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
SSCO	Site Specific Concervation Objective
WS	Working Strip

1 INTRODUCTION

1.1 Legal framework for the conduction of Appropriate Assessment for the SAC "Limnes Trichonida Kai Lysimacheia", GR2310009

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 section 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 "Limnes Trichonida Kai Lysimacheia", GR2310009, 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. This data and relative reports have been provided to NCC prior to development of the present AA, and were used for the redaction of the AA, along with all data collected by NCC from field surveys at the site.

The pipeline crosses close to the SPA "Limni Lysimacheia", GR2310013, for which a separate AA has been conducted.

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) "Limnes Trichonida Kai Lysimacheia", GR2310009, 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 over 20 days between April 2021and December 2021, including the following activities:

- Collection of field data on fauna species of interest present in the section of the Natura 2000 site directly crossed by the pipeline by fauna experts;
- Collection of field data on habitats and flora by habitat expert at the same section;

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, (c) details of the HDD method concerning the water abstraction/disposal and drilling depth for avoiding alluvial vegetation.

- 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 (e.g. accidental leakage of water/bentonite mixture, during application of the HDD method into the water body), 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, all 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 Social Impact Assessment.

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

Legislation	Category	Project Categorization
	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 "Limnes Trichonida Kai Lysimacheia", GR2310009. As shown in Figure 2-1 the routing of the Onshore pipeline crosses for a length of 1.2 km the site at the rural area between the two lakes Trichonida and Lysimachia and the Alampei ditch.

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 500 m either side of the linear infrastructure falling within the Study Area. Consequently, the FSA for the present AA is an area of 1 km in width and of 1.2 km in length within the Natura 2000 site, strictly considering the intersection between the pipeline and the site (IP 2153-2156, KP: 37.010 - 38.242). However, given that:

- the routing of the pipeline extends outside the Natura 2000 site and at its immediate vicinity; and
- the construction of the project outside the Natura 2000 site may affect the defined buffer zone within the site;

a larger FSA area was considered, that includes also an are outside the Natura 2000 site, covering a total surface area of 1,047 ha, of which 177 ha overlaps with the Natura 2000 site (1.2% of the site's area) (Figure 2-3).

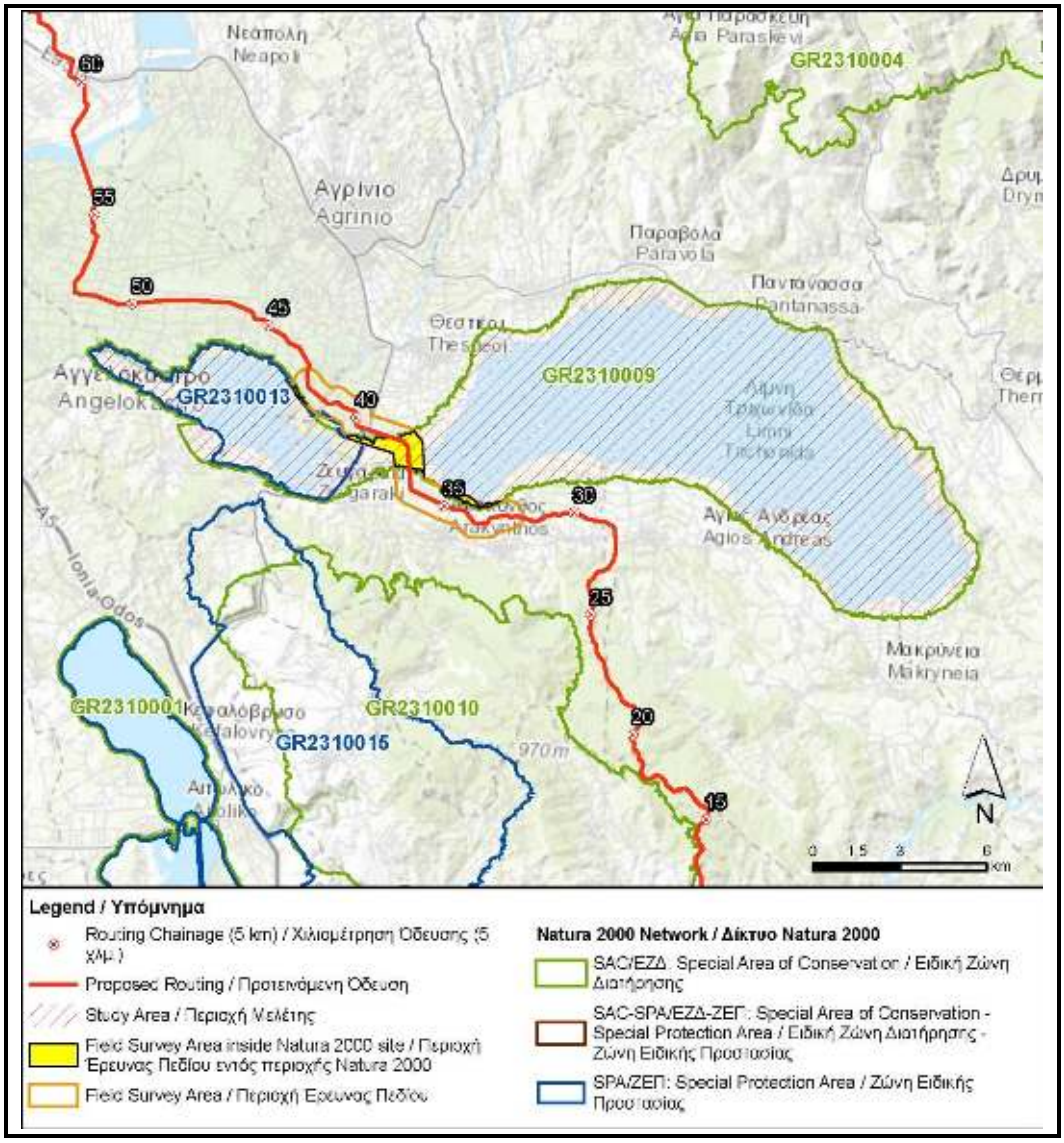
Maps of the Study Area and the Field Survey Area are provided in ANNEX F, in Maps 2 and 4 respectively.

It is noted that the pipeline will be buried underground for the entire site, whilst main water bodies within the protected site shall be crossed with the use of trenchless technique (HDD), namely the Alambei ditch, in order to avoid impacts on aquatic and riparian ecosystems of the protected area (see Figure 4-10). Project activities will take place in rural ecosystems of the area, both sides of the ditch.

It should also be mentioned that at the area the pipeline crosses the National Park "Messolonghi-Aitoliko Lagoon, lower reaches and estuaries of Acheloos and Evinos rivers and Echinades islands" approximately between IP 2156-2189 and two of its zones, namely:

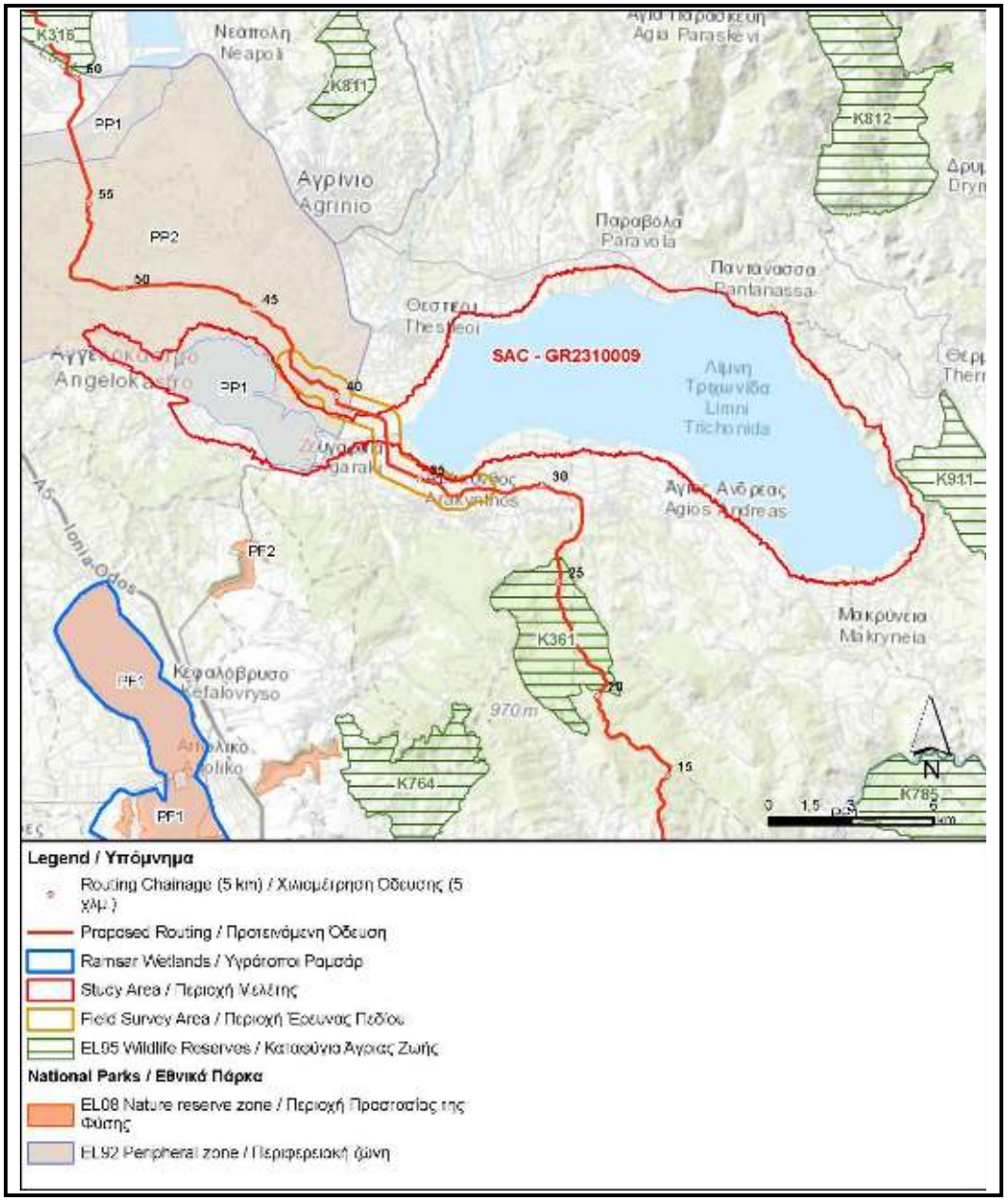
- the Peripheral area of Irrigated areas of Agrinio (ΠΠ2 – EL92), which is partly inside the Natura 2000 site.
- the Peripheral area of Acheloos riverbed (ΠΠ1 – EL92), which is outside the Natura 2000 site.

Furthermore, it crosses in close proximity (350m) to the SPA GR2310013 that overlaps partially with the Study Area.



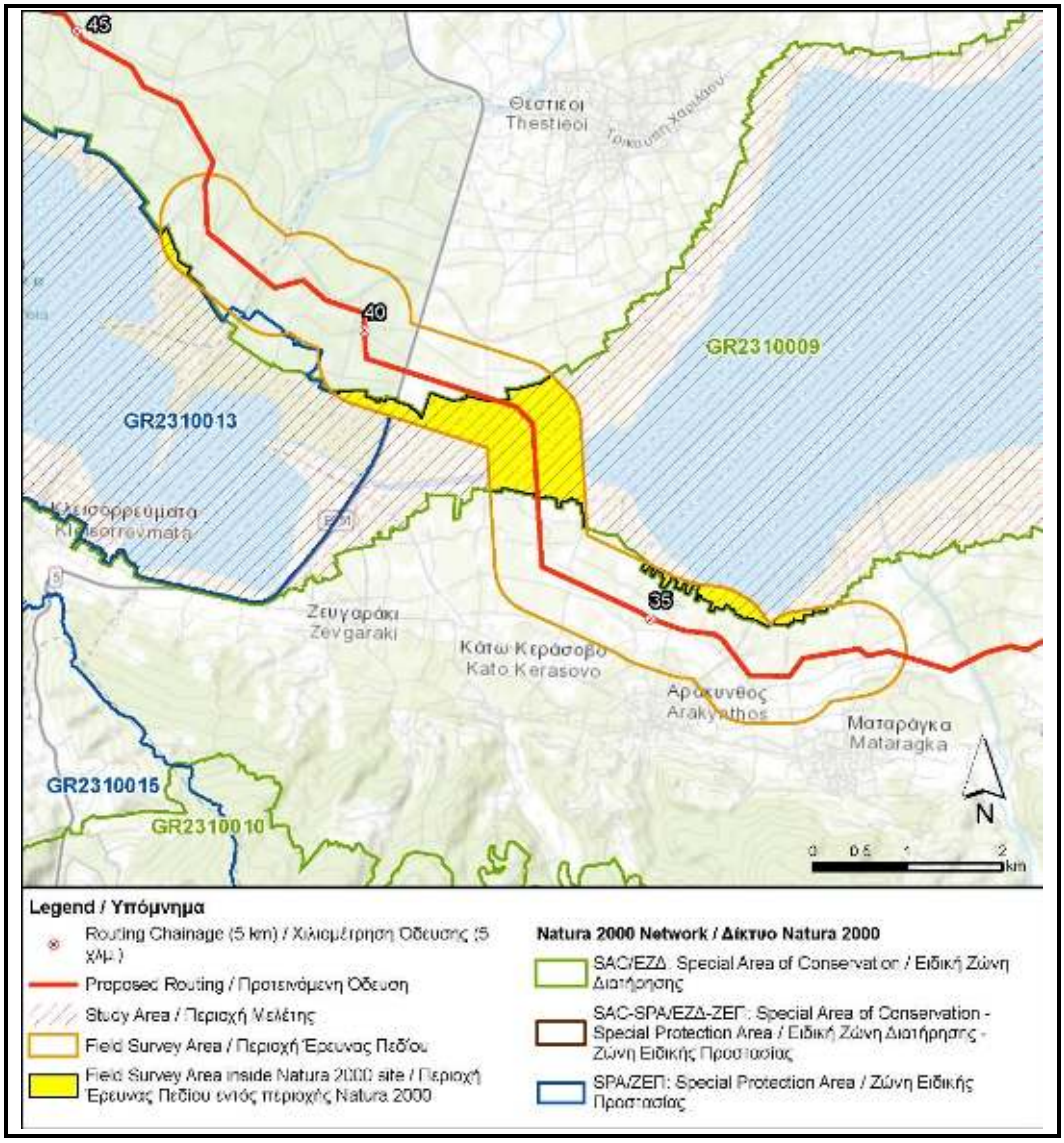
Prepared by: (NCC, 2021)

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 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 GR2310009 (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:

- Recording and monitoring of habitat types and flora and fauna species of the Directives 92/43 and 79/409 (NERCO, 2015).
- 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 “Limnes Trichonida Kai Lysimacheia”, GR2310009, which is located within the administrative limits of the Region of Western Greece covering an area of 14,349.46 hectares. The area is managed by the Management Body of Messolonghi Lagoon - Akarnanika Mountains. The Study Area overlaps with the Special Protection Area GR2310013 "Limni

Lysimacheia" and the lake Lysimacheia is part of the National Park of the Messolonghi-Aitoliko Lagoon, lower reaches and estuaries of Acheloos and Evinos rivers and Echinades islands.

The site consists of the two large freshwater lakes Trichonida and Lysimachia and their surrounding area. Lake Trichonida is the largest lake in Greece and is connected with Lake Lysimachia through an artificial ditch (Alampei ditch), with water of the first one overflowing to the second. Although the two lakes are basically considered oligotrophic the vascular plants found there (*Myriophyllum spicatum, Potamogeton pectinatus, Ranunculus trichophyllus*, etc.) mostly occur in eutrophic or mesotrophic lakes.

Lake Trichonida is surrounded by cultivated fields with tobacco, citrus and olive trees. At the littoral zone of the lake herbs predominate while shrubs (*Vitex agnus-castus, Nerium oleander, Rubus sanctus*) and trees (*Platanus orientalis. Salix alba, Populus alba*) occur only sporadically. At the upper infralittoral zone *Phragmites australis* and *Typha domingensis* dominate and shape an almost continuous zone on the alluvial deposits mainly at the western part of the lake. *Iris pseudacorus* participates in low frequency of occurrence in the structure of the plant communities of the upper infralittoral zone, which is interrupted, in some places only, by human activities. The middle infralittoral zone is locally covered by *Nymphaea alba* and *Potamogeton nodosus* species, while at the lower infralittoral zone, species of the genera Potamogeton, Myriophyllum and Chara (Charophyta) predominate. In the north-east and south-east sides of lake Trichonida, rocky calcareous places with shrubby vegetation are observed.

