COMPANY :

IGI Poseidon

ENGINEER: Consortium

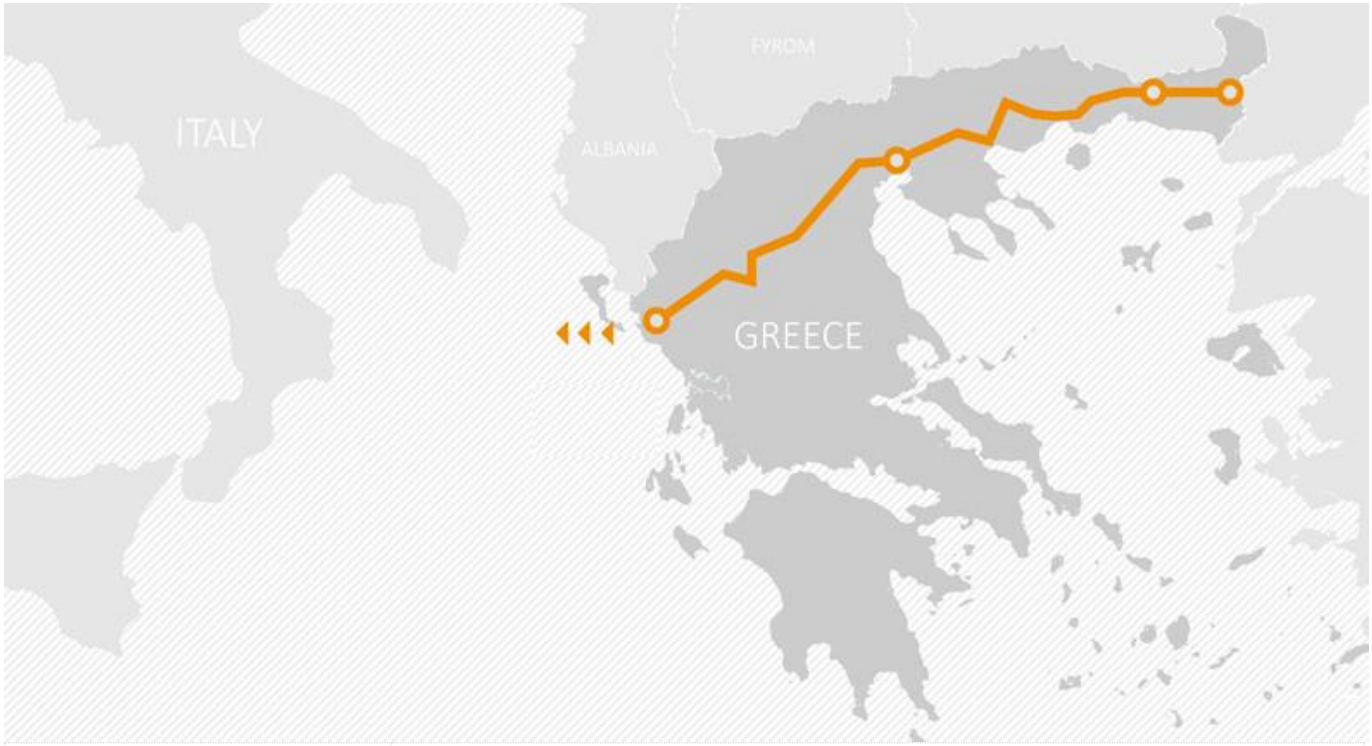
C&M ENGINEERING

Asprofos engineering

PROJECT:

Poseidon Pipeline Project - Offshore Section

Front End Engineering & Design And Permitting



Document Title:	Application File for ETA Amendment of Greek Offshore Section of High Pressure Natural Gas Interconnector Greece Italy
Company's Document No:	
Project Document No:	P581-000-ST-ENV-05
Engineer's Document No:	AUT-11726200-STU-006

REV.	DATE	REVISION DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY
3	24.04.2018	IFI – Comments Received through email on 24.04.2018	HOD	PRI	VAT
2	27.03.2018	IFR – Comments Received through email on 22.03.2018	HOD	PRI	VAT
1	21.03.2018	IFR – Comments Received through DRS 013 on 15.03.2018	HOD	PRI	VAT

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Abbreviations

Abbreviation	Description
a.s.l.	above sea level
C/S Florovouni (Onshore Facilities) (FCS)	Compressor Station at Florovouni area, Thesprotia Regional Unit
CWT	Characteristic Weather Types
EIA	Environmental Impact Assessment
EPA	Natural Gas Cooperation
ETA	Environmental Terms Approval
FCS (Onshore Facilities) (C/S Florovouni)	Compressor Station at Florovouni area, Thesprotia Regional Unit
FEED	Front End Engineering Design
GTP	General Town Plan
HEDNO	Hellenic Electricity Distribution Network Operator S.A.
IED	Industrial Emissions Directive
IGB	Interconnector Greece-Bulgaria
Investigated Project	Construction and Operation of the Offshore PPP
IPPC	Integrated Pollution Prevention and Control
IPTO	Independent Power Transmission Operator
MEECC	Ministry of Environment, Energy and Climate Change
NCSR DEMOKRITOS	National Center for Scientific Research “Demokritos“
NDL	New Dutch List. Till today, there is no active legislation in terms of set values for soil and/or groundwater contamination in Greece. Currently, an international acceptable quality standard for soil (and groundwater) is used by stakeholders when necessary. The most common one is the New Dutch list. According to the New Dutch List, which is valid in many European countries, two different values are given for the concentration of each pollutant: (i) Optimum value which determines the average concentration in the soil and water, and (ii) Action value which determines the concentration above which decontamination measures are mandatory.
Offshore PPP	The greek offshore section of PPP stretching from the north-western coast of Greece (Florovouni area, at Thesprotia Regional Unit) to Italy,

Abbreviation	Description
Onshore PPP	The greek onshore section of PPP stretching from Kipoi (Greek Turkish border) to the north western coast of Greece (Florovouni area, at Thesprotia Regional Unit)
Onshore Facilities (C/S Florovouni) (FCS)	Compressor Station at Florovouni area, Thesprotia Regional Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyl
PEIA	Preliminary Environmental Impact Assessment
PLONOR	List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR) according to OSPAR Agreement 2013-06
PPP	Poseidon Pipeline Project extending from Kipi, in Regional Unit of Evros, to Otranto, Italy.
Project Owner	IGI POSEIDON S.A. (Interconnector Greece – Italy Poseidon S.A.)
RSPSD	Regional Spatial Planning and Sustainable Development of Epirus Region
SHOAP	City's Spatial and Residential Organization Plan
TPH	Total Petroleum Hydrocarbons

1 INTRODUCTION

1.1 Project Title

This report constitutes an Amendment to the Environmental Impact Assessment (EIA) of the Offshore section of Poseidon Pipeline Project (PPP) in Greece, which stretches from the north-western coast of Greece (Florovouni area, at Thesprotia Regional Unit) to the Greece-Italy border (*hereafter Offshore PPP*).

The entire PPP, stretching from Kipoi (Greece-Turkey border) to Italy, is expected to bring a geopolitical diversification of energy resources, since it will be able to supply the European market with natural gas from multiple sources.

The Offshore Section of Poseidon is included in the 3rd PCI list released in 23/11/2017. According to Law 4001/2011, ar. 176, the project has been characterized as of National Importance and Public Interest.

The Offshore PPP received the 130201/17.09.10 Approval of the Preliminary EIA for project's footprint as was determined at that time. After the recommendation of the Local Authorities'' representatives in front of the 'Committee on Production and Commerce' of the Greek Parliament, the area of Florovouni was investigated for new site of the onshore facilities. This modification, along with the corresponding modifications of the pipeline route, received the 200088/08.07.11 Approval of the PEIA. The EIA of the Offshore PPP in Greece was submitted to the Ministry of Environment, Energy and Climate Change (MEECC) in June 2012 and the project was granted an Environmental Terms Approval (Ref. No. 145493/21-01-2015 see Annex 11.7 - Environmental Terms Approval) in 2015. Table 1-1 summarizes Offshore PPP's environmental licensing.

Table 1-1 Environmental Licensing background of the Offshore PPP.

Date	Reference Number	Title
21/01/2015	145493	Environmental Terms Approval (ETA) for the Construction and Operation of the project: "Offshore Natural Gas Pipeline Interconnector Greece – Italy & Associated Facilities – Greek Section"
08/07/2011	200088	Preliminary Environmental Impact Assessment for the compressor and metering station of the project: "Interconnector Greece – Italy Natural Gas Pipeline - Offshore Greek Section"
17/09/2010	130201	Preliminary Environmental Impact Assessment for the compressor and metering station of the project: "Offshore

Date	Reference Number	Title
		Natural Gas Pipeline Interconnector Greece – Italy & Associated Facilities – Greek Section“

Prepared by: (ASPROFOS, 2018)

Some changes have taken place to the project design of the Offshore PPP since the submission of the EIA. The present EIA Amendment describes these changes and assesses their impacts to the natural, physical, cultural and socioeconomic environment.

It is highlighted that the Offshore PPP is part of the overall Poseidon Pipeline Project (PPP) which includes also an onshore section (Onshore PPP) stretching from Kipoi to Florovouni (details are provided in section 2).

1.2 Project Size and Type

Offshore PPP includes the following basic components:

- The Compressor Station (C/S) of the Offshore PPP, at Florovouni area at the Greek coast of Thesprotia Regional Unit.
- The onshore section of the pipeline from the C/S to the landfall site, in Thesprotia Regional Unit.
- The offshore section of the pipeline from the landfall site, on the Greek coastline of Thesprotia Regional Unit, passing south of Corfu Island, to the middle of the sea crossing between Greece and Italy (Greece-Italy border).

Offshore PPP’s components are complemented by a small block valve station at approximately 600m from the Greek landfall site, for additional safety of the natural gas pipeline.

Table 1-2 summarizes the amendments to the approved Offshore PPP EIA applied for approval through the present report.

Table 1-2 Modifications between Approved and Suggested Offshore PPP’s design.

Offshore PPP Compoment	Item	Approved	Suggested Amendment
Offshore PPP	Initial Capacity	9 BSCM/y	12 BSCM/y
Offshore PPP	Final Capacity	12 BSCM/y	20 BSCM/y
Offshore PPP	Maximum Design Pressure	160 barg	170 barg

Offshore PPP Compoment	Item	Approved	Suggested Amendment
Offshore PPP	Maximum Operating Pressure	140 barg	151 barg
C/S Florovouni	Total Area	87210 m²(1)	97532 m²(1)
C/S Florovouni	Number of Compressors (Initial Phase)	3 (+1 back up)	4 (+1 back up)
C/S Florovouni	Number of Compressors (Final Phase)	4 (+1 back up)	7 (+1 back up)
C/S Florovouni	Capacity of each Compressor	30 - 32 MW	27 - 32 MW
CS Florovouni	Metering facilities	Yes	No
Onshore Section	Pipeline diameter	32"	36"
Onshore Section	Pipeline length	8.2 km	8.2 km
Offshore Section	Pipeline diameter	32"	36"
Offshore Section	Pipeline length	146 km	146 km

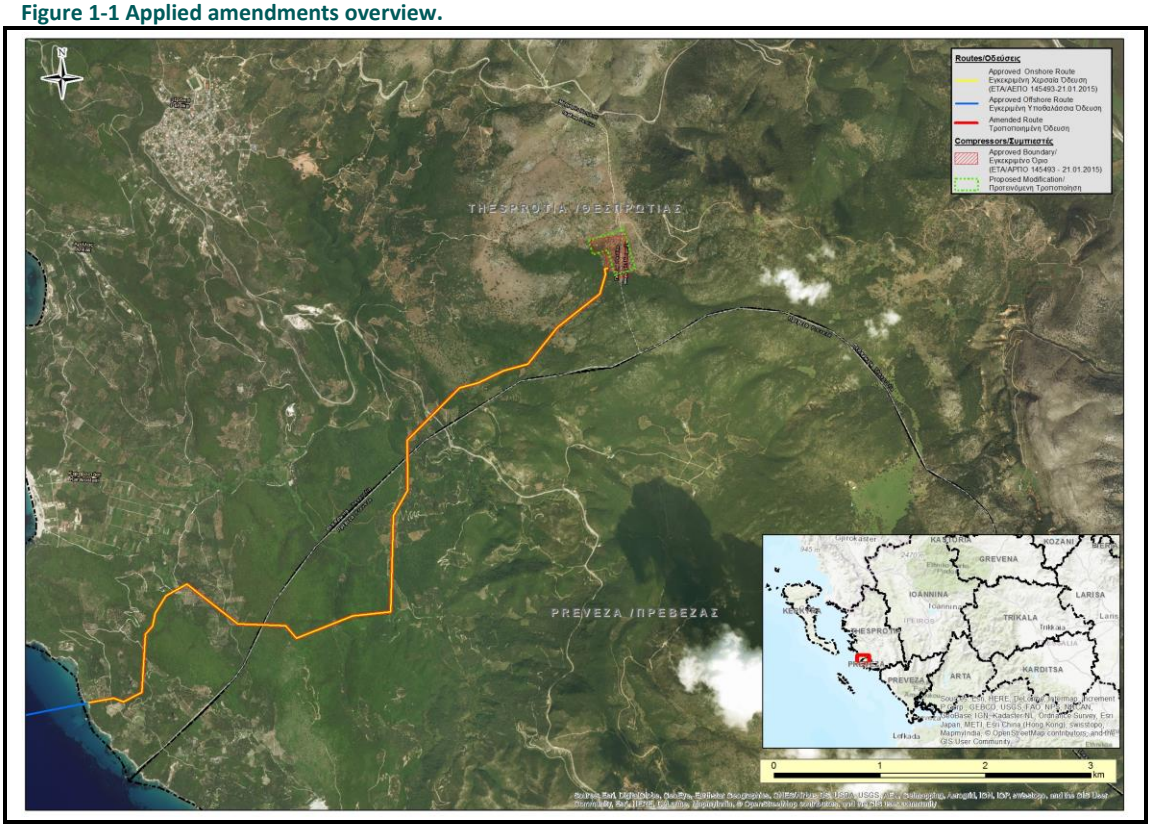
Notes
(1) The area refers only to the fenced site of the facility. The area of the ring road and buffer zone are not included, since their characteristics are not modified in comparison to the ones presented in the approved EIA.

Prepared by: (ASPROFOS, 2018)

Figure 1-1 presents an overview of the amendments applied for through the present report. A more distinct overview of the applied modifications is presented in chapter 10.1.1 - Modifications Map.

It is stressed that the proposed modifications regarding increase in pipeline diameter from 32" to 36" (equal to 4” or 10.16 cm) and the increase in maximum operating pressure from 140 barg to 151 barg do not modify any parameter relating to environmental (or social) parameters, such as Working Strip, Right of Way, or Building Restrictions and the overall footprint as described in the approved ETA. The same applies for the fiscal Metering facilities that initially were included in the design of the approved Offshore PPP, but now are excluded.

Figure 1-1 Applied amendments overview.



Prepared by: (ASPROFOS, 2018).

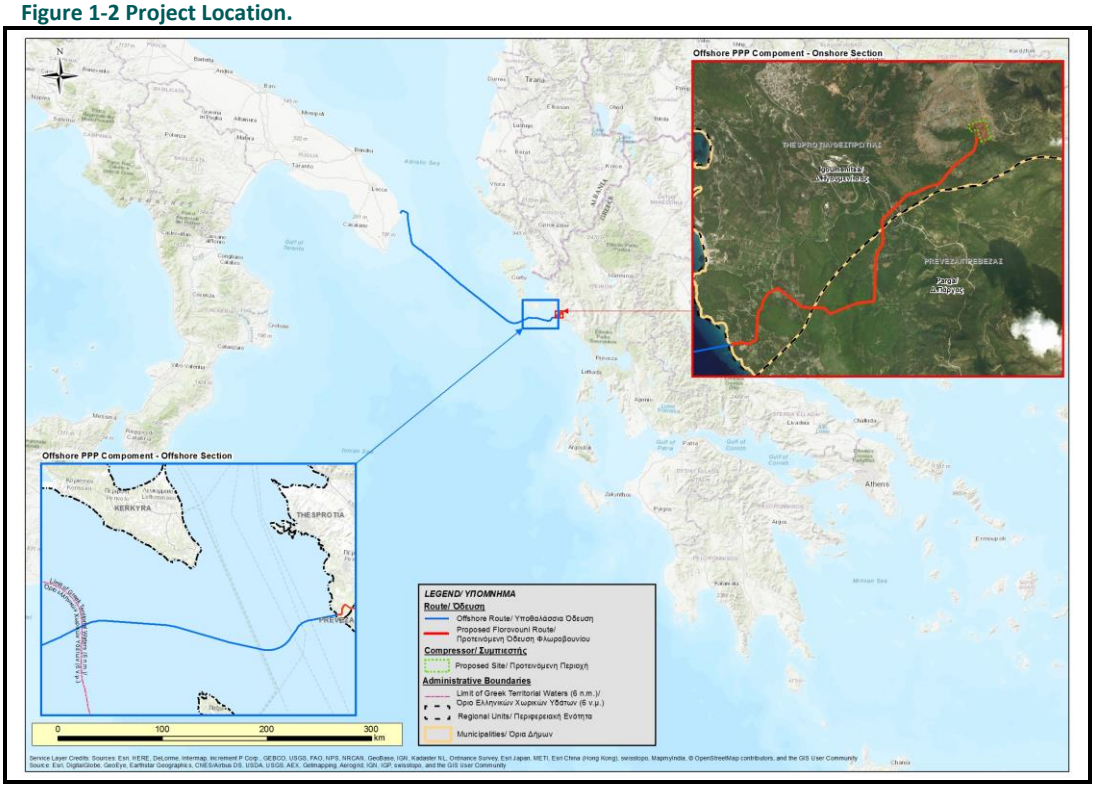
1.3 Project Location and Administrative Jurisdiction

1.3.1 Project Location

Offshore PPP starts at C/S Florovouni, at Thesprotia Regional Unit. The onshore section ends at the landfall site “Omprela 2” and then crosses Ionian Sea, south of Corfu, and Adriatic Sea to come ashore in southern Italy, near Otranto, allowing gas to flow directly from multiple sources to European markets.

The scope of the present study lies within Greek jurisdiction, only.

Figure 1-2 Project Location.



Prepared by: (ASPROFOS, 2018)

1.3.2 Project Administrative Jurisdiction

The onshore section of Offshore PPP crosses Decentralized Administration of Epirus – Western Macedonia, Region of Epirus, Regional Unit (Municipality of Igoumenitsa, M.E. of Margariti and Perdika) and Regional Unit of Preveza (M. of Parga, M.E. of Parga). The offshore section crosses the Ionian sea.

Section 10.1.3 - Offshore PPP Amendment Overview Map is also relevant.

1.3.3 Project geographic coordinates

Table 1-3 provides the coordinates of the approved Offshore PPP components along with and the coordinates of the requested amendment. Modifications are marked with red fonts.

Table 1-3 Coordinates of Offshore PPP.

Offshore PPP Components		Coordinate System			
		GGRS87		WGS84, 34N	
		Approved	Amendment	Approved	Amendment
C/S Florovouni (centroid)		X: 185386.09 Y: 4362946.46	X: 185357.79 Y: 4362931.30	X: 444028.09 Y: 4357078.42	X: 444000.34 Y: 4357062.35
Onshore Section	Start	X: 185565.38 Y: 4364483.97	X: 185565.38 Y: 4364483.97	X: 444156.02 Y: 4358619.22	X: 444156.02 Y: 4358619.22
	Middle	X: 183411.40 Y: 4360660.46	X: 183411.40 Y: 4360660.46	X: 442132.70 Y: 4354730.87	X: 442132.70 Y: 4354730.87
	End (Landfall Site)*	X: 180414.07 Y: 4358694.29	X: 180415.32 Y: 4358694.53	X: 439205.86 Y: 4352668.73	X: 439207.09 Y: 4352669.02
Offshore Section	Start (Landfall Site)	X: 180414.07 Y: 4358694.29	X: 180414.07 Y: 4358694.29	X: 439205.86 Y: 4352668.73	X: 439205.86 Y: 4352668.73
	Middle	X: 167275.33 Y: 4356191.22	X: 167275.33 Y: 4356191.22	X: 426173.87 Y: 4349734.57	X: 426173.87 Y: 4349734.57
	End (Greece-Italy Border)	X: 152937.14 Y: 4357512.35	X: 152937.14 Y: 4357512.35	X: 411819.06 Y: 4350577.89	X: 411819.06 Y: 4350577.89
* There is a negligible difference (approx. 1.5 m) between the two measurements due to transformations performed by the different softwares (ArcGIS and Autocad Map).					

Prepared by: (ASPROFOS, 2018)

1.4 Project Classification

According to Law 4001/2011, ar. 176, the project has been characterized as of National Importance and Public Interest.

Offshore PPP classification, according to the requirements of the MD 170225/2014 is provided in Table 1-4. Relevant legislation includes:

- MD 1958/2012, as codified by MD YA 37674/2016 regarding environmental classification of projects and amended with MD 2307/2018,
- Greek and European statistical classification of economic activities (STAKOD and NACE, respectively),
- JMD 3137/191/Φ.15/12 (HGG B' 1048), as amended and applicable, regarding nuisance classes of projects.

It is emphasized that the project type investigated may not be explicitly mentioned in the relevant legislation. For completion purposes, study team deemed appropriate to present the group of projects most relevant to the amendment under consideration.

Table 1-4 Offshore PPP Classification.

Legislation	Classes	Project Classification
MD 1958/2011	Group	11 - Transport of energy, fuels and chemical compounds
	a/a	1 – Pipelines of national importance or included in european or international networks and associated/ supporting facilities
	Category	A1 – Total
	Comments	-
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	Electricity Production
	a/a	302 – Electricity Production Plants with: (a) Fuel Gas
	Nuisance Class	Moderate (<300 MW)
	Comments	Units are referred to installed thermal power
* The categorization is not precise but presents the most relevant (according to the study team) activity with the requested amendment. Classification refers only to the Compressor Station.		

Prepared by: (ASPROFOS, 2018)

1.5 Project Owner

Owner of the PPP, and the investigated project is the “Interconnector Greece – Italy - POSEIDON S.A.” company, in which D.EP.A. S.A (Greek) and EDISON S.A. (Italian) participate in half.

Table 1-5 Contact details for Project Owner.

Project Owner	
Name	IGI POSEIDON S.A.
Address	92, Marinou Antipa str, P.C. 141 21, Iraklio, Attica
Telephone	(0030) 210-2701216, (0030) 210-2701281
Fax	(0030) 210-2750249
Website	http://www.igi-poseidon.com/
Email	info@igi-poseidon.com
Contact Person	
SURNAME, Name	KOSTOPOULOS, George
Position	Technical Director
Telephone	(+30) 210 2701144
email	G.KOSTOPOULOS@depa.gr

Prepared by: (ASPROFOS, 2018)

1.6 Environmental Consultant for Project Amendment

The present study has been assigned to ASPROFOS S.A. Technical Company, which has also undertaken the performance of the approved EIA, PEIA and Supplementary PEIA of the Offshore PPP. ASPROFOS Engineering is a subsidiary of HELLENIC PETROLEUM Group (HELPE) and a leading engineering consultancy company in the Oil & Gas Sector operating in accordance to internationally recognized standards and practices.

Coordination of the team was performed by Mrs. Noukou Dimitra registered environmental consultant (Class 27A).

Table 1-6 Environmental consultant contact details.

Name	ASPROFOS S.A.
Address	284,El. Venizelou Av. 17675 Kallithea
Telephone	(0030) 210-9491600,
Fax	(0030) 210-9491610
Website	www.asprofos.gr
Email	info@asprofos.gr
Contact Person	
SURNAME, Name	VAITSIS, Tilemachos
Position	Project Manager
Telephone	(0030) 210-9491318
email	TVaitsis@asprofos.gr
Signatory Consultant	
SURNAME, Name	NOUKOU, Dimitra
Consultant Register Number	25730

Telephone	(0030) 210-9491326
email	dnoukou@asprofos.gr

Prepared by: (ASPROFOS, 2018)

The preparation of this report lasted from August 2017 till March 2018, taking into account all necessary special studies and site surveys that were performed within the scope of the present study. Individual tasks were assigned and completed by an interdisciplinary study group of all engaged Consultant Engineer, as illustrated in Table 1-7.

For the needs of the present study, data have been used from the ongoing updated FEED of the Project, whilst the following studies were, also, prepared:

1. Air Quality Baseline and Air Dispersion Model performed by National Center for Scientific Research "DEMOKRITOS"
2. Noise Baseline and Noise Propagation Model performed by EMA Acoustics Consultancy Company
3. Soil Baseline Survey performed by INTERGEO
4. Groundwater Baseline Survey performed by INTERGEO.

Table 1-7 Study Team.

SURNAME, Name	Scientific Background	Responsibilities	Experience
ASPROFOS S.A.			
VAITSIS, Tilemachos	Civil Engineer, DUT Project Management, UOA	Project Manager	30 years of experience in project management and construction project management, contract administration (FIDIC, HSE, QA/QC) of natural gas projects, including pipelines and associated facilities engineering.
GEORGOPOULOU, Melina-Christina	Civil Engineer, UMIST MSc in Engineering Project Management, UMIST PDip in Environmental Engineering, University of Manchester	Project Engineer, Project Planner	10 years of experience in project engineering involved with various engineering projects including pipeline projects. Project Engineer and social and stakeholder engagement coordinator to the Trans Adriatic Pipeline (TAP) and Offshore PPP ESIA project.
Dr. PROTOPAPA, Irini	Geologist, NKUA Dr. Environmental Physics, NKUA	Head of the Permits Engineering and Environmental Studies Department. Responsible for Abiotic Environment (baseline and impacts assessment)..	20 years of experience in environmental studies of energy projects
HOURMOUZIADIS, Dimitris	Forester – Environmental Expert, AUTh, MSc in Environment and Development, University of Edinburgh	EIA Coordinator. Responsible for Biotic Environment (baseline and impacts assessment). Co-responsible for Abiotic and Social Environment (baseline and impacts assessment).	10 years of experience in compilation of environmental studies for energy infrastructure projects. Signatory consultant for Trans Adriatic Pipeline (TAP) and Offshore PPP ESIA. Member of Study Team for Burgaz-Alexandroupoli Crude Oil Pipeline and Associated Facilities (BAP)

SURNAME, Name	Scientific Background	Responsibilities	Experience
KOUTSOUKOS, Stamatis	Chemical Engineer NTUA M.B.A. in Financial Analysis, American University, Washington, DC, USA	Technical specialist in chemical engineering. Co-responsible for technical description. Co-responsible for impacts assessment on social environment.	10 years of experience in safety studies (Seveso and natural gas pipelines), fire protection, explosion protection (ATEX), oil and natural gas plant design, and implementation of quality management systems (ISO 9001), environment (ISO 14001) and health and safety at work (OHSAS 18001).
NOUKOU, Dimitria	Civil Engineer, UP, MSc in Occupational & Environmental Health, NKUA	Co-responsible for abiotic and social environment.	5 years of experience in compilation of environmental studies and permits engineering of industrial projects (production units, natural gas projects and refineries)
PAPANIKOLAS, Dimitris	Geotechnical and Environmental Engineer, TEI of W.Macedonia, MSc in Energy, Heriot Watt.	Co-responsible for Stakeholder Engagement, legislative framework and abiotic environment (baseline and impacts assessment).	3 years of experience in energy studies, surveying works, compilation of environmental studies and soil assessments
CHANIOTI, Maria	Civil Engineer, NTUA, MSc in Applied Geography – European Policies, Planning and Spatial Development, Harokopio University	Co-responsible for Abiotic Environment (baseline and impacts assessment). Co-responsible for Stakeholder Engagement and impacts assessment on social environment.	3 years of experience in compilation of technical and environmental studies for energy infrastructure projects.
GIOTI, Evangelia	Geographer, Harokopio University MSc in Applied Geography and Spatial Planning -	GIS Expert. Co-responsible for Landscape (baseline and impacts assessment). Responsible for Visualization material	5 years of experience in GIS and Remote Sensing focusing on GIS data collection and management, GIS modelling, multicriteria spatial analysis, satellite

SURNAME, Name	Scientific Background	Responsibilities	Experience
	Geoinformatics, Harokopio University		image processing and WebGIS services in Oil & Gas Sector.
STAMATIS, Kostas	Rural and Surveying Engineer, NTUA,	Chief Engineer, Route Verification	28 years of experience in topographical / terrestrial works and studies 24 years of experience in pipeline projects dealing with Construction Supervision, Engineering and Management (N.G.T.S. of Greece, ITGI Project, BAP Project, TAP Project etc)
STASINOULIAS, Stathis	Geologist, NKUA	Chief Geotechnical Engineer, Route Verification	30 years of experience in geotechnical engineering, geological works and studies, construction site management and construction supervision.
STAVRINOS, Kostas	Forester – Environmental Expert, AUTh.	Co-responsible for Biotic Environment (baseline and impacts assessment). Co-responsible for Stakeholder Engagement.	10 years of experience in compilation of environmental studies for energy infrastructure projects. Signatory consultant for Trans Adriatic Pipeline (TAP) and Offshore PPP ESIA. Member of Study Team for Burgaz-Alexandroupoli Crude Oil Pipeline and Associated Facilities (BAP)
THOMA, Theodosia	Rural and Surveying Engineer, NTUA MSc in Environmental Design of Infrastructure Projects	Contact with Authorities, Field Surveys, Stakeholder Engagement Activities. Co-responsible for Stakeholder Engagement and impacts assessment on social environment.	25 years of experience in stakeholders engagement and field surveys for Permits acquisition of pipelines. 20 years of experience in elaboration of Environmental Impact Studies for energy and other projects.

SURNAME, Name	Scientific Background	Responsibilities	Experience
National Center for Scientific Research "DEMOKRITOS"			
Dr VLACHOGIANNI DIAMANDO	PhD Atmospheric Physics (Imperial College London); MSc Remote Sensing (University College London); BSc Astrophysics (University College London)	Senior Researcher at the National Centre for Scientific Research "Demokritos"; Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)*.	20 years experience in : Atmospheric Physics with applications in Environmental Quality and Climatic Change; Coordination and Management of Collaborative R&D large scale Projects with the participation of European industries and Academic entities; Funded by the European Commission: DG-Research and DG-Energy and Transport and National (Greek) Funding Entities.
Dr. SFETSOS Athanasios	PhD Electrical Engineering, Imperial College London; BSc University of Patras.	Senior Researcher, at the National Centre for Scientific Research "Demokritos"; Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)* & Research Collaborator with the Centre for Security Studies	17 years of experience in: Atmospheric modelling with emphasis on the impacts of climate change and Critical Infrastructure protection; has participated in more than 20 EU and nationally funded projects and currently is the coordinator of H2020 funded project "EU-CIRCLE".
GOUNARIS Nikolaos	MSc in Environmental Remote Sensing, University of Aberdeen; Diploma in Agriculture, Agricultural University of Athens	Scientific Personnel, at the National Centre for Scientific Research "Demokritos"; Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)*	25 years experience in Geographical Information System & Earth Observation applications; Integrated Field Identification Systems (agriculture and land cover changes).
Dr MAGGOS Thomas	PhD Mechanical Engineering (University of Western	Senior Researcher, at the National Centre for Scientific Research "Demokritos";	19 years' experience in environmental chemistry, innovative technological

SURNAME, Name	Scientific Background	Responsibilities	Experience
	Macedonia); MSc Environmental Chemistry & Technology (University of Athens); BSc Chemistry (University of Crete)	Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)*	systems for air quality characterization of urban, indoor and occupational environment and on photocatalytic processes and applications for air pollutants abatement. He is currently scientific manager for NCSRD of the H2020 project "ICARUS" while he participated in various European and National R&D projects. He is member of European Committees CEN/TC264/WG15 & CEN/TC386/WG2 and in charge of the accreditation of EREL by the Hellenic Accreditation System (ESYD) under the terms of ELOT EN ISO 17025:2005
Dr SARAGA Dikaia	PhD Mechanical Engineering (University of Western Macedonia); MSc Environmental Physics (University of Athens); BSc Physics (University of Athens)	Associate researcher, at the National Centre for Scientific Research "Demokritos"; Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)*	15 years experience in environmental physics and chemistry, indoor and outdoor air quality assessment, population exposure, source apportionment models application (PMF, PCA, FA) on environmental data. Position of analyst for the accreditation of EREL by the Hellenic Accreditation System (ESYD) under the terms of ELOT EN ISO 17025:2005
Mr PANAGOPOULOS Panagiotis	B.Sc Environmentalist (University of Ioannina),	Associate scientific personnel, at the National Centre for Scientific Research	4 years experience in experimental study of indoor and outdoor air pollution, air

SURNAME, Name	Scientific Background	Responsibilities	Experience
	ending his MSc on Chemistry, Technology and Environmental Management (University of Athens).	"Demokritos"; Environmental Research Laboratory (EREL), Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety *(I.N.RA.S.T.E.S.)*	quality measurements, chemical analysis, photocatalytic processes.
EMA			
GALATAS, Alexandros	Civil Engineer NTUA, MSc Sound & Vibration Studies	Responsible for Noise Baseline measurements and noise propagation model	10 years of experience in conducting environmental noise measurements and surveys and environmental noise impact studies
INTERGEO			
Dr. Vatseris Christos	Dr. Hydrogeologist	Project coordinator for the Soil & Groundwater investigation and remediation, Senior Environmental Consultant, Technical Director of INTERGEO Environmental Technology	22 years of experience in soil & groundwater investigation and remediation projects, various environmental studies
Patrelis Lazaros	Geologist	Project manager for the Soil & Groundwater investigation and Remediation, Senior Environmental Consultant	21 years of experience in soil & groundwater investigation and remediation projects, various environmental studies

Prepared by: (ASPROFOS, 2018)

2 DESCRIPTION OF APPROVED PROJECT

2.1 PPP Overview

The Poseidon Pipeline Project (PPP) is developed by IGI Poseidon S.A. to allow the supply of gas from multiple sources to the European market.

As illustrated in Map 10.1.2, PPP consists of two sections:

- An onshore section, stretching from Kipoi (Greek Turkish border) to the north western coast of Greece (Florovouni area, at Thesprotia Regional Unit), (*hereafter Onshore PPP*).
- An offshore section, from the north-western coast of Greece (Florovouni area, at Thesprotia Regional Unit) to Italy *(hereafter Offshore PPP)*.

The latter section of the PPP is the Offshore Poseidon Project, which comprises:

- A compressor station next to the Greek landfall (Florovouni area, at Thesprotia Regional Unit) (*hereafter C/S Florovouni*);
- A deep-water offshore pipeline from the Greek landfall to Italy (Otranto, Apulia region). The offshore section will cross the Ionian see up to the middle of the sea straits between Greece and Italy and then continue to the Italian slope, to make landfall east of Otranto;
- A receiving fiscal metering and pressure reduction station in Italy (Otranto, Apulia region);
- Two short buried onshore pipeline sections connecting compressor station in Greece and metering station in Italy to the respective landfalls, including associated scraper launching and receipt facilities;
- Associated SCADA and Telecommunication systems.

The Greek part of the offshore section of PPP is the subject of the present study (*hereafter Offshore PPP*).

The whole PPP starts at the Greek-Turkish borders, at “Kipoi” location in Evros Region, crosses Greece from East to West and ends at the proposed landfall point in “Omprela 2” in Thesprotia Region. From this point, the Natural Gas Pipeline continues offshore, crosses the Ionian and the Adriatic Sea, reaching Otranto, Italy.

Poseidon represents a flexible "multi-source" solution for the further development of the Southern Gas Corridor. Poseidon is a direct link to the additional gas volumes available at the broader area of Greece for SEE and EU markets. This way natural gas diversification of routes and sources is enhanced.

Poseidon represents a key enabler for a partial diversification of routes for existing supplies and for transporting new and diversified sources from the Eastern Mediterranean, in synergy with the new offshore discoveries, which can be made available to the EU market by virtue of the planned EastMed project. Poseidon is therefore complementary to the existing and proposed pipelines within the southern gas corridor.

The Offshore Section of Poseidon is included in the 3rd PCI list released in 23/11/2017. In November 2017, the Ministry of Economic Development (Ministero dello Sviluppo Economico) of the Italian Republic included the Poseidon Project in Italy's National Energy Strategic Plan.

The final investment decision (FID) is targeted for June 2019.

It should be noted that a part of the natural gas quantities transferred through the PPP, will supply Bulgaria (through the Interconnector Greece-Bulgaria – IGB) and also Region of Epirus and Region of Western Macedonia with natural gas.

The realization of the Project enhances the role of Greece as a key energy player in the wider region.

2.2 Approved Offshore PPP Brief Technical Description

Offshore PPP would be developed in two phases: an initial phase with a transfer capacity of 9 BSCM/y. At a later stage, the final capacity shall reach 12 BSCM/y.

Focusing on the approved Greek Offshore PPP, this consists of:

- A compressor station next to the Greek landfall (Florovouni area, at Thesprotia Regional Unit) (*hereafter C/S Florovouni*). The approved technical characteristics of C/S Florovouni include:
    - A Total area of 87210 m²

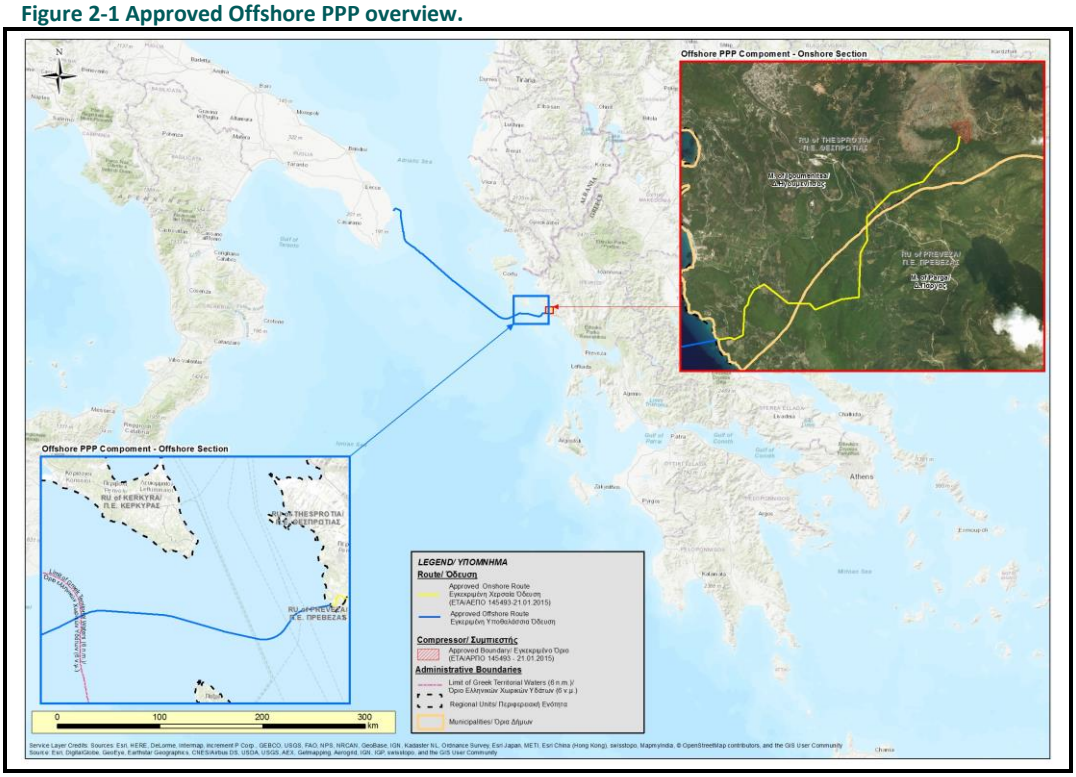
- Initially, there shall be 3 (+1 back up) compressor units; during final development an additional unit shall operate, reaching 4 (+1 back up) compressor units.

In addition to the above, a ring road for serving the station and the neighboring properties will be constructed. This road will replace the existing earth road and will be constructed by the Project Owner. This road is estimated to have a width of 6m and at a distance of 8m from the fence line. To this end, a corridor 10 to 20m in the perimeter of the Station, will be also acquired. These two features are not included in the above mentioned total area.

- An onshore buried section of approximately 8.2 km in length and 32" in diameter, connecting C/S Florovouni to the landfall site, including associated scraper launching and receipt facilities. The design pressure is 160 barg and the operational pressure 140 barg.
- An onshore blockvalve station at approximately 600 m from the landfall site
- An offshore pipeline from the Greek landfall site (Omprela area, at Thesprotia Regional Unit) to the limit of the Greek Territorial Water, of approximately 146 km in length and 32" in diameter.
- Associated SCADA and Telecommunication systems.

Figure 2-1 illustrates the basic data of the Offshore PPP while details can be found in Annex 11.7 - Environmental Terms Approval.

Figure 2-1 Approved Offshore PPP overview.



Prepared by: (ASPROFOS, 2018).

2.3 Project Progress since Issuance of ETA

The submission of the EIA for the Offshore PPP took place in June 2012. The name of the Project (instead of the Offshore section of the POSEIDON pipeline used in the present report) was : “Greek Offshore Part of the Natural Gas Interconnector Greece – Italy”. The submitted EIA was approved and Environmental Terms Approval was issued on January 2015.

Recent developments lead to a reconsideration of the overall PPP and consequently of its offshore section. From mid-2016, engineering design for the PPP (and consequently of its offshore section) revived to include latest updates on natural gas availability, design characteristics and environmental constraints update.

3 DESCRIPTION OF PROPOSED AMENDMENT

3.1 Introduction

Since approval of the ETA of the investigated project additional natural gas resources were identified, leading to the revival of a pipeline project that would transfer natural gas from the upstream areas to the European gas markets. As such, a system for transferring natural gas, additional to other approved pipeline systems, is a viable option.

However, in order for the investigated project to be able to transfer the future natural gas quantities from multiple sources, some modifications to the approved project needed to take place.

The present ETA Amendment report introduces modifications regarding:

A. the footprint and the design of the compressor station at Florovouni (C/S Florovouni). Specifically, the addressed modifications are:
    1. Changes in the exact siting and footprint of C/S Florovouni
    2. Change in the number of compressor units for the initial and final phase.
    3. Change to the installed power for the initial and final phase.
    4. Change in the operations of the station, i.e. no fiscal metering facilities shall be constructed

B. the design of the pipeline system of Offshore PPP. Specifically, the addressed modifications are:
    1. Change in the diameter of the pipeline.
    2. Change to the pressure of the pipeline.

Table 1-2 summarizes the amendments to the approved Offshore PPP EIA applied for approval through the present report.

The following sections describe the requested amendments in detail.

It is stressed that the proposed modifications regarding increase in pipeline diameter from 32" to 36" (equals to 4” or 10.16 cm) and the increase in maximum operating pressure from 140 barg to 151 barg do not modify any parameter relating to environmental (or social) parameters, such as Working Strip, Right of Way, or Building Restrictions and the overall footprint as described in the approved ETA. The same

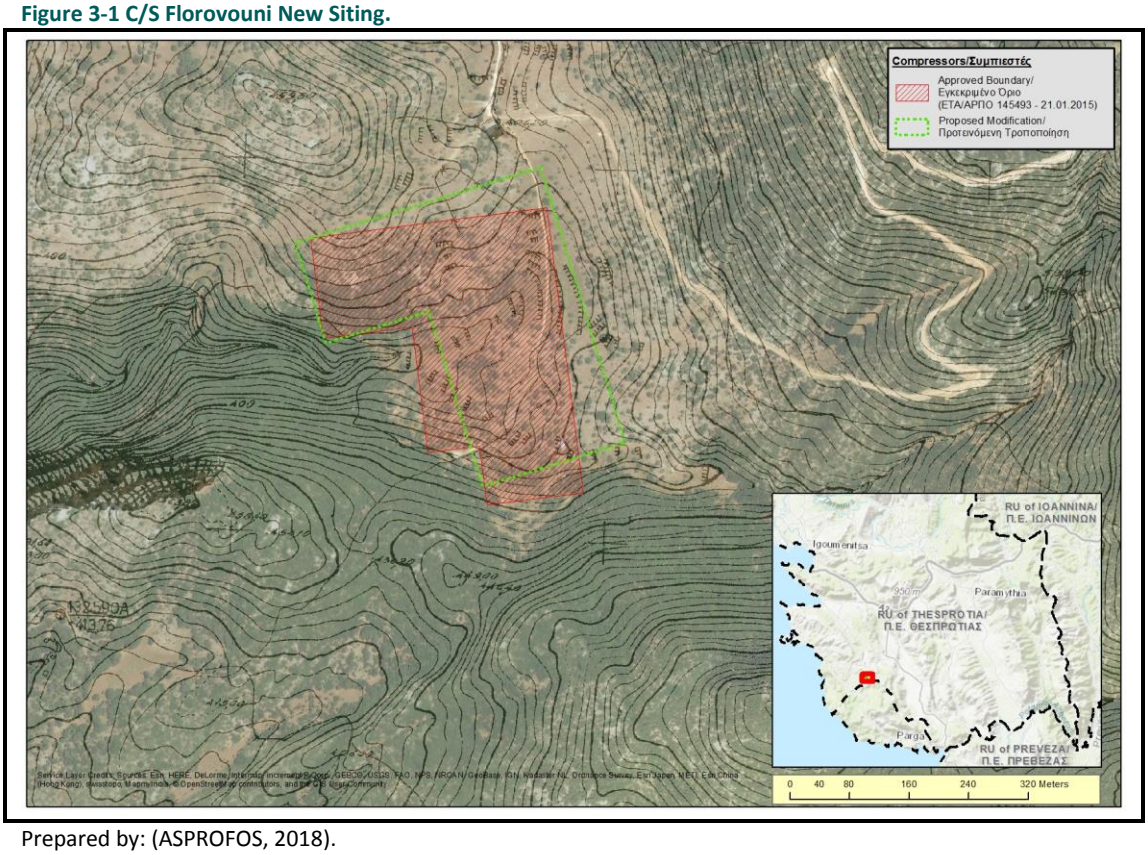
applies for the fiscal Metering facilities that initially were included in the design of the approved Offshore PPP, but now are excluded.

3.2 Compressor Station Amendments

3.2.1 Siting of Compressor Station

The new C/S Florovouni siting is in the same location as the approved one, only slightly modified. Figure 3-1 provides an overview of the modification, whilst a topographical map of C/S Florovouni is presented in section 10.2.1 - C/S Florovouni Topographical Diagram.

Figure 3-1 C/S Florovouni New Siting.



Prepared by: (ASPROFOS, 2018).

Table 3-1 provides the coordinates of the new polygon for the C/S Florovouni.

Table 3-1 Coordinates of the new C/S Florovouni Siting.

Vertex	EGSA 87		WGS 84 UTM 34N	
	X	Y	X	Y
1	185332.016	4362981.835	443972.934	4357111.936
2	185193.615	4362939.482	443836.179	4357065.063

Vertex	EGSA 87		WGS 84 UTM 34N	
	X	Y	X	Y
3	185152.461	4363073.297	443790.655	4357197.279
4	185482.035	4363174.909	444116.284	4357309.654
5	185595.501	4362805.740	444241.807	4356944.892
6	185404.503	4362746.960	444053.091	4356879.875

Prepared by: (ASPROFOS, 2018).

The new siting is rotated so as to avoid, as much as possible existing natural forest vegetation (mainly bushes) located in the surroundings.

As it is evident from the relevant figure, the only thing that essentially changes is the total area covered (Table 3-2):

Table 3-2 C/S Florovouni area modification.

Feature	Approved	Amendment
Total Area	87210 $m^{2(1)}$	97532 m^{2} (1)
Notes (1) The area refers only to the fenced site of the facility. The area of the ring road and buffer zone are not included, since their characteristics are not modified in comparison to the ones presented in the approved EIA.		

As already mentioned, the above area covers only the fenced site of the compressor station.

The following items, already approved in the initial EIA, are still valid (but are excluded in the above mentioned area):

- Ring road. A ring road for serving the station and the neighbouring properties will be required. This road will replace the existing earth road and will be constructed by the Project Owner. This road is estimated to have a width of 6m and at a distance of 8m from the fence line. This road shall be sited within a buffer zone of up to 20 m in the perimeter of the Station that shall be acquired for various purposes (access to neighbouring areas, and safety reasons).

3.2.1.1 Requirements for Site Preparation and Levelling

The site is located in a hilly area at Florovouni location. A small hill with a ridge altitude of about 400 m a.s.l. runs west-east in the northern part of the site. The natural surface of the site slopes towards south giving the possibility of excavation on the uphill side (north and central areas) and using the same material (provided that it is suitable for backfill) to create an embankment on the downhill side (south and western areas) thus

reducing the amount of earth movements along the length of the station axis as much as possible.

Due to the layout of the property and the installations the plot area will be prepared as a flat surface. Following a terrestrial topographic survey, a 3D Modell was generated to provide an indicative soil management (excavation and backfill) scheme. The results of this calculation are the quantities of the excavated material and the backfill material:

- Excavated material: approx. 452.350 m³
- Backfill material: approx. 486.200 m³
- Additional material for Backfill: approx.: 33.850 m³

Depending on soil characteristics and construction/transportation equipment, the amount of additional soil will indicatively require a total of 3400 – 4300 truck rides[1] to be transported to the site of C/S Florovouni within an overall indicative site preparation period of 11-15 months[2], i.e. about 10 trucks per day.

3.2.1.2 Access Roads

Access to the site is not subject to amendment regarding the approved EIA.

3.2.2 Layout and Technical Characteristics of C/S Florovouni

The main technical characteristics of C/S Florovouni were described in the approved EIA. Most of the buildings technical aspects have not changed, such as type and number of facilities and auxiliary buildings, height of stacks, etc. The proposed layout of C/S Florovouni is illustrated in Section 10.2.2 - C/S Florovouni General Layout and in Section 10.2.3 - C/S Florovouni Sections.

However, changes have taken place to the transfer capacity and consequently the installed number of compressor units and the overall installed power of C/S Florovouni.

The modifications are:

- Station's Capacity.

[1] It is assumed that 8 m³ / 10 m³ trucks will be used to get 33850 m³ of backfill material to Site.
[2] Calculated considering 10 trucks/day for 30 days/month so every day.

During initial phase of the project (Phase 1) capacity shall be 12 BSCM/y. This is the capacity already provisioned in the ETA; the difference is that the ETA were providing this capacity for final development of the project.

During the final phase of the project (Phase 2) capacity shall increase to 20 BSCM/y. That is instead of 12 BSCM/y, which is the already provisioned in the ETA capacity for the project's final phase, the modified capacity for the project's final phase shall be increased to 20 BSCM/y

- Station's Number of Compressor Units

  Modifications to the number of compressor units follows the one of the station's capacity. During initial phase of the project (Phase 1) the number of compressor units shall be 4 (+1 back up). This is the number of units already covered by the ETA; the difference is that the ETA were providing this number at the final development of the project.

  During the final phase of the project (Phase 2) the number of compressor units shall increase to 7 (+1 back up). That is instead of 4 (+1 back up) which is the already covered by the ETA number of units for the project's final phase, the modified number of compressor units for the project's final phase shall be increased to 7 (+1 back up).

- Station's Metering Facilities

  No fiscal metering facilities shall be constructed within the boundaries of C/S Florovouni.

These changes are also presented in Table 1-2.

3.3 Pipeline Amendments

3.3.1 Pipeline diameter

The new pipeline shall have a diameter of 36" instead of 32".

The difference of 4" equals to 10.16 cm. For construction and operation purposes, this difference is of essentially no consequence. This means that no modifications need to be taken into consideration regarding construction phase (e.g. equipment used, working strip and construction philosophy, etc.) nor operation phase (e.g. Right of

Way, maintenance requirements, etc.). Limited increase in wastes and aggregates is expected, generally a 20% increase during construction.

Small modifications regarding the total excavated material, backfilled and disposal quantities are expected for the onshore section and the nearshore one.

3.3.2 Pipeline Pressure

Some modifications are also suggested regarding pressure values of the project.

- Design Pressure is suggested to be increased to 170 barg, instead of 160 barg which is provisioned in the ETA.
- Maximum Operation Pressure is suggested to be increased to 151 barg, instead of 140 barg which is provisioned in the ETA.

These changes are also presented in Table 1-2.

3.4 Raw Materials and Utilities

Given the increase in capacity, a modification to the approved raw material balance is consequent. Table 3-3 provides an overview of the raw materials and utilities balance during operation of the C/S Florovouni.

