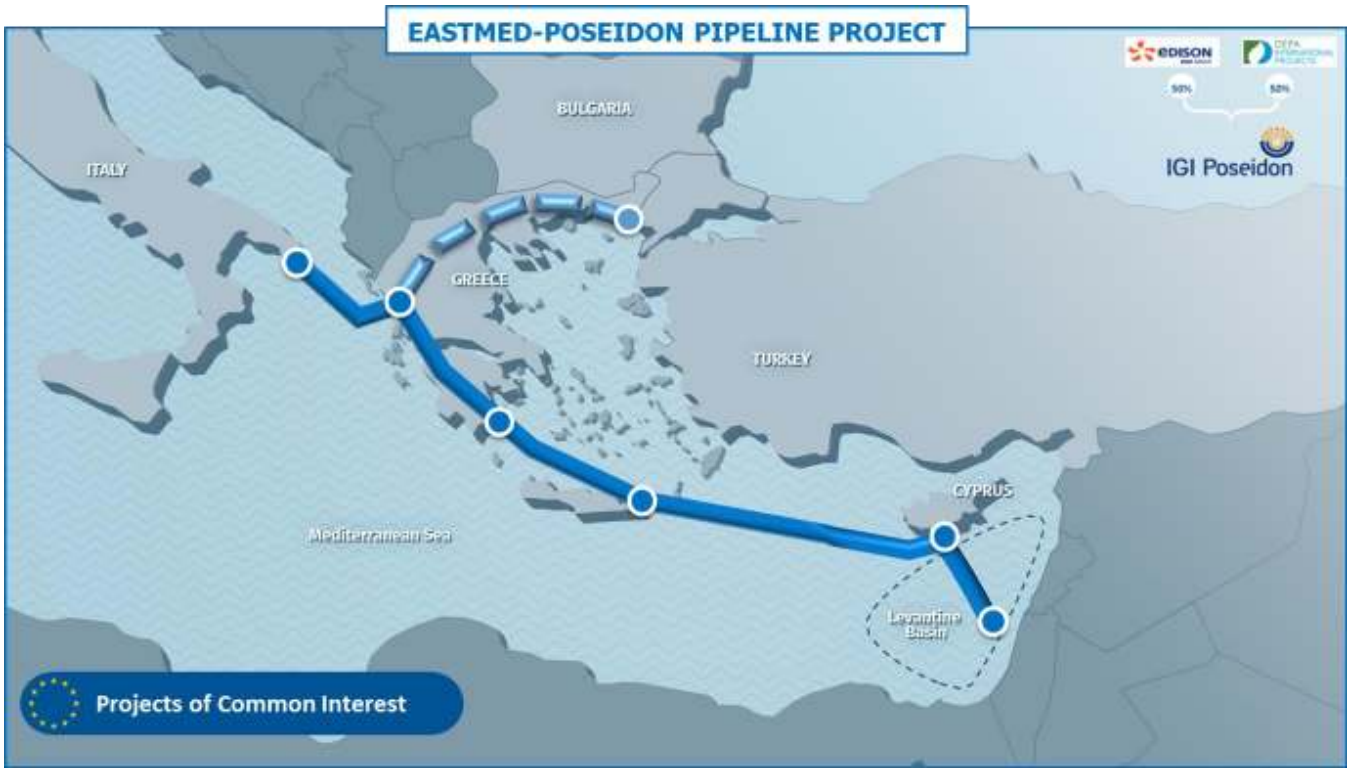
PROJECT:

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 "Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001

According to Greek national legislation Law 4014/2011 an Environmental Impact Assessment 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 indispensable part of the projects' ESIA.

The EastMed Pipeline Project has offshore and onshore sections and is directly connecting East Mediterranean resources to mainland Greece via Cyprus and Crete. The project is being developed by IGI Poseidon (Project Owner), a company based in Athens and equally owned (50-50%) by the Greek company DEPA International Projects S.A. and the Italian company Edison S.p.A.. The ESIA has been prepared on behalf of the Project Owner by the company ERM Italia SpA and the engineering company ASPROFOS Engineering S.A. (member of the HELPE Group of Companies) and in collaboration with renowned, experienced and specialised consultants, in accordance with applicable environmental legislation. The AAs of the Project have been carried out by Nature Conservation Consultants Ltd (NCC), subcontractor of ASPROFOS Engineering S.A.

The present AA concerns the Special Area of Conservation "Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001, 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 Amvrakikos Gulf - Lefkada, the responsible Body for the management and protection of the site and requested the most up to date information on habitats, flora and fauna monitoring in the site available from its' biodiversity data-bank.

The pipeline crosses at the same location the SPA "Amvrakikos Kolpos, Limnothalassa Katafourko Kai Korakonisia", GR2110004, 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 biodiversity data 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) "Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001, 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 43 days between April 2021 and December 2021, including the following activities:

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

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 normal operative conditions of the 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) Projects are classified in two categories: Category A, when they potentially may cause very significant/significant environmental impacts, or in Category B, when they may cause only locally or of no significance environmental impacts.

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

- detailed record of natural environment data with emphasis to the protected elements of the Natura 2000 sites and those likely to be affected by the project or activity,

- appropriate assessment and impact assessment,
- mitigation measures for the potential impacts,
- compensatory measures (if needed)
- monitoring program,
- conclusions summary,
- bibliography sources and
- study team.

1.3.4 Classification of the project based on National legislation

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

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

Legislation	Category	Project Categorization
MD 1958/2011	Group	11 - Transport of energy, fuels and chemical compounds
	No.	1 – Pipelines of national importance or included in European or international networks and associated/ supporting facilities
	Category	A1 – Project and activities that may have very significant impacts on the environment
	Comment	-
STAKOD 08/ NACE Rev.2*	Section	D – Electricity, Gas, Steam and Air Conditioning Supply
	Division	35 – Electricity, gas, steam and air conditioning supply
	Group	35.2 – Manufacture of gas; distribution of gaseous fuels through mains
	Class	35.23
	Description	Trade of gas through mains
JMD 3137/191/Φ.15/2012*	Group	n/a
	Sub-group	n/a
	No.	n/a
	Disturbance class	n/a
* The classification presents the activity most relevant to the Project. The applicable provisions concern also the compressor stations. *It is noted that the compressor stations, having a total capacity >50 MW, fall into the provisions of JMD 36060/1155/E.103 regarding "Establishing a framework of rules, measures and procedures for the integrated*		

Legislation	Category	Project Categorization
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 "Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001. As shown in Figure 2-1 the routing of the Onshore pipeline crosses the northernmost edge of the Natura 2000 site at Louros and Arachthos rivers for a length of 0.6 km.

According to the National regulatory specifications (MD 170225/2014), the Field Survey Area (FSA) for linear projects (such as the pipeline) is defined as a buffer zone of at least 500m on either side of the linear infrastructure falling within the Study Area. Consequently, the FSA for the present AA is an area of 1km in width and of 0.6km in length within the Natura 2000 site, strictly considering the intersection between the pipeline and the site (at KP: 134.84 - 135.02 & 159.63 - 160.02 and at IP: 2578-2579 & 2513-2514). However, given that:

- the routing of the pipeline extends also 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 area outside the Natura 2000 site, covering a total surface area of 716ha, of which 126ha overlap with the Natura 2000 site (0.21% 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. Specifically the two main water bodies within the protected site, namely Arachthos and Louros rivers, shall be crossed with the use of trenchless technique (HDD), in order to avoid impacts on aquatic and riparian ecosystems of the protected area (see Figure 4-10, Figure 4-11). Project activities will only take place in adjacent rural ecosystems of the area, on either side of the rivers outside the SAC.

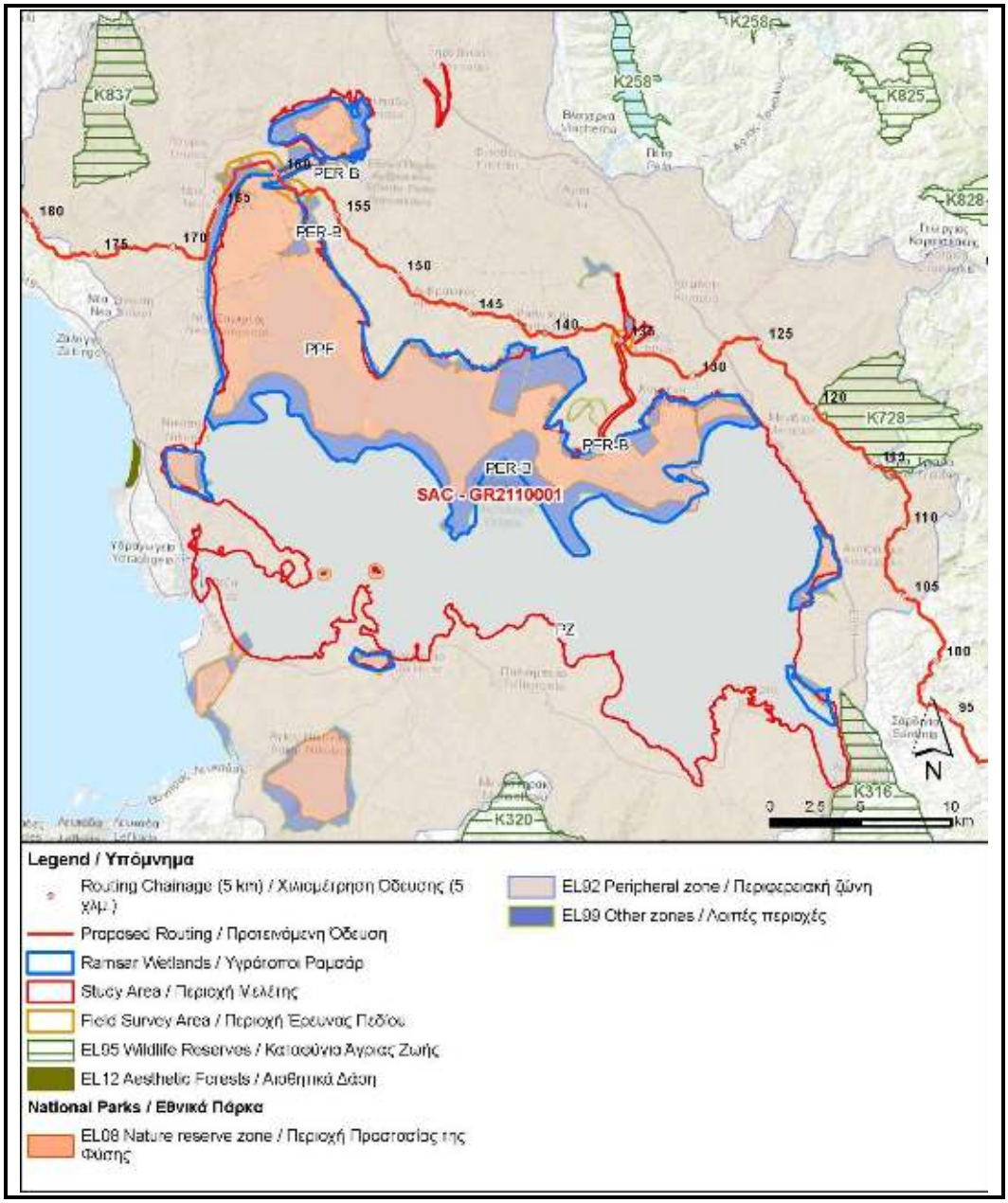
It should also be mentioned that the pipeline crosses also other protected areas (Figure 2-2), which overlap with the Study Area and are presented in Section 3.1.1, namely (a) the Ramsar site of Amvrakikos Gulf at IP 2576-2577 and 2578-2579, (b) the SPA GR2110004 at IP 2578-2579 and (c) the National Park of Amvrakikos wetlands and three of its zones, namely:

- Zone A (EL08), the nature protection area, inside the Natura 2000 site, at Louros river part of the pipeline routing at IP 2578-2579.

- Zone B (EL99), the special settings area, at Arachthos river (at 135km, part of the pipeline routing at IP 2513-2514) and at Louros river, as well as the surrounding area of Rodia lagoon (between IP 2576-2586, outside Zone A and approximately the part at IP 2579-2580, IP 2583-2584, both areas being outside the Natura 2000 site).
- Zone C (EL98), the area of environmental control, outside the Natura 2000 site, at IP 2401-2606, except of the pipeline routing at IP 2440-2442 and outside the aforementioned zones.

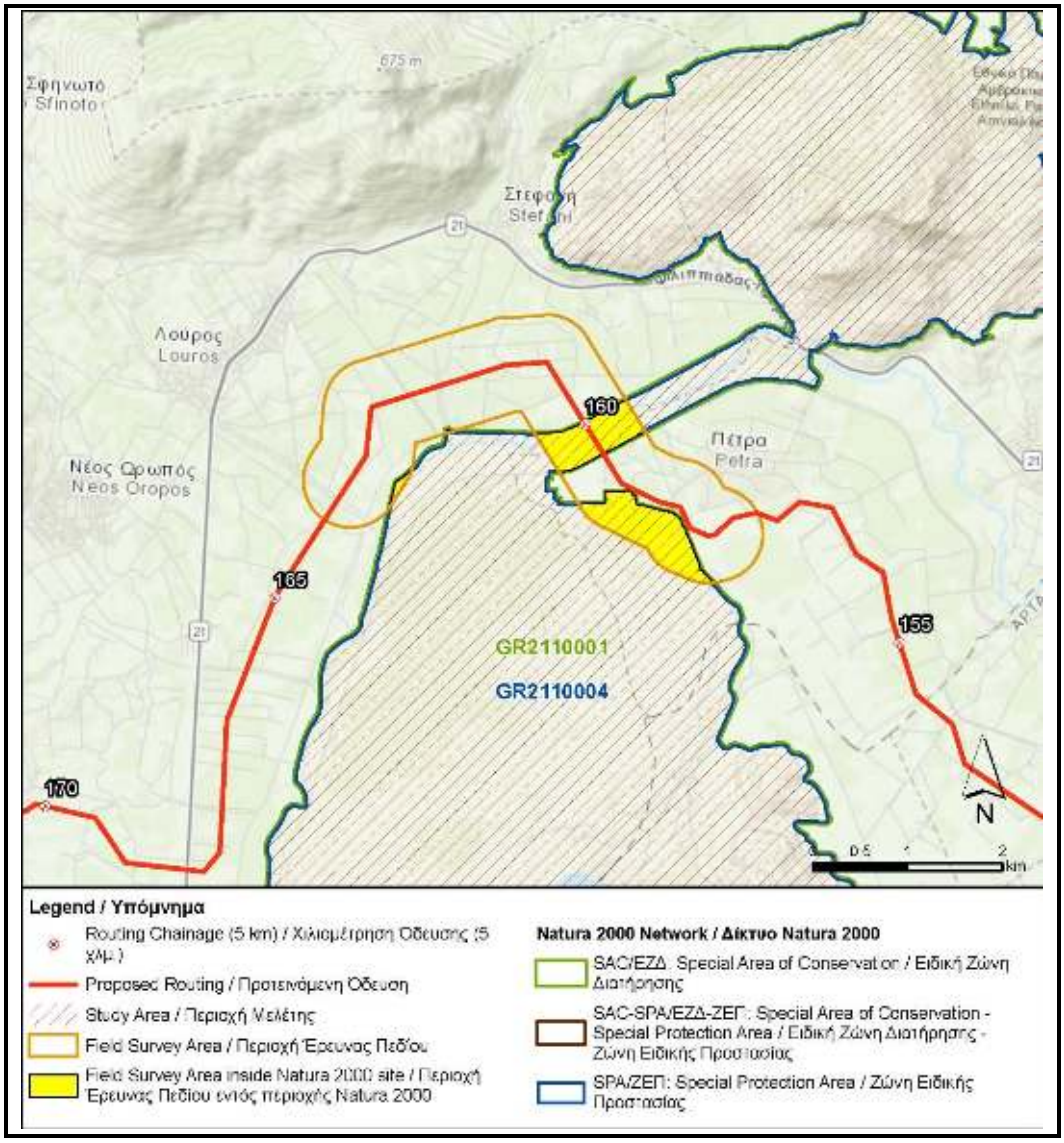
Prepared by: (NCC, 2021)

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



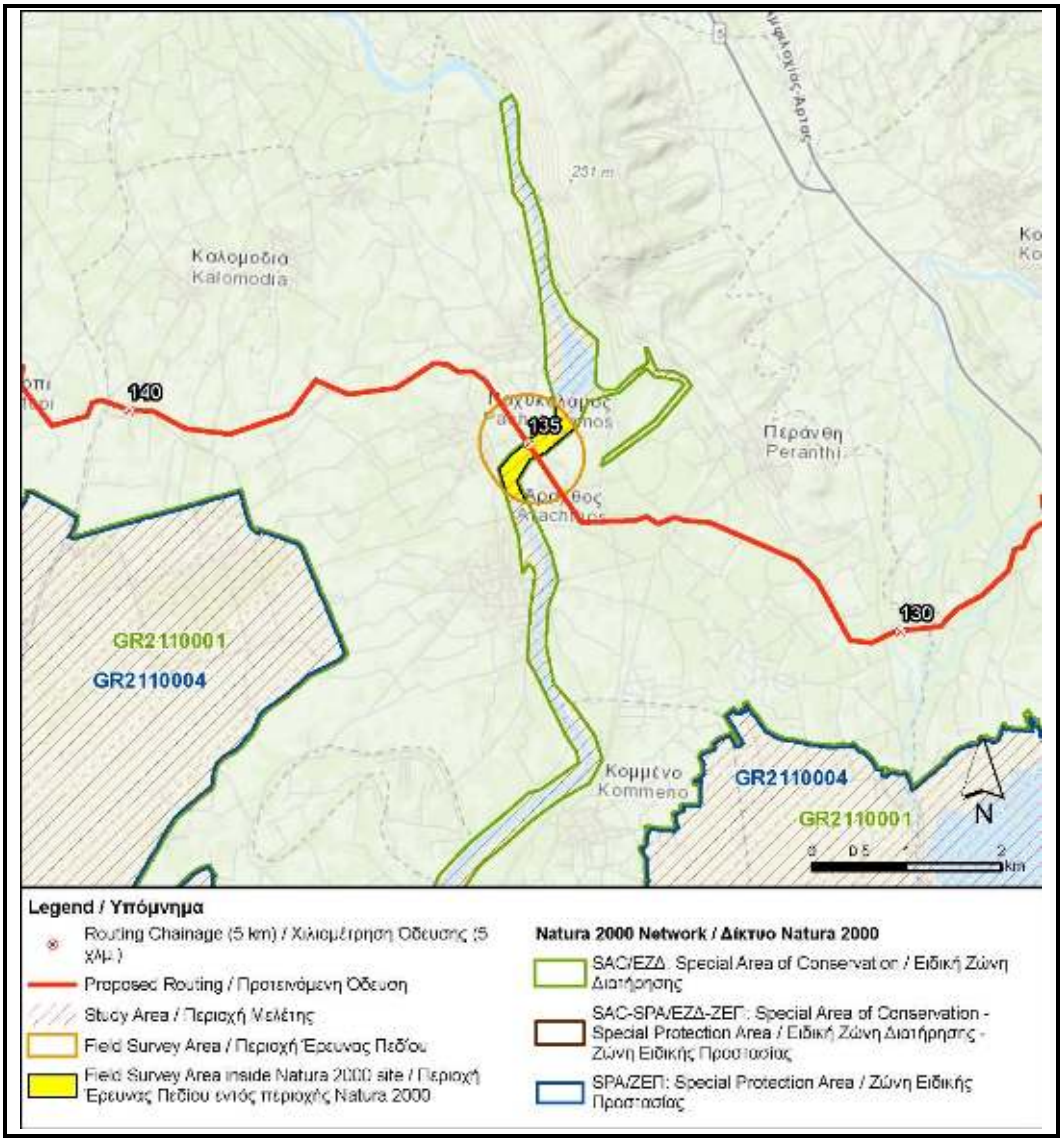
Prepared by: (NCC, 2021)

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) at Louros river at KP approx. 160. Pipeline routing in red



Prepared by: (NCC, 2021)

Figure 2-4 Field Survey Area (in yellow the FSA part within the SAC) at Arachthos river at KP approx.. 135. Pipeline routing in red

3 CURRENT STATUS OF NATURAL ENVIRONMENT

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

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

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

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

In particular, for the purpose of the present document, a literature review of published references and a desktop review of data available from existing databases were carried out for the Study Area.

The main bibliographic sources of information used include:

- The Standard Data Form of SAC Area GR2110001 (2020).
- The most recent reports on the implementation of Directives 92/43/EEC and 2009/147/EC, including habitat mapping.

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

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

3.1.1 Short description of the Study Area

The Study Area is the Special Area of Conservation “Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)”, GR2110001, which is located within the administrative limits of the Regions of Epirus and Western Greece covering an area of 60,155.58 hectares. The area is managed by the Management Body of Amvrakikos Gulf - Lefkada. The area of Amvrakikos Gulf is designated as a Ramsar site (GR61), while the Study Area overlaps with

the Special Protection Area GR2110004 "Amvrakikos Kolpos, Limnothalassa Katafourko Kai Korakonisia" and it is part of the National Park of Amvrakikos wetlands.

The site consists of a complex ecosystem including the shallow marine waters of the gulf itself, a rare wetlands formation of a double delta of Louros and Arachthos rivers, a lagoon system composed of three major lagoons (Rodia, Tsoukalio, Logarou) and some smaller ones (Mazoma, Tsopeli, Koftra-Paliobouka, Agrilios), as well as a sea zone just south of them. The lagoons are mainly shallow, with depth not exceeding 2m, with narrow sandy strips separating them from the sea. The gulf is connected to the Ionian Sea to the west through a narrow natural channel. The whole delta covers an area of about 450 km^2. The total area of the lagoons is approximately 80 km^2. Variable habitats characterize the area. Dense and extensive reed communities (Phragmitetum) cover a large terrestrial part of the site and can be differentiated in a major area along the Louros and in many small areas in the eastern sector. Close to the reed-belts, stands of *Scirpetum maritimi* as well as patches of *Nymphaea alba* and *Iris pseudacorus* occur. Very few stands of gallery woodlands remaines in the Louros - Arachthos double delta. The maquis vegetation covers a small area with main distribution on the surrounding hills. The single true evergreen woodland is found in the peninsula of Koronisia, while the last remaining stands of deciduous woodland are found on the northeast of the Mavrovouni hill and according to their species composition belong to the Coccifero - Carpinetum community.