Lake Lysimachia is surrounded by alluvial deposits, which are mainly cultivated fields of tobacco. In several locations of the site permanent or seasonal marshes are present. The natural shoreline vegetation particularly consists of herbs (*Scirpus holoschoenus, Paspalum paspaloides, Mentha aquatica, Kickxia elatine, Cyperus longus, Carex otrubae, Juncus acutus* etc.), while shrubs (*Vitex agnus-castus*) and trees (*Platanus orientalis, Salix alba, Populus alba*) have scattered distributions. The species dominating near the shore line is *Phragmites australis*, which forms an extremely dense, almost continuous reed-fringe, mainly near the water edge, as well as in the upper infralittoral zone and is interrupted in several places only by human activities. The greatest typical cover is presented by the species *Paspalum paspaloides*. The submerged species *Vallisneria spiralis* predominates in the lower infralittoral zone, forming dense stands, while *Ceratophyllum demersum, Myriophyllum spicatum* and *Najas marina* constitute the lower cover.

Despite of human activities, the lakes conserve a significant amount of their flora and fauna. Around them, extensive reed communities are developed, which offer valuable refuge to wild fauna. Interesting is the presence of calcareous fens. Moreover, the lakes ensure the water supply and irrigation of the surrounding area. Many interesting plants comprise the flora of the site. The endangered aquatic species *Cladium mariscus* has been found at the south side of the lake

Trichonida. The site hosts significant species, such as *Salvinia natans* and *Azolla filiculoides*, as well as species with limited or scattered distribution in Greece. The fish species *Economidichthys trichonis* is confined only to the Trichonida lake system. It is an important site for wintering ducks and breeding and passage waterbirds.

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

According to official habitat mapping, the Natura 2000 site hosts 6 habitat types of Annex I of Directive 92/43/EEC. Most of the area is covered by wetland vegetation, *Salix alba* galleries and humid herb grassland. The rest of the area is covered by open water, kermes oak forests 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 area of the site, as provided by the habitat map of the site (Ministry of Environment, 2018).

One priority habitat type of Annex I of Directive 92/43/EEC, the Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (code 7210) has been recorded.

Regarding flora species, none of the Directive 92/43/EEC have been identified. In addition to the above, the following important species have been recorded in the area based on SDF: *Anchusa undulata* subsp. *undulata, Lippia nodiflora, Ludwigia palustris, Salvinia natans, Sorghum bicolor, Spirodela polyrhiza, Stachys arvensis, Stellaria pallida, Utricularia vulgaris*.

Table 3-1 Habitat types found at the site (source: SDF and official habitat mapping)

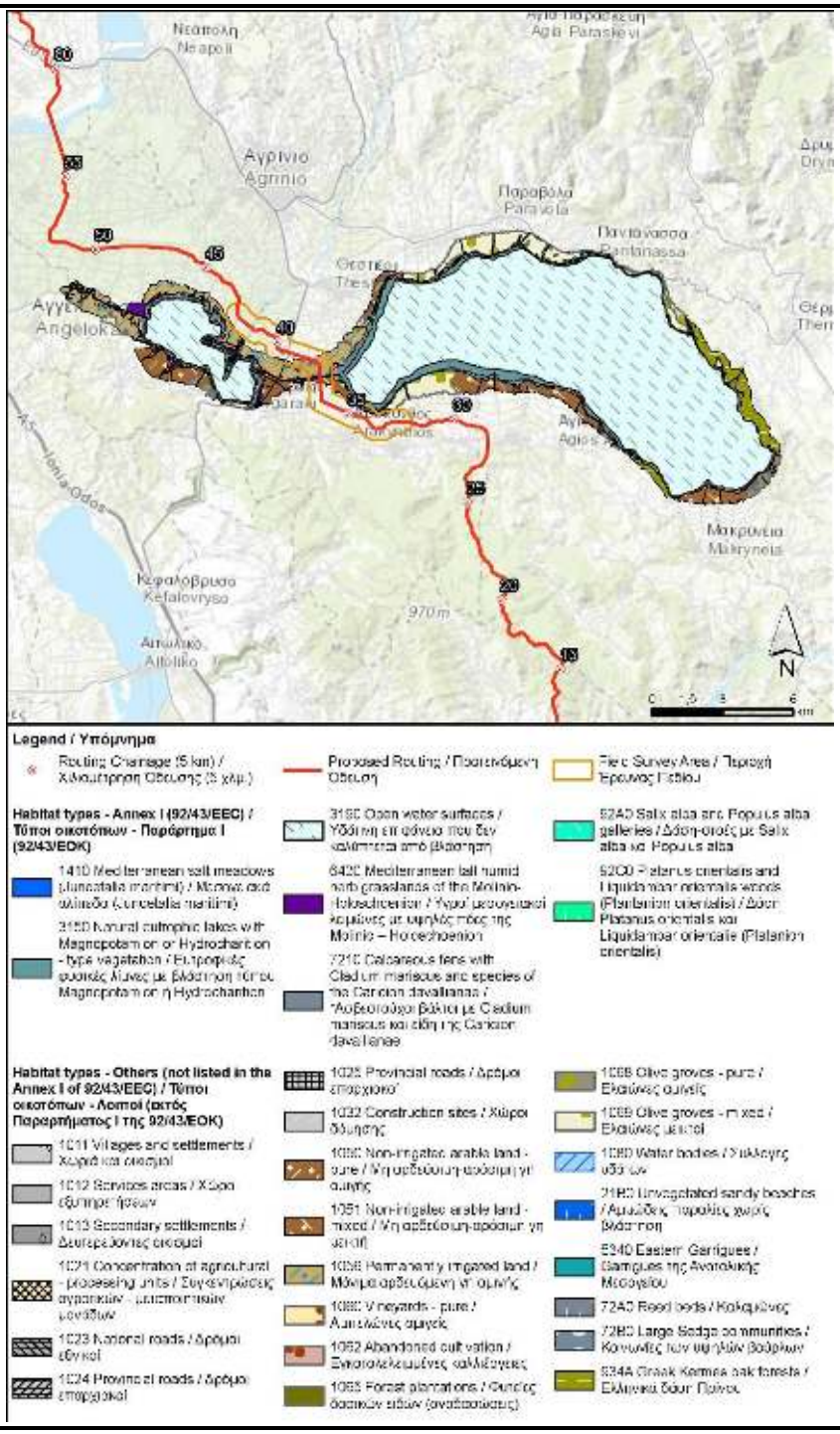
Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
Habitat types included in the SDF				
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	669.14	4.66%	HD: Annex I
92A0	*Salix alba* and *Populus alba* galleries	86.59	0.60%	HD: Annex I
6420	Mediterranean tall humid grasslands of the Molinio-Holoschoenion	76.07	0.53%	HD: Annex I

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
92C0	*Platanus orientalis* and Liquidambar orientalis woods (*Platanion orientalis*)	59.12	0.41%	HD: Annex I
7210*	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	1.84	0.01%	HD: Annex I
1410	Mediterranean salt meadows (*Juncetalia maritimi*)	1.41	0.01%	HD: Annex I
Other habitat types				
3190	Open water surfaces	9,686.99	67.51%	
1069	Olive groves – mixed	837.01	5.83%	
1056	Permanently irrigated land	813.84	5.67%	
1051	Non-irrigated arable land – mixed	736.37	5.13%	
72A0	Reed beds	544.14	3.79%	Of national importance
934A	Greek Kermes oak forests	373.21	2.60%	Of national importance
1050	Non-irrigated arable land – pure	236.25	1.65%	
1068	Olive groves - pure	131.63	0.92%	
1080	Water bodies	34.87	0.24%	
1012	Services areas	11.99	0.08%	
72B0	Large Sedge communities	10.66	0.07%	Of national importance
1021	Concentration of agricultural/processing units	10.44	0.07%	
1011	Villages and settlements	6.03	0.04%	
1025	Provincial roads	3.25	0.02%	
1024	Provincial roads	3.06	0.02%	
1013	Secondary settlements	2.78	0.02%	
5340	Eastern Garrigues	2.44	0.02%	Of national importance
1023	National roads	2.30	0.02%	
1032	Construction sites	2.27	0.02%	
1060	Vineyards - pure	2.04	0.01%	

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
1065	Forest plantations	1.73	0.01%	
1062	Abandoned cultivation	1.72	0.01%	
21B0	Unvegetated sandy beaches	0.27	0.00%	

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 hosts many important species. It supports all elements of a typical natural Mediterranean delta. The sensitive species for the site are 17, namely 3 mammal (*Canis lupus, Lutra lutra, Miniopterus schreibersii*), 2 reptile (*Elaphe quatuorlineata, Testudo graeca*), 10 fish (*Alosa fallax, Barbus peloponnesius, Cobitis trichonica, Economidichthys pygmaeus, Economidichthys trichonis, Pelasgus stymphalicus, Rutilus panosi, Silurus aristotelis, Telestes pleurobipunctatus, Tropidophoxinellus hellenicus*) and 2 invertebrate species (*Lindenia tetraphylla, Unio crassus*). The species are residents in the site, except for *Alosa fallax*, which is only present during the breeding period. Most species are present or common at the site, while the species *Elaphe quatuorlineata, Lindenia tetraphylla and Testudo graeca* are rare and the species *Canis lupus* very rare. ANNEX A of the present AA presents the sensitive species and of special ecological value of the SAC included in the SDF of the site, as well as their presence in the site, population and conservation assessment.

All species are protected under the Habitats Directive and are included in Annex II, while 7 are included also in Annex IV. In total 8 species have been characterized as Endangered, Near Threatened or Vulnerable worldwide, while at national level 3 are under the same threat status and 9 fish species are endemic. 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 data.

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

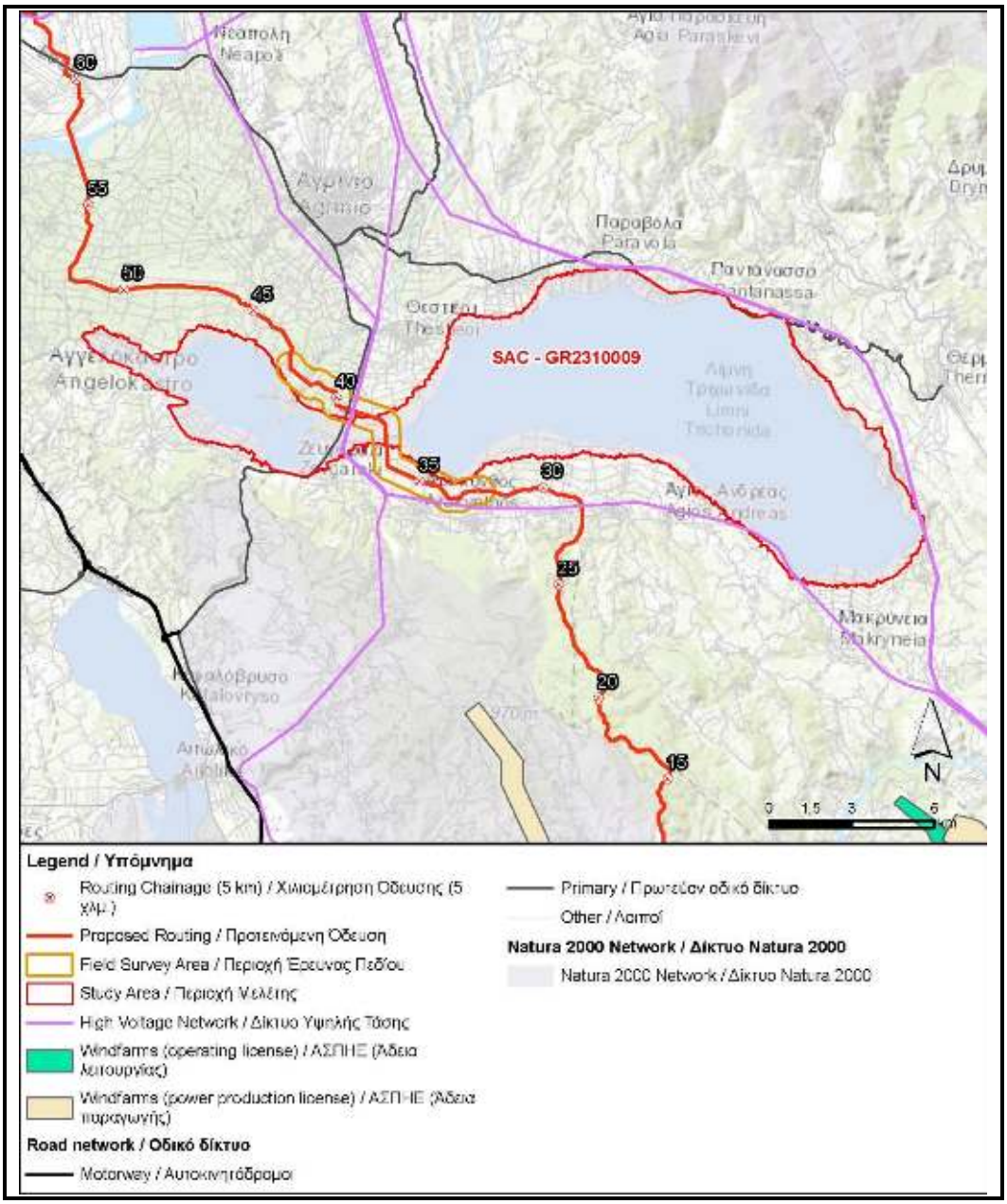
3.2 Other projects – potential cumulative impacts

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 site has no other significant existing or planned projects and infrastructures, such as Pipelines, Power lines, energy and other major projects; except for:

- the national road network (EO5)
- the high voltage network as well as
- the local road network crossing the western area of the site and the FSA of the pipeline.



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 23 days of field work have been conducted (timing provided in Table 3-2); more specifically:

- 12 days of field work were conducted during April 2021 (spring survey)
- 7 days of field work were conducted during May 2021 (summer survey)
- 2 days of field work were conducted during October 2021 (autumn 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 *Lutra lutra, Canis aureus, 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 ichthyofauna at the ditch crossed by the pipeline, by freshwater fish experts from HCMR.
- 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.

Table 3-2 Timetable of the Field work days

Group	Date	No of field work person-days
General site assessment	12/04/2021	1
Habitats, Flora	25/05/2021	1
Jackal/Wolf	26-27/04/2021	3
Otter	26-27/04/2021 22/05/2021 19/12/2021	5

Group	Date	No of field work person-days
Bat species	26/04/2021	2
Reptiles - Amphibians	12/04/2021 26/04/2021 22/05/2021 05/10/2021	8
Ichtyofauna (HCMR, 2021)	19/05/2021	3
	Total	23

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 was 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 3-12) 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 aureus* and *Canis lupus*, point inspections and random transects were carried out (Figure 3-12), 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 both canid species are usually more active during night hours. In total, inspections were carried out at five (5) points and surveys along five (5) transects.

Regarding bat species, passive acoustic bat recording was conducted stationary (Figure 3-12) for 1 full night (from 30 min before sunset to sunrise) at 3 locations near Trichonida lake and 1 location near Lysimachia lake within the FSA. Additionally, a recording on a transect line was done on foot for about 30 min after the sunset covering larger area than the stationary recordings at Trichonida. For the recordings, SM4BAT-FS bat recorders were used with UU2 microphones on a 3m pole (for the stationary) or 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 coolected by searching the Greek Bat Database held on Natural Museum of Crete, University of Crete, Greece and by contacting local people and speleologists. Settlements such as old buildings, churches that were spotted along the pipeline routing, were visited –when possible– and checked for bats.

Reference: (NCC, 2021)

Figure 3-3 The microphone on the 3m pole that is connected with the SM4BAT-FS recorder at Trichonida lake, near Mataraga

Reference: (NCC, 2021)

Figure 3-4 The microphone on the 3m pole that was connected with the SM4BAT-FS recorder at Trichonida lake.

Reference: (NCC, 2021)

Figure 3-5 The microphone on the 3m pole that was connected with the SM4BAT-FS recorder at Trichonida lake.

Reference: (NCC, 2021)

Figure 3-6 The microphone on the 3m pole that was connected with the SM4BAT-FS recorder at Lysimachia lake.

Regarding *Lutra lutra*, and given the ecological requirement of the species for freshwater, the potential distribution coincides with the hydrographic network with permanent water presence. The presence of the species was assessed (Figure 3-12) indirectly, with surveying for signs, specifically for faeces (spraints), food leftovers, footprints and dens. Spraint surveys is a reliable method to give a picture of the species distribution (Mason & Macdonald 1987). Since spraints are used for communication signs, they are usually exposed in visible places therefore can be also easily spotted by humans (Mason & Macdonald 1987). Possible habitats that the species may use were surveyed on foot for signs, e.g. bridges, lakes and their riparian zone, river banks, streams. Stones exceeding from the water at the river banks or lake shores and under bridges were checked for *Lutra lutra* signs.

