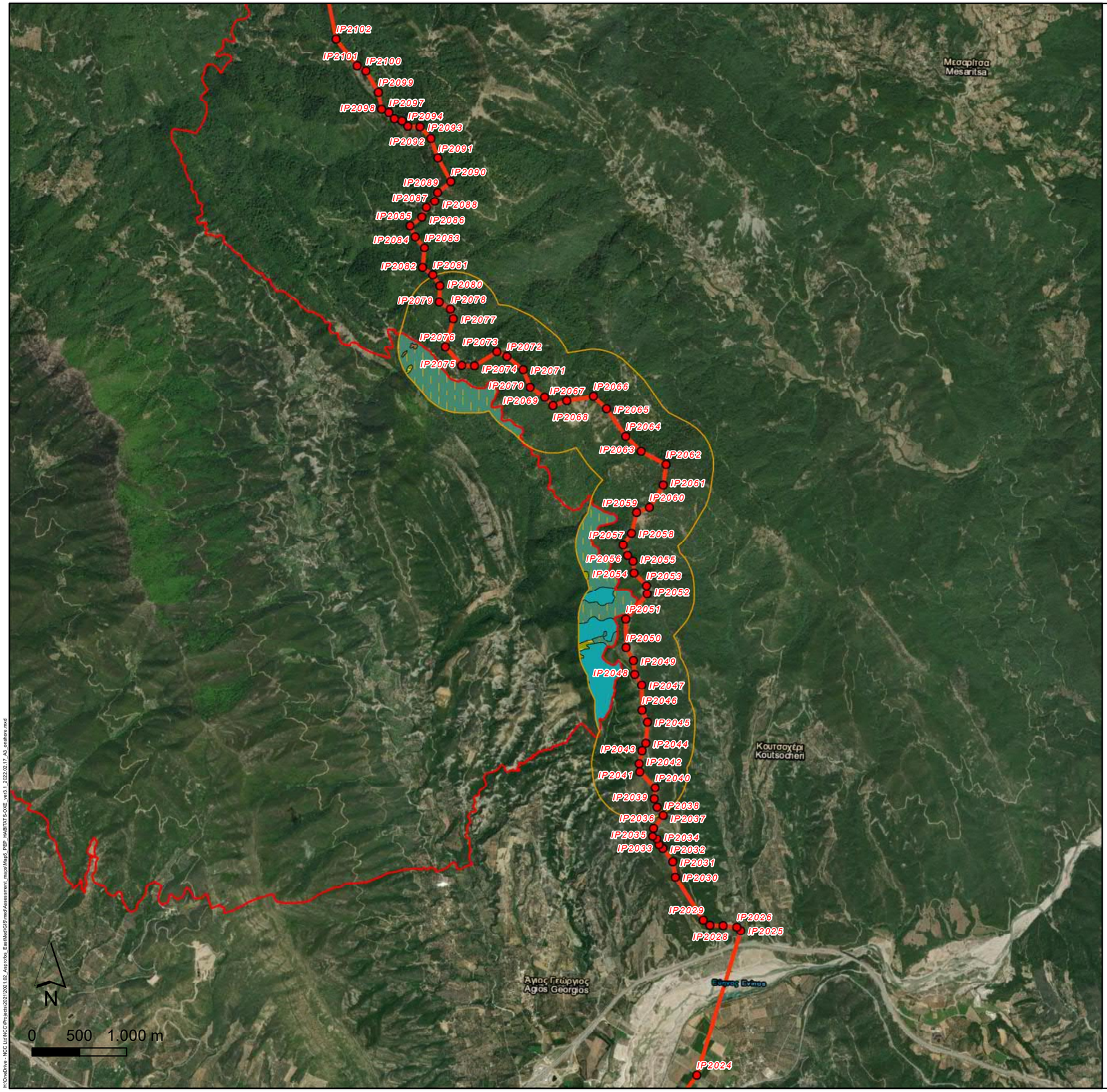

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310010" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310010" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Route IP / Κορυφή Όδευσης
- Proposed Routing / Προτεινόμενη Όδευση
- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Study Area / Περιοχή Μελέτης