Regarding water and electrical power more details are presented in order to allow assessment of potential impacts, given that these resources are connected to environmental parameters (water as a resource itself whilst power as a potential associated project that may induce additional impacts to the environment).

Table 3-3 Raw materials and Utilities balance during C/S Florovouni operation.

Material	Location	Components	CAS no.	Amount	Flash Point (°C)	Boiling/ Liquefaction Point (°C)	Relative Density (air=1 for gases) (water=1, for liquids)	LEL (%)	K-class	Notes
Natural Gas	Process equipment	82 -98 % C1 (methane)	68410-63-9	1580 m³ @ 30 ÷ 75barg	GAS	-162	0,55-0.68	3,6-4.4	K0	Excluding settle- out scenario
				714 m³ @ 69 ÷ 153 barg						
				83 m³ @ 20 ÷ 45 barg						Depending on selected GT
Condensate	Condensate Storage Tank	C2 -C10	68919-39-1	35 m³	-40	39 - 200	>1 0.62 - 0.76 (liq)	3	K1	
Diesel	Diesel Storage Tank	C12 -C25	68334-30-5	24 m³	49 ->55	163 - >180	3 – 7 0,81 - 0,85 (liq @25C)	0,4 -6.5	K2	
Lubricants	Emergency Generator	C15 - C50	mixture	1 m³	200	315	>1 0.866 (liq @ 15C	NA	K3	
	Back-up Generator	C15 - C50	mixture	7 m³	200	315	>1 0.866 (liq @ 15C	NA	K3	
	Turbocompression units	C15 - C50	mixture	18 m³ x 8 units	200	315	>1 0.866 (liq @ 15C	NA	K3	

Material	Location	Components	CAS no.	Amount	Flash Point (°C)	Boiling/ Liquefaction Point (°C)	Relative Density (air=1 for gases) (water=1, for liquids)	LEL (%)	K-class	Notes
Air	Receiver Vessel	Air	132259-10-0	36 m³ @ 10 barg	NA	-194.3	1	NA	NA	
Nitrogen	Receiver Vessel	N2	7727-37-9	35 m³ @ 9 barg	NA	-195.86	0.97	NA	NA	
Water	Potable Water Storage Tank	H2O	7732-18-5	2 tanks x 25 m³	NA	100	>1 1,0 (liq @ 4C)	NA	NA	
	Utility Water Break Tank	H2O	7732-18-5	1 m³	NA	100	>1 1,0 (liq @ 4C)	NA	NA	
Purified Water	Purified Water Storage Tank	H2O	7732-18-5	2 tanks x 50 m³	NA	100	>1 1,0 (liq @ 4C)	NA	NA	For GT on line and off line washing
Waste Water from GT washing	Washing Water Tank	H2O		8 basins x 3 m³	NA	100	>1 1,0 (liq @ 4C)	NA	NA	From GT off line washing
Argonite	Gas Bottles Storage FF System (electrical building)	Argon (50%) N2 (50%)	7440-37-1 (Ar) 7727-37-9 (N2)	6 - 12 m³	NA	-190.1	>1	NA	NA	
Carbon Dioxide	Gas Bottles Storage FF System (vents)	CO2	124-38-9	9 - 12 m³	NA	-78,4	1.65 (@ 20C)	NA	NA	

Material	Location	Components	CAS no.	Amount	Flash Point (°C)	Boiling/ Liquefaction Point (°C)	Relative Density (air=1 for gases) (water=1, for liquids)	LEL (%)	K-class	Notes
Carbon Dioxide	Gas Bottles Storage FF System (gas turbine)	CO2	124-38-9	6 - 12 m³	NA	-78,4	1.65 (@ 20C)	NA	NA	
Carbon Dioxide	Gas Bottles Storage FF System (emergency diesel generator)	CO2	124-38-9	5 - 10 m³	NA	-78,4	1.65 (@ 20C)	NA	NA	
Anti Freeze	Emergency Generator	Ethylene Glycol	107-21-1	1 m³	111	198	2.1-2,6 1,115 (liq @ 20C)	3,2	K4	

Source: (ETA Amendment Workshop, Milan, 31-01-2018)

3.4.1 Power Requirements

The pipeline crosses two overhead medium voltage power lines, one approximately 2300m and one approximately 6500m of the proposed route (from the Onshore Facilities and seawards). Regarding existing high voltage power lines, the Independent Power Transmission Operator (IPTO) provided information regarding the ARAXTHOS-IGOUMENITSA 150kV power line.

The required power the C/S Florovouni construction and operation will be provided using a new power transmission line. The required power for the operation of the Onshore Facilities is ~4.8MW (~6000KVA); the same line will be used for the construction phase.

According to preliminary correspondence with PPC of Peloponnesus-Epirus during the initial EIA (back in 2012) which was verified during the preparation of the present study (see Annex 11.6 - Stakeholders Engagement Documentation/ Hellenic Electricity Distribution Network Operator S.A.) a new medium voltage power line of 14km will be required (according to EN50160) from the Substation 150/20kV of Mourtou till Florovouni site. For back up another new medium voltage power line of approximately 1.3km will also be required. The overall cost is approximately ~1.300.000€.

Upon finalization of the power supply option, a separate licensing procedure will be followed, according to HEDNO's and national legislation's provisions[3], as and if applicable.

3.4.2 Water Supply

- Construction Phase

a) Freshwater. During the construction phase of the project, freshwater shall be trucked to site in order to cover the needs of the construction personnel and activities, from the near-by villages. The quantities are limited as described in the approved EIA. Slight increase is deemed insignificant from environmental point of view.

[3] It needs to be clarified that Greece went through some administrative modifications, regarding jurisdiction of electrical power production and operation, the past decade. Initially, Public Power Cooperation (PPC) was producer and operator. Then PPC operating department was separated and IPTO and HEDNO were created. Back in 2012, ITPO was competent for the power provision, but now HEDNO is.

b) Seawater. The main activity which will require significant amount of water is hydrotesting of the project. It is repeated that, according to the approved EIA, no chemicals are envisaged to be added to the hydrotesting water; only water filtering and UV sterilization is applied before flooding of the pipeline. In case that technical restrictions defined by the EPC Contractor make necessary the use of chemicals, only chemicals included in the PLONOR list shall be used.

Hydrotest water bill is illustrated in Table 3-4.

Table 3-4 Hydrotest water bill.

Offshore PPP Component	Approved Qnt (m^3)	Updated Qnt (m^3)	Additional (m^3)	Increase (%)	Source	Disposal
Onshore pipeline	3500	5382.15	1882.15	34.97	Sea water	Sea
Offshore pipeline	85000	134553.80	49553.80	36.83	Sea water	Sea

Prepared by: (ASPROFOS, 2018)

It is noted that the C/S Florovouni is going to be tested using Nitrogen which will be emitted to the atmosphere without any further impact, given that it is an inert gas.

- Operation Phase

Potable water is used in the buildings for normal domestic use and to feed the utility water system. The total water consumption is estimated to be 0.18 m^3/d. This quantity is estimated based on the assumption that 6 persons will daily consume 30 liter/day. Utility water is only used at utility stations. Its consumption is estimated at 0.1m^3/d. In addition, there will be potable bottled water provided through commercial bottles used in similar cases.

The utility water is distributed to connections at utility stations. The maximum flow will be based on the concurrent use of 2 utility connections with a flow of 3 m^3/h each resulting in a required flow of 6 m^3/h. Utility water is used for flushing purpose. The use is intermittent and a total consumption cannot be estimated. If water is used, the pressure will drop and the utility water pump will start. The flow of the utility water pump is 6m^3/h and a pressure of 3 barg. Two 100% centrifugal pumps will be installed. The feed to the utility water system is from the potable water system. A break tank is applied to inhibit any back flow from the utility water system to the potable water system.

Other water needs will be supplied through water tanks which will be located under the building. This will prevent temperature increase of the water and thus prevent bacteria growth.

The water system consists of:

- 2 storage tanks of 25m³
- 1(+1 spare) circulation pump with a flow of 6m³/h
- distribution system

Table 3-5 Break down of water requirements during operation.

Flow Case	Unit	Approved	Suggested Modification
Domestic use	m³/d	0,18	0,18
Utility Water (average)	m³/d	0,1	0,1
Total Water consumption	m³/d	0,28	0,28
Average water consumption	m³/h	0,012	0,012
Total Water consumption/year	m³/y	102,2	102,2
Total Water consumption/half year	m³/d	51,1	51,1

Source: (ETA Amendment Workshop, Milan, 31-01-2018)

As it is evident, the quantities of water requirements during operation are not modified.

3.5 Wastes

3.5.1 Liquid wastes

No changes regarding liquid wastes are expected, other than the requirements of the hydrotest water described in section 3.4.2.

3.5.2 Solid wastes and aggregates

It is assumed that the quantities increase proportionally to the overall modification of the project footprint.

The pipeline route modification is 4” (from 32" to 36") in diameter corresponding to an increase of 12.5 %.

The Compressor Station modification was assumed equal to the increase of total Compressor Units which is 3 (from 4 (+1 back up) to 7 (+1 back up)) being the most important modification. This corresponds to an increase of approx. 60 %.

During construction solid wastes may include:

- Packaging material.

This depends to a large extent on the specific supply method of the suppliers, but it is roughly estimated that it will be 1.5 % of the equipment weight.

Table 3-6 summarizes the approved and modified quantities of packaging material.

- Welding works residuals

For the onshore pipeline, it is estimated that there will be approximately 650 welds in 8km of the onshore pipeline, which equates to approximately 7600kg of weld material. Assuming 10% wastage gives 760kg of waste weld material. It is assumed that the compressor station construction shall produce a similar amount resulting in a total weld waste of 1520kg.

Table 3-6 summarizes the approved and modified quantities of welding material.

Table 3-6 Waste material bill.

		Packaging material			Welding material		
Project Component	**Increase Factor**	**Approved Qnt (tn)**	**Updated Qnt (tn)**	**Additional (tn)**	**Approved Qnt (tn)**	**Updated Qnt (tn)**	**Additional (tn)**
Onshore Pipeline	12.5 %	n/a	n/a	n/a	0.76	0.86	0.10
C/S Florovouni	60 %	30.00	40.88	18.00	1.52	2.43	0.91

Prepared by: (ASPROFOS, 2018).

The contractor will carry off all waste material from the construction. Consequently, the “net” amount of waste material remaining at the site is therefore essentially zero. This is especially the case for the offshore pipeline segment construction; all welding and waste production activities will be performed onboard and consequently, all waste shall be managed according to the ship’s waste management plan.

- Earthworks and volumes of surplus soil or debris material.

Theoretically, the modified Greek onshore pipeline volume is approximately 5400m³ which will be the amount of excavated material. For the nearshore section of the offshore pipeline (up to the depth contour of 25 m - approximately 530 m long), theoretically, the modified volume is approximately 348 m³. For both cases, most of

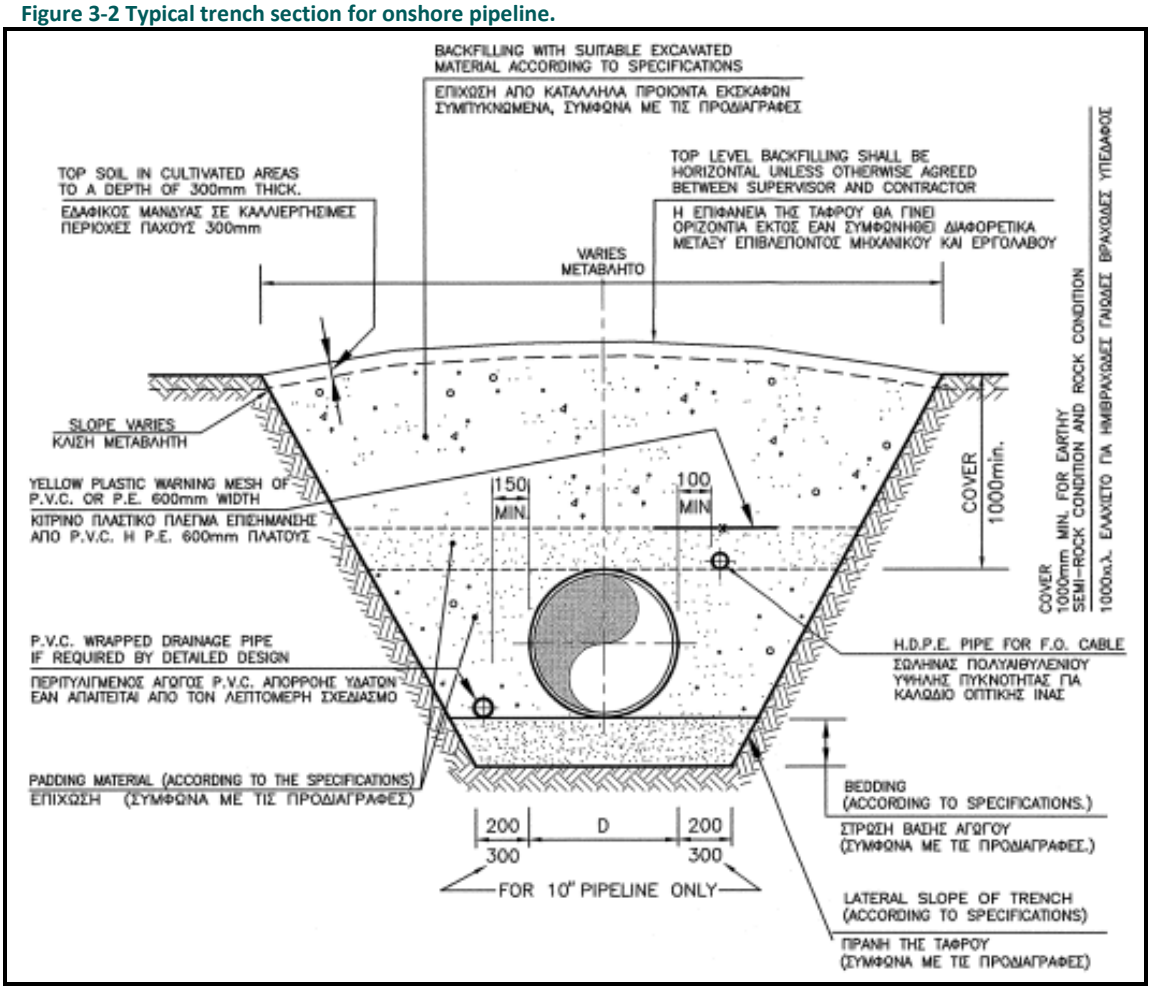
the excavated material will be used for backfilling purposes. Any remaining excavated material will be spread out locally, after receiving the approval of the landowner; otherwise it will be disposed to permitted areas as indicated by the local authorities. These will be used for disposal of any boulders that are not allowed to be used as backfilling material or for other purposes related to the construction of the investigated project.

For the deepwater section (from the depth contour of 25 m and deeper) the balance of excavation and backfill will be nil.

For the Onshore Facilities there will be no surplus soil, but 33850 m³ of additional material to be used for backfilling purposes will be required.

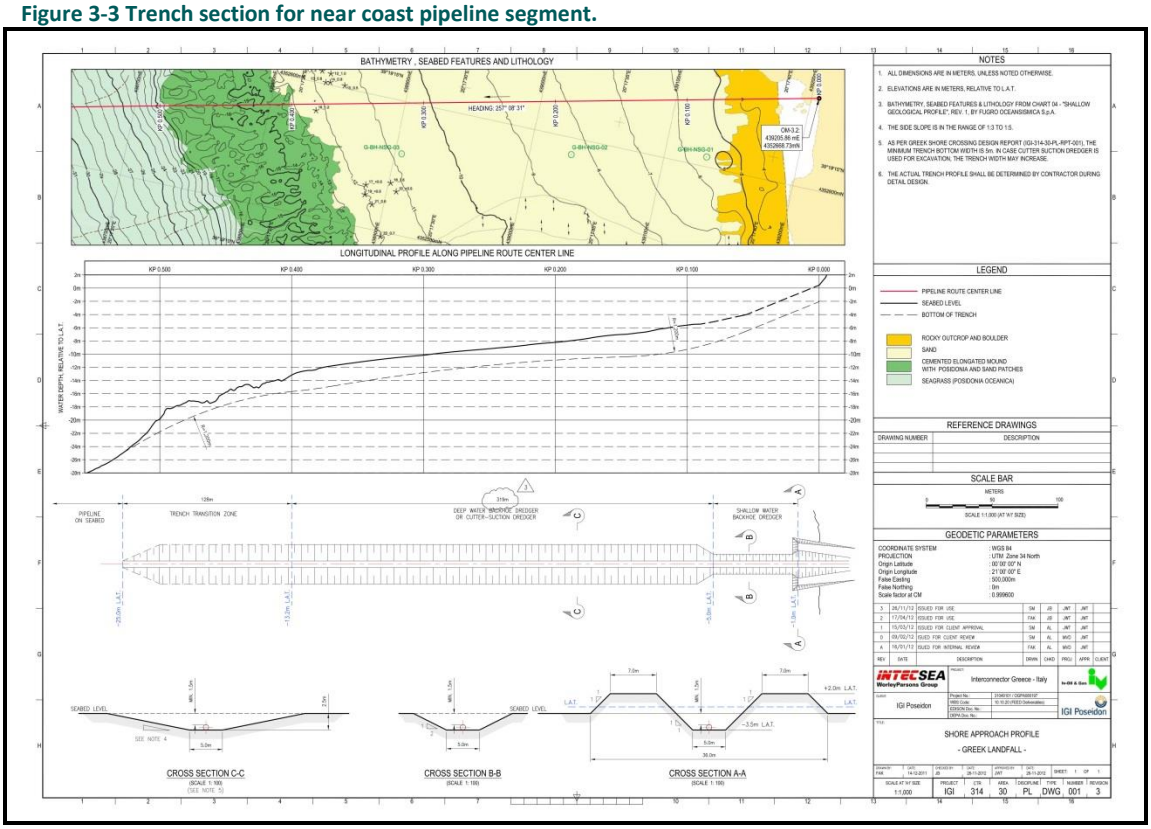
Figure 3-2 and Figure 3-3 illustrate the typical trench section for the onshore and near coast segment of the pipeline. Based on these assumptions, Table 3-7 presents the excavated material balance.

Figure 3-2 Typical trench section for onshore pipeline.



Source: ASPROFOS, 2006 – Drawing No. 8100-STD-00-41-15_5.

Figure 3-3 Trench section for near coast pipeline segment.



Source: INTECSEA, 2012 – Drawing No. IGI-314-30-PL-DWG-001_3

Table 3-7 Excavated material bill.

		Project Component		
		Onshore pipeline	**Coastal pipeline**	**C/S Florovouni**
Total Excavated Material	**Approved Qnt (m³)**	40944.82	18291.23	254600.00
	Updated Qnt (m³)	41840.65	18291.23	452350.00
	Additional (m³)	895.82	0.00	197750.00
Backfilling Material	**Approved Qnt (m³)**	36692.26	16208.24	237100.00
	Updated Qnt (m³)	36458.49	16025.71	486200.00
	Additional (m³)	-233.76	-182.52	249100.00
Material Balance	**Approved Qnt (m³)**	4252.56	824.58	17500.00
	Updated Qnt (m³)	5382.15	1043.61	-33850.00
	Additional (m³)	1129.59	219.03	-51350,00
	Increase (%)	26.5	26.5	n/a*
	Disposal	Near by areas along the route	Near by areas along the route	Acquisition from approved borrow pits

* The approved material balance was positive, meaning that disposal of aggregates would be necessary. On the other hand, the updated material balance is negative, meaning that acquisition of aggregates is necessary. As such, presentation of an increase figure would be misleading and confusing. What should be noted is that no aggregates shall be disposed in the surrounding area

	Project Component		
	Onshore pipeline	**Coastal pipeline**	**C/S Florovouni**
(or approved receptor) due to the applied modification but acquisition of backfilling material by approved deposits shall be required.			

Prepared by: (ASPROFOS, 2018)

3.6 Air Emissions

Air emissions during construction phase are not modified compared to the description provided with the approved EIA.

During operation, pipeline itself has no air emissions.

Air emissions that will be generated continuously during the operation of C/S Florovouni result from the gas turbine of each Compressor Unit and are emitted through their exhaust stack. Location of these gas turbines is presented in section 10.2.2 - C/S Florovouni General Layout – Plot Plan.

Air emissions characteristics are summarized in the Table 3-8.

Table 3-8 Air emissions characteristics.

Description and location of source	**Name of Emission Source**	Gas turbine
	Description of emission source	Gas Turbine power: 31 MW in ISO condition
	Location of emission source	Next to Unit gas turbine compressor enclosure
	Height [m] (consider plant zero)	19
	Size [m]	2,6 x 3,8 *(rectangular)*
Operation parameters	**Operation [h]**	7008 (in phase 1); 7665 (in phase 2) *(8760 max, without standstill in a year)*
	Operation mode [description]	Gas Flow Control *GT is operated between minimum environmental load and full load.*
	Turbine Exhaust Gas temperature [°C]	531°C *typical value in ISO conditions for heavy industry Gas Turbine*
	Turbine Exhaust Gas Mass Flow [kg/h]	332.800 *typical value in ISO conditions for heavy industry Gas Turbine*

	Turbine Exhaust Gas Density [kg/m³]	0.41
Emitted flows/ materials	**Descr.**	NOx CO
	Concentration Real mg/Nm³ (ref. 15% O2 dry)	According to BREF NOx ≤ 35 mg/Nm³ (as NO2) CO ≤ 40 mg/Nm³ *(for any GT load above minimum environmental load)*
	Concentration Limit mg/Nm³ (ref. 15% O2 dry)	NOx = 35 mg/Nm³ (as NO_2) CO = 40 mg/Nm³
	Mass flow [kg/h] (Emission rates of the compounds NOx, CO)	NOx: 9.1 kg/h (as NO_2) CO: 10.4 kg/h
Data based on Siemens SGT700 Gas Turbine. For phase 1, 4 of 5 GTs shall be in operation (s/n 1 to 5). For phase 2, 7 of 8 GTs shall be in operation (additional s/n 6 to 8).		

Prepared by: (ASPROFOS, 2018).

3.7 Noise Emissions

Noise emissions during construction phase are not modified compared to the description provided with the approved EIA.

During operation, pipeline itself has no noise emissions.

Based on the applicable legislation (PD 1180/1981), noise limits at the fence line of a facility are determined based on the dominant characteristics of the areas land use (see Table 3-9).

Table 3-9 Allowable Noise Levels according to P.D. 1180/1981 (HGG A' 293/1981).

Area's Description	Maximum Allowable Noise Level (dBA)
Statutory Industrial Areas	70
Areas where industrial characteristics are dominant	65
Areas where industrial and urban characteristics are equally present	55
Areas where urban characteristics are dominant	50

Prepared by: (ASPROFOS, 2012)

In the initial EIA, the noise level at the fence line of the station was estimated at 50 dB(A), whilst based on the ongoing design, the noise level at the fence line is expected to be 65 dB(A).

3.8 Requirements of IED Directive

The following section provides an overview of the Project's design compliance with the IED and specifically with the Best Available Techniques (BAT) regarding C/S Florovouni.

3.8.1 Compliance with BAT

The overall design philosophy regarding emission prevention is to reduce the emissions to air, water and soil to zero or as low as reasonably achievable. The design has the following provisions to prevent emissions to air, water and soil.

- Emission to air

The main process equipment has limited continuous emissions of natural gas or other process fluids. The main emission of natural gas is the leakage from the dry gas seals of the compressors. The application of dry gas seals is the best available technology to minimize the compressor seal leakages. The leakage from dry gas seals is further minimized by adequate monitoring and maintenance programs of the compressors. The leakage rate is dependent on the amount of wear of the dry seals. In case the leakage rate is too high and is detected by the continuous measurement of the seal gas flow and pressure, the compressor is stopped automatically.

The expected leakage rate of a dry seal is around 0.7-4.2 kg/hr. It is assumed that each compressor has two dry seals. The leakage is given as a range because it depends on the amount of wear (and thus the age) of the seals. New seals will leak at rates near the lower range limit. Assuming timely replacement of the seals, the actual annual emission of CH4 in the seal gas is limited to the minimum possible.

The compressors are driven by gas turbines running on natural gas as fuel gas. The exhaust of the gas turbines will represent the main emissions to air.

The vent stacks are used for emergency or maintenance depressurization. The vent system and stacks are purged with nitrogen.

Maintenance on the process equipment may require depressurization and should in these cases be carefully planned to minimize the need for depressurization. Design of instrumentation and equipment should be such that requirement of depressurization for maintenance is avoided as much as possible by either provisions allowing

maintenance without depressurization or selection of reliable equipment and instrumentation required minimum of maintenance.

Electrical power is supplied from one external power supply cable. As a back-up a gas turbine driven generator is running on 50% load, to prevent the compressor station shutting down when the power supply by cable fails. The emissions from the exhaust of the gas turbine can only be avoided by providing a second independent external electrical power supply cable or allowing a reduced availability of the compressor station. Reduced availability of the compressor station is not considered practicable considering the contractual requirements on availability The emergency generator will only run during emergencies and for testing purposes. The emissions from the diesel generator will comply with the European Emission limits.

- Emission to water

Areas with the potential of spills of chemical substances, such as diesel and condensate, are provided with a dedicated drain collection system in which collected liquids are routed via a water-oil separator. Then the treated liquids are discharged to the surface receptor. Oily liquids shall be considered as chemical waste and their management shall be performed only by licenced operators, according to legal requirements.

Surface rain water shall be collected and discharged to the surface receptor via a sand catcher. Sanitary waste water shall be collected and guided to a septic tank.

- Emission to soil

Emissions to soil are caused by either leaks from underground equipment and piping or spills/leaks from above ground equipment containing chemical substances and truck (un-)loading areas.

Underground storage tanks of diesel and condensate are double walled and provided with leak detection. Both tanks and underground piping should be inspected regularly

Above ground equipment containing chemical substances and truck (un-)loading areas are placed on watertight paved areas to collect possible leaks or spills.

Table 3-10 includes an overview of the applicable BAT to the Compressor Station[4].

[4] COMMISSION IMPLEMENTING DECISION (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants

Table 3-10 BAT Compliance Matrix.

Relevant Process	BAT	Technique	Limits	Remarks
Monitoring	3	n/a	n/a	Only flue gas, since no flue gas treatment exist
Monitoring	4	Continuous emissions monitoring system	n/a	Parameters to be monitored are: • NOx • CO
Efficiency	40		36.5% Net mechanical energy efficiency at full load, in ISO conditions (according to BAT 2)	Lower limit.
Emissions	42	Dry low-NOx burners (DLN)	35 mg/Nm³ (considered as yearly average)	(upper limits) 15% O2 (vol dry
Emissions	44	Dry low-NOx burners (DLN)	40 mg/Nm³ (considered as yearly average)	(upper limits) 15% O2 (vol dry)

Source: (ETA Amendment Workshop, Milan, 31-01-2018)

3.8.2 Requirements for Baseline Report

According to Circular 153914/02.12.2015 (ΑΔΑ: 7ΔΩ14653Π8-8Ο2) regarding baseline report of Art. 18 of JMD 36060/1155/E.103/13 (HGG 1450B), stages 1 -3 as defined in the 2014/C 136/03 Guidance, must be submitted before construction starts.

Based on 2014/C 136/03,

- Stage 1. During Stage 1 identification of the hazardous substances is performed by production of a list of all hazardous substances dealt with inside the installation boundary (either as raw materials, products, intermediaries, by-products, emissions or wastes). Where hazardous substances are listed under trade names the chemical constituents should also be identified. For mixtures or compounds the relative proportion of the largest constituent chemicals should be identified.
- Stage 2. During Stage 2, the relevant hazardous substances from the list produced in Stage 1 are identified, determining the potential pollution risk of each hazardous substance by considering its chemical and physical properties such as: composition, physical state (solid, liquid, and gas), solubility, toxicity, mobility, persistence, etc. This information should be used to determine whether or not the substance has the potential to cause pollution of soil and

groundwater. The data, together with the rationale used to interpret it, should be presented so it is clear in the baseline report why substances have been excluded or included. Where a group of substances display similar characteristics they may be considered together provided that justification for the grouping is given. Where it is clear that the hazardous substances used, produced or released at the installation are incapable of causing contamination of soil and groundwater a baseline report does not need to be produced. The identified relevant hazardous substances should be taken forward to Stage 3 for further consideration.

- Stage 3. During Stage 3 assessment of the site-specific pollution possibility is made. Each substance brought forward from Stage 2 should be considered in the context of the site to determine whether circumstances exist which may result in the release of the substance in sufficient quantities to represent a pollution risk, either as a result of a single emission or as a result of accumulation from multiple emissions. Specific issues to be considered include: (i) The quantity of each hazardous substance handled, produced or emitted in relation to its environmental effects; (ii) The location of each hazardous substance on the site e.g. where it is or will be delivered, stored, used, moved around the site, emitted etc., in particular in view of the characteristics of the soil and groundwater at that part of the site; (iii) the presence and integrity of containment mechanisms, nature and condition of site surfacing, location of drains, services or other potential conduits for migration. The method of storage, handling and use of relevant hazardous substances needs to be identified and whether there are any containment mechanisms to prevent emissions occurring; e.g. bunds, hard-standing, handling procedures.

Table 3-11 presents a preliminary list of substances to be used at the C/S Florovouni. The table also identifies which of the substances are 'relevant' within the meaning of Article 22 of the Industrial Emissions Directive: '*Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation…*'.

It needs to be clarified that all liquids stored on-site will be provided with robust primary containment appropriate for each substance. Containment of vessels employed within the process contain dilute quantities of substances identified in the

table below and may cause pollution to ground or ground water if released to the environment is described in Table 5.1.7. Secondary containment will comprise either individual bunds which will be sized to 110% of the capacity of the tank or 25% of the total quantity (whichever is the greatest) for all potential hazardous substances. In addition to the above measures, the whole site shall be comprised of built structures on impermeable surface.

Table 3-11 Relevant Hazardous Substances (Source, Pathway, Receptors) relevant to Baseline Report of Art. 22, of IED.

Substance	Location	Use (Raw materials, Products, Intermediaries, By-products, Emissions or Wastes)	Hazardous Properties	Quantity stored on-site	Pollution prevention measures
Diesel Oil	Diesel Storage Tank	Raw materials	Flammable liquids, C. 3 H226 Aspiration hazard, C. 1 H304 Skin corrosion/irritation, C.2, H315 Acute toxicity, C.4; Inhalation H332 Carcinogenicity, C. 2 H351 Specific target organ toxicity - repeated exposure, C. 2; Blood.; Liver.; Thymus. H373 Chronic hazards to the aquatic environment, C. 2 H411	24 m^3	double walled tank
Diesel oil	Emergency Diesel Generator			1 m^3	containment basin
Condensates	Condensate Storage Tank	Raw materials	Flammable Liquid, C.1, H224 Aspiration Hazard, C.1, H304 Carcinogenicity, C.1B, H350 Skin Irritation, C.2, H315 Specific Target Organ Toxicity - STOT, Single Exposure SE, C.3, H336 Hazardous to the aquatic environment, long-term, chronic, C.2, H411	35 m^3	double walled tank
Lubricants	Backup Generator	Raw materials	N/A	7 m^3	containment basin
Lubricants	Turbocompressor Units			18 m^3 x 8 units	containment basin
Oil	Water/Oil Separator	Waste	N/A	1 m^3	containment basin

Substance	Location	Use (Raw materials, Products, Intermediaries, By-products, Emissions or Wastes)	Hazardous Properties	Quantity stored on-site	Pollution prevention measures
Waste Water from GT washing	Washing Water Tank	Waste	N/A	8 basins 3 x 3 m^3	containment basin
Detergents for GT washing	GT Building	Waste	N/A	1 m^3 x 8 units	containment basin
Detergents for GT washing	Storage Area	Waste	N/A	22 m^3	containment basin

Source: (ETA Amendment Workshop, Milan, 31-01-2018)

3.9 Alternatives Investigation

No alternatives were investigated regarding siting (given the approved through public consultation location), technology or other technical parameters.

Regarding the zero alternative, if the requested modification is not implemented, the overall PPP project would not be able to provide the foreseen quantities of natural gas to Italy, given that the C/S Florovouni is part of the Offshore PPP but supports the overall PPP project.

As such, the zero alternative could induce the necessity to develop another project, another pipeline system that would transfer the foreseen quantities of natural gas from various sources to the European market. This other project might not include Greece, in its footprint, and consequently, the significant geopolitical benefits of a project like the investigated one, would be lost.

4 COMPLIANCE OF PROPOSED AMENDMENT TO LEGISLATIVE REQUIREMENTS

4.1 Land Use and Building Terms Framework

No modifications to the land use, building terms framework, etc. have taken place; more details are provided in the following sections.

4.1.1 Spatial and Town Planning

No modifications to the spatial or town planning framework have taken place between the submission of the initial EIA, in 2012 and presently. However, at the time when the present study was prepared, amendments were ongoing, on various stages.

Table 4-1 Modifications between Approved and Suggested Offshore PPP's design.

Framework Title	During Approved EIA	Amended (Currently in force)
Regional Spatial Planning and Sustainable Development of Epirus Region (RSPSD)	HGG 1451/ B'/ 06-10-2003	Amendment is ongoing – Phase B1 was out for public disclosure on 2015 and is pending for approval
City's Spatial and Residential Organization Plan (SHOAP) of M. of Margariti	Data from Phase B2 studies were used	Amendment is ongoing – Approval of Phase B2 is pending
General Town Plan (GTP) of M. of Parga	Data from Phase B1 studies were used	Amendment is ongoing – Phase B1 is ongoing
SHOAP of C. of Perdika	Data from Phase B2 studies were used	Amendment is ongoing – Approval of Phase B2 is pending

Prepared by: (ASPROFOS, 2018)

It is highlighted that the Phase B1 study of the Epirus Region RSPSD (ΘΕΩΡΗΜΑ Α.Ε. & ΡΟΪΚΟΣ Α.Ε. & ΛΩΛΟΣ, 2015) states that the cancelation of the ITGI pipeline (former description of PPP), which route included Epirus and instead TAP's qualification (which does not cross the specific region), also canceled Epirus Region expectations for improving its role regarding new European "energy corridor" and for satisfying its energy requirements by using natural gas. In addition, Region's position in the Adriatic – Ionian axis needs to be developed focusing on the sectors of tourism, energy and

transportation and also attract investments especially on the sectors of industry, transportation and tourism.

On the other hand, the same study also states that the location of the compressor station could be reassessed. In addition, for the coastal zone of Preveza and Thesprotia (including Community of Perdika) tourism is a dynamic and emerging sector. However, it should be noted that the location of the C/S Florovouni is not modified, only its exact footprint. The location was carefully selected through public disclosure and numerous stakeholder engagement activities and hence, its initial approval. The requested amendment does not modify the location only the area and the capacity which are have no impact on the compliance to the provisions of Epirus Regional Plan.

4.1.2 Settlements

No modifications to the settlements boundaries have taken place between the submission of the initial EIA, in 2012 and presently.

4.1.3 Protected Areas

No modifications to protected areas have taken place.

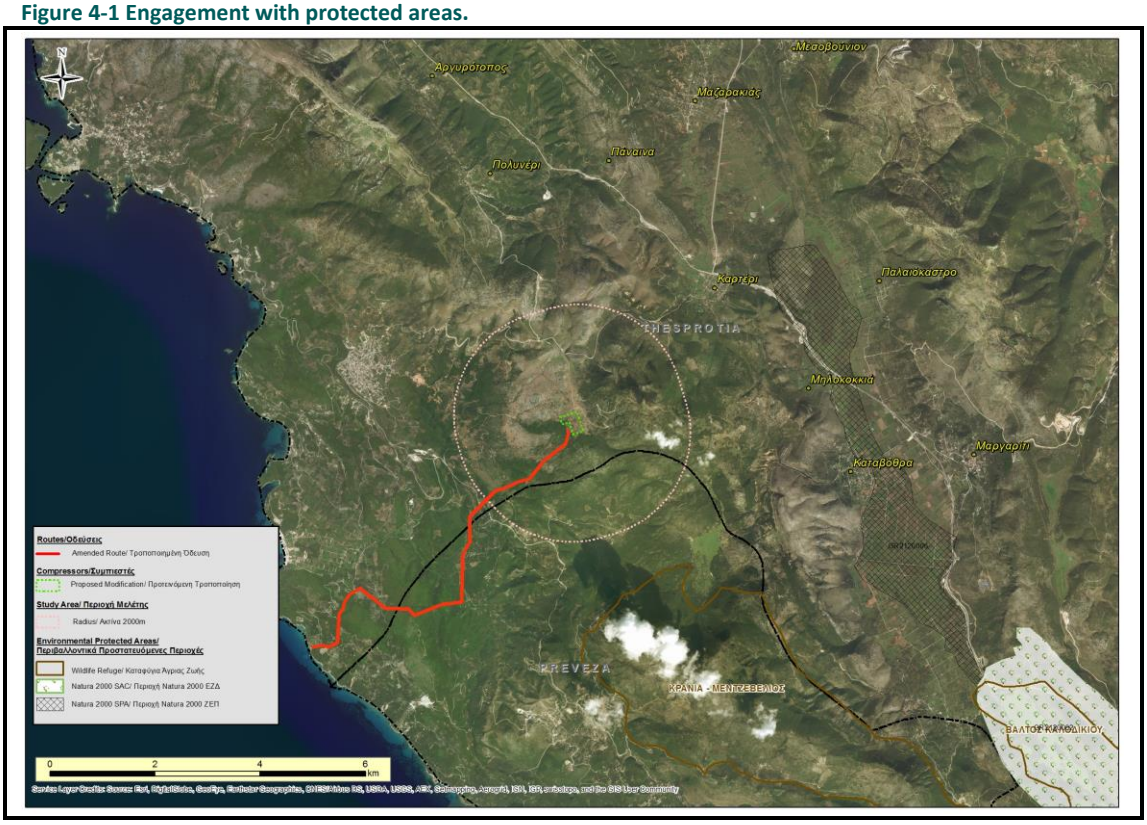
The proposed C/S Florovouni is located at the same area as the approved one. The shortest distance to the nearest protected areas are presented in Table 4-2.

Table 4-2 Distances from protected areas.

Protected Area	Distance
SPA GR2120006 – Eli Kalodikiou, Margariti, Karteri kai Limni Prontani (*Marshes of Kalodiki, Margariti, Karteri and Lake Prontani)*	4.3 km
WRA of Krania - Mentzevelios	3 km

Prepared by: (ASPROFOS, 2018).

Figure 4-1 Engagement with protected areas.



Prepared by: (ASPROFOS, 2018).

4.1.4 Areas under Forest Legislation

So far, forest maps of the area are not available.

The project lays within the jurisdiction of two forest authorities (the same as during 2012 EIA).

- Regarding Forest Directorate of Thesprotia Regional Unit, application for forest characterization act was filed in April 2018 but the decision was not issued till the submission of the present study (see Annex 11.6 - Stakeholders Engagement Documentation).
- Regarding Forest Directorate of Preveza Regional Unit, forest characterization act was issued during the initial environmental permitting procedure (Ref. No. 10790/621/19-06-2013)

Details regarding existing land coverage are provided in section 5.7.

4.1.5 Social Infrastructure

No changes have taken place between the approved EIA and the current report.

This is especially the case for the planned wind farms in the broader area and especially at Florovouni Site. Details are presented in section 5.9.

4.2 Legislative Framework Modifications

Legislative framework regarding the emissions limits for all environmental parameters is quite extensive and subject to constant modifications. Study team has tabulated the regulations based on which the ETA was issued and the corresponding amendments in Annex 11.8 - Legislative Framework Modifications.

4.3 Regulatory Framework Modifications

It should be noted that the most import differentiation regarding regulatory framework is the EU Directive 96/61/EK concerning Integrated Pollution Prevention and Control (IPPC) and its repealing by the EU Directive 2010/75/EU concerning Industrial Emissions (IED). Based on the IED Directive, implementation of BAT is mandatory. Table 4-3 summarizes the relevant to the investigated project EU Directives.

Table 4-3 Relevant basic EU Directives.

Directive	Title	Amended	Incorporation to Greek Legislation (basic document)
2014/68/EU	Pressure Equipment Directive (PED)	-	MD 74124/ΔΤΒΝ 1431/2016, (HGG 2278/B/22.7.2016)
2014/34/EU	Equipment for potentially explosive atmospheres (ATEX)	-	JMD 52019/ΔΤΒΝ 1152/2016, (HGG 1426/B/22.05.2016)
2014/30/EU	Electromagnetic Compatibility Directive (EMC)	-	JMD 37764/873/Φ342/2016 (HGG 1602/B/07.06.2016)
2010/75/EU	on industrial emissions (integrated pollution prevention and control) (IED)	-	MD 36060/1155/E.103/2013, (HGG 1450/B/14.06.2013)
2008/1/EC	concerning integrated pollution prevention and control	Repealed by 2010/75/EU IED	JMD 48416/2037/E.103, (HGG 2516/B/07.11.2011)

Directive	Title	Amended	Incorporation to Greek Legislation (basic document)
2006/42/EK	on machinery	2009/127/EU	PD 57/2010, (HGG 97/A/25.6.2010)
2004/108/EC	on Electromagnetic Compatibility	Repealed by 2014/30/EU	JMD 50268/5137/07 (HGG 1853/13.09.2007)
2003/87/EK	establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC	2004/101/EC, 2008/101/EC, 2009/219/EC 2009/29/EC 2013/1359/EU 2014/421/EU 2015/1814/EU	JMD 54409/2632/2004, (HGG 1931/B/27.12.2004)
2001/80/EK	on the limitation of emissions of certain pollutants into the air from large combustion plants	2010/75/EU	JMD 29457/1511/2005, (HGG 992/B/14.07.2005)
2000/532/EK	establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste	2001/118/EK 2008/98/EK 2014/955/EE	L. 4042 / 2012 (HGG A' 24) JMD 43942/4026/2016 (HGG B' 2992) JMD 62952/5348/2016 (HGG B' 4326)
96/61/EK	concerning integrated pollution prevention and control	Repealed by 2010/75/EU	L. 3010/2002, (HGG A' 91)

Prepared by: (ASPROFOS, 2018).

4.4 Documentation of Compliance Verification

Given that the siting of the proposed C/S is identical to the permitted one and that:

- It is considered that the construction of the pipeline will allow DEPA and/ or other parties to introduce gas through it to neighbouring regions while project siting is not modified nor in conflict with touristic activities.
- The closest protected area is at a distance of approximately 3 km.

- All the necessary measures and provisions have been taken into consideration for the design of the investigated project in order to meet emissions limits.

Based on the data provided by the engineering team the investigated project is in full compliance with the in force legislative and regulatory framework.

5 ENVIRONMENTAL AND SOCIAL BASELINE

5.1 Introduction

Based on relevant legislation (MD 170225/2014), the present section aims to analyze and assess environmental and social baseline within the study area, only in relation to the proposed amendment and the environmental parameters that may be affected. In general, according to Art. 4 of MD 170225/2014, baseline description is focused on the elements that may be significantly impacted by the proposed project and/ or modification.

Study team assessed that the following parameters may be affected and should be presented in the present section:

1. Air Quality, Noise and Landscape baselines are shortly presented in order to provide a baseline for quantified impacts assessment. Although baseline conditions are not expected to be modified, these are deemed the most important factors that may be affected by the proposed amendments.
2. Natural Environment and specifically Forest Areas. Natural environment is the same. However, limited additional areas are required for the new enlarged parcel of C/S Florovouni.
3. Land Uses. In correlation with forest areas, land uses are presented so that additional impacts may be assessed.
4. Planned Developments. As identified in the initial EIA, a wind farm of 32 MW was planned in the area. Status of the specific development and potential planning of additional ones are important factors for noise modelling.

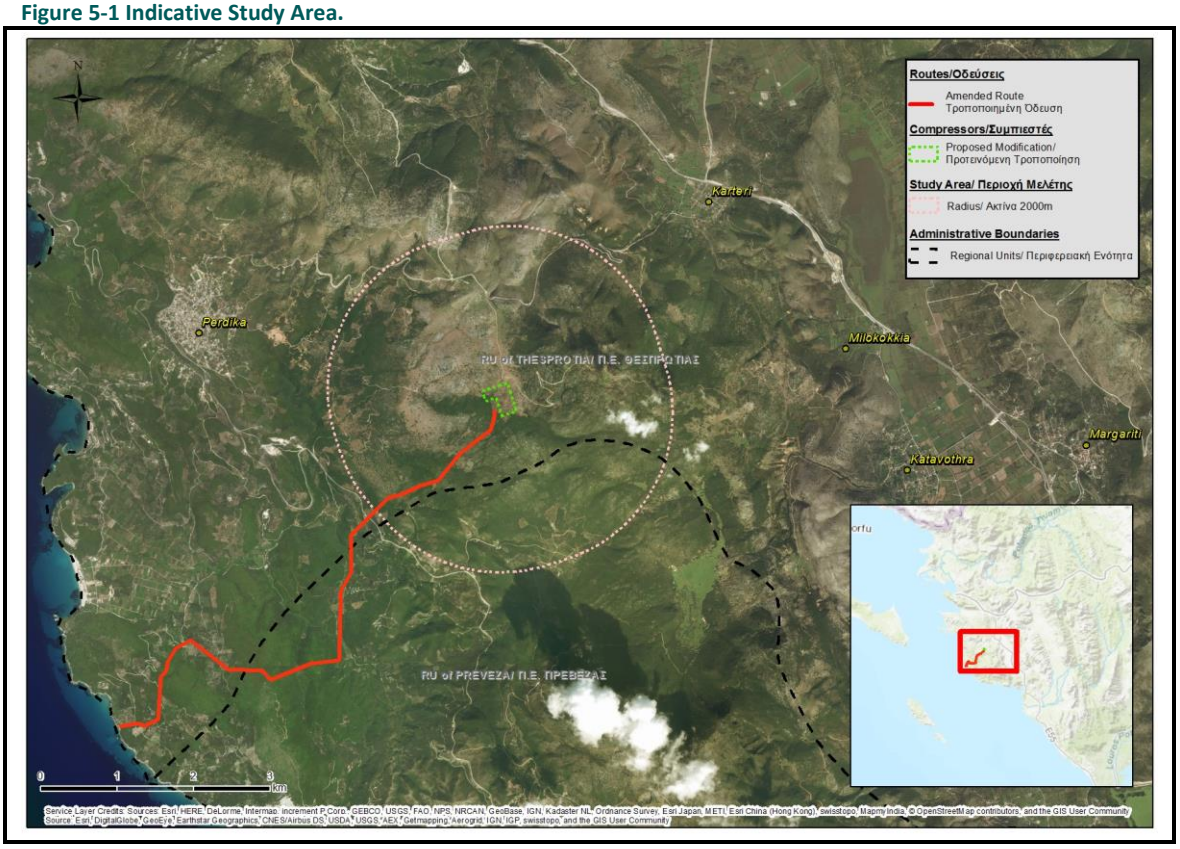
Climatic conditions, which are also important for the Air Dispersion and Noise Propagation Models are not repeated, given that no modifications are expected from the 2012 approved EIA.

As study area a 2 km buffer zone around the mainly modified project component was selected, i.e. C/S Florovouni. Modifications to the pipeline route were deemed insignificant, since no modifications of the project footprint were induced and on top of that the baseline conditions along the route were not modified.

However, it should be stressed out that environmental parameters were investigated only in correlation to the proposed amendments and specifically for the modified footprint. Some parameters should be investigated in a broader area of potential impact, e.g. Air, whilst others in a smaller one, immediately affected by the

modifications. The 2 km buffer zone, which includes all the surrounding area was studied in the 2012 EIA.

Figure 5-1 Indicative Study Area.



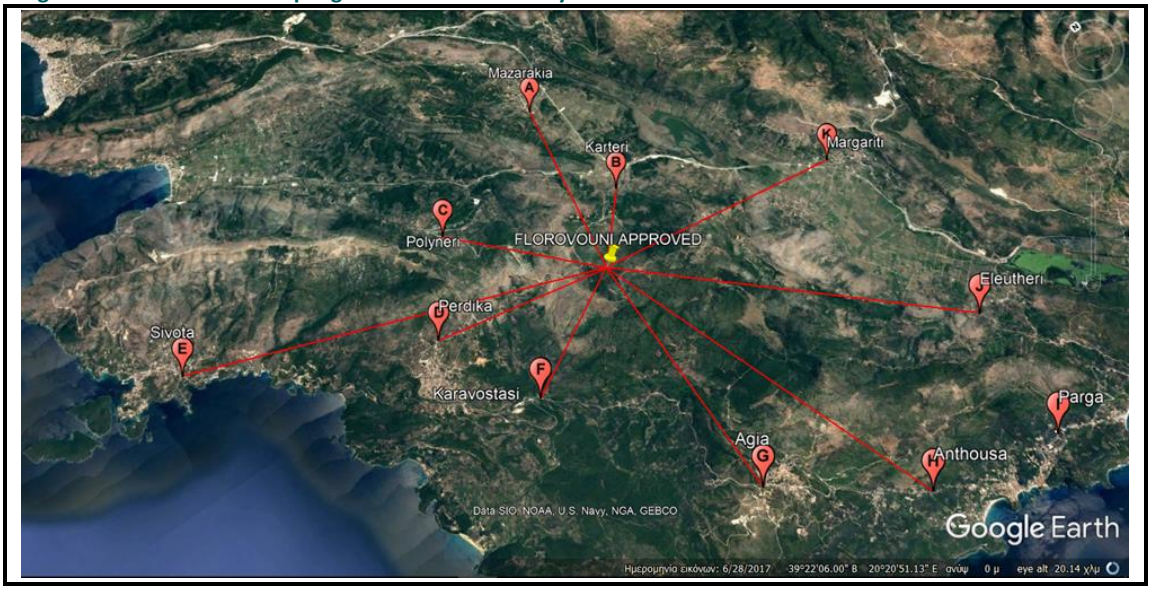
Prepared by: (ASPROFOS, 2018).

5.2 Air Quality

A special survey was performed in order to record the baseline of air quality in the area of C/S Florovouni. The full report is presented in Annex 11.1 - Air Quality Baseline Report. Here below, a summary is presented.

Air quality survey was carried out during December 2017- January 2018 to investigate the ambient air quality conditions in the area of Florovouni. The locations of the measurements were mainly within a circle of 10 km centered at the compression station. The total number of sampling points were 11 and are shown in Figure 5-2. The sampling was conducted with the use of passive diffusion tubes and lasted for 24 days for Florovouni campaign (12/12/2017 - 03/01/2018). The methodology of passive sampling was selected in order to measure the average pollutants background levels and the long-term comparability of the results.

Figure 5-2 Ambient Air Sampling Locations in Proximity of Florovouni.



Prepared by: (NCSR "DEMOKRITOS", 2018)

Table 5-1 summarizes the results from the field campaign.

Table 5-1 Field survey (measured) total daily NOx and CO concentrations at locations within a radius of 10 km around FCS.

Site	NOx concentration (µg/m³)	CO concentrations (mg/m³)	Limit value (Dir 2008/50/EC and JMD14122/549/E.103/2011)
MAZARAKIA	6.2	0.009	CO 10000 µg/m³ (8 hours max average value - Margin of tolerance 60%) NO_2 200 µg/m³, not to be exceeded more than 18 times a calendar year (1 hour averaging period - Margin of tolerance 50% on 19 July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal percentages to reach 0% by 1 January 2010
KARTERI	8.5	0.012	
POLYNERI	3.9	0.008	
PERDIKA	12.1	0.010	
SIVOTA	5.3	0.008	
KARAVOSTASI	8.3	0.008	
AGIA	7.1	0.006	
ANTHOUSA	8.6	0.007	
PARGA	13.0	0.010	
ELEUTHERI	6.7	0.011	
MARGARITI	8.4	0.009	

Adopted by: (ASPROFOS, 2018). Data from: (NCSR "DEMOKRITOS", 2018)

In the Florovouni area, the average values (during the sampling period) were 8.00 µg/m³ for NOx while for SO2 and CO all values were below the detection limit which is 0.6 µg/m³ and 0.2 mg/m³ respectively. According to Directive 2008/50/EC CO, SO2 and NOx limits were not exceeded.

Levels of all measured pollutants are significant low at the proposed area, likely to be resulting from the lack of strong sources of pollution (intense vehicle circulation, anthropogenic activities, industries etc.) in the local areas. The air quality in the area is considered to be good.

5.3 Noise

A special survey was performed in order to record noise baseline in the area of C/S Florovouni.