Each hydrographic part of the FSA was thoroughly surveyed by foot for otter signs, both at riparian vegetation as well as where stones exceeding the river bank, typical locations for droppings and food leftovers. As this surveying is largely related to signs rather than sightings, it can be undertaken at any time of day or year, although it is important to avoid periods after heavy rains, as floods usually wash away all riverbank signs and may give a false indication of *Lutra lutra* absence. Ideally the weather should have been dry for at least a week before the monitoring visit, a fact which was taken into account during surveys (Sargent & Morris 1997).

Regarding amphibians and reptiles, three different methods have been used (Figure 3-12); line transects have been selected in order to have visual 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 ichthyofauna, sampling and assessment of the status of the ichthyofauna was carried out by HCMR (2021) and a detailed presentation of the methods applied in Greece is mentioned in the HCMR manual for sampling fish in rivers (IMBRIW-HCMR, 2012).

3.3.2 Detailed description of the Field Survey Area

3.3.2.1 Habitat types

Most of the FSA is located on agricultural land, with many irrigation ditches providing water from the lakes to the fields. Based on field work observations at the FSA, apart from crops and settlements (codes such as 1012, 1021, 1023, 1025, 1032, 1051, 1056, 1068, 1069 and 1080), some natural Greek habitat types of national importance were recorded, dominated by reedbeds (code 72A0) representing monospecific communities of *Phragmites australis*. The habitat types included in Annex I of Habitats Directive Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation (code 3150), Mediterranean tall humid herb grasslands of the Molinio-Holoschoenion (code 6420) and *Salix alba* and *Populus alba* galleries (code 92A0) were identified (Table 3-3).

The FSA is dominated by wetland vegetation types with the dominance of common wetland species such as *Phragmites australis*, *Arundo donax*, *Nymphaea alba* etc., forest galleries with *Salix alba* and more or less synanthropic vegetation at the field edges and in abandoned crops with species such as *Sisymbrium officinale*, *Stellaria media,* 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%
3150[1]	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	669,14	1.60	0.24%	-		-	
92A0[1]	*Salix alba* and *Populus alba* galleries	86,59	0.60	0.69%	-		-	
6420[1]	Mediterranean tall humid grasslands of the Molinio-Holoschoenion	76,07	0.86	1.13%	-		-	
1069	Olive groves – mixed	837,01	1.68	0.20%	-		-	
1056	Permanently irrigated land	813,84	121.29	14.90%	4.12	0.51%	0.75	0.09%
1051	Non-irrigated arable land – mixed	736,37	35.64	4.84%	0.90	0.12%	0.19	0.03%

Code	Habitat type	Study Area	FSA	FSA%	WS	WS%	PPS	PPS%
72A0[2]	Reed beds	544,14	10.69	1.96%	-		-	
1050	Non-irrigated arable land – pure	236,25		0.00%	-		-	
1068	Olive groves - pure	131,63	4.16	3.16%	-		-	
1080	Water bodies	34,87	5.10	14.64%	-		-	
1012	Services areas	11,99	2.55	21.26%	-		-	
1021	Concentration of agricultural/processing units	10,44	5.40	51.73%	-		-	
1025	Provincial roads	3,25	0.09	2.92%	-		-	
1023	National roads	2,3	0.17	7.18%	-		-	
1032	Construction sites	2,27	0.14	6.17%	-		-	

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 he WS and the PPS are crossing premanently irrigated land and the affected area is expected to be 4.12ha (0.51% of this habitat within the site) and 0.75ha (0.09%), respectively, as well as mixed non-irrigated arable land with the affected area expected to be 0.90ha (0.12%) and 0.19ha (0.03%), respectively.

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

Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation (code 3150)

Habitat type 3150 includes plant societies mainly in eutrophic waters, freely floating on the water surface plant communities or with bottom-rooted societies plant communities. It expands on Lake Trichonida. The spread of the habitat type varies depending on the lake level. The habitat type is at risk mainly from changes in the hydrological cycle and from water pollution.

Mediterranean tall humid herb grasslands of the Molinio-Holoschoenion (code 6420)

The habitat type 6420 includes the humid grasslands of tall grasses and rushes in the Mediterranean basin.

In the FSA, the habitat type appears in a small spot with *Cyperus longus* and *Galium debile* dominating. This type of habitat is quite vulnerable to pressures and threats. The main threat to the FSA is change in the hydrological cycle.

Salix alba and *Populus alba* galleries (code 92A0)

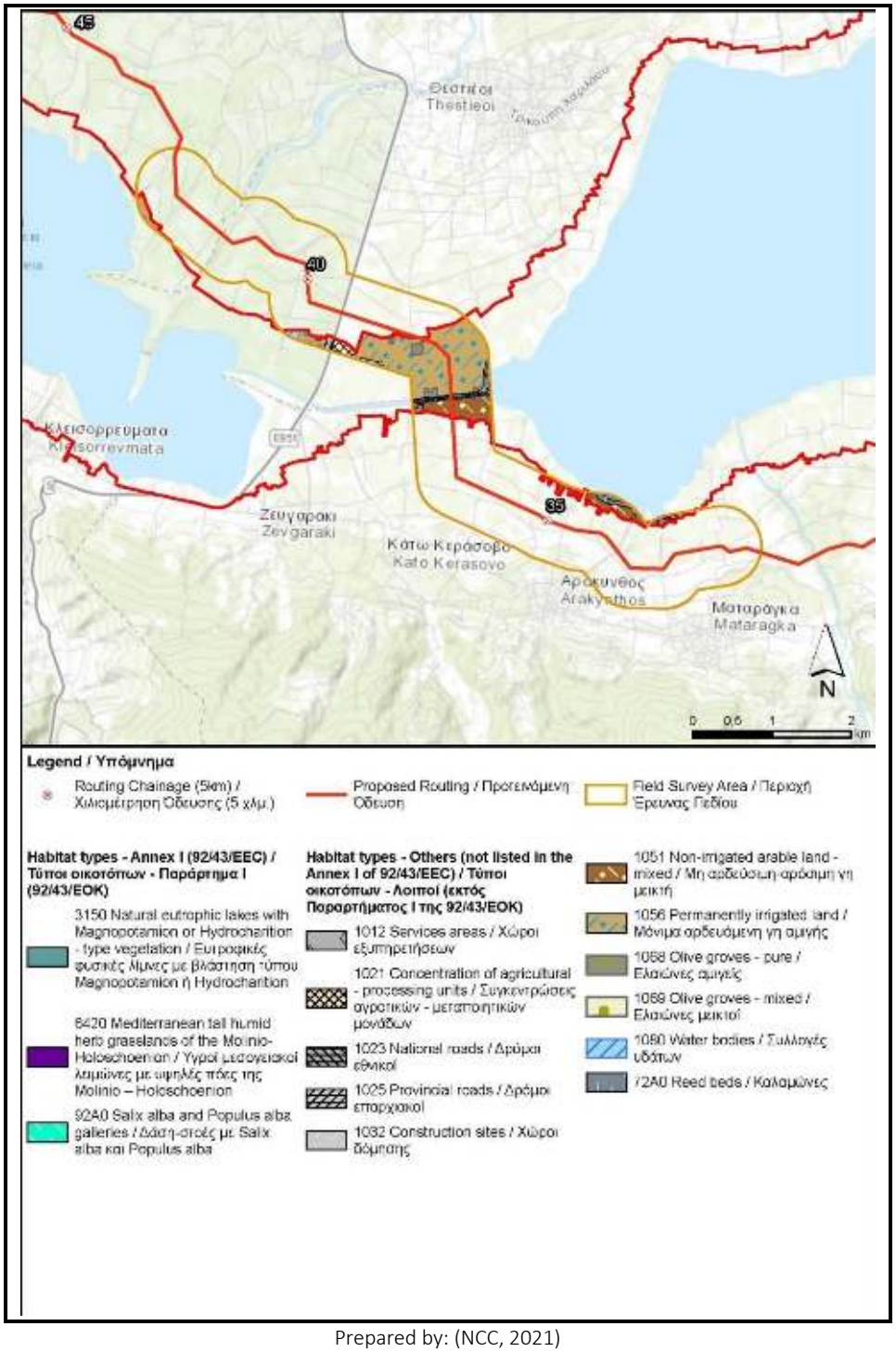
The habitat type 92A0 includes riparian forests dominated by *Salix alba* or other relatives. It spreads in riparian areas with deep, wet to damp and fertile soils.

In the FSA, habitat type 92A0 spreads along Trichonida Lake. The structure and functions of the habitat type can be directly affected by tree felling or land clearance, but also by changes in the hydrological cycle, or by water contamination by debris.

Reference: (NCC, 2021)

Figure 3-7 Salix alba and Populus alba galleries (code 92A0)

The mapping of habitats for the FSA is provided in Figure 3-8.



Prepared by: (NCC, 2021)

Figure 3-8 Habitat type coverage at the Field Survey Area

Concerning the riparian vegetation and the channel conditions, a rapid survey of the woody flora in the riparian zone was carried out by the team responsible for the assessment of the water bodies, using a DAFOR scale to produce a semi-quantitative representation of the observed species on-site. The conditions were estimated to be bad at Alampei ditch.

3.3.2.2 Flora

No significant plant species were identified during field sampling 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
Apiaceae	*Daucus carota* L.
	Tordylium apulum L.
	Torilis arvensis (Huds.) Link
Asteraceae	*Crepis setosa* Haller f.
	Matricaria recutita L.
	Silybum marianum (L.) Gaertn.
	Sonchus asper (L.) Hill
Brassicaceae	*Crambe hispanica* L.
	Sisymbrium officinale (L.) Scop.
Caryophyllaceae	*Stellaria media* (L.) Vill.
Chenopodiaceae	*Chenopodium album* L.
Convolvulaceae	*Calystegia sepium* (L.) R. Br.
	Convolvulus althaeoides L.
Fabaceae	*Medicago sativa* L.
	Vicia villosa subsp. *varia* (Host) Corb.
	Vicia cracca L.
	Trifolium arvense L.
	Trifolium campestre Schreb.
Papaveraceae	*Papaver rhoeas* L.
Plantaginaceae	*Plantago lanceolata* L.
Poaceae	*Arundo donax* L.
	Avena sterilis L.
	Bromus sterilis L.

Family	Taxon
	Bromus hordeaceus L.
	Phragmites australis (Cav.) Steud.
	Hordeum murinum L.
	Lolium perenne L.
	Setaria viridis (L.) P. Beauv.
	Dasypyrum villosum (L.) P. Candargy
Ranunculaceae	*Ranunculus* sp.
Rosaceae	*Rubus sanctus* Schreb.
Rubiaceae	*Galium verum* L.
Salicaceae	*Salix alba* L.
	Populus nigra L.
Ulmaceae	*Ulmus procera* Salisb.
Urticaceae	*Urtica dioica* L.

Prepared by: (NCC, 2021)

3.3.2.3 Fauna

3.3.2.3.1 Mammals – Bats

The presence of water is known to attract several bat species to drink water and feed on emerging insects (e.g. Salvarina 2016). Also, the riparian habitats host a diverse insect community that bats can consume. Limited information exists for the bat species of the region. The Annex II species *Miniopterus schreibersii* is reported to have permanent presence in the area. The area is characterised as significant for conservation of the species. The following species are also previously reported: *Eptesicus serotinus, Hypsugo savii, Nyctalus noctula, Pipistrellus kuhlii, P. pipistrellus and P. pygmaeus.*

At least 13 bat taxa (Table 3-5) were recorded during fieldwork. Due to the high overlap of the call parameters between several species, it was not possible to identify the *Myotis* calls in species level. Especially at the Alapmei ditch calls of *Myotis* species were very abundant (23% of the total calls). Considering species distribution (SDF and Greek Bat Database of the Natural History Museum of Crete) and the call parameters, the recorded *Myotis* calls could be possibly attributed to two or more of the following species: *Myotis aurascens, M. bechsteinii, M. blythii* and *M. capaccinii*. *Myotis capaccinii* is a typical species that forages over wetlands and waterbodies.

The priority species *Barbastella barbastellus* was also recorded. The Study Area also includes more Chiroptera species of high conservation status, such as *Miniopterus schreibersii*. It is known to forage mainly in deciduous woodlands and mature orchards but also along hedgerows separating pastures (IUCN 2021). *Rhinolophus ferrumequinum* is present in the area as well.

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 other 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* and *Eptesicus*), but their identification only from their calls is ambiguous.

No specific roosts have been identified within the FSA, as far as it was possible to search.

Table 3-5 Bat species that were recorded at the FSA during field surveys and species found in previous surveys (SDF and Greek Bat Database of the Natural History Museum of Crete)

Code	Species	Previous data	Observed during fieldwork		
			Trichonida	Alampei ditch	Lysimachia
1308	*Barbastella barbastellus*		X	X	X
1327	*Eptesicus serotinus*	X		X	X
5365	*Hypsugo savii*	X		X	X
1310	*Miniopterus schreibersii*	X	?	?	?
	Myotis spp.		X		X
1312	*Nyctalus noctula*	X	X	?	X
	Nyctaloid		X		
1309	*Pipistrellus pipistrellus*	X	X	?	X
5009	*Pipistrellus pygmaeus*	X	X	X	X
2016	*Pipistrellus kuhlii*	X			
	Pipistrellus kuhlii / P. nathusii			X	X
	H. savii or *P. kuhlii / P. nathusii*		X		
1304	*Rhinolophus ferrumequinum*		X	X	X
1333	*Tadarida teniotis*			X	X

Note: X: confirmed presence, ?: possible presence in the area, *Nyctaloid*: *Nyctalus* spp. or *Eptesicus* spp.
Prepared by: (NCC, 2021)

3.3.2.3.2 Mammals – Canis lupus / Canis aureus

Canis lupus and *Canis aureus* presence was not confirmed directly (animal observation) or indirectly (tracks, scats) at the FSA during the field surveys.

Lacking strong evidence that the two species have constant presence in the area and given the existing human activities and disturbance observed during field surveys, it is estimated that the segment of the pipeline routing does not overlap with sites of high suitability as denning sites, and therefore of high sensitivity for them. The species may have sporadic presence in the site to forage or are attracted by livestock and water.

Reference: (NCC, 2021)

Figure 3-9 Olive and hay fields where BVS15 is located, Irrigation ditch with water supply, Lake Trichonida shore.

3.3.2.3.3 Mammals – Lutra lutra

Lutra lutra presence was not confirmed directly (animal observation) or indirectly (tracks, scats) at the FSA during the field surveys. However, the presence of the species has been reported at the wetlands of Trichonida and Lysimachia in close proximity to the ditch (Theodoropoulos, 2021). The ditch is potentially suitable habitat for the species, the same applies to the seasonally flooded fields in close proximity of it (personal communication I. Theodoropoulos). The species has also been observed at the Ermitsa stream which the pipeline crosses and outflows to Lysimachia lake.

3.3.2.3.4 Amphibians and Reptiles

During the field survey no reptile species of interest, for which the site has been designated, were observed in the FSA. The species *Elaphe quatuorlineata* was detected outside of the FSA and it may habituate inside the FSA due to the existing suitable habitats. The species prefers warm and humid areas, but uses a wide range of habitats, dry rocky slopes and shrublands, forest openings, wet meadows and river and lake shores.

The species which are included in the Annexes II and IV of the Habitats Directive, but are not included in the SDF, and were observed within the FSA are four lizard species: *Ablepharus kitaibelii, Lacerta viridis, Podarcis muralis, Podarcis taurica*, two turtles *Emys orbicularis, Mauremys rivulata* and one snake species *Natrix tessellate*. Other species observed were: *Hemidactylus turcicus, Pelophylax epeiroticus, Pelophylax kurtmuelleri.*

Reference: (NCC, 2021)

Figure 3-10 Area of fieldwork at Alampei ditch.

3.3.2.3.5 Fish

According to HCMR (2021), field work was carried out at the Alampei ditch. In Table 3-6 the fish species found are presented.

Table 3-6 Fish species of interest

Code	Species	Abundance	Annex of Habitats Directive / IUCN / Greek Red List / endemic
5338	*Economidichthys trichonis*	1	- / EN / LC / x
5654	*Gambusia holbrooki**	3	- / LC / - /
	Gobiidae sp.	2	
5180	*Luciobarbus albanicus*	3	- / LC / LC / x
	Scardinius acarnanicus	3	- / NT / LC / x

NOTE: 1= Rare; Few individuals (less than 10), one class size per 100 m; 2= Common/ Large number (more than 10), more than one class size per 100 m; 3= Abundant (more than 20) and more than two size classes per 100 m; Invasive and translocated species are marked with an asterisk.