Habitat types - Annex I (92/43/EEC) / Τύποι οικοτόπων - Παράρτημα I (92/43/ΕΟΚ)

- 91M0 Pannonian-Balkanic turkey oak-sessile oak forests / Δάση δρυός με Quercus cerris και Quercus petraea

Habitat types - Others (not listed in the Annex I of 92/43/EEC) / Τύποι οικοτόπων - Λοιποί (εκτός Παραρτήματος I της 92/43/ΕΟΚ)

- 1050 Non-irrigated arable land - pure / Μη αρδεύσιμη-αρόσιμη γη αμιγής
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 934A Greek Kermes oak forests / Ελληνικά δάση Πρίνου

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0A	28/2/2022	ISSUED FOR REVIEW	NCC Ltd	PiM	Client

Contract No:
Αρ. Συμβολαίου:

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
WKID: 3857 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/CONSULTANT ΜΗΧΑΝΙΚΟΣ/ ΜΕΛΕΤΗΤΗΣ: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310010"

Map n°:	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE FIELD SURVEY AREA /ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*	
M5-N05 S07A01		
Scale/ Κλίμακα: 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ: 0A
Size/ Μέγεθος: A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: - / Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1	Sheet/ Φύλλο: 1 of 1

Document Name: Map5_PEP_HABITATS-OXE_ver3.1_2022.02.17_A3_onshore

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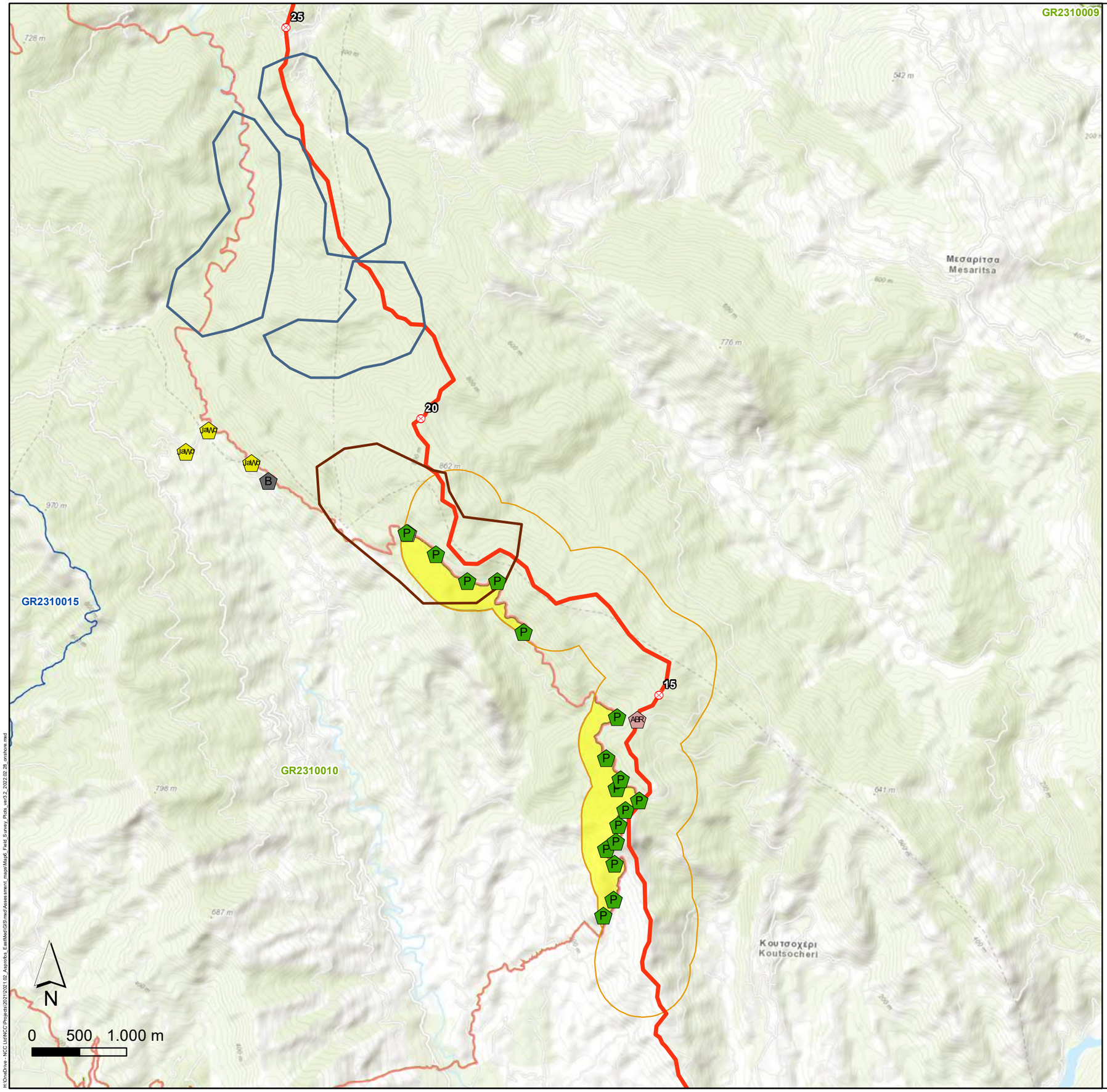