The full report is presented in Annex 11.3 - Noise Baseline Report and Propagation Model. Here below, a summary is presented.

Acoustic measurements were conducted from Monday 29.01.2018 till Wednesday, 31.01.2018 to investigate the existing ambient noise[5] at the settlements around the C/S Florovouni. Particularly, the locations of the measurements were the center of each settlement and the center of C/S Florovouni as well (Table 5-2).

Table 5-2 Noise Measurements Table.

Position	Start	End	GGRS87 X	GGRS87 Y
N_01 Karavostasi	29/1/18 08:42	30/1/18 08:43	179980,58	4360490,87
N_02 Agia	29/1/18 09:15	30/1/18 09:16	185913,26	4357625,69
N_03 Perdika	30/1/18 10:22	31/1/18 11:54	188291,59	4365418,86
N_04 Karteri	30/1/18 11:37	31/1/18 12:51	181210,50	4363982,09
N_05 Site	29/1/18 11:00	31/1/18 13:00	185 433,54	4362983,39

Adopted by: (ASPROFOS, 2018). Data from: (Acoustics Consultancy Company, 2018)

For the evaluation of the acoustic environment the noise measurements are performed in accordance with the ISO 1996-1:2003. In each case calibration was performed on the spot, before starting the measurements.

The equipment used corresponds to the technical specifications contained in the Publications 61672-1:2003 of the International Electro Technical Committee (I.E.C. Publications 61672-1:2002) as well as the ΕΛΟΤ EN 61672.01.

Common indices that used for environmental noise impact assessment are:

1. **Leq:** The energetic average level of the noise during a measurement

[5] Ambient noise is the total result of all airborne sounds that are produced from multiple sources, near or far in a given environment, and none of the source is of any interest. ELOT 263.1 (1.209)

2. **Lday:** A-weighted long-term mean sound level, calculated for the total 'day' time periods (07:00 – 19:00) of the year
3. **Levening:** A-weighted long-term mean sound level, calculated for the total 'evening' time periods (19:00 – 23:00) of the year
4. **Lnight:** A-weighted long-term mean sound level, calculated for the total 'night' time periods (23:00 – 07:00) of the year
5. **LDEN:** 24hr noise index which is defined from the above indices as:

$$LDEN = 10\ \log_{10}\left({}^{1}/_{24}\left(12 \times 10^{\frac{Lday}{10}} + 4 \times 10^{\frac{Levening+5}{10}} + 8 \times 10^{\frac{Lnight+10}{10}}\right)\right)$$

A summary table of the measurement results appear on the table below (Table 5-3). Details of the measurements are provided at Annex 11.3 - Noise Baseline Report and Propagation Model.

Table 5-3 Measurement Results.

Position	Lday	Levening	Lnight	LDEN	Leq	L95
N_01 Karavostasi	52,2	44,1	44,0	51,8	49,8	39,3
N_02 Agia	57,9	56,9	46,7	57,9	56,1	31,3
N_03 Perdika	59,2	56,9	49,5	59,2	57,2	26,6
N_04 Karteri	51,8	48,8	45,2	53,0	50,0	29,6
N_05 Site	29,1	27,9	30,2	36,1	29,3	21,4

Adopted by: (ASPROFOS, 2018). Data from: (Acoustics Consultancy Company, 2018)

Summarizing, in all settlements the sound level meters were placed close to the center of each settlement and thus exposed to the road traffic noise of the main road of each settlement, which was the major noise source in all cases. Houses further away from the main road would be exposed up to 10 dB less noise. The L95 index is a representative value for the noise level at all houses in the settlement when there is no traffic circulation.

The evaluation of the results is based on the Presidential Decree P.D. 1180 (G.P. 293/A/6-10-81) "Regulation of issues relative to the foundation and operation of industries, all kinds of mechanical facilities and storage areas for to environmental protection".

The Presidential Decree P.D. 1180, defines the allowed noise limits that are emitted to the environment during the operation of the facilities, measured over the border of the estate in which the facility operates.

Regarding legislated industry areas, the maximum noise limit is up to 70dB(A). In areas where a number of industries are located, the maximum noise level is up to 65dB(A). In areas where industries and residencies are equally shared, maximum noise level is up to 55dB(A). In areas where residencies prevail, maximum noise level is up to 50dB(A). In the area of the project the limit is considered 65 dB(A).

The conclusions of the Baseline Noise Study are:

- The ambient noise in the centers of the settlements near the proposed site for the construction of the 'Florovouni' Compression Station is in the LDEN = 50 – 60 dB(A) zone. The main noise source is the traffic noise from vehicles crossing the main road of each village. During nighttime the noise levels are in the Lnight = 45 – 50 dB(A) zone.
- The noise currently at the proposed site location, is roughly constant, day and night, around 30 dB(A).

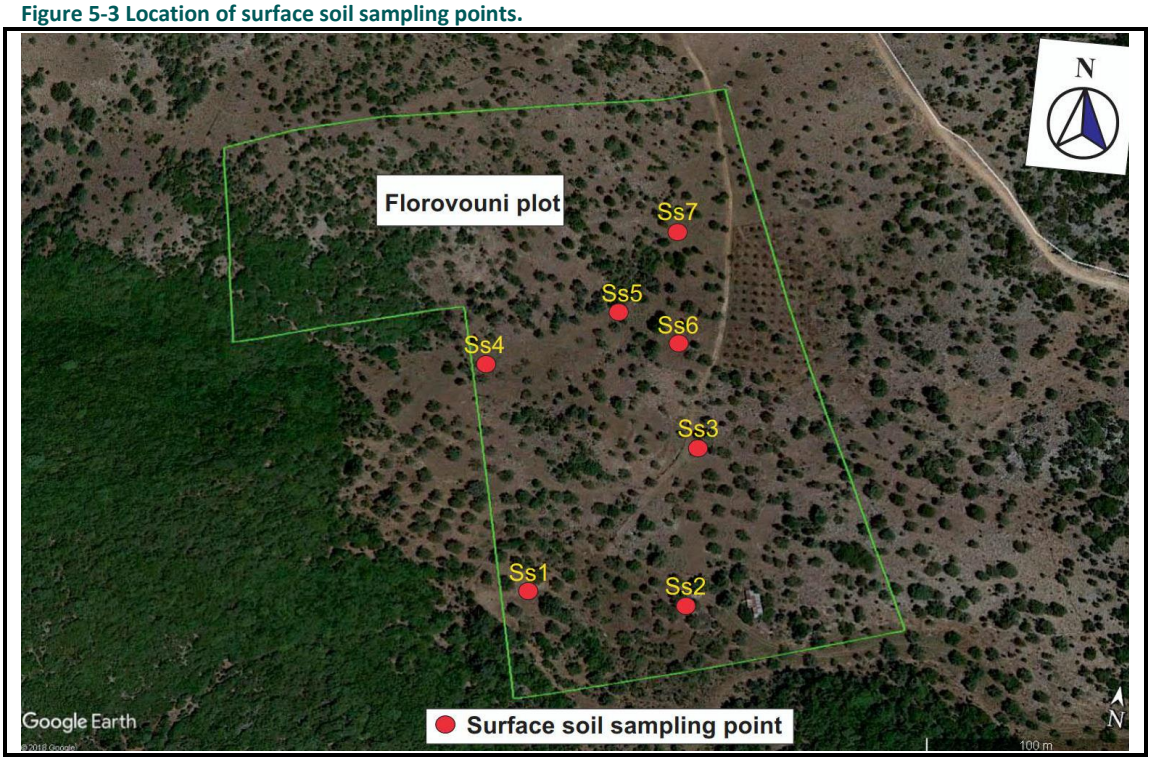
5.4 Soil

A special survey was performed in order to record soil baseline in the area of C/S Florovouni in order to obtain a representative overview of the type and extent of contamination that might be present at the site.

The full report is presented in Annex 11.4 - Soil Baseline Report. Here below, a summary is presented.

Soil baseline survey started and completed in 14/12/2017. The Environmental site investigation included the performance of surface soil sampling in selected locations illustrated in Figure 5-3. Totally seven (7) surface soil samples were collected within the investigated area. The soil sampling was performed by means of hand auger equipment and reached the maximum depth of 30cm below ground surface.

Figure 5-3 Location of surface soil sampling points.



Prepared by: (INTERGEO Ltd., 2018).

Soil baseline survey included the following stages:

1. Site investigation field works: Performance of seven (7) surface soil sampling points.
2. Performance of chemical analyses for Residue at 105° C, Fraction sieved 2mm dry basis at 105° C , Heavy Metals (Sb, As, Be, Cd, Co, Cr, CrIV, Hg, Ni, Pb, Cu, Se, Sn, Tl, V, Zn), TPH index, PCBs and PAHs (totally 7 surface soil samples).
3. Evaluation and interpretation of results
4. Report completion.

Till today, there is no active legislation in terms of set values for soil and/or groundwater contamination in Greece. Currently, an international acceptable quality standard for soil (and groundwater) is used by stakeholders when necessary. The most common one is the New Dutch list. According to the New Dutch List, which is valid in many European countries, two different values are given for the concentration of each pollutant: (i) Optimum value which determines the average concentration in the soil and water, and (ii) Action value which determines the concentration above which decontamination measures are mandatory.

Table 5-4 summarizes the results of the heavy metals analysis. Regarding TPHs, PAHs, and PCBs no sample was detected above detection limit.

Table 5-4 Range of the recorded concentrations of heavy metals in the examined surface soil samples.

			NDL Values (mg/kg)		Samples Measured Concentrations (mg/kg)		Number of samples exceeding values of NDL	
Heavy Metal	**Symbol**	**Number of samples**	**Optimum**	**Action**	**Minimum**	**Maximum**	**Optimum**	**Action**
Arsenic	(As)	7	29	55	6.8	12	--	--
Cadmium	(Cd)	7	0.8	12	1	3.5	7	--
Chromium	(Cr)	7	100	380	47	89	--	--
Copper	(Cu)	7	36	190	23	56	6	--
Mercury	(Hg)	7	0.3	10	n.d.	0.08	--	--
Nickel	(Ni)	7	35	210	40	83	7	--
Lead	(Pb)	7	85	530	18	36	--	--
Zink	(Zn)	7	140	720	69.2	189	5	--
Beryllium	(Be)	7	1.1	30	2	3	7	--
Selenium	(Se)	7	100	n.d.	n.d.	--	--	
Vanadium	(V)	7	42	250	51	125	7	--
Cobalt	(Co)	7	20	240	12	25	5	--
Thallium	(Tl)	7	1	15	0.7	1.3	5	--
Antimony	(Sb)	7	3	15	n.d.	n.d.	--	--
Tin	(Sn)	7	900	1	3	--	--	

Based on: (INTERGEO Ltd., 2018)

The conclusions of the environmental assessment are:

- The soil was found in satisfactory condition regarding the petroleum hydrocarbons. The TPH (Total Petroleum Hydrocarbons) and PAHs concentration in all the examined surface soil samples remained below the detection limit (1mg/kg for TPH and 0,05mg/kg for PAH).
- All PCBs concentrations remained below the detection limit (0,01mg/kg).
- Not any significant heavy metals concentration was recorded in the examined surface soil samples in comparison to the New Dutch List optimum and action value limits. The concentration of Nickel (Ni), Cadmium (Cd), Beryllium (Be) and Vanadium (V) in all of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Furthermore, the concentrations of Zink (Zn), Copper (Cu). Cobalt (Co) and

Thallium (Tl) in the majority of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Their presence is attributed to the lithology of the local geological formations and not due to any anthropogenic influence. All the rest heavy metals concentrations remained below action and optimum value limit of the New Dutch List.

According to the overall evaluation of the investigation results, not any significant inorganic and organic contamination was detected in the surface soil of the investigated plot area. Moreover, no contamination inflow was recorded at the site from activities irrelevant to the plot area.

5.5 Groundwater

A special survey was performed in order to record groundwater baseline in the area of C/S Florovouni. The full report is presented in Annex 11.5 - Groundwater Baseline Report. Here below, a summary is presented.

Groundwater baseline survey was performed in 25/01/2018. Groundwater sampling was performed by an existing private well located adjacent and downstream from the investigated site, north-west at a distance of about 2.000m. The specific existing private well belongs to the Hydrogeological system of Parga (GR 0500170). The plot where the future Natural Gas compression Terminal will be constructed belongs also to the Hydrogeological system of Parga (GR 0500170). Thus, in spite the 2.000m distance between the existing private well and the plot, the performed groundwater sampling can be characterized acceptable, as both the existing private well and the plot belongs to the same Hydrogeological system. The hydrogeological system is categorized according to the approved Epirus Water Management Plan (ΥΔ05). The location of the private well is shown in Figure 5-4.

The obtained groundwater sample was sent for further chemical analyses as shown below:

- Anions: Cl, PO4, Nitrate, Sulfate,
- Metals: Al, As, Be, Cd, Co, Cr, CrIV, Cu, F, Fe, Li, Mn, Mo, Ni, Pb, Se, V, Tl, Zn, Sb, B, Hg,
- Total oil, TPH and animal and vegetable oil and fat,
- PAHs: Total PAH,

- Total coliforms,
- BOD5,
- Total COD,
- TDS,
- TOC

Quality standards are provided in Annex 11.5 - Groundwater Baseline Report.

Figure 5-4 Satellite view existing private groundwater well (GW1) at Florovouni-Thesprotia, Greece.

Prepared by: (INTERGEO Ltd., 2018)

The measured physicochemical parameters are shown in Table 5-5.

Table 5-5: On site measurements in existing private groundwater well in Florovouni- Thesprotia, Greece (on 25/01/2018).

Monitoring well	Depth of the well in m	Conductivity in µS/cm	Temperature in ^{0}C	pH	Organoleptical observation
GW1	90	864	18,0	7,30	No smell

Prepared by: (INTERGEO Ltd., 2018)

The EC value in the examined private groundwater well was measured from 864μS/cm indicating normal condition (decreased salinity). Temperature was found in normal range expected at the specific time period. The pH value that was determined for the obtained groundwater sample was within the normal range. According to organoleptic observation, no smell of any petroleum product was recorded in the obtained groundwater sample.

According to the chemical analyses results groundwater was found in satisfactory condition. Almost all examined parameters remained in very low values and in some cases in **not detectable level** according to MD Y2/2600.

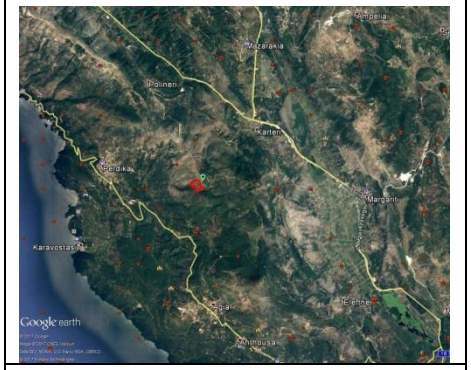
5.6 Landscape and Visual Amenity

Landscape characteristics have not been modified between the initial EIA and the current situation.

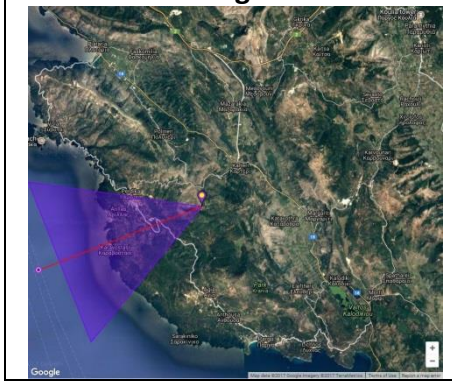
The major landscape feature in the modifications area is the one of hilly mosaic of shrublands and olive groves. There are no buildings or other manmade structures of significance or geological formations of importance.

Figure 5-5 Landscape characteristics (East Station's Corner).

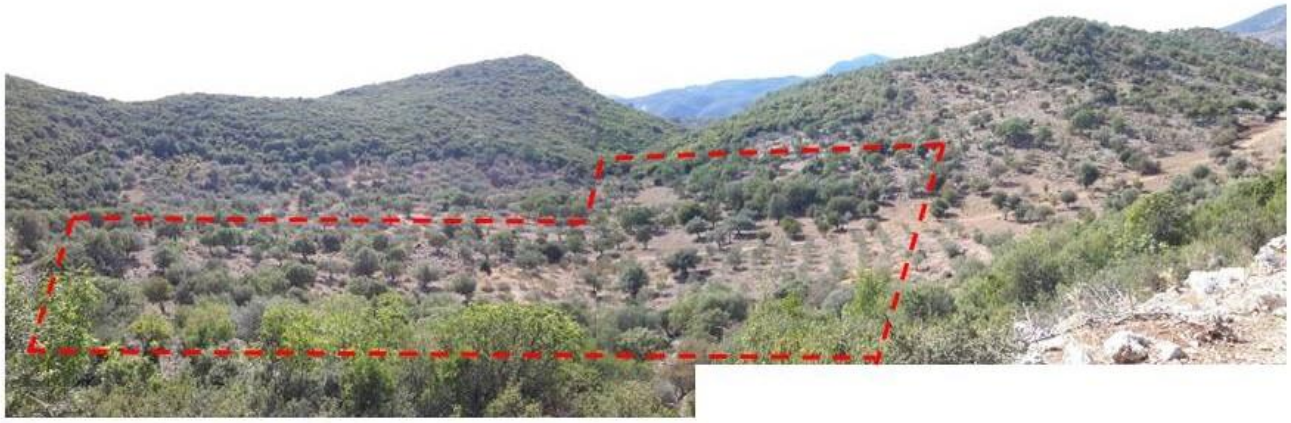
- **Picture's Location**



- **Picture's Angle**



Station's Area Landscape from the East Corner

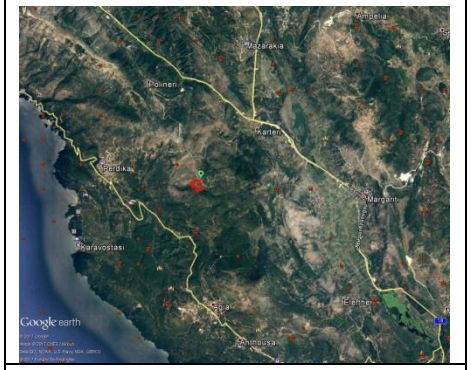


Station's Footprint is Indicative.

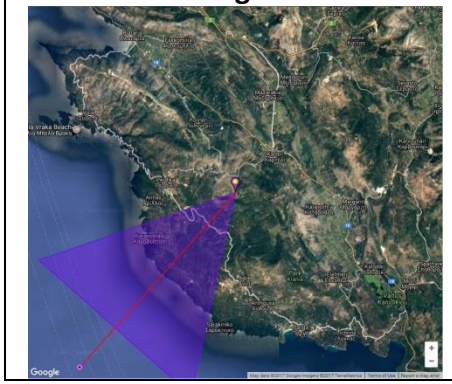
Prepared by: (ASPROFOS, 2018). Pictures used for mosaic (date_number): 20170919_160343 & 20170919_160350.

Figure 5-6 Landscape characteristics (North East Station's Corner).

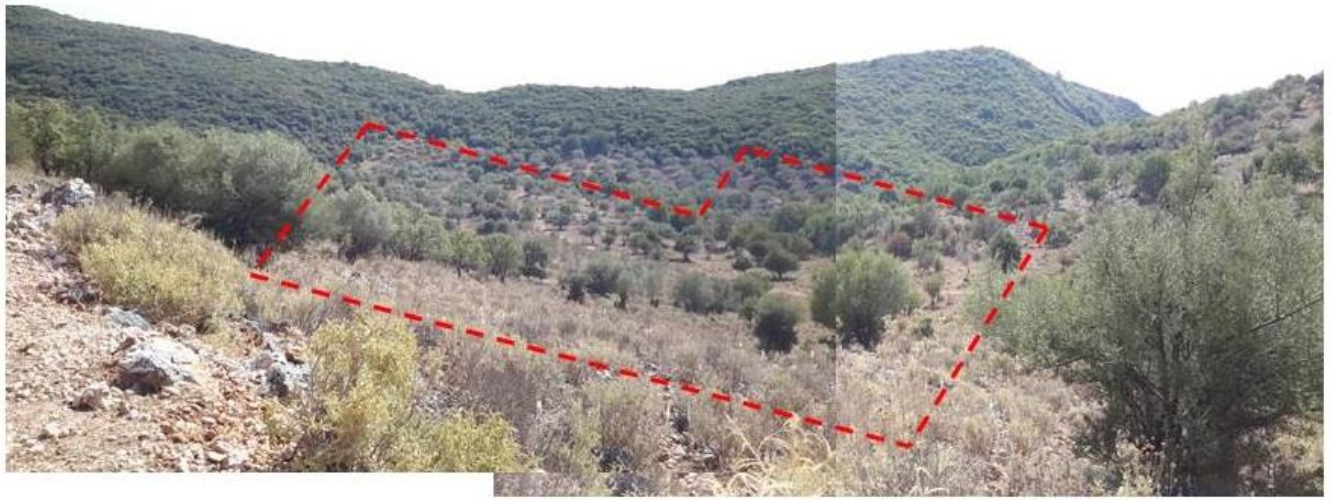
- **Picture's Location**



- **Picture's Angle**



Station's Area Landscape from the North East Corner



Station's Footprint is Indicative.

Prepared by: (ASPROFOS, 2018). Pictures used for mosaic (date_number): 20170919_155217 & 20170919_155222.

5.7 Natural Environment

Natural environment baseline has not been modified between the initial EIA and the current situation.

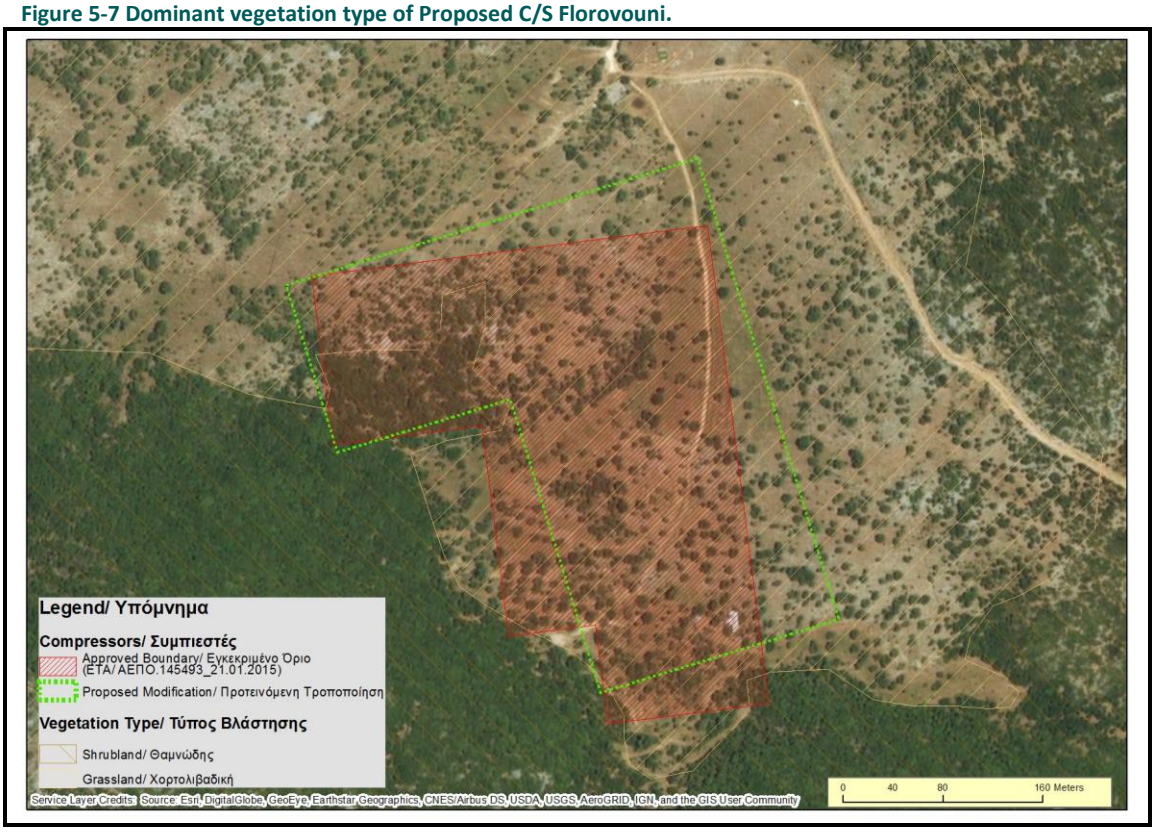
Table 5-6 and Figure 5-7 illustrate vegetation's dominant type upon which the proposed land parcel shall be located.

Table 5-6 Dominant vegetation type Comparison Matrix between Approved and Proposed C/S Florovouni Footprint.

	ETA Status			
	Approved		Proposed Modification	
Vegetation Type	**m²**	**%**	**m²**	**%**
Grasslands	76316.75	86.80	87390.34	89.60
Shrublands	11605.15	13.20	10140.94	10.40

Prepared by: (ASPROFOS, 2018).

Figure 5-7 Dominant vegetation type of Proposed C/S Florovouni.



Source: (ASPROFOS, 2018).

5.8 Land Uses

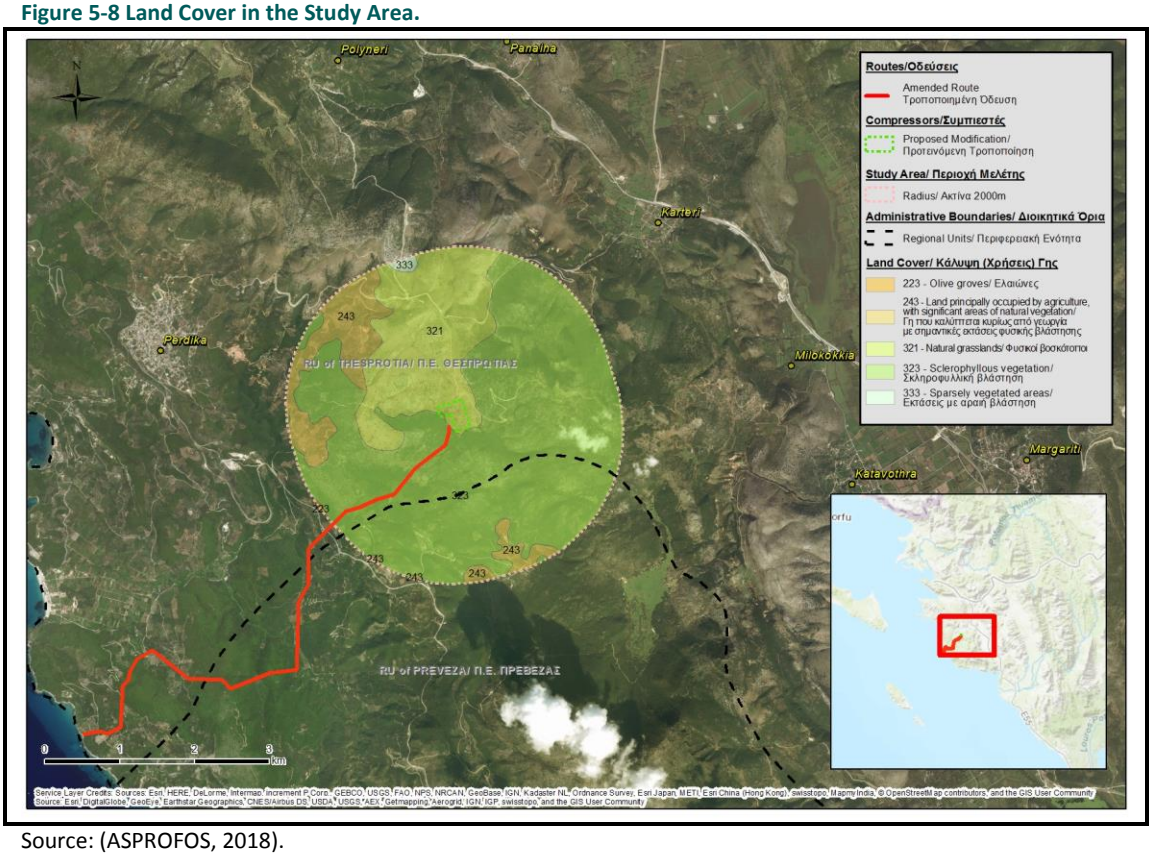
Based on the available land cover data of the area (European Environment Agency (EEA), 2012), the proposed modified footprint of the C/S Florovouni is sited on the same land cover types as the approved component. It is obvious that the total area covered in absolute numbers is modified, however the percentage is more or less the same. The percentage of the overall sclerophyllous vegetation is slightly decreased, whilst the percentage of natural grasslands increased. Table 5-7 and Figure 5-8 (and Figure 5-7) are relevant.

Table 5-7 Land Cover Comparison Matrix between Approved and Proposed C/S Florovouni Footprint.

		ETA Status			
		Approved		Proposed Modification	
CLC Code	Description	m²	%	m²	%
321	Natural grasslands	85354.65	97.08	95008.89	97.41
323	Sclerophyllous vegetation	2567.25	2.92	2522.39	2.59

Prepared by: (ASPROFOS, 2018).

Figure 5-8 Land Cover in the Study Area.



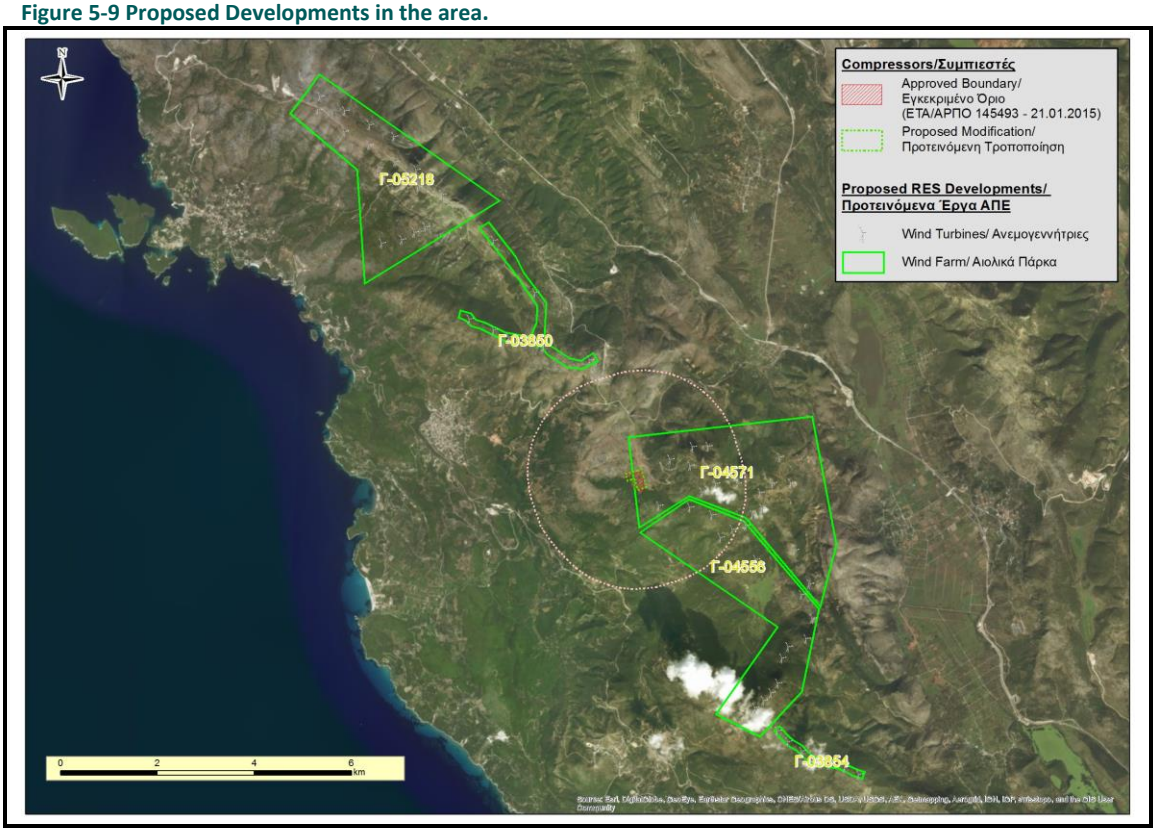
Source: (ASPROFOS, 2018).

It should be highlighted, that the proposed siting is located in area 2A and 2b „Areas outside town plan“ of Margariti's SHOAP where similar activities are allowed (see Annex 11.6 - Stakeholders Engagement Documentation, Municipality of Igoumenitsa/ Directorate of Technical Services.

5.9 Planned Developments

As identified in the initial EIA, a wind farm of 32 MW is planned in the area. Based on the most updated data acquired by the Regulatory Authority for Energy[6], the same wind farm permit status has not been modified. This is the case for all proposed wind farms in the broader area (see Figure 5-9 and Table 5-8).

Figure 5-9 Proposed Developments in the area.



Prepared by: (ASPROFOS, 2018). Data retrieved by www.rae.gr/geo on 13.10.2017.

Table 5-8 Planned RES Developments in the broader area.

WIND TURBINES CHARACTERISTICS

[6] Data retrieved by RAE's Official Geoportal (http://www.rae.gr/geo/) on 13.10.2017. Data were verified also through telephone communication on the same date.

Code	Type	Owner	Permitting Status	ETA Status	Power (MW)	Area (m^2)	No	Type	Power (MW)	PYLON HEIGHT (m)
Γ-03850	W/F	SPIDER ΕΝΕΡΓΕΙΑΚΗ Α.Ε.	Production Permit	YES	12.6	1073093.227	7	V100	1.8	80
Γ-03854	W/F	SPIDER ΕΝΕΡΓΕΙΑΚΗ ΑΕ	Production Permit	NO	16.8	314147.5	7	N117	2.4	91
Γ-04556	W/F	EDF EN HELLAS A.E. & ΣΙΑ –ΠΡΕΒΕΖΑ 1 Ε.Ε	Production Permit	NO	40	6662627.999	8*2 MW & 8*3 MW	V90	2 / 3	80
Γ-04571	W/F	EDF EN HELLAS A.E. & ΣΙΑ –ΠΡΕΒΕΖΑ 1 Ε.Ε	Production Permit	NO	32	8759707.095	16	V90	2	80
Γ-05218	W/F	EDF EN GREECE A.E. & ΣΙΑ - ΠΡΕΒΕΖΑ 1 Ε.Ε.	Under Evaluation	NO	30	6951552.18	15	V90	2	80
WF: Wind Farm										

Prepared by: (ASPROFOS, 2018). Data retrieved by www.rae.gr/geo on 13.10.2017.

Other proposed developments of Renewable Energy Sources have been investigated in the broader area in the past but have been rejected (or discarded) for various reasons.

It is repeated that the wind farm at Florovouni site, is of 32MW, owned by EDF EN GREECE S.A. & Co – PREVEZA 1 LTD, and has received the 1001/2011 positive response (Production Permit). Operation permit is yet to be received.

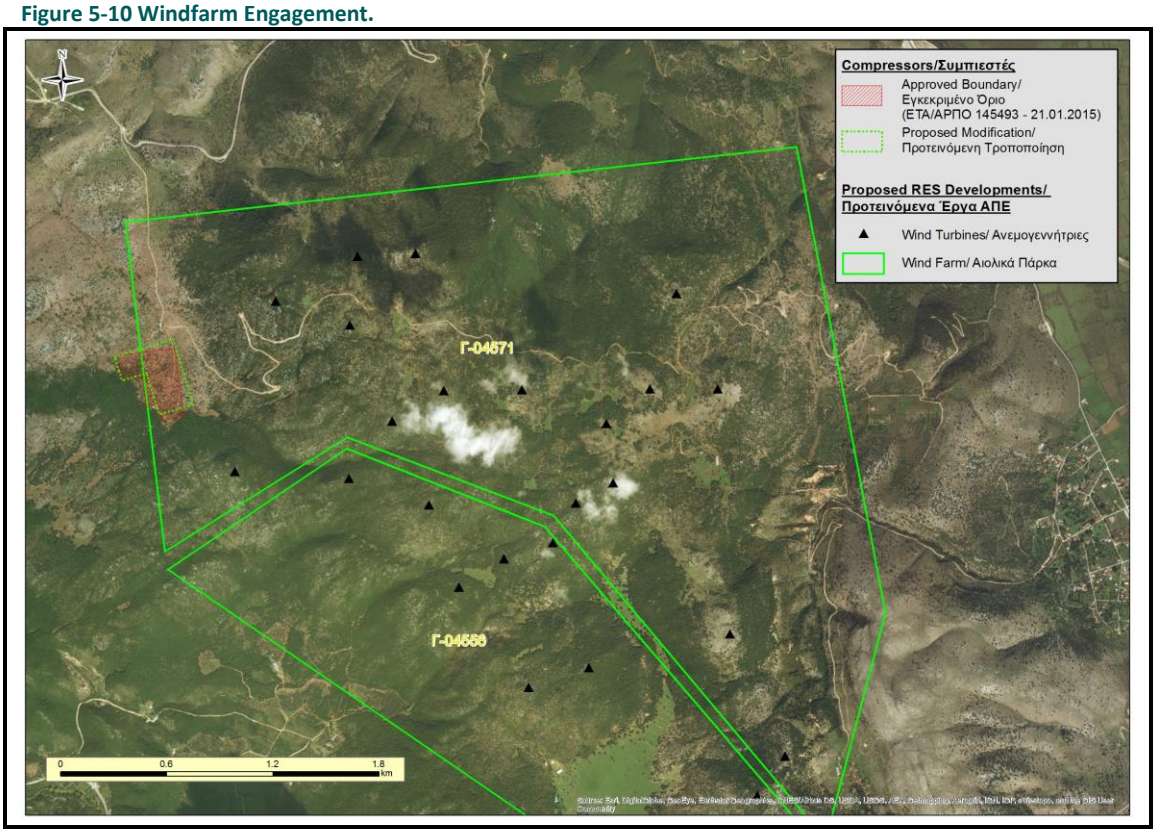
The area of the wind farm overlaps, partially, with the C/S Florovouni.

The overlapping of the wind farm parcel and the C/S Florovouni site has been addressed through a contact between the two interested parties with positive results.

The wind farm project has 16 wind turbines in an overall area of ~876ha and includes most of the Onshore Facilities parcel as illustrated in the following figure (Figure 5-10). The overlapping section does not include any wind turbines.

Regarding safety, in case of both projects' operation, contacts with the engineering team of the wind farm development have already been established and reached an agreement on relocating the two closest to the Facilities wind turbines.

Figure 5-10 Windfarm Engagement.



Prepared by: (ASPROFOS, 2018). Data retrieved by www.rae.gr/geo on 13.10.2017.

At this point, there is another significant development that should be noted, that was developed after the approval of the project: the tendering for exploration for and exploitation of hydrocarbons. The onshore section of the project lays within the “Arta-Preveza” block, at its western area. In addition, the offshore section crosses two concession areas: Block Sea 2 and Ionian Sea. A meeting was held with Hellenic Hydrocarbon Resources Management S.A. (competent management body for hydrocarbons exploration and exploitation) on 18/12/2017. During the construction and operation of the investigated project there should be close cooperation with the Operators of these concession so that any works that may induce any disturbance or may be prohibitive for one of the two projects, such as seismic surveys, are planned and performed in such a way that they do not affect the integrity and proper operation of each other. In any case, it was considered positive that a natural gas pipeline passes from the concession plot and that there might be technical provisions for allowing the natural gas reserves of the area to be channelled through the investigated project, if commercially exploitable reserves are discovered.

6 RESULTS OF ENVIRONMENTAL AND SOCIAL MONITORING AND INSPECTIONS

Offshore PPP has not been constructed yet. Upon issuance of the ETA no further actions were taken. Consequently, no environmental or social monitoring or inspection results exist.

In all, the present chapter is not applicable and is presented only for completeness purposes.

7 IMPACTS ASSESSMENT AND MITIGATION MEASURES

7.1 Methodology

According to MD 170225/2014, only potentially important environmental impacts that may be imposed by the suggested modification are assessed. Assessment is performed so as to examine whether that due to the modifications:

i) there is a substantial modification to the environmental impacts induced by the proposed modifications in comparison to the original project, or.

ii) there is no significant change to the environmental impacts induced by the proposed modifications in comparison to the original project.

Assessment and evaluation is limited to the direct and indirect significant impacts of the proposed modification of the project and their degree of differentiation to those assessed and evaluated for the originally environmentally licensed project or activity. It also examines whether there is a likelihood of significant cumulative or synergistic action between the new impacts of the modification and those of the originally environmentally licensed project as well as of other projects or activities that may have taken place in the region in the meantime.

7.2 Screening

Initially, study team performed a screening process to identify which environmental parameters may induce significant impacts from the proposed modifications of the original project design.

This was verified in a meeting with the competent authority.

Table 7-1 Screening matrix for significant change to environmental impacts induced by the proposed modification in comparison to the original project.

Environmental Parameter	Discussion	Is there significant change to the environmental impact induced by the proposed modification in comparison to the original project?	Is further impacts assessment necessary?
Soil and Subsurface	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the mechanisms inducing impacts. The area is somewhat bigger but no new soil types are affected.	No	No
Water Resourses	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the mechanisms inducing impacts. the same applies for the offshore section; although the quantity of hydrotest water is increased, the same procedure shall be followed inducing the same impacts to the marine environment as the approved project.	No	No
Air Quality	In comparison to 2012 EIA, the final capacity is increased significantly. Emissions register is important based on the updated legislation (IED Directive). The broader area is pristine, lacking significant sources of air pollution and any new development could have impacts. The impact may be similar but cumulative effects (to the ones assessed dugin the initial permitting procedure) are expected.	Maybe	Yes
Acoustic Environment	In comparison to 2012 EIA, the final capacity is increased significantly, and the noise emitting equipment respectively. The broader area is pristine, lacking significant sources of noise and any new development could have impacts. The impact may be similar but cumulative effects (to the ones assessed dugin the initial permitting procedure) are expected.	Maybe	Yes

Environmental Parameter	Discussion	Is there significant change to the environmental impact induced by the proposed modification in comparison to the original project?	Is further impacts assessment necessary?
Natural Environment	In comparison to 2012 EIA, no modifications to the relevant baseline has taken place nor to the mechanisms inducing impacts. The area is somewhat bigger but no new vegetation types are affected. In order that the ETA can act as permit for intervention into areas under forest legislation, Forest Characterization Act is a prerequisite. As such, Forest Areas would rather be investigated during ETA Amendment Application File.	No	No. However, impacts are quantified in order to assist procedures regarding forest areas intervention permit.
Demographics	In comparison to 2012 EIA, no modifications (new census data) to the relevant baseline have taken place nor to the mechanisms inducing impacts. Modifications to the overall magnitude of the project are not enough to differentiate impacts to demography in comparison to the original project.	No	No
Local Economy (including Planned Developments)	In comparison to 2012 EIA, no modifications (new census data) to the relevant baseline have taken place nor to the mechanisms inducing impacts. Modifications to the overall magnitude of the project are not enough to differentiate impacts to local economy in comparison to the original project. Engagement with the planned windfarm is not modified. No engagement with „Arta-Preveza“ Hydrocarbons block is assessed. The project has been licensed before relevant permitting and any activities regarding the block should take into consideration Offshore PPP.	No	No
Land Uses	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the mechanisms inducing impacts. The area that shall be occupied by the station is somewhat bigger but no new land uses types are affected. However,	No.	No. However, impacts are quantified in order to provide an overview

Environmental Parameter	Discussion	Is there significant change to the environmental impact induced by the proposed modification in comparison to the original project?	Is further impacts assessment necessary?
	assuming that land uses provide an overview of the existing social environment and potential for future development, it was deemed useful to investigate in more detail the likelihood of inducing additional, cumulative impacts in comparison to the original project.		of potential impacts to social environment.
Infrastructure	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the mechanisms inducing impacts. The required power supply is somewhat bigger but this does not induce modifications to the power supply provision design. The Station will be connected to Medium voltage lines	No	No
Landscape and Visual Amenity	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the design (mainly height) of the buildings. However, more compressor trains are introduced, modifying the mechanisms inducing impacts. The impact may be similar but cumulative effects (to the ones assessed dugin the initial permitting procedure) could be expected.	Maybe	Yes
Cultural Heritage	In comparison to 2012 EIA, no modifications to the relevant baseline have taken place nor to the mechanisms inducing impacts. The area is somewhat bigger but field surveys during the 2012 EIA did not reveal high archaeological potential in the C/S Florovouni site. Official correspondence with the competent authority for the proposed modification validates this (see Annex 11.6 - Stakeholders Engagement Documentation/Minister of Culture and Sports/ Ephorate of Antiquities of Thesprotia).	No	No.

7.3 Air Quality

Impacts on air quality during construction are considered identical to the ones already assessed during the initial EIA of the project. However, given the modification of the total (phase 2) capacity of C/S Florovouni, it was deemed appropriate to assess impacts from the facility during operation. In order to do that, an air dispersion model was run by NCSR DEMOKRITOS.

The Air Resources Laboratory's HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model was used. As a result of a joint effort between NOAA and Australia's Bureau of Meteorology, the model has been used for several applications (https://ready.arl.noaa.gov/HYSPLIT.php).

The following sections presents a summary of the full report that can be found in Annex 11.2 - Air Dispersion Model.

7.3.1 Model Set up

To investigate the impact of the dispersion of Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) on the atmospheric quality from the future installation of the Florovouni Compression Station (FCS), the Air Quality Survey based in an appropriate methodology (D. Vlachogiannis, 9-12 May 2016) and 3-dimensional computer modelling tools of the Environmental Research Laboratory of the NCSR "Demokritos". The basic computational steps followed are listed below:

1. Processing of the available data, preparation of the input files for the dispersion model regarding the topography (ARC.GIS) and the meteorology of the area.
2. Meteorological computational calculations to obtain the characteristic weather types of the area of interest and the respective 3-Dimensional meteorological fields (WRF model).
3. Modelling calculations of the atmospheric dispersion of the emissions of NOx and CO from the gas compression station (HYSPLIT model). The background air quality concentrations of the area available from measurements were included in the study.
4. Analysis and evaluation of the model results on the near surface distribution of the NOx and CO concentrations.

5. Comparison of the calculated concentrations NOx and CO with the current EU Directives of air quality standards. Emphasis was placed on the investigation of the concentration values of the air pollutants over the nearby populated settlements.

The necessary input data, for the specific study, include the topography and meteorological fields of the area of interest. SIEMENS SGT 700 Gas Turbines characteristics were used as technical data input[7].

The Characteristic Weather Types (CWT) were obtained by applying the methodology of (A. Sfetsos, D. Vlachogiannis; , N. Gounaris & A. K. Stubos, 2005). The results showed that the area of study is characterised by eleven (11) in total weather types (Table 7-2). Details regarding weather types are presented in Annex 11.2 - Air Dispersion Model and are summarized in the following table.

Table 7-2 Characteristic weather types (CWT) and percentage of their frequency of occurrence within a year in the area of Florovouni (region of Thesprotia).

Characteristic weather type (CWT)		Annual Frequency (%)
No	**Description**	
1	During this typical winter weather day, high pressures prevail over the western region of Greece, resulting to low surface wind speeds from variable directions and high for this time period surface temperatures at noon, up to 17-18 ° Celsius. Night temperatures of less than 9°C occur in the area. This weather type favors high relative humidity and stable conditions in the lower atmospheric levels.	7.8
2	The combination of relatively high pressures prevailing over southern Greece and relatively low over north Italy causes weak-moderate southerly winds over western Greece and especially Thesprotia region. The temperature is up to 19 °C during midday. Light rain affects this area from the afternoon.	8.9
3	High pressures prevailing over the Balkan Peninsula are combined with low pressures over Cyprus resulting to low wind speeds in the area of Thesprotia. Land and sea breezes are prevailing in coastal areas at night and noon, respectively. High surface temperatures occur (up to 35 °C) during this usual summer day.	17.6
4	High pressures over central Europe and low pressures over eastern Mediterranean cause low to medium intensity wind speeds over Thesprotia and moderate north-westerly winds over the Ionian Sea. The surface temperature reaches 12-14 °C in the afternoon, while in the morning it falls down to 4-6 °C.	7.6

[7] Given that the exact gas turbine to be installed is yet to be defined, the model used the two alternatives available so far. The present section presents the worst case scenario, whilst the full report (see Annex 11.2 - Air Dispersion Model) includes both scenarios.

Characteristic weather type (CWT)		Annual Frequency (%)
No	**Description**	
5	A low pressure barometric system passes over the Aegean Sea area and moderate northerly winds affect the area of Thesprotia. The surface temperature of less than 7°C at night reaches 13-14 °C around noon. Precipitation amounts are recorded during the first hours, improving to drizzle or no rain conditions later in the day.	5.8
6	An upper air trough of cold air masses and relatively low surface pressures cause moderate and gradually strong rain in the area of Thesprotia during this typical weather day. Low wind speeds are prevailing. Maximum temperature is around 15°C at noon.	12.1
7	Low pressures over the Ionian Sea cause southerly winds strengthening at noon with temporal rain and weather improvement later. High surface temperatures around 22°C occur because of the warm air masses moving from south.	6.9
8	Mid-day atmospheric instability causes temporal rain around noon. Weak pressure gradient results to light sea breeze at noon and weak northerly winds later. Temperature varies around the normal seasonal levels for this area of 25°C.	3.7
9	High pressures prevailing over the Balkan Peninsula are combined with low pressures over the eastern Mediterranean Sea resulting to low up to moderate east-north-easterly wind speeds in the area of Thesprotia. Low temperatures occur at night around 10°C and relatively high temperatures at 2m, for this period, during the day reach up to 19°C.	11.7
10	The weak pressure gradient during the day results to variable winds with moderate sea breeze at noon over Thesprotia region. Temporary rainfall occurs during midday hours as a result of thermal atmospheric instability. The temperature is at normal levels for this period rising up to 25 °Celsius around noon.	9.8
11	An upper air trough results to moderate rainfall at times during the day. Northerly winds turning to variable (directions) and finally to north-easterlies, with moderate wind speeds affecting the area. The surface temperature reaches 26-27 ° C around noon, falling down to 12-14 °C at night.	8.1

Adopted by: (ASPROFOS, 2018). Data from: (NCSR "DEMOKRITOS", 2018)

Two set-ups of model simulations were performed for the case of SIEMENS SGT 700 Gas Turbines (shows that the SIEMENS gas turbines produce higher emissions). The first one included only the emissions of NOx and CO from the FCS. In the second set-up, the model simulated the total effect of the background values and those from the FCS on NOx concentration fields during the winter CWTs (cumulative impact assessment).

7.3.2 Model Results

The concentrations of NOx were calculated on an hourly and annual basis to compare the modelled calculated results with the respective air quality limits as set by the legislation in force (MD 14122/549/E.103/2011 "Measures to improve air quality in compliance with the provisions of Directive 2008/50/EC "on the air quality and cleaner air for Europe" the European Parliament and Council of the European Union of 21 May 2008"). According to the current directive, the air quality limit for NO2 for averaging period of 1 hour is set at 200 μg/m³ not to be exceeded more than 18 times a calendar. On an annual average basis, the respective limit is 40 μg/m³. The CO values were calculated as maximum daily 8 hour running mean concentrations for comparison with the respective air quality limit of 10 mg/m³ (Directive 2008/50/EC).

The modelling approach was performed without the inclusion of the photochemical reactions which could reduce the concentrations of NOx and CO in the atmosphere for the reason of obtaining the maximum possible values in the domain. Moreover, detailed data on the compounds from high resolution inventories would be needed for a photochemical model, which were not available.

Table 7-3 summarizes the maximum hourly average and annual NOx concentrations as well as the CO maximum 8-hour running mean values from the FCS calculated by the dispersion model over the residential areas of the domain.

Table 7-4 summarizes the maximum hourly average NOx concentrations found in the CWT of winter, over the residential areas from the FCS as well as those calculated as total contribution to the field from the FCS and the background concentrations (cumulative impact).

It can be observed that:

- the maximum hourly average values of NOx concentrations from the FCS are not found to exceed the limit of 200 μg/m³ during any characteristic weather type
- annual concentration values in NOx from the FCS do not exceed the respective air quality limit of 40 μg/m³
- no exceedances of the NO2 and CO respective air quality limits occur over the populated areas within a distance of 20 km
- the concentrations from total contribution remain low and well below the air quality limit of 200 μg/m³ over all residential settlements within a distance of 20 km from the FCS.

- the CO 8-hour mean values were found to remain very low and insignificant compared to the legislative limit everywhere in the domain. No exceedances occurred whatsoever

Table 7-3 Calculated maximum concentration values of NOx and CO over the residential areas in the domain for all CWT (SGT700 Gas Turbines).