Prepared by: (NCC, 2021)

A total of five species were recorded, bearing large numbers of fish. The location is a heavily modified water body (artificial canal in a wetland area) and the fish index cannot be applied.

The composition of the fish fauna originates from Trichonida Lake and the presence of some species with special interest in the protection of biodiversity cannot affect the assessment of water quality. As far as the ecological potential is concerned, the area is characterized higher than average (i.e. probably as of "good" ecological potential). This assumption cannot be based on an index or measurements but mainly on indications concerning species richness, the presence of species with low pollution tolerances, the non-predominance of alien species and the presence of species with particular interest regarding the conservation of local biological diversity (rare, endangered and endemic species). This location hosts more than 16 fish species and is of special ichthyological interest.

Reference: (HMCR, 2021)

Figure 3-11 One of the most peculiar endemic species of freshwater fish and one of the smallest fishes in Europe. Here is the *Economidichthys trichonis* (Nanogovios) which is limited to its worldwide distribution in Trichonida and Lysimacheia lakes.

3.3.3 Key findings

The main findings of interest are summarized as follows:

- *Habitat types*: The FSA is covered mainly by agricultural land, while at the Alambei ditch and the habitat type 72A0 is present. The important habitats are at distance from the area where construction works will take place and include the habitat types 3150, 6420 and 92A0.
- *Plant species*: No species of interest were found within the FSA.
- *Mammal species*: *Lutra lutra* was not observed in the FSA but the ditch is potentially suitable habitat for the species, while the same applies to the seasonally flooded fields in close proximity to it. The species has also been observed at the Ermitsa stream. Although *Canis lupus* and *Canis aureus* were not observed in the area, the species are expected to have presence in the area and the riparian vegetation along the ditch could be potentially be a corridor for their movements. Many bat species were also observed using the aerial area above the ditch for feeding, while large trees may be used as roosting sites mainly by *Myotis* species. No reproduction or roosting habitat of the above species was located within the FSA.
- *Reptile/amphibian species*: Several species of interest were found within the FSA, while the habitats are estimated as suitable also for a number of species that were not observed during field work.
- *Fish species*: No fish species of interest were recorded.

In Table 3-7 the species of interest recorded during fieldwork at specific segments of the pipeline routing are presented.

Table 3-7 Species of interest recorded during fieldwork

IP	Species of interest
2147*	*Lacerta viridis, Natrix tessellata, Podarcis taurica* *Myotis spp., Pipistrellus pygmaeus, Barbastella barbastellus, Nyctalus noctula, Pipistrellus pipistrellus, Rhinolophus ferrumequinum*
2153-2154	*Emys orbicularis, Podarcis muralis, Ablepharus kitaibelii, Natrix tessellata* *Myotis spp., Nyctalus noctula, Pipistrellus pygmaeus, Rhinolophus ferrumequinum, Tadarida teniotis, Barbastella barbastellus, Hypsugo savii* *Economidichthys trichonis*
2154-2156	*Mauremys rivulata* *Myotis spp., Hypsugo savii, Nyctalus noctula, Pipistrellus pipistrellus, Pipistrellus pygmaeus, Rhinolophus ferrumequinum, Tadarida teniotis*

Note: *: outside the FSA

Prepared by: (NCC, 2021)

Prepared by: (NCC, 2021)

Figure 3-12 Field Survey locations for the survey of habitats, fauna groups of Annex II and IV (Directive 92/43/EEC), carried out within the FSA

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 habitat 3150 that is recorded within the FSA. The representativity of the natural habitats in the Natura 2000 site is good to excellent. Their conservation status varies from good to average or reduced, while for most of the habitats the status is good. The overall value of the site for the conservation of the habitats is indicated as good for all habitat types, except the habitat 1410 which is assessed as significant.

Concerning the species included in the SDF, the SAC hosts high percentage (15-100%) of the national population of *Cobitis trichonica* and *Silurus aristotelis*, as well as significant percentage (2-15%) of the total national population of several species, namely of several fish species, among which *Economidichthys trichonis*, and an invertebrate *Lindenia tetraphylla*. The conservation status of *Cobitis trichonica*, *Lutra lutra, Pelasgus stymphalicus* and *Rutilus panosi* is excellent. The only isolated species is *Economidichthys trichonis*. The overall value of the site for the conservation of the species is assessed from excellent to significant.

Detailed information is provided in ANNEX A.

3.4.3 Threats/Pressures

According to the SDF of the SAC, the main threats are of high, medium and low magnitude. Threats of high magnitude within the site include cultivation, the creation of structures and buildings in the landscape, outdoor sports and leisure activities, recreational activities and human induced changes in hydraulic conditions.

Of medium magnitude are threats that concern irrigation and pollution of surface waters, as well as the presence of garbage and solid waste. Human structures, such as roads and expansion of urbanized areas are also of medium magnitude. Moreover, there is threat due to freshwater aquaculture and genetic pollution.

Threats of low magnitude include disposal of inert materials and fertilization at agriculture. Furthermore, surface water abstractions for agriculture and canalization takes place in the site, along with the creation of dykes, embankments. Fishing and hunting are threats of low magnitude, while nautical sports are also of low magnitude. At the area silting up, drying out, biocenotic evolution, succession and natural eutrophication also takes place.

3.4.4 Ecological functions

The Natura 2000 site consists an important wetland ecosystem in western Greece, with significant ecological value. The two lakes, despite of human activities, supports habitats that holds significant amounts of important flora and fauna species. These habitats further function as a resting area for migratory waterfowl as they support migratory birds during their journey by providing suitable areas for resting. The lakes ecosystem further functions as a water supply and irrigation assurance for the surrounding area.

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 area of interest, human activities (fishing and recreation) and present conditions of other natural elements (morphology/ beautiful scenery) set the site's development trends, which seems to be stable during last years.

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):

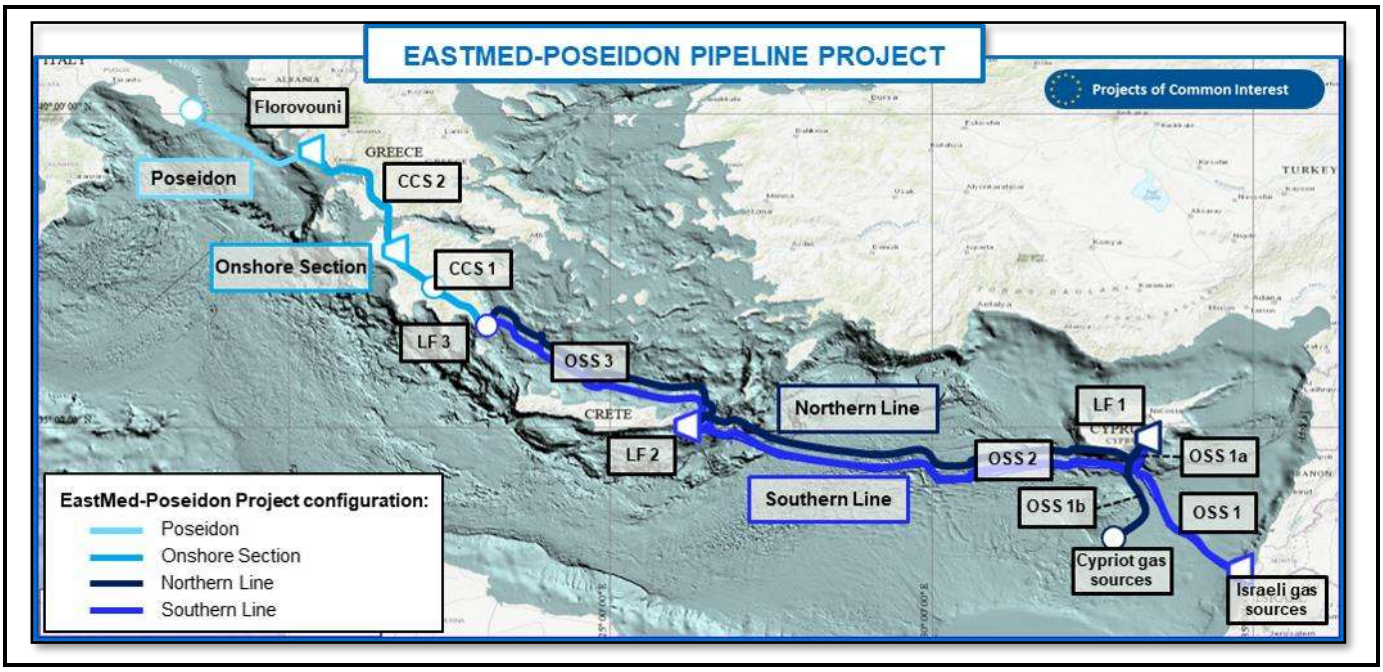
- Delivers dry gas originating from one or more of the Cypriot offshore gas discoveries to the compression and metering stations in Cyprus (CS1/MS1) first, through OSS1b and then in Crete (CS2/MS2N), through OSS2N and from there to the mainland Greece and Poseidon Pipeline Project, as referred in the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

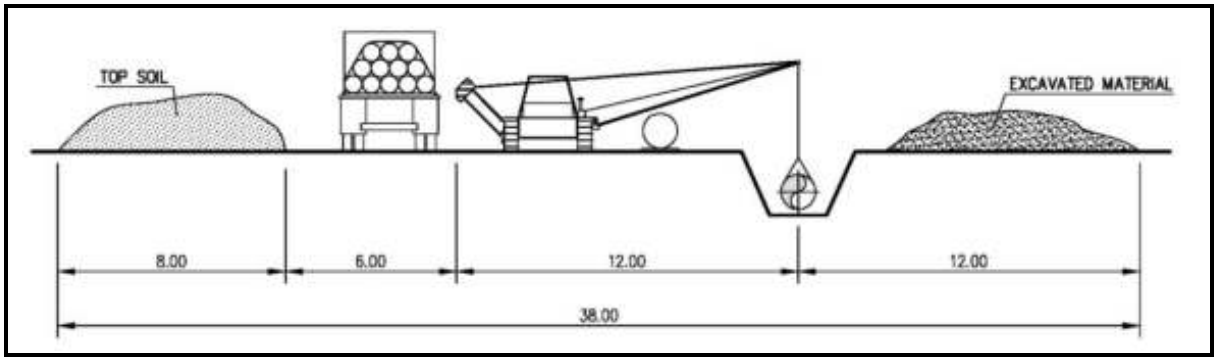
A survey control system in the form of permanent ground markers (PGM) will be installed. A subcontractor will tie all survey works into this control system and confirm the accuracy of the PGM control system.

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

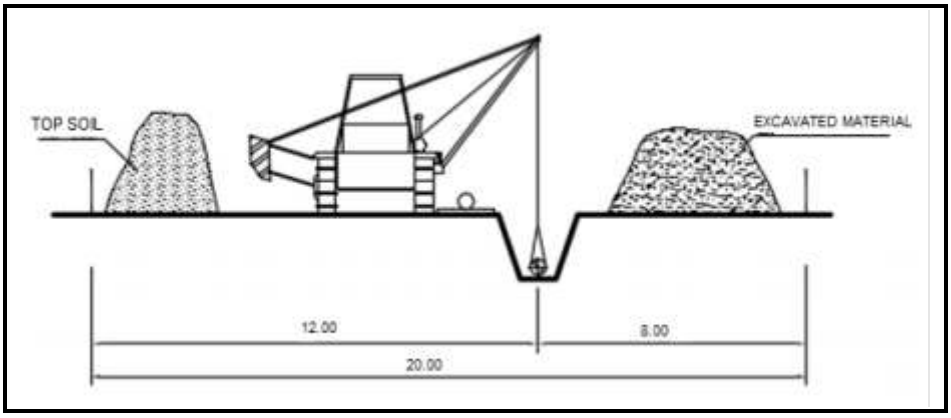
The working strip is the temporary corridor along the pipeline where construction takes place. It must be wide enough to allow all activities to be carried out safely whilst providing sufficient room to store topsoil and trench material separately and keeping crop loss to the farmer to a minimum. The 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"

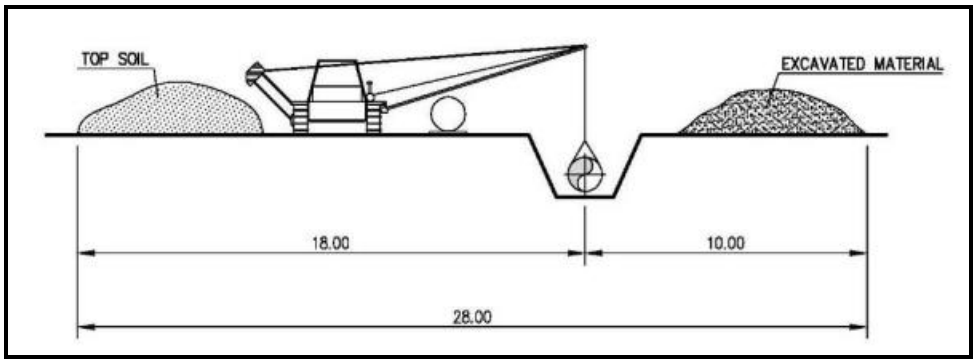
The width of the working strip in open country for pipeline of ND 16'' will be 20 m.



Source: (Design Basis Memorandum – Pipeline and Facilities)

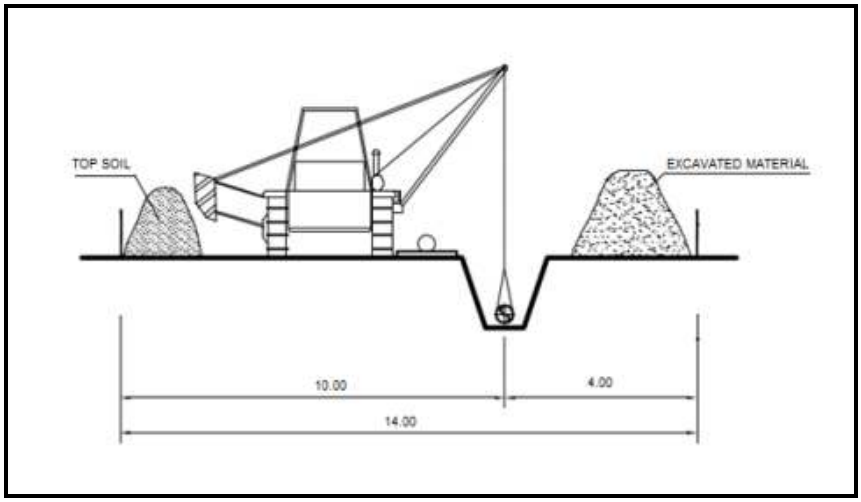
Figure 4-4 Regular Working Strip in Open Country for Pipeline ND 16”

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”

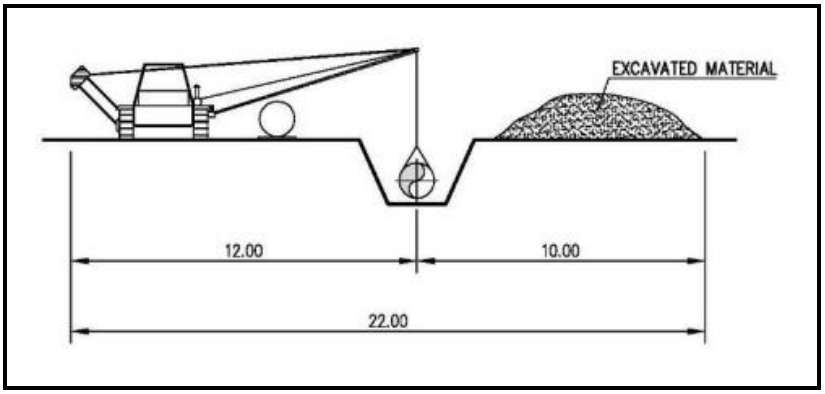


Source: (Design Basis Memorandum – Pipeline and Facilities)

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 Watercourse Crossings

In general, crossing techniques can be divided into open cut (i.e., dry or wet, where the trench is directly dug across the feature) and trenchless crossing methods which prevent surface disturbance (e.g., HDD). According to the current design, all river crossings are planned with the open-cut technique unless trenchless techniques are required due to environmental, technical and engineering constraints. Trenchless crossing techniques (e.g., HDD) advantages include no interaction with the water body engaged, no modification to the riverbed morphology or to the flow regime.