It is one of the best conserved ecosystems with high ecological value at both national and international level. It hosts all elements of a typical natural Mediterranean delta. The habitat types that are in a very good ecological condition and cover large areas are the wet meadows of *Juncus* and the halophytic communities of the class Arthrocnemetalia. The halophilous vegetation covers an area of 43km^2 and this is the third largest delta complex in Greece. The Tsoukalio lagoon is one of the largest of its kind in Greece and the Mediterranean region. The major reedbed area at Louros can be considered as one of the largest coherent reedbeds in Greece, and the deciduous woodland on the Mavrovouni hill represents a system comparatively rare in Greece.

It hosts several endemic plant species, while some additional interesting plants include *Spirodela polyrhiza*, *Alnus glutinosa* and *Fraxinus angustifolia* clusters, as well as *Salvinia natans* and *Cotula coronopifolia*.

The area hosts a very diverse and abundant fauna, with several vertebrate taxa (other than birds) recorded in the area. Species of interest include endemic fish species, as well as *Neomys anomalus*, *Dryomys nitedula*, *Canis aureus*, and *Delphinus delphis*.

The marine area of the site is considered of great importance for the local resident population of *Tursiops truncatus*. The species is the only cetacean species living in the murky and eutrophic waters

of the Gulf of Ambracia, constituting a geographically and otherwise distinct group with little demographic exchange with probably one of the most important isolated population units of the species in the Mediterranean Sea. The site is also a foraging area of *Caretta caretta*.

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 the official habitat mapping, the Natura 2000 site hosts 19 habitat types of Annex I of Directive 92/43/EEC. Most of the area is covered by coastal lagoons, halophilous scrubs and salt meadows. The rest of the area is covered by riparian galleries and thickets, *Olea* and *Ceratonia* and *Quercus ithaburensis* subsp. *macrolepis* forests, phrygana, reedbeds, etc. Table 3-1 provides the spatial extension of each habitat identified in the Study Area, as well as their percentage with respect to the whole Natura 2000 site area, as provided by the habitat map of the site (Ministry of Environment, 2018).

Two priority habitats are present in the area, namely the Coastal lagoons (1150*) and the Posidonia beds (1120*).

It should be noted that the available spatial information concerns only terrestrial habitats (namely 28,884 ha – 48% of the site) and the information on marine habitats is only qualitative.

With regard to flora species, no species of the Directive 92/43/EEC have been identified. Only one of the other important species, *Salvinia natans*, is mentioned in the area.

Table 3-1 Habitat types found at the site

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
Habitat types included in the SDF				
Marine habitat types				
1110	Sandbanks which are slightly covered by sea water all the time	No Data		HD: Annex I
1120*	Posidonia beds (*Posidonion oceanicae*)	No Data		HD: Annex I
1130	Estuaries	No Data		HD: Annex I
Terrestrial habitat types				

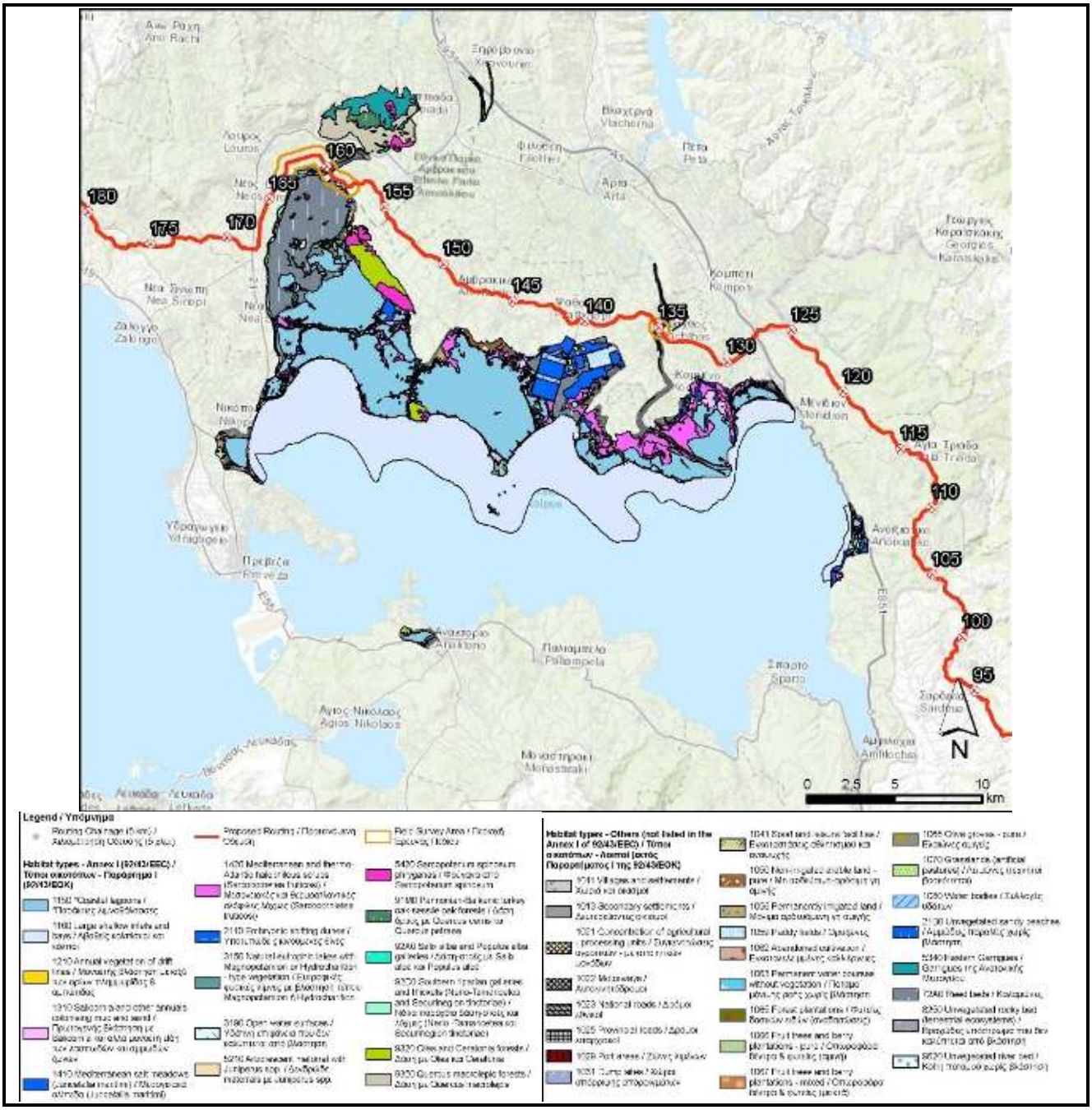
Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
1150*	Coastal lagoons	8,577.41	14.26%	HD: Annex I
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	1878.86	3.12%	HD: Annex I
1410	Mediterranean salt meadows (*Juncetalia maritimi*)	1344.96	2.24%	HD: Annex I
9350	*Quercus macrolepis* forests	686.78	1.14%	HD: Annex I
9320	Olea and Ceratonia forests	510.82	0.85%	HD: Annex I
5420	*Sarcopoterium spinosum* phryganas	389.19	0.65%	HD: Annex I
1310	Salicornia and other annuals colonizing mud and sand	326.51	0.54%	HD: Annex I
91M0	Pannonian-Balkanic turkey oak –sessile oak forests	125.93	0.21%	HD: Annex I
92D0	Southern riparian galleries and thickets (Nerio-Tamaricetea and *Securinegion tinctoriae*)	412.84	0.69%	HD: Annex I
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	54.43	0.09%	HD: Annex I
1210	Annual vegetation of drift lines	16.23	0.03%	HD: Annex I
2110	Embryonic shifting dunes	4.96	0.01%	HD: Annex I
92A0	*Salix alba* and *Populus alba* galleries	1.37	0.00%	HD: Annex I
5210	*Juniperus drupacea* arborescent matorral	0.29	0.00%	HD: Annex I
Other habitat types				
1160	Large shallow inlets and bays	9611.68	15.98%	HD: Annex I
3190	Open water surfaces	52.74	0.09%	
72A0	Reed beds	2873.42	4.78%	Of national importance
5340	Eastern Garrigues	525.25	0.87%	Of national importance
1068	Olive groves - pure	259.49	0.43%	
1056	Permanently irrigated land	234.45	0.39%	

Code	Description of habitat type	Area (ha)	Percentage (%)	Classification
1063	Permanent water courses without vegetation	195.71	0.33%	
1050	Non-irrigated arable land - pure	184.67	0.31%	
1059	Rice fields	148.41	0.25%	
1062	Abandoned cultivation	113.01	0.19%	
1080	Water bodies	96.03	0.16%	
1011	Villages and settlements	52.51	0.09%	
1021	Concentration of agricultural/processing units	43.40	0.07%	
9620	Unvegetated river bed	31.07	0.05%	
1065	Forest plantations	17.52	0.03%	
1066	Fruit trees and berry plantations - pure	15.98	0.03%	
1013	Secondary settlements	12.88	0.02%	
1025	Provincial roads	11.87	0.02%	
1023	National roads	9.30	0.02%	
1041	Sport and leisure facilities	8.24	0.01%	
1070	Grasslands (artificial pastures)	4.48	0.01%	
21B0	Unvegetated sandy beaches	3.05	0.01%	
1029	Port areas	2.34	0.00%	
1031	Dump sites	1.89	0.00%	
1067	Fruit trees and berry plantations - mixed	1.61	0.00%	
8250	Unvegetated rocky bed (terrestrial ecosystems)	0.62	0.00%	
1022	Motorways	0.54	0.00%	

Note: HD: Habitats Directive, source: SDF and official habitat mapping

Prepared by: NCC, 2021.

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



Prepared by: (NCC, 2021)

Figure 3-1 Habitat type coverage at the Study Area

3.1.2.2 Fauna

The Natura 2000 site is one of the best conserved ecosystems with high ecological value at both national and international level. It hosts all elements of a typical natural Mediterranean delta. The species for which the site has been designated are 18, namely 3 mammal (*Lutra lutra, Monachus monachus, Tursiops truncatus*), 7 reptile (*Caretta caretta, Elaphe quatuorlineata, Zamenis situla, Emys orbicularis, Mauremys rivulata, Testudo hermanni, Testudo marginata*), 7 fish (*Alosa fallax, Cobitis arachthosensis, Economidichthys pygmaeus, Eudontomyzon graecus, Pelasgus thesproticus, Telestes pleurobipunctatus, Valencia letourneuxi*) and one invertebrate species (*Lycaena dispar*). 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, Valencia letourneuxi* are rare and the species *Zamenis situla, Eudontomyzon graecus, Lutra lutra, Monachus monachus* very rare. Furthermore, 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.

Of the species included in the SDF, all are protected under the Habitats Directive and are included in Annex II, while 12 of them are also included in Annex IV. In total 11 species have been characterized as Critically Endangered, Endangered, Near Threatened or Vulnerable worldwide (IUCN), while at national level 11 are under the same threat status and 6 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 bibliographic sources.

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 Natura 2000 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, EO21) and the high voltage network at its southern part, as well as the local road network crossing the site and the FSA of the pipeline.

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 43 daysof field work have been conducted (timing provided in Table 3-2); more specifically:

- 17 days of field work were conducted during April 2021 (spring survey)
- 22 days of field work were conducted during May 2021 (summer survey)
- 2 day of field work were conducted during October 2021 (autumn survey)
- 2 day of field work were conducted during December 2021 (winter survey)

During which the following activities were conducted:

- Field data collection for mammals, namely *Lutra lutra, Canis aureus, Canis lupus* and bats at 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 at the FSA, by a herpetofauna expert.
- Field data collection for invertebrates at the FSA, by an invertebrate expert.
- Field data collection for ichthyofauna at the rivers 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.

The main focus of the field work carried out was during spring and summer period.

Table 3-2 Timetable of the Field work days

Group	Date	No of field work person-days
General site assessment	22-23/05/2021	2
Habitats, Flora	24/05/2021	1
Jackal/Wolf	27-28/04/2021	7

Group	Date	No of field work person-days
	19/12/2021	
Otter	27-28/04/2021 22-25/05/2021	6
Bat species	27-28/04/2021	4
Reptiles – Amphibians	27-28/04/2021 22-24/05/2021 5/10/2021	12
Ichtyofauna (HCMR, 2021)	20-21/05/2021	6
Invertebrates	22-24/05/2021	5
Total		43

Prepared by: (NCC, 2021)

The field work methodological approach aimed at:

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

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

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

3.3.1.1 Field survey methodology for Habitats/flora

The purpose of the survey on habitat types is to locate important habitat types, identify important flora species by mapping their habitats in order to describe their coverage and population respectively. The results have been processed in the form of a map of habitat types. The research techniques used are the interpretation of satellite images and on site-landscape verification.

Satellite images provide important information about habitat types and land uses of the Study Area. Through the interpretation of an updated satellite image, the general conditions (e.g. vegetation

coverage, land use) of the Study Area and the wider area are easily illustrated and provide a preliminary map of habitat types. 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 preliminary map 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 3-16, Figure 3-17) 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 sampling period does not allow the identification and distinction of all plant species. As a result, additional to the fieldwork, the following were taken into account: (a) the results of the monitoring projects for habitats and species and (b) the available bibliographical data for the areas the pipeline crosses (e.g. Sarika et al. 2005).

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, in search of signs of the species presence or reproduction within the FSA (Figure 3-16, Figure 3-17). Furthermore, other areas of possible interest/sensitivity in proximity were also inspected. The surveys were conducted both during day and night. During day, the signs of presence expected to be found were tracks and scats, whereas during 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 four (4) points and surveys along four (4) transects.

Regarding bat species, passive acoustic bat recording was conducted stationary (Figure 3-16, Figure 3-17) for 1 full night (from 30 min before sunset to sunrise) at 2 locations within the FSA at Arachthos River and at 2 more locations at Louros- Rodia wetland. Bat recorders SM4BAT-FS were used with UU2 microphones on a 3m pole (Figure 3-3). Additionally, a car transect near Rodia wetland was conducted using the same type of recorder and night vision camera.

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

Apart from the above-mentioned fieldwork, information on bat roosts and bat presence in the area was collected by the Greek Bat Database held on Natural Museum of Crete, University of Crete, Greece and contacting local people and speleologists.

Reference: (NCC, 2021)

Figure 3-3 The microphone on the 3m pole (at the fence, on the left of the road) that is connected with the SM4BAT-FS recorder at Arachthos.

Reference: (NCC, 2021)

Figure 3-4 Photo of a bat flying, using night vision camera.

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 indirectly (Figure 3-16, Figure 3-17), 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 where 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 on foot for otter signs, both at riparian vegetation as well as on stones exceeding the river bank, usual locations for droppings and food leftovers. As this monitoring 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 3-16, Figure 3-17); line transects have been selected in order to ensure visually contact with amphibians and

reptiles, as well as refugia and habitat searching. These methods are mostly used for the detection and record of amphibians and reptiles during both day and night. As extra data, frequent used roads were checked within or close to the FSA, in order to locate roadkills.

Regarding invertebrates, non-invasive techniques were applied (Figure 3-16, Figure 3-17) especially concerning flying insect taxa, such as Lepidoptera and Odonata. Therefore, the needed observations were carried out on the field, based on photographic material, using a high shutter-speed camera (Combes et al., 2013) and real-time stereoscopic observation, with hand lenses. In order to perform close inspections, the use of an entomological net was essential and for night-time observation, in the case of nocturnal moths, a white sheet and a lamp was used (Hsiao, 1973).

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 Habitats

The pipeline routing crosses (a) Arachthos River, where riparian zone with aquatic trees and shrubs exists, while agricultural land with meadows, orange, kiwi, olive and walnut groves are found at the surrounding area, (b) the NE part of Rodia Marsh, where reedbeds, shrubs, and channels are found, and (c) the Louros River where reedbeds and shrubs exist. The pipeline routing crosses the rivers close to their deltas. Fresh water from the rivers feeds the lagoon system composed of three major lagoons (Rodia, Tsoukalio and Logarou).

Based on field work observations at the FSA, apart from crops (codes such as 1056 and 1062), some natural Greek habitat types of national importance were recorded, dominated by reedbeds (code 72A0) represented by monospecific communities of *Phragmittes australis*. The habitat types included in Habitats Directive Annex I: Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (code 1420), Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation (code 3150), *Salix alba* and *Populus alba* galleries (code 92A0), and Southern riparian galleries and thickets (Nerio-Tamaricetea and *Securinegion tinctoriae*) (code 92D0) were also identified (Table 3-3).

It should be noted that the official mapping of the Study Area does not include the part of Arachthos river, as this part was included after the last 6-year report to the EU and thus was mapped by the habitat expert and the habitat type 92A0 is mainly present in this part of the Study Area.

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%
Louros river								
1420[1]	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	1,878.86	3.66	0.19%	-		-	
92D0[1]	Southern riparian galleries and thickets (Nerio-Tamaricetea and *Securinegion tinctoriae*)	412.84	18.50	4.48%	-		-	
3150[1]	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	54.43	3.41	6.26%	-		-	
72A0[2]	Reed beds	2,873.42	68.34	2.38%	-		-	
1056	Permanently irrigated land	234.45	0.08	0.03%	-		-	
1062	Abandoned cultivation	113.01	1.06	0.94%	-		-	
9620	Unvegetated river bed	31.07	2.48	7.98%	-		-	
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	1,878.86	3.66	0.19%	-		-	
Arachthos river								
92A0[1]	*Salix alba* and *Populus alba* galleries	1.37			-		-	
1068	Olive groves - pure	259.49	13.75	5,30%	-		-	
1063	Permanent water courses without vegetation	195.71	7.51	3,84%	-		-	
9620	Unvegetated river bed	31.07	2.48	7,98%	-		-	

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

Prepared by: (NCC, 2021)

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

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

Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (code 1420)

This habitat type includes perennial vegetation of marine saline muds mainly composed of scrub, essentially with Mediterranean-Atlantic distribution.

Within the FSA, habitat type 1420 appears in a small spot with *Arthrocnemum macrostachyum*. The main threats to this habitat type are (a) changes in the hydrological cycle which is not affected by the construction of the pipeline as the working strip is at the downstream side of the wetland and (b) the invasion of nitrophyllus species which can be increased by any excavation or deposition work.

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

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

Reference: (NCC, 2021)

Figure 3-5 Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation (code 3150)

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, the habitat type 92A0 spreads along Arachthos River. This habitat type is of great ecological significance since represent natural vegetation stripes that unite Amvrakikos gulf with the forests on foothills of Pindus range, forming natural corridors for the important fauna of the area. 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, while in recent years is also threatened by the invasion of foreign invasive species. It should be noted that the presence of invasive species is increasing when excavations and deposition of excavation debris take place.

Note: the approximate pipeline routing in red
Reference: (NCC, 2021)

Figure 3-6 Panoramic view of FSA at Arachthos river and the habitat type 92A0.

Southern riparian galleries and thickets (Nerio-Tamaricetea and *Securinegion tinctoriae*) (code 92D0)

The habitat type 92D0 includes tamarisk, oleander, and chaste tree galleries and thickets and similar ligneous formations of permanent or temporary streams and wetlands.

In the FSA, the habitat type 92D0 occurs in the form of spots along the streams, but in more dry places than the habitat type 92A0, as its water dependence is very small. In essence, the habitat type

appears as a shrubland with *Tamarix* sp., while in the herbaceous understory many nitrophilous species appear such as *Rumex pulcher* and *Galium verum*.