A/A	Settlements	Distance from FCS	Maximum hourly (mean) NOX concentration (μg/m³) (limit 200 μg/m³)	Annual average NOx concentration (limit 40 μg/m³)	Maximum hourly (mean) NOX concentration (μg/m³) (limit 10000 μg/m³)
1	IGOUMENITSA	17.28	2.20	0.04	1.11
2	NEA SELEFKEIA	19.79	1.02	0.03	0.68
3	PARAMYTHIA	18.6	0.72	0.01	0.54
4	PARGA	9.6	10.31	0.22	2.96
5	PERDIKA	3.99	2.78	0.06	1.30
6	ACHEROUSIA	24.17	0.31	0.01	0.21
7	AGIA	5.48	8.35	0.33	4.36
8	AGIA KYRIAKI	23.63	0.04	0.00	0.01
9	AGIA MARINA	12.4	0.52	0.02	0.18
10	AMMOUDIA	17.96	1.15	0.04	0.50
11	AMPELIA	10.52	0.21	0.00	0.10
12	ANTHOUSA	7.28	10.69	0.43	5.38
13	ARGYROTOPOS	6.95	54.15	2.11	34.01
14	CHOCHLA	24.74	0.20	0.00	0.04
15	CHOIKA	20.43	0.19	0.00	0.09
16	CHRYSAVGI	18.14	0.64	0.01	0.32
17	ELATARIA	24.85	0.16	0.00	0.02
18	ELEUTHERION	8.39	4.99	0.16	2.50
19	FASKOMILIA	10.33	0.65	0.01	0.19
20	GAIOS	23.18	2.08	0.02	1.22
21	GARDIKION	19.54	0.62	0.00	0.15
22	GRAIKOCHORION	16.38	3.26	0.07	2.05
23	GRIKA	13.75	0.31	0.01	0.13
24	KALLITHEA	20.78	0.19	0.00	0.06
25	KARIOTION	18.46	0.38	0.00	0.06
26	KARTERION	4.05	22.91	0.17	9.07
27	KARVOUNARION	12.02	0.25	0.00	0.06
28	KASTRION	22.54	0.34	0.01	0.15
29	KATAVOTHRA	5.64	17.62	0.33	6.21
30	KEFALOVRYSON	17.66	0.18	0.00	0.21
31	KORITIANI	15.61	4.32	0.05	1.86
32	KORONI	19.84	0.50	0.01	0.36

A/A	Settlements	Distance from FCS	Maximum hourly (mean) NOX concentration (μg/m³) (limit 200 μg/m³)	Annual average NOx concentration (limit 40 μg/m³)	Maximum hourly (mean) NOX concentration (μg/m³) (limit 10000 μg/m³)
33	KRYOVRYSI	13.68	0.69	0.01	0.19
34	KYPARISSON	19.43	0.51	0.01	0.32
35	KYPSELI	19.06	0.50	0.02	0.44
36	LADOCHORION	15.56	4.84	0.11	1.93
37	LAKKA	23.31	0.94	0.02	0.13
38	LOGOS	22.15	0.44	0.01	0.20
39	LOUTSA	24.12	0.27	0.01	0.16
40	MAGAZIA	24.54	0.28	0.01	0.12
41	MARGARITION	7.73	0.49	0.01	0.27
42	MAVROUDION	20.24	0.97	0.03	0.59
43	MAZARAKIA	6.18	2.21	0.05	0.69
44	MESOPOTAMON	20.94	0.47	0.01	0.32
45	MORFION	12.56	1.92	0.03	0.53
46	MOUZAKAIIKA	23.52	0.41	0.01	0.18
47	NEOCHORION	18.08	0.61	0.01	0.26
48	PALAIOCHORION	21.69	0.27	0.01	0.15
49	PANKRATI	13.29	0.16	0.00	0.05
50	PARAPOTAMOS	20.72	0.75	0.02	0.57
51	PLATARIA	12.45	4.33	0.09	1.56
52	PRODROMION	18.22	0.38	0.00	0.08
53	PSAKA	12.79	0.26	0.01	0.08
54	SALONIKI	25.56	0.10	0.00	0.02
55	SEVASTON	12.94	0.34	0.00	0.02
56	SKANDALON	16.04	0.31	0.01	0.14
57	STAVROCHORION	21.76	0.17	0.01	0.14
58	SYVOTA	10.43	3.92	0.06	2.09
59	THEMELON	19.41	0.45	0.02	0.36
60	VALANIDORACHI	21.44	0.41	0.01	0.19
61	VERENIKI	27.71	0.19	0.00	0.07
62	VRYSAI	8.88	3.96	0.11	1.97
63	XIROLOFOS	14.45	0.43	0.01	0.12
64	ZERVOCHORION	19.22	0.84	0.01	0.34

Prepared by: (NCSR "DEMOKRITOS", 2018)

Table 7-4 Calculated for characteristic weather types of winter near surface: 1) maximum hourly concentration values of NOx over the residential areas in the domain from FCS and 2) total concentrations from FCS and background (SGT700 Gas Turbines). Air quality limit 200 μg/m³.

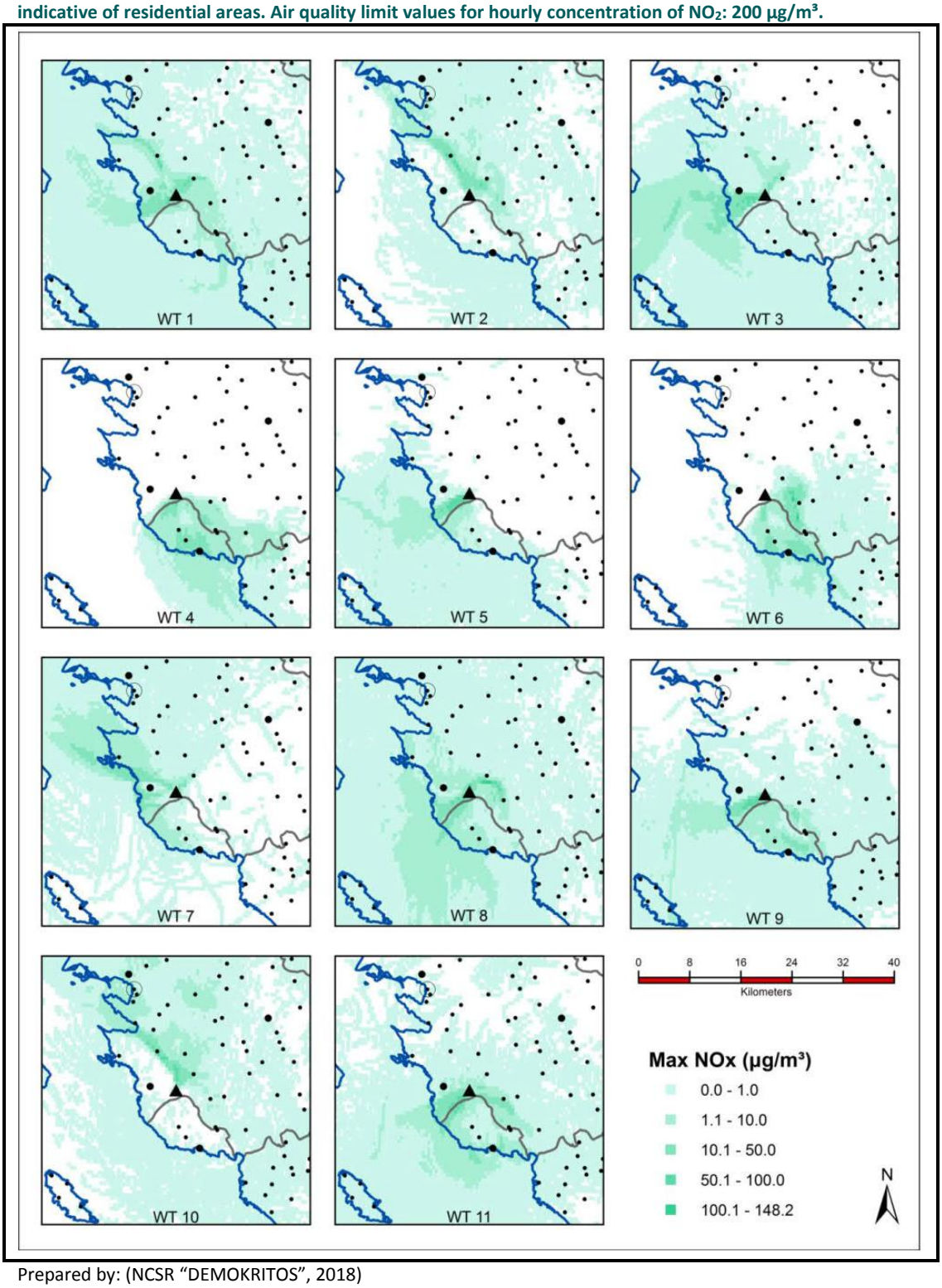
A/A	Settlements	Maximum hourly (mean) NO_X concentration (μg/m³) (no background contribution)	Maximum hourly (mean) NO_X Total concentration (μg/m³) (with background contribution)
		Air quality limit 200 μg/m³	
1	IGOUMENITSA	0.12	0.28
2	NEA SELEFKEIA	0.16	0.32
3	PARAMYTHIA	0.72	0.88
4	PARGA	10.31	10.70
5	PERDIKA	2.78	3.18
6	ACHEROUSIA	0.22	0.38
7	AGIA	8.35	8.65
8	AGIA KYRIAKI	0.00	0.16
9	AGIA MARINA	0.24	0.40
10	AMMOUDIA	0.84	1.01
11	AMPELIA	0.21	0.38
12	ANTHOUSA	10.69	11.01
13	ARGYROTOPOS	41.26	41.43
14	CHOCHLA	0.12	0.29
15	CHOIKA	0.07	0.23
16	CHRYSAVGI	0.64	0.81
17	ELATARIA	0.00	0.16
18	ELEUTHERION	4.99	5.30
19	FASKOMILIA	0.07	0.23
20	GAIOS	2.08	2.24
21	GARDIKION	0.62	0.78
22	GRAIKOCHORION	0.14	0.30
23	GRIKA	0.31	0.47
24	KALLITHEA	0.00	0.16
25	KARIOTION	0.38	0.54
26	KARTERION	22.91	23.24
27	KARVOUNARION	0.07	0.24
28	KASTRION	0.34	0.50
29	KATAVOTHRA	2.29	2.63
30	KEFALOVRYSON	0.18	0.34
31	KORITIANI	0.05	0.22
32	KORONI	0.50	0.66
33	KRYOVRYSI	0.15	0.32
34	KYPARISSON	0.05	0.21
35	KYPSELI	0.50	0.66
36	LADOCHORION	0.24	0.41
37	LAKKA	0.29	0.46
38	LOGOS	0.44	0.60

A/A	Settlements	Maximum hourly (mean) NO_X concentration (μg/m³) (no background contribution)	Maximum hourly (mean) NO_X Total concentration (μg/m³) (with background contribution)
39	LOUTSA	0.25	0.41
40	MAGAZIA	0.16	0.33
41	MARGARITION	0.49	0.80
42	MAVROUDION	0.10	0.27
43	MAZARAKIA	0.14	0.36
44	MESOPOTAMON	0.47	0.63
45	MORFION	1.92	2.08
46	MOUZAKAIIKA	0.41	0.57
47	NEOCHORION	0.00	0.16
48	PALAIOCHORION	0.00	0.16
49	PANKRATI	0.03	0.19
50	PARAPOTAMOS	0.06	0.22
51	PLATARIA	0.38	0.54
52	PRODROMION	0.38	0.54
53	PSAKA	0.26	0.42
54	SALONIKI	0.03	0.20
55	SEVASTON	0.34	0.51
56	SKANDALON	0.20	0.36
57	STAVROCHORION	0.16	0.33
58	SYVOTA	0.35	0.54
59	THEMELON	0.45	0.61
60	VALANIDORACHI	0.41	0.57
61	VERENIKI	0.10	0.26
62	VRYSAI	3.96	4.31
63	XIROLOFOS	0.43	0.60
64	ZERVOCHORION	0.84	1.00

Prepared by: (NCSR "DEMOKRITOS", 2018)

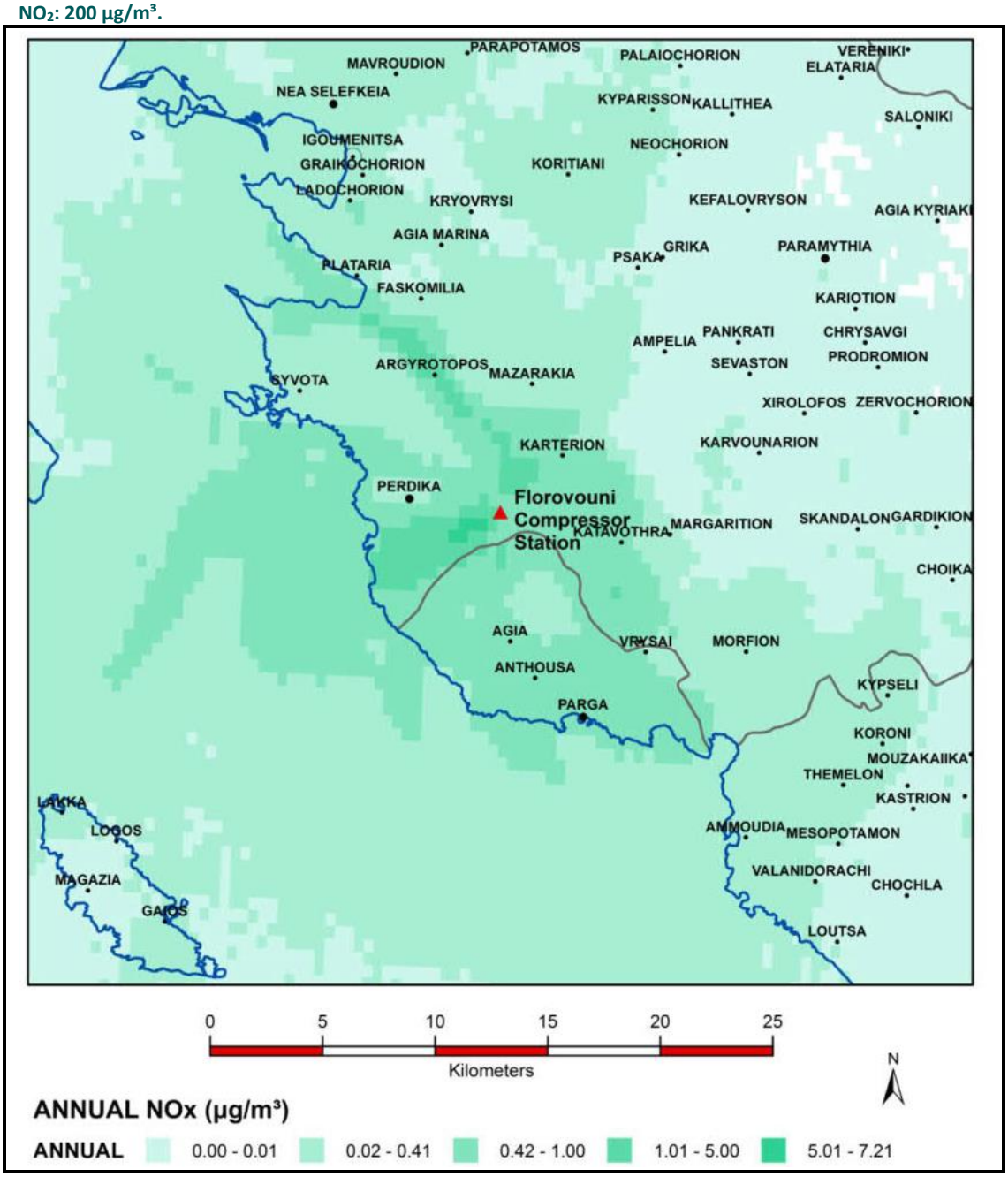
The following figures are also informative.

Figure 7-1 Near surface maximum hourly average concentrations of NOx from FCS for the 11 CWT. Black dots indicative of residential areas. Air quality limit values for hourly concentration of NO_2: 200 μg/m³.



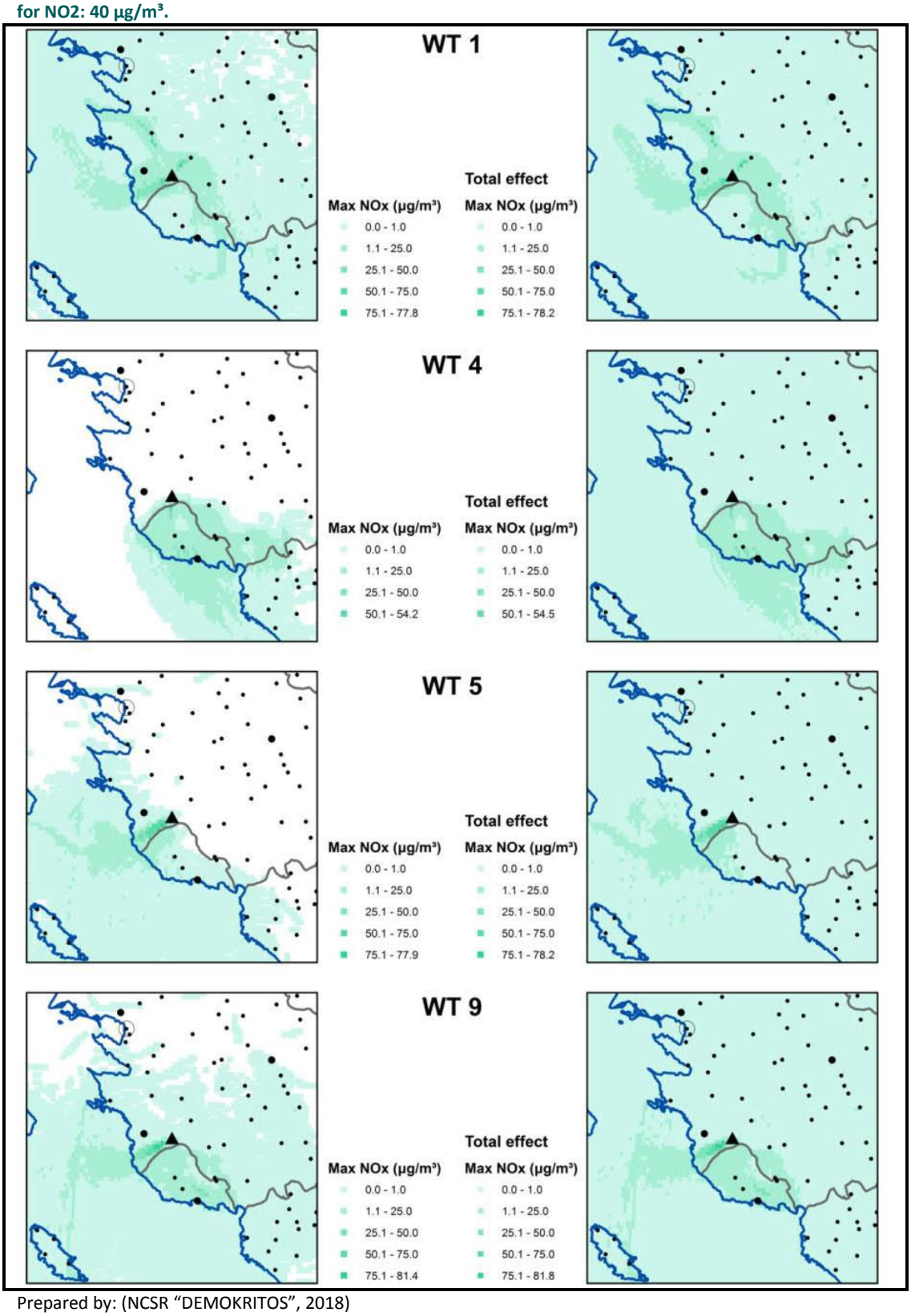
Prepared by: (NCSR "DEMOKRITOS", 2018)

Figure 7-2 Near surface total average annual NOx concentrations from FCS (in µg/m³). Annual Quality Limit for NO_2: 200 µg/m³.



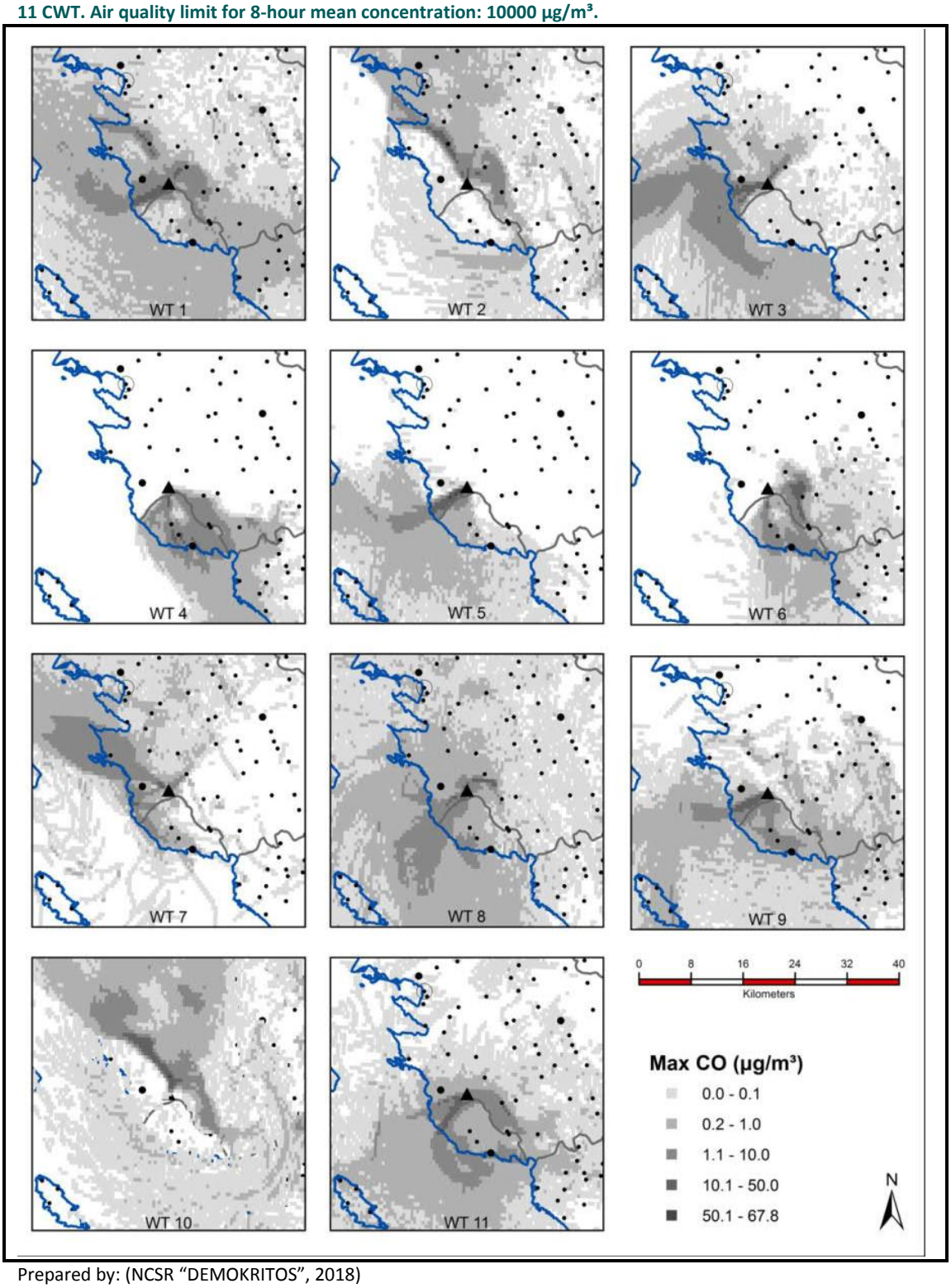
Prepared by: (NCSR "DEMOKRITOS", 2018)

Figure 7-3 Left: Near surface maximum hourly average concentrations of NOx from FCS for CWT 1, 4, 5, 9. Right: Combined effect of NOx emitted from FCS and background values measured in the area. Annual Air Quality Limit for NO2: 40 μg/m³.



Prepared by: (NCSR "DEMOKRITOS", 2018)

Figure 7-4 Near surface calculated 8-hour running mean concentration values of CO (in µg/m³) from FCS for the 11 CWT. Air quality limit for 8-hour mean concentration: 10000 µg/m³.



Prepared by: (NCSR "DEMOKRITOS", 2018)

7.3.3 Model Summary - Conclusions

The hourly mean and annual NO_x concentrations were calculated to be smaller than the air quality limits everywhere in the domain and during all the 11 CWTs. Maximum concentrations were found in close distances from the FCS and within a radius of less than 5 km. The CO concentrations were calculated to be negligible compared to the air quality legislative limit.

It must be emphasised also that no exceedances of the NO_2 and CO respective air quality limits were found over the populated settlements within a distance of 20 km due to the emissions from the Florovouni compressor station.

More particularly, the modelling results for SGT 700 Gas Turbines yielded the following:

- the maximum mean hourly NOx concentration was found to be equal to 74% of the air quality limit of 200 μg/m³ (during CWT 6) (see Figure 7-1).
- the maximum annual NOx concentration was found to be equal to 18% of the air quality limit of 40 μg/m³ (see Figure 7-2)
- the maximum 8-hour running mean CO concentration was found to be equal to 0.68% of the air quality limit of 10000 μg/m³ (during CWT5) (see Figure 7-4)

Regarding cumulative impacts, SGT 700 Gas Turbines with contribution of background concentrations included:

- the maximum mean hourly NOx concentration was found to be equal to 41% of the air quality limit of 200 μg/m³ (during CWT 9) (see Figure 7-3)

All model results are considering the worst case scenarios (including CWT and technical characteristics).

As such, it is assessed that no significant change to the environmental impacts, regarding air quality, of the original project are induced due to the proposed modifications. In fact, no significant variation of impacts to air quality is induced by the implementation of the project regardless of any past licensing. Hence, no additional mitigation measures are necessary – the ones presented in the initial ETA are adequate.

7.4 Noise

Impacts on noise during construction are considered identical to the ones already assessed during the initial EIA of the project. However, given the modification of the total (phase 2) capacity of C/S Florovouni, it was deemed appropriate to assess impacts from the facility during operation. In order to do that, a noise propagation model was run by EMA Acoustics Consultancy Company.

The acoustic study was implemented with the use of specialized software for the noise prediction and noise mapping, which is in accordance to the requirements of the directive 2002/49/EC. The software used is `IMMI 2017 Premium` of the German Company `Woelfel Meβsysteme GmbH`. The calculations of the noise propagation were conducted base on the international standard ISO 9613 (Acoustics -- Attenuation of sound during propagation outdoors) and in accordance to the ISO/TR 17534-3:2015 (Acoustics -- Software for the calculation of sound outdoors).

All the calculations correspond to the A-weighted equivalent sound level index (LA,eq measured in dB(A)).

The following sections presents a summary of the full report that can be found in Annex 11.3 - Noise Baseline Report and Propagation Model.

7.4.1 Model Set up

The input parameters are displayed in Table 7-5 with the respective assumptions. Based on this data, a 3-D model for the noise propagation was made (Figure 7-5), in order to produce a noise map of the area. The model was calibrated using the noise field measurements. The noise sources from the Compression Station are modeled as an area source which results to noise level not more than 65 dB(A) at the borders of the plant, as this is a requirement by the Law.

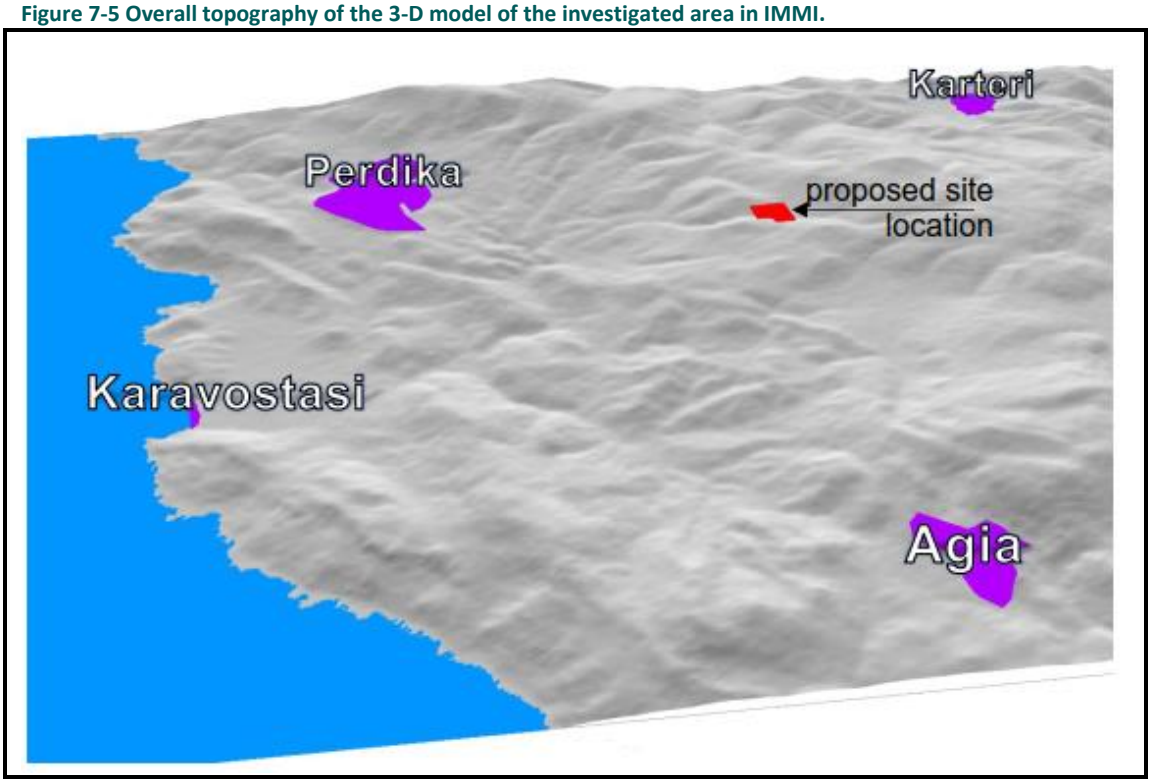
Table 7-5 Input data and assumptions for the sound dissipation 3D model.

No	INPUT DATA	ASSUMPTIONS - VALUES
1	Topography: Primary and secondary contour lines and altitude points	Contours in project area Rest of study area: from the SRTM (NASA) database X – Y coordinates of settlements: from satellite pictures (assumption)
2	Buildings - obstacles	No buildings or other objects were taken in consideration
3	Ground – Sound Absorption	Average ground and sea sound absorption A=0.5 (assumption)

No	INPUT DATA	ASSUMPTIONS - VALUES
4	Noise Sources – traffic noise	The traffic noise was not modeled as it is not part of the scope of works of the study
5	Noise Sources – sound level from plant	Area noise source inside the plan that was calibrated to give 65 Db (A) at the border of the plan
6	Noise Propagation – wind direction	Downwind propagation (worst case scenario)
7	Noise Propagation – meteorological conditions	Temperature 25^{0}C, Humidity 60%
8	Calculations – order of reflections	3
9	Control Criteria	A-weighted Leq

Prepared by: (Acoustics Consultancy Company, 2018)

Figure 7-5 Overall topography of the 3-D model of the investigated area in IMMI.



Prepared by: (Acoustics Consultancy Company, 2018)

7.4.2 Model Results

The resulting noise levels at the four settlements around Florovouni Compression Station are summarized in the table below (Table 7-6). It is evident that due to distance and terrain screening, the noise level is substantially lower than the values that were measured in these settlements during the measurement survey in January 2018. The

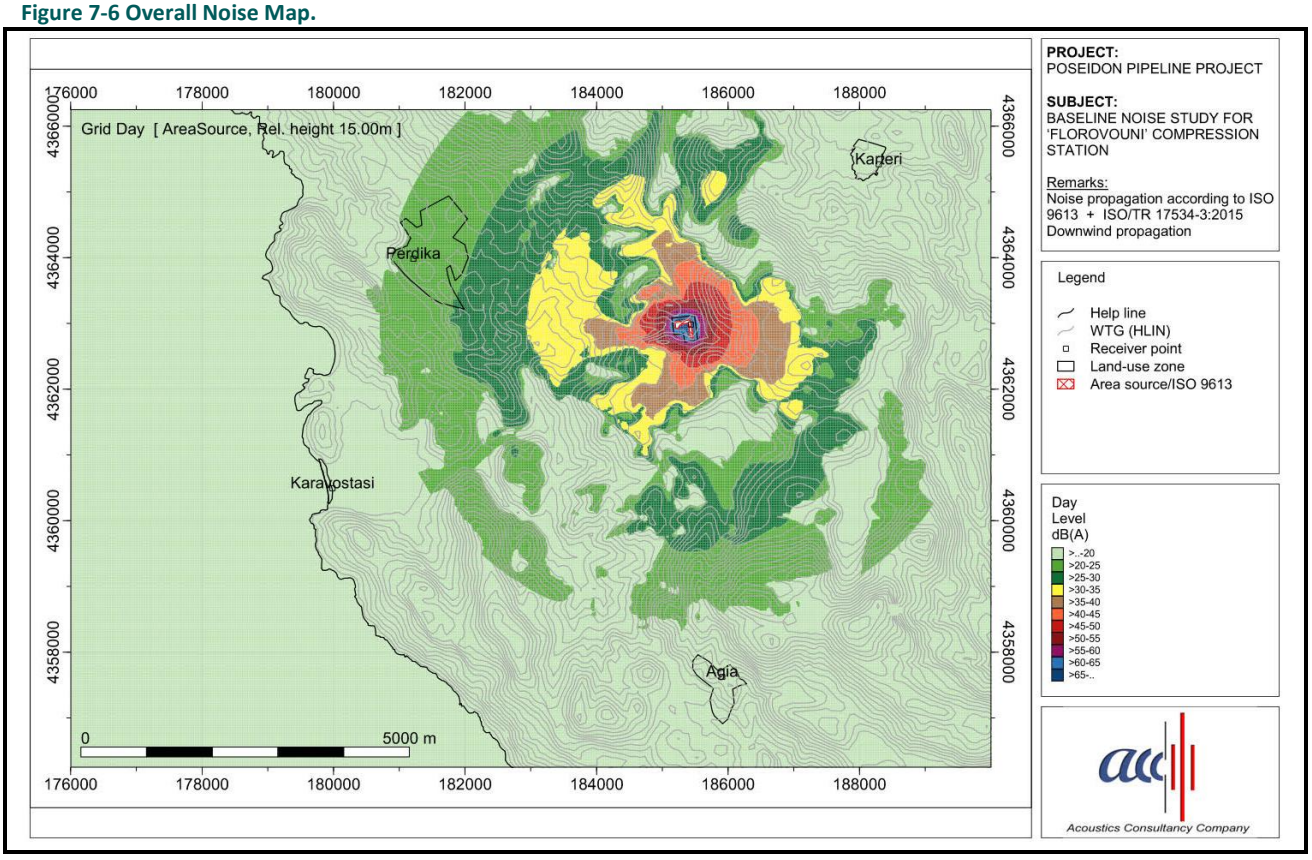
highest noise level is expected in Perdika settlement, at 22 dB(A), where Leq = 57,2 dB(A) for the average ambient noise level and 49,5 dB(A) during the night. Even with no traffic circulation (based on index L95%), the maximum noise level from the Compression Station is 4 dB lower.

Table 7-6 Measurements Table.

Position	Prediction with Station in operation	Baseline measurements		
	Leq	Lnight	Leq	L95
N_01 Karavostasi	14.2	44.0	49.8	39.3
N_02 Agia	-2.2	46.7	56.1	31.3
N_03 Perdika	22.4	49.5	57.2	26.6
N_04 Karteri	8.1	45.2	50.0	29.6
N_05 Site	65.0	30.2	29.3	21.4

Prepared by: (Acoustics Consultancy Company, 2018)

Figure 7-6 Overall Noise Map.

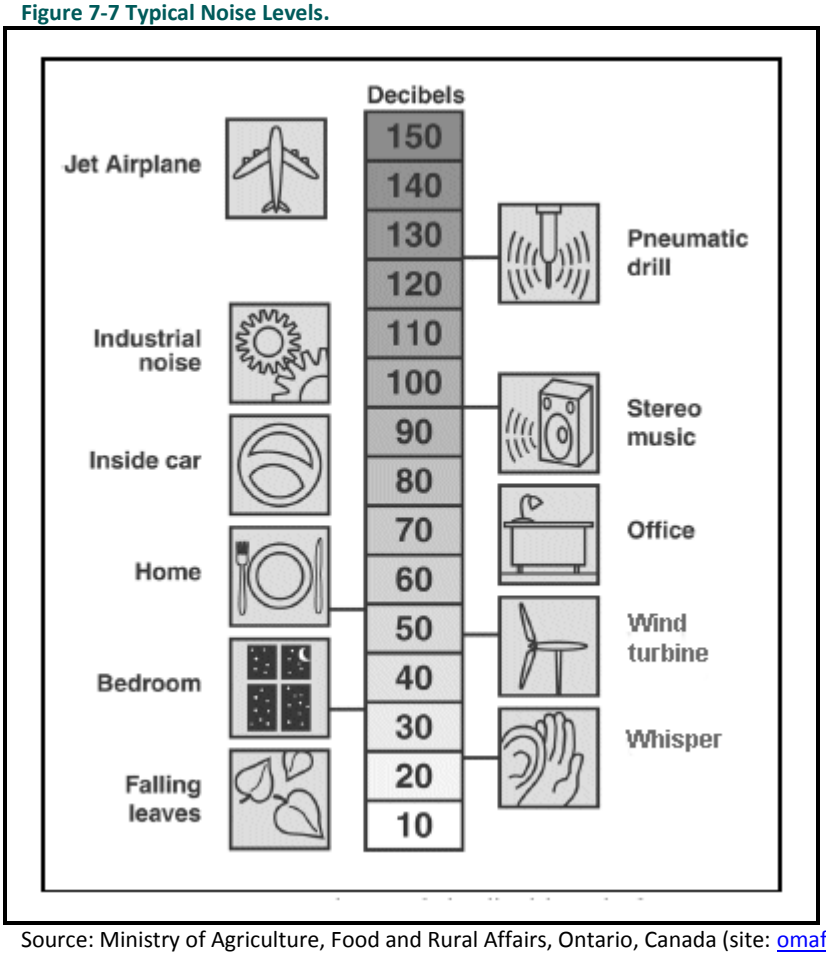


Prepared by: (Acoustics Consultancy Company, 2018)

7.4.3 Model Summary - Conclusions

According to sound dissipation calculations that were performed using a computer 3-D model of an area about 6km around the site, the noise impact during the operation of Florovouni Compression Station will be negligible for the settlements Karavostasi, Karteri, Agia and Perdika, assuming that all the necessary measures will be taken so that the Compression Station will comply with the limit of emitting noise levels no more than 65 dB(A) at the plant's border, which is implied by the Law. As illustrated in Figure 7-6, the noise level is assessed at 30 dB(A) maximum for the above mentioned settlements which according to Figure 7-7 corresponds to a noise level within a house, during night time. It is highlighted that noise level is decreased exponentially which could be translated that for every 10 dB(A) decrease, the sound is halved[8].

Figure 7-7 Typical Noise Levels.



Source: Ministry of Agriculture, Food and Rural Affairs, Ontario, Canada (site: omafra.gov.on.ca).

[8] Adopted by http://www.earinfo.com/how-to-read-a-hearing-aid-test/

As such, it is assessed that no significant change to the environmental impacts, regarding noise levels, of the original project are induced due to the proposed modifications. In fact, no variation of impacts to air quality is induced by the implementation of the project regardless of any past licensing.

A 65 dB(A) noise limit at the fence line of the Compressor Station should be reached, but no other additional mitigation measures are necessary; the previously mentioned limit and the ones presented in the initial ETA are adequate.

7.5 Landscape

Regarding landscape, based on the project design described in Section 3, impacts during construction are the same as the ones assessed in the approved EIA.

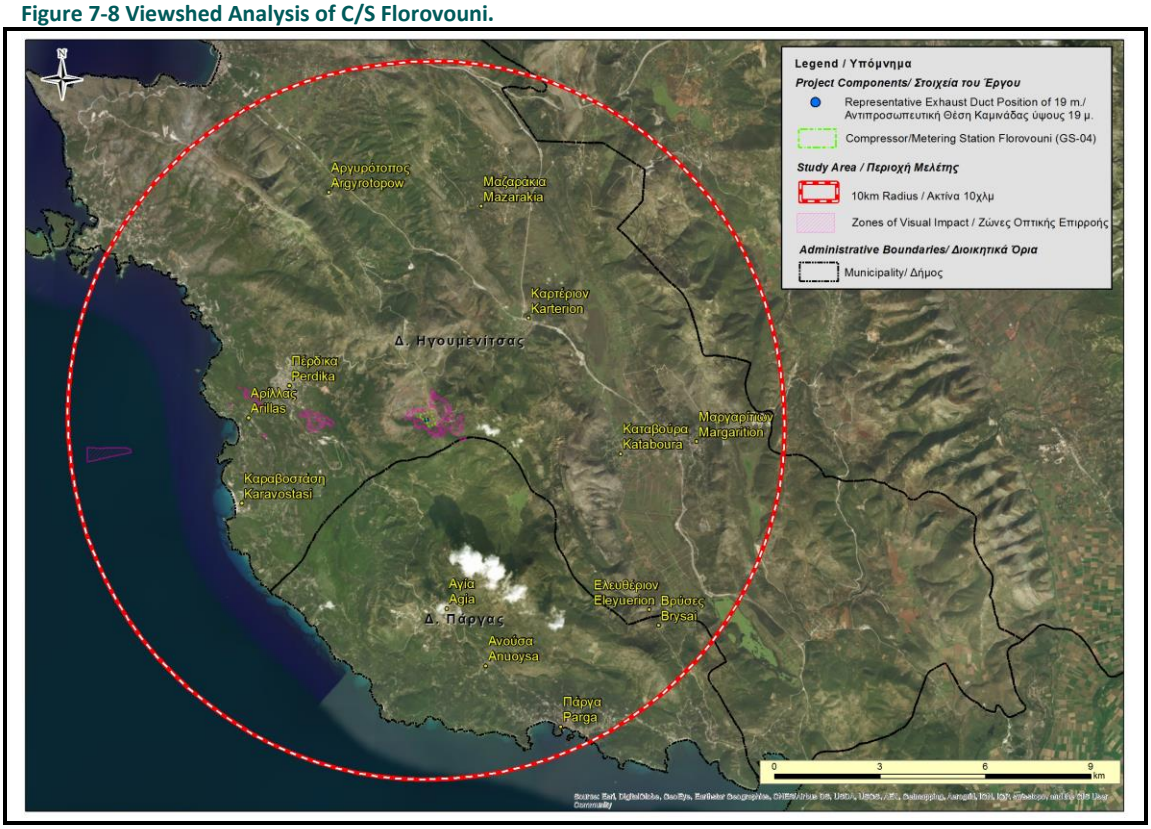
During operation phase, one could argue that due to the overall increase of the facility, the impact on the landscape, e.g. visual intrusion could be more significant.

In order to quantify C/S Florovouni landscape impact, the GIS-based method of viewshed analysis was used to determine the Zones of Visual Impact within a radius of 10km around the center of the onshore facility. During this analysis, a high resolution Digital Elevation Model of the area is correlated with a visible feature at a certain elevation, in order to perform spatial analysis. As a point feature, a representative exhaust stuck (being the most prominent modified structured feature of the facility) was selected. In order to provide a more representative feature, the stack was relocated at the centroid of the site. Based on the available data, the height of the stuck is 19 m.

The viewshed analysis indicates the areas that can view a specific feature; in our case the point feature of the representative exhaust stuck.

Figure 7-8 presents the viewshed analysis performed for C/S Florovouni. Section 10.1.5, as well.

Figure 7-8 Viewshed Analysis of C/S Florovouni.



Prepared by: (ASPROFOS, 2018).

The EIA team identified the following sensitive receptors in the area with potential visual intrusion induced by the C/S Florovouni:

1. Perdika as the closest local community, and
2. Karavostasi, as tourist venue

It was assessed that no other receptors should be considered as sensitive ones because of the overall morphology of the broader area. In more details, the location of C/S Florovouni was selected in such an area as to minimize visibility from surrounding settlements and other receptors; its visibility is restricted by the hilly characteristics of the surrounding area.

The results can be also summarized in Table 7-7.

Table 7-7 Viewshed analysis results – Areas with visibility of the C/S Florovouni.

Areas with view of the C/S Florovouni	Total Coverage of Affected Areas (m²)	Total Investigated Area (m²)	%
5	1459127.97	327873198.90	0.44

Prepared by: (ASPROFOS, 2018).

As illustrated in Figure 7-8 (and Section 10.1.5) and summarized in Table 7-7, the C/S Florovouni will be barely visible from any point within the study area (less than 0.5%

of the study area). Specifically, no sensitive receptor shall have direct visual contact with the facility. Only outside of Perdika village, may the facility be visible. It needs to be stressed out that using a Digital Elevation Model no standing obstacles (e.g. trees, buildings, structures, etc.) are taken into consideration. This means that the resulting zones of visual impact represent a conservative approach. In reality, the visibility of the facility shall be further decreased through existing (and future) vegetation. Consequently, it is evident that the impact on the landscape and visual amenity of the area is insignificant.

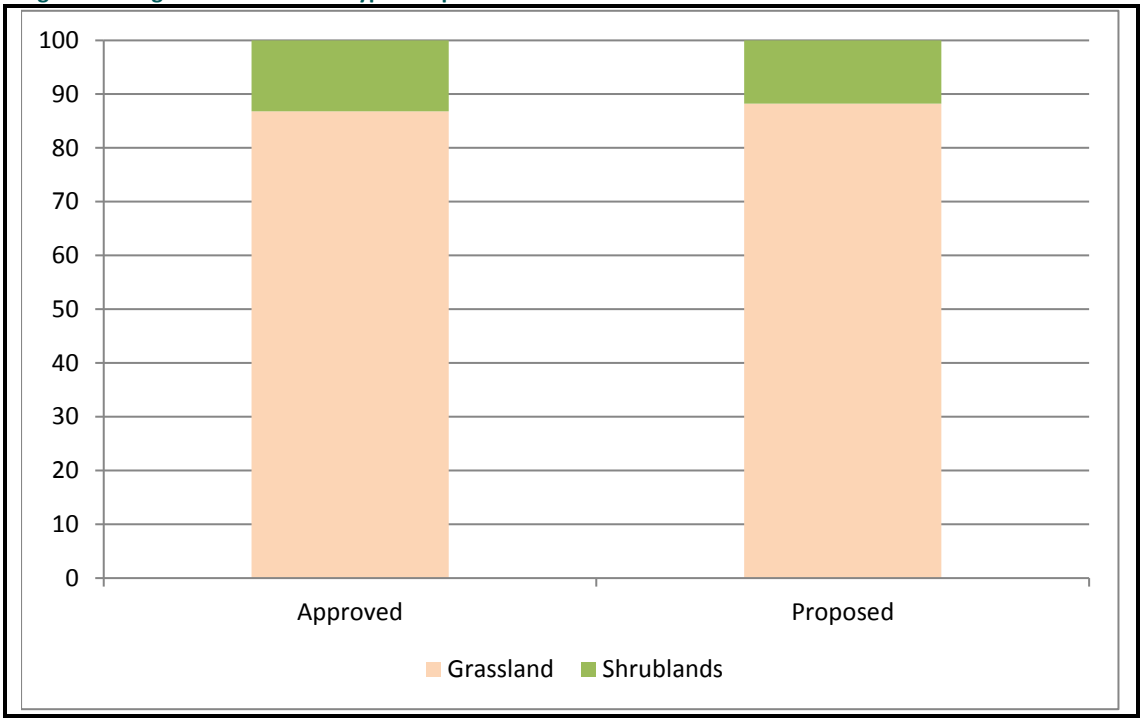
As such, it is assessed that no significant change to the environmental impacts, regarding landscape, of the original project are induced due to the proposed modifications. Hence, no additional mitigation measures are necessary – the ones presented in the initial ETA are adequate.

7.6 Natural Environment

Regarding natural environment, based on the project design described in Section 3, impacts during construction and operation phase regarding natural environment are not distinguished, given that the same land parcel shall be used for temporary construction site, whilst the rest of the temporary sites are not modified.

Based on the data presented in section 5.7, there is no difference in the vegetation's dominant type upon which the proposed land parcel shall be located but only in the total area covered (see Figure 7-10 and Figure 5-8).

Figure 7-9 Vegetation Dominant Type comparison.



Prepared by: (ASPROFOS, 2018).

The difference results in vegetation dominant type clearance absolute numbers is presented in Table 7-9.

Table 7-8 Vegetation Cover Difference between Approved and Proposed C/S Florovouni Footprint.

	Difference (Proposed – Approved)	
Description	**m²**	**%**
Grasslands	11073.59	14.51
Shrublands	-1464.21	-12.62

Prepared by: (ASPROFOS, 2018).

Grasslands and shrublands are very common in the study area and also in the broader area, not to mention quite typical dominant vegetation type for the entire Greece. As such, the increased surface maybe noteworthy in absolute numbers but does not constitute substantial modification to the environmental impacts induced by the original project.

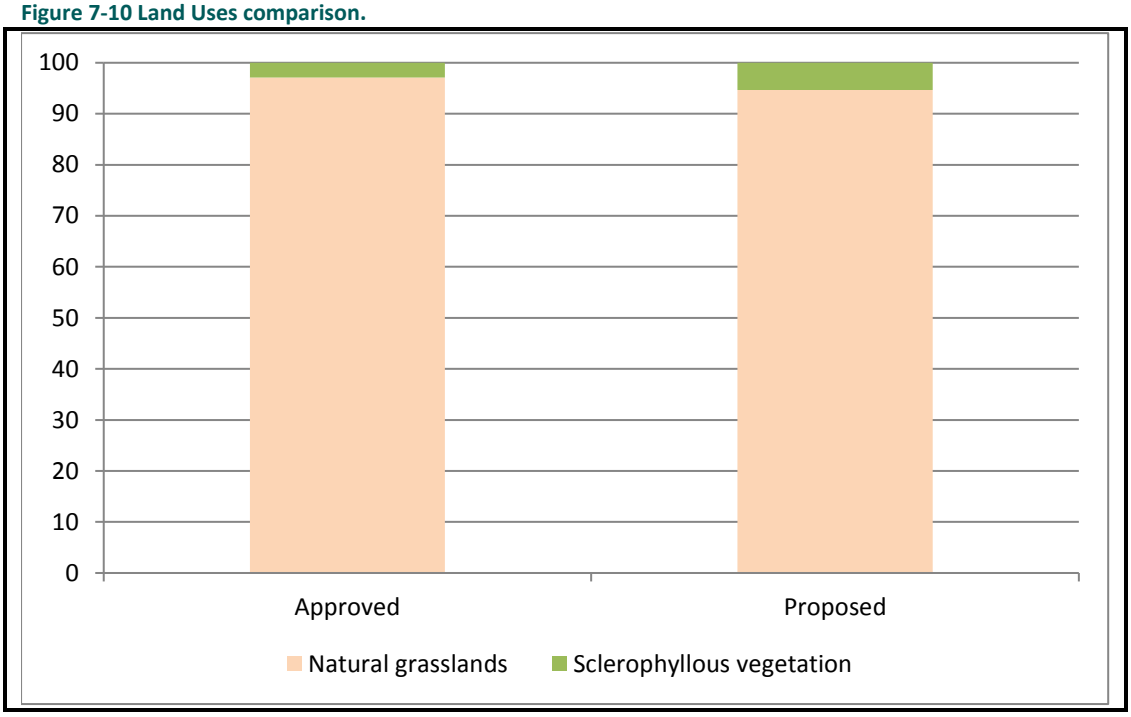
As such, it is assessed that no significant change to the environmental impacts, regarding natural environment, of the original project are induced due to the proposed modifications. Hence, no additional mitigation measures are necessary – the ones presented in the initial ETA are adequate.

7.7 Land Uses

Regarding land uses, based on the project design described in Section 3, impacts during construction and operation phase regarding land uses are not distinguished, given that the same land parcel shall be used for temporary construction site, whilst the rest of the temporary sites are not modified.

Based on the data presented in section 5.8, there is no difference in the land use type but only in the total area covered (see Figure 7-10 and Figure 5-8).