4.2.3.1 Open cut

Rivers are generally crossed by excavating an open trench and installing a siphon. The pipe trench is excavated by means of excavators operating from floating pontoons. The defined height and the width of the pipe trench are continuously monitored and documented by means of echo soundings. The excavated material is stored temporarily in designated and approved places. The pipeline section for the river crossing is constructed on the river bank and then pulled into position using a winch located on the opposite river bank. After checking that the pipeline is in the correct position, the pipe trench is backfilled and any sheet piles are removed. Pipes with increased wall thickness and a "reinforced PE coating" are used for the crossings as they will have to withstand the additional weight of the overlying river bed material and water. Buoyancy control is achieved by means of a reinforced concrete coating which also serves to mechanically protect the PE coating during the pulling-in process. The following table indicates the locations where open cut will be implemented.

Regarding smaller rivers and streams, a temporary passage is erected across the watercourse after preparing the working strip. This passage principally consists of an earth dam, which, depending on

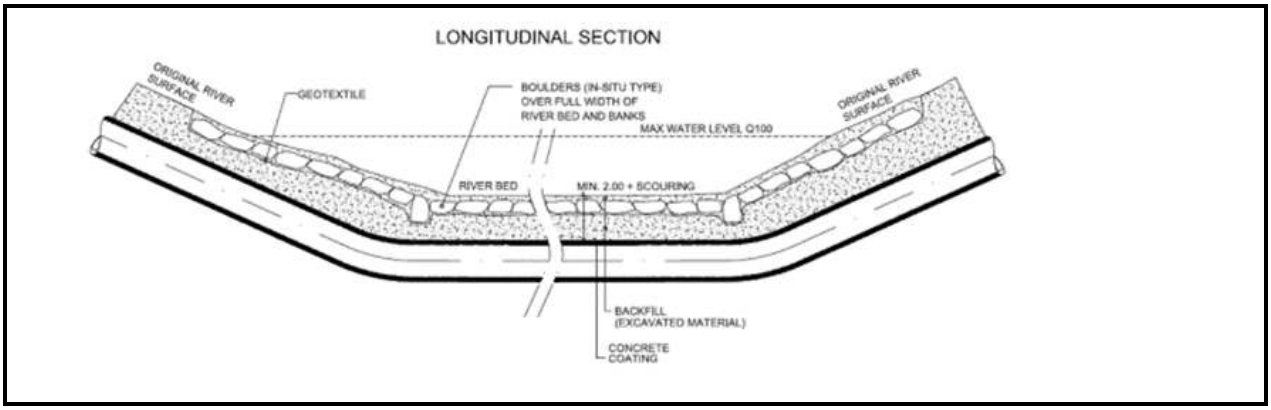
the water level, is equipped with pipes to ensure the unhindered flow of water. This passage is dimensioned for a low to medium water flow and is flooded in case of high water levels.

The pipeline section is pre-fabricated on the river bank together with its concrete casing.

The trench is then excavated across the watercourse to accommodate the pipeline. Excavation of the trench is likely to make the water turbid. However, in the smaller streams with a surface width of between 3-5 m this turbidity will last for approximately half a day only. For bigger crossings sediment curtains can be installed in order to prevent the sediment plume from travelling downstream. Specific measures, such as sediment barriers, and seasonal limitations such as construction only in low flow conditions, are usually implemented to minimise the mobilisation of fine particulate materials downstream.

The prefabricated section of pipeline will then be lifted into place and the pipe trench is backfilled using the stored excavation material. This will again make the water turbid, with the duration of the work being limited to a few hours for smaller streams. In streams where an infiltration from the river into the groundwater is possible, clay barriers at the river banks are used to seal the pipeline trench. The river bed is then restored to its original state.

The river banks are then restored incorporating stabilisation of the river bank slopes (erosion control systems). Slope stabilisation is dimensioned according to the expected flood run-off, with bank protection being defined as a function of the water depth and the inclination of the water run. In order to construct bank protection in accordance with ecological aspects, natural measures for stabilising the river bank are given preference. When stones are used to stabilise the river bank, they are subsequently covered with humus to facilitate a natural vegetation cover.



Source: (ASPROFOS, 2021)

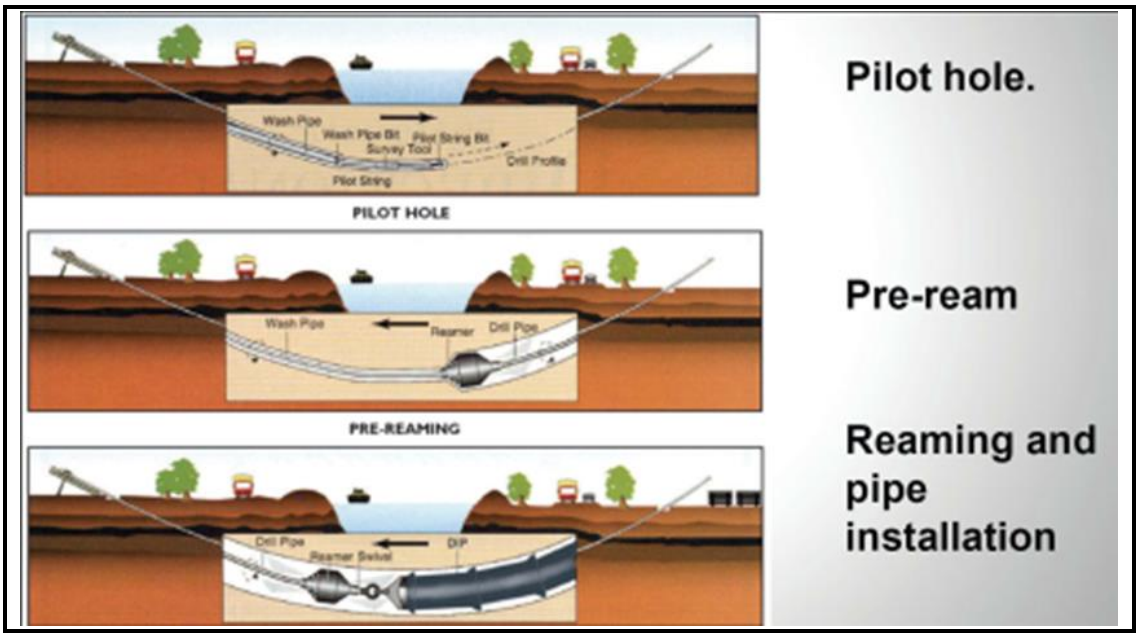
Figure 4-8 Typical Open-Cut River Crossing

4.2.3.2 Trenchless crossing

At rivers and streams of high ecological importance, trenchless crossing shall be investigated if technically possible and if necessary to minimize impacts to biodiversity.

It is envisaged that the major watercourse crossings will be performed mainly with the use of Horizontal Directional Drilling method (HDD).

HDD is a trenchless crossing method which begins with boring a small diameter, horizontal hole (pilot hole) under the crossing obstacle (e.g., a river) with a steel drill rod. When the steel drill rod emerges on the opposite side of the crossing, a special cutter, called a back reamer, is attached and pulled back through the pilot hole. The reamer bores out the pilot hole so that the pipe can be pulled through. The pipe is usually pulled through from the side of the crossing opposite the drill rig. Usually a drilling mud, such as fluid bentonite clay (an inert, non-toxic substance), is forced down the hole to stabilise the hole and remove soil cuttings. Bentonite provides lubrication to the hole drilling and also provides stability and support for the borehole. Figure 4-9 demonstrates the procedure of HDD.



Source: (ASPROFOS, 2021)

Figure 4-9 Typical HDD River Crossing

Additionally, it should be mentioned that in order for the HDD technique to be applied large quantities of water will be required. Prior of water abstraction, the EPC Contractor shall have obtained all necessary permits by the competent public authorities

HDD activities are related to significant increase of noise levels in the area for the limited time that HDD works are conducted. Noise sources are located mainly at the drilling (rig) side and are caused predominately by the generators and the pumps.

The following table indicates the location and the method that will be implemented.

Table 4-3 River Crossing Points with Trenchless Methods

s/n	Crossing Method	WaterCourse Name	Crossing Type	Location of crossing point (Related IP and Distance (m)	Kilometer Chainage	Pipeline Section
MC0026	Direct Pipe	Alfios River	Large Rivers (Crossing Width≥30m)	IP0907+475.74	202.37	CCS1
MC0103	Direct Pipe	River Evinos	Large Rivers (Crossing Width≥30m)	IP2024+969.13	8.77	CCS2
MC0109	HDD	Water Canal Trichonida - Lisimachia	Large Rivers (Crossing Width≥30m)	IP2153+1,009.99	37.28	CCS2
MC0114	Direct Pipe	River Acheloos	Large Rivers (Crossing Width≥30m)	IP2188+1,711.2	57.14	CCS2
MC0116	Boring Without Casing	Artificial Concrete Irrigation Channel	Concrete Irrigation Channel	IP2192+609.36	59.84	CCS2
MC0121	HDD	River Arachthos	Large Rivers (Crossing Width≥30m)	IP2513+909.18	134.91	CCS2
MC0126	HDD	River Louros	Large Rivers (Crossing Width≥30m)	IP2578+551.52	159.82	CCS2
MC0127	HDD	Tributary of River Louros	Rivers (Crossing Width<30m-≥5)	IP2580+728.38	161.92	CCS2
MC0129	HDD	Irrigation Ditch	Rivers (Crossing Width<30m-≥5)	IP2584+944.7	167.34	CCS2
MC0133	HDD	River Acherontas	Large Rivers (Crossing Width≥30m)	IP2672+410.51	196.43	CCS2
MC0135	HDD	Vouvopotamos River	Rivers (Crossing Width<30m-≥5)	IP2676+1,610.02	201.55	CCS2

References: (ASPROFOS (2021))

4.2.4 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.

4.2.4.1 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.

4.2.4.2 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.

4.2.4.2.1 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.

4.2.4.3 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.

4.2.4.4 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 4-4 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 4-4 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

Pipeline Spread		Water Source	Approx. Volume Required (m^3)	Pipeline Section
From KP	To KP			
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.

4.2.4.4.1 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 overlaps with the Study Area (Natura 2000 site: GR2310009). The total length of the project crossing the Study Area is 1.2km at the section IP 2153-2156 (KP: 37.010 - 38.242).

According to the current planning, the pipeline will cross the Alampei Ditch connecting Trichonida and Lysimachia lakes (aka Water Canal of Trichnoida) with the use of the trenchless HDD method. A preliminary layout of the HDD construction and working strip is illustrated in the following figure. It is highlighted that the final layout will be developed at a later stage by the HDD contractor and all necessary permits will be acquired prior to any relevant works commencement.

During construction

- The working strip will be of 38m width covering an area of 5.0 ha.
- The Alampei Ditch crossing will be performed by HDD method (trenchless solution).
  - HDD sites (drilling/pulling) will be established at both sides of the ditch.

- For the needs of the HDD method water will be abstracted from Alampei Ditch.

- Open-trenching will be used for the crossing of Ermitsa stream outside the Study Area. The crossing will take place at about 1.5km from its river mouth.
- Water will be abstracted from Alampei Ditch for hydrotesting.
  - According to Table 4-4, the required amount of abstracted water is about 21,960 m^3.
  - Alampei ditch will be also used as a receptor of the water used for hydrotesting. It should be noted that according to the projects' specifications, the total water volume for the HDD and hydrotesting should not exceed 10% of the ditch's flow.
- 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 the only construction activities that will take place during night are related to the trenchless crossing of the rivers and hydrotesting, as they have to be continuous until their completion.

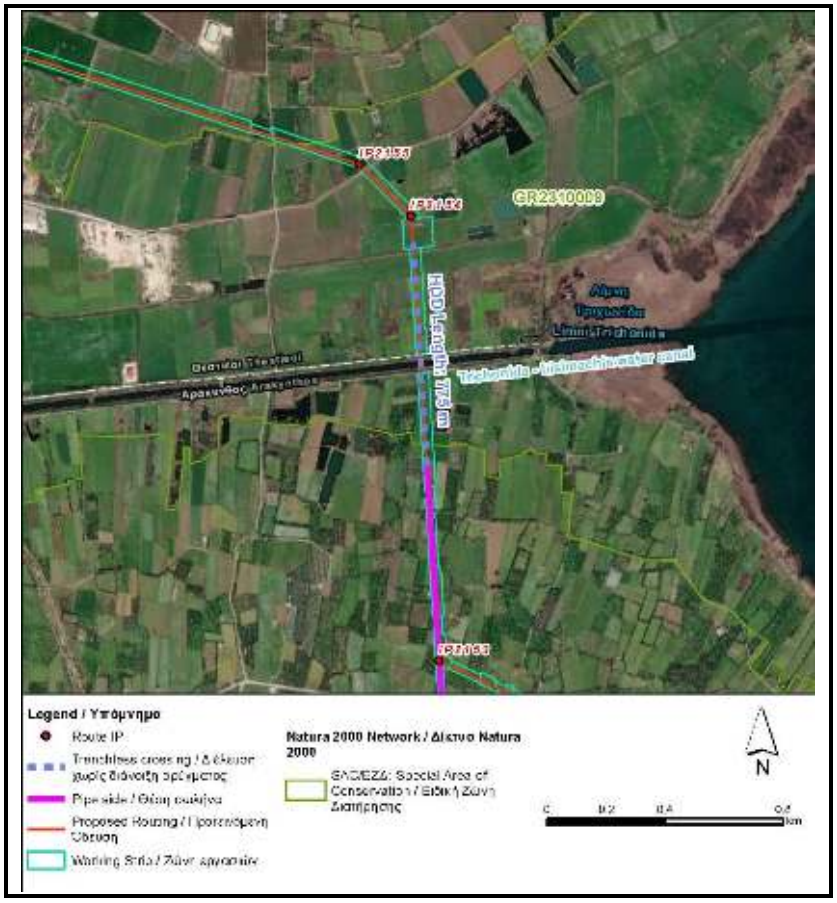
During operation/maintenance

- An 8m wide pipeline protection strip will be maintained along the pipeline covering an area of 0.9 ha.

Table 4-5 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)



Prepared by: (NCC, 2021)

Figure 4-10 Trenchless crossing of Alampei ditch

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 important 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 impact		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.

Significance	Definition
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 individuals 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. Finally, the alternative scenarios are examined.

5.2.1 Species / habitat types screening

In respect to habitat types, the habitats that were taken into consideration for the appropriate assessment are those included in the FSA and are presented in Table 5-7. 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.

Table 5-7 Habitat types of interest in FSA

Code	Habitat type
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
92A0	*Salix alba* and *Populus alba* galleries
6420	Mediterranean tall humid grasslands of the Molinio-Holoschoenion

Prepared by: (NCC, 2021)

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 affected by the project, based on field observations and bibliographic data. The species for which the site has been designated as a Natura 2000 site and could potentially be affected by the project were selected.

Their ecological requirements are presented in ANNEX D.

Table 5-8 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*			II; IV|LC|VU
M	1355	*Lutra lutra*	p		II; IV|NT|EN
M	1310	*Miniopterus schreibersii*	p		II; IV|NT|NT
R	1279	*Elaphe quatuorlineata*	p		II; IV|NT|LC
R	1219	*Testudo graeca*	p		II; IV|VU|LC
I	1043	*Lindenia tetraphylla*	p		II; IV|LC|-
I	1032	*Unio crassus*	p		II; IV|EN|-
F	1103	*Alosa fallax*	r		II|LC|DD
F	5094	*Barbus peloponnesius*	p		II|LC|LC
F	1144	*Cobitis trichonica*	p		II|EN|LC
F	5337	*Economidichthys pygmaeus*	p		II|LC|LC
F	5338	*Economidichthys trichonis*	p	X	II|EN|LC
F	5333	*Pelasgus stymphalicus*	p		II|LC|LC
F	5344	*Rutilus panosi*	p		II|VU|LC
F	1150	*Silurus aristotelis*	p		II|DD|LC
F	5334	*Telestes pleurobipunctatus*	p		II|LC|LC
F	5341	*Tropidophoxinellus hellenicus*	p		II|LC|LC

Note: p: permanent, r: reproducing (Source: SDF) , II, IV: Annexes of Habitats Directive, LC: Least Concern, VU: Vulnerable, NT: Near Threatened, EN: Endangered, DD: Data Deficient

Prepared by: (NCC, 2021)

Furthermore, the sensitivities of the species of concern, namely species of the Annexes II and IV of the Habitats 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 5-9.