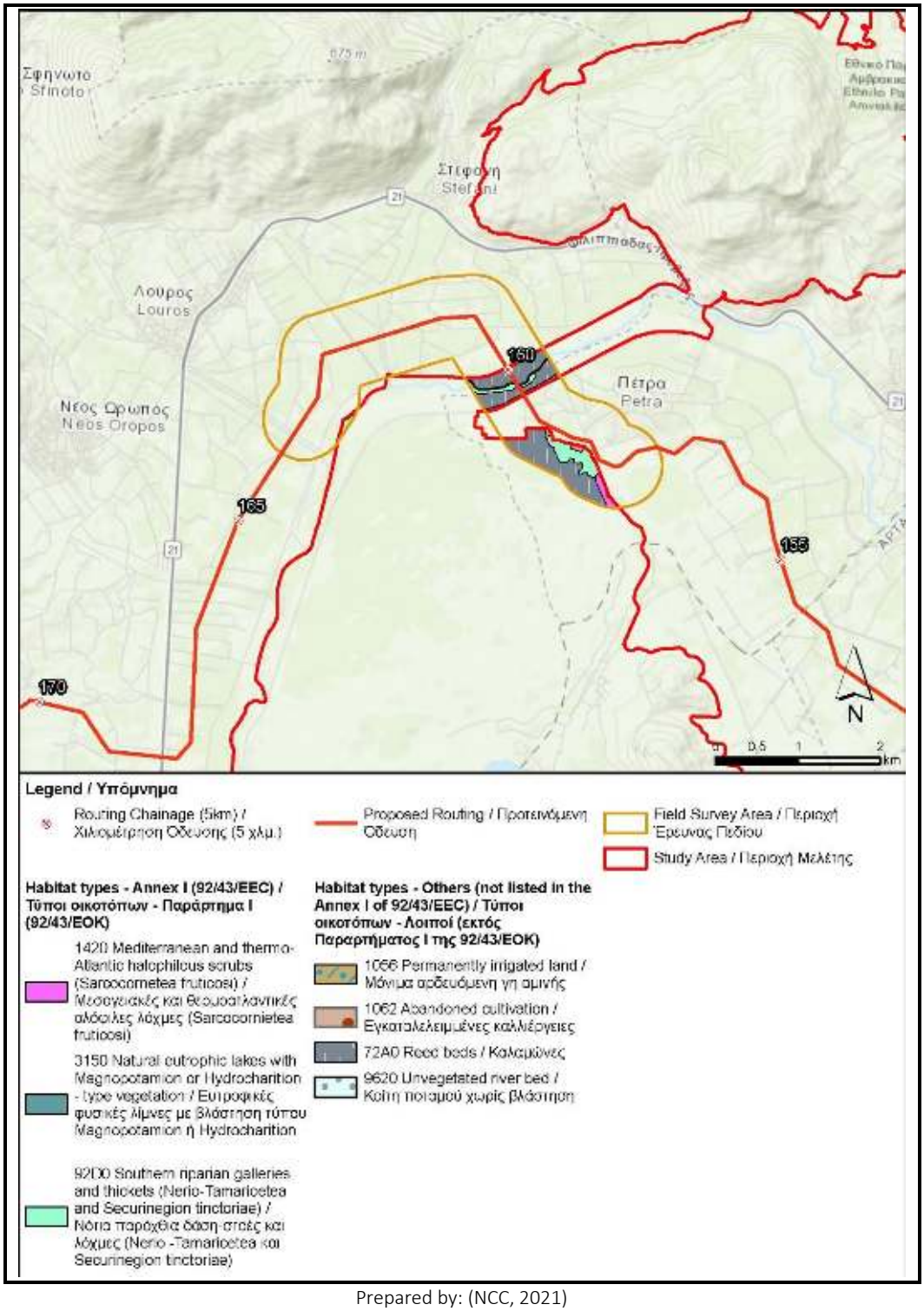
Reference: (NCC, 2021)

Figure 3-7 Panoramic view of FSA at Louros river

Note: the approximate pipeline routing in red
Reference: (NCC, 2021)

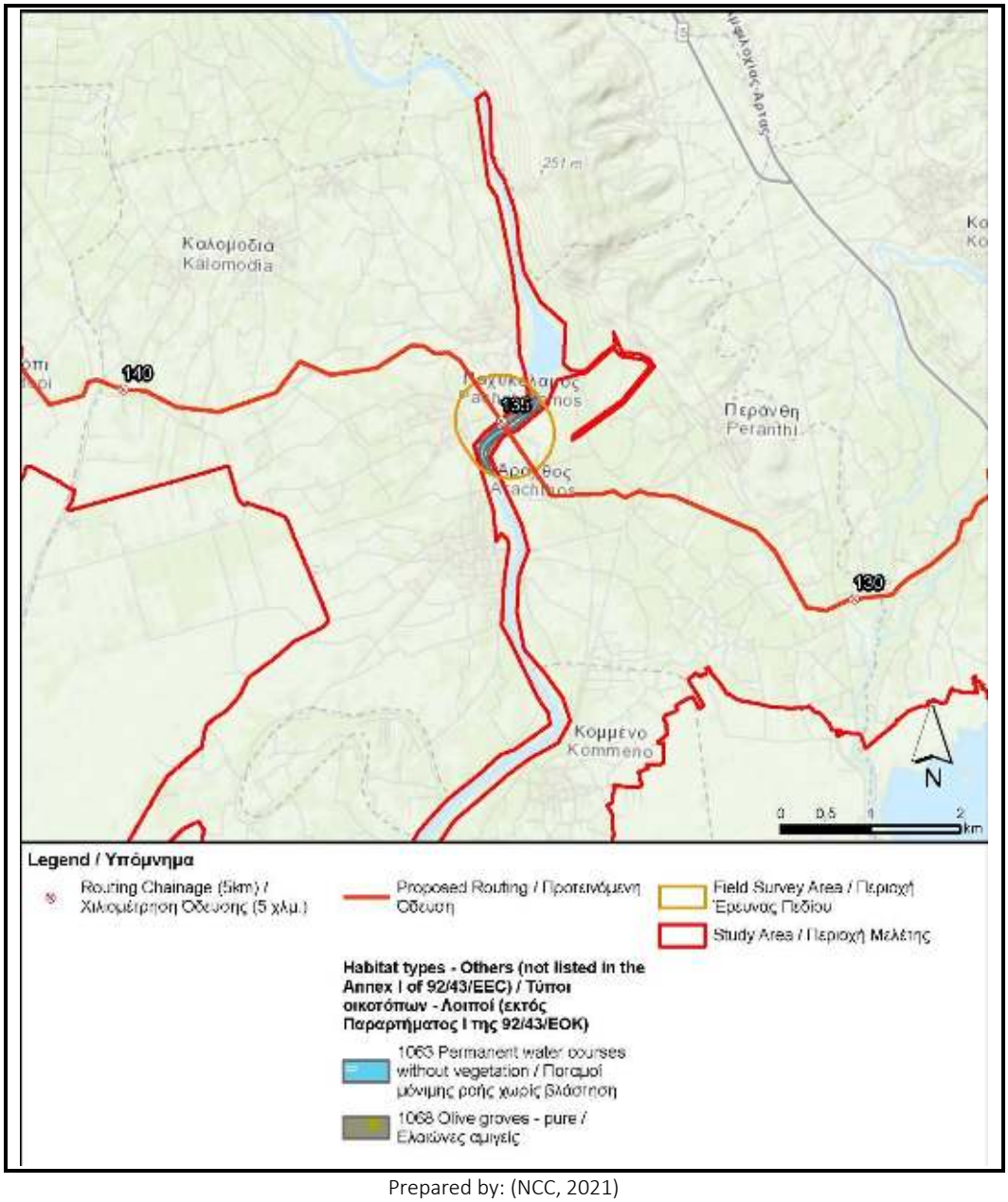
Figure 3-8 Panoramic view of FSA at Louros river

The mapping of habitats for the FSA has been carried out by the habitat expert and is provided in Figure 3-9.



Prepared by: (NCC, 2021)

Figure 3-9 Habitat type coverage at the Field Survey Area at Louros river



Prepared by: (NCC, 2021)

Figure 3-10 Habitat type coverage at the Field Survey Area at Arachthos river

3.3.2.2 Flora

The FSA is dominated by wetland vegetation types with the dominance of common wetland species such as *Phragmites australis, Arundo donax, Lemna* spp. etc. There are also formations with shrubs, such as *Vitex agnus-castus* and *Tamarix* sp. and some galleries with *Salix alba*. Along roads there are

common synanthropic species such as *Cichorium intybus*, while along rivers there are tree lines with *Salix alba, Ulmus procera* etc.

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.
	Oenanthe pimpinelloides L.
	Tordylium apulum L.
Asteraceae	*Cichorium intybus* L.
	Silybum marianum (L.) Gaertn.
	Sonchus asper (L.) Hill
Boraginaceae	*Echium italicum* L.
	Myosotis incrassata Guss.
Brassicaceae	*Sisymbrium officinale* (L.) Scop.
Caryophyllaceae	*Saponaria officinalis* L.
Convolvulaceae	*Convolvulus althaeoides* L.
Fabaceae	*Vicia cracca* L.
	Trifolium arvense L.
	Trifolium campestre Schreb.
Hypericaceae	*Hypericum perforatum* L.
Lamiaceae	*Stachys germanica* L.
Lemnaceae	*Lemna minor* L.
Malvaceae	*Malva sylvestris* L.
Poaceae	*Arundo donax* L.
	Avena sterilis L.
	Holcus lanatus L.
	Hordeum murinum L.
	Lolium perenne L.
	Phleum pratense L.
	Phragmites australis (Cav.) Steud.
Polygonaceae	*Rumex pulcher* L.
Ranunculaceae	*Ranunculus* sp.

Family	Taxon
	Poa bulbosa L.
Rhamnaceae	*Paliurus spina-christi* Mill.
Rosaceae	*Crataegus monogyna* Jacq.
	Rubus sanctus Schreb.
	Prunus sp.
Rubiaceae	*Galium verum* L.
Salicaceae	*Populus alba* L.
	Salix alba L.
Salviniaceae	*Azolla filiculoides* Lam.
Tamaricaceae	*Tamarix* spp.
Typhaceae	*Typha angustifolia* L.
Ulmaceae	*Ulmus procera* Salisb.
Urticaceae	*Urtica dioica* L.
Verbenaceae	*Vitex agnus-castus* L.

Prepared by: (NCC, 2021)

3.3.2.3 Fauna

3.3.2.3.1 Mammals – Bats

No previous information on bats within the Natura 2000 site is available. The presence of water is known to attract several bat species to drink water and feed on emerging insects (e.g. Salvarina, 2016). The site is rich in freshwater, both at Arachthos river and the wetlands at Louros river and Rodia wetland. Also, the riparian habitats probably host a diverse insect community.

At least 12 bat taxa (Table 3-5) were recorded within the FSA, while the real number of species is expected to be higher. Due to the high overlap of the call parameters between several species, it was not possible to identify the *Myotis* calls in species level. The recorded *Myotis* calls could be possibly attributed to one or more of the following species: *Myotis aurascens, M. bechsteinii, M. blythii, M. capaccinii* and *M. emarginatus* without excluding the presence of other species. The Study Area also hosts more Chiroptera species such as *Rhinolophus ferrumequinum* and *R. euryale*. The presence of *Miniopterus schreibersii* – due to the resemblance of its calls with *P. pygmaeus* – was not confirmed but it is very possible to be present in the area. The rest of the species that were recorded include *Hypsugo savii*, *Tadarida teniotis* and *Pipistrellus* species. Due to the high overlap in call parameters, it was usually impossible to distinguish with safety *Pipistrellus nathusii* from *P. kuhlii* therefore the

last two species are grouped. However, *P. nathusii* was confirmed in the region thanks to some social calls that were recorded and they are distinct from those of *P. kuhlii*. Also, there are probably more than one species of the group Nyctaloid (*Nyctalus* and *Eptesicus*), but their identification is also ambiguous only from their calls.

No specific roosts have been identified within the FSA, as far as it was possible to search, but it is possible that bats roost in hollows of big trees and also in settlements in the villages of the region exist.

Table 3-5 Bat species that were recorded at Arachthos and Louros sites during field surveys

Code	Species	Observed during fieldwork	
		Arachthos river	Louros river
5365	*Hypsugo savii*	X	X
1310	*Miniopterus schreibersii*	?	?
	Myotis spp.	X	X
	Nyctaloid	X	X
1312	*Nyctalus noctula*		X
2016	*Pipistrellus kuhlii*	?	
	Pipistrellus kuhlii / P. nathusii		X
1317	*Pipistrellus nathusii*	X	
1309	*Pipistrellus pipistrellus*	X	X
5009	*Pipistrellus pygmaeus*	X	X
1305	*Rhinolophus euryale*		X
1304	*Rhinolophus ferrumequinum*	X	X
1333	*Tadarida teniotis*	X	X

Note: X: confirmed presence, ?: the 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 human activities and existing disturbance observed during field evaluation, it is estimated that the segment of the pipeline routing from Arachthos river to Louros river does not overlap with sites of high suitability as denning sites, and therefore of high sensitivity for them. On the other hand, the two riverbanks act as a low-disturbance and highly-

vegetated connective corridor, that large mammals could use to reach the lagoon area avoiding crossing the human dominated and highly fragmented surrounding area.

Reference: (NCC, 2021)

Figure 3-11 Arachthos's riverbank and transect segment view

Reference: (NCC, 2021)

Figure 3-12 Alluvial meadow and reed communities at Louros river and Louros's riverbank view

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 species presence was confirmed by the field team of HCMR at Louros, Arachthos and Dipotamos rivers, while the first river was estimated as "very suitable" and the two later "suitable" for the species at the location where the pipeline routing crosses.

3.3.2.3.4 Amphibians and Reptiles

During the field survey only one reptile species of interest for which the Natura 2000 site has been designated was observed inside the FSA, namely *Testudo hermanni*. The other terrestrial or freshwater species are likely also to occur in the area due to the presence of suitable for them habitats. *Elaphe quatuorlineata* 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. *Zamenis situla* is found in maquis vegetation, rocky areas with shrubs, abandoned buildings, cultivated areas and deciduous forests. *Emys orbicularis* and *Mauremys rivulata* prefer stagnant or low-flowing freshwater, natural or artificial habitats, usually with muddy bottom and dense aquatic vegetation, like estuaries of rivers and streams, marshes and lakes or reservoirs. *Testudo marginata* occurs in dense vegetation, mainly in shrublands, forests, and even agricultural land.

The species which are included in the Annexes II and IV of the Habitats Directive, but not included in the SDF, and were also observed within the FSA are three lizard species: *Ablepharus kitaibelii, Lacerta viridis, Podarcis muralis*, one snake species *Platyceps najadum* and one amphibian species: *Hyla arborea*. Other species observed were: *Pelophylax epeiroticus* and *Pelophylax kurtmuelleri*.

Reference: (NCC, 2021)

Figure 3-13 Area of fieldwork at Arachthos riverside, area of fieldwork near Louros river.

3.3.2.3.5 Invertebrates

A total of 26 insect species were recorded and sufficiently identified during the point samplings (Table 2). Out of the total number of the recorded species *Stylurus flavipes* is included to the Annex II of Habitats Directive.

The habitats by the banks of Louros and Arachtos rivers, and the halophile vegetation by the coasts of Amvrakikos Gulf accommodate a wide variety of water dependent animal groups, including dragonflies, damselflies, grasshoppers and crickets. Both in terms of odonatan species numbers and abundance, Louros River shows remarkably high numbers, with 10 different resident species (both sexes observed) recorded during the time of the visits. Signs of reproduction were caught in vivo, for *G. vulgatissimus, P. pennipes, C. virgo, C. splendens*. Coenagrionidae species were recorded with the greatest abundances.

Former field surveys recorded presence of the following interesting species at the FSA: *Paracaloptenus caloptenoides*, *Morimus funereus,* while the species *Lycaena dispar* is also expected in the area. *Lycaena dispar* has a high host specificity to the perennial herbaceous plant *Rumex hydrolapathum,* which is found by freshwater banks.

Reference: (A.Dakari, 2021)

Figure 3-14 (a) *Stylurus flavipes (male), (b) Gomphus vulgatissimus mating*

3.3.2.3.6 Fish

According to HCMR (2021), field work was carried out at the rivers Arachthos, Louros and Dipotamos. In Table 3-6 the fish species found in each river are presented.

Table 3-6 Fish species of interest

Code	Species	Abundance			Annex of Habitats Directive / IUCN / Greek Red List
		Louros river	Arachthos river	Dipotamos river	
3019	*Anguilla anguilla*	1			- / CR / NT /
5562	*Atherina boyeri*			1	- / LC / LC / x
5337	*Economidichthys pygmaeus*	3			IV / LC / LC / x
5654	*Gambusia holbrooki**	3			- / LC / -
5180	*Luciobarbus albanicus*		1		- / LC / LC / x
5734	*Mugil cephalus*			1	- / LC / LC /
	Mugilidae sp.		1	2	
5279	*Pelasgus thesproticus*	1			II / NT / NT / 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)

Overall, (a) at Dipotamos river one fish species was recorded and small numbers of fish were detected, (b) at Arachthos river two fish species were recorded and moderate numbers of fish were detected and (c) at Louros river four fish species were recorded and moderate numbers of fish were detected. All locations were initially assessed as "degraded" based on fish fauna sampling. The species of interest *Economidichthys pygmaeus* is abundant at Louros, while *Pelasgus thesproticus* is rare.

Reference: (HMCR, 2021)

Figure 3-15 Sampling station located in Louros river.

3.3.3 Key findings

The main findings of interest are summarized as follows:

- *Habitat types*: The FSA consists of two rivers and their riparian habitats, which the project will cross underground with the use of HDD. The main habitat types of interest found there are directly related to the rivers and are included in the Annex I of the Habitats Directive 1420, 3150, 92A0 and 92D0.
- *Plant species*: No species of interest were found within the FSA.
- *Mammal species*: Both rivers, as well as Dipotamos river to the east outside the Study Area, are used by *Lutra lutra*. 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 area could be potentially be a

corridor for their movements. Many bat species were also observed using the aerial area above the two rivers Louros and Arachthos for feeding, while large trees may be used as roosting sites mainly by *Myotis* species. No reproduction habitat of the above species was located within the FSA.

- *Reptile/amphibian species*: The main species of interest observed is *Testudo hermanni*, while the habitats are estimated as suitable also for a number of species that were not observed during field work.
- *Invertebrate species*: One invertebrate species of interest was found (*Stylurus flavipes*), while *Lycaena dispar* is also expected in the area.
- *Fish species*: Two fish species of interest were recorded at Louros river.

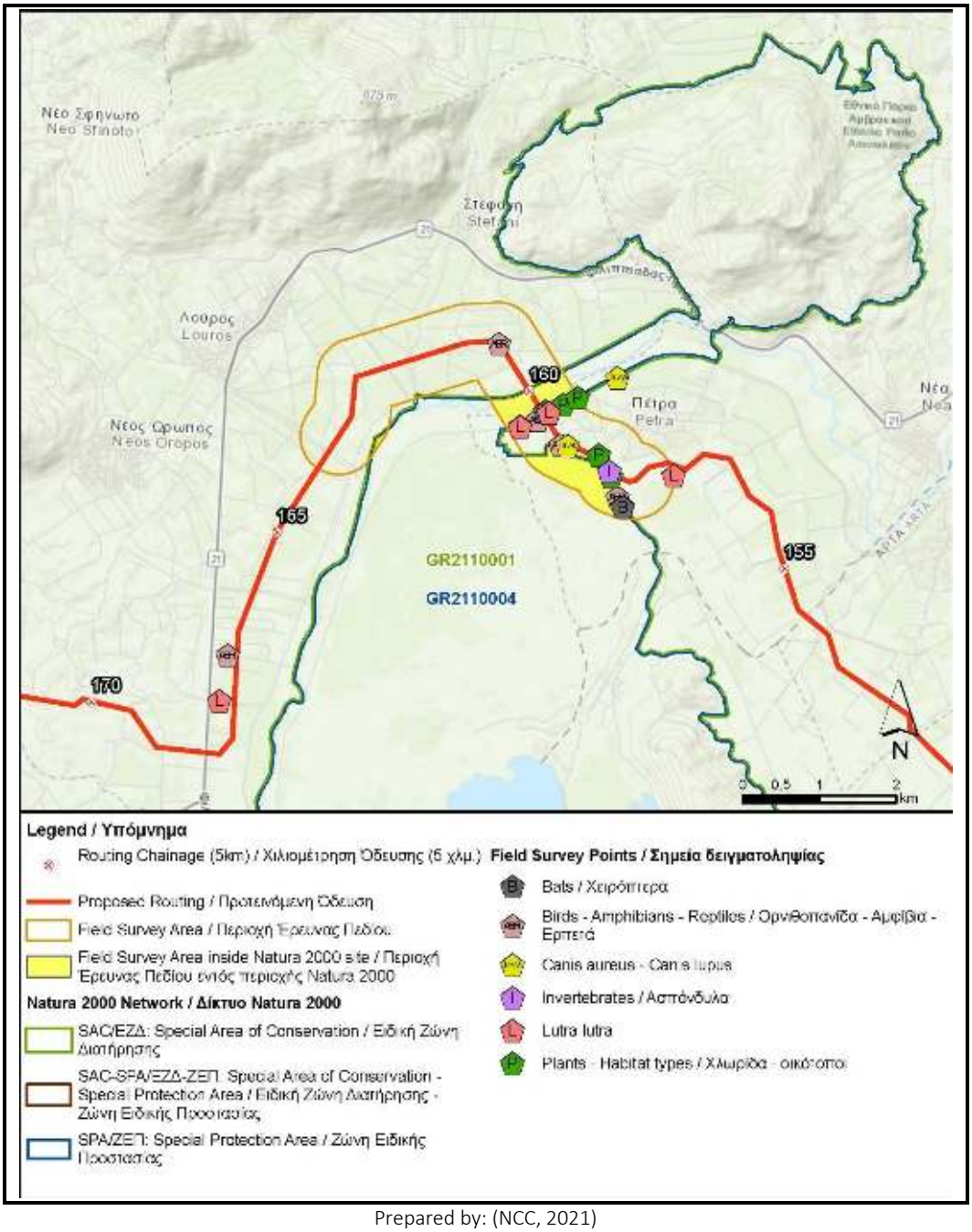
In Table 3-7 the species of interest recorded during fieldwork at specific segments of the pipeline routing are presented.

Table 3-7 Species of interest recorded during fieldwork

IP	Species of interest
2513-2514	*Testudo hermanni, Ablepharus kitaibelii, Lacerta viridis* *Pipistrellus nathusii, Pipistrellus pipistrellus, Pipistrellus pygmaeus, Rhinolophus ferrumequinum, Tadarida teniotis* *Lutra lutra*
2578-2579	*Lacerta viridis* *Nyctalus noctula, Pipistrellus pipistrellus, Pipistrellus pygmaeus, Rhinolophus euryale, Rhinolophus ferrumequinum, Tadarida teniotis* *Economidichthys pygmaeus, Pelasgus thesproticus* *Lutra lutra*
2484-2502*	*Lutra lutra*

Note: *: outside the FSA

Prepared by: (NCC, 2021)



Prepared by: (NCC, 2021)

Figure 3-16 Field Survey locations for the survey of habitats, fauna groups of Annex II and IV (Directive 92/43/EEC), carried out within the FSA (Louros river crossing)

Prepared by: (NCC, 2021)

Figure 3-17 Field Survey locations for the survey of habitats, fauna groups of Annex II and IV (Directive 92/43/EEC), carried out within the FSA (Arachthos river crossing)

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 high percentage (15-100%) of the total national area covered by the habitat types 1150 and 1420, as well as significant percentage (2-15%) of the habitat types 1210, 1310, 1410, 92D0, 9350. The representativity of the natural habitats in the Natura 2000 site is good to excellent, with only the representativity of the habitat type 1120 being significant. Their conservation status varies from excellent 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 excellent for the habitat types 92D0, 1410 and 1420.