Figure 7-10 Land Uses comparison.



Prepared by: (ASPROFOS, 2018).

The difference results in land use occupation absolute numbers is presented in Table 7-9.

Table 7-9 Land Cover Difference between Approved and Proposed C/S Florovouni Footprint.

		Difference (Proposed – Approved)	
CLC Code	**Description**	**m²**	**%**
321	Natural grasslands	9654.25	11.31
323	Sclerophyllous vegetation	-44.86	-1.75

Prepared by: (ASPROFOS, 2018).

Natural grasslands and sclerophyllous vegetation are very widespread in the study area and also in the broader area, not to mention quite typical land cover for the entire Greece. As such, the increased surface maybe noteworthy in absolute numbers but

does not constitute substantial modification to the environmental impacts induced by the original project.

As such, it is assessed that no significant change to the environmental impacts, regarding land uses, of the original project are induced due to the proposed modifications. Hence, no additional mitigation measures are necessary – the ones presented in the initial ETA are adequate.

8 CODIFICATION OF RESULTS AND SUGGESTIONS FOR ENVIRONMENTAL TERMS APPROVAL AMENDMENT

This section codifies the results and the suggestions of the present study presenting a draft of the suggested Amendment of the approved ETA.

It goes without saying that the presented codification aims at assisting the public disclosure of the environmental permitting procedure and the work of the competent authority. The competent authority reserves the right to change and/ or discard the presented codification.

The amendment of ETA 145493/21.01.2015 is suggested as follows:

Section 1.1 "General Project Components", is replaced by the following:

The project concerns the construction and operation of the Greek section of the Greek-Italian submarine High Pressure Natural Gas Interconnector and its accompanying facilities.

The offshore pipeline, in his total (in Greece and Italy) includes the offshore section of approximately 205 km, in total, a Compressor Station in Greece, a Metering Station in Italy as well as two onshore sections connecting the Compressor Station on Epirus' coasts in Greece and the Metering Station on Otranto's coasts in Italy, in Apulia region. The Offshore PPP is part of the overall PPP project which stretches from Kipoi, in the area of Greek-Turkish border, to Otranto.

The diameter of the pipeline shall be 36" (91,44 cm) and maximum operating pressure shall be 151 barg (maximum design pressure at 170 barg). The project shall have initial capacity of twelve billion cubic meters of natural gas per year (12 BSCM/y), with the potential of increasing this capacity to twenty billion cubic meters of natural gas per year (20 BSCM/y).

Paragraph 1.2 "Description of pipeline and associated facilities" is replaced by the following:

The Greek section of the Offshore PPP includes the following sections:

a) The offshore section from the landfall site OMPRELLA 2, at the shores of R.U. Thesprotia, till the middle of the sea straight between Greece and Italy, of approximately 146 km in length and 36" in diameter.

b) The Compressor Station at Florovouni occupying a total area of 97532 m².

The Compressor Station shall include:

- For the first and initial operation phase (12 BSCM/y), the establishment of 4 (+1 back up) – four operating and one back up - Compressor Trains, each one of 27 - 32 MW capacity.
- For the second and final operation phase (20 BSCM/y), the establishment of 7 (+1 back up) – seven operating and one back up – Compressor Trains, each one of 27 - 32 MW capacity

The Compressor Station area shall host all necessary associated facilities for the operation of the pipeline (pigging station, operation and maintenance station).

c) The onshore section of the pipeline from the Compressor Station at Florovouni till the landfall site, of approximately 8.2 km in length and 36" in diameter.

d) A Block Valve station, at approximately 600 m upstream of the landfall site.

Paragraph 1.4 is replaced by the following:

The design of the project is described in section 5 of the initially submitted EIA documentation (Ref. No EYPE 198779/05.06.12 and 201697/11.09.12) and section 3 of the ETA Amendment Application File (Ref. No. DIPA XXXXXXX/XX.XX.2018).

All other terms and conditions of the original ETA (Ref. No. EYPE 145493/21.01.2015) are applicable.

9 CONCLUSIONS

The EIA of the Offshore PPP in Greece was submitted to the Ministry of Environment, Energy and Climate Change (MEECC) in June 2012 and the project was granted an Environmental Terms Approval (Ref. No. 145493/21-01-2015) in 2015.

Some changes have taken place to the project design of the Offshore PPP since the submission of the EIA. Table 9-1 summarizes the amendments to the approved Offshore PPP EIA applied for approval through the present report following the provisions of JMD 170225/2014, Annex 5.

Table 9-1 Modifications between Approved and Suggested Offshore PPP's design.

Offshore PPP Compoment	Item	Approved	Suggested Amendment
Offshore PPP	Initial Capacity	9 BSCM/y	12 BSCM/y
Offshore PPP	Final Capacity	12 BSCM/y	20 BSCM/y
Offshore PPP	Maximum Design Pressure	160 barg	170 barg
Offshore PPP	Maximum Operating Pressure	140 barg	151 barg
C/S Florovouni	Total Area	87210 m² (1)	97532 m² (1)
C/S Florovouni	Number of Compressors (Initial Phase)	3 (+1 back up)	4 (+1 back up)
C/S Florovouni	Number of Compressors (Final Phase)	4 (+1 back up)	7 (+1 back up)
C/S Florovouni	Capacity of each Compressor	30 - 32 MW	27 - 32 MW
CS Florovouni	Metering facilities	Yes	No
Onshore Section	Pipeline diameter	32"	36"
Onshore Section	Pipeline length	8.2 km	8.2 km
Offshore Section	Pipeline diameter	32"	36"
Offshore Section	Pipeline length	146 km	146 km

Notes
(1) The area refers only to the fenced site of the facility. The area of the ring road and buffer zone are not included, since their characteristics are not modified in comparison to the ones presented in the approved EIA.

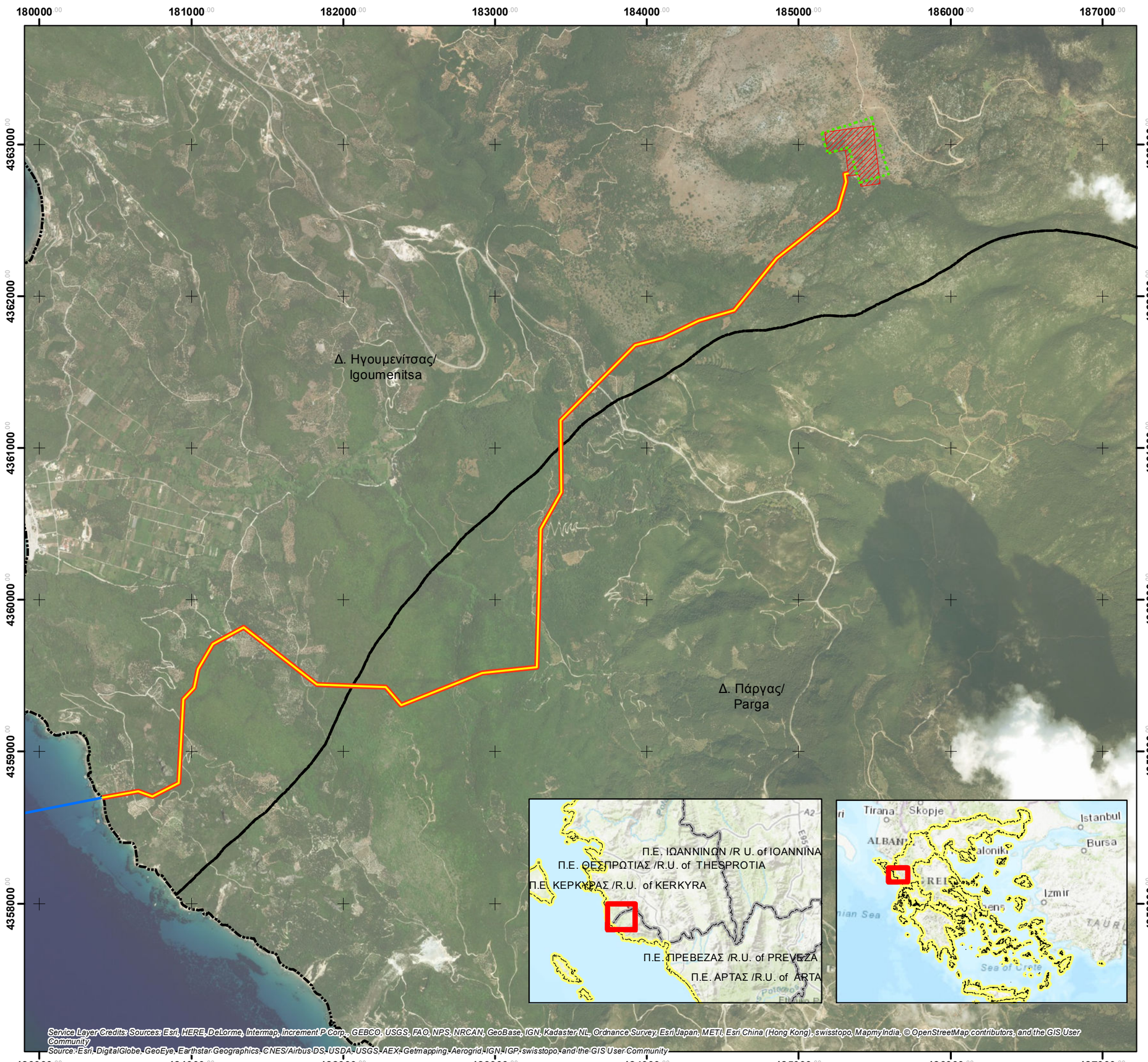
Prepared by: (ASPROFOS, 2018)

The present EIA Amendment based on quantified assessment of the main environmental parameters that could be impacted or have been highlighted during initial EIA procedure assesses **that no significant changes to the environmental impacts of the original project are induced due to the proposed modifications.**

10 MAPS AND DRAWINGS

10.1 Maps

10.1.1 Modifications Map



LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components/ Στοιχεία του Έργου

- Approved Onshore Route/Εγκεκριμένη Χερσαία Όδευση (ΕΤΑ/ΑΕΠΟ 145493-21.01.2015)
- Approved Offshore Route/Εγκεριμένη Υποθαλάσσια Όδευση
- Amended Route/Τροποποιημένη Όδευση
- Approved Boundary (ETA Ref.145493_21.01.2015)/ Εγκεκριμένο Όριο (ΑΕΠΟ: 145493_21.01.2015)
- Proposed Modification/ Προτεινόμενη Τροποποίηση

Administrative Boundaries/ Διοικητικά Όρια

- Decentralized Administration/ Αποκεντρωμένη Διοίκηση
- Regional Unit/ Περιφερειακή Ενότητα
- Municipality/ Δήμος

Geodetic Parameters & Scale Bar/ Γεωδαιτικές Παράμετροι & Κλίμακα

N

0 0.2 0.4 0.6 km

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 24.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

Rev. Αναθ	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
00	2018-02-21	ISSUED FOR REVIEW	GIE	HOD	HOD

COMPANY / ΕΤΑΙΡΕΙΑ

IGI Poseidon

Contract No:
Αρ. Συμβολαίου:

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Αντικαταστάθηκε από:

Αντικαθιστά το:
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PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

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Οριστική Μελέτη & Αδειοδότηση

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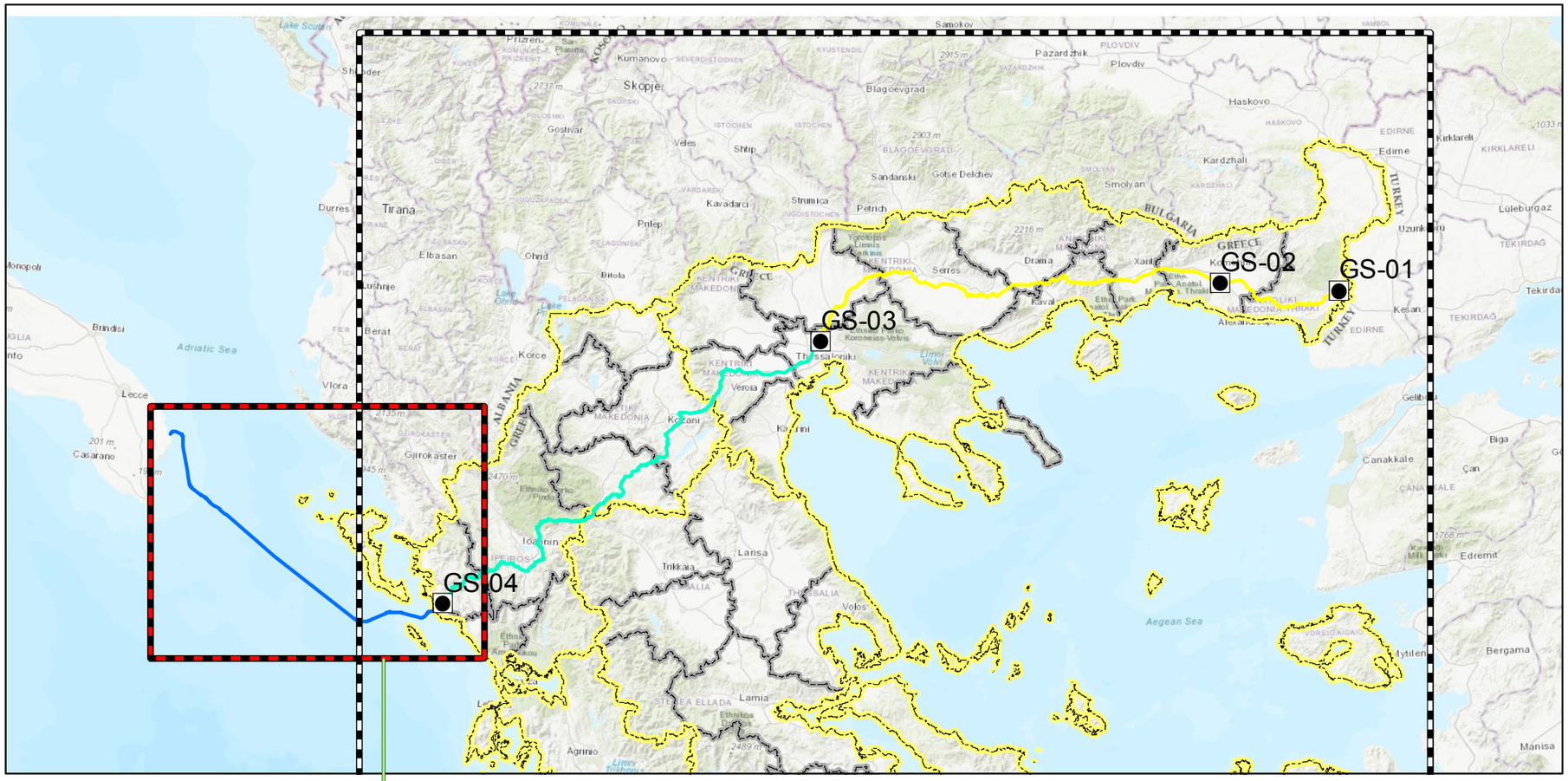
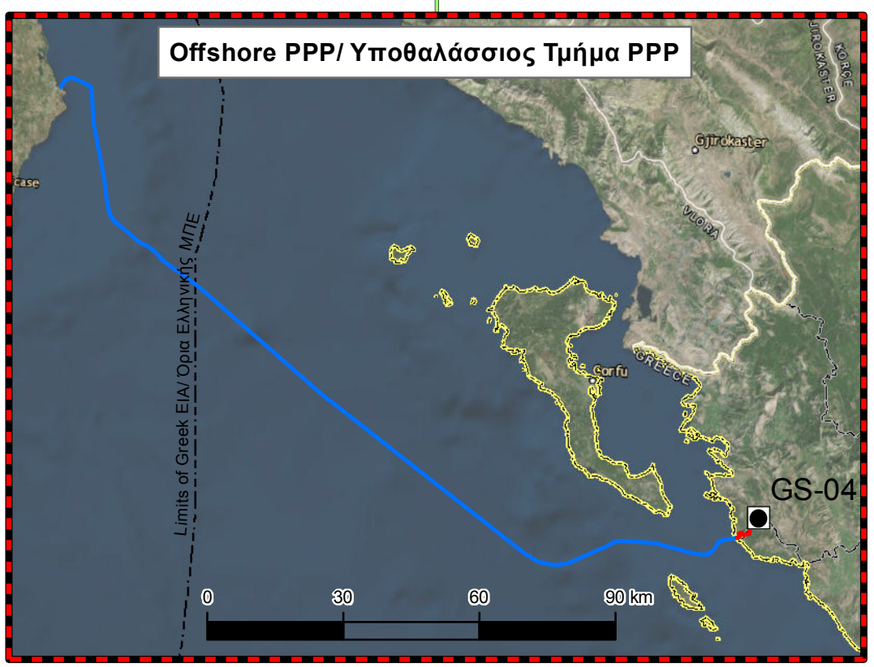
Modifications Map/Χάρτης Προτεινόμενων Τροποποιήσεων

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ
1:25,000	**P581-000-ST-ENV-05/ Section 10.1.1**	00

Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας	Engineer's DWG No/ Αρ. Σχ. Μελετητή:	Sheet/ Φύλλο
A3	-	AUT-11726200-STU-006/ Section 10.1.5	of

10.1.2 PPP Overview Map





LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components/ Στοιχεία του Έργου

- Onshore Stations/ Χερσαίοι Σταθμοί
- Onshore PPP - East Section/ Χερσαίος PPP - Ανατολικό Τμήμα
- Onshore PPP - West Section/ Χερσαίος PPP - ΔυτικόΤμήμα
- Offshore PPP - Onshore Section/ Υποθαλάσσιος PPP - Χερσαίο Τμήμα
- Offshore PPP - Offshore Section/ Υποθαλάσσιος PPP - Υποθαλάσσιο Τμήμα

Administrative Boundaries/ Διοικητικά Όρια

- Decentralized Administration/ Αποκεντρωμένη Διοίκηση
- Regional Unit/ Περιφερειακή Ενότητα
- Municipality/ Δήμος

Geodetic Parameters & Scale Bar/ Γεωδαιτικές Παράμετροι & Κλίμακα

N

0 25 50 75 km

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 24.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

Rev. Αναθ	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
00	2018-02-21	ISSUED FOR REVIEW	HOD	GIE	HOD

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Supersedes the:

ENGINEER/ ΜΕΛΕΤΗΤΗΣ

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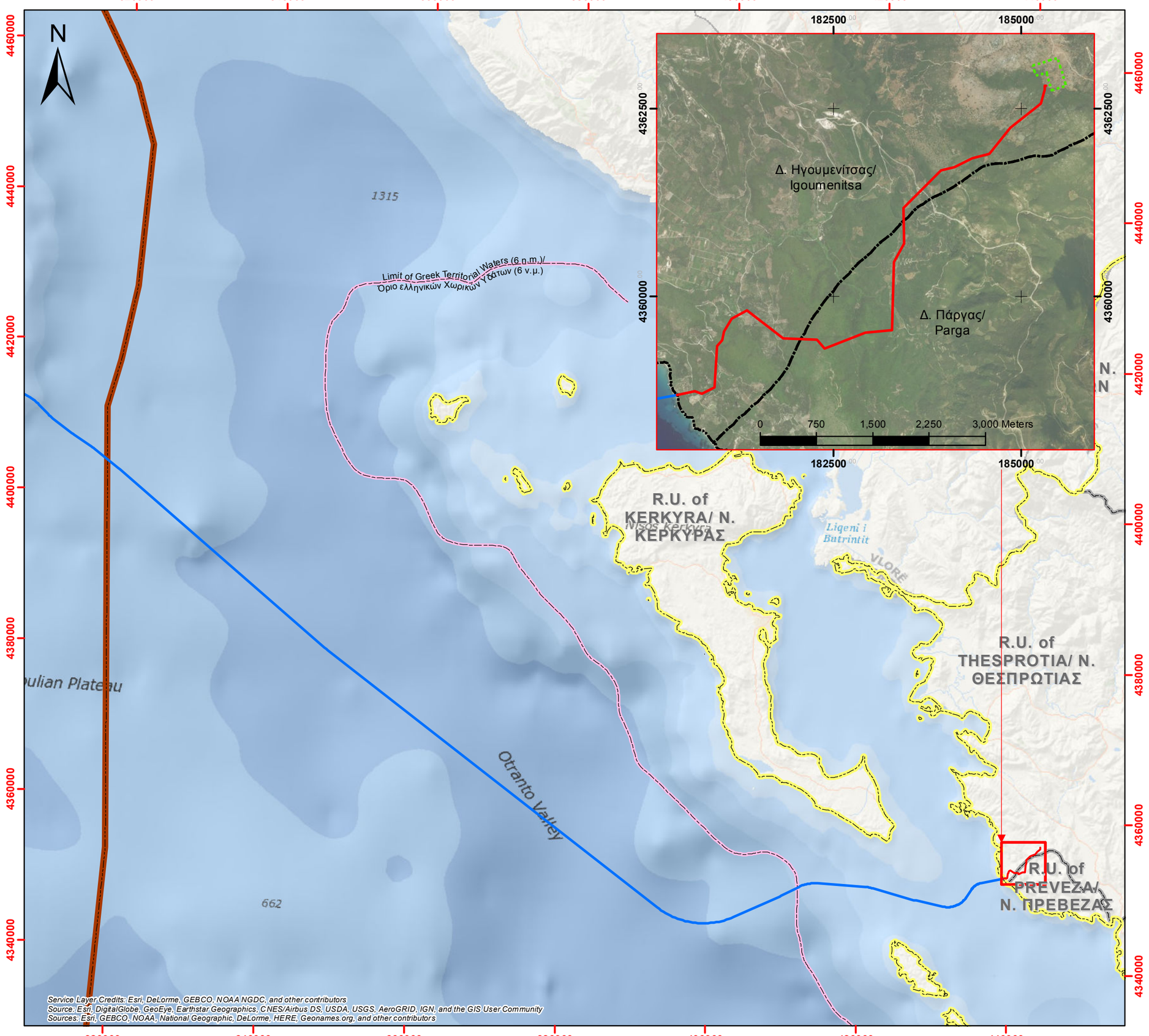
PPP Overview Map/Εποπτικός Χάρτης Έργου PPP

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:		Rev/ Αναθ
13,000,000	**P581-000-ST-ENV-05/ Section 10.1.2**		00
Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας	Engineer's DWG No/ Αρ. Σχ. Μελετητή:	Sheet/ Φύλλο
A3	-	AUT-11726200-STU-006/ Section 10.1.5	of

10.1.3 Offshore PPP Amendment Overview Map



LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components/ Στοιχεία του Έργου

- Approved Offshore Route/Εγκεριμένη Υποθαλάσσια Όδευση (ΕΤΑ/ΑΕΠΟ 145493-21.01.2015)
- Approved Onshore Route/ Εγκεκριμένη Χερσαία Όδευση (ΕΤΑ/ΑΕΠΟ 145493-21.01.2015)
- Proposed Modification/ Προτεινόμενη Τροποποίηση

Administrative Boundaries/ Διοικητικά Όρια

- Limits of 2012 EIA/ Όρια ΜΠΕ 2012
- Limit of Greek Territorial Waters (6 n.m.)/ Όριο Ελληνικών Χωρικών Υδάτων (6 ν.μ)
- Decentralized Administration/ Αποκεντρωμένη Διοίκηση
- Regional Unit/ Περιφερειακή Ενότητα
- Municipality/ Δήμος

Geodetic Parameters & Scale Bar/ Γεωδαιτικές Παράμετροι & Κλίμακα

Coordinate System: WGS 1984 UTM Zone 34N	Coordinate System: Greek Grid
Projection: Transverse Mercator	Projection: Transverse Mercator
Datum: WGS 1984	Datum: GGRS 1987
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False Northing: 0.0000	False Northing: 0.0000
Central Meridian: 21.0000	Central Meridian: 24.0000
Scale Factor: 0.9996	Scale Factor: 0.9996
Latitude Of Origin: 0.0000	Latitude Of Origin: 0.0000
Units: Meter	Units: Meter

0 4.5 9 13.5 km

Rev. Αναθ	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
00	2018-02-21	ISSUED FOR REVIEW	GIE	HOD	VAT

COMPANY / ΕΤΑΙΡΕΙΑ

IGI Poseidon

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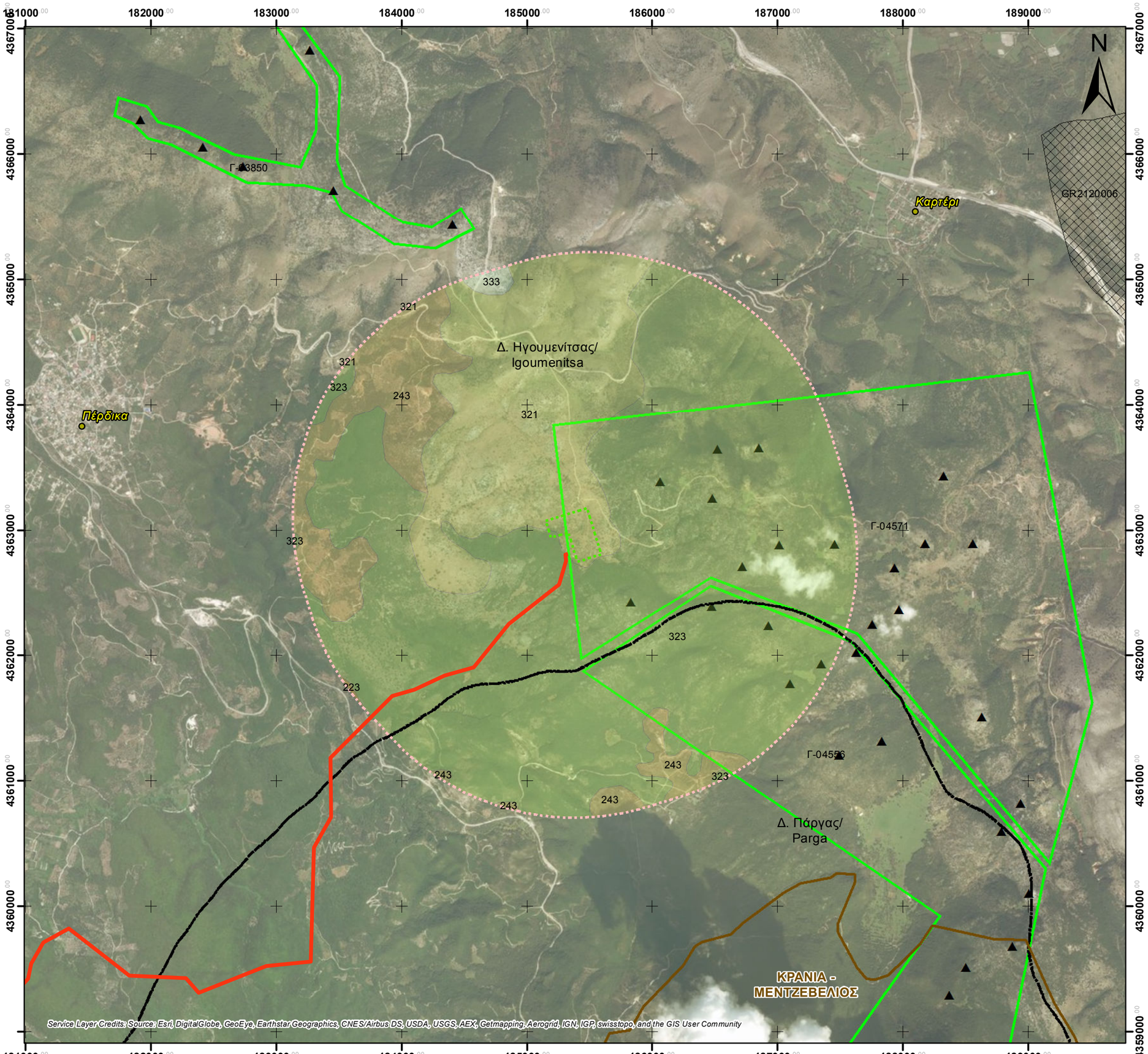
Offshore PPP Amendment Overview Map/
Εποπτικός Χάρτης Τροποποιημένου Έργου

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ
1:500,000	**P581-000-ST-ENV-05/ Section 10.1.3**	00

Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας	Engineer's DWG No/ Αρ. Σχ. Μελετητή:	Sheet/ Φύλλο
A3	-	AUT-11726200-STU-006/ Section 10.1.5	of

10.1.4 Baseline Data Map



LEGEND/ ΥΠΟΜΝΗΜΑ

Project Components/ Στοιχεία του Έργου

- Amended Route/Τροποποιημένη Όδευση
- Proposed Modification/ Προτεινόμενη Τροποποίηση

Study Area/ Περιοχή Μελέτης

- Radius/ Ακτίνα 2000m

Administrative Boundaries/ Διοικητικά Όρια

- Decentralized Administration/ Αποκεντρωμένη Διοίκηση
- Regional Unit/ Περιφερειακή Ενότητα
- Municipality/ Δήμος

Land Cover/ Κάλυψη (Χρήσεις) Γης

- 223 - Olive groves/ Ελαιώνες
- 243 - Land principally occupied by agriculture, with significant areas of natural vegetation/ Γη που καλύπτεται κυρίως από γεωργία με σημαντικές εκτάσεις φυσικής βλάστησης
- 321 - Natural grasslands/ Φυσικοί βοσκότοποι
- 323 - Sclerophyllous vegetation/ Σκληροφυλλική βλάστηση
- 333 - Sparsely vegetated areas/ Εκτάσεις με αραιή βλάστηση

Proposed RES Developments/ Προτεινόμενα Έργα ΑΠΕ

- Wind Turbines/ Ανεμογεννήτριες
- Wind Farm/ Αιολικά Πάρκα

Environmental Protected Areas/Περιβαλλοντικά Προστατευόμενες Περιοχές

- Wildlife Refuge/ Καταφύγια Άγριας Ζωής
- Natura 2000 SPA/ Περιοχή Natura 2000 ΖΕΠ

Geodetic Parameters & Scale Bar/Γεωδαιτικές Παράμετροι & Κλίμακα

N

0 0.4 0.8 1.2 km

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 24.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

Rev. Αναθ	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
00	2018-02-21	ISSUED FOR REVIEW	GIE	HOD	HOD

COMPANY / ΕΤΑΙΡΕΙΑ

IGI Poseidon

Contract No:
Αρ. Συμβολαίου:

Superseded by:
Αντικαταστάθηκε από:

Αντικαθιστά το:
Supersedes the:

ENGINEER/ ΜΕΛΕΤΗΤΗΣ

CONSORTIUM-ΣΥΜΠΡΑΞΗ

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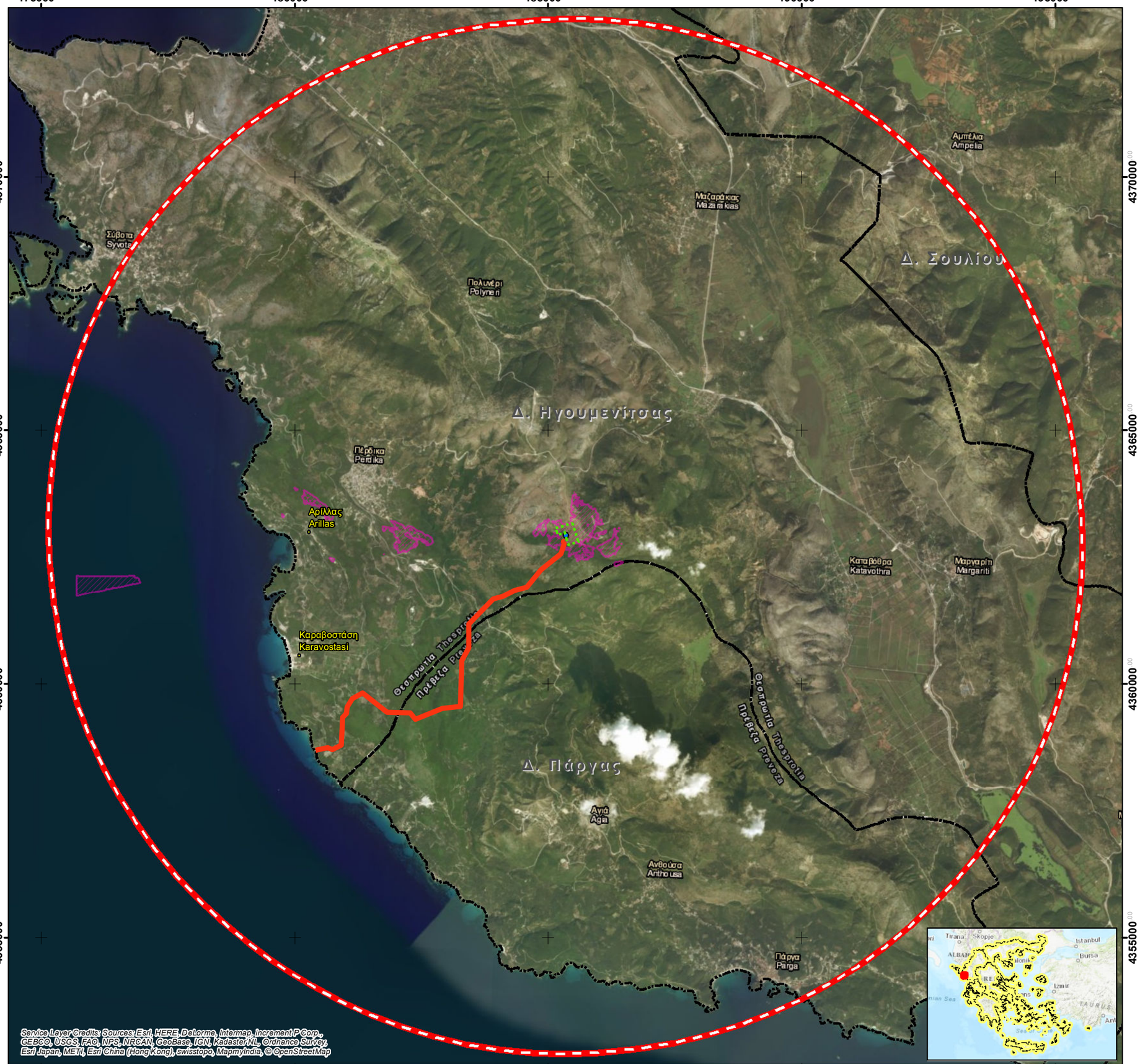
Baseline Data Map/
Χάρτης Δεδομένων Υφιστάμενης Κατάστασης

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:	Rev/ Αναθ
1:30,000	**P581-000-ST-ENV-05/ Section 10.1.4**	00

Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας	Engineer's DWG No/ Αρ. Σχ. Μελετητή:	Sheet/ Φύλλο
A3	-	AUT-11726200-STU-006/ Section 10.1.5	of

10.1.5 Zone of Visual Impact



Reference Documents/ Drawings
Σχετικά Έγγραφα / Σχέδια

DOCUMENT / DRAWING No ΑΡ. ΕΓΓΡΑΦΟΥ / ΣΧΕΔΙΟΥ	TITLE /ΤΙΤΛΟΣ

Legend / Υπόμνημα

Project Components/ Στοιχεία του Έργου

- Representative Exhaust Duct Position of 19 m./ Αντιπροσωπευτική Θέση Καμινάδας ύψους 19 μ.
- Compressor/Metering Station Florovouni (GS-04)

Study Area / Περιοχή Μελέτης

- 10km Radius / Ακτίνα 10χλμ
- Zone of Visual Impact / Ζώνη Οπτικής Επιρροής

Administrative Boundaries/ Διοικητικά Όρια

- Municipality/ Δήμος

Geodetic Parameters & Scale Bar/
Γεωδαιτικές Παράμετροι & Κλίμακα

N

0 1 2 3 km

Coordinate System: Greek Grid
Projection: Transverse Mercator
Datum: GGRS 1987
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 24.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

Rev. Αναθ	Date Ημερομ.	Description Περιγραφή	Drawn Σχεδίαση	Checked Έλεγχος	Approved Έγκριση
00	2018-02-21	ISSUED FOR REVIEW	GIE	HOD	VAT

COMPANY / ΕΤΑΙΡΕΙΑ

IGI Poseidon

Contract No:
Αρ. Συμβολαίου:

Superseded by:
Αντικαταστάθηκε από:

Αντικαθιστά το:
Supersedes the:

ENGINEER/ ΜΕΛΕΤΗΤΗΣ

CONSORTIUM-ΣΥΜΠΡΑΞΗ

C&M ENGINEERING S.A.

Asprofos engineering

PROJECT TITLE - ΤΙΤΛΟΣ ΕΡΓΟΥ

Poseidon Pipeline Project – Onshore Section
Frond End Engineering & Design and Permitting
Έργο Αγωγού Ποσειδών - Χερσαίο Τμήμα
Οριστική Μελέτη & Αδειοδότηση

DOCUMENT TITLE - ΤΙΤΛΟΣ ΕΓΓΡΑΦΟΥ

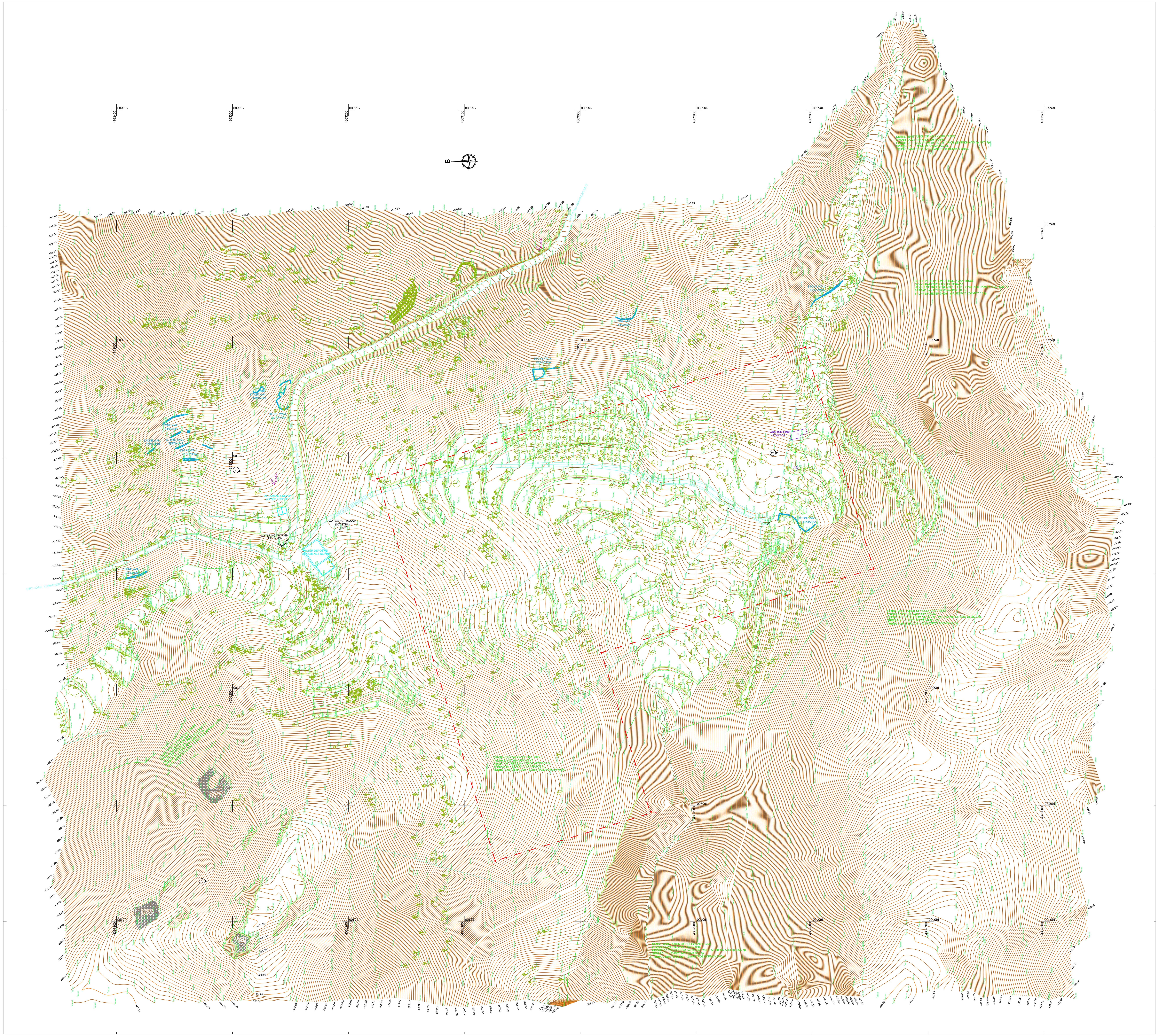
Application File for ETA Amendment of Greek Offshore Section of High Pressure Natural Gas Interconnector Greece Italy/
Φάκελος Τροποποίησης ΑΕΠΟ για το Ελληνικό Υποθαλλάσιο Τμήμα του Διασυνδετήριου Αγωγού Φυσικού Αερίου Ελλάδας - Ιταλίας.

Zone of Visual Impact/ Ζώνη Οπτικής Όχλησης

Scale/ Κλίμακα	Project DWG No./ Αρ. Σχ. Έργου:			Rev/ Αναθ
1:75,000	**P581-000-ST-ENV-05/ Section 10.1.5**			00
Size/ Μέγεθος	Company's DWG No/ Αρ. Σχ. Εταιρείας	Engineer's DWG No/ Αρ. Σχ. Μελετητή:		Sheet/ Φύλλο
A3	-	AUT-11726200-STU-006/ Section 10.1.5		of

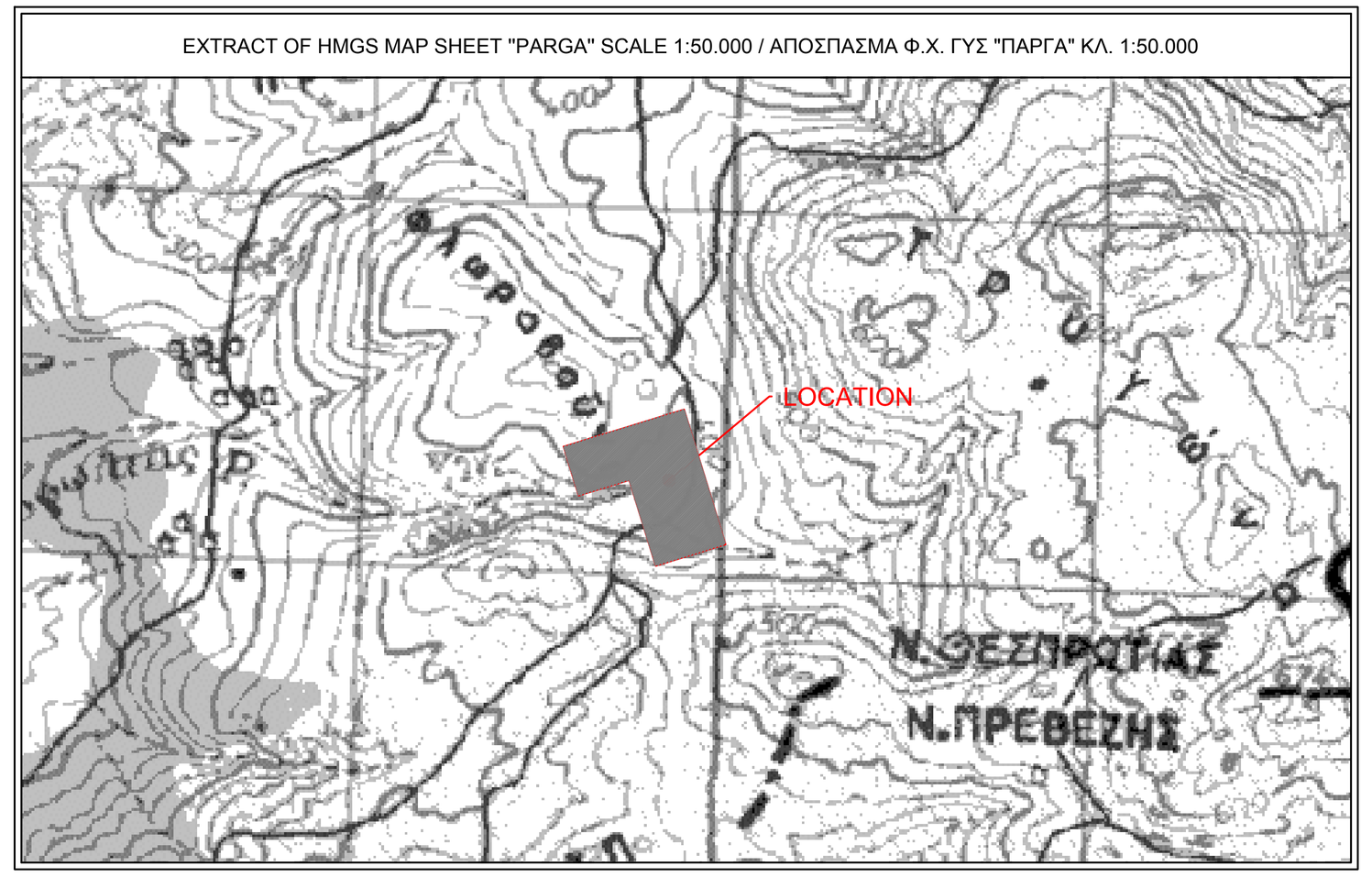
10.2 Drawings

10.2.1 C/S Florovouni Topographical Diagram

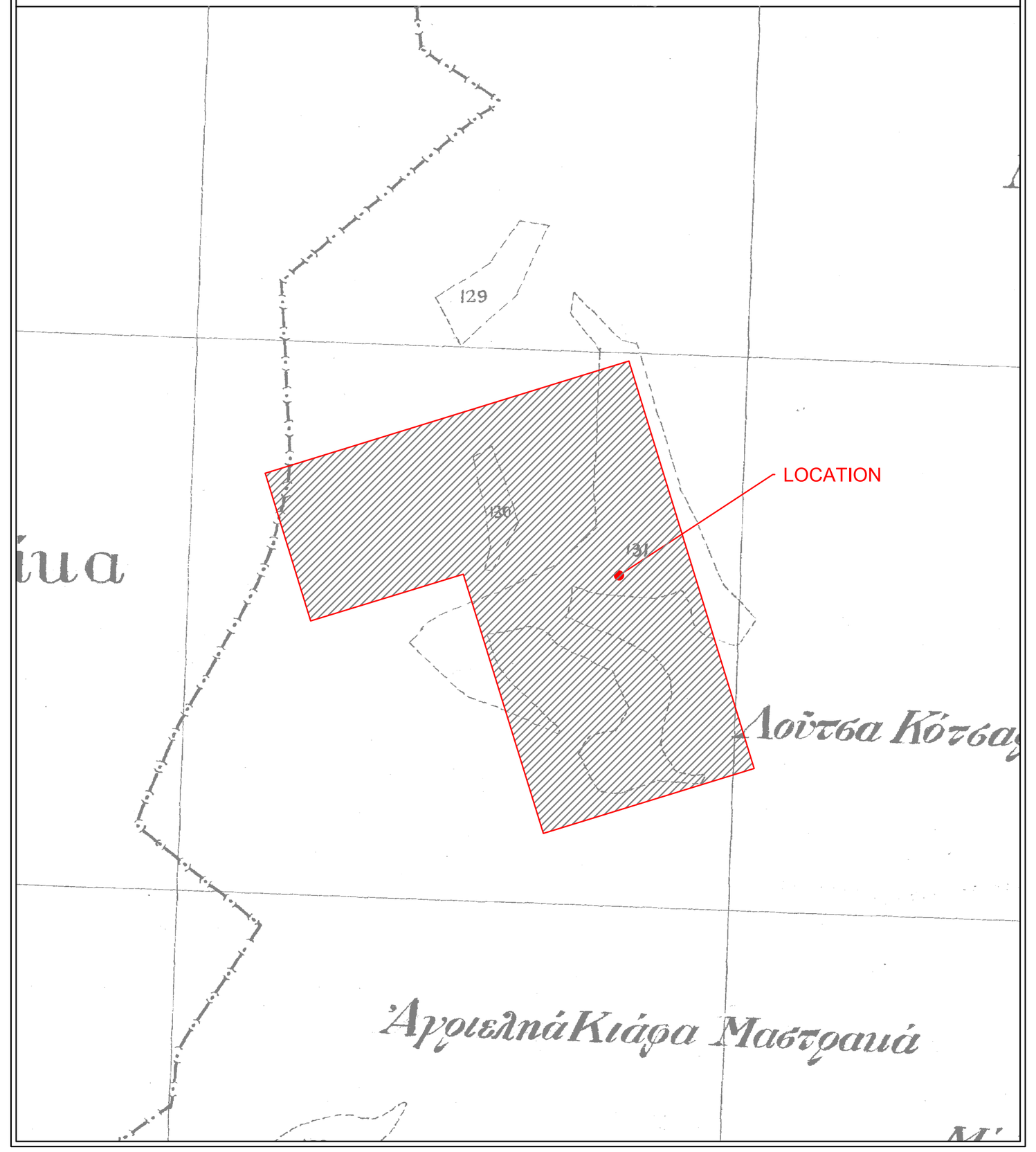


ORTHORECTIFIED MAP EXTRACT SCALE 1:5.000 / ΑΠΟΣΠΑΣΜΑ ΟΡΘΟΦΩΤΟΧΑΡΤΗ ΚΛ. 1:5.000

EXTRACT OF HMGS MAP SHEET "PARGA" SCALE 1:50.000 / ΑΠΟΣΠΑΣΜΑ Φ.Χ. ΓΥΣ "ΠΑΡΓΑ" ΚΛ. 1:50.000



EXTRACT OF MAP OF THE DISTRIBUTION OF THE YEAR 1961
ΑΠΟΣΠΑΣΜΑ Φ.Χ. ΔΙΑΝΟΜΗΣ ΤΟΥ ΕΤΟΥΣ 1961



POSITION OF PHOTOSHOOTING 1 - ΦΩΤΟΓΡΑΦΙΑ ΑΠΟ ΘΕΣΗ ΛΗΨΗΣ 1

POSITION OF PHOTOSHOOTING 2 - ΦΩΤΟΓΡΑΦΙΑ ΑΠΟ ΘΕΣΗ ΛΗΨΗΣ 2

POSITION OF PHOTOSHOOTING 3 - ΦΩΤΟΓΡΑΦΙΑ ΑΠΟ ΘΕΣΗ ΛΗΨΗΣ 3

LEGEND / ΥΠΟΜΝΗΜΑ

- Pylon of High Voltage Lines / Πυλώνας Γραμμών Υψ. Τάσης
- Pole Electricity / Στύλος ΔΕΗ
- Pole Telecommunication / Στύλος Τηλεπικοινωνιών
- Light Pole / Στύλος Φωτισμού
- Olive Tree / Ελιά
- Other Tree / Άλλο Δέντρο
- Conifers Tree / Κωνοφόρα
- Citrus Tree / Εσπεριδοειδή
- Oak / Δρύς
- Holly Oak / Πουρνάρι
- Almond Tree / Αμυγδαλιά - Αχλαδιά
- Bush / Θάμνος
- T1 438.287 — Triangulation Point / Τριγωνομετρικό Σημείο
- 210220112011 — Cadastral Number / Κτηματολογικός Αριθμός
- Property Boundaries / Ορια Ιδιοκτησιών
- Cultivate Areas Boundaries / Ορια Καλλιεργήσιμων Εκτάσεων
- Municipality - Community Boundaries / Ορια Δήμων - Κοινοτήτων
- Dirt Road / Χωματόδρομος
- Asphalt Road / Ασφάλτινη Οδός
- Railway Company Expropriation Limit / Σιδηροδρομική Γραμμή
- Building / Κτήριο
- Crest of Slope / Φρύδι Πρανούς
- Toe of Slope / Πόδας Πρανούς
- Barded Wire Fence / Συρματοπερίφραξη
- Rails Iron Fence / Κάγκελο - Περίφραξη
- Stone Wall / Ξερολιθιά
- High Voltage Transmission Lines / Γραμμές Μεταφοράς Υψηλής Τάσης
- Fiber Optic Cables / Καλώδια Οπτικών Ινών
- Water Pipeline / Δίκτυο Ύδρευσης
- Wind Park / Αιολικό Πάρκο
- Highway Expropriation Current Limit / Όριο Υφιστάμενης Απαλ/σης Αυτοκινητόδρομου
- PV Installation Area / Χώρος Εγκατάστασης Φωτοβολταικών
- Tank Boundary / Όριο Δεξαμενής
- Position of Photoshooting / Θέση Λήψης Φωτογραφίας

PROJECTION GGRS 87
ΠΡΟΒΟΛΗ ΕΓΣΑ 87

B.M. B.T. B.G.