Table 5-9 Other species expected or observed within the FSA

Group	Code	Species	Presence	Observed during fieldwork	Annex of Habitats 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					

Group	Code	Species	Presence	Observed during fieldwork	Annex of Habitats Directive / IUCN / Greek Red List
R	1276	*Ablepharus kitaibelii*	p	X	IV|LC|LC
R	1248	*Podarcis taurica*	p	X	IV|LC|LC
R	1292	*Natrix tessellata*	p	X	IV|LC|LC
Other important Annex II and IV species of the Study Area not included in the site's SDF					
M	1353	*Canis aureus*			-|LC|EN
M	1308	*Barbastella barbastellus*		X	II; IV|NT|EN
M	1327	*Eptesicus serotinus*		X	IV|LC|LC
M	5365	*Hypsugo savii*		X	IV|LC|LC
M	1312	*Nyctalus noctula*		X	IV|LC|DD
M	1309	*Pipistrellus pipistrellus*		X	IV|LC|DD
M	5009	*Pipistrellus pygmaeus*		X	IV|LC|DD
M	1304	*Rhinolophus ferrumequinum*		X	II; IV|LC|LC
M	1333	*Tadarida teniotis*		X	IV|LC|LC
R	1263	*Lacerta viridis*	p	X	IV|LC|LC
R	2373	*Mauremys rivulata*	p	X	II; IV||LC
R	1220	*Emys orbicularis*	p	X	II; IV|NT|NT
R	1256	*Podarcis muralis*	p	X	IV|LC|LC

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

Prepared by: (NCC, 2021)

5.2.2 Pipeline Construction and Pre-commissioning

The project will cross underground the Study Area at the Alambei ditch using the HDD method and the agricultural area with open trenching. The construction is expected not to exceed a few weeks at the Natura 2000 site and its adjacent area.

During the preliminary design phase special care was taken in order:

- to minimize the overlap of the project with the Study Area in an attempt to minimize any potential impact of the project to the site and the Natura 2000 network in general. As a result, the project crosses the site at its central part that is is narrowest and special care has been taken to avoid important habitats, while the project is crossing the Alambei ditch underground.

- 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) the use of HDD method to pass underground the site, (b) no use of blasting within the site, (c) abstraction/discharge of less than 10% of the river flow and use of sedimentation pools and water treatment at hydrotesting, (d) minimization of construction works during night, (e) application of reduced working strip when environmental constraints apply and (f) all necessary precausions to avoid the spill of mud from HDD to the river.

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 (March-July), following the provisions of the EU Habitats Directive and of national legislation.

Habitat type coverage loss, deterioration, fragmentation: **Not applicable.**

The working strip crosses exclusively agricultural areas, as well as the ditch where reeds grow on both sides. As a result, no habitat types of Annex I of the Habitats Directive are expected to be affected by trenching. The habitat types of interest are located at a distance greater than 300 m. Furthermore, as the abstraction and discharge of water used for hydrotesting and the application of HDD will be less than 10% of the flow at the ditch and will not be contaminated with chemicals or sediments, it is not expected to affect the aquatic habitats.

Ermitsa stream, that flows to Lysimachia lake will be crossed with open cutting, however any sediment plume created is expected to have settled before the water will reach the Study Area.

It is estimated that no habitat type loss, deterioration or fragmentation will take place.

For the habitat types assessed the general Conservation Objectives apply, as no Site Specific Conservation Objectives (SSCOs) have been defined. Thus, the Conservation Objective for 3150, 92A0, 6420 is to maintain the Degree of Conservation B in the short term. The Degree of Conservation is directly related to the conservation of the habitat type's structure and functions, as well as its restoration possibility. Both, structure and function of the above mentioned habitats are not expected to be affected, thus their Conservation Status and Conservation Objectives are not expected to be affected.

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

The majority of the species observed are related to aquatic or riparian habitats. As a result, as mentioned above the expected impacts to those habitats are negligible. At the immediate vicinity of

the ditch the area is mainly agricultural land, which is not expected to be affected, except of the loss of the existing hedgerows between the fields which maintain local species. However, the intervention is small and linear and the impact is estimated to be also negligible.

Consequently, no fragmentation of habitats and no loss or reduction of key features for the species are expected.

For the species habitats' quality, the general Conservation Objectives apply for all species, as no SSCOs have been defined. Thus, the Conservation Objective for *Cobitis trichonica, Pelasgus stymphalicus, Rutilus panosi, Lutra lutra* is to maintain Degree of Conservation A, for *Barbus peloponnesius, Economidichthys pygmaeus, Economidichthys trichonis, Silurus aristotelis, Tropidophoxinellus hellenicus, Lindenia tetraphylla, Miniopterus schreibersii, Elaphe quatuorlineata, Testudo graeca* is to maintain the Degree of Conservation B in the short term, while for the *Alosa fallax, Telestes pleurobipunctatus, Unio crassus, Canis lupus* to achieve Degree of Conservation B in the short term. The Degree of Conservation is directly related to the conservation of the features of the habitat which are important for the species, as well as the restoration possibility of the species. Based on the above, as the features of the habitat which are important for the species are maintained, the Conservation Status and the Conservation Objective for the species are not expected to be affected.

Furthermore, the SSCOs for *Testudo graeca* is suitable habitat >50% in the 8 cells of 1x1km in the site, while for Elaphe quatuorlineata in 124 cells, within the Natura 2000 site. For Lutra lutra the SSCO is suitable habitat at a significant part of the area of the 10X10 cells of the species distribution within the site (>50%), while the same applies for *Miniopterus schreibersii* and its feeding habitat. These SSCOs are not expected to be affected.

In general, the Conservation Objectives concerning the species' habitat quality and coverage are not expected to be affected by the project.

Loss of Individuals: **Negligible**

At the FSA no plant or fish species of interest were found. *Lutra lutra* was not observed in the FSA but the ditch is potentially suitable habitat for the species, while the same applies to the seasonally flooded fields which are found in close proximity to it. The species has also been observed at the Ermitsa stream. For *Canis lupus* although the species was not observed in the area, it is expected to have presence in the area and the riparian vegetation along the ditch could be potentially used as a corridor for their movements. Many bat species were also observed using the aerial area above the ditch for feeding, but the species of interest was not observed. Although no fish species of interest

were observed, potentially they can be present in the area and as there are also endemic ones, it is important that they are taken into consideration

During construction, increase of the vehicle traffic is expected in the area and as a result individuals of reptile, amphibian and mammal species that are moving in the area may become victims of accidental roadkill. The increase in traffic is estimated to be about 200 vehicle movements per day. Furthermore, species that potentially hibernate at the working strip may be accidentaly killed during construction works. *Canis lupus* may be attracted by the presence of garbage and food remains, increasing habituation of the species to humans, which may lead to increase of conflict.

Open trenches may act as traps mainly for reptiles

The abstraction of water for hydrotesting and the application of the HDD method may lead to loss of amphibian or fish individuals through their draining.

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

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

Prepared by: (NCC, 2021)

Lutra lutra is expected to be active in the FSA year round, while *Canis lupus* may have sporadic presence in the area. Especially *Lutra lutra* may utilize except of the Alambei ditch also the flooded fields that are present at its north and in close proximity, thus its movements may be frequent. As a result, roadkill may occur.

Reptiles are active specific period of the year, which in its main part coincides with the breeding period that was set as precondition. Furthermore, they may hibernate underground at some locations in the FSA.

The value of the receptor is high as it concerns two protected mammals, which are listed in Annex II of the Habitats Directive, while *Canis aureus* although not included in the Directive is characterized as Endangered species in Greece. 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. Based on the above the impact is estimated to be low.

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

The SSCO for *Testudo graeca* is average density population in areas with suitable habitat greater or equal to 4 ind./ha, while *Lutra lutra* of 1ind./35km^2 and *Minipterus schreibersii* of 1ind./4km^2. Furthermore, *Testudo graeca* has to be recorded in 8 1x1km cells, *Elaphe quatuorlineata* in 124 cells, in the Natura 2000 site. The SSCOs for *Lutra lutra* are to be presence of the species in each 5X5km cell and have permanent presence in at least 7 5x5km cell within the Natura 2000 site. *Minipterus schreibersii* has to be present in each cell of 10x10 distribution of the species in the Natura 2000 site. Positive recording of the presence at a percentage of ≥50% of the locations where the species were distributed apply for *Pelasgus stymphalicus, Rutilus panosi, Silurus aristotelis, Tropidophoxinellus hellenicus.* It is estimated that the project will not affect these SSCOs, as necessary mitigation measures will be taken in order to avoid loss of individuals and also the species have broad distribution in the area.

In general, the Conservation Objectives concerning the population density and distribution of the species are not expected to be affected.

Disturbance: Low

Disturbance is mainly related to mammal species, which may be affected by increased human presence, vehicle movement and construction work carried out. Furthermore, HDD is related to significant increase of noise levels in the area for the limited time that HDD works are conducted. Noise sources are located mainly at the drilling (rig) side and are caused predominately by the generators and the pumps.

Lutra lutra potentially uses the Alambei ditch and the riparian zone, as well as the surrounding periodically flooded fields, while *Canis lupus* potentially uses the riparian zone as a corridor for their movements in the area. Furthermore, bat species use the area for foraging. Furthermore, the trenchless crossing will be a twenty-four hours a day procedure until its completion.

It should be mentioned that the area is regularly used by farmers, while heavy machinery is used for the cultivation or harvesting of crops and therefore a disturbance already exists. A relevant habituation is hence expected by the species during day.

As the mammals species are mainly nocturnal and feed during dawn, dusk and night, light pollution at the working strip will induce disturbance, as well as the construction activities carried out during night. However, it should be mentioned that the activities of the trenchless crossing will last for a few days.

Table 5-11 General impact characteristics for disturbance - fauna

Receptor	Nature	Extent	Duration
Lutra lutra *Canis lupus* *Miniopterus schreibersii*	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. (few weeks)

Prepared by: (NCC, 2021)

The value of the receptor is high, as it concerns species included in Annexes II and IV of the Habitats Directive. 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 outside the sensitive period. Based on the above the impact is estimated to be low.

As 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 low.

The Conservation Objectives for *Lutra lutra* and *Miniopterus schreibersii* concerning their distribution were presented above. They are not expected to be affected.

It should be mentioned that the measures foreseen for the mitigation of species disturbance should also apply at Ermitsa stream, in order to avoid potential disturbance mainly of Lutra lutra in the area. Also, best practices already foreseen for open cutting at streams and rivers should also apply.

Changes in the general ecosystem of the Study Area: **Not applicable**

The project is crossing the Study Area at its central part that is narrowest and special care has been taken to avoid important habitats and the project is crossing the Alambei ditch underground. As a result, it is expected that the project will not cause changes to the vital defining aspects that determine how the site functions as a habitat or ecosystem.

The above in combination with the negligible impact to species and habitats leads to the estimation that no change to the dynamics of the relationships that define the structure and/or function of the site are expected. Furthermore, the project does not interfere with predicted or expected natural changes to the site.

The project is not expected to change the balance between key species or reduce the diversity of the site.

5.2.3 Operation and Maintenance

During operation and maintenance, the pipeline will be maintained and operation will not include any regular human or vehicle presence, apart from what is necessary for the safe operation of the pipeline. As the pipeline will be located underground and not interaction between the project and the environment is foreseen, no impact is expected during operation and maintenance of the pipeline.

Habitat type loss, deterioration, fragmentation: Not applicable.

No loss, deterioration, fragmentation of habitat type is expected during operation.

Species habitat loss, deterioration, fragmentation: Not applicable.

No loss, deterioration, fragmentation of species habitat is expected during operation.

Loss of Individuals: Not applicable.

No loss of individuals is expected during operation.

Disturbance: Not applicable.

No disturbance is expected during operation.

Table 5-12 Assessment of impacts

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

Prepared by: (NCC, 2021)

5.2.4 Sensitivities of other species

As presented in Table 5-9, other species included in the Annex II and IV of the Habitats Directive were also observed or are expected in the FSA.

The riparian area of Alambei ditch is estimated to be potentially used by *Canis aureus* for their movements in the area. Many bat species were also observed using the aerial area above the ditch for feeding, while large trees may be used as roosting sites mainly by Myotis species. No reproduction or roosting habitat of the above species was located within the FSA.

Canis aureus is sensitive to loss of individuals due to accidental roadkill and they may avoid the area during construction due to human presence, vehicle movement and construction work carried out, as well as light pollution. It also may be attracted by the presence of garbage and food remains, increasing habituation of the species to humans, which may lead to increase of conflict.

The reptiles are sensitive to loss of individuals, as presented above for the species included in the SDF, due to accidental roadkill and trapping in open trenches.

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 not significant other existing or planned projects and infrastructures, such as Pipelines, Power lines, energy and other major projects; except for the national road network (EO5) and the high voltage network, as well as the local road network crossing the western area of the site and the FSA area of the pipeline.

The routing of the EastMed pipeline crosses the site for some hundred meters, in areas where no other projects exist, just the local road network. It must be noted that the pipeline will cross trenchless the Alambei ditch connecting the two lakes (Trichonida and Lychimacheia), in order to avoid impacts on aquatic and riparian ecosystems of the protected area. Project activities will only take place in adjacent rural ecosystems of the area, both sides of the ditch. This choice of trenchless technique leads to decrease of any cumulative impact, as it does not increase the habitat fragmentation at the Study Area and the surroundings. In addition, no other planned projects or plans are known to be proposed within the Natura 2000 site and therefore no cumulative impacts are expected.

5.2.6 Alternative scenarios

Detailed description of alternative scenarios is given in the relevant chapters of the ESIA (Chapter 7). Concerning the assessment of alternative routings of the project, to avoid the specific SAC site, this is not considered as a viable scenario due to the extent of the lakes and the fact that the routing is already passing through the narrowest area of this particular SAC. The pipeline traverses the Alambei ditch connecting the two lakes (Trichonida and Lychimacheia) within the site, with HDD trenchless technique in order to avoid impacts on aquatic and riparian ecosystems of the protected area. Project activities will only take place in adjacent rural ecosystems of the area, both sides of the ditch. This routing forms practically the optimum scenario from the environmental point of view for the routing of the pipeline.

Scenario 1: Current routing.

The construction works for the current routing are estimated to have no impact on the qualifying features of the SAC. By respecting the construction time-constraints and by taking appropriate pre-construction mitigation measures such as ornithological and fauna surveys for spotting nesting trees and tree stands or other appropriate nesting sports, to avoid the destruction of nest sites or important flora species through micro-siting, the impact is expected to be low.

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.

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 is not expected to:

- Cause delay or disrupt the progress in meeting the conservation objectives of the Natura 2000 area concerned.

- Reduce the size of the population of protected species or affect the conservation status of their habitats or fragment or affect the balance between species or affect their degree of isolation.
- 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 and considering the implementation of the aforementioned management and mitigation measures towards the prevention/reduction of potential impacts, it is concluded that the implementation and operation of the proposed project will induce low impacts on the protected species, on the ecological functions they perform regarding the ecological integrity of the Study Area and on its role towards the coherence of the Natura 2000 network.