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2310010"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2310010"
ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Routing Chainage (5km) / Χιλιομέτρηση Όδευσης (5 χλμ.)
- Proposed Routing / Προτεινόμενη Όδευση
- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Field Survey Area inside Natura 2000 site / Περιοχή Έρευνας Πεδίου εντός περιοχής Natura 2000
- Study Area / Περιοχή Μελέτης

Natura 2000 Network / Δίκτυο Natura 2000

- SAC/ΕΖΔ: Special Area of Conservation / Ειδική Ζώνη Διατήρησης
- SAC-SPA/ΕΖΔ-ΖΕΠ: Special Area of Conservation - Special Protection Area / Ειδική Ζώνη Διατήρησης - Ζώνη Ειδικής Προστασίας
- SPA/ΖΕΠ: Special Protection Area / Ζώνη Ειδικής Προστασίας

Field Survey Points / Σημεία δειγματοληψίας

- B: Bats / Χειρόπτερα
- ABR: Birds - Amphibians - Reptiles / Ορνιθοπανίδα - Αμφίβια - Ερπετά
- ΙaWo: Canis aureus - Canis lupus
- P: Plants - Habitat types / Χλωρίδα - οικότοποι
- Canis lupus suitable homesite / Κατάλληλο ενδιαίτημα θέσεων ανάπαυσης Canis lupus
- Canis lupus confirmed presence / Επιβεβαιωμένη παρουσια Canis lupus

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
0A	28/2/2022	ISSUED FOR REVIEW	NCC Ltd	PiM	Client

Contract No:
Αρ. Συμβολαίου:

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
WKID: 3857 Authority: EPSG

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/CONSULTANT ΜΗΧΑΝΙΚΟΣ/ ΜΕΛΕΤΗΤΗΣ: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " - GR2310010" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310010"

Map n°:	*FIELD SURVEY POINTS / ΣΗΜΕΙΑ ΔΕΙΓΜΑΤΟΛΗΨΙΑΣ*	
M6-N05 S07A01		
Scale/ Κλίμακα: 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ: 0A
Size/ Μέγεθος: A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1
		Sheet/ Φύλλο: 1 of 1

Document Name: Map6_Field_Survey_Plots_ver3.2_2022.02.28_onshore

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