Β.Γ. Βορράς Γεωγραφικός
B.G. Geografical North
Β.Μ. Βορράς Μαγνητικός
B.M. Magnetical North
Β.Τ. Βορράς Τετραγωνισμού
B.T. North of Quadrature

Σύγκλιση Μεσημβρινών
Convocation of Meridian
Μαγνητική απόκλιση
Magnetical divorgonco

Ε.Γ.Σ.Α. (Ελληνικό Γεωδαιτικό Σύστημα Αναφοράς)
Projected coordinate system: Greek Grid
Εγκάρσια Μερκατορική Προβολή
Projection Traverse Mercator
Κεντρικός Μεσημβρινός 24°
Central Meridian 24° scale factor 0.9996
Στον μεσημβρινό αναφοράς το χ=500000
False Easting x=500000
Πλάτος αναφοράς 00° 00' 00''
Latitude of origin 00° 00' 00''

Vertex	EGSA 87		WGS 84 UTM 34N	
	X	Y	X	Y
1	185332.016	4362981.835	443972.934	4357111.936
2	185193.615	4362939.482	443836.179	4357065.063
3	185152.461	4363073.297	443790.655	4357197.279
4	185482.035	4363174.909	444116.284	4357309.654
5	185595.501	4362805.740	444241.807	4356944.892
6	185404.503	4362746.960	444053.091	4356879.875

REFERENCE DOCUMENTS / DRAWINGS
ΣΧΕΤΙΚΑ ΕΓΓΡΑΦΑ / ΣΧΕΔΙΑ

DOCUMENT / DRAWING No ΑΡ. ΕΓΓΡΑΦΟΥ / ΣΧΕΔΙΟΥ	DOCUMENT / DRAWING TITLE ΑΡ. ΕΓΓΡΑΦΟΥ / ΣΧΕΔΙΟΥ
P581-440-94-001_rev0	Florovouni Metering & Compressor Station – Topographical Survey Plan

REV. ΑΝΑΘ.	DATE ΗΜΕΡΟΜ.	DESCRIPTION ΠΕΡΙΓΡΑΦΗ	DRAWN ΣΧΕΔΙΑΣΤΗΚΕ	CHECKED ΕΛΕΓΧΘΗΚΕ	APPROVED ΕΓΚΡΙΘΗΚΕ
00	2018.02.23	Issued for Review	HOD	GIE	VAT

COMPANY – ΕΤΑΙΡΕΙΑ: IGI Poseidon

CONTRACT No : ΑΡ.ΣΥΜΒΟΛΑΙΟΥ : AF117262

SUPERSEDED BY : ΑΝΤΙΚΑΤΑΣΤΑΘΗΚΕ ΑΠΟ :

SUPERSEDES THE : ΑΝΤΙΚΑΘΙΣΤΑ ΤΟ :

ENGINEER – ΜΕΛΕΤΗΤΗΣ / CONSORTIUM – ΣΥΜΠΡΑΞΗ: C&M ENGINEERING, Asprofos engineering

PROJECT – ΕΡΓΟ

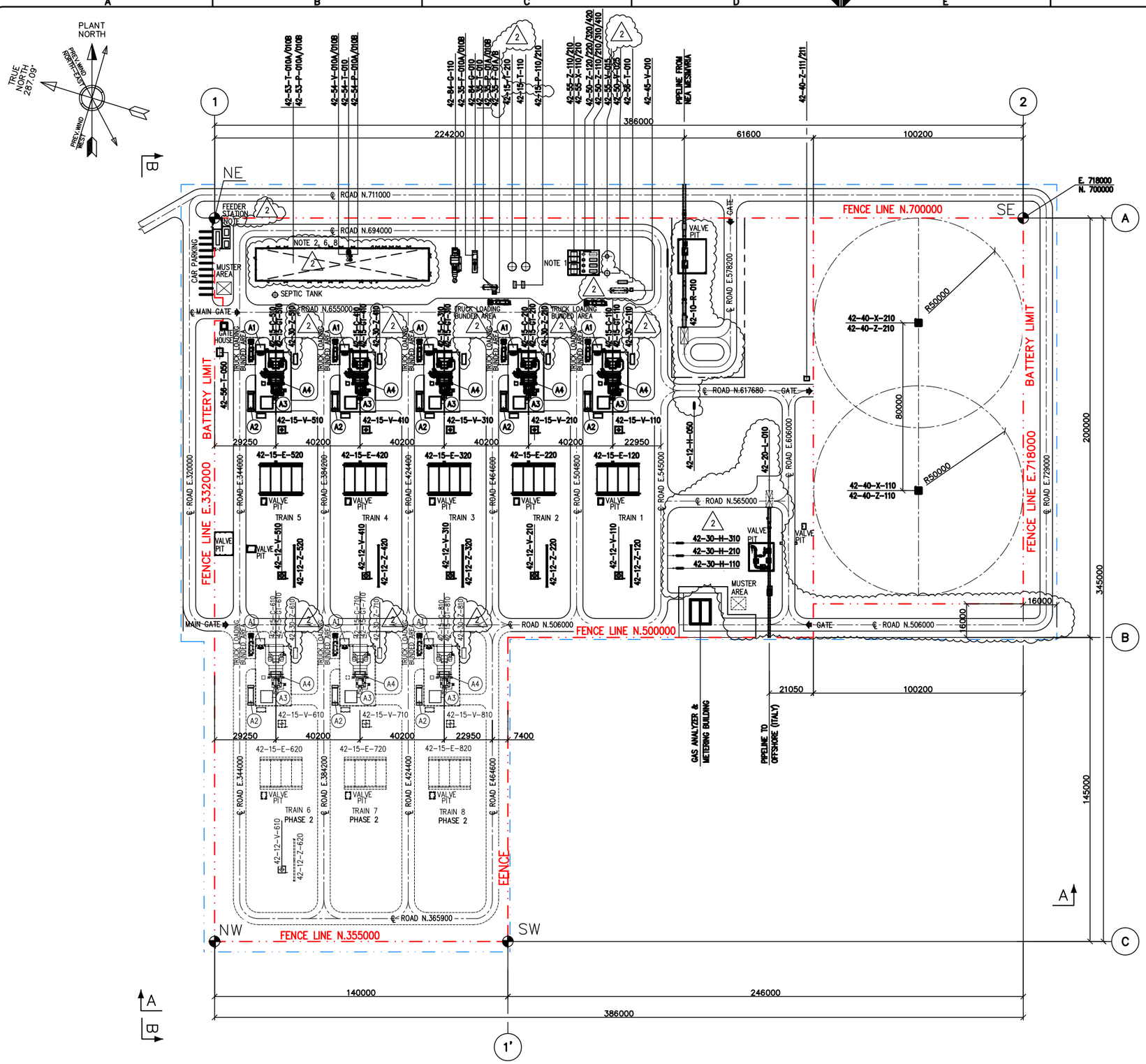
POSEIDON PIPELINE PROJECT - ONSHORE SECTION
FRONT END ENGINEERING & DESIGN AND PERMITTING
ΕΡΓΟ ΑΓΩΓΟΥ ΠΟΣΕΙΔΩΝ - ΧΕΡΣΑΙΟ ΤΜΗΜΑ
ΟΡΙΣΤΙΚΗ ΜΕΛΕΤΗ & ΑΔΕΙΟΔΟΤΗΣΗ

TITLE – ΤΙΤΛΟΣ

Florovouni Metering & Compressor Station - Topographical Survey Plan
Μετρητικός Σταθμός και Σταθμός Συμπιεστή "Φλωροβούνι" - Τοπογραφικό Διάγραμμα

SCALE – ΚΛΙΜΑΚΑ	PROJECT DWG No: ΑΡ. ΣΧ. ΕΡΓΟΥ:		REVISION / ΑΝΑΘ.
1:1000	P581-440-94-001		00
SIZE – ΜΕΓΕΘΟΣ	COMPANY'S DWG No: ΑΡ. ΣΧ. ΕΤΑΙΡΕΙΑΣ:	ENGINEER'S DWG No: ΑΡ. ΣΧ. ΜΕΛΕΤΗΤΗ:	SHEET / ΦΥΛΛΟ
A0+		AUT-11726200-STU-006/Section 10.2.1	1 of/από 1

10.2.2 C/S Florovouni General Layout – Plot Plan



	WGS 84-UTM-ZONE 34N	
ID	EASTING (m)	Northing (m)
SE	444.241.97	4.356.999.89

0 10 20 30 40 50 MTR
SCALE BAR

NOTES

1. NITROGEN GENERATOR LOCATED IN CANOPY.
2. ARGONITE SYSTEM SKID (42-72-Z-010) WILL BE LOCATED INSIDE MAIN BUILDING. FOR DETAILS REF. TO FIREFIGHTING SYSTEMS LAYOUT DRAWINGS (DOC. P402PLMK401).
3. ALL DIMENSION & ELEVATION ARE IN MILLIMITERS UNLESS OTHERWISE NOTED.
4. "SE" POINT LOCAL COORDINATES (E 718000 & N 700000, REFERRED TO PLANT NORTH), ARE EQUIVALENT TO GEOGRAPHIC COORDINATES SYSTEM N 4356944.89 & E 444241.97 DEFINED WITH RESPECT TO TRUE NORTH
5. HIGH POINT OF PAVING (H.P.P.) EL. +100.000 CORRESPOND AT ELEV. +398.00 m ABOVE MEAN SEA LEVEL.
6. FOR ELECTRICAL ROOM LAYOUT SEE DOC. P402NLE401 (ELECTRICAL EQUIPMENT LAYOUTS").
7. FOR MV INTERCONNECTION CABINET LAYOUT SEE DOC. P402NLE401 (ELECTRICAL EQUIPMENT LAYOUTS").
8. WATER TANKS UNDER MAIN SERVICE BUILDING.

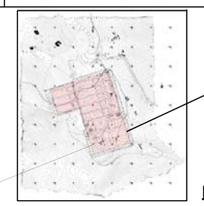
HOLDS

EQUIPMENT DESCRIPTION

42-10-R-010	PIG RECEIVER
42-12-H-050	START-UP HEATER
42-12-V-110/210/310/410/510/610	INLET SEPARATOR
42-12-Z-120/220/320/420/520/620	FLOW METERING RUN
42-15-C-110/210/310/410/510/610/710/810	GAS COMPRESSOR
42-15-E-120/220/320/420/520/620/720/820	GAS COOLER
42-15-GT-110/210/310/410/510/610/710/810	GAS TURBINE
42-15-V-110/210/310/410/510/610/710/810	K.O. DRUM
42-15-P-110/210	PURIFIED WATER PUMPS
42-15-T-110/210	PURIFIED WATER TANKS
42-20-L-010	PIG LAUNCHER
42-30-H-110/210/310	FUEL GAS PREHEATERS
42-30-Z-110/210/310/410/510/610/710/810	FUEL GAS PACKAGE TRAIN
42-35-F-010A/B	DIESEL OIL FILTERS
42-35-P-010A/B	DIESEL OIL TRANSFER PUMPS
42-35-T-010	DIESEL OIL STORAGE TANK
42-40-X-110	VENT TIP
42-40-X-210	VENT TIP
42-40-Z-110	VENT STACK PACKAGE
42-40-Z-210	VENT STACK PACKAGE
42-45-V-010	CONDENSATE COLLECTION VESSEL
42-50-V-025	INSTRUMENT AIR RECEIVER
42-50-Z-110/210/310/410	AIR COMPRESSOR PACKAGE
42-50-Z-120/220/320/420	AIR DRYER PACKAGE
42-53-P-010A/B	POTABLE WATER PUMPS
42-53-T-010A/B	POTABLE WATER TANKS
42-54-P-010A/B	UTILITY WATER PUMPS
42-54-T-010	UTILITY WATER BREAK TANK
42-54-V-010A/B	EXPANSION VESSELS
42-55-V-015	NITROGEN BUFFER VESSEL
42-55-X-110/210	NITROGEN MEMBRANE
42-55-Z-110/210	NITROGEN PACKAGE
42-56-T-010	WATER OIL SEPARATOR
42-56-T-050	SANITAIRY WASTE/FLUID TANK
42-84-G-010	EMERGENCY DIESEL GENERATOR
42-84-G-110	BACK-UP POWER GENERATOR
42-40-Z-111/211	CO_2 SNUFFING SKID FOR COLD VENTS
A1	WASHING WATER BASIN
A2	OIL COOLER AIR BLAST
A3	MINERAL OIL CONSOLE
A4	EXHAUST GAS STACK

REFERENCE DRAWINGS

DRAWING NUMBER	
P402NKM401_01	PIPING GENERAL LAYOUT
P402PLKM402_01 + 12	PIPING LAYOUT – COMPRESSOR TRAIN
P402PLKC404_02	COMPRESSION STATION GENERAL LAYOUT – SECTIONS A-A AND B-B



LOCATION PLAN

REV. Rev.	STATO Status	DESCRIZIONE Description	DATA Date	ELABORATO Prepared	VERIFICATO Checked	APPROVATO Approved
3						
2	FUS	THIRD ISSUE	13-04-2018	CARRIERI	CITTERIO	CITTERIO
1	FAC	SECOND ISSUE ⚠	07-03-2018	CARRIERI	CITTERIO	CITTERIO
0	FAC	FIRST ISSUE	16-02-2018	CARRIERI	CITTERIO	CITTERIO

COMMITTENTE/Client: IGI Poseidon

CODIFICA DOC. / Doc. Code: N° P402PLKC404

IMPIANTO/Plant: POSEIDON PIPELINE PROJECT – FEED WP5

SCALA/Scale: 1/1000 | FOGLIO/Sheet: 1/2

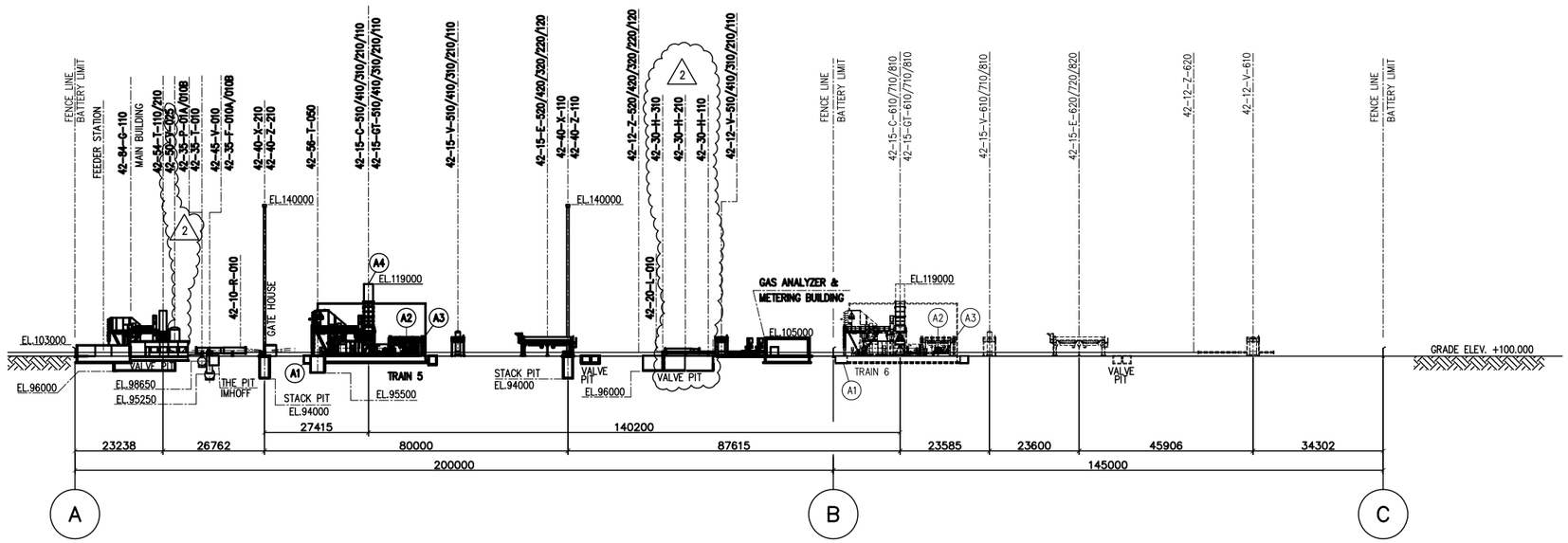
SOSTITUISCE IL/ Il supersedes

SOSTITUITO DAL/ Superseded by

TITOLO DOCUMENTO/Document Title: FLOROVOUNI COMPRESSION STATION GENERAL LAYOUT

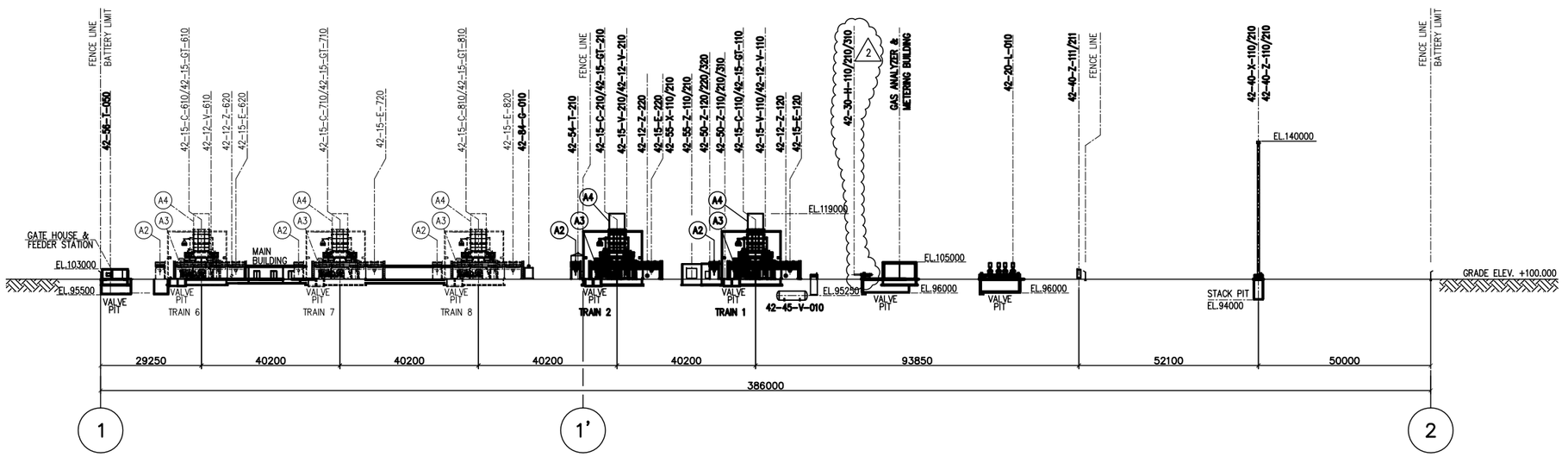
Formato A1

10.2.3 C/S Florovouni Sections



SECTION B–B "LOOKING EAST"

FOR LOCATION SEE GENERAL LAYOUT SHEET 1



SECTION A–A "LOOKING NORTH"

FOR LOCATION SEE GENERAL LAYOUT SHEET 1

SCALE BAR 0 10 20 30 40 50 MTR

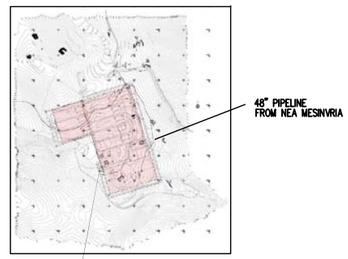
NOTES

1. FOR GENERAL NOTES AND HOLDS SEE GENERAL LAYOUT SH.1.
2. HIGH POINT OF PAVING (H.P.P.) EL. +100.000 CORRESPOND AT ELEV. +399.00 m ABOVE MEAN SEA LEVEL.

HOLDS

REFERENCE DRAWINGS

DRAWING NUMBER	
P402INKM401_01	PIPING GENERAL LAYOUT
P402PLKM402_01 ÷ 14	PIPING LAYOUT – COMPRESSOR TRAIN
P402PLKC404_01	COMPRESSION STATION GENERAL LAYOUT



LOCATION PLAN

REV. Rev.	STATO Status	DESCRIZIONE Description	DATA Date	ELABORATO Prepared	VERIFICATO Checked	APPROVATO Approved
3						
2	FUS	THIRD ISSUE	13-04-2018	CARRIERI	CITTERIO	CITTERIO
1	FAC	SECOND ISSUE	07/03/2018	CARRIERI	CITTERIO	CITTERIO
0	FAC	FIRST ISSUE	16-02-2018	CARRIERI	CITTERIO	CITTERIO

COMMITTENTE/Client

EDISON EDF GROUP — IGI Poseidon

CODIFICA DOC. / Doc. Code
N° P402PLKC404

IMPIANTO/Plant
POSEIDON PIPELINE PROJECT – FEED WP5

SCALA/Scale 1/750

FOGLIO/Sheet 2/2

SOSTITUISCE IL/It supersedes

SOSTITUITO DAL/Superseded by

TITOLO DOCUMENTO/Document Title
FLOROVOUNI COMPRESSION STATION
GENERAL LAYOUT

Formato A1

10.2.4 C/S Florovouni Process Flow Diagram

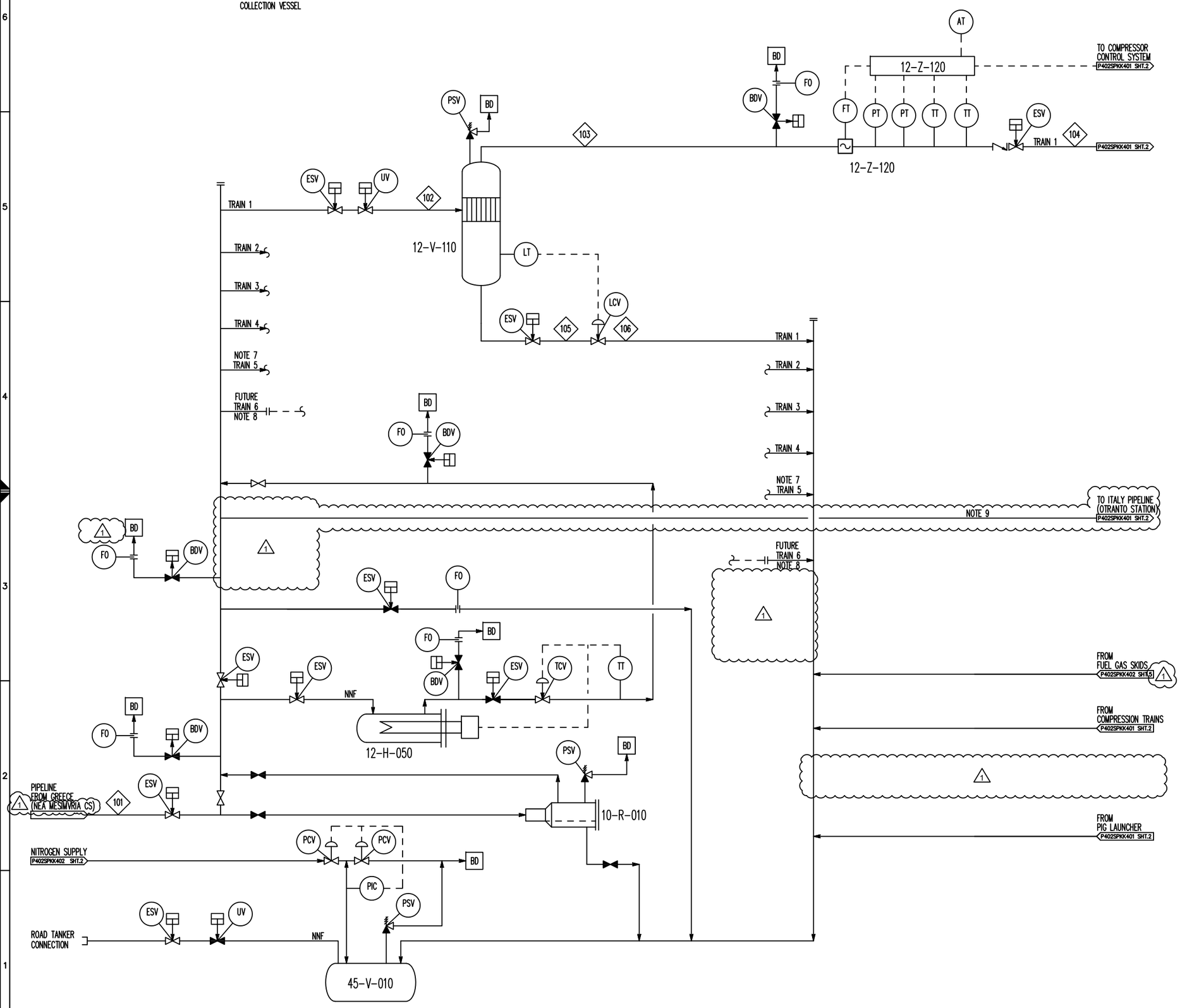
45-V-010
CONDENSATE COLLECTION VESSEL

12-H-050
START-UP HEATER

12-V-110/210/310/410
INLET SEPARATOR

10-R-010
PIG RECEIVER

12-Z-120/220/320/420
SALES GAS METERING RUN



NOTES

1. PIG RECEIVER PREFIX IS 42
2. PIG LAUNCHER PREFIX IS 42
3. PROCESS TRAIN EQUIPMENT PREFIX IS 42
4. ALL TRAINS HAVE IDENTICAL SAFE GUARDING
5. ALL ESD VALVES ARE PROVIDED WITH START-UP EQUALISING BYPASS.
6. DELETED. (1)
7. TRAIN 5 IS SPARE DURING 12 BSm³/y CASE.
   TRAIN 5 WILL BE IN OPERATION DURING 20 BSm³/y CASE.
8. FUTURE TRAIN 6 WILL BE IN OPERATION DURING 20 BSm³/y CASE. (1)
9. LINE FOR SEALINE PRESSURIZATION.

ABBREVIATIONS:

BD	BLOW DOWN
BDV	BLOW DOWN VALVE
ESD	EMERGENCY SHUTDOWN
ESV	EMERGENCY SHUTDOWN VALVE
FO	FLOW ORIFICE
FT	FLOW TRANSMITTER
LCV	LEVEL CONTROL VALVE
LT	LEVEL TRANSMITTER
NNF	NORMALLY NO FLOW
PCV	PRESSURE CONTROL VALVE
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
TT	TEMPERATURE TRANSMITTER
SSV	SAFETY SHUTDOWN VALVE
TCV	TEMPERATURE CONTROL VALVE
UV	UTILITY VALVE

HOLDS

1. DELETED. (1)

REFERENCE DRAWINGS

DRAWING NUMBER	DESCRIPTION
P402CHKK401	HEAT AND MATERIAL BALANCES

REV. Rev.	STATO Status	DESCRIZIONE Description	DATA Date	ELABORATO Prepared	VERIFICATO Checked	APPROVATO Approved
1	FAC	SECOND ISSUE	13/03/18	SCIEGHI	CAVANDOLI	CAVANDOLI
0	FAC	FIRST ISSUE	26/01/18	SCIEGHI	CAVANDOLI	CAVANDOLI

COMMITTENTE/Client: IGI Poseidon

"QR CODE"

CODIFICA DOC. / Doc. Code: N° P402SPKK401

IMPIANTO/Plant: POSEIDON PIPELINE PROJECT – FEED WP5 COMPRESSION AND METERING STATIONS

SCALA/Scale: –

FOGLIO/Sheet: 01/03

TITOLO DOCUMENTO/Document Title:
FLOROVOUNI COMPRESSION FACILITIES
METERING SYSTEM
PROCESS FLOW DIAGRAMS

SOSTITUISCE IL / It supersedes
SOSTITUITO DAL / Superseded by

Formato A1

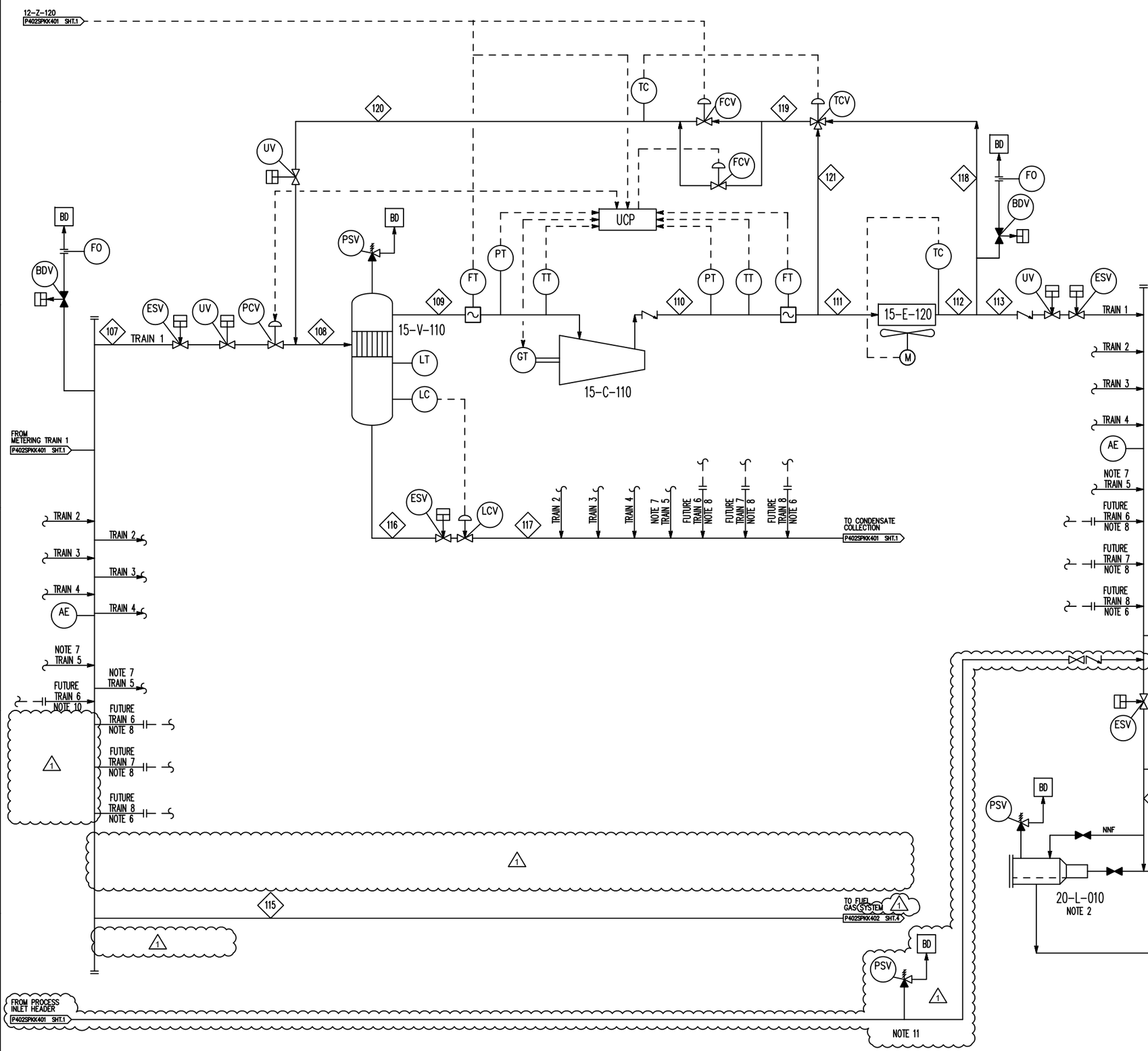
FILE:P402SPKK401-01_1_Metering System PFD.dwg

15-V-110/210/310/410A/B
KNOCK OUT DRUM

15-C-110/210/310/410
GAS COMPRESSOR

15-E-120/220/320/420
GAS COOLER

20-L-010
PIG LAUNCHER



NOTES

1. PIG RECEIVER PREFIX IS 42
2. PIG LAUNCHER PREFIX IS 42
3. PROCESS TRAIN EQUIPMENT PREFIX IS 42
4. ALL TRAINS HAVE IDENTICAL SAFE GUARDING
5. ALL ESD VALVES ARE PROVIDED WITH START-UP EQUALISING BYPASS.
6. FUTURE TRAIN 8 WILL BE SPARE DURING 20 BSm³/y CASE (VALID FOR COMPRESSION TRAINS). 1
7. TRAIN 5 IS SPARE DURING 12 BSm³/y CASE.
   TRAIN 5 WILL BE IN OPERATION DURING 20 BSm³/y CASE.
8. FUTURE TRAINS 6 AND 7 WILL BE IN OPERATION DURING 20 BSm³/y CASE (VALID FOR COMPRESSION TRAINS). 1
9. DELETED.
10. FUTURE TRAIN 6 IS SPARE DURING 20BSm³/y CASE (VALID FOR SEPARATION AND METERING TRAIN).
11. LINE FOR SEALINE PRESSURIZATION.

ABBREVIATIONS:

BD	BLOW DOWN
BDV	BLOW DOWN VALVE
ESD	EMERGENCY SHUTDOWN
ESV	EMERGENCY SHUTDOWN VALVE
FCV	FLOW CONTROL VALVE
FO	FLOW ORIFICE
FT	FLOW TRANSMITTER
GT	GAS TURBINE
LCV	LEVEL CONTROL VALVE
LT	LEVEL TRANSMITTER
NNF	NORMALLY NO FLOW
PCV	PRESSURE CONTROL VALVE
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
TT	TEMPERATURE TRANSMITTER
SSV	SAFETY SHUTDOWN VALVE
TCV	TEMPERATURE CONTROL VALVE
UCP	UNIT CONTROL PANEL
UV	UTILITY VALVE

HOLDS

1. DELETED. 1

REFERENCE DRAWINGS

DRAWING NUMBER	DESCRIPTION
P402CHKK401	HEAT AND MATERIAL BALANCES

REV. Rev.	STATO Status	DESCRIZIONE Description	DATA Date	ELABORATO Prepared	VERIFICATO Checked	APPROVATO Approved
1	FAC	SECOND ISSUE	13/03/18	SCIEGHI	CAVANDOLI	CAVANDOLI
0	FAC	FIRST ISSUE	26/01/18	SCIEGHI	CAVANDOLI	CAVANDOLI

COMMITTENTE/Client: IGI Poseidon

"QR CODE"

CODIFICA DOC. / Doc. Code: N° P402SPKK401

IMPIANTO/Plant: POSEIDON PIPELINE PROJECT – FEED WP5 COMPRESSION AND METERING STATIONS

SCALA/Scale: –

FOGLIO/Sheet: 02/03

SOSTITUISCE IL/ Il supersedes:

SOSTITUITO DAL/ Superseded by:

TITOLO DOCUMENTO/Document Title:
FLOROVOUNI COMPRESSION FACILITIES
COMPRESSION SYSTEM
PROCESS FLOW DIAGRAMS

Formato A1

FILE:P402SPKK401-02_1_Compression System PFD.dwg

BLOWDOWN VALVE METERING TRAIN 1
P402SPKK401 SH.1

RELIEF VALVE METERING TRAIN 1
P402SPKK401 SH.1

NITROGEN
NOTE 5

FO

61

BLOWDOWN VALVES COMPRESSION TRAIN 1
P402SPKK401 SH.2

RELIEF VALVE COMPRESSION TRAIN 1
P402SPKK401 SH.2

AIR COOLER COMPRESSION TRAIN 1
P402SPKK401 SH.2

NITROGEN COMPRESSION TRAIN 1
NOTE 5

FT

COMPRESSOR DISCHARGE HEADER
P402SPKK401 SH.2

FUTURE COMPRESSION TRAIN 7
NOTE 6

METERING TRAIN 1

COMPRESSION TRAIN 1

METERING TRAIN 3

COMPRESSION TRAIN 3

METERING TRAIN 5
NOTE 3

COMPRESSION TRAIN 5
NOTE 3

FUTURE COMPRESSION TRAIN 8
NOTE 7

FUTURE COMPRESSION TRAIN 6
NOTE 6

FUTURE METERING TRAIN 6
NOTE 6

COMPRESSION TRAIN 4

METERING TRAIN 4

FUEL GAS SYSTEM
P402SPKK402 SH.4

COMPRESSOR DISCHARGE HEADER
P402SPKK401 SH.2

COMPRESSION TRAIN 2

METERING TRAIN 2

COMPRESSOR SUCTION HEADER
P402SPKK401 SH.2

CONDENSATE COLLECTION VESSEL
P402SPKK401 SH.1

BY-PASS PRESSURIZATION SEALINE PSV
P402SPKK401 SH.2

INLET HEADER BDV
P402SPKK401 SH.1

START-UP HEATER BDV
P402SPKK401 SH.1

INLET HEADER BDV
P402SPKK401 SH.1

PIG LAUNCHER 20-L-010
P402SPKK401 SH.1

PIG RECEIVER 40-R-010
P402SPKK401 SH.1

BACKUP POWER GENERATOR 84-G-110

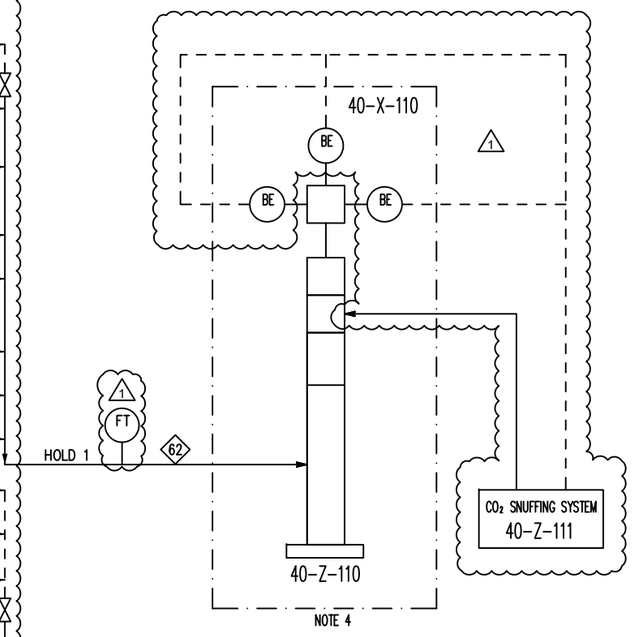
△1

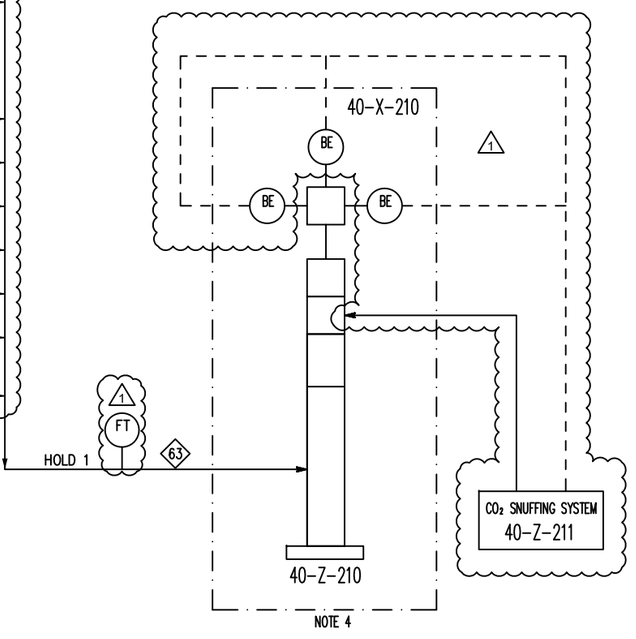
STREAM No	61	62	63
	HOLD 2 NOTE 5	HOLD 2 NOTE 8	HOLD 2 NOTE 8
FLUID	NITROGEN	HC	HC
PHASE	GAS	GAS	GAS
FLOWRATE (Sm³/h)	3.21	201724.6	201724.6
TEMP (°C)	40	-20	-20
PRESSURE (barg)	ATM	2.61	2.65

40-Z-110/210
VENT STACK PACKAGE

40-X-110/210
VENT TIP

△1 40-Z-111/211
CO_2 SNUFFING SYSTEM





NOTES

1. ALL EQUIPMENT NUMBERS HAVE PREFIX 42
2. DELETED. △1
3. TRAIN 5 IS SPARE DURING 12 BSm³/y CASE. (VALID FOR METERING AND COMPRESSION TRAIN). TRAIN 5 WILL BE IN OPERATION DURING 20 BSm³/y CASE. (VALID FOR METERING AND COMPRESSION TRAIN). △1
4. METERING/COMPRESSION TRAIN 1, TRAIN 3, TRAIN 5 AND FUTURE COMPRESSION TRAIN 7 DIRECTED TO VENT SYSTEM 110.
   △1 METERING/COMPRESSION TRAIN 2, TRAIN 4, FUTURE TRAIN 6 AND FUTURE COMPRESSION TRAIN 8 DIRECTED TO VENT SYSTEM 210. △1
5. NITROGEN LINE PURGING EACH TRAIN IS PROVIDED WITH DEDICATED LINE. FLOWRATE VALVE IS THE MAXIMUM FOR EACH TRAIN.
6. FUTURE COMPRESSION TRAINS 6 AND 7 WILL BE IN OPERATION DURING 20 BSm³/y CASE. FUTURE METERING TRAIN 6 WILL BE IN OPERATION DURING 20 BSm³/y CASE. △1
7. FUTURE COMPRESSION TRAIN 8 WILL BE SPARE DURING 20 BSm³/y CASE.
8. MAXIMUM FLOWRATE FOR EACH VENT CONSIDERING CONTEMPORARY RADIATION OF 4.73 Km/m²

ABBREVIATIONS:

ATM	ATMOSPHERE
BDV	BLOW DOWN VALVE
ESD	EMERGENCY SHUTDOWN
FO	FLOW ORIFICE

HOLDS

1. DISTRIBUTION OF BLOWDOWN LOAD TO BE CONFIRMED.
2. CONDITIONS TO BE CONFIRMED.
3. DISCHARGE LOCATION DEFINITION IS IN PROGRESS.
4. DELETED. △1

REFERENCE DRAWINGS

DRAWING NUMBER	DESCRIPTION

REV. Rev.	STATO Status	DESCRIZIONE Description	DATA Date	ELABORATO Prepared	VERIFICATO Checked	APPROVATO Approved
1	FAC	SECOND ISSUE	13/03/18	SCIEGHI	CAVANDOLI	CAVANDOLI
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IMPIANTO/Plant
POSEIDON PIPELINE PROJECT – FEED WP5
COMPRESSION AND METERING STATIONS

SCALA/Scale: –
FOGLIO/Sheet: 03/03

SOSTITUISCE IL / It supersedes
SOSTITUITO DAL / Superseded by

TITOLO DOCUMENTO/Document Title
FLOROVOUNI COMPRESSION FACILITIES
VENT SYSTEM
PROCESS FLOW DIAGRAMS

Formato A1

FILE:P402SPKK401-03_1_Vent System PFD.dwg

11 ANNEXES

11.1 Air Quality Baseline Report

HELLENIC REPUBLIC
MINISTRY OF NATIONAL EDUCATION
& RELIGION AFFAIRS

GENERAL SECRETARIAT FOR RESEARCH & TECHNOLOGY

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INSTITUTE OF NUCLEAR & RADIOLOGICAL SCIENCES & TECHNOLOGY, ENERGY & SAFETY
ENVIRONMENTAL RESEARCH LABORATORY

Contact Person	:	Dr. Thomas Maggos	**Security Degree**	:	**CONFIDENTIAL**
Phone No.	:	(0030210)-6503716	**Agia Paraskevi**	:	06/02/2018
Fax	:	(0030210)-6525004	**Our Reference**	:	
E-mail	:	tmaggos@ipta.demokritos.gr	**Priority Degree**	:	**URGENT**

Subject : Air quality assessment at the Florovouni area - Contract SC-522/17 / AF-117262

National Centre for Scientific Research "Demokritos" (NCSRD) – Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety (INRASTES) – Environmental Research Laboratory submit the following report on the ambient air quality of Florovouni area according to the contract **SC-522/17 / AF-117262** .

Sincerely

Dr. Thomas Maggos

Senior Researcher

HELLENIC REPUBLIC
MINISTRY OF EDUCATION, RESEARCH
AND RELIGIOUS AFFAIRS

GENERAL SEGRETARIAT FOR RESEARCH & TECHNOLOGY

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Institute of Nuclear & Radiology Sciences & Technology, Energy & Safety
Environmental Research Laboratory

Air quality assessment in the Florovouni area

1. FINAL REPORT

FEBRUARY 2018

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LIST OF FIGURES

1 INTRODUCTION

The scope of the December 2017 January 2018 field survey campaign was to establish the ambient air quality conditions in the areas of the proposed compressor station location. At the time of conducting the field survey the Project design included a compressor station at Florovouni area, in Greece.

2 RELEVANT LEGISLATION AND STANDARDS

During operation, the compressor station facilities emit air pollutants as a result of the combustion of natural gas that drives the compressor units. The emissions mainly consist of nitrogen dioxide (NO_2), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter less than 10 micrometers in diameter (PM10), sulphur dioxide (SO_2), and hazardous air pollutants (HAPs).

Air quality standards applicable to the compressor station facilities in Greece are defined in EU Directive 2008/50/EC and in the Greek regulation on ambient air quality, Joint Ministerial Decision (JMD) 14122/549/E.103/2011 (Gov. Gaz. 488/B/30.03.11). The JMD harmonises Greek Environmental Law with the EU Directive 2008/50/EC on ambient air quality, and it sets air quality limits for NO_X, SO_2, PM_{10}, $PM_{2.5}$, Benzene, Pb, O_3, CO. The same limits apply in both the Directive and in the JMD

Air quality standards for the under study pollutants are presented in *Table 2-1*.

Table 2-1 EU and Greek Air Quality Standards for CO, NO_x and SO_2

Averaging period	***Limit value (Dir 2008/50/EC and JMD14122/549/E.103/2011)***	***Margin of tolerance***	***Date by which limit value is to be met***
CO			
8 hours max average value	10000 µg/m^3	60%	—
NO_2			
1 hour	200 µg/m^3, not to be exceeded more than 18 times a calendar year	50% on 19 July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal percentages to reach 0% by 1 January 2010	1 January 2010
calendar year	40 µg/m^3	50% on 19 July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal percentages to reach 0% by 1 January 2011	1 January 2010
SO_2			
1 hour	350 µg/m^3, not to be exceeded more than 24 times a calendar year	125 µg/m^3 (43%)	In force from 1 January 2005
calendar year	125 µg/m^3 not to be exceeded more than 24 times a calendar year	None	In force from 1 January 2005

Compiled by ERM (2011)

3 METHODOLOGY

3.1 Selection of Sample Points

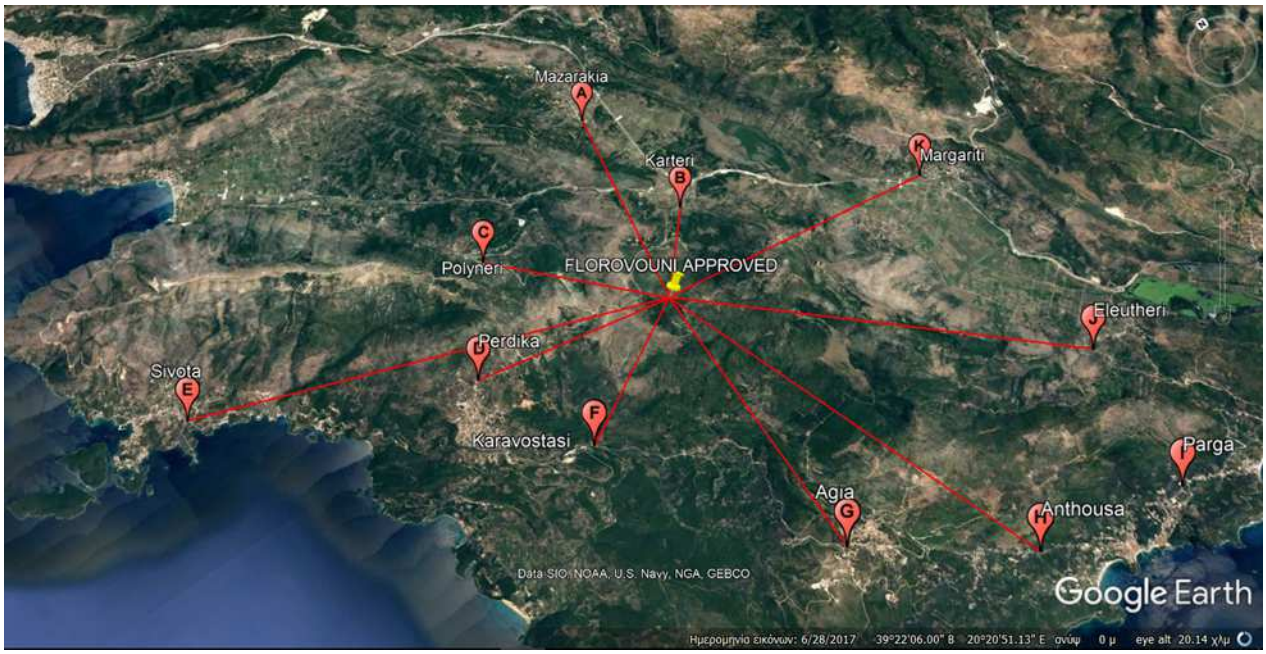
The survey was conducted to establish an air quality baseline to assess the potential impact of a new emission source (compressor station) on the airshed, particularly on any sensitive receivers.

The siting of the air quality monitoring was determined according to the German *Technical Instruction on Air Emissions,* or '*TA – Luft*' as it is commonly referred, approach which is similarly applied in other EU countries (and applied previously in other EBRD funded projects).

According to this approach, the airshed is determined by the compressor station stack height in which the point of maximum ground concentration impact will usually fall - this gives a radius around the emission source of 1.5 km. Since the exact location or orientation of the facility within the proposed site was not known at the time of monitoring a 10 km radius from the centre of the site was considered acceptable. This schematic sampling location pattern was also modified to monitor near any sensitive receptors in the vicinity (residential areas). The total number of sampling points were 11 and are shown in

Figure 3-1

Figure 3-1 Ambient Air Sampling Locations in Proximity of Florovouni



3.2 Sampling Methodology and Samples Analysis

The sampling was conducted with the use of passive diffusion tubes and lasted for 24 days for Florovouni campaign (12/12/2017 - 03/01/2018). The methodology of passive sampling was selected in order to measure the average pollutants background levels and the long-term comparability of the results. The passive samplers used were provided by Passam Ag Laboratory.

Active sampling was avoided for practical reasons (lack of electricity supply in the field, instrumentation needed for simultaneous measurements etc).

The passive samplers were placed on trees or electricity poles (at a height of 2 meters from the ground), taking into account the following restrictions:

- the sampling site should not be placed in a private field without permission (trees or poles on public roads/fields were preferred).
- the risk of samples' getting wet or destroyed from agricultural activities should be avoided.
- to protect the sampler from the weather, as well as minimising wind disturbance, a plastic shelter was used (*Figure 3-2*).