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						
Implement time-constraints and undertake construction works outside the breeding period between 1st March and the 31st July.	X				2153-2156	Negligible
Habitat types loss / Species habitat loss, degradation or fragmentation						
Already foreseen by the project: Establishment and marking of working strip and use of existing infrastructure and roads.	X				2153-2156	Negligible
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					
Access road upgrading will follow existing tracks and trails where possible			X			
HDD						
HDD cooling water will be discharged free of any chemicals and with a similar temperature to the water in the watercourse.	X	X			Alampei ditch 2153-2154	Negligible
Drill mud, such as bentonite clay, will be an inert and non-toxic substance.	X					

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
Water use from rivers/streams						
Already foreseen by the project: The water abstraction from rivers shall be limited to a maximum of 10 % of the run-off rate during the abstraction period.		X	X		Alampei ditch 2153-2154	Negligible
Already foreseen by the project: No additives such as biocides or oxygen scavengers should be discharged back to the watershed. In case of such substances used, they should be listed in the PLONOR list.	X					
Already foreseen by the project: Water discharge back to rivers / streams will be done through sedimentation ponds.		X	X			
Water taken from one specific watershed shall not be discharged in another watershed.		X				
No water discharges will be conducted on any of the water bodies, without appropriate authorization from the competent public authority.	X					
Water quality will be monitored prior to discharge to comply with relevant regulations.	X					
All potential water sources should have a minimum discharge rate of 3 m^3/sec.		X	X			
Reuse of the hydrotest water will be performed wherever possible.		X	X			
Loss of individuals						
Limiting of vehicle speed (limits will be established at the Traffic Management Plan)	X	X	X		2153-2156	Negligible
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				2153-2156	Negligible

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
Litter and other waste material have to be stored and disposed of appropriately. Any environmentally hazardous material used during construction works have to be carefully stored and in accordance with the applicable legislation.	X					
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				
Pre-construction survey along the route for potential presence of important hibernating species or colonies.	X					
Fauna species should not be caught or killed during construction.	X					
Application of fine mesh to water abstraction to avoid entrance of small fish and amphibians.	X				Alampei ditch 2153-2154	Negligible
Disturbance						
Limitation of night working and minimization of the use of lighting along the corridor. Avoidance of dusk-dawn work.		X			2153-2156	Low
Usage of lights to minimum, for safety reasons, and directional lighting.	X		X			
No garbage or food remains will be left at the working strip.	X					
All impacts						
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	2153-2156	Low

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
Ecological awareness/behaviour training should be provided to all personnel.	X	X	X			
Establishment of a Fire Risk Prevention Plan.	X					
Construction work must be supervised by fauna and habitat experts and monitoring of 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.	X					
Operation Phase						
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	2153-2156	

Prepared by: (NCC, 2021)

The majority of the aforementioned mitigation measures are expected to benefit also the 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					
Good Practice for Open cut					

Good Practices	Efficiency				IP
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration	
Controlled placement of spoil materials. Run-off barriers such as silt fencing, berms, boulder breaks, rock check dams and woven geotextile fabric silt fence, will be installed around disturbed areas and soil stockpile sites, as required, to prevent the transfer of sediments into watercourses.	X				Ermitsa stream 2160-2161
Management of silt plume. Temporary silt fences will be installed in areas where surface runoff might transport fines and silts to watercourses. Sediment interceptor methods will be used during construction as a contingency method, and will remain in place at the banks of the watercourse as a long-term mitigation measure.	X	X			
Gravel and cobble substrates will be salvaged before trenching, and replaced as part of restoration.				X	
Trees will be felled away from watercourses and away from the limits of the RoW, to limit damage to watercourse banks, beds and adjacent trees. Hand clearing will be conducted, if necessary to limit disturbance.	X		X		
Appropriate measures for limitation of erosion. More information provided below. *	X	X			
Open cut at the stream during its dry period.	X				
Rapid execution of open cut with enhanced excavation methods and machinery. Timing with low flow or dry periods.	X	X	X		
Sedimentation pools to be used during construction works.		X	X		
Maintain passage for fish populations during river works.		X	X		
Wherever possible vehicles and machinery will avoid contact with surface waters. Portable bridges may be used in order to achieve this.		X	X		
Access roads located in the proximity of surface water will be paved, or in absence of pavement they will be dampened periodically.		X	X		

* Watercourse bed and banks will be recontoured and restored as closely as possible to the preconstruction profile to maintain long-term bank stability. The natural sinuosity, depth, width and thalweg of the watercourse will be maintained, where appropriate.

Disturbed areas may be reseeded as soon as they are no longer required for project access or other purposes. The approved seed mixture may include a cover crop to prevent surface erosion.

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 significant negative impact on the integrity and the 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 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.

Based on the site's recorded fauna, attention during monitoring should be given in the species that are qualifying features, Directive 92/43/EEC Annex II, IV and V species, as well as rare and important species that may be affected by the construction and operation of the project, as presented in the present AA, namely (a) mammals, including *Canis lupus*, *Lutra lutra* and bats and (b) reptiles and amphibians.

Monitoring during construction

In the case of mammals. 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. For *Canis lupus*, it is advisable to also use night surveys with vocal mimicry and responses recording. For bat species passive acoustic bat recording should be used.

During construction it is advisable to have both a monitoring process 3-4 days before construction reaches at the surveyed area, 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.

In the case of reptiles and amphibians, foot line transects again is one of the most common, simple and low-cost technique to monitor them as well that can cover many species' survey, and is only applied during the day due to the species biological traits for reptiles and during day and night for amphibians. One of the main techniques of herpetofauna monitoring, apart the foot survey, is the turnover of all material possible to give shelter to reptiles, stones, cupboards, wood debris, trunks, etc. High attention should be given to possible encounter with venomous snakes, and only specialists should undertake handling. During night the survey is also (and probably mainly) acoustic, recording and identifying individuals from their sound. Line transects should be applied whenever there is adequate aquatic habitat for amphibian species. Line transects should cover linearly all the perimeter extension of any aquatic habitat.

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. In case of direct observation of animals inside the working strip, evaluation of the situation should take place as well on a case by case basis, possible relocation should be considered, and first aid help if an animal is injured.

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) “Limnes Trichonida Kai Lysimacheia", GR2310009. 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 23 days were carried out in 2021, to cover all the annual cycle.

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 project will cross the Study Area at the Alambei ditch underground using the HDD method and the agricultural area with open trenching. The construction is expected not to exceed a few weeks. As a result, the expected residual impact to habitats and species of the Study Area are estimated as low and are mainly related to (a) potential loss of individuals of mammals, reptiles and fish, due to increase of vehicle traffic, abstraction of water for hydrotesting and HDD and trapping in open trenches and (b) potential disturbance of mammals due to construction works and mainly HDD application, that is related with significant increase of noise level, and light pollution.

The present AA proposes a key measure for mitigation of the impacts on the local biodiversity, in order to minimize project impacts to the site: The construction works within the site and its vicinity will take place outside the main breeding period, March-July, following the provisions of the EU Habitat Directive and of the national legislation. By applying this measure and other mitigation measures proposed in the relevant chapter of the AA, the impact of the project to the ecological integrity of the SAC site are assessed to be low.

Concerning cumulative impacts, no other planned projects or plans are known to be proposed within the Natura 2000 site and therefore no cumulative impacts are expected. The scenario of the current routing is estimated as the optimal one.

The present AA also provided 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.

Provided that the described above precautions are taken into consideration, it is well beyond doubt that the impacts of the crossing of the project to the ecological integrity of the Special Area of Conservation (SAC) “Limnes Trichonida Kai Lysimacheia", GR2310009, of the Natura 2000 network, will be low.

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 expert Field survey, Preparation of texts
Irini Antoniadi	Biologist, MSc	Wolf/Jackal expert Field survey, Preparation of texts
Ioanna Salvarina	Dr. Biologist	Bat/Otter expert Field survey, Preparation of texts
Aliki Dakari	Biologist	Invertebrate expert Preparation of texts
Thanos Kastritis	Dr. Oceanographer	Field worker: Mammal 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
1410	1.407737591255	G	B	C	C	C
3150	669.142228943	G	A	B	B	B
6420	76.075419474841	G	B	C	B	B
92A0	86.5876103065687	G	A	C	B	B
92C0	59.1223670791044	G	A	C	B	B
7210	1.83580676457	G	A	C	C	B

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'

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
F	1103	*Alosa fallax*	r				P		B	C	C	B
F	5094	*Barbus peloponnesius*	p				P	DD	B	B	C	B
F	1144	*Cobitis trichonica*	p				C	DD	A	A	B	A
F	5337	*Economidichthys pygmaeus*	p				C	DD	B	B	C	C
F	5338	*Economidichthys trichonis*	p				P	DD	B	B	A	A
F	5333	*Pelasgus stymphalicus*	p				C	DD	B	A	C	A
F	5344	*Rutilus panosi*	p				C	DD	B	A	B	A
F	1150	*Silurus aristotelis*	p				P	DD	A	B	B	A
F	5334	*Telestes pleurobipunctatus*	p				P	DD	B	C	C	C
F	5341	*Tropidophoxinellus hellenicus*	p				C	DD	B	B	B	B
I	1043	*Lindenia tetraphylla*	p				R	DD	B	B	C	C
I	1032	*Unio crassus*	p				P	DD	C	C	C	C
M	1352	*Canis lupus*					V	P	D	C	B	C
M	1355	*Lutra lutra*	p				C	G	C	A	C	A
M	1310	*Miniopterus schreibersii*	p				P	P		B	C	C
R	1279	*Elaphe quatuorlineata*	p				R	DD	C	B	C	C
R	1219	*Testudo graeca*	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' (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)

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 33 other species of importance for the area included in the SDF, of which 3 are amphibians, 1 fish, 1 invertebrate, 7 mammals, 9 plants and 12 reptiles, of which 23 included in the National Red Data Lists, 24 in International Conventions, while 16 are listed in Annex IV of the Habitats Directive and 1 in Annex V and 8 are listed for other reasons. 1 species is endemic. 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
F	1103	*Alosa fallax*	LC	DD		Y-HTL		III			
F	5094	*Barbus peloponnesius*	LC	LC	X	Y-CTC		III			
M	1352	*Canis lupus*	LC	VU		Y-EXCP	Y-EXCP	II		I/II	
F	1144	*Cobitis trichonica*	EN	LC	X	Y		III			
F	5337	*Economidichthys pygmaeus*	LC	LC	X	Y-CTC					
F	5338	*Economidichthys trichonis*	EN	LC	x	Y-CTC					X
R	1279	*Elaphe quatuorlineata*	NT	LC		Y	Y	II			
I	1043	*Lindenia tetraphylla*	LC			Y	Y	II			
M	1355	*Lutra lutra*	NT	EN		Y	Y	II		I	
M	1310	*Miniopterus schreibersii*	NT	NT		Y	Y	II	II		
F	5333	*Pelasgus stymphalicus*	LC	LC	x	Y-HTL					
F	5344	*Rutilus panosi*	VU	LC	x	Y-CTC					
F	1150	*Silurus aristotelis*	DD	LC	x	Y		III			
F	5334	*Telestes pleurobipunctatus*	LC	LC	(x)	Y-CTC					
R	1219	*Testudo graeca*	VU	LC		Y	Y	II		II	
F	5341	*Tropidophoxinellus hellenicus*	LC	LC	x	Y-CTC					
I	1032	*Unio crassus*	EN			Y	Y				

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), including amendments up to 2007. 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

3150, 6420, 7210, 92A0:

The General Conservation Objectives apply to these habitat types.

1410:

Improve/upgrade the current state of structures and functions (including typical species) to tend towards a Conservation Degree A. Change of the type and magnitude of pressures and threats from medium - high with medium or high effect/impact to low - medium magnitude with small - medium effect/impact, and therefore contribution to the upgrading of the future prospects of the structure and functions of the habitat type from Poor (P) to Good (G).

Lindenia tetraphylla:

Achievement of population Favorable Reference Value (FRV) i.e., species presence in at least 3 cells 10x10km. No significant (10%) reduction of the distribution range below the FRV of the distribution (135.3km^2) and long-term objective to achieve FRV of distribution. Increase (10%) of the current area of the aquatic habitat. Improvement and increase of riparian vegetation. Pollution elimination - water quality restoration.

Unio crassus:

Achievement of population Favorable Reference Value (FRV) i.e., species presence in at least 2 cells 10x10km. No significant (10%) reduction of the distribution range below the FRV of the distribution (75.76km^2) and long-term objective to achieve FRV of distribution. Increase (10%) of the current area of the aquatic habitat. Improvement and increase of riparian vegetation. Pollution elimination - water quality restoration. Increase presence of host fishes (*Cottus gobio, Phoxinus phoxinus, Leuciscus cephalus, Scardinuis erythrophthalmus, Gymnocephalus cernua & Perca fluviatilis*).

Elaphe quatuorlineata:

Conservation of suitable habitat at a percentage of > 50% in 124 cells of 1x1km grid in the Natura 2000 site. Record the presence of the species in 169 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.

Testudo graeca:

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 8 cells of 1x1km grid in the Natura 2000 site. Recording of the species presence in 44 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.

Pelasgus stymphalicus, Rutilus panosi, Silurus aristotelis, Tropidophoxinellus hellenicus:

Positive recording of the presence at a percentage of ≥50% of the locations where the species was distributed. On the habitat, 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 7 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.

Miniopterus schreibersii:

Permanent species presence in at least 7 cells 5x5km within the Natura 2000 site. Average density 1 ind./4km^2. Species presence in each cell of 10x10 species distribution within Natura 2000 site. Suitable feeding habitat covers significant part of the area of 10x10 cells of the species distribution range within Natura 2000 site (> 50%). On habitat quality, see general conservation objectives for the Natura 2000 site in relation to the species' habitat conservation degree.

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, www.fishbase.de, [2]: 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	C
1355	*Lutra lutra*	Riparian zones	Wetlands	Habitat fragmentation, poisoning, water pollution, wetland alteration	Resident, mostly in continental Greece	C
1310	*Miniopterus schreibersii*	Underground roosts		Cave recreation- closure-collapses, vandalism	Resident	
1279	*Elaphe quatuorlineata*	Wood edge and hedges	Wood edge and hedges	Cultivation, roads, pollution, collection	Resident	C
1219	*Testudo graeca*	Areas with dense vegetation and hot summers	Areas with dense vegetation and hot summers	Agricultural intensification, hedge/grassland removal, pollution, roads, collection, fires	Resident, continental Greece	A
1043	*Lindenia tetraphylla*	Locations above of adjacent to freshwater bodies (mating mostly during flight). Ssubmerged hydrophytes, such as Ceratophyllum sp., for oviposition.	Natural and artificial lakes and reservoirs, rivers, streams, eustaries and floodplains. Ascociated with reeds (Phragmites australis), hydrophytes (Ceratophyllum	Changes in water bodies conditions.	Resident to northern and northeast Greece, central and western Greece, new to Crete and Corfu. Also recorded in Thasos	B

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
			sp.), helophytes and shrubs. Humnting grounds also include woodlands (i.e. Quercus sp.).			
1032	*Unio crassus*	Flowing water (fertilization and glochidial larvae release)	Depending on the life-cycle stage, in freshwater bodies (natural lakes, rivers, streams): 1) animal hosts (freshwater fish), such as Phoxinus phoxinus and Squalius cephalusa (larval, parasitic stage) 2) river-bed substratum 3) substratum surface (filter-feeding adults)	Pollution to surface waters, Changes in water bodies conditions (especially temperature rise), Fertilisation in agriculture, Modification of cultivation practices, Discharges (household/ industrial), Other changes to ecosystems, Abiotic natural processes, Abiotic changes (climate change), Other forestry activities, Production of renewable energy (abiotic).	Continental. Resident to northestern, central and western Greece and southern Peloponnese	B
1103	*Alosa fallax*	schooling and strongly migratory, but apparently not penetrating far up rivers. anadromous, entering river mouths in March (Italy) or early June (northenr European rivers) to spawn in or above the tidal reaches; adults probably return to sea not long after spawning	open waters along the coast, along estuaries and near the shore	pollution and impoundment of large rivers	Mediterranean Sea	B

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
5094	*Barbus peloponnesius*	lakes and water bodies on low-lying plains, with little current, lower and upper parts of streams with stone bottom and current	lakes and water bodies on low-lying plains, with little current, lower and upper parts of streams with stone bottom and current	water abstraction	endemic to the western Greece from Kalamas to Pamissos drainages. Introduced and established in the Isonzo River, northeastern Italy	B
1144	*Cobitis trichonica*	lakes and lowland water courses with little current	lakes and lowland water courses with little current	water abstraction	Endemic to Acheloos drainage in Greece	A
5337	*Economidichthys pygmaeus*	both flowing and stagnant shallows with abundant vegetation and detrital substrate. Spawns in March and April	both flowing and stagnant shallows with abundant vegetation and detrital substrate.		in rivers and streams of western Greece, north of the Patraikos Gulf, including Lefkas Island	B
5338	*Economidichthys trichonis*	areas covered by aquatic vegetation, in reed stands; in sheltered bays down to 15 m, at the mouth of tributary streams and has been observed in small shoals near the surface, over open areas of gravel or stones	areas covered by aquatic vegetation, in reed stands; in sheltered bays down to 15 m, at the mouth of tributary streams and has been observed in small shoals near the surface, over open areas of gravel or stones	land reclamation, lake level fluctuations resulting to water abstraction and pollution	endemic to the oligotrophic Lake Trichonis, western Greece	B
5333	*Pelasgus stymphalicus*	wetlands and in lowland water courses with little current. Spawns in December to March	wetlands and in lowland water courses with little current	water abstraction and habitat destruction	Lake Stymphalia in Peloponnese, Greece. Populations from lower	B

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
					Alfios and Pinios (Peloponnese), Etolia-Acarnania and Lefkas island treated as conspecific	
5344	*Rutilus panosi*	lakes. spawning season may commence at the end of January and extend possibly until March-April	lakes		Acheloos and Louros river systems in Greece; lakes Trichonis and Ambrakia. Introduced in Lake Joannina.	B
1150	*Silurus aristotelis*	lowland rivers and nutrient-rich lakes	lowland rivers and nutrient-rich lakes		Acheloos drainage in Greece. Introduced in Lakes Pamvotis and Volvi.	A
5334	*Telestes pleurobipunctatus*	lowland water courses with little current, streams with moderate to swift current, often in cavities along shores	lowland water courses with little current, streams with moderate to swift current, often in cavities along shores	pollution, habitat destruction, water abstraction	Corfu Island and from Butrintit to Alfios drainages (southern Albania and western Greece)	B
5341	*Tropidophoxinellus hellenicus*	lowland water courses with little current	lowland water courses with little current		Acheloos and Pinios (Peloponnese) drainages in Greece	B