Concerning the species included in the SDF, the SAC hosts significant percentage (2-15%) of the total national population of *Cobitis arachthosensis, Eudontomyzon graecus, Lycaena dispar, Monachus monachus, Testudo marginata* and *Valencia letourneuxi*. The conservation status of the species varies from good to average or reduced. The only isolated species is *Tursiops truncatus.* The overall value of the site for the conservation of the species is assessed as good or significant, while for the species *Eudontomyzon graecus* as excellent.

Detailed information is provided in ANNEX A.

3.4.3 Threats/Pressures

According to the SDF of the Natura 2000 site, the majority of threats/pressures the site faces are of medium magnitude. Threats of high magnitude within the site include agricultural intensification and diffuse pollution to surface waters due to agricultural activities, human induced changes in hydraulic conditions and changes in abiotic conditions, as well as aquacultures and trawling at the marine environment. Furthermore, accidental capture is an important pressure.

Of medium magnitude is the pollution both of terrestrial areas and surface waters, the first due to garbage and solid waste disposal originating from industries, households and recreational facilities, including inert material; the later due to household sewage and waste waters discharge and marine macro-pollution. Moreover, threats of medium magnitude within the site include those induced by the intensive maintenance of public parks and the cleaning of beaches, also the removal of beach material. Medium threat is also imposed by human facilities development including roads and urbanized and industrial areas. Threats to wildlife individuals are netting and hunting, as well as reduction of prey availability. There are also modifications in hydrological functioning, erosion and natural eutrophication.

Threats of low magnitude within the area are the removal of hedges and copses or scrub and the infilling of ditches, dykes, ponds, pools, marshes or pits, as well as the abstraction of groundwater for

agriculture and the following intrusion of saltwater. There is also grazing, irrigation, pollution of limnic and terrestrial waters. At sea, threats of low magnitude are marine constructions and nautical sports. Threats for wildlife individuals include death or injury by collision.

3.4.4 Ecological functions

The Natura 2000 site consists one of the best conserved ecosystems with high ecological value at both national and international level. It supports a diverse ecosystem with life sustaining, different habitats in which we can find at least all elements of a typical natural Mediterranean delta. Wet meadows of *Juncus* and the halophytic communities of the class *Arthrocnemetalia* form habitat types that are in a very good ecological condition and cover large areas of the site. The major reed-bed area on the Louros can be considered as one of the largest coherent reed-beds in Greece, and the deciduous woodland on the Mavrovouni hill represents a system comparatively rare in Greece. The site functions as a very rich delta ecosystem which provides suitable habitats and conditions for endemic plant species, as well as suitable habitats for important fauna species whom diversity and abundance are high.

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, i.e. the SAC GR2110001, human activities (e.g. land uses, human exploitation) have been smoothly included and incorporated in the site, possible due to the local environmental legislation framework, while other natural elements of the biotic and abiotic environment (e.g. morphology, climate, topology, species, habitats, vegetation cover, etc.), have in combination formed the existing dynamics of the site. These natural environmental elements have shaped current development trends, which seems to be stable and unaffected to existing plans and projects.

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):

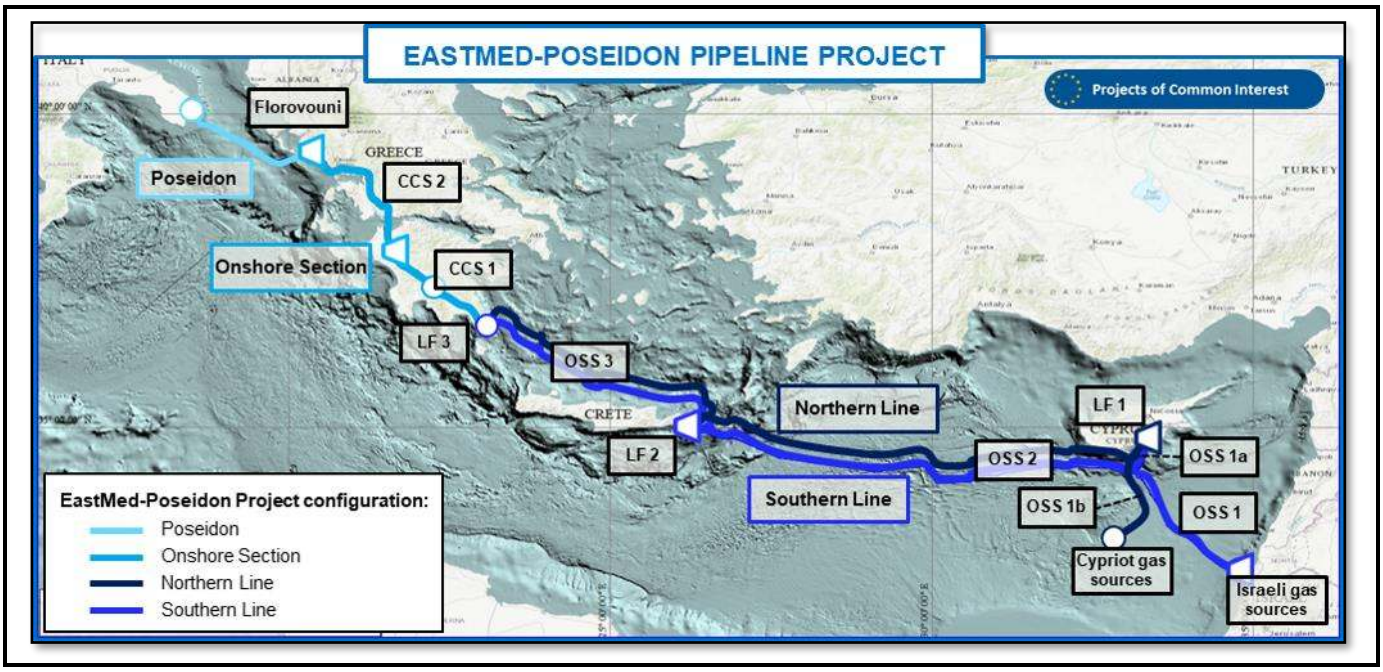
- Delivers dry gas originating from one or more of the Cypriot offshore gas discoveries to the compression and metering stations in Cyprus (CS1/MS1) first, through OSS1b and then in Crete (CS2/MS2N), through OSS2N and from there to the mainland Greece and Poseidon Pipeline Project, as referred in the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

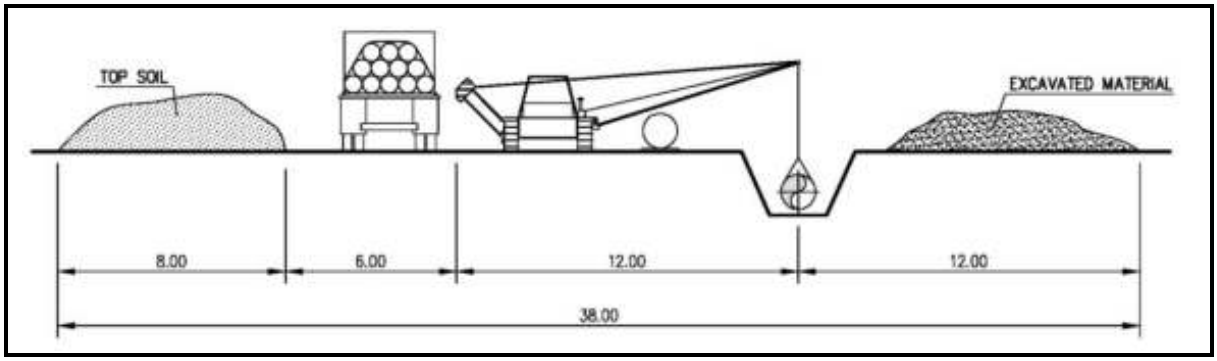
A survey control system in the form of permanent ground markers (PGM) will be installed. A subcontractor will tie all survey works into this control system and confirm the accuracy of the PGM control system.

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

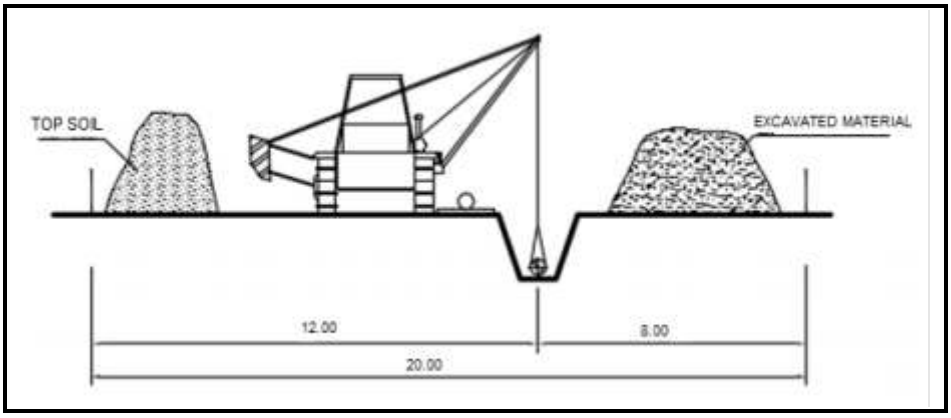
The working strip is the temporary corridor along the pipeline where construction takes place. It must be wide enough to allow all activities to be carried out safely whilst providing sufficient room to store topsoil and trench material separately and keeping crop loss to the farmer to a minimum. The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

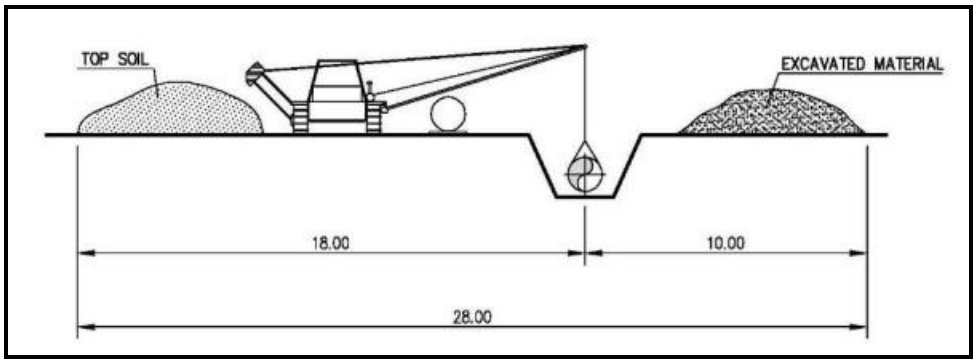
The width of the working strip in open country for pipeline of ND 16'' will be 20 m.



Source: (Design Basis Memorandum – Pipeline and Facilities)

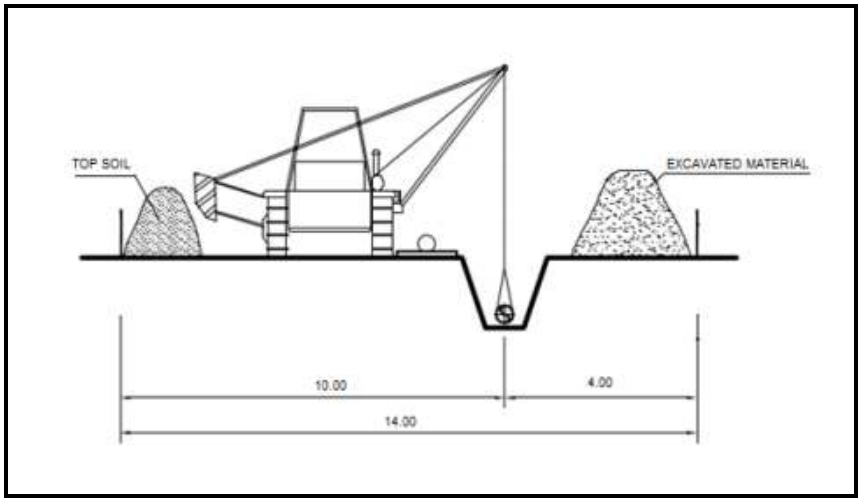
Figure 4-4 Regular Working Strip in Open Country for Pipeline ND 16”

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”

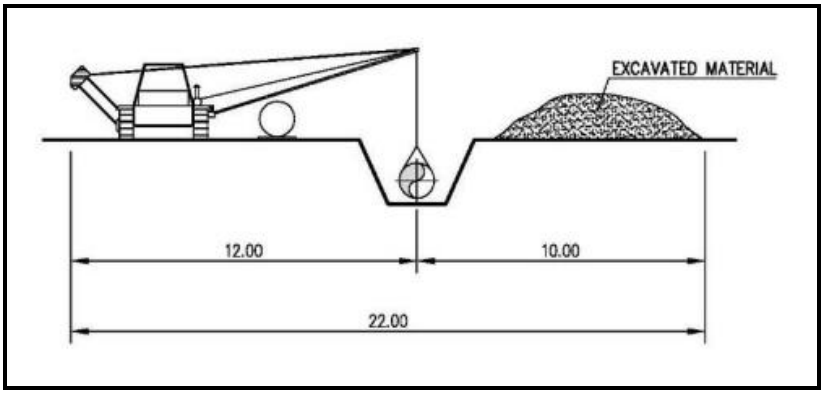


Source: (Design Basis Memorandum – Pipeline and Facilities)

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

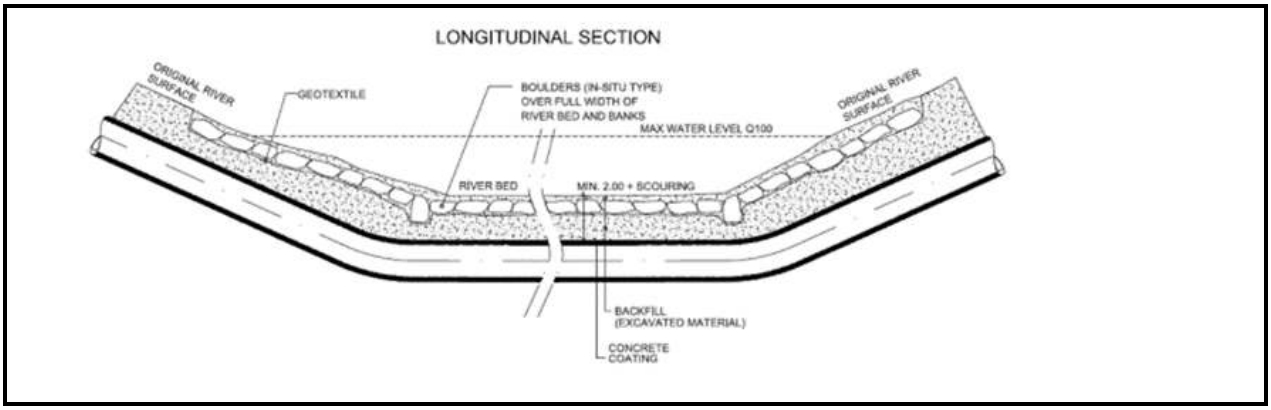
the water level, is equipped with pipes to ensure the unhindered flow of water. This passage is dimensioned for a low to medium water flow and is flooded in case of high water levels.

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)

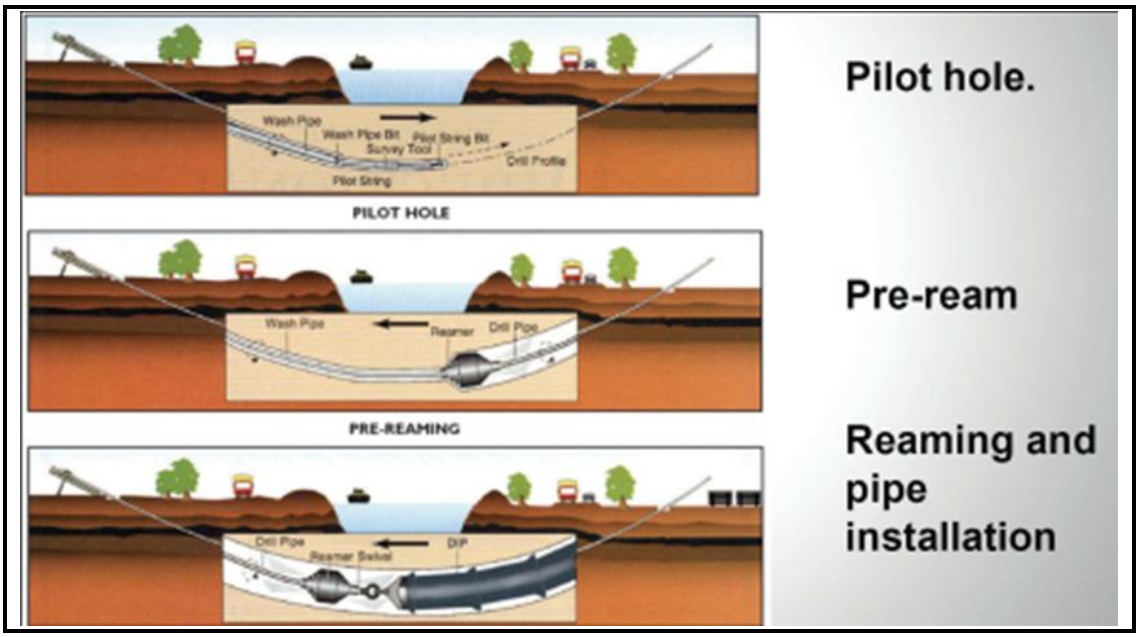
Figure 4-8 Typical Open-Cut River Crossing

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: GR2110001). The total length of the project crossing the Study Area is 0.6km at the sections IP 2513-2514 (KP: 134.838 - 135.022) and IP 2578-2579 (KP: 159.632 - 160.024).

At Louros and Arachthos rivers there will be no working strip within the Study Area. The crossing of the two rivers will be exclusively trenchless with the use of the method HDD. The same applies for two tributes of Louros rives and a drainage ditch. A preliminary layout of the HDD construction and working strip is illustrated in the following figures. 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 outside the Study Area and of 28 and 38m width , while at the rentry and exit pits an area of greater width is needed, namely of about 100x100m at 250m from Louros river and at 300m from Arachthos river.
- Within the Study Area the crossing will be trenchless by using the HDD method and the part of working strip will be of 28m width.
  - Outside the Study Area, HDD sites (drilling/pulling) will be established at both sides of the river.
  - For the needs of the HDD method water will be abstracted from Louros and Arachthos rivers.
- Open-trenching will be used for the crossing of Dipotamos river outside the Study Area. The Dipotamos river will be crossed about 5km from its river mouth and in total will be crossed at 5 locations.
- Water will be abstracted from Louros and Arachthos rivers for hydrotesting. According to the Table 4-4, the required water amount is about 125,172 m^3 (in detail: 71,370/2 m^3 + 71,370 m^3 + 36,234/2 m^3) and 35,685 m^3 (in detail: 71,370/2 m^3), respectively.
- Louros and Arachthos rivers 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 rivers' 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.

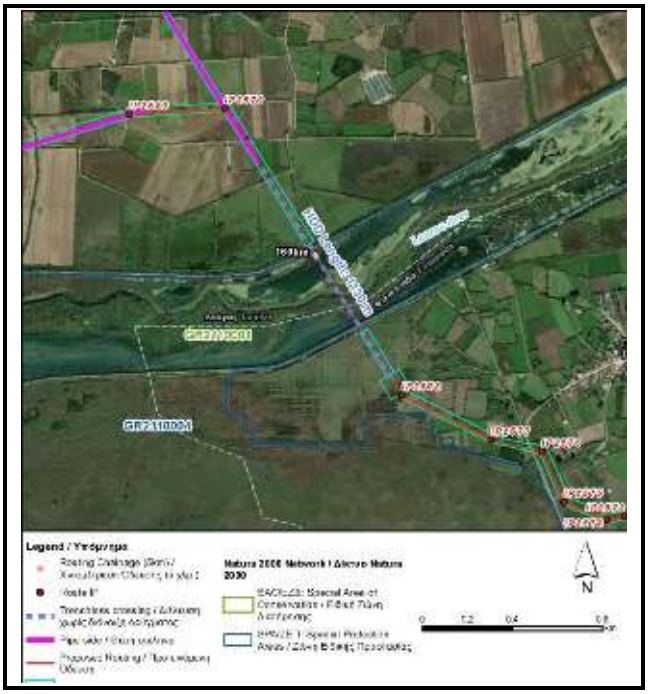
During operation/maintenance

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

Table 4-5 Pipeline Working Strips

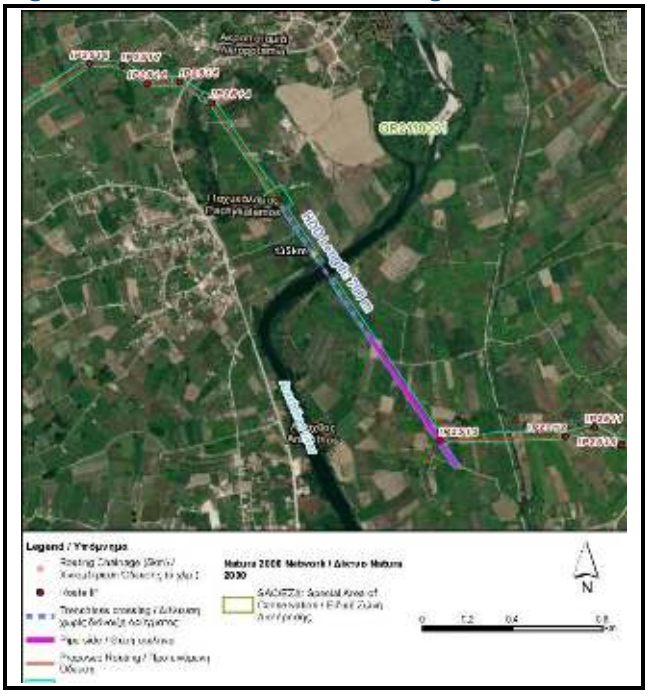
Project phase	Working Strip	Width (m)
Construction and pre-commissioning	General working strip	38
	Working strip with construction/environmental constraints	28
Operation and maintenance	Pipeline protection strip	8

Reference: (ESIA Project Description)



Prepared by: (NCC, 2021)

Figure 4-10 Trenchless crossing of Louros river.