Figure 3-2 Passive Samplers attached to Electricity Poles

Photographs from December 2017 Field Survey

4 RESULTS

The results of the air sampling campaign are presented in *Table 4-1*

Table 4-1 Analytical Results of Air Sampling at Florovouni

NOx

Site	COORDINATES (WGS84)		start		end		exposure		
Code: NOx	Latitude	Longitude	date	time	date	time	time	code	µg/m3
MAZARAKIA	39°24'45"N	20°22'23"E	12/12/2017	13:50	3/1/2018	13:50	528.0	GGK5	**6.2**
KARTERI	39°23'2"N	20°22'35"E	12/12/2017	14:05	3/1/2018	14:05	528.0	GGK1	**8.5**
POLYNERI	39°23'50"N	20°19'23"E	12/12/2017	14:45	3/1/2018	14:25	527.7	GGK3	**3.9**
PERDIKA	39°22'37"N	20°18'36"E	12/12/2017	15:10	3/1/2018	14:40	527.5	GGK4	**12.1**
SIVOTA	39°24'9"N	20°15'2"E	12/12/2017	15:55	3/1/2018	15:05	527.2	GGK2	**5.3**
KARAVOSTASI	39°21'14"N	20°18'47"E	12/12/2017	16:25	3/1/2018	15:45	527.3	GGK6	**8.3**
AGIA	39°18'49"N	20°21'9"E	12/12/2017	16:45	3/1/2018	15:55	527.2	GGK7	**7.1**
ANTHOUSA	39°17'37"N	20°23'4"E	12/12/2017	16:58	3/1/2018	16:05	527.1	GGK9	**8.6**
PARGA	39°17'14"N	20°25'10"E	13/12/2017	10:15	3/1/2018	16:15	510.0	GGK10	**13.0**
ELEUTHERI	39°18'59"N	20°25'43"E	13/12/2017	10:50	3/1/2018	16:35	509.8	GGK11	**6.7**
MARGARITI	39°21'38"N	20°25'50"E	13/12/2017	11:15	3/1/2018	16:50	509.6	GGK12	**8.4**
								Detection limit	***0.4***

SO2

Site	COORDINATES (WGS84)		start		end		exposure		
Code: SO2	Latitude	Longitude	date	time	date	time	time	code	µg/m^3
MAZARAKIA	39°24'45"N	20°22'23"E	12/12/2017	13:50	3/1/2018	13:50	528.00	GGK8	**<0.6**
KARTERI	39°23'2"N	20°22'35"E	12/12/2017	14:05	3/1/2018	14:05	528.00	GGK1	**<0.6**
POLYNERI	39°23'50"N	20°19'23"E	12/12/2017	14:45	3/1/2018	14:25	527.67	GGK3	**<0.6**
PERDIKA	39°22'37"N	20°18'36"E	12/12/2017	15:10	3/1/2018	14:40	527.50	GGK4	**<0.6**
SIVOTA	39°24'9"N	20°15'2"E	12/12/2017	15:55	3/1/2018	15:05	527.17	GGK5	**<0.6**
KARAVOSTASI	39°21'14"N	20°18'47"E	12/12/2017	16:25	3/1/2018	15:45	527.33	GGK6	**<0.6**
AGIA	39°18'49"N	20°21'9"E	12/12/2017	16:45	3/1/2018	15:55	527.17	GGK7	**<0.6**
ANTHOUSA	39°17'37"N	20°23'4"E	12/12/2017	16:58	3/1/2018	16:05	527.12	GGK9	**<0.6**
PARGA	39°17'14"N	20°25'10"E	13/12/2017	10:15	3/1/2018	16:15	510.00	GGK10	**<0.6**
ELEUTHERI	39°18'59"N	20°25'43"E	13/12/2017	10:50	3/1/2018	16:35	509.75	GGK11	**<0.6**
MARGARITI	39°21'38"N	20°25'50"E	13/12/2017	11:15	3/1/2018	16:50	509.58	GGK12	**<0.6**
								Detection limit	***0.6***

CO

Site	COORDINATES (WGS84)		start		end		exposure		
Code: CO	Latitude	Longitude	date	time	date	time	time	code	mg/m^3
MAZARAKIA	39°24'45"N	20°22'23"E	12/12/2017	13:50	3/1/2018	13:50	528.0	GGK 2	**<0.2**
KARTERI	39°23'2"N	20°22'35"E	12/12/2017	14:05	3/1/2018	14:05	528.0	GGK 1	**<0.2**
POLYNERI	39°23'50"N	20°19'23"E	12/12/2017	14:45	3/1/2018	14:25	527.7	GGK 3	**<0.2**
PERDIKA	39°22'37"N	20°18'36"E	12/12/2017	15:10	3/1/2018	14:40	527.5	GGK 4	**<0.2**
SIVOTA	39°24'9"N	20°15'2"E	12/12/2017	15:55	3/1/2018	15:05	527.2	GGK 5	**<0.2**
KARAVOSTASI	39°21'14"N	20°18'47"E	12/12/2017	16:25	3/1/2018	15:45	527.3	GGK 6	**<0.2**
AGIA	39°18'49"N	20°21'9"E	12/12/2017	16:45	3/1/2018	15:55	527.2	GGK 7	**<0.2**
ANTHOUSA	39°17'37"N	20°23'4"E	12/12/2017	16:58	3/1/2018	16:05	527.1	GGK 9	**<0.2**
PARGA	39°17'14"N	20°25'10"E	13/12/2017	10:15	3/1/2018	16:15	510.0	GGK 10	**<0.2**
ELEUTHERI	39°18'59"N	20°25'43"E	13/12/2017	10:50	3/1/2018	16:35	509.8	GGK 11	**<0.2**
MARGARITI	39°21'38"N	20°25'50"E	13/12/2017	11:15	3/1/2018	16:50	509.6	GGK 12	**<0.2**
								Detection limit	***0.2***

In the Florovouni area, the average values (during the sampling period) were 8.00 μg/m^3 for NO_x while for SO_2 and CO all values were below the detection limit which is 0.6 μg/m^3 and 0.2 mg/m^3 respectively. According to Directive 2008/50/EC CO, SO_2 and NO_x limits were not exceeded.

Levels of all measured pollutants are significant low at the proposed area, likely to be resulting from the lack of strong sources of pollution (intense vehicle circulation, anthropogenic activities, industries etc) in the local areas. The air quality in the area is considered to be good.

5 LIMITATIONS

The number of sampling points used in the field survey is considered sufficient for obtaining a picture of ambient air pollutants in the vicinity of the preferred sampling sites. Furthermore the seasonal variation effect (possible summer sources) could be studied through further campaigns to enhance the gathered data set.

11.2 Air Dispersion Model

HELLENIC REPUBLIC
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Institute of Nuclear & Radiology Sciences & Technology, Energy & Safety
Environmental Research Laboratory

Investigation of atmospheric dispersion of gas pollutants from a future Gas Compressor Station in the Florovouni area

FINAL REPORT

FEBRUARY 2018

Contents

SUMMARY

The *Environmental Research Laboratory (EREL)* of the National Centre for Scientific Research "Demokritos" performed a modelling study of the atmospheric dispersion of NO_x, and CO concentrations from the future installation of the Compression of Natural Gas Station at the location of Florovouni in the region of Thesprotia (Greece).

The study was carried out for ASPROFOS Engineering S.A. by the following EREL personnel:

Vlachogiannis Diamando, M.Sc., Ph.D
Sfetsos Athanasios., Ph.D
Gounaris N., M.Sc.
Emannouil George, PhD.

AIM OF THE REPORT

The aim of this study was to investigate the impact of the dispersion of Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) on the atmospheric quality from the future installation of the Florovouni Compression Station (FCS) (region of Thesprotia, Greece), using appropriate methodology[1] and 3-dimensional computer modelling tools of the Environmental Research Laboratory of the NCSR "Demokritos".

The position and geometry of the FCS as well as the necessary data on stacks, emission rates of NO_x and CO were provided to EREL by Asprofos S.A. based on construction information. The technical input for the impact assessment study was based on emission sources, operating at 20 BSCM/Y (Phase 2, 7 of 8 Gas Turbines in operation) from two different gas turbines suppliers: 1) Siemens SGT 700 Gas Turbines and 2) GE PGT 25+ Gas Turbines.

The meteorological data for the area of interest were retrieved by EREL. The data related to the topography of the area were extracted from the Geographic Information System (ARC GIS) available at EREL. The basic computational steps followed are listed below:

- Processing of the available data, preparation of the input files for the dispersion model regarding the topography (ARC.GIS) and the meteorology of the area.
- Meteorological computational calculations to obtain the characteristic weather types of the area of interest and the respective 3-Dimensional meteorological fields (WRF model).
- Modelling calculations of the atmospheric dispersion of the emissions of NO_x and CO from the gas compression station (HYSPLIT model). The background air quality concentrations of the area available from measurements were included in the study.
- Analysis and evaluation of the model results on the near surface distribution of the NO_x and CO concentrations.
- Comparison of the calculated concentrations NO_x and CO with the current EU Directives of air quality standards. Emphasis was placed on the investigation of the concentration values of the air pollutants over the nearby populated settlements.

[1] [1] D. Vlachogiannis, A. Sfetsos, N. Gounaris and A. Papadopoulos," Investigation of atmospheric dispersion of gas compounds from an industrial installation over a realistic topography", 17th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes, 9-12 May 2016, Budapest.

PREPARATION OF THE INPUT DATA

This part involves the preparation of the input data files for the atmospheric dispersion model. For the specific study, the necessary data include the topography and meteorological fields of the area of interest.

TOPOGRAPHY AND MODELLING DOMAIN

The geographical coordinates of the emission sources of the compression station of natural gas at the location of Florovouni (region of Thesprotia) (FCS) were provided by the construction company in WGS84-UTM Zone34N. The coordinates on Greek Geodetic Reference System GGRS87 (X,Y) and latitude /longitude are shown on Table 1.

Table 1. Geographic coordinates of the location of the emission sources of FCS.

ID Emission Source	UTM_X	UTM_Y	LONG	LAT	EGSA_X	EGSA_Y
C1	444,080.21	4,357,056.75	20.35090	39.36116	185,437.5228	4,362,923.0436
C2	444,073.77	4,357,096.43	20.35083	39.36151	185,432.3989	4,362,962.9629
C3	444,067.32	4,357,136.11	20.35075	39.36187	185,427.2651	4,363,002.8826
C4	444,060.88	4,357,175.79	20.35067	39.36223	185,422.1412	4,363,042.8020
C5	444,054.43	4,357,215.47	20.35059	39.36259	185,417.0073	4,363,082.7217
C6	443,916.05	4,357,193.00	20.34899	39.36237	185,277.7921	4,363,064.8416
C7	443,922.49	4,357,153.32	20.34906	39.36202	185,282.9160	4,363,024.9222
C8	443,928.94	4,357,113.64	20.34914	39.36166	185,288.0499	4,362,985.0025

The computational domain for the atmospheric modelling calculations was formulated so as to include at its centre the emission sources of FCS. The domain extent was set to 42 km × 42 km to include all the neighbouring urban areas (see Figure 1). The original topographical data used were of 100 m resolution. The topography of the area shows a non uniform terrain with hills and high ridges (up to heights of ~1600m) alternating with valleys in a northwest to southeast direction.

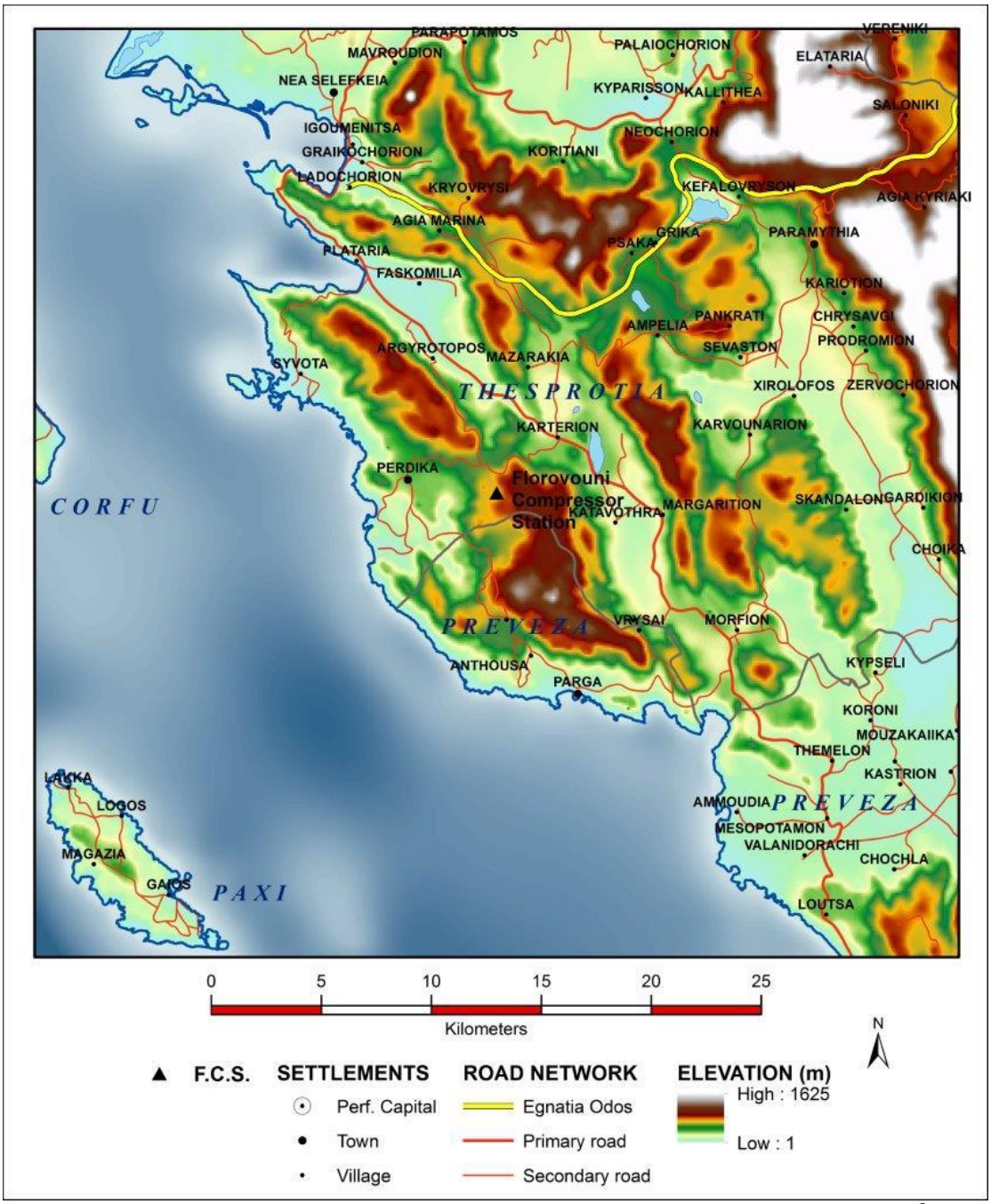

Figure 1. Topography map of the computational domain of size 42 ×42 km^2 (contour interval 250 m). The compressor station FCS is located in the centre of the domain.

METEOROLOGY AND CHARACTERISTIC WEATHER TYPES

The atmospheric dispersion models use as input data meteorological variables such as wind speed and wind direction, temperature, category of atmospheric stability, mixing layer height etc. The more complex models (like the one used in this study named HYSPLIT) use 3-dimensional meteorological fields as input. The discretised meteorological fields are calculated by prognostic and/or diagnostic models.

The sources of meteorological data are usually the following:

1. Prognostic meteorological weather models of large scale, which use coarser grid than the dispersion models.
2. Observational stations in random locations in the computational domain.

For the current study, meteorological data (vertical distribution of wind speed and direction, temperature, mixing layer height, humidity, precipitation, cloud cover etc) were extracted from the National Centers for Environmental Prediction (NCEP / USA) FNL (Final) Operational Global Analysis[2] high-resolution reanalysis, available on a 6-hour temporal resolution.

The prognostic meteorological model Weather Research Forecasting (WRF-ARW) version 3.6.1 (Skamarock et al., 2008)[3] was used for the calculation of the 3-dimensional meteorological fields.

Typical Meteorological Conditions over the study area

To calculate the average levels and the maximum values of the pollutant concentrations from a future installation in the atmosphere on an annual, daily and hourly basis, the procedure of identifying the characteristic weather types of the area of interest was followed. The prevailing meteorological conditions or in other words characteristic weather types were obtained by applying the methodology of Sfetsos et al. (2005)[4]. The specific methodology was applied on the FNL meteorological data of large scale, as referenced above, covering a six year period (2011-2016). The analysis revealed the prevailing weather conditions in the defined computational domain and the corresponding frequency of occurrence (in percentage) per year. Each weather condition was assigned a characteristic or else typical day (24-hour).

The results showed that the area of study is characterised by eleven (11) in total weather types (see Table 2). The FNL data for the determined characteristic weather days were used as initial and boundary conditions to the meteorological model (WRF). The WRF model calculated the 3-dimensional meteorological fields of the region of interest, in a horizontal and temporal resolution of 1 km × 1 km and 1-hour, respectively. Table 3, summarises the meteorological conditions from the WRF model, which characterise each typical weather day of the region. Subsequently, the meteorological data files were used as input to the dispersion model.

[2] https://rda.ucar.edu/datasets/ds083.2/

3 Skamarock, W. C., J. B. Klemp, J. Dudhia, D. O. Gill, D. M. Barker, M. G. Duda, X.-Y. Huang, W. Wang, and J. G. Powers, 2008: A description of the Advanced Research WRF version 3. NCAR Technical Note 475, http://www.mmm.ucar.edu/wrf/users/docs/arw_v3.pdf.

[4] A. Sfetsos, D. Vlachogiannis, N. Gounaris, and A. K. Stubos, (2005). On the identification of representative samples from large data sets with application to synoptic climatology, Theor. Appl. Climatol. 82, 177–182.

Table 2. Characteristic weather types (CWT) and percentage of their frequency of occurrence within a year in the area of Florovouni (region of Thesprotia).

Characteristic weather type (CWT)	Frequency Percentage of occurrence in a year (%)
1	7.8
2	8.9
3	17.6
4	7.6
5	5.8
6	12.1
7	6.9
8	3.7
9	11.7
10	9.8
11	8.1

Weather conditions description

The description of the weather conditions prevailing during each characteristic weather type (CWT) is provided below.

CWT 1

During this typical winter weather day, high pressures prevail over the western region of Greece, resulting to low surface wind speeds from variable directions and high for this time period surface temperatures at noon, up to 17-18 ° Celsius. Night temperatures of less than 9°C occur in the area. This weather type favors high relative humidity and stable conditions in the lower atmospheric levels.

CWT 2

The combination of relatively high pressures prevailing over southern Greece and relatively low over north Italy causes weak-moderate southerly winds over western Greece and especially Thesprotia region. The temperature is up to 19 °C during midday. Light rain affects this area from the afternoon.

CWT 3

High pressures prevailing over the Balkan Peninsula are combined with low pressures over Cyprus resulting to low wind speeds in the area of Thesprotia. Land and sea breezes are prevailing in coastal areas at night and noon, respectively. High surface temperatures occur (up to 35 °C) during this usual summer day.

CWT 4

High pressures over central Europe and low pressures over eastern Mediterranean cause low to medium intensity wind speeds over Thesprotia and moderate north-westerly winds over the Ionian Sea. The surface temperature reaches 12-14 °C in the afternoon, while in the morning it falls down to 4-6 °C.

CWT 5

A low pressure barometric system passes over the Aegean Sea area and moderate northerly winds affect the area of Thesprotia. The surface temperature of less than 7°C at night reaches 13-14 °C around

noon. Precipitation amounts are recorded during the first hours, improving to drizzle or no rain conditions later in the day.

CWT 6

An upper air trough of cold air masses and relatively low surface pressures cause moderate and gradually strong rain in the area of Thesprotia during this typical weather day. Low wind speeds are prevailing. Maximum temperature is around 15°C at noon.

CWT 7

Low pressures over the Ionian Sea cause southerly winds strengthening at noon with temporal rain and weather improvement later. High surface temperatures around 22°C occur because of the warm air masses moving from south.

CWT 8

Mid-day atmospheric instability causes temporal rain around noon. Weak pressure gradient results to light sea breeze at noon and weak northerly winds later. Temperature varies around the normal seasonal levels for this area of 25°C.

CWT 9

High pressures prevailing over the Balkan Peninsula are combined with low pressures over the eastern Mediterranean Sea resulting to low up to moderate east-north-easterly wind speeds in the area of Thesprotia. Low temperatures occur at night around 10°C and relatively high temperatures at 2m, for this period, during the day reach up to 19°C.

CWT 10

The weak pressure gradient during the day results to variable winds with moderate sea breeze at noon over Thesprotia region. Temporary rainfall occurs during midday hours as a result of thermal atmospheric instability. The temperature is at normal levels for this period rising up to 25 °Celsius around noon.

CWT 11

An upper air trough results to moderate rainfall at times during the day. Northerly winds turning to variable (directions) and finally to north-easterlies, with moderate wind speeds affecting the area. The surface temperature reaches 26-27 ° C around noon, falling down to 12-14 °C at night.

Table 3. Prevailing meteorological conditions during the characteristic weather types (CWT) in the area of Florovouni (WRF model data): Horizontal component of wind speed, U (m/s), Vertical component of wind speed V (m/s), (at 850 mbar), T Temperature (K) (at 2 meters above sea level), Relative Humidity (in %), MLH Mixing Layer Height (m above sea level): Results for 00:00, 12:00 and 24:00.

(00:00)					
Typical Day	U (m/s) (850 mb)	V (m/s) (850 mb)	T (K) (at 2 m a.s.l.)		
1	7.12	0.6	282.09		
2	5.2	1.82	280.86		
3	0.18	1.72	295.42		
4	3.29	-23.3	277.59		
5	10.95	3.12	280.63		
6	-0.89	-2.49	279.67		
7	2.41	1.14	286.7		
8	-4.54	-1.92	292.95		
9	3.16	-3.5	284.78		
10	9.85	1.01	293.58		
11	8.29	-1.07	289.33		
(12:00)					
Typical Day	U (m/s) (850 mb)	V (m/s) (850 mb)	T (K) (2 m a.s.l.)	RH (%) (2 m a.s.l.)	MLH (m a.s.l.)
1	10.91	1.07	286.42	71.24	528.68
2	8.86	-0.67	285.06	84.66	626.33
3	-1.79	2.25	302.95	79.05	942.04
4	1.06	-20.04	283.82	66.5	435.41
5	9.48	-0.21	284.36	78.77	589.71
6	-1.92	-2.76	285.99	75.37	516.84
7	4.13	2.42	296.32	89.54	693.08
8	-6.84	-0.63	296.99	70.8	332.18
9	4.07	-3.88	291.2	74.82	700.72
10	9.44	4.26	297.31	79.05	887.15
11	6.98	-0.69	294.23	85.47	863.01
(24:00)					
Typical Day	U (m/s) (850 mb)	V (m/s) (850 mb)	T (K) (2 m a.s.l.)		
1	10.18	1.23	283.39		
2	8.21	1.38	282.76		
3	-0.57	-0.35	297.37		
4	1.32	-18.39	281.28		
5	8.43	-2.97	279.48		
6	-3.82	-1.65	280.3		
7	7.18	0.23	289.63		
8	-4.13	-2.12	293.28		
9	3.38	-5.59	286.57		
10	3.69	2.39	291.96		
11	9.42	0.7	288.31		

SIMULATION OF THE DISPERSION OF THE POLLUTANTS

This chapter presents the preparation of the input data for the atmospheric dispersion model **HYSPLIT** (Hybrid Single Particle Lagrangian Integrated Trajectory Model) used in the present study.

There are two potential suppliers of gas turbines in the Florovouni compressor station:

1) SIEMENS SGT 700 Gas Turbines
2) GE PGT 25+ Gas Turbines.

The technical data provided by the constructor show that the SIEMENS gas turbines produce higher emissions than those of GE. For this reason, the present study investigated the impact of the emissions from SIEMENS Gas Turbines in the area including also the background pollutant concentrations. Yet, to provide a complete picture of both potential turbines installations, model simulations were also carried out for the second case of GE Gas Turbines.

The Dispersion Model

The HYSPLIT model is the newest version of a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. As a result of a joint effort between NOAA and Australia's Bureau of Meteorology, the model has been used for several applications (https://ready.arl.noaa.gov/HYSPLIT.php). The Air Resources Laboratory's HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model is a complete system for computing both simple air parcel trajectories and complex dispersion and deposition simulations. The model calculation method is a hybrid between the Lagrangian approach, which uses a moving frame of reference as the air parcels move from their initial location, and the Eulerian approach, which uses a fixed three-dimensional grid as a frame of reference. In the model, advection and diffusion calculations are made in a Lagrangian framework following the transport of the air parcel, while pollutant concentrations are calculated on a fixed grid. The model is designed to support a wide range of simulations related to the atmospheric transport and dispersion of pollutants and hazardous materials, as well as the deposition of these materials onto the Earth's surface.

Data of the pollutant emissions from FCS

The Florovouni station is designed to comprise eight (8) Stacks – Gas Turbines of 31MW each (in ISO conditions) in total. The computational study investigated the Phase 2 of the project which included 7 of 8 Gas Turbines (GT) operating 7665 hours per year.

Table 4 shows data on the geometric characteristics of the stacks and the gas flow properties while Tables 5 and 6 provide the emission values of the pollutants from the two GT suppliers. The data show that in each GT case, the seven stacks are identical between them with respect to the geometric characteristics, operational parameters and emission rates of the pollutants.

Table 4. Data on emission sources from FCS.

Emission source	Number of stacks	Stack Geometric characteristics		Exit gas Temperature (°C)	Turbine Exhaust gas flow rate (kg/h)	Turbine Exhaust gas density (kg/m^3)	Exit gas velocity (m/s)
		Height (m)	Size (m)				
Siemens SGT 700 Gas Turbine	7	19	2.6 × 3.8	531.0	332,800	0.410	22.8
GE PGT 25+ Gas Turbines	7	19	2.15 × 4.25	505.0	284,400	0.442	19.5

Table 5: Data of NO_x and CO from each SGT700 Gas Turbine.

Pollutant	Pollutant concentration limit in exhaust mg/Nm^3	Emission rates of the pollutants kg/h
NO_x (as NO_2)	35	9.1
CO	40	10.4

Table 6: Data of NOx and CO from each GE PGT 25+ Gas Turbine.

Pollutant	Pollutant concentration limit in exhaust mg/Nm^3	Emission rates of the pollutants kg/h
NO_x (as NO_2)	35	7.6
CO	40	8.7

Ambient Air Quality in the Study Area

A field survey campaign was carried out during December 2017- January 2018 for two weeks (14 days in total) to investigate the ambient air quality conditions in the area of Florovouni. The area is mountainous and sparsely populated. The main economical activities in the region are agriculture (farmlands in the valleys) and summer tourism mainly along the coast. There is no industrial activity in the area of interest. During the winter months the concentrations of NOx and CO originate from anthropogenic activities such as traffic and domestic heating. Hence, the campaign was designed to determine the NO_x and CO ambient concentrations of the residential areas, where the highest possible concentrations out of the whole area could be detected. The locations of the measurements were mainly within a circle of 10 km centred at the compression station.

Table 7, summarises the results from the field campaign. The measured data represent total daily values, mean of the period of 14 days during the winter season. The measurements and consequent laboratory analysis showed that the daily average background concentrations of both pollutants of interest were of very low values compared to those found in more heavily populated areas of the country. In particular, the CO ambient concentrations were smaller than the detection limit (0.2 mg/m^3) of the measuring device and analytical method. Hence, the concentrations of the CO background could not be taken into account in the modelling study and were considered to be equal to zero.

The measured NO_x concentrations were exploited in the modelling study to determine the accumulated effect of the compressor station and the background on the mean hourly NO_x concentrations. Annual values of the ambient concentrations of the pollutant could not be determined as the field campaign was limited to two weeks.

Since the campaign took place during the specific winter months, the corresponding measured data was assumed as winter background in the dispersion modelling study in the simulation of the mean hourly NO_x concentrations during the characteristic weather types of winter (CW1, CW4, CW5 and CW9). An interpolation method according to Wong et al, (2004)[5], was applied to determine the background near surface NO_x hourly mean concentrations over the whole computational domain.

[5] Wong D W, Yuan L., & Perlin SA, Comparison of spatial interpolation methods for the estimation of air quality data, *Journal of Exposure Analysis and Environmental Epidemiology* 14, 404–415 (2004), doi:10.1038/sj.jea.7500338

Table 7. Field survey (measured) total daily NO_x and CO concentrations at locations within a radius of 10 km around FCS.

Site	NO_x concentration ($\mu g/m^3$)	CO concentrations (mg/m^3) Detection limit 0.2 mg/m^3
MAZARAKIA	6.2	0.009
KARTERI	8.5	0.012
POLYNERI	3.9	0.008
PERDIKA	12.1	0.010
SIVOTA	5.3	0.008
KARAVOSTASI	8.3	0.008
AGIA	7.1	0.006
ANTHOUSA	8.6	0.007
PARGA	13.0	0.010
ELEUTHERI	6.7	0.011
MARGARITI	8.4	0.009

RESULTS - CONCLUSIONS

This section focuses on the analysis of the HYSPLIT model results of the concentration values of NO_x, and CO from Florovouni Compression Station (FCS) for the two case studies of gas turbines suppliers.

The concentrations of NO_x were calculated on an hourly and annual basis to compare the modelled calculated results with the respective air quality limits as set by the legislation in force (MD 14122/549/E.103/2011 “Measures to improve air quality in compliance with the provisions of Directive 2008/50/EC "on the air quality and cleaner air for Europe" the European Parliament and Council of the European Union of 21 May 2008”). According to the current directive, the air quality limit for NO_2 for averaging period of 1 hour is set at 200 $\mu g/m^3$ not to be exceeded more than 18 times a calendar. On an annual average basis, the respective limit is 40 $\mu g/m^3$. The CO values were calculated as maximum daily 8 hour running mean concentrations for comparison with the respective air quality limit of 10 mg/m^3 (Directive 2008/50/EC).

The modelling approach was performed without the inclusion of the photochemical reactions which could reduce the concentrations of NO_x and CO in the atmosphere for the reason of obtaining the maximum possible values in the domain. Moreover, detailed data on the compounds from high resolution inventories would be needed for a photochemical model, which were not available.

1. SIEMENS SGT 700 Gas Turbines

Two set-ups of model simulations were performed for the case of SIEMENS SGT 700 Gas Turbines. The first one included only the emissions of NO_x and CO from the FCS. In the second set-up, the model simulated the total effect of the background values and those from the FCS on NO_x concentration fields during the winter CWTs. The distribution of the calculated NO_x concentrations emitted from the FCS only is shown in contours in Figures 2 and 3, where the domain centre is placed at the FCS. Special attention was given to the populated areas around the compression station.

Figures 2 and 3 show the maximum hourly and annual average concentrations of NO_x for the case of SGT700 Gas Turbines, respectively, calculated by HYSPLIT taking into account the eleven characteristic weather types of the region and their frequency of occurrence within a typical year (see Table 2). It can be observed that the **maximum hourly average values of NO_x concentrations from the FCS are not found to exceed the limit of 200 $\mu g/m^3$ during any characteristic weather type** (see Table 8). The maximum hourly average NO_x concentrations remain low and well below the air quality limit. The maximum hourly average

concentration of NO_x of 148.2 μg/m^3 was calculated during CWT6. Those maximum values are calculated in places closely to the compression station, within an approximate radius of less than 5 km. Furthermore, **the annual concentration values in NO_x from the FCS do not exceed the respective air quality limit of 40 μg/m^3** (Figure 3). The modelling calculations show that the impact of the NO_x concentrations from the Florovouni compression station in the area is very small.

Table 10 summarizes the maximum hourly average and annual NO_x concentrations as well as the CO maximum 8-hour running mean values from the FCS calculated by the dispersion model over the residential areas of the domain. **It can be deduced, that no exceedances of the NO_2 and CO respective air quality limits occur over the populated areas within an approximate distance of 20 km.**

Figure 4 (right hand panel) depicts the **combined effect** of background measured NO_x concentrations and those from the compressor station (left hand panel) in the near surface maximum hourly average concentrations of NO_x for winter characteristic weather types (CWT1, CW4, CW6 and CW9). As previously mentioned, the hourly NOx concentrations during the winter period were measured to be very small. **The total NO_x concentrations calculated in the domain during the winter period remain very low, well below the air quality limit**. The maximum total mean hourly NO_x concentration in the domain was detected during the CW9 to be equal to 81.8 μg/m^3, whereas the corresponding value without the background concentrations was 81.4 μg/m^3 (Fig. 4, left hand panel).

Table 11 summarizes the maximum hourly average NO_x concentrations found in CWT 1, 4, 5 and 9, over the residential areas from the FCS as well as those calculated as total contribution to the field from the FCS and the background concentrations. The modelling results show that the concentrations from total contribution remain low and well below the air quality limit of 200 μg/m^3 over all residential settlements within a distance of 20 km from the FCS.

Figure 5 depicts the model results of the CO maximum 8-hour running mean concentrations for the 11 CWTs. The maximum 8-hour value of CO concentration was calculated to be equal to 67.8 μg/m^3 during CWT5. This concentration value is not significant compared to the respective air quality limit of 10000 μg/m^3. **Overall, the CO 8-hour mean values were found to remain very low and insignificant compared to the legislative limit everywhere in the domain. No exceedances occurred whatsoever** (see Tables 9 & 10).

Table 8. Maximum calculated near surface values of hourly average NO_x concentrations in the domain per CWT (SGT700 Gas Turbines).

FCS (SGT700 Gas Turbines)	
CWT	**Maximum hourly (mean) NO_X concentration (μg/m^3)** (air quality limit 200 μg/m^3)
1	77.8
2	83.4
3	68.2
4	54.2
5	77.9
6	**148.2**
7	40.3
8	129.3
9	81.4
10	73.3
11	79.4

Table 9. Maximum calculated average concentration values of NO_x and CO in the domain (SGT700 Gas Turbines) and air quality limits (2008/50/EC).

Maximum hourly NOX (μg/m^3)	Annual average NO_x (μg/m^3)	Maximum 8-h mean CO (μg/m^3)
(limit 200 μg/m^3)	(limit 40 μg/m^3)	(limit 10000 μg/m^3)
148.2	7.2	67.8

Table 10. Calculated maximum concentration values of NO_x and CO over the residential areas in the domain for all CWT (SGT700 Gas Turbines).

FCS SGT700 Gas Turbines					
		Distance from FCS (km)	Maximum hourly (mean) NO_X concentration ($\mu g/m^3$)	Annual average NOx concentration ($\mu g/m^3$)	Maximum 8-h running mean CO concentration ($\mu g/m^3$)
Nu.	Settlements		(limit 200 $\mu g/m^3$)	(limit 40 $\mu g/m^3$)	(limit 10000 $\mu g/m^3$)
1	IGOUMENITSA	17.28	2.20	0.04	1.11
2	NEA SELEFKEIA	19.79	1.02	0.03	0.68
3	PARAMYTHIA	18.6	0.72	0.01	0.54
4	PARGA	9.6	10.31	0.22	2.96
5	PERDIKA	3.99	2.78	0.06	1.30
6	ACHEROUSIA	24.17	0.31	0.01	0.21
7	AGIA	5.48	8.35	0.33	4.36
8	AGIA KYRIAKI	23.63	0.04	0.00	0.01
9	AGIA MARINA	12.4	0.52	0.02	0.18
10	AMMOUDIA	17.96	1.15	0.04	0.50
11	AMPELIA	10.52	0.21	0.00	0.10
12	ANTHOUSA	7.28	10.69	0.43	5.38
13	ARGYROTOPOS	6.95	54.15	2.11	34.01
14	CHOCHLA	24.74	0.20	0.00	0.04
15	CHOIKA	20.43	0.19	0.00	0.09
16	CHRYSAVGI	18.14	0.64	0.01	0.32
17	ELATARIA	24.85	0.16	0.00	0.02
18	ELEUTHERION	8.39	4.99	0.16	2.50
19	FASKOMILIA	10.33	0.65	0.01	0.19
20	GAIOS	23.18	2.08	0.02	1.22
21	GARDIKION	19.54	0.62	0.00	0.15
22	GRAIKOCHORION	16.38	3.26	0.07	2.05
23	GRIKA	13.75	0.31	0.01	0.13
24	KALLITHEA	20.78	0.19	0.00	0.06
25	KARIOTION	18.46	0.38	0.00	0.06
26	KARTERION	4.05	22.91	0.17	9.07
27	KARVOUNARION	12.02	0.25	0.00	0.06
28	KASTRION	22.54	0.34	0.01	0.15
29	KATAVOTHRA	5.64	17.62	0.33	6.21
30	KEFALOVRYSON	17.66	0.18	0.00	0.21
31	KORITIANI	15.61	4.32	0.05	1.86
32	KORONI	19.84	0.50	0.01	0.36
33	KRYOVRYSI	13.68	0.69	0.01	0.19
34	KYPARISSON	19.43	0.51	0.01	0.32
35	KYPSELI	19.06	0.50	0.02	0.44
36	LADOCHORION	15.56	4.84	0.11	1.93

37	LAKKA	23.31	0.94	0.02	0.13
38	LOGOS	22.15	0.44	0.01	0.20
39	LOUTSA	24.12	0.27	0.01	0.16
40	MAGAZIA	24.54	0.28	0.01	0.12
41	MARGARITION	7.73	0.49	0.01	0.27
42	MAVROUDION	20.24	0.97	0.03	0.59
43	MAZARAKIA	6.18	2.21	0.05	0.69
44	MESOPOTAMON	20.94	0.47	0.01	0.32
45	MORFION	12.56	1.92	0.03	0.53
46	MOUZAKAIIKA	23.52	0.41	0.01	0.18
47	NEOCHORION	18.08	0.61	0.01	0.26
48	PALAIOCHORION	21.69	0.27	0.01	0.15
49	PANKRATI	13.29	0.16	0.00	0.05
50	PARAPOTAMOS	20.72	0.75	0.02	0.57
51	PLATARIA	12.45	4.33	0.09	1.56
52	PRODROMION	18.22	0.38	0.00	0.08
53	PSAKA	12.79	0.26	0.01	0.08
54	SALONIKI	25.56	0.10	0.00	0.02
55	SEVASTON	12.94	0.34	0.00	0.02
56	SKANDALON	16.04	0.31	0.01	0.14
57	STAVROCHORION	21.76	0.17	0.01	0.14
58	SYVOTA	10.43	3.92	0.06	2.09
59	THEMELON	19.41	0.45	0.02	0.36
60	VALANIDORACHI	21.44	0.41	0.01	0.19
61	VERENIKI	27.71	0.19	0.00	0.07
62	VRYSAI	8.88	3.96	0.11	1.97
63	XIROLOFOS	14.45	0.43	0.01	0.12
64	ZERVOCHORION	19.22	0.84	0.01	0.34

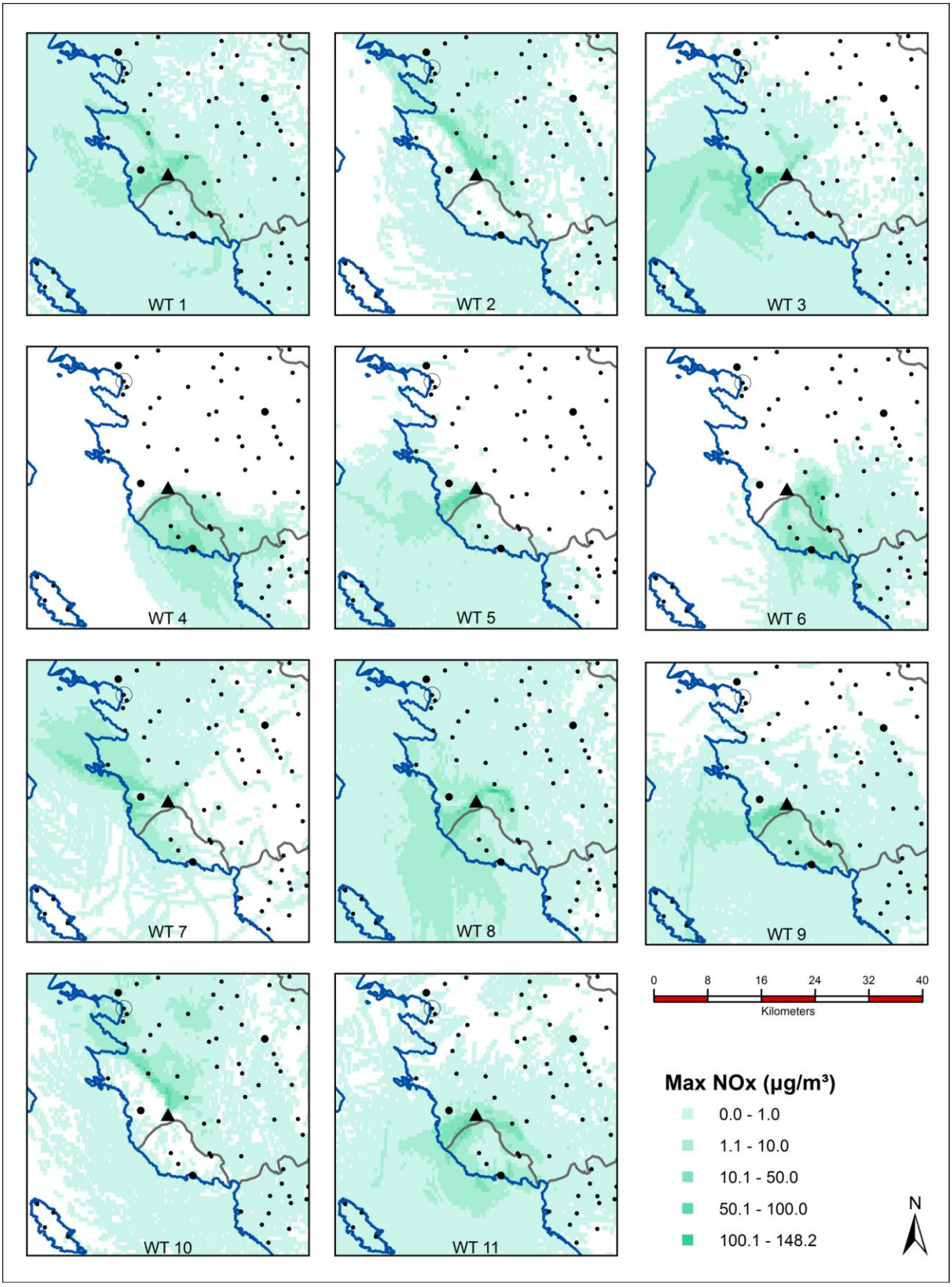

Figure 2. Near surface maximum hourly average concentrations of NO_x from FCS for the 11 CWT (SGT 700 Gas Turbines). Black dots indicate residential areas. Air quality limit values for hourly concentration of NO_2: 200 ($\mu g/m^3$).

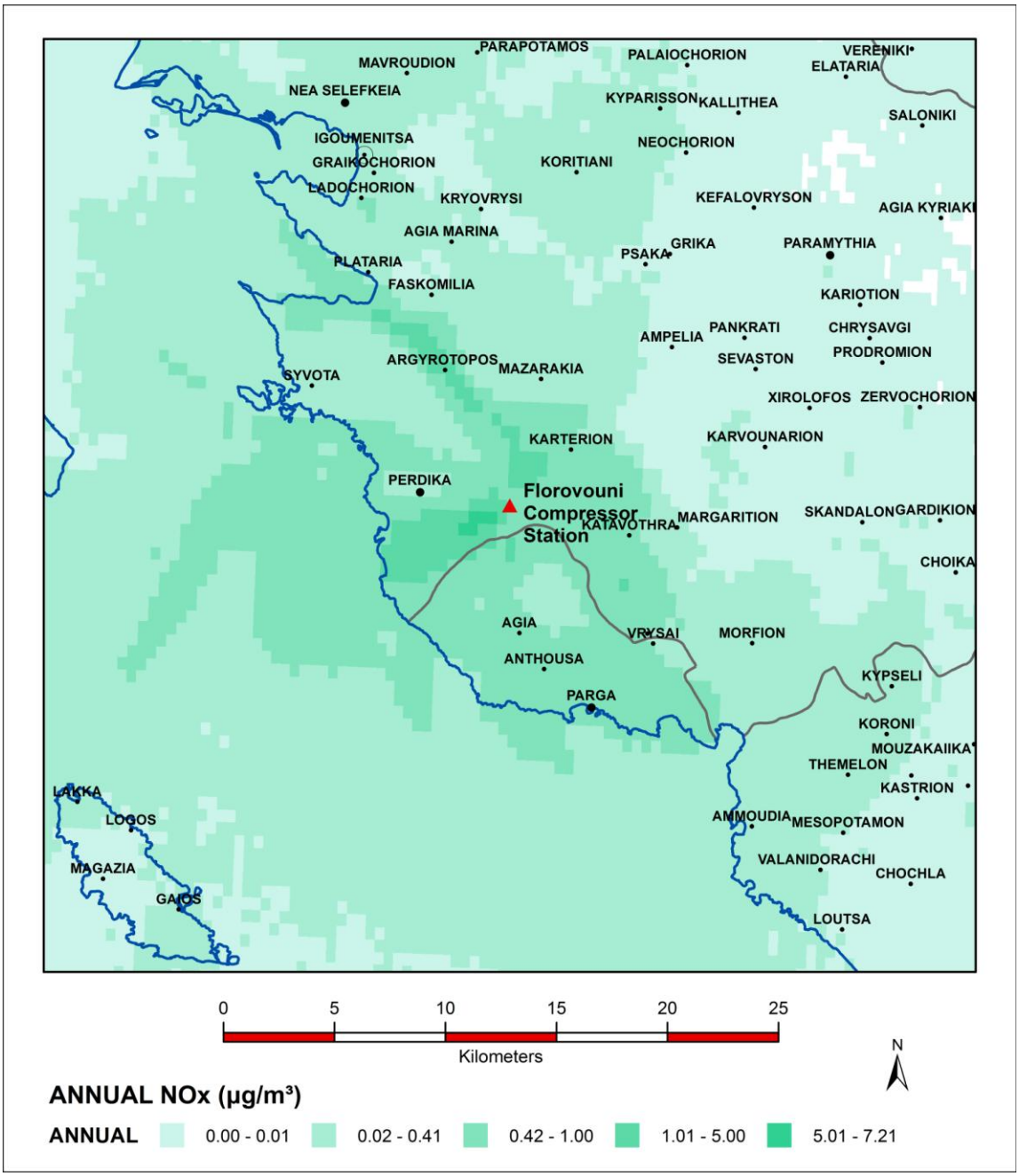

Figure 3. Near surface total average annual NO_x concentration contours from FCS (in µg/m^3) (SGT 700 Gas Turbines). Annual Air Quality Limit for NO_2: 40 (µg/m^3).

Table 11. Calculated for CWT 1, 4, 5 and 9 near surface: 1) maximum hourly concentration values of NOx over the residential areas in the domain from FCS and 2) total concentrations from FCS and background (SGT700 Gas Turbines).
- Air quality limit 200 μg/m^3 –

	Settlements	Maximum hourly (mean) NO_X concentration (μg/m^3) (no background contribution)	Maximum hourly (mean) NO_X Total concentration (μg/m^3) (with background contribution)
1	IGOUMENITSA	0.12	0.28
2	NEA SELEFKEIA	0.16	0.32
3	PARAMYTHIA	0.72	0.88
4	PARGA	10.31	10.70
5	PERDIKA	2.78	3.18
6	ACHEROUSIA	0.22	0.38
7	AGIA	8.35	8.65
8	AGIA KYRIAKI	0.00	0.16
9	AGIA MARINA	0.24	0.40
10	AMMOUDIA	0.84	1.01
11	AMPELIA	0.21	0.38
12	ANTHOUSA	10.69	11.01
13	ARGYROTOPOS	**41.26**	**41.43**
14	CHOCHLA	0.12	0.29
15	CHOIKA	0.07	0.23
16	CHRYSAVGI	0.64	0.81
17	ELATARIA	0.00	0.16
18	ELEUTHERION	4.99	5.30
19	FASKOMILIA	0.07	0.23
20	GAIOS	2.08	2.24
21	GARDIKION	0.62	0.78
22	GRAIKOCHORION	0.14	0.30
23	GRIKA	0.31	0.47
24	KALLITHEA	0.00	0.16
25	KARIOTION	0.38	0.54
26	KARTERION	22.91	23.24
27	KARVOUNARION	0.07	0.24
28	KASTRION	0.34	0.50
29	KATAVOTHRA	2.29	2.63
30	KEFALOVRYSON	0.18	0.34
31	KORITIANI	0.05	0.22
32	KORONI	0.50	0.66
33	KRYOVRYSI	0.15	0.32
34	KYPARISSON	0.05	0.21
35	KYPSELI	0.50	0.66
36	LADOCHORION	0.24	0.41
37	LAKKA	0.29	0.46
38	LOGOS	0.44	0.60

39	LOUTSA	0.25	0.41
40	MAGAZIA	0.16	0.33
41	MARGARITION	0.49	0.80
42	MAVROUDION	0.10	0.27
43	MAZARAKIA	0.14	0.36
44	MESOPOTAMON	0.47	0.63
45	MORFION	1.92	2.08
46	MOUZAKAIIKA	0.41	0.57
47	NEOCHORION	0.00	0.16
48	PALAIOCHORION	0.00	0.16
49	PANKRATI	0.03	0.19
50	PARAPOTAMOS	0.06	0.22
51	PLATARIA	0.38	0.54
52	PRODROMION	0.38	0.54
53	PSAKA	0.26	0.42
54	SALONIKI	0.03	0.20
55	SEVASTON	0.34	0.51
56	SKANDALON	0.20	0.36
57	STAVROCHORION	0.16	0.33
58	SYVOTA	0.35	0.54
59	THEMELON	0.45	0.61
60	VALANIDORACHI	0.41	0.57
61	VERENIKI	0.10	0.26
62	VRYSAI	3.96	4.31
63	XIROLOFOS	0.43	0.60
64	ZERVOCHORION	0.84	1.00

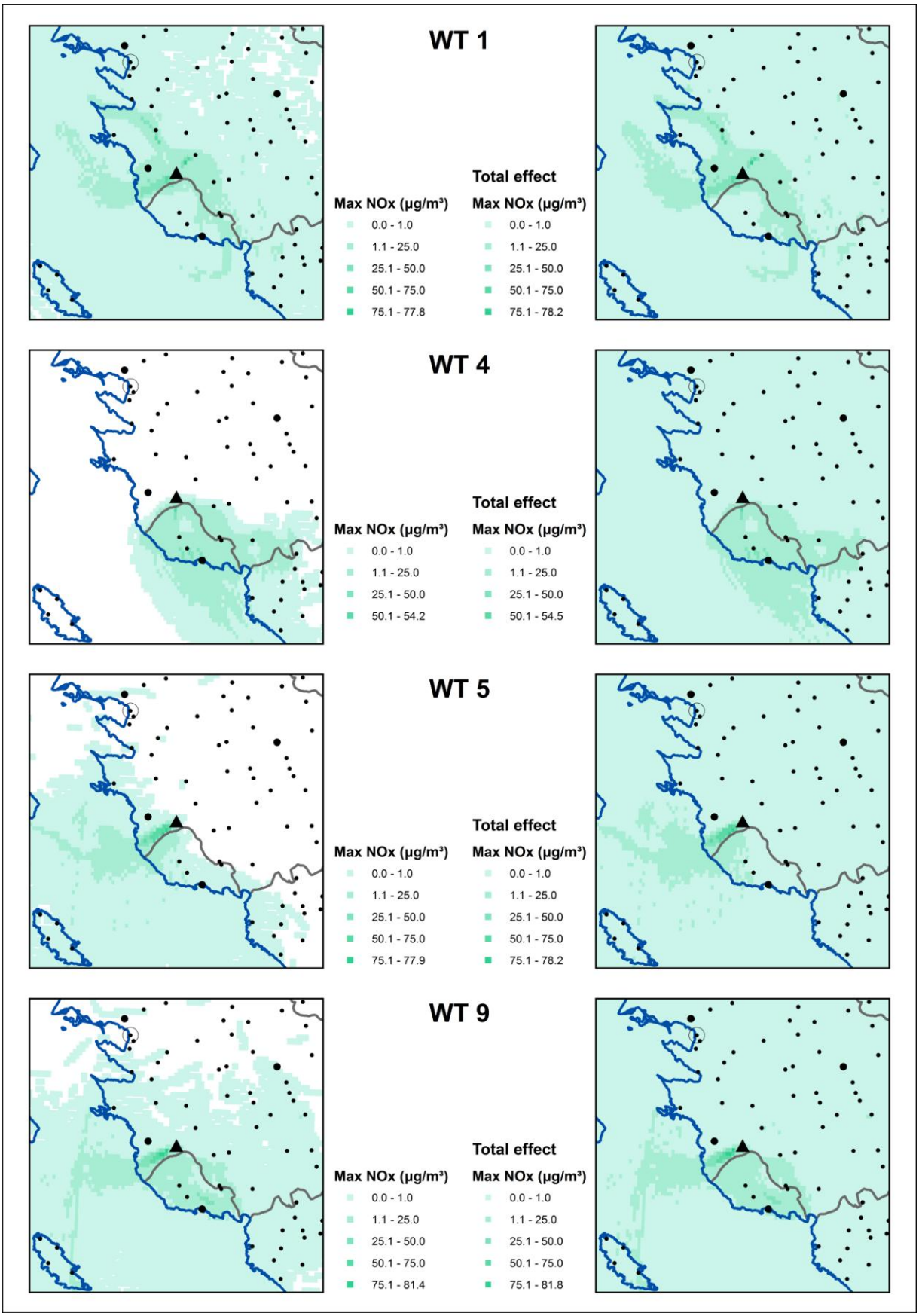

Figure 4. Left: Near surface maximum hourly average concentrations of NO_x from FCS for CWT 1, 4, 5 and 9 (SGT 700 Gas Turbines). Right: Combined effect of NO_x emitted from FCS and background values measured in the area. Annual Air Quality Limit for NO_2: 40 (µg/m^3).