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	
	
	
	

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
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IP	Photograph	Sampling Plot	Filename / Date
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2156		ABR40	JPEG_20210426154328988.jpg
2156		ABR40	JPEG_20210426154403408.jpg

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2153-2154		ABR38	JPEG_20210426125645824.jpg
2153-2154		ABR38	JPEG_20210426150002721.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

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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 - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2310009"

Map n°:	
M1-N07 S08	*STUDY AREA: NATURA 2000 SITES CROSSED BY ONSHORE EASTMED PIPELINE / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ: ΠΕΡΙΟΧΕΣ NATURA 2000 ΠΟΥ ΤΕΜΝΕΙ Ο ΑΓΩΓΟΣ EASTMED*

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ
1:2.500.000		0A

Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας:	Engineer's DWG No/ Αρ. Σχ. Μελετητή:	Sheet/ Φύλλο
A3	-	AUT-11727500-STU-XXX/ Section 11.1.1	

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-N09 S08A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310009" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310009" 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	PIM	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 - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2310009"

Map n°:			
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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

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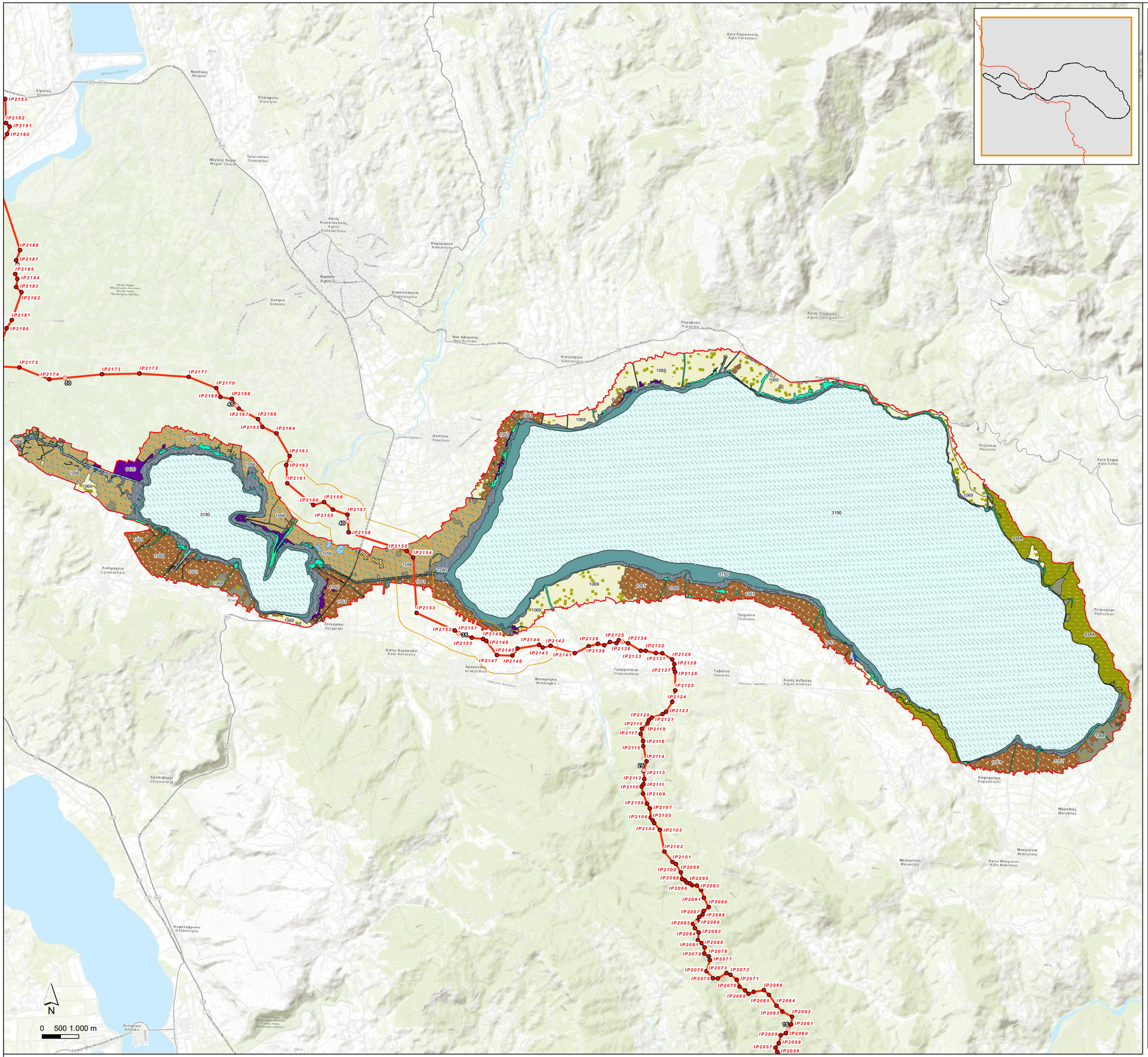

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N09 S08A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310009" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310009" 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/ΕΟΚ)

- 1410 Mediterranean salt meadows (Juncetalia maritimi) / Μεσογειακά αλίπεδα (Juncetalia maritimi)
- 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation / Ευτροφικές φυσικές λίμνες με βλάστηση τύπου Magnopotamion ή Hydrocharition
- 3190 Open water surfaces / Υδάτινη επιφάνεια που δεν καλύπτεται από βλάστηση
- 6420 Mediterranean tall humid herb grasslands of the Molinio-Holoschoenion / Υγροί μεσογειακοί λειμώνες με υψηλές πόες της Molinio – Holoschoenion
- 7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae / *Ασβεστούχοι βάλτοι με Cladium mariscus και είδη της Caricion davallianae
- 92A0 Salix alba and Populus alba galleries / Δάση-στοές με Salix alba και Populus alba
- 92C0 Platanus orientalis and Liquidambar orientalis woods (Plantanion orientalis) / Δάση Platanus orientalis και Liquidambar orientalis (Platanion orientalis)

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
- 1024 Provincial roads / Δρόμοι επαρχιακοί
- 1025 Provincial roads / Δρόμοι επαρχιακοί
- 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
- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
- 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
- 1080 Water bodies / Συλλογές υδάτων
- 21B0 Unvegetated sandy beaches / Αμμώδεις παραλίες χωρίς βλάστηση
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 72A0 Reed beds / Καλαμώνες
- 72B0 Large Sedge communities / Κοινωνίες των υψηλών βούρλων
- 934A Greek Kermes oak forests / Ελληνικά δάση Πρίνου

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

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0A	28/2/2022	ISSUED FOR REVIEW	NCC Ltd	PjM	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

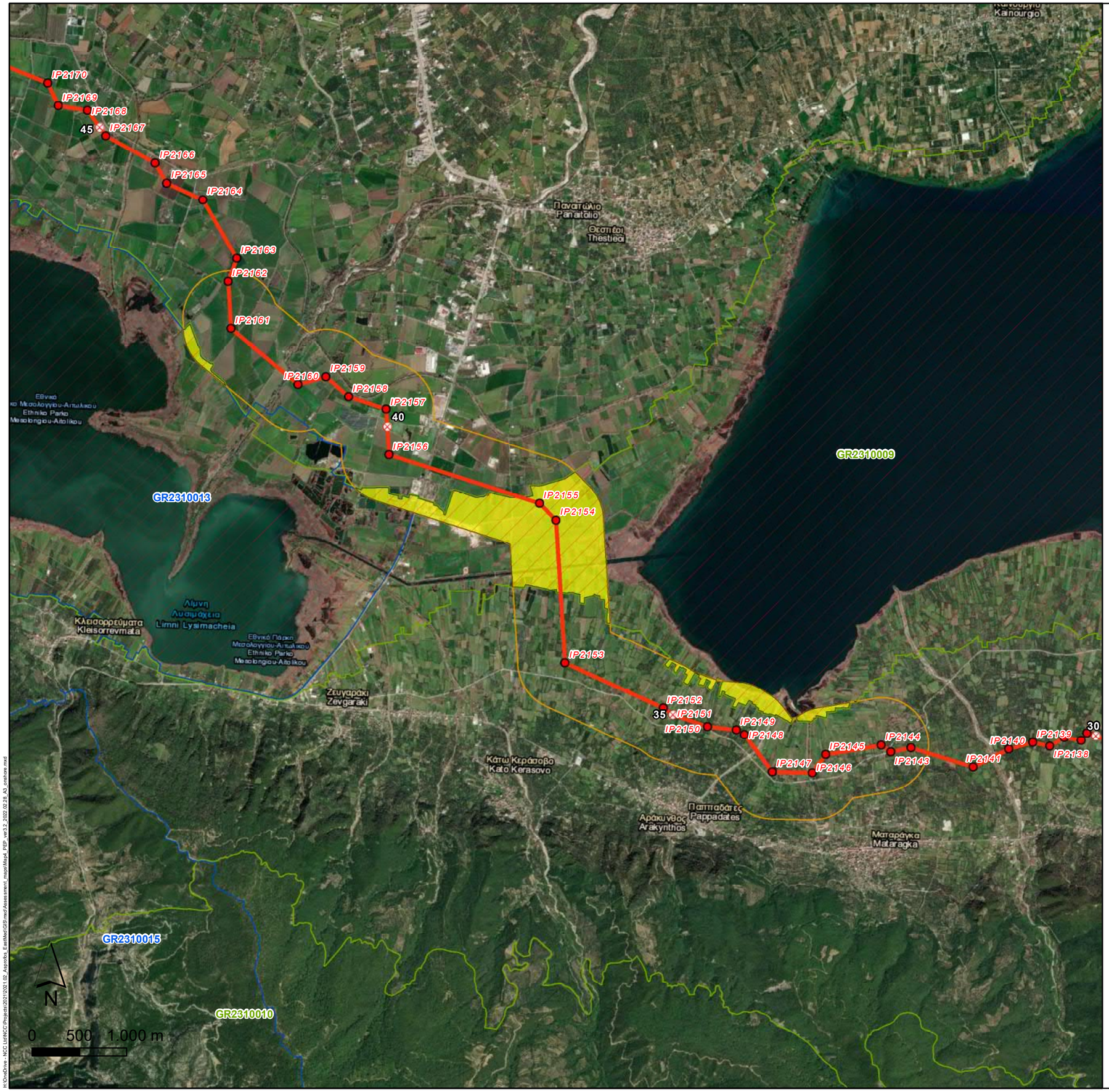
PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310009"

Map n°:	
M3-N09 S08A01	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE STUDY AREA /* *ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ* *ΣΤΗΝ ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*

Scale/Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/Αναθ
1:50.000			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



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REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2310009"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2310009"
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 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

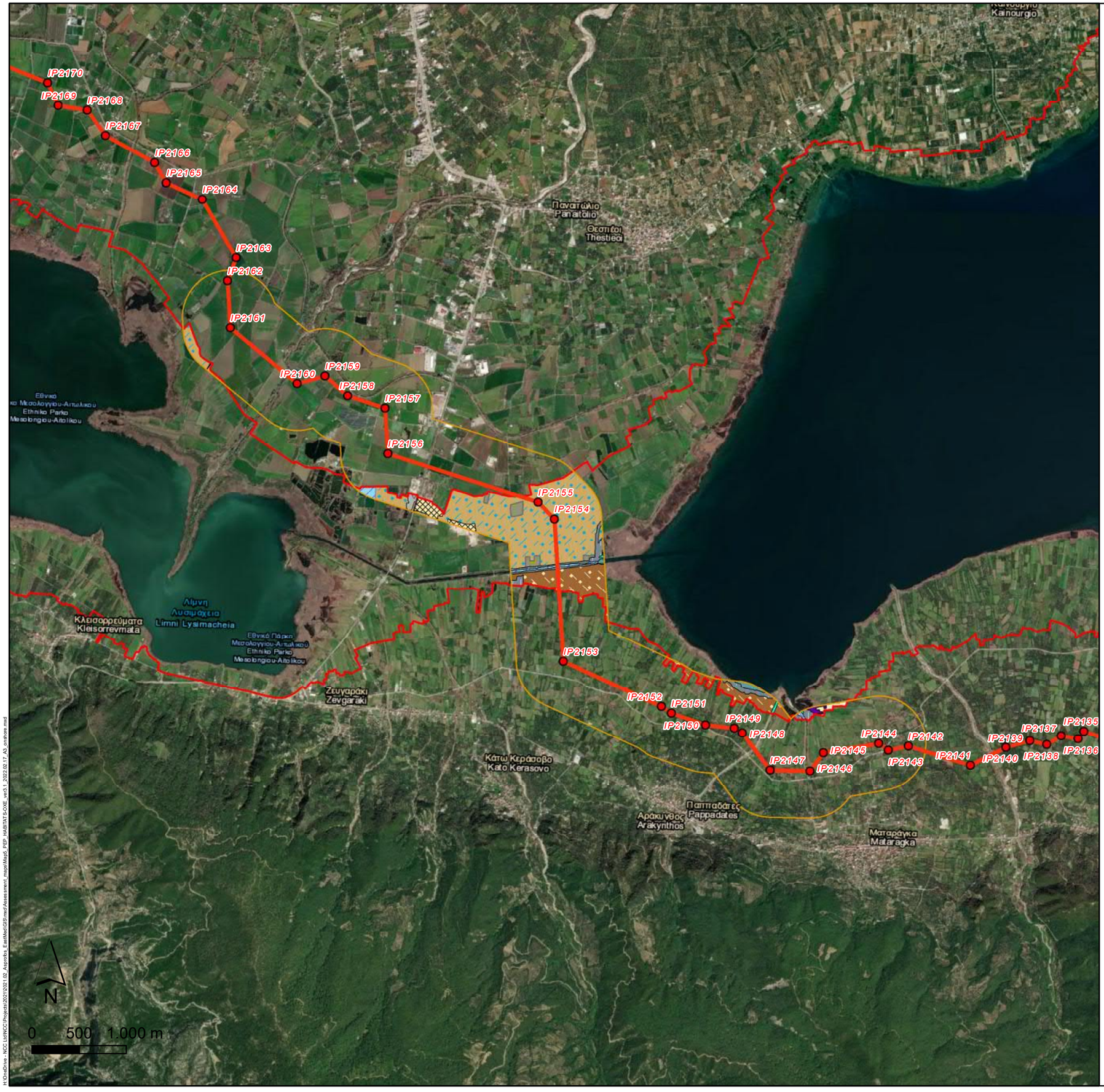
DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310009"

Map n°:	
M4-N07 S08A01	*FIELD SURVEY AREA / ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/ Αναθ
1:40.000			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



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2310009"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2310009"
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)

- 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation / Ευτροφικές φυσικές λίμνες με βλάστηση τύπου Magnopotamion ή Hydrocharition
- 6420 Mediterranean tall humid herb grasslands of the Molinio-Holoschoenion / Υγροί μεσογειακοί λειμώνες με υψηλές πόες της Molinio – Holoschoenion
- 92A0 Salix alba and Populus alba galleries / Δάση-στοές με Salix alba και Populus alba

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

- 1012 Services areas / Χώροι εξυπηρετήσεων
- 1021 Concentration of agricultural - processing units / Συγκεντρώσεις αγροτικών - μεταποιητικών μονάδων
- 1023 National roads / Δρόμοι εθνικοί
- 1025 Provincial roads / Δρόμοι επαρχιακοί
- 1032 Construction sites / Χώροι δόμησης
- 1051 Non-irrigated arable land - mixed / Μη αρδεύσιμη-αρόσιμη γη μεικτή
- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
- 1068 Olive groves - pure / Ελαιώνες αμιγείς
- 1069 Olive groves - mixed / Ελαιώνες μεικτοί
- 1080 Water bodies / Συλλογές υδάτων
- 72A0 Reed beds / Καλαμώνες

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 "SAC - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310009"

Map n°:	
M5-N07 S08A01	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE FIELD SURVEY AREA /ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/ Αναθ
1:40.000			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 " GR2310009"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2310009"
ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

- Routing Chainage (5km) / Χιλιομέτρηση Όδευσης (5 χλμ.)
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- Study Area / Περιοχή Μελέτης

Natura 2000 Network / Δίκτυο Natura 2000

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- 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
- JaWo: Canis aureus - Canis lupus
- L: Lutra lutra
- P: Plants - Habitat types / Χλωρίδα - οικότοποι

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 " - GR2310009" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2310009"

Map n°:	
M6-N06 S08A01	*FIELD SURVEY POINTS / ΣΗΜΕΙΑ ΔΕΙΓΜΑΤΟΛΗΨΙΑΣ*

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/ Αναθ
1:40.000			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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