Prepared by: (NCC, 2021)

Figure 4-11 Trenchless crossing of Arachthos river

Prepared by: (NCC, 2021)

Figure 4-12 Trenchless crossing of Louros tributes and drainage channel

5 APPROPRIATE ASSESSMENT

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

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

5.1 Appropriate Assessment Methodology

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

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

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

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

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

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

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

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

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

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

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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.

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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 evaluates 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 type 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
Louros river	
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)
92D0	Southern riparian galleries and thickets (Nerio-Tamaricetea and *Securinegion tinctoriae*)
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

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 be affected by the project, based on field observations and

bibliographic data. The species for which the Natura 2000 site has been designated and could potentially be affected by the project were selected. The rest of the species are marine species and are not expected in the FSA.

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	1355	*Lutra lutra*	p		II; IV|NT|EN
R	1279	*Elaphe quatuorlineata*	p		II; IV|NT|LC
R	6095	*Zamenis situla*	p		II; IV||LC
R	1220	*Emys orbicularis*	p		II; IV|NT|NT
R	2373	*Mauremys rivulata*	p		II; IV||LC
R	1217	*Testudo hermanni*	p	X	II; IV|NT|VU
R	1218	*Testudo marginata*	p		II; IV|LC|LC
I	1060	*Lycaena dispar*	p		II; IV|NT|VU
F	1103	*Alosa fallax*	r		II|LC|DD
F	5312	*Cobitis arachthosensis*	p		II|EN|EN
F	5337	*Economidichthys pygmaeus*	p	X	II|LC|LC
F	5260	*Eudontomyzon graecus*	p		-
F	5279	*Pelasgus thesproticus*	p	X	II|NT|NT
F	5334	*Telestes pleurobipunctatus*	p		II|LC|LC
F	1992	*Valencia letourneuxi*	p		II; IV|CR|CR

Note: p: permanent, r: reproducing, II, IV: Annexes of Habitats Directive, LC: Least Concern, VU: Vulnerable, NT: Near Threatened, EN: Endangered, CR: Critically 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					
M	1353	*Canis aureus*			-|LC|EN
R	1276	*Ablepharus kitaibelii*	p	X	IV|LC|LC
A	1203	*Hyla arborea*	p	X	IV|LC|LC
R	1263	*Lacerta viridis*	p	X	IV|LC|LC
R	1256	*Podarcis muralis*	p	X	IV|LC|LC
Other important Annex II and IV species of the Study Area not included in the site's SDF					
M	1352	*Canis lupus*			II; IV|LC|VU
M	5365	*Hypsugo savii*	p	X	IV|LC|LC
M	1312	*Nyctalus noctula*	p	X	IV|LC|DD
M	1317	*Pipistrellus nathusii*	p	X	IV|LC|DD
M	1309	*Pipistrellus pipistrellus*	p	X	IV|LC|DD
M	5009	*Pipistrellus pygmaeus*	p	X	IV|LC|DD
M	1305	*Rhinolophus euryale*	p	X	II; IV|NT|NT
M	1304	*Rhinolophus ferrumequinum*	p	X	II; IV|LC|LC
M	1333	*Tadarida teniotis*	p	X	IV|LC|LC
R	1286	*Platyceps najadum*	p	X	IV|LC|LC
I	1040	*Stylurus flavipes*	p	X	II|LC|-

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

Prepared by: (NCC, 2021)

5.2.2 Pipeline Construction and Pre-commissioning

The project will cross the Study Area exclusively underground using the HDD method, and the adjacent 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 northern part at the area of the two rivers Louros and Arachthos.
- 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 main water bodies (within the protected area), (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 constrations 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: **Negligible**

The pipeline will cross the Study Area exclusively with trenchless HDD, taking into consideration that the depth at which the pipeline will cross will not interfere with the riparian vegetation roots. As a result, the habitats 3150 and 92D0 that will be crossed by the project are not expected to be affected. Furthermore, as the abstraction and discharge of water used for hydrotesting and the application of HDD will be less than 10% of the rivers' flow and will not be contaminated with chemicals or sediments, it is not expected to affect the aquatic habitats.

The habitats may be affected by any potential discharge of liquid waste or deposition of garbage or aggregates.

Table 5-10 General impact characteristics for habitats and flora

Receptor	Nature	Extent	Duration
92D0 3150	Negative. Deterioration due to garbage and liquid waste.	Local	Short-term. The impact is expected only during the construction period.

Prepared by: (NCC, 2021)

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

As appropriate mitigation measures can be applied in order to avoid and prevent those impacts, the reversibility of the impact is medium and the residual impact negligible. The mitigation measures proposed include no discharge of toxic or harmful for the environment substances for hydrotesting or HDD, while litter and other waste material or any environmentally hazardous material will be stored and disposed of appropriately.

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 is to maintain the Degree of Conservation B in the short term, while for the 92D0 to maintain of the Degree of Conservation A. 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 the Conservation Objectives are not expected to be affected.

It should be noted that Dipotamos river, outside the Study Area, will be crossed with open trench and namely in 5 locations at the streams by which it is formed. It is expected that any sediment plume created will settle before entering the Study Area.

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

The many species of interest 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 rivers 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 arachthosensis, Economidichthys pygmaeus, Pelasgus thesproticus, Lutra lutra, Elaphe quatuorlineata, Zamenis situla, Emys orbicularis, Mauremys rivulata, Testudo hermanni, Testudo marginata* is to maintain the Degree of Conservation B in the short term, while for the *Eudontomyzon graecus, Telestes pleurobipunctatus, Valencia letourneuxi, Lycaena dispar* 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 important for the species, as well as the restoration possibility of the species. Based on the above, as the important for the species features of the habitat are maintained the Conservation Status and the

Conservation Objective for the species are not expected to be affected. Concerning the species *Alosa fallax* no Conservation Status has been defined. As a result, no general Conservation Objectives have been set and no estimation on the impact of the project on them can be provided. However, the impact to the quality of the species' habitat is estimated to be negliglible.

Furthermore, the suitable habitat should be >50% of the 8 cells and 18 cells of 1x1km in the site for *Testudo hermanni* and *Testudo marginata*, respectively, while for *Lutra lutra* the suitable habitat should cover a significant part of the area of the 10X10 cells of the species distribution within the site (>50%). This SSCO is also not expected to be affected and the impact is estimated to be negligible.

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 and its vicinity no plant species of interest were found and no impacts are expected.

At Louros river fish species of interest were found, while *Lutra lutra* is present at all rivers.

The species of interest *Testudo hermanni* was observed, while reptile species of interest are also expected in the area.

During construction, increase of the vehicle traffic is expected in the area and as a result individuals of reptile and mammal species that are moving in the area may become victims of 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.

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 fish individuals through their draining.

Table 5-11 General impact characteristics for loss of individuals - fauna

Receptor	Nature	Extent	Duration
Lutra lutra *Testudo hermanni* Other reptile species *Economidichthys pygmaeus* *Telestes pleurobipunctatus* Other fish species	Negative. Potential loss of individuals	Local, at the broader area of the working strip and the surrounding area	Short-term. The impact is expected only during the construction period. (few weeks)

Prepared by: (NCC, 2021)

Lutra lutra is expected to be active in the FSA year round. As a result, accidental 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 a proposed time constraint. Furthermore, they may hibernate underground at locations.

The value of the receptor is high as it concerns protected species, which are listed in Annex II 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 and outside sensitive periods for the species. Based on the above the impact is estimated to be low.

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

The SSCOs for *Testudo hermanni* and *Testudo marginata* are an average density population in areas with suitable habitat to be greater or equal to 4 ind./ha and 5ind./ha respectively. Furthermore, the species to be recorded in 20 and 12 1x1km cells, respectively, within the Natura 2000 site. The SSCOs for the species *Lutra lutra* are a mean density of 1 ind./35km^2, presence of the species in each 5X5km cell and permanent presence in at least 9 5x5km cell within the Natura 2000 site. It is estimated that the project will not affect the objectives, as necessary mitigation measures will be taken in order to avoid loss of individuals, while the species have broad distribution in the area. Concerning *Valencia letourneuxi*, the SSCO is positive recordings in ≥ 50% of the locations where the species has distribution. The project is not expected to affect this objective. For the rest of the species no SSCO have been set concerning their population and no estimation on the impact of the project can be provided. However, the impact to the species is estimated to be negligible.

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. Furthermore, the trenchless crossing will be a twenty-four hours a day procedure until its completion.

Lutra lutra potentially uses the river and the riparian zone. As it is mainly nocturnal and feeds 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.

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

Table 5-12 General impact characteristics for disturbance - fauna

Receptor	Nature	Extent	Duration
Lutra lutra	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, 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. 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 SSCO for *Lutra lutra* concerning its distribution, as presented above, is not expected to be affected.

It should be mentioned that the measures foreseen for the mitigation of species disturbance should also apply at Dipotamos river, 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 northern edge and special care has been taken to avoid important habitats as the project is crossing it 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 no 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 5-13 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	92A0, 92D0, 3150	Negative	Local	Short term	Low	High	Low	Low	Medium	Negligible
	Species habitat loss, deterioration, fragmentation	Fauna & SSCOs	Negative	Local	Short term	Low	High	Low	Low	Medium	Negligible
	Loss of individuals	Fauna & species' SSCOs	Negative	Local	Short term	Low	High	Low	Low	Medium	Negligible
	Disturbance	Fauna & species' SSCOs	Negative	Local	Short term	Low	High	Low	Low	Low	Low
Operation	Habitat loss	92A0, 92D0, 3150	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 in the FSA. The riparian area of Louros and Arachthos is estimated to be potentially used by *Canis lupus* and *Canis aureus* for their movements in the area, bat species were found to feed over the rivers and their vicinity, while reptile species were also observed.

The two canine species are sensitive to loss of individuals due to accidental roadkill, and to disturbance as they may avoid the area during construction due to disturbance. Furthermore, they 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. Along with the bat species they are nocturnal species and are expected to be affected by any light pollution.

The reptiles are sensitive to loss of individuals, as presented above for the species included in the SDF, due to roadkill, 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, EO21) and the high voltage network at its southern part, as well as the local road network crossing the site and the FSA of the pipeline.

It must be noted that the pipeline will cross trenchless the site at 2 different river locations, 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 Arachthos and Louros rivers crossing outside the SAC. 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 chapter (Chapter 7) of the ESIA. 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 fact that the routing is already mainly passing outside the borders of this particular SAC and only for a few meters the pipeline traverses the site, with HDD trenchless techniques at the two river crossings, 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 Arachthos and Louros rivers outside the SAC. This routing forms practically the optimum scenario from the ecological 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 other fauna surveys for spotting nesting trees and tree stands or other appropriate nesting spots, to avoid the destruction of nest sites through micro-siting, the impact is expected to be negligible.

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 no 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 preventing/reducing 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 at the Study Area

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				2513-2514 2568-2580	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				2513-2514 2568-2580	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					
HDD						
HDD water will be discharged free of any chemicals and with a similar temperature to the water in the watercourse.	X	X			Louros/ Arachthos rivers	Negligible
Drill mud, such as bentonite clay, will be an inert and non-toxic substance.	X					
Water use from rivers/streams						

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
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		Louros/ Arachthos rivers	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 m³/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		2513-2514 2568-2580	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	X					

Mitigation Commitments to Address the Impact / Risk	Efficiency				IP	Significance of Residual Impact / Risk
	Prevention/ avoidance	Reduction of intensity	Reduction of extent	Restoration		
underpasses, tunnels or other measures should be installed.						
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					
Disturbance						
Limitation of night working and minimization of the use of lighting along the corridor. Avoidance of dusk-dawn work.		X			2513-2514 2568-2580	Low
Usage of lights to minimum, for safety reasons, and directional lighting.	X		X			
All impacts						
A Biodiversity Action Plan (BAP) will be prepared & 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	2513-2514 2568-2580	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	2513-2514 2568-2580	Negligible

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					
Disturbance					
No garbage or food remains will be left at the working strip.	X				2513-2514

Good practices	Efficiency				IP
	Prevention / avoidance	Reduction of intensity	Reduction of extent	Restoration	
					2568-2580
Open cut					
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				Dipotamos river 2485-2503
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			
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, wherever feasible and as much as possible. 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 the Study Area

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

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

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

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

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

The species to be monitored are the species included in the SDF of the Habitats Directive that may be affected by the construction and operation of the project, as presented in the present AA, namely for (a) *Lutra lutra*, (b) reptiles and (c) fish.

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 prey left-overs, nests, scats, footprints, hair and more.

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. Additional to the above, monitoring of the ichthyofauna should also be carried out.

In respect to ichthyofauna, sampling and assessment of the status of the ichthyofauna should be carried out through electrofishing.

9 CONCLUSIONS

The present Appropriate Assessment concerns the onshore section of the EastMed pipeline, which crosses the Special Area of Conservation (SAC) “Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001. 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 43 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 rivers Arachthos and Louros and their riparian ecosystems - exclusively underground using the HDD method, and the adjacent agricultural area with open trenching. The construction is expected not to exceed a few weeks. As a result, the expected residual impact to habitat types and species of the Study Area are estimated as low and is mainly related to disturbance of mammals due to construction works and mainly HDD application, that is related with significant increase of noise level and is expected to be applied continously during day and night until its completion for a few day and light pollution. Negligible impacts are expected due to (a) potential habitat degradation due to waste/litter disposal and (b) potential loss of individuals of mammals (i.e. *Lutra lutra*), reptiles and fish, due to increase of vehicle traffic, abstraction of water for hydrotesting and HDD and trapping in open trenches.

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 on the ecological integrity of the SAC site are assessed to be low.

Concerning cumulative impacts, the site has not significant other existing or planned projects and infrastructures, such as pipelines, power lines, energy and other major projects; that are expected to act cumulatively. 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 on the ecological integrity of the Special Area of Conservation (SAC) “Amvrakikos Kolpos, Delta Lourou Kai Arachthou (Petra, Mytikas, Evryteri Periochi, Kato Pous Arachthou, Kampi Filippiadas)", GR2110001, 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 Field survey, 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	Cover (ha)	Data quality	Assessment			
			Repres.	Rel.surf.	Cons.	Global
1110		M	B		C	C
1120		P	C			
1130		G	B		C	C
1150	8,577.409	G	A	A	C	B
1210	16.228	G	B	B	B	B
1310	326.510	G	A	B	A	B
1410	1,344.95	G	A	B	A	A
1420	1,878.860	G	A	A	A	A
2110	4.961	G	B	C	B	B
3150	54.429	G	A	C	B	B
5210	0.295	G	B	C	B	B
5420	389.192	G	B	C	B	B
91M0	125.933	G	B	C	B	B
92A0	1.367	G	B	C	B	B
92D0	412.841	G	A	B	A	A
9320	510.826	G	B	C	B	B
9350	686.779	G	B	B	B	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	DD	D			
F	5312	Cobitis arachthosensis	p				C	DD	B	B	C	B
F	5337	Economidichthys pygmaeus	p				C	DD	C	B	C	C
F	5260	Eudontomyzon graecus	p				V	DD	B	C	C	A
F	5279	Pelasgus thesproticus	p				C	DD	C	B	C	C
F	5334	Telestes pleurobipunctatus	p				C	DD	C	C	C	C
F	1992	Valencia letourneuxi	p				R	DD	B	C	B	B
I	1060	Lycaena dispar	p				P	DD	B	C	C	C
M	1355	Lutra lutra	p				V	M		B	C	C
M	1366	Monachus monachus	p			i	V	M	B	C	C	B
M	1349	Tursiops truncatus	p	132	180	i		G	C	C	A	B
R	1224	Caretta caretta	p	400	500	subad.	C	M	C	B	C	C
R	1279	Elaphe quatuorlineata	p				R	DD	C	B	C	C
R	6095	Zamenis situla	p				V	DD	C	B	C	C
R	1220	Emys orbicularis	p				C	DD	C	B	C	C

Group	Code	Species Name	Population						Assessment			
			Type	Min	Max	Unit	Abund.	Data Quality	Pop.	Cons.	Isol.	Global
R	2373	Mauremys rivulata	p				C	DD	C	B	C	C
R	1217	Testudo hermanni	p				C	DD	C	B	C	C
R	1218	Testudo marginata	p				C	DD	B	B	C	B

Prepared by: (NCC, 2021)

Definitions:

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

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

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

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

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

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

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

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

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

Other species

There are also 33 other species of importance for the area included in the SDF, of which 6 are amphibians, 9 mammals, 1 plant, 2 birds, 1 fish and 1 invertebrate and 13 reptiles, of which 32 included in the National Red Data Lists, 31 in International Conventions, while 17 are listed in Annex IV of the Habitats Directive and 3 in Annex V. 3 are listed for other reasons. There are no endemic species. For further detail please refer to the SDF.

ANNEX B THREAT STATUS

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

Group	Code	Species Name	IUCN (2020)	Greek Red Data Book (2008)	Endemic - Greek Red Data Book (2008)	Habitats Directive Annex II	Habitats Directive Annex IV	Bern Convention	Bonn Convention	CITES	Observed during field work
I	6199	*Euplagia quadripunctaria*				Y					
R	2373	*Mauremys rivulata*		LC		Y-CTC	Y-CTC	III			
M	1310	*Miniopterus schreibersii*	NT	NT		Y	Y	II	II		
M	1366	*Monachus monachus*	EN	CR		Y	Y	II	I; II	I	
M	1307	*Myotis blythii*	LC	LC		Y	Y	II	II		
M	1321	*Myotis emarginatus*	LC	NT		Y	Y	II	II		
M	1305	*Rhinolophus euryale*	NT	NT		Y	Y	II	II		
M	1304	*Rhinolophus ferrumequinum*	LC	LC		Y	Y	II	II		
M	1303	*Rhinolophus hipposideros*	LC	LC		Y	Y	II	II		
R	1217	*Testudo hermanni*	NT	VU		Y	Y	II		II	
R	1218	*Testudo marginata*	LC	LC		Y	Y	II		II	

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

Site Specific Conservation Objectives

1110, 1130, 1140, 1210, 91M0, 1310, 1410, 9350, 5420, 91B0, 92A0, 92C0:

The General Conservation Objectives apply to these habitat types.

1150:

Conservation of the distribution dynamically stable, taking into consideration also the stochastic natural processes. Conservation of at least the current area taking into consideration also the stochastic natural processes. Increase of the structure and composition of the bio-community LEE indicator values (M-AMBI) ≥0.82. Increase of the restoration of plant societies indicator values (EEI-c)> 0.48.

Elaphe situla, Emys orbicularis, Mauremys caspica:

The General Conservation Objectives apply to these species.

Testudo hermanni:

Average population density in areas with suitable habitat greater than or equal to 4 ind./ha. Conservation of suitable habitat at a percentage of >50% in 18 cells of 1x1km grid in the Natura 2000 site. Recording of the species presence in 20 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 marginata:

Average population density in areas with suitable habitat greater than or equal to 5 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 12 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.

Valencia letourneuxi:

Positive recordings in ≥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 9 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.

Tursiops truncatus:

Avoidance of the species' habitat degradation with special emphasis on the reduction of the fishing pressure and ensuring sustainable fish stocks that constitute its food. Conservation of the current distribution range at least at the level of the FRV at national level, as well as at Amvrakikos gulf level (wider marine area of SPA GR2110001), i.e.~ 350 km^2. Conservation of the existing population at least at the level of FRV at Amvrakikos gulf level (wider marine area of SAC GR2110001) :> 180 individuals. Midterm conservation and long-term increase of the species abundance in the area. Conservation of the species population health. Assurance of habitat connectivity and avoidance of potential anthropogenic barriers. Conservation of the genetic diversity of the population. Assurance of channels of exchange between local subpopulations of the same species in the Greek seas, in order to avoid genetic isolation and to enhance gene flow between subpopulations. Assurance of anthropogenic activities to such an extent that do not adversely affect the species population within the site. Avoidance of species disturbance due to human activities. Reduction of habitat degradation due to agricultural activities, which diffuse pesticides and fertilizers into the marine environment causing eutrophication, reduction of the species' reproductive capacity, weakening of the immune system and potential impact local fish stocks.

Monachus monachus:

Increase of reproductive individuals to more than 10 individuals. Increase of the annual number of pups to more than 2 pups. Conservation of the species distribution dynamically stable. Increase of the number of reproductive locations to > N = 5. On the habitat, see general conservation objectives for the Natura 2000 site in relation to the degree species' habitat conservation. Also, the number of suitable shelters (N = 5) should remain stable.

Caretta caretta:

Increased or at least stable population (not less than 500 individuals). Avoidance of significant reduction of the existing feeding area. No restriction of the connection between the habitat and the open sea by artificial barriers. Non-adverse effect of anthropogenic activities in the wider area on the species population within the Natura 2000 site. Avoidance of pollution increase mainly from the rivers that flow into the site.