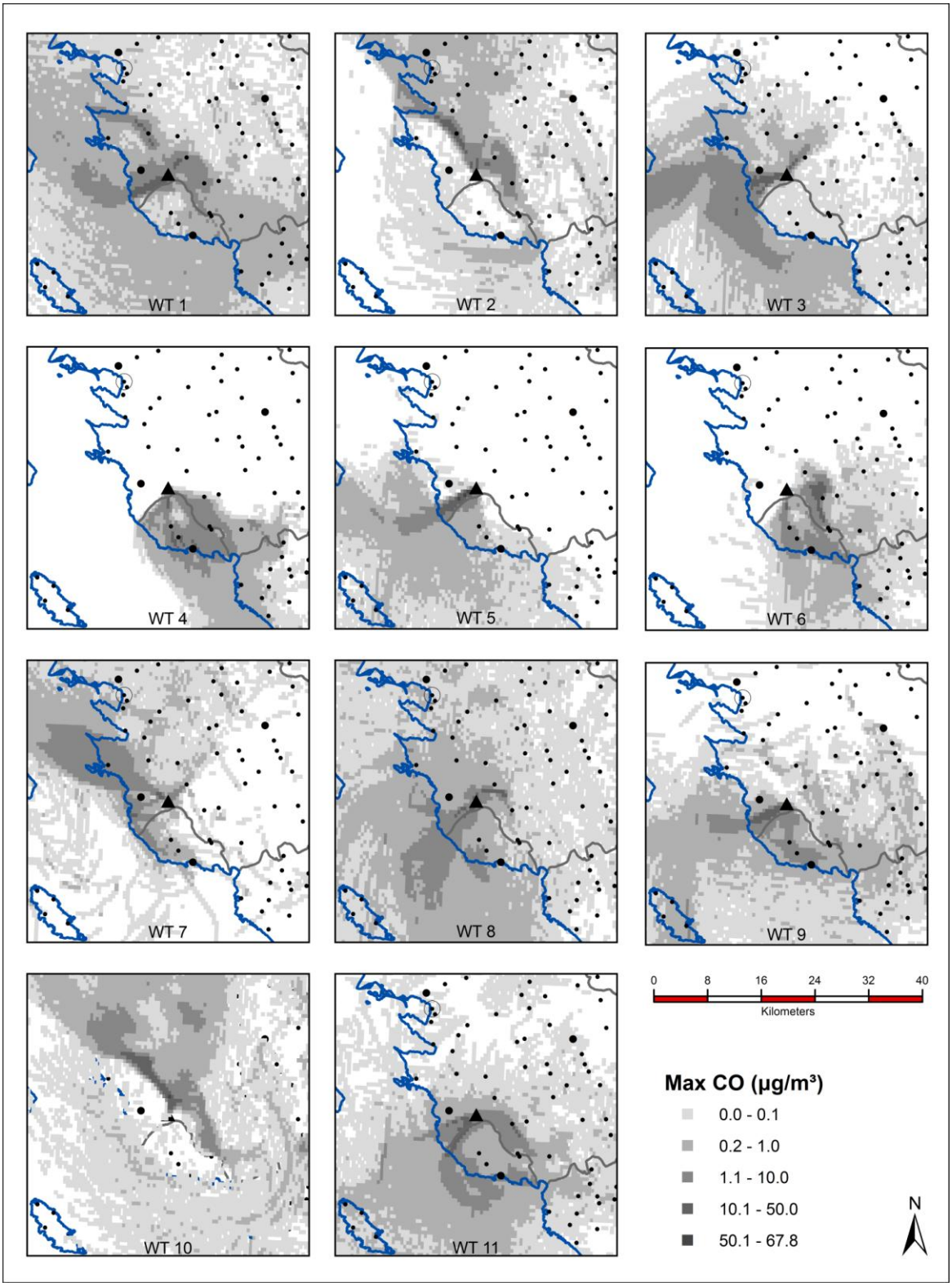

Figure 5. Near surface calculated 8-hour running mean concentration values of CO (µg/m^3) from FCS for the 11 CWT (SGT 700 Gas Turbines). Air quality limit for 8-hour mean concentration: 10000 (µg/m^3).

2 GE PGT 25+ Gas Turbines

The model simulated also the emissions from GE PGT 25+ Gas Turbines even though the supplier's data show that they are lower than those of SIEMENS. In this case, the model was set-up to simulate only emissions from the compression station without the inclusion of ambient concentrations. The total contribution of the background and the FCS concentrations to the air quality of the area was investigated during the SIEMENS case and that was found to be very small in the area, below the air quality limits.

Figures 6 and 7 show the maximum hourly and annual average concentrations of NO_x for the case of GE Gas Turbines, calculated by the model taking into account the eleven characteristic weather types of the region and their frequency of occurrence within a typical year (see Table 2). It can be observed that the **maximum hourly average values of NO_x concentrations from the FCS do not exceed the limit of 200 μg/m^3 during any characteristic weather type** (see Table 12). In fact, the maximum hourly average NO_x concentrations remain low and well below the air quality limit. The maximum hourly average concentration of NO_x of 133.3 μg/m^3 was found during CWT6. Those maximum values are calculated in areas closely to the compression station, within an approximate radius of less than 5 km. In addition, **the annual concentration values in NO_x from the FCS do not exceed the respective air quality limit** (40 μg/m^3) (Figure 7). The maximum annual NO_x concentration of 7.2 μg/m^3 is low compared to the respective air quality limit of 40 μg/m^3 (Table 13). It can be deduced that the impact of the NO_x concentrations from the Florovouni compression station in the area is very small for the case of GE PGT 25+ Gas Turbines. The maximum 8-hour running mean CO concentration was found to be equal to 67.6 μg/m^3, a value considered to be negligible compared to the air quality limit of 10000 μg/m^3.

Table 14 summarizes the maximum hourly average and annual NO_x concentrations as well as the CO maximum 8-hour running mean values from the FCS calculated by the dispersion model over the residential areas of the domain. **It can be deduced, that no exceedances of the NO_2 or CO respective air quality limits occur over the populated areas.**

Table 12. Maximum calculated near surface values of hourly average NO_x concentrations from FCS in the domain per CWT (GE PGT 25+ Gas Turbines).

Weather types	Maximum hourly (mean) NO_X concentration (μg/m^3)
1	66.2
2	101.0
3	59.4
4	45.1
5	68.6
6	**133.3**
7	50.3
8	132.1
9	67.7
10	68.4
11	86.9

Table 13. Maximum calculated average concentration values of NO_x and CO in the domain (FCS GE PGT 25+ Gas Turbines) and air quality limits (2008/50/EC).

Maximum hourly (mean) NOX concentration (μg/m^3)	Annual average NO_x concentration (μg/m^3)	Maximum 8-h mean CO concentration (μg/m^3)
(limit 200 μg/m^3)	(limit 40 μg/m^3)	(limit 10000 μg/m^3)
133.3	7.2	67.6

Table 14. Calculated maximum concentration values of NO_x and CO over the residential areas in the domain for all CWT (GE PGT 25+ Gas Turbines).

FCS GE PGT 25+ Gas Turbines					
		Distance from FCS (km)	**Maximum hourly (mean) NO_x concentration ($\mu g/m^3$)**	**Annual average NOx concentration ($\mu g/m^3$)**	**Maximum 8-h mean CO concentration ($\mu g/m^3$)**
Nu.	**Place of residence**		(limit 200 $\mu g/m^3$)	(limit 40 $\mu g/m^3$)	(limit 10000 $\mu g/m^3$)
1	IGOUMENITSA	17.28	2.07	0.03	0.29
2	NEA SELEFKEIA	19.79	0.69	0.02	0.31
3	PARAMYTHIA	18.6	8.67	0.00	2.60
4	PARGA	9.6	8.67	0.18	2.60
5	PERDIKA	3.99	3.12	0.06	1.34
6	ACHEROUSIA	24.17	6.14	0.00	3.00
7	AGIA	5.48	6.14	0.27	3.00
8	AGIA KYRIAKI	23.63	0.39	0.00	0.11
9	AGIA MARINA	12.4	0.93	0.01	0.41
10	AMMOUDIA	17.96	0.93	0.03	0.41
11	AMPELIA	10.52	7.84	0.00	2.88
12	ANTHOUSA	7.28	**45.80**	0.28	**12.43**
13	ARGYROTOPOS	6.95	**45.80**	**1.94**	**12.43**
14	CHOCHLA	24.74	0.19	0.00	0.25
15	CHOIKA	20.43	0.33	0.00	0.25
16	CHRYSAVGI	18.14	0.33	0.00	0.02
17	ELATARIA	24.85	3.73	0.00	1.59
18	ELEUTHERION	8.39	3.73	0.10	1.59
19	FASKOMILIA	10.33	2.69	0.01	0.13
20	GAIOS	23.18	2.69	0.02	0.13
21	GARDIKION	19.54	3.65	0.00	0.24
22	GRAIKOCHORION	16.38	3.65	0.05	0.24
23	GRIKA	13.75	0.24	0.00	0.05
24	KALLITHEA	20.78	0.72	0.00	0.05
25	KARIOTION	18.46	22.37	0.00	8.85
26	KARTERION	4.05	22.37	0.15	8.85
27	KARVOUNARION	12.02	0.98	0.01	0.14
28	KASTRION	22.54	16.08	0.01	4.79
29	KATAVOTHRA	5.64	16.08	0.33	4.79
30	KEFALOVRYSON	17.66	3.50	0.00	0.16
31	KORITIANI	15.61	3.50	0.05	0.30
32	KORONI	19.84	0.49	0.01	0.30
33	KRYOVRYSI	13.68	0.45	0.01	0.15
34	KYPARISSON	19.43	0.52	0.01	0.38
35	KYPSELI	19.06	2.62	0.01	0.57
36	LADOCHORION	15.56	2.62	0.08	0.57
37	LAKKA	23.31	1.09	0.02	0.02
38	LOGOS	22.15	0.45	0.01	0.11

39	LOUTSA	24.12	0.26	0.00	0.11
40	MAGAZIA	24.54	0.67	0.01	0.23
41	MARGARITION	7.73	0.67	0.01	0.31
42	MAVROUDION	20.24	1.96	0.02	0.54
43	MAZARAKIA	6.18	1.96	0.04	0.54
44	MESOPOTAMON	20.94	2.23	0.01	0.64
45	MORFION	12.56	2.23	0.03	0.64
46	MOUZAKAIIKA	23.52	0.62	0.00	0.10
47	NEOCHORION	18.08	0.62	0.01	0.07
48	PALAIOCHORION	21.69	0.41	0.01	0.07
49	PANKRATI	13.29	0.21	0.00	0.14
50	PARAPOTAMOS	20.72	1.66	0.01	0.49
51	PLATARIA	12.45	1.66	0.06	0.49
52	PRODROMION	18.22	0.63	0.00	0.06
53	PSAKA	12.79	0.63	0.01	0.09
54	SALONIKI	25.56	0.22	0.00	0.09
55	SEVASTON	12.94	0.35	0.00	0.11
56	SKANDALON	16.04	0.35	0.01	0.11
57	STAVROCHORION	21.76	2.23	0.01	0.25
58	SYVOTA	10.43	2.23	0.04	0.51
59	THEMELON	19.41	0.64	0.02	0.51
60	VALANIDORACHI	21.44	0.56	0.01	0.19
61	VERENIKI	27.71	1.55	0.00	1.06
62	VRYSAI	8.88	1.55	0.06	1.06
63	XIROLOFOS	14.45	0.22	0.01	0.06
64	ZERVOCHORION	19.22	0.20	0.00	0.06

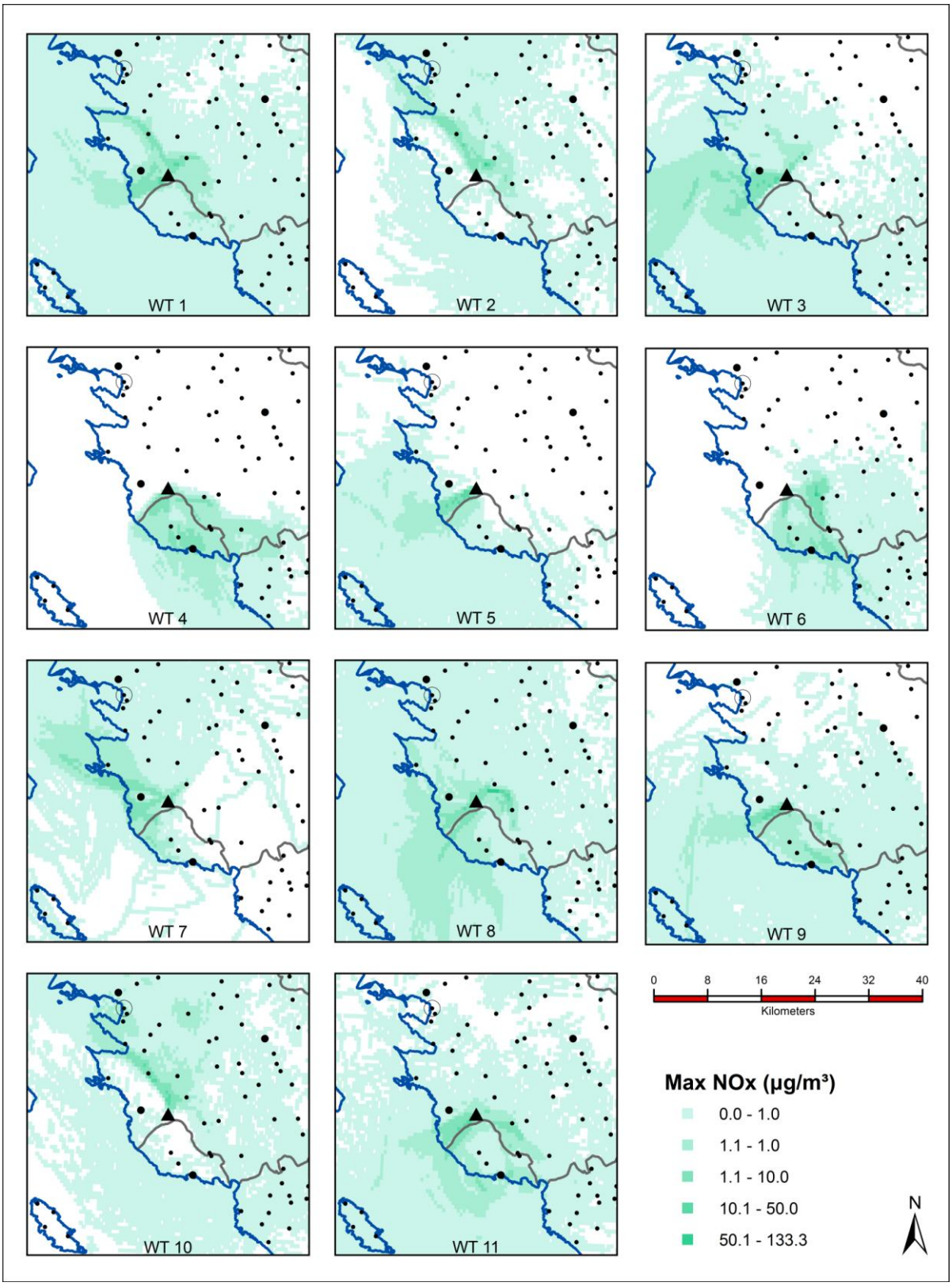

Figure 6. Near surface maximum hourly average concentrations of NO_x from FCS for the 11 CWT (GE PGT 25+ Gas Turbines). Black dots indicate residential areas. Air quality limit values for hourly concentration of NO_2: 200 (µg/m^3).

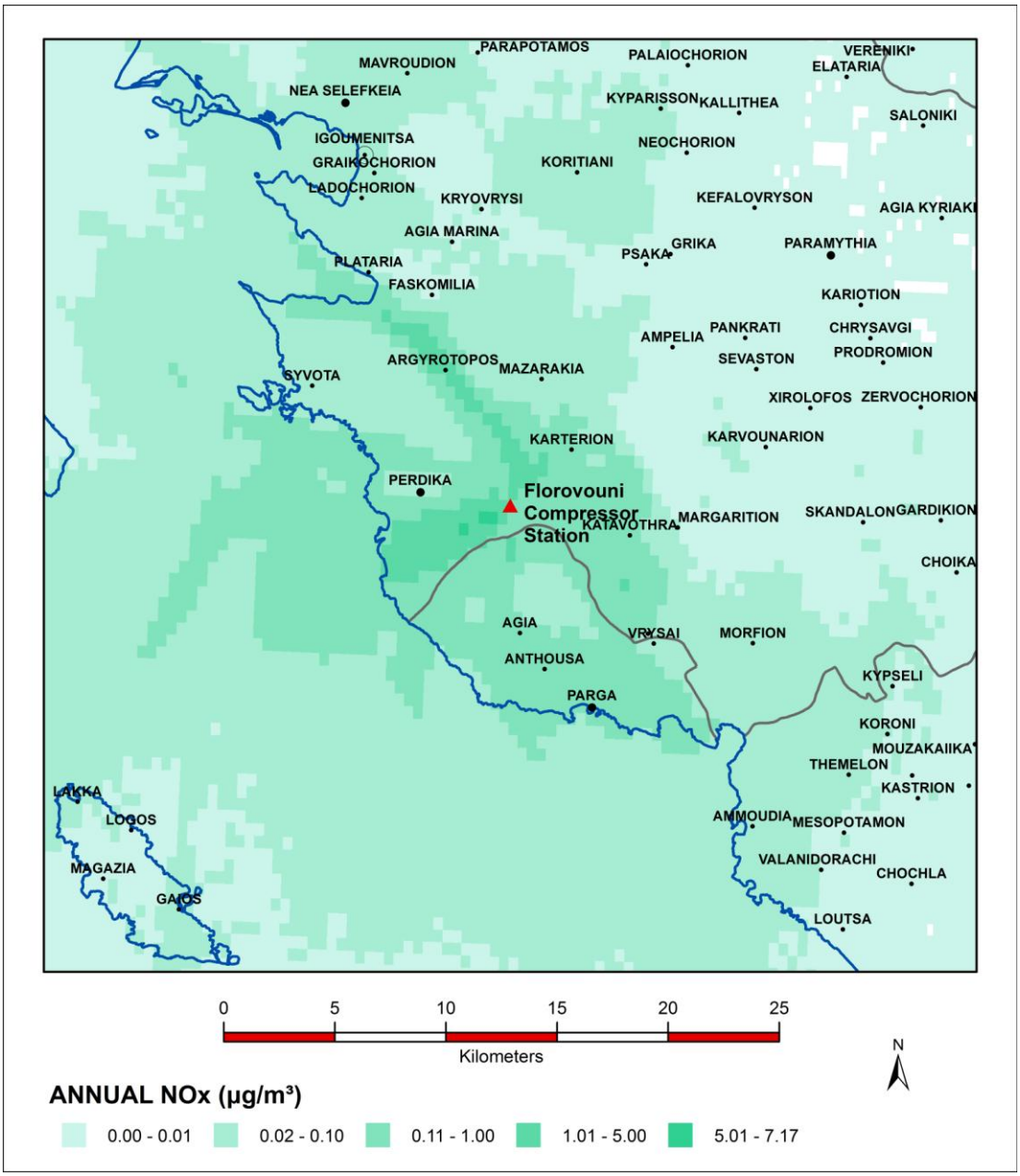

Figure 7. Near surface total average annual NO_x concentration contours from FCS (in µg/m^3) (GE PGT 25+ Gas Turbines). Annual Air Quality Limit for NO_2: 40 (µg/m^3).

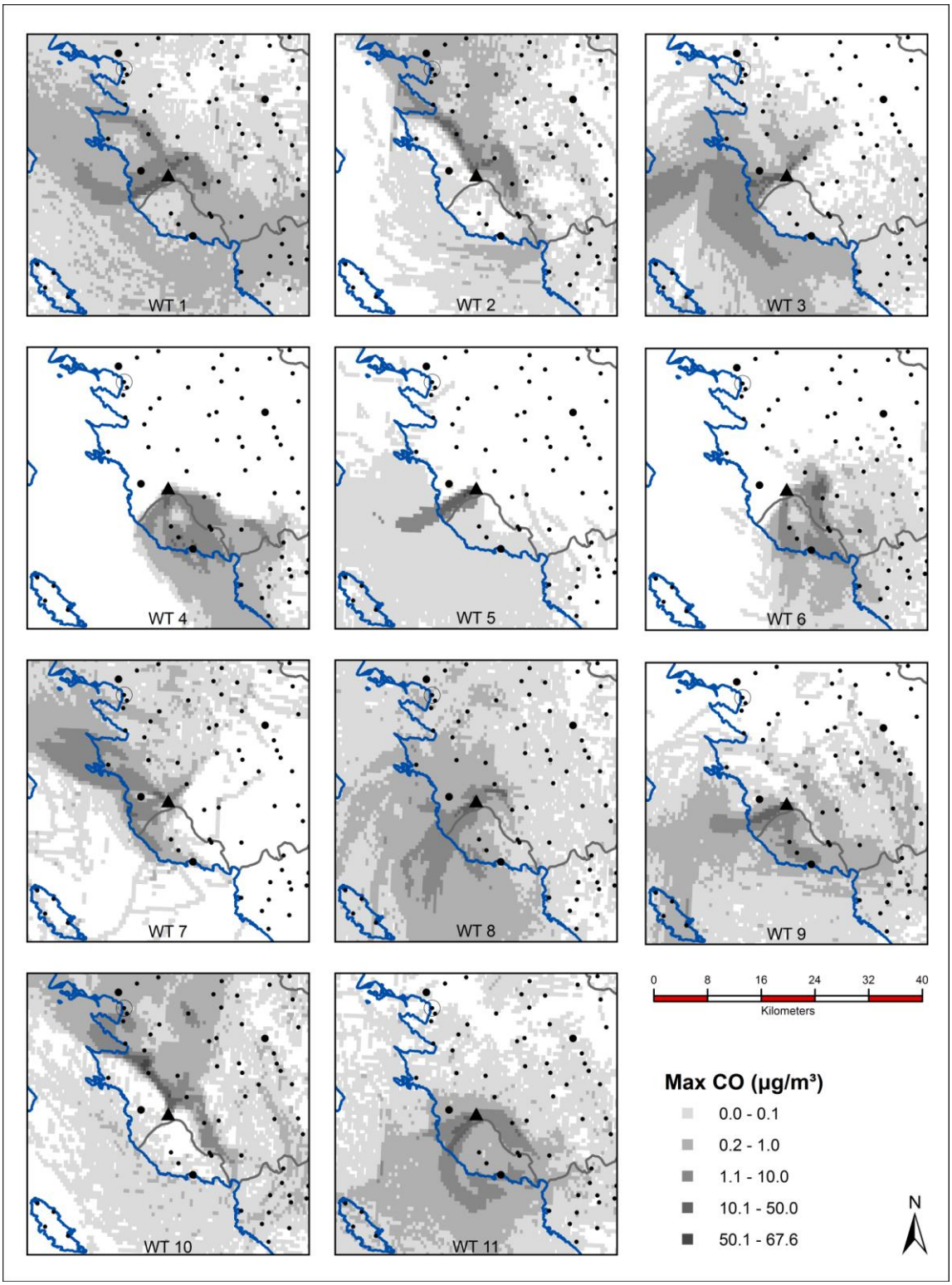

Figure 8. Near surface calculated 8-hour running mean concentration values of CO (µg/m^3) from FCS for the 11 CWT (GE PGT 25+ Gas Turbines). Air quality limit for 8-hour concentration: 10000 (µg/m^3).

Summary – conclusions

The study was performed with the modelling system WRF-HYSPLIT to investigate the dispersion of NO_x and CO emissions from the future Florovouni gas compressor station during Phase 2 of the project and for the potential installation of gas turbines from two suppliers, SIEMENS SGT 700 Gas Turbines and GE PGT 25+ Gas Turbines. The measured ambient concentrations were taken into account in the dispersion simulation for the supplier SGT 700 Gas Turbines, which produced the highest emissions compared to the GE PGT 25+ Gas Turbines case. The dimensions of the modelling domain were large enough to include sufficiently the residential areas within a distance of approximately 20 km from the compression station.

The dispersion simulations were carried out for the eleven (11) characteristic weather types (CWT) of the area determined using appropriate 3-dimensional meteorological data. The near-surface hourly average and annual NO_x concentrations as well as the 8-hour running mean CO concentration values were calculated in order to be comparable to the respective air quality limits as set by the legislation in force (MD 14122/549/E.103/2011 "Measures to improve air quality in compliance with the provisions of Directive 2008/50/EC "on the air quality and cleaner air for Europe" the European Parliament and Council of the European Union of 21 May 2008").

Overall, the hourly mean and annual NO_x concentrations were calculated to be smaller than the air quality limits everywhere in the domain and during all the 11 CWTs, for both cases of gas turbines suppliers. Maximum concentrations were found in close distances from the FCS and within a radius of less than 5 km. The CO concentrations were calculated to be negligible compared to the air quality legislative limit.

It must be emphasised also that no exceedances of the NO_2 and CO respective air quality limits were found over the populated settlements within a distance of approximately 20 km due to the emissions from the Florovouni compressor station.

More particularly, the modelling results yielded the following:

SGT 700 Gas Turbines:

- the maximum mean hourly NO_x concentration was found to be equal to 74% of the air quality limit of 200 $\mu g/m^3$ (during CWT 6)
- the maximum annual NO_x concentration was found to be equal to 18% of the air quality limit of 40 $\mu g/m^3$
- the maximum 8-hour running mean CO concentration was found to be equal to 0.68% of the air quality limit of 10000 $\mu g/m^3$ (during CWT5)

SGT 700 Gas Turbines **with** contribution of background concentrations included:

- the maximum mean hourly NO_x concentration was found to be equal to 41% of the air quality limit of 200 $\mu g/m^3$ (during CWT 9)

GE PGT 25+ Gas Turbines:

- the maximum mean hourly NO_x concentration was found to be equal to 67% of the air quality limit of 200 $\mu g/m^3$ (during CWT 6)
- the maximum annual NO_x concentration was found to be equal to 18% of the air quality limit of 40 $\mu g/m^3$
- the maximum 8-hour running mean CO concentration was found to be equal to 0.67% of the air quality limit of 10000 $\mu g/m^3$ (during CWT5)

11.3 Noise Baseline Report and Propagation Model

NOISE IMPACT STUDY

PROJECT: POSEIDON PIPELINE PROJECT
SUBJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

LOCATION: FLOROVOUNI THESPROTIAS

CLIENT: ASPROFOS

CONSULTANT:

Acoustics Consultancy Company
54 Spirou Dimas st.,
Peania, GREECE – 190 02
TEL: +30 210 6921928
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ATHENS, FEBRUARY 2018

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A. SCOPE OF WORKS

Poseidon Pipeline Project is a natural gas pipe under study, that will transfer natural gas to Europe through the south corridor. The pipe will start from Greece, it will traverse the Adriatic Sea and it will end in South Italy.

'Florovouni' Compression Station will be located in Thesprotia in West Greece (GGRS87 coordinates: X = 185 405,69 Y = 4 362 971.98). At the initial stage it will have 70 MW capacity and at the final stage it will have 210 MW capacity.

The subject of this Acoustic Study is to measure the existing ambient noise in settlements around the location of the 'Florovouni' Compression Station and to assess the impact to these settlements from noise emitted from the plant when it will be operating. The project is under study; hence the assessment will be made by simulating the propagation of the sound emitted during the operation to the nearby settlements of:

- Karavostasi, 6km Southwest
- Perdika, 4km West
- Agia, 5.3km South
- Karteri, 3.5km East

This report presents the baseline noise measurements and the noise maps predicted from the noise propagation model.

B. THEORY - DEFINITIONS

B.1. Definitions, properties and measurement units of sound

Sound is defined as the mechanical disturbance that propagates with certain speed in a medium that can develop internal forces and has such a character that can stimulate the auditory transducer and cause auditory sense.

The frequency of the sound (f) is the oscillation frequency of the particles of the elastic medium due to the dissipation of the sound wave, which corresponds to the number of repetitions per second and is measured in Hertz (Hz).

In acoustics, the units that are used are usually logarithmic. The main unit of measurement is the decibel (dB). It is a logarithmic unit of measurement of acoustic pressure, tension and power emitted by a sound source.

Instant sound level (Sound Pressure Level) is defined thus as:

$$L_p(t) = 10\log\frac{p^2(t)}{p_0^2} = 20\log\frac{p(t)}{p_0}dB, \quad (1)$$

where p(t) is the instantaneous sound pressure and p_0 = 2x10-5 N/m^2 is the reference value.

The dynamic range that can be perceived by an average person is 0-120 dB. Since the dB is a logarithmic unit, a reduction of 6 dB corresponds to half (1/2) the value of the instantaneous sound pressure.

All noise sources cause a time-varying sound level. Therefore, noise cannot be described and evaluated with the use of instant sound level. For this reason, the equivalent continuous sound level or equivalent noise level is used, Leq, which expresses the level of a constant sound source that encompasses the same acoustic energy with the actual sound.

$$Leq = 10\log\frac{\frac{1}{T}\int_0^T p^2 dt}{p_{ref}^2}, \quad (2)$$

where T is the time of observation.

The human ear works in the frequency range from 16Hz up to 20 kHz but its sensitivity is not the same at all frequencies. Specifically, the human ear is more sensitive to frequencies in the range of 1000-2000 Hz. For this reason, and in order to adjust the measured noise in the way of the human ear canal, we use frequency-weighting filters. The most common filter is the A-weighting filter.

The sound level resulting from measurements with A-weighting filter called the A-Weighted sound level and is measured in dB(A). In the majority of cases, the noise measurements (acoustic pressure levels) are made using this filter, by using certified portable devices, called sound level meters. These instruments are fitted with A-weighting filter and the calculation in dB(A) is done automatically.

B.2. Sound and its evaluation criteria

Sound is defined as the mechanical disturbance that propagates with certain speed in a medium that can develop internal forces and has such a character that can stimulate the auditory transducer and cause auditory sense.

Common indices that are used for environmental noise impact assessment are:

L_{eq}: The energetic average level of the noise during a measurement

L_{day} A-weighted long-term mean sound level, calculated for the total 'day' time periods (07:00 – 19:00) of the year

$L_{evening}$ A-weighted long-term mean sound level, calculated for the total 'evening' time periods (19:00 – 23:00) of the year

L_{night} A-weighted long-term mean sound level, calculated for the total 'night' time periods (23:00 – 07:00) of the year

L_{DEN} 24hr noise index which is defined from the above indices as:

$$L_{DEN} = 10 \cdot \log_{10}\left(\frac{1}{24}\left(12 \cdot 10^{\frac{L_{day}}{10}} + 4 \cdot 10^{\frac{L_{evening}+5}{10}} + 8 \cdot 10^{\frac{L_{night}+10}{10}}\right)\right)$$

Any non-constant, complex sound, which creates an annoying acoustic impression, is noise. Noise is defined as an unwanted sound, which is

unpleasant and usually causes side effects such as: discomfort, difficulty in communication, etc, as well as physical impacts such as hearing loss.

Depending on the way of observation, the noise is divided into the following categories:

Ambient Noise

Ambient noise is the total result of all airborne sounds that are produced from multiple sources, near or far in a given environment, and none of the source is of any interest. ELOT 263.1 (1.209)

Background Noise

Background noise is the noise that comes from all sources that are not related to the specific noise under study. ΕΛΟΤ 263.1 (1.210)

C. SPECIFICATIONS – LEGISLATION

- Presidential Decree P.D. 1180 (G.P. 293/A/6-10-81) **"Regulation of issues relative to the foundation and operation of industries, all kinds of mechanical facilities and storage areas for to environmental protection".**

  The Presidential Decree P.D. 1180, defines the allowed noise limits that are emitted to the environment during the operation of the facilities, measured over the border of the estate in which the facility operates.

  Regarding legislated industry areas, the maximum noise limit is up to 70dB(A). In areas where a number of industries are located, the maximum noise level is up to 65dB(A). In areas where industries and residencies are equally shared, maximum noise level is up to 55dB(A). In areas where residencies prevail, maximum noise level is up to 50dB(A).

  In the area of the project the limit is 65 dB(A).

D. AMBIENT NOISE MEASUREMENTS

For the evaluation of the acoustic environment the noise measurements are performed in accordance with the ISO 1996-1:2003.

D.1. Equipment

The acoustic measurements were undertaken with the following equipment:

Integrating Sound level meter:
Norsonic N-140 and Cirrus CR:8011A Sound analysers (S/N 1403508, B19372FD, B19377FD), precision Class 1, with real time filters 1/1- και 1/3-octave and spectral weighting networks A, C and Flat

Precision sound calibrators:
Calibrator Norsonic N-1251 serial number 32297, precision Class 1
Cirrus CR:511 S/N ???, precision Class 1

The sound analysers are precision Class 1, that corresponds to the technical specifications contained in the Publications 61672-1:2003 of the International Electro technical Committee (I.E.C. Publications 61672-1:2002) as well as the ΕΛΟΤ EN 61672.01.

D.2. Measurement procedure

The measurements were conducted from Monday, 29.01.2018 till Wednesday, 31.01.2018. In each case calibration was performed on the spot, before starting the measurements (which was repeated at the end of measurement as required by the standard measurement procedure ISO 1996 and indicated that the sensitivity of the instruments had remained stable during the measurements). The sound measurements were made with a time circuit **(F) Fast** and A-weighting frequency filter while third 1/3 spectral analysis.

Position	Start	End	GGRS87 X	GGRS87 Y
N_01 Karavostasi	29/1/18 08:42	30/1/18 08:43	179 980,58	4 360 490,87
N_02 Agia	29/1/18 09:15	30/1/18 09:16	185 913,26	4 357 625,69
N_03 Perdika	30/1/18 10:22	31/1/18 11:54	188 291,59	4 365 418,86
N_04 Karteri	30/1/18 11:37	31/1/18 12:51	181 210,50	4 363 982,09
N_05 Site	29/1/18 11:00	31/1/18 13:00	185 433,54	4 362 983,39

Table 1, Measurements Table

D.3. Measurement results

A summary table of the measurement results appear on the table below:

Position	Lday	Levening	Lnight	LDEN	Leq	L95
N_01 Karavostasi	52,2	44,1	44,0	51,8	49,8	39,3
N_02 Agia	57,9	56,9	46,7	57,9	56,1	31,3
N_03 Perdika	59,2	56,9	49,5	59,2	57,2	26,6
N_04 Karteri	51,8	48,8	45,2	53,0	50,0	29,6
N_05 Site	29,1	27,9	30,2	36,1	29,3	21,4

Table 2, Measurement Results

Details of the measurements are provided at Appendix B: 'Detailed Measurements Results' which is attached at the end of the report.

In all settlements the sound level meters were placed close to the centre of each settlement and thus exposed to the road traffic noise of the main road of each settlement, which was the major noise source in all cases. House further away from the main road would be exposed up to 10 dB less noise. The L95 index is a representative value for the noise level at all houses in the settlement when there is no traffic circulation.

F. NOISE PROPAGATION MODEL

F.1. Noise propagation software

The acoustic study was implemented with the use of specialized software for the noise prediction and noise mapping, which is in accordance to the requirements of the directive 2002/49/EC.

The software used is `IMMI 2017 Premium` of the German Company `Woelfel Meβsysteme GmbH`. The consultancy team has in its possession the license IMMI 2017 Premium S72/354.

The calculations of the noise propagation was conducted base on the international standard ISO 9613 (Acoustics -- Attenuation of sound during propagation outdoors) and in accordance to the ISO/TR 17534-3:2015 (Acoustics -- Software for the calculation of sound outdoors).

All the calculations correspond to the A-weighted equivalent sound level index ($L_{A,eq}$ measured in dB(A)).

F.2. Noise Propagation Simulation

The input parameters are displayed in the Table 3 with the respective assumptions. Based on this data, a 3-D model for the noise propagation was made (Figure 1), in order to produce a noise map of the area.

The model was calibrated using the noise field measurements. The noise sources from the Compression Station are modeled as an area source which results to noise level not more than 65 dB(A) at the borders of the plant, as this is a requirement by the Law (see page 7 of this report, section C. SPECIFICATIONS – LEGISLATION) and the environmental terms of the project.

No	INPUT DATA	ASSUMPTIONS - VALUES
1	**Topography: Primary and secondary contour lines and altitude points**	Contours in project area Rest of study area: from the SRTM (NASA) database X – Y coordinates of settlements: from satellite pictures (assumption)
2	**Buildings – obstacles**	No buildings or other objects were taken in consideration
3	**Ground– Sound Absorption**	Average ground and sea sound absorption A = 0.5 (assumption)
4	**Noise Sources – traffic noise**	The traffic noise was not modeled as it is not part of the scope of works of the study.
5	**Noise Sources – sound level from plant**	Area noise source inside the plan that was calibrated to give 65 dB(A) at the border of the plan
6	**Noise Propagation – wind direction**	Downwind propagation (worst case scenario)
7	**Noise Propagation – meteorological conditions**	Temperature 25ºC, Humidity 60%
8	**Calculations – order of reflections**	3
9	**Control Criteria**	A-weighted Leq

Table 3, Input data and assumptions for the sound dissipation 3D model

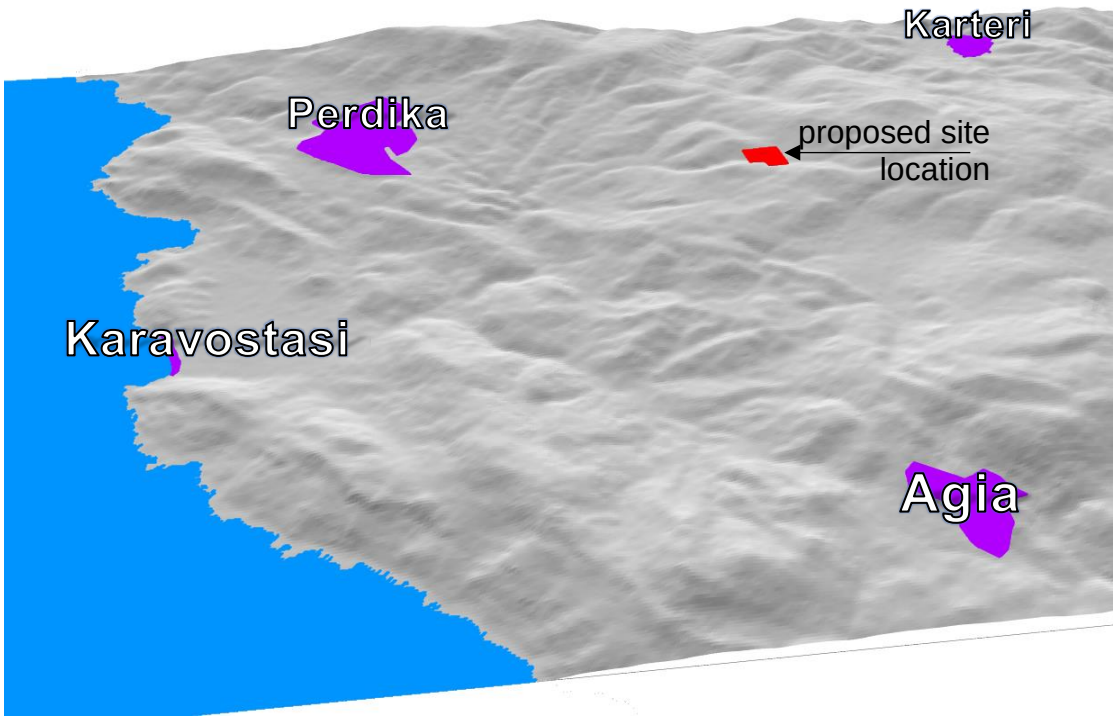


Figure 1, Overall topography of the 3-D model of the investigated area in IMMI

F.3. Model Results

The resulting noise levels at the four settlements around Florovouni Compression Station are summarized in the table below:

Position Position	Prediction with Station in operation	Baseline measurements (see page 9 and Appendix B)		
	Leq	Lnight	Leq	L95
N_01 Karavostasi	14,2	44,0	49,8	39,3
N_02 Agia	-2,2	46,7	56,1	31,3
N_03 Perdika	22,4	49,5	57,2	26,6
N_04 Karteri	8,1	45,2	50,0	29,6
N_05 Site	65,0	30,2	29,3	21,4

Table 4, Summary results from 3D noise emission model

It is evident that due to distance and terrain screening, the noise level is substantially lower than the values that were measured in these settlements during the measurement survey in January 2018. The highest noise level is expected in Perdika settlement, at 22 dB(A), where L_{eq} = 57,2 dB(A) for the average ambient noise level and 49,5 dB(A) during the night. Even with no traffic circulation (based on index $L_{95\%}$), the maximum noise level from the Compression Station is 4 dB lower.

Detailed noise maps are presented in Appendix A.

G. CONCLUSIONS

1. From the acoustic measurements made by specialist acoustic consultants, the ambient noise in the centers of the settlements near the proposed site for the construction of the 'Florovouni' Compression Station is in the L_{DEN} = 50 – 60 dB(A) zone. The main noise source is the traffic noise from vehicles crossing the main road of each village. During nighttime the noise levels are in the L_{night} = 45 – 50 dB(A) zone.
2. The noise currently at the proposed site location on top of Florovouni highland, is roughly constant, day and night, around 30 dB(A).
3. According to sound dissipation calculations that were performed using a computer 3-D model of an area about 6km around the site, the noise impact during the operation of Florovouni Compression Station will be negligible for the settlements Karavostasi, Karteri and Agia and barely minimal for settlement Perdika, assuming that all the necessary measures will be taken so that the Compression Station will comply with the limit of emitting noise levels no more than 65 dB(A) at the plant's border, which is implied by the Law and the environmental terms of the project.

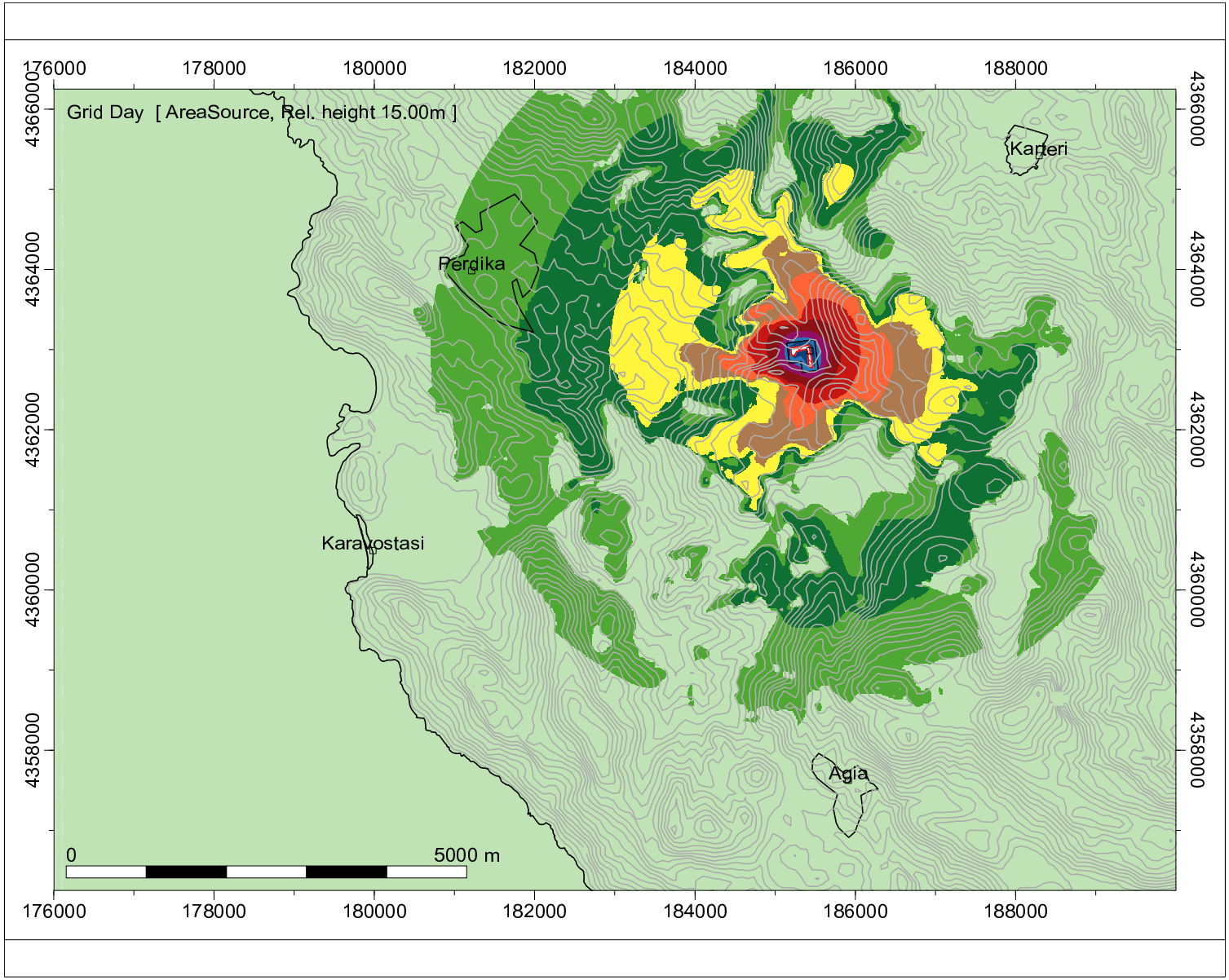
On behalf of
Acoustics Consultancy Company

Alexandros Galatas
Civil Engineer
MSc Sound & Vibration Studies

APPENDIX A

Noise Maps

OVERALL NOISE MAP OF STUDY AREA



PROJECT:
POSEIDON PIPELINE PROJECT

SUBJECT:
BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

Remarks:
Noise propagation according to ISO 9613 + ISO/TR 17534-3:2015
Downwind propagation

Legend

- Help line
- WTG (HLIN)
- Receiver point
- Land-use zone
- Area source/ISO 9613

Day
Level
dB(A)

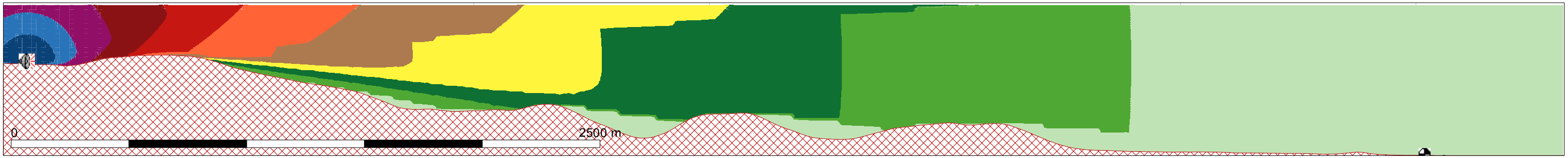
- >..-20
- >20-25
- >25-30
- >30-35
- >35-40
- >40-45
- >45-50
- >50-55
- >55-60
- >60-65
- >65-..

Acoustics Consultancy Company

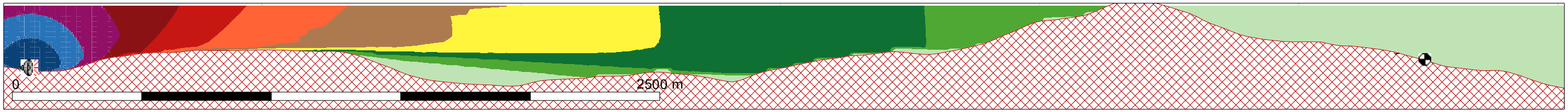
IMMI 2017 06.09.2017

VERTICAL GRIDS FROM COMPRESSION STATION TO RECEIVERS

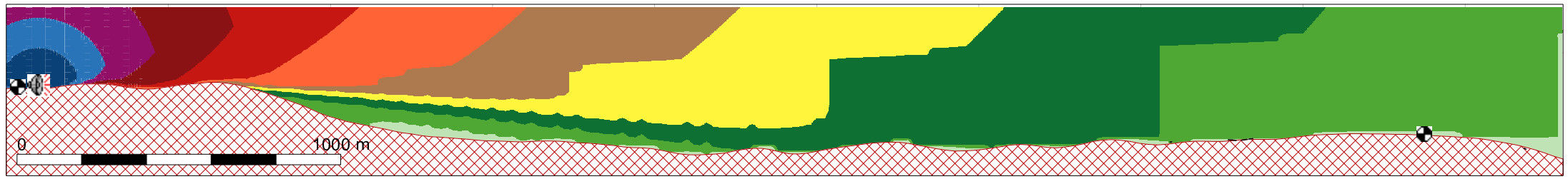
N01 - Karavostasi



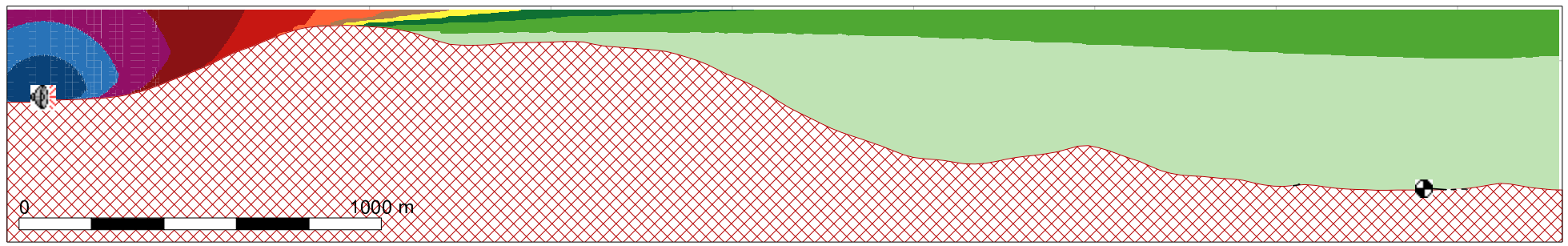
N02 - Agia



N03 - Perdika



N04 - Karteri



PROJECT: POSEIDON PIPELINE PROJECT
SUBJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

Remarks:
Noise propagation according to ISO 9613 + ISO/TR 17534-3:2015
Downwind propagation
Source Noise Level: 65 dB(A) at Compression Station plant borders

Day
Level
dB(A)

>..-20
>20-25
>25-30
>30-35
>35-40
>40-45
>45-50
>50-55
>55-60
>60-65
>65-..

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APPENDIX B

Detailed Measurement Results

54 SPIROY DIMA str, 190 02 – PEANIA
Tel.: 210 6921928 Fax: 210 6921958 E-mail: info@ema.com.gr

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NOISE MEASUREMENT RESULTS

PROJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

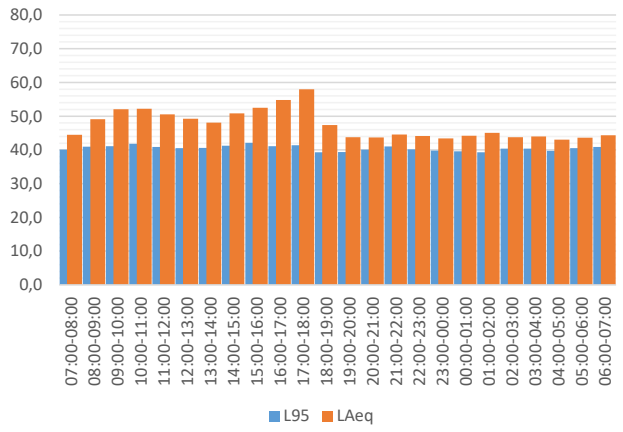
Acoustics Consultancy Company

Measuring Position	**01**	**Karavostasi**
Coordinates	X =	179 980,58
(GGRS 87)	Y =	4 360 490,87
Microphone Height (m)	4,00	
Start	29/1/18 8:42	
End	30/1/18 8:43	
Meaasured By	Αλέξανδρος Γαλατάς	
Report By	Αλέξανδρος Γαλατάς	
Measuring Instrument	Cirrus CR:811A S/N B19377FD	
Mic. Sensiticity before / after	-25,3 dB / -24,8 dB	
Field calibrator	Cirrus CR:511E S/N 43636	
Calibration Date	17/4/2015	
Calibration Laboratory	Norsonic Calibration Labs	
Average wind (m/sec)	2,03	
Major wind direction	ENE	
Temperature