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						
1355	*Lutra lutra*	Riparian zones	Wetlands	Habitat fragmentation, poisoning, water pollution, wetland alteration	Resident, mostly in continental Greece	
1279	*Elaphe quatuorlineata*	Wood edge and hedges	Wood edge and hedges	Cultivation, roads, pollution, collection	Resident	C
6095	*Zamenis situla*	Sunny vegetation and stony ground	Sunny vegetation and stony ground, cultivated land	Urbanisation, roads	Resident	C
1220	*Emys orbicularis*	Freshwater wetlands with abundant aquatic vegetation	Freshwater wetlands with abundant aquatic vegetation	Agricultural intensification, water pollution, wetland alteration, water abstraction	Resident	C
2373	*Mauremys rivulata*	Freshwater wetlands with abundant aquatic vegetation	Freshwater wetlands with abundant aquatic vegetation	Agricultural intensification, water pollution, wetland alteration, water abstraction, collection	Resident	C
1217	*Testudo hermanni*	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	C
1218	*Testudo marginata*	dense vegetation, mainly in shrubs, oak forests, and even crops	dense vegetation, mainly in shrubs, oak forests, and even crops	wildfires, habitat degradation, road construction, illegal collection	mainland Greece to the south of Macedonia, the	B

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
					Peloponnese, Evia, the Sporades and the islands of the Saronic Gulf	
1060	*Lycaena dispar*	Locations near lakes, canals, streams, rivers and other areas with wet soil, at altitudes from 0-900 m. Always associated with the plant Rumex hydrolapathum.	Locations near lakes, canals, streams, rivers and other areas with wet soil, at altitudes from 0-900 m. Always associated with the plant Rumex hydrolapathum.	Collection, destruction of Rumex hydrolapathum, mainly due to drying of wetlands.	Resident, northern Greece, recorded also in western, central Greece	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	D
5312	*Cobitis arachthosensis*	burrows mostly in sandy to silty substrate in still to moderately flowing waters	burrows mostly in sandy to silty substrate in still to moderately flowing waters	small distribution range, habitat alterations and risk of hybridisation with C. hellenica	Greece	B
5337	*Economidichthys pygmaeus*	both flowing and stagnant shallows with abundant	both flowing and stagnant shallows with abundant		in rivers and streams of western Greece,	C

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
		vegetation and detrital substrate. Spawns in March and April	vegetation and detrital substrate.		north of the Patraikos Gulf, including Lefkas Island	
5260	*Eudontomyzon graecus*				Greece. Endemic to the Epirus Periphery, Greece, being found only in the Loúros River and one of its tributaries	B
5279	*Pelasgus thesproticus*	springs, streams, ponds, usually in shallow, quiet water with dense vegetation	springs, streams, ponds, usually in shallow, quiet water with dense vegetation		Greece (Kalamas to Arachthos drainages, Corfu Island) and Albania (Butrint drainage)	C
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)	C
1992	*Valencia letourneuxi*	swamps, lowland water courses with little current, lagoons, springs and associated wetlands	swamps, lowland water courses with little current, lagoons, springs and associated wetlands	introduction of other species and water abstraction	Albania and western Greece, from Lake Butrint to Alfios drainages, and Corfu and Lefkas islands	B

Code	Species Name	Habitat[1]		Threats[1]	Presence Status in Greece[1]	Significant Presence Status in the Study Area[2]
		Reproduction	Foraging			
					where it has been extirpated.	

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
2578-2579		Panoramic	DJI_0129.jpg 22/05/2021
2579-2582		Panoramic	DJI_0134.JPG 22/05/2021
2577-2579		Panoramic	DJI_0098.JPG 22/05/2021

IP	Photograph	Sampling Plot	Filename / Date
2580-2581		Panoramic	DJI_0147.JPG 22/05/2021
2578-2579		ABR51	JPEG_20210427 171322377.jpg
2578-2579		ABR51	JPEG_20210427 171410724.jpg

IP	Photograph	Sampling Plot	Filename / Date
2574-2575		ABR50	JPEG_20210427162839355.jpg
2579		ABR55	JPEG_20210428090148420.jpg
2579		ABR55	JPEG_20210428090219193.jpg

IP	Photograph	Sampling Plot	Filename / Date
2578-2579		I04	JPEG_20210523111816926.jpg
2513-2514		I03	JPEG_20210524071003954.jpg

Prepared by: (NCC, 2021)

ANNEX F MAPS

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

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

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

Contract No:
Αρ. Συμβολαίου: project code

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

COMPANY / ΕΤΑΙΡΕΙΑ
IGI Poseidon

ENGINEER/CONSULTANT
ΜΗΧΑΝΙΚΟΣ/ ΜΕΛΕΤΗΤΗΣ
Asprofos engineering
ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

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

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2110001"

Map n°:	
M1-N08 S10	*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-N11 S10A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" 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
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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

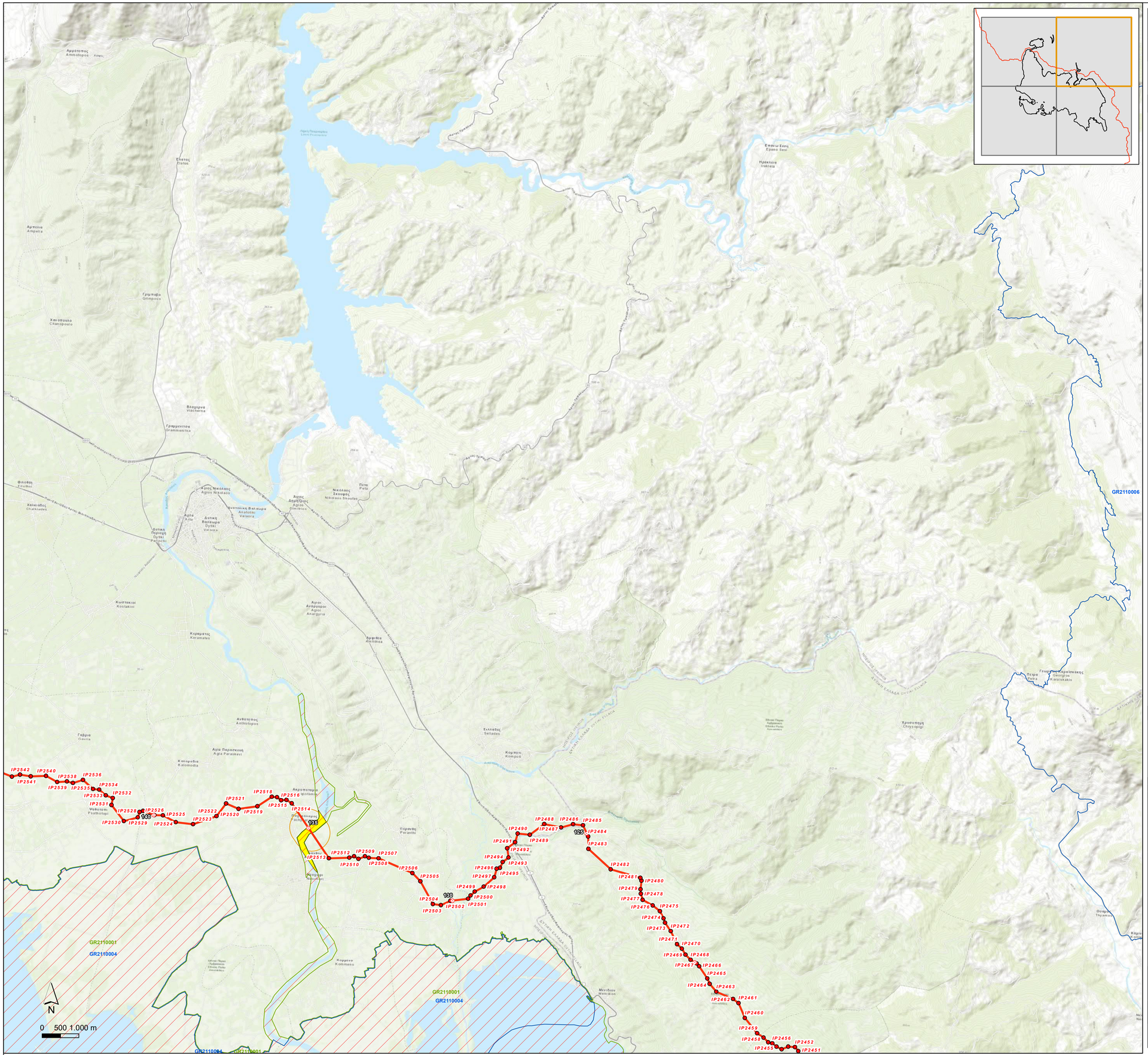
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2110001"

Map n°:		
M2-N11 S10A01	*STUDY AREA / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*	
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 4

Document Name: Map2_STUDY_AREA_ver3.1_2021.01.09_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M2-N12 S10A02	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" 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

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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 - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2110001"

Map n°:		
M2-N12 S10A02	*STUDY AREA / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*	
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 2 of 4

Document Name: Map2_STUDY_AREA_ver3.1_2021.01.09_A1_onshore

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GR2240001
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REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M2-N13 S10B01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" 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
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Natura 2000 Network / Δίκτυο Natura 2000

- SAC/ΕΖΔ: Special Area of Conservation / Ειδική Ζώνη Διατήρησης
- SAC-SPA/ΕΖΔ-ΖΕΠ: Special Area of Conservation - Special Protection 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
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Contract No.
Αρ. Συμβολαίου: project code

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

COMPANY / ETAIPEIA: IGI Poseidon

ENGINEER/ CONSULTANT: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

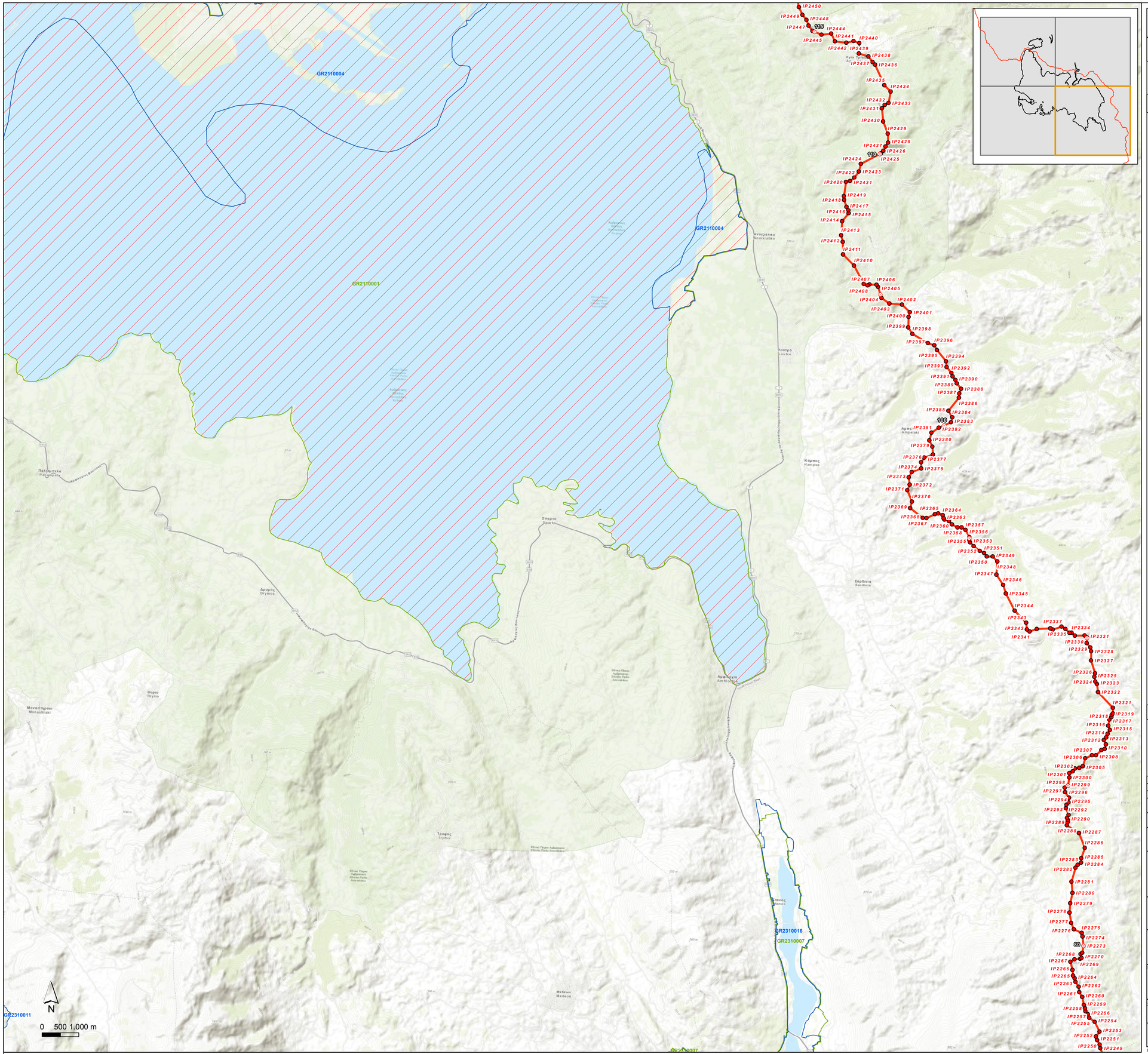
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2110001"

Map n°:		
M2-N13 S10B01	*STUDY AREA / ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*	
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 3 of 4

Document Name: Map2_STUDY_AREA_ver3.1_2021.01.09_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M2-N14 S10B02	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

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NOTES/ ΣΗΜΕΙΩΣΕΙΣ

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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

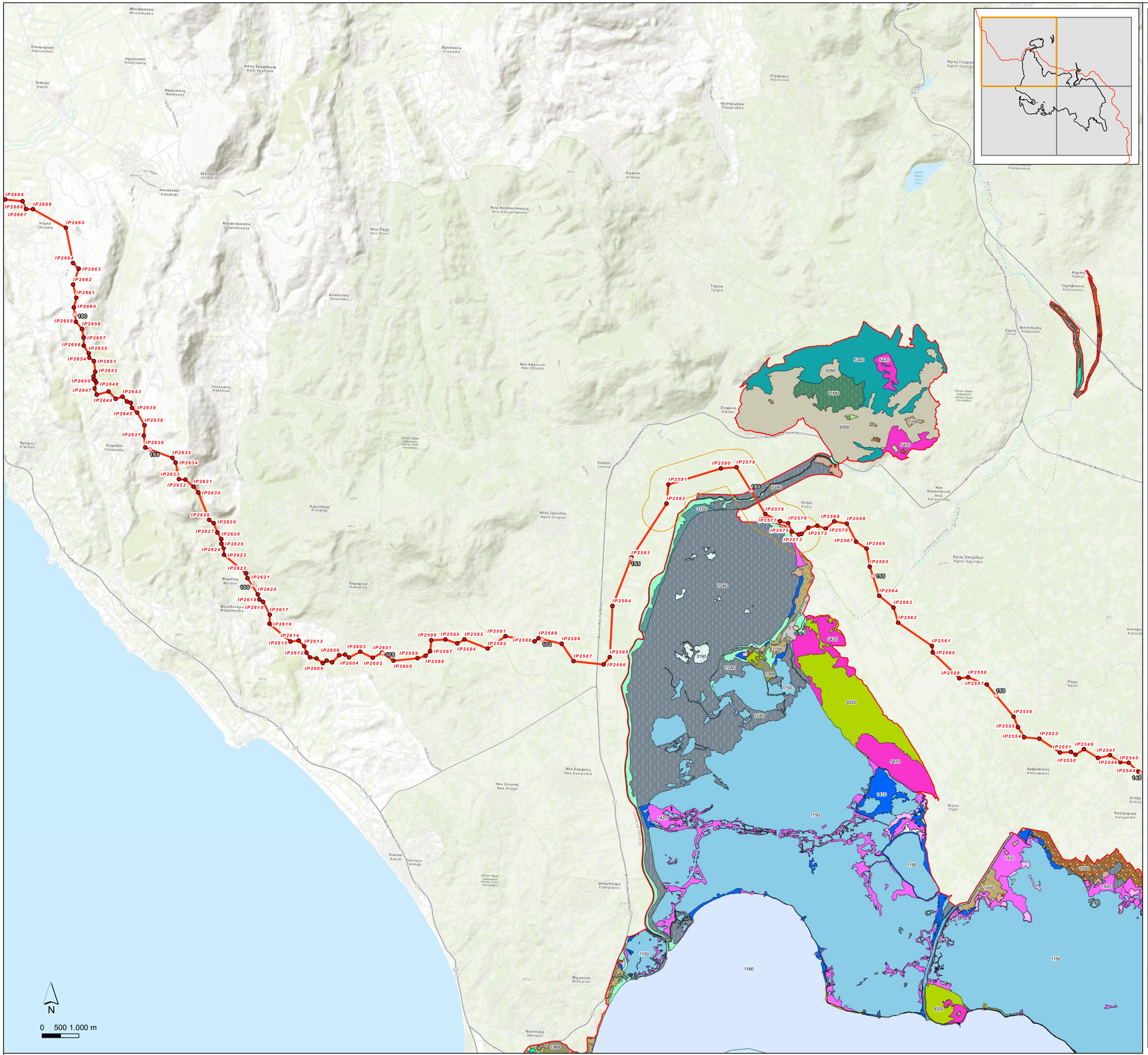
PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "ΕΖΔ - GR2110001"

Map n°:	
M2-N14 S10B02	*STUDY AREA / 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 4 of 4

Document Name: Map2_STUDY_AREA_ver3.1_2021.01.09_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N11 S10A01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

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- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Study Area / Περιοχή Μελέτης

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

- 1150 *Coastal lagoons / *Παράκτιες λιμνοθάλασσες
- 1160 Large shallow inlets and bays / Αβαθείς κολπίσκοι και κόλποι
- 1210 Annual vegetation of drift lines / Μονοετής βλάστηση μεταξύ των ορίων πλημμυρίδας & αμπώπιδας
- 1310 Salicornia and other annuals colonising mud and sand / Πρωτογενής βλάστηση με Salicornia και άλλα μονοετή είδη των λασπωδών και αμμωδών ζωνών
- 1410 Mediterranean salt meadows (Juncetalia maritimi) / Μεσογειακά αλίπεδα (Juncetalia maritimi)
- 1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) / Μεσογειακές και θερμοατλαντικές αλόφιλες λόχμες (Sarcocornietea fruticosi)
- 2110 Embryonic shifting dunes / Υποτυπώδεις κινούμενες δίνες
- 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
- 5210 Arborescent matorral with Juniperus spp. / Δενδρώδη matorrals με Juniperus spp.
- 5420 Sarcopoterium spinosum phryganas / Φρύγανα από Sarcopoterium spinosum
- 91M0 Pannonian-Balkanic turkey oak-sessile oak forests / Δάση δρυός με Quercus cerris και Quercus petraea
- 92A0 Salix alba and Populus alba galleries / Δάση-στοές με Salix alba και Populus alba
- 92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae) / Νότια παρόχθια δάση-στοές και λόχμες (Nerio -Tamaricetea και Securinegion tinctoriae)
- 9320 Olea and Ceratonia forests / Δάση με Olea και Ceratonia
- 9350 Quercus macrolepis forests / Δάση με Quercus macrolepis

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

- 1011 Villages and settlements / Χωριά και οικισμοί
- 1013 Secondary settlements / Δευτερεύοντες οικισμοί
- 1021 Concentration of agricultural - processing units / Συγκεντρώσεις αγροτικών - μεταποιητικών μονάδων
- 1022 Motorways / Αυτοκινητόδρομοι
- 1023 National roads / Δρόμοι εθνικοί
- 1025 Provincial roads / Δρόμοι επαρχιακοί
- 1029 Port areas / Ζώνες λιμένων
- 1031 Dump sites / Χώροι απόρριψης απορριμμάτων
- 1041 Sport and leisure facilities / Εγκαταστάσεις αθλητισμού και αναψυχής
- 1050 Non-irrigated arable land - pure / Μη αρδεύσιμη-αρόσιμη γη αμιγής
- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
- 1059 Paddy fields / Ορυζώνες
- 1062 Abandoned cultivation / Εγκαταλελειμμένες καλλιέργειες
- 1063 Permanent water courses without vegetation / Ποταμοί μόνιμης ροής χωρίς βλάστηση
- 1065 Forest plantations / Φυτείες δασικών ειδών (αναδασώσεις)
- 1066 Fruit trees and berry plantations - pure / Οπωροφόρα δέντρα & φυτείες (αμιγή)
- 1067 Fruit trees and berry plantations - mixed / Οπωροφόρα δέντρα & φυτείες (μεικτά)
- 1068 Olive groves - pure / Ελαιώνες αμιγείς
- 1070 Grasslands (artificial pastures) / Λειμώνες (τεχνητοί βοσκότοποι)
- 1080 Water bodies / Συλλογές υδάτων
- 21B0 Unvegetated sandy beaches / Αμμώδεις παραλίες χωρίς βλάστηση
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 72A0 Reed beds / Καλαμώνες
- 8250 Unvegetated rocky bed (terrestrial ecosystems) / Βραχώδες υπόστρωμα που δεν καλύπτεται από βλάστηση
- 9620 Unvegetated river bed / Κοίτη ποταμού χωρίς βλάστηση

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

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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

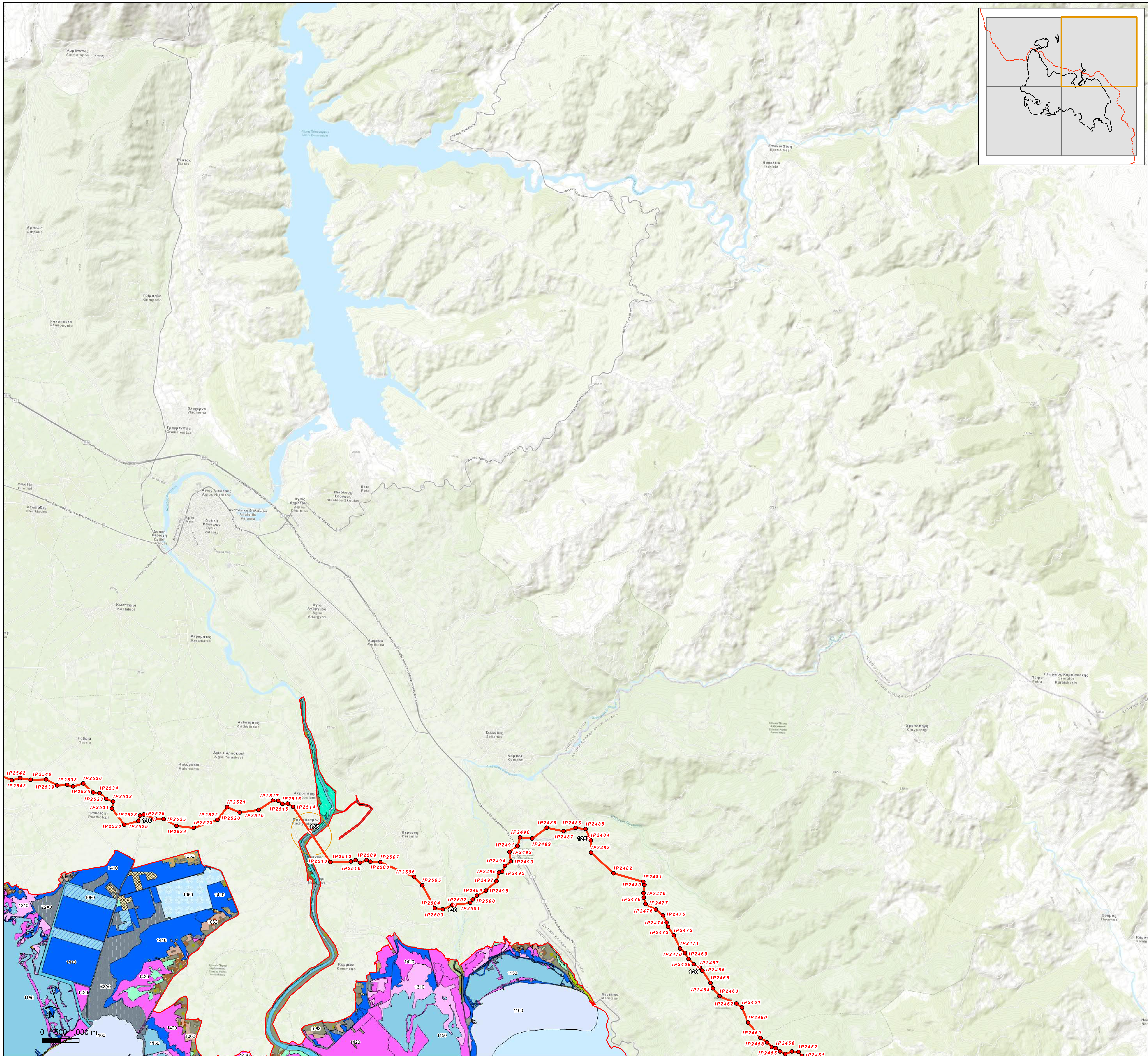
EASTMED PIPELINE PROJECT - GREEK SECTION/
ΕΡΓΟ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED - ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE STUDY AREA / ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ*	
M3-N11 S10A01		
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 4

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



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N12 S10A02	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" 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 Ι (92/43/ΕΟΚ)

- 1150 *Coastal lagoons / *Παράκτιες λιμνοθάλασσες
- 1160 Large shallow inlets and bays / Αβαθείς κολπίσκοι και κόλποι
- 1210 Annual vegetation of drift lines / Μονοετής βλάστηση μεταξύ των ορίων πλημμυρίδας & αμπώτιδας
- 1310 Salicornia and other annuals colonising mud and sand / Πρωτογενής βλάστηση με Salicornia και άλλα μονοετή είδη των λασπωδών και αμμωδών ζωνών
- 1410 Mediterranean salt meadows (Juncetalia maritimi) / Μεσογειακά αλίπεδα (Juncetalia maritimi)
- 1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) / Μεσογειακές και θερμοατλαντικές αλόφιλες λόχμες (Sarcocornetea fruticosi)
- 2110 Embryonic shifting dunes / Υποτυπώδεις κινούμενες θίνες
- 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
- 5210 Arborescent matorral with Juniperus spp. / Δενδρώδη matorrals με Juniperus spp.
- 5420 Sarcopoterium spinosum phryganas / Φρύγανα από Sarcopoterium spinosum
- 91M0 Pannonian-Balkanic turkey oak-sessile oak forests / Δάση δρυός με Quercus cerris και Quercus petraea
- 92A0 Salix alba and Populus alba galleries / Δάση-στοές με Salix alba και Populus alba
- 92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae) / Νότια παρόχθια δάση-στοές και λόχμες (Nerio -Tamaricetea και Securinegion tinctoriae)
- 9320 Olea and Ceratonia forests / Δάση με Olea και Ceratonia
- 9350 Quercus macrolepis forests / Δάση με Quercus macrolepis

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
- 1013 Secondary settlements / Δευτερεύοντες οικισμοί
- 1021 Concentration of agricultural - processing units / Συγκεντρώσεις αγροτικών - μεταποιητικών μονάδων
- 1022 Motorways / Αυτοκινητόδρομοι
- 1023 National roads / Δρόμοι εθνικοί
- 1025 Provincial roads / Δρόμοι επαρχιακοί
- 1029 Port areas / Ζώνες λιμένων
- 1031 Dump sites / Χώροι απόρριψης απορριμμάτων
- 1041 Sport and leisure facilities / Εγκαταστάσεις αθλητισμού και αναψυχής
- 1050 Non-irrigated arable land - pure / Μη αρδεύσιμη-αρόσιμη γη αμιγής
- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
- 1059 Paddy fields / Ορυζώνες
- 1062 Abandoned cultivation / Εγκαταλελειμμένες καλλιέργειες
- 1063 Permanent water courses without vegetation / Ποταμοί μόνιμης ροής χωρίς βλάστηση
- 1065 Forest plantations / Φυτείες δασικών ειδών (αναδασώσεις)
- 1066 Fruit trees and berry plantations - pure / Οπωροφόρα δέντρα & φυτείες (αμιγή)
- 1067 Fruit trees and berry plantations - mixed / Οπωροφόρα δέντρα & φυτείες (μεικτά)
- 1068 Olive groves - pure / Ελαιώνες αμιγείς
- 1070 Grasslands (artificial pastures) / Λειμώνες (τεχνητοί βοσκότοποι)
- 1080 Water bodies / Συλλογές υδάτων
- 21B0 Unvegetated sandy beaches / Αμμώδεις παραλίες χωρίς βλάστηση
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 72A0 Reed beds / Καλαμώνες
- 8250 Unvegetated rocky bed (terrestrial ecosystems) / Βραχώδες υπόστρωμα που δεν καλύπτεται από βλάστηση
- 9620 Unvegetated river bed / Κοίτη ποταμού χωρίς βλάστηση

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
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 - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	
M3-N12 S10A02	*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	**Company's DWG No/ Αρ. Σχ. Εταιρείας:**	**Engineer's DWG No/ Αρ. Σχ. Μελετητή:**	**Sheet/Φύλλο**
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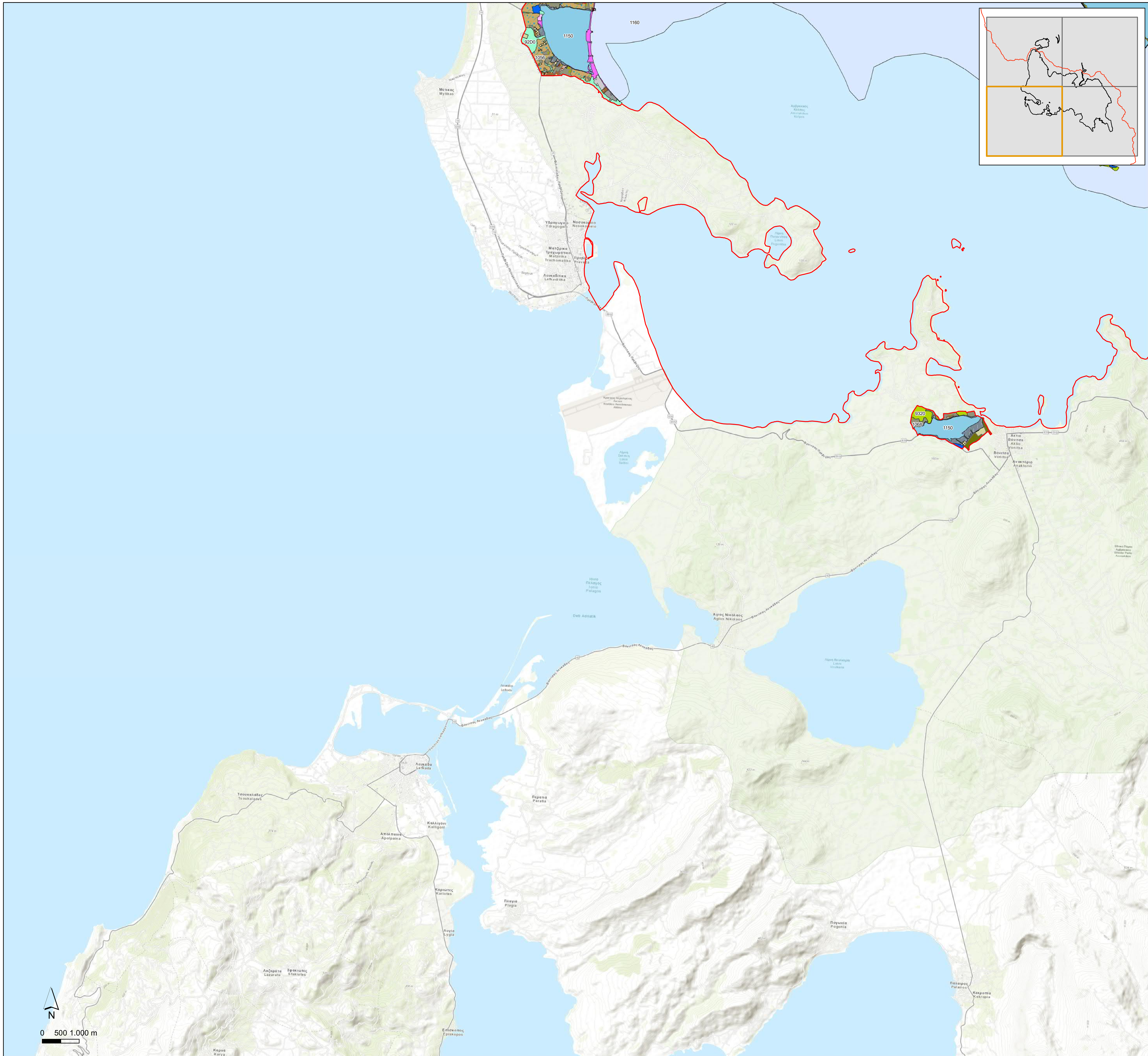
Document Name: Map3_HABITATS-OXE_ver3.1_2022.02.14_A1_onshore



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N13 S10B01	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

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- Proposed Routing / Προτεινόμενη Όδευση
- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Study Area / Περιοχή Μελέτης

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

- 1150 *Coastal lagoons / *Παράκτιες λιμνοθάλασσες
- 1160 Large shallow inlets and bays / Αβαθείς κολπίσκοι και κόλποι
- 1210 Annual vegetation of drift lines / Μονοετής βλάστηση μεταξύ των ορίων πλημμυρίδας & αμπώτιδας
- 1310 Salicornia and other annuals colonising mud and sand / Πρωτογενής βλάστηση με Salicornia και άλλα μονοετή είδη των λασπωδών και αμμωδών ζωνών
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NOTES/ ΣΗΜΕΙΩΣΕΙΣ

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
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 - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°: M3-N13 S10B01

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 3 of 4

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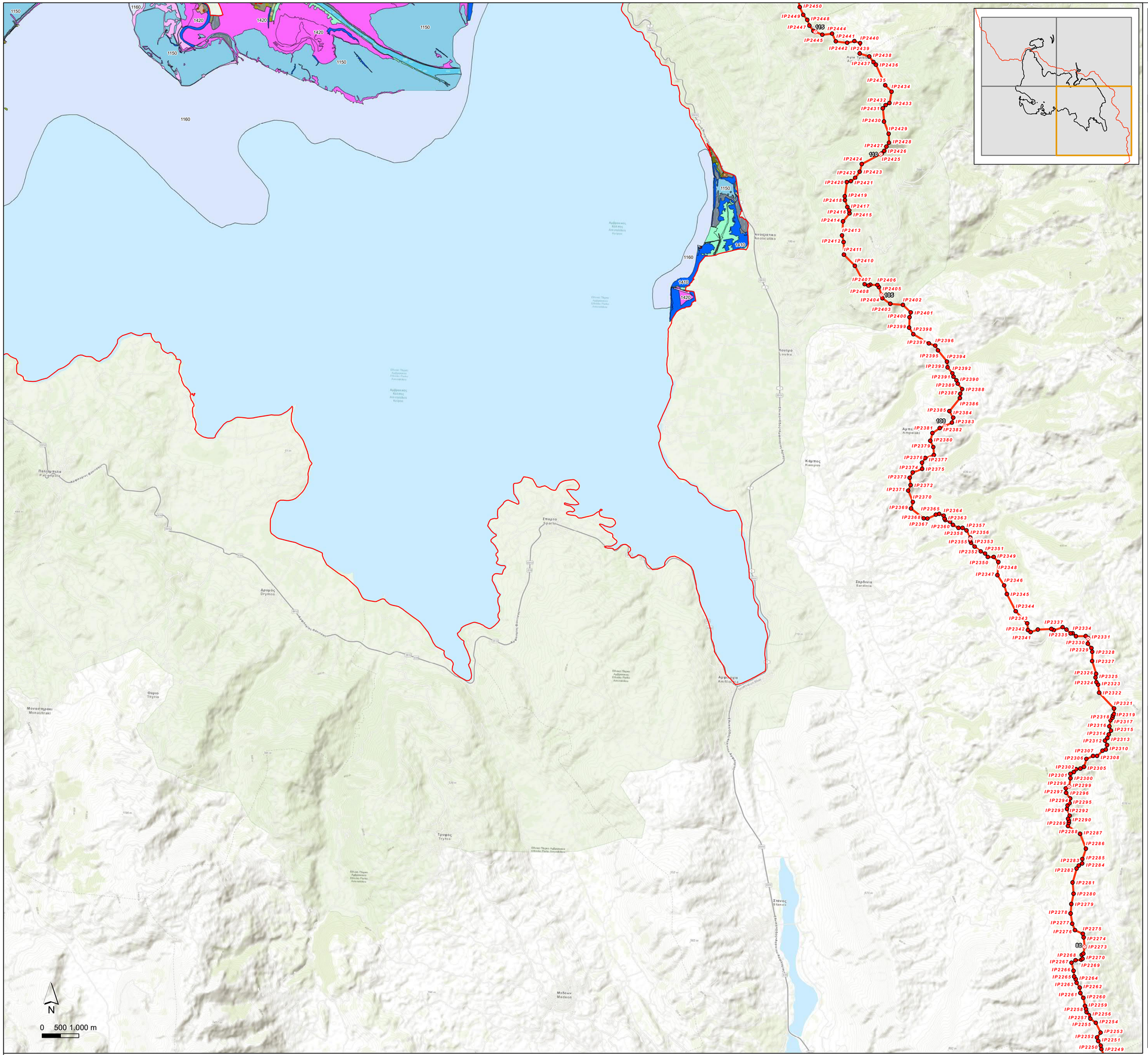

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / ΑΡ. ΕΓΓΡΑΦΟΥ	DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ
M3-N14 S10B02	APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001" FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001" ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

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- Field Survey Area / Περιοχή Έρευνας Πεδίου
- Study Area / Περιοχή Μελέτης

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

- 1150 *Coastal lagoons / *Παράκτιες λιμνοθάλασσες
- 1160 Large shallow inlets and bays / Αβαθείς κολπίσκοι και κόλποι
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- 1050 Non-irrigated arable land - pure / Μη αρδεύσιμη-αρόσιμη γη αμιγής
- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
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- 1065 Forest plantations / Φυτείες δασικών ειδών (αναδασώσεις)
- 1066 Fruit trees and berry plantations - pure / Οπωροφόρα δέντρα & φυτείες (αμιγή)
- 1067 Fruit trees and berry plantations - mixed / Οπωροφόρα δέντρα & φυτείες (μεικτά)
- 1068 Olive groves - pure / Ελαιώνες αμιγείς
- 1070 Grasslands (artificial pastures) / Λειμώνες (τεχνητοί βοσκότοποι)
- 1080 Water bodies / Συλλογές υδάτων
- 21B0 Unvegetated sandy beaches / Αμμώδεις παραλίες χωρίς βλάστηση
- 5340 Eastern Garrigues / Garrigues της Ανατολικής Μεσογείου
- 72A0 Reed beds / Καλαμώνες
- 8250 Unvegetated rocky bed (terrestrial ecosystems) / Βραχώδες υπόστρωμα που δεν καλύπτεται από βλάστηση
- 9620 Unvegetated river bed / Κοίτη ποταμού χωρίς βλάστηση

NOTES/ ΣΗΜΕΙΩΣΕΙΣ

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

Contract No:
Αρ. Συμβολαίου:

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

COMPANY / ΕΤΑΙΡΕΙΑ: IGI Poseidon

ENGINEER/ CONSULTANT: Asprofos engineering, ERM

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

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

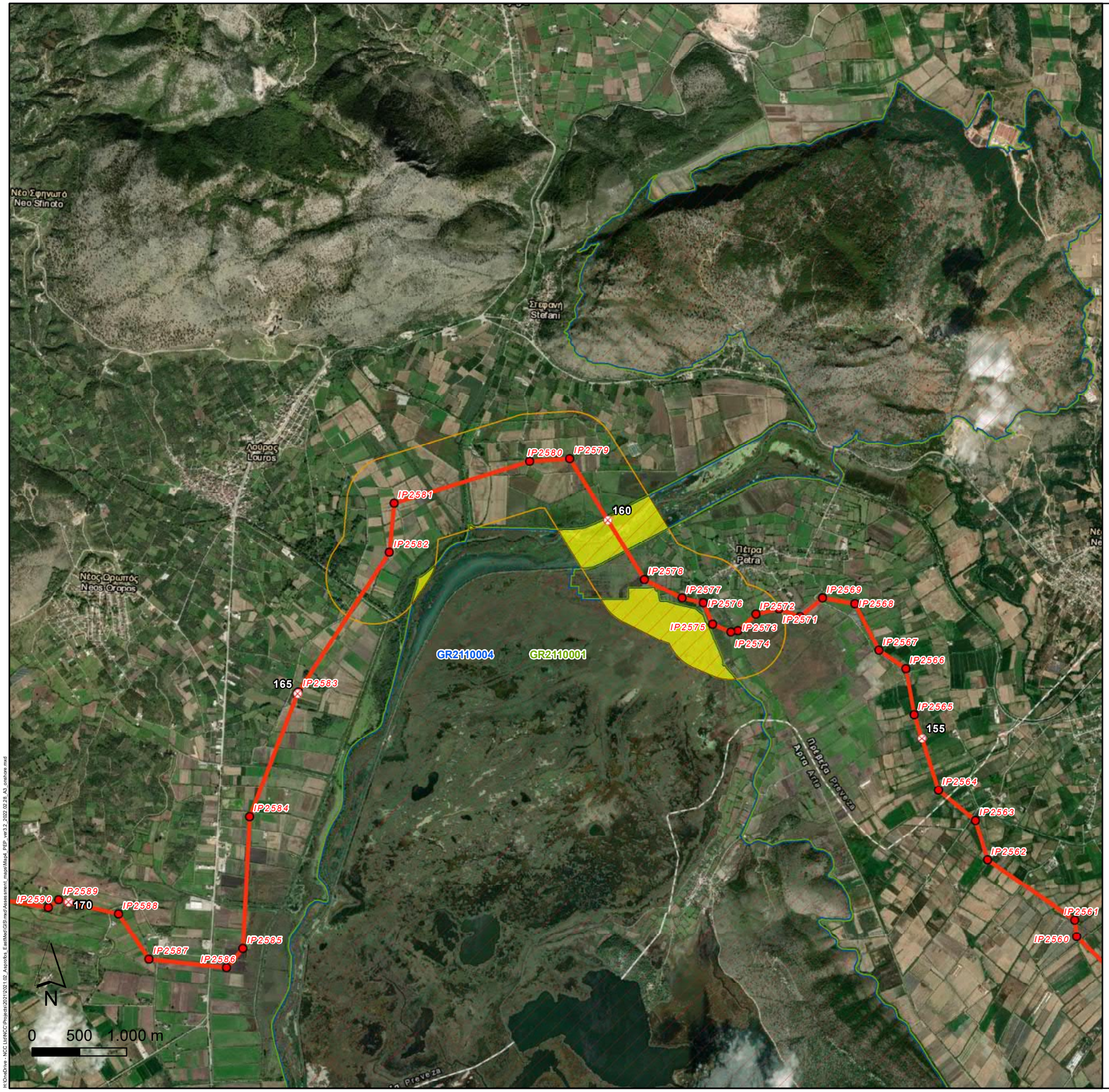
DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	
M3-N14 S10B02	*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 4 of 4

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



REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2110001"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2110001"
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 " - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΠΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	
M4-N08 S10A01	*FIELD SURVEY AREA / ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ
1:40.000		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	1 of 2

Document Name: Map4_PEP_ver3.2_2022.02.28_A3_onshore

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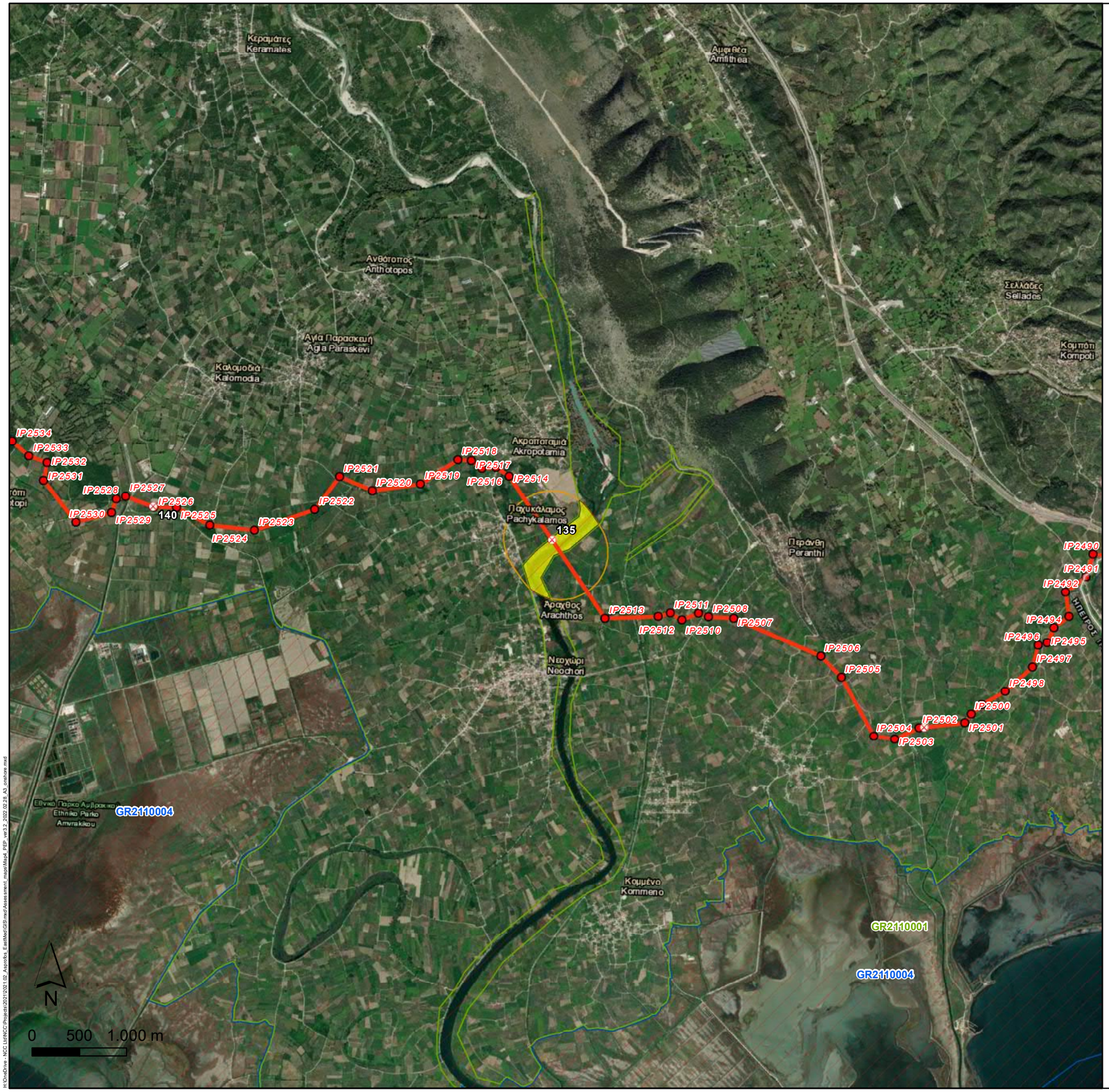

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REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2110001"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2110001"
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 " - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:			
M4-N09 S10A02	*FIELD SURVEY AREA / ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*		
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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 2 of 2

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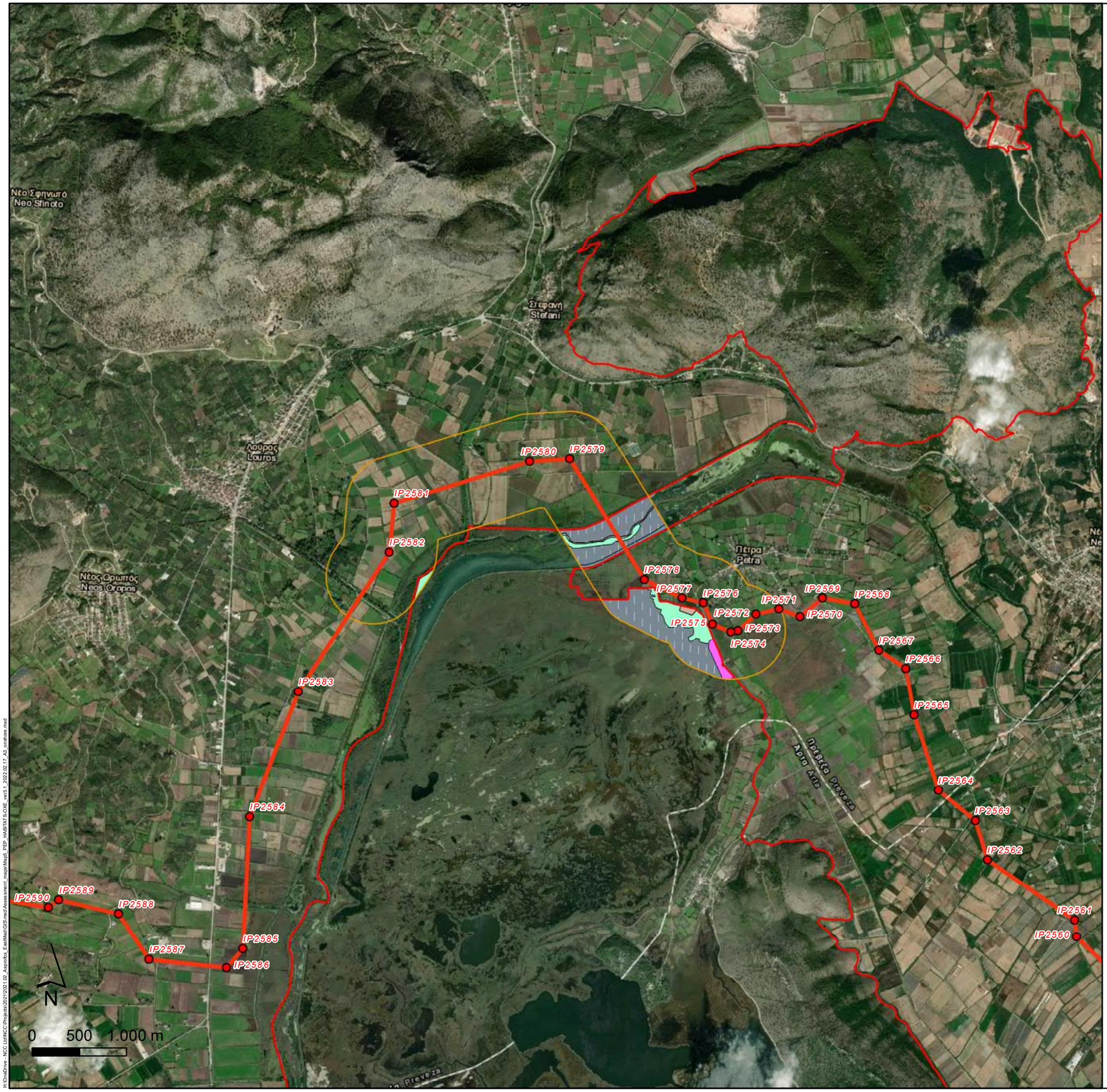

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001"
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)

- 1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) / Μεσογειακές και θερμοατλαντικές αλόφιλες λόχμες (Sarcocornietea fruticosi)
- 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation / Ευτροφικές φυσικές λίμνες με βλάστηση τύπου Magnopotamion ή Hydrocharition
- 92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae) / Νότια παρόχθια δάση-στοές και λόχμες (Nerio - Tamaricetea και Securinegion tinctoriae)

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

- 1056 Permanently irrigated land / Μόνιμα αρδευόμενη γη αμιγής
- 1062 Abandoned cultivation / Εγκαταλελειμμένες καλλιέργειες
- 72A0 Reed beds / Καλαμώνες
- 9620 Unvegetated river bed / Κοίτη ποταμού χωρίς βλάστηση

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 - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	
M5-N08 S10A01	*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-117275000-STU-XXX/ Section 11.1.1	Sheet/ Φύλλο 1 of 2

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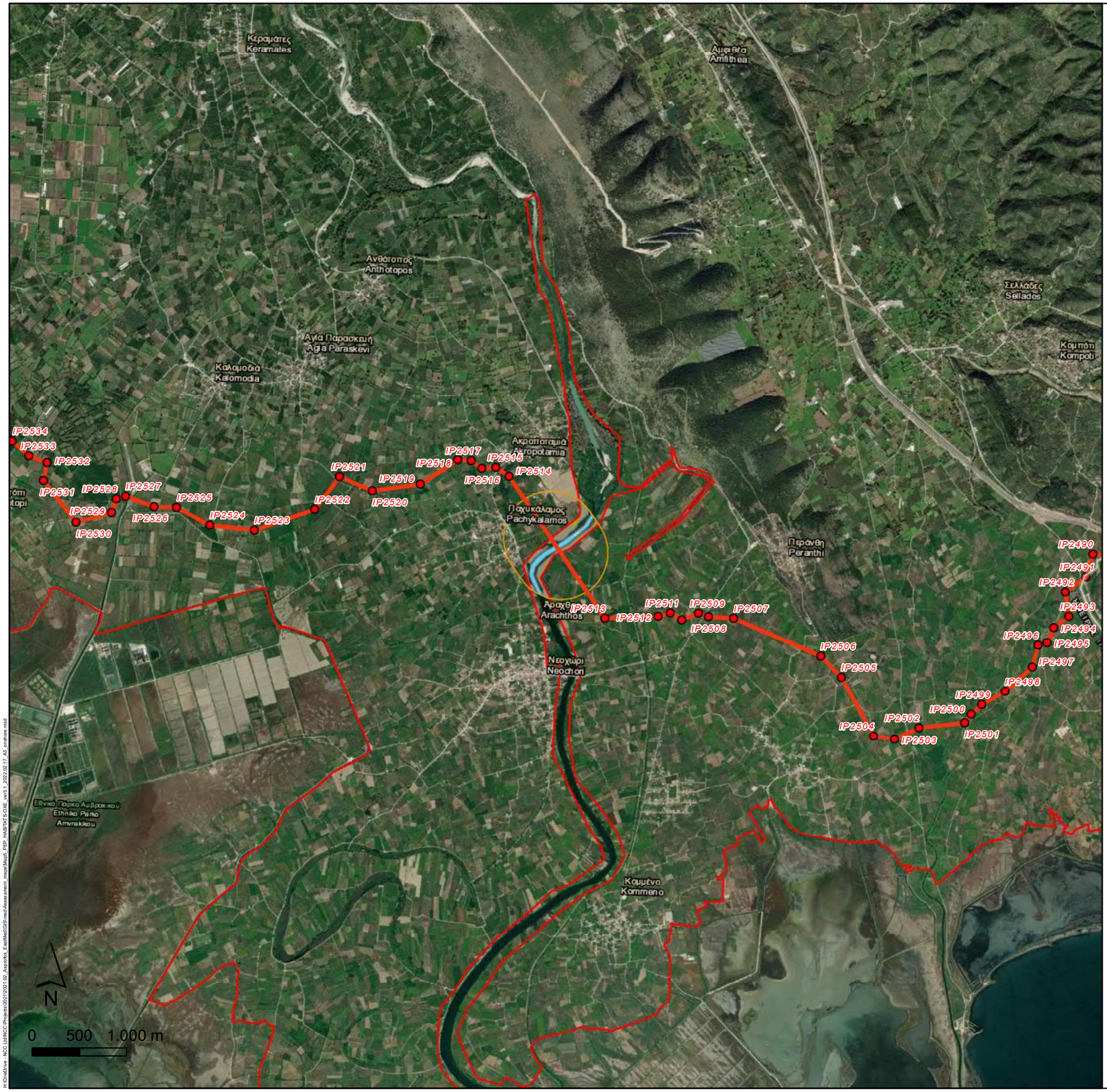

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REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE "SAC GR2110001"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 "SAC GR2110001"
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 - Others (not listed in the Annex I of 92/43/EEC) / Τύποι οικοτόπων - Λοιποί (εκτός Παραρτήματος I της 92/43/ΕΟΚ)

- 1063 Permanent water courses without vegetation / Ποταμοί μόνιμης ροής χωρίς βλάστηση
- 1068 Olive groves - pure / Ελαιώνες αμιγείς

Rev. Αναθ.	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
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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 - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	*HABITAT TYPES - ECOLOGICAL SPATIAL UNITS INSIDE FIELD SURVEY AREA /ΤΥΠΟΙ ΟΙΚΟΤΟΠΩΝ - ΟΙΚΟΛΟΓΙΚΕΣ ΧΩΡΙΚΕΣ ΕΝΟΤΗΤΕΣ ΣΤΗΝ ΠΕΡΙΟΧΗ ΕΡΕΥΝΑΣ ΠΕΔΙΟΥ*	
M5-N09 S10A02		
Scale/ Κλίμακα: 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ: 0A
Size/ Μέγεθος: A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1
		Sheet/ Φύλλο: 2 of 2

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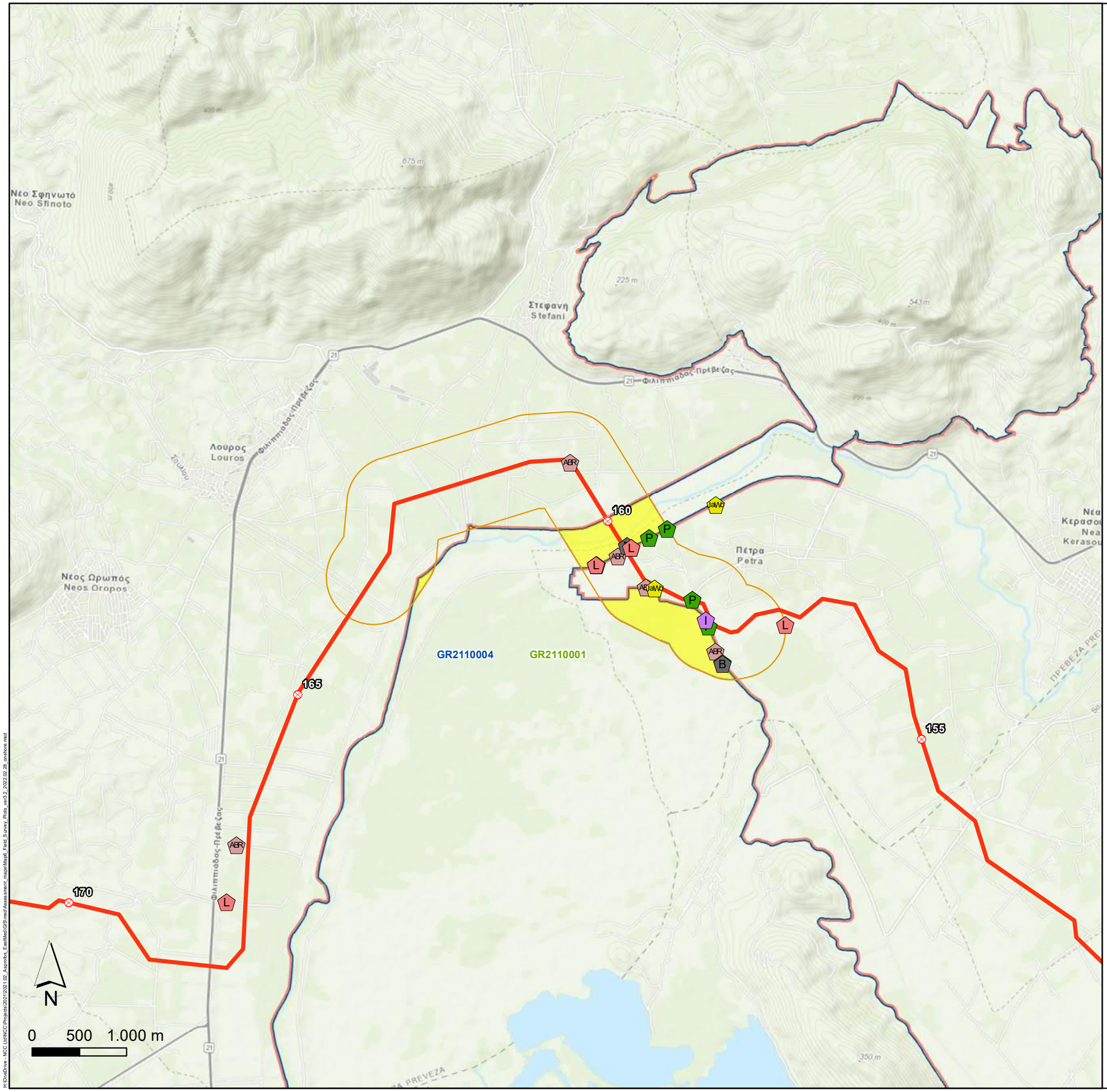

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

APPROPRIATE ASSESSMENT OF THE NATURA 2000 SITE " GR2110001"
FOR THE ONSHORE SECTION OF EASTMED PIPELINE PROJECT
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " GR2110001"
ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΔΙΑΣΥΝΔΕΤΗΡΙΟΥ ΑΓΩΓΟΥ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ EASTMED

LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components / Στοιχεία του Έργου

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

Natura 2000 Network / Δίκτυο Natura 2000

- SAC/ΕΖΔ: Special Area of Conservation / Ειδική Ζώνη Διατήρησης
- SAC-SPA/ΕΖΔ-ΖΕΠ: Special Area of Conservation - Special Protection Area / Ειδική Ζώνη Διατήρησης - Ζώνη Ειδικής Προστασίας
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Field Survey Points / Σημεία δειγματοληψίας

- B: Bats / Χειρόπτερα
- ABR: Birds - Amphibians - Reptiles / Ορνιθοπανίδα - Αμφίβια - Ερπετά
- JaWo: Canis aureus - Canis lupus
- I: Invertebrates / Ασπόνδυλα
- 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 " - GR2110001" /
ΕΙΔΙΚΗ ΟΙΚΟΛΟΓΙΚΗ ΑΞΙΟΛΟΓΗΣΗ ΤΗΣ ΠΕΡΙΟΧΗΣ NATURA 2000 " - GR2110001"

Map n°:	*FIELD SURVEY POINTS / ΣΗΜΕΙΑ ΔΕΙΓΜΑΤΟΛΗΨΙΑΣ*	
M6-N08 S10A01		
Scale/ Κλίμακα: 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ: 0A
Size/ Μέγεθος: A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1

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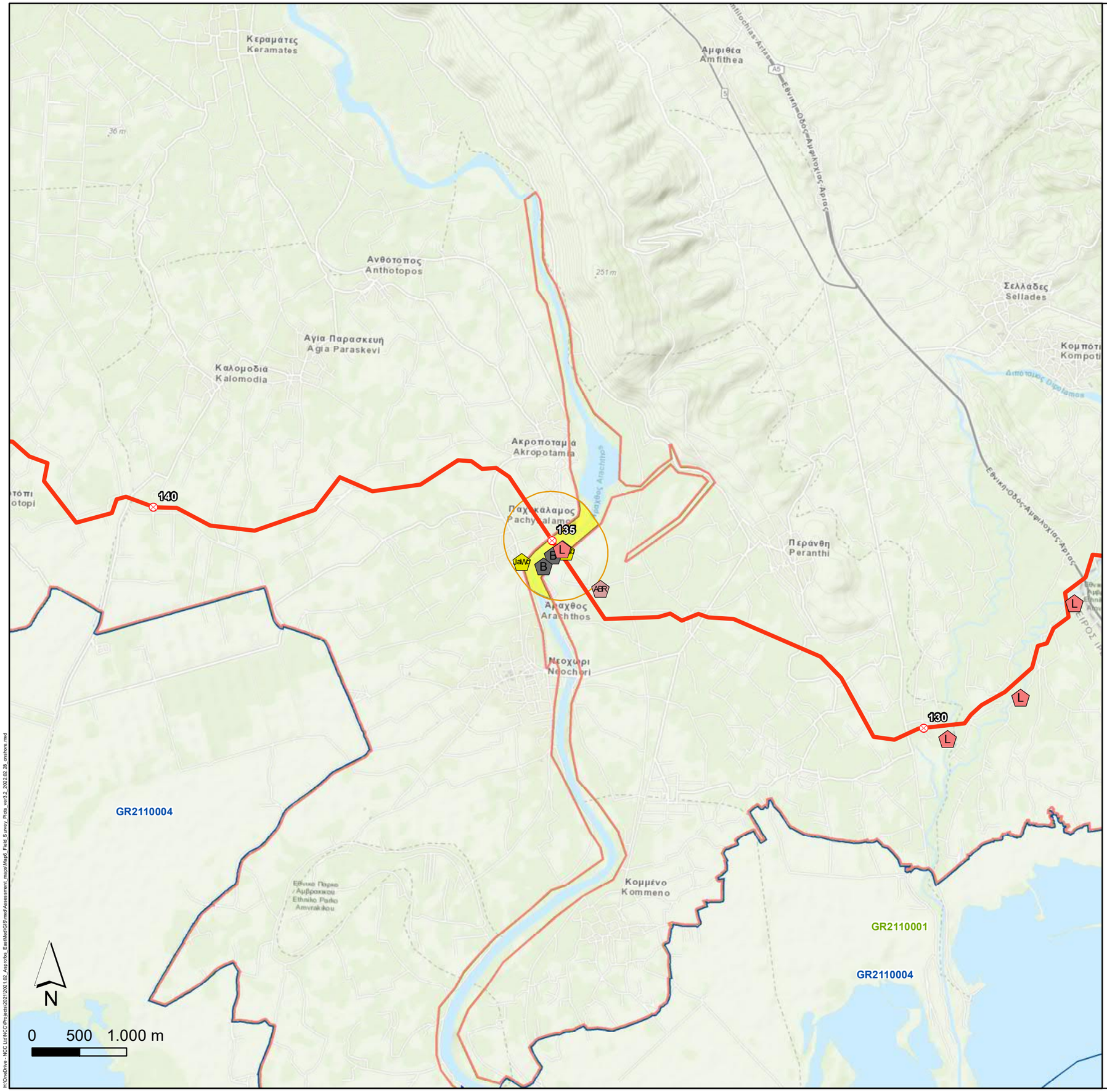

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT TITLE / ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

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Map n°:	*FIELD SURVEY POINTS / ΣΗΜΕΙΑ ΔΕΙΓΜΑΤΟΛΗΨΙΑΣ*	
M6-N09 S10A02		
Scale/ Κλίμακα: 1:40.000	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ: 0A
Size/ Μέγεθος: A3	Company's DWG No/ Αρ. Σχ. Εταιρείας: -	Engineer's DWG No/ Αρ. Σχ. Μελετητή: AUT-11727500-STU-XXX/ Section 11.1.1
		Sheet/ Φύλλο: 2 of 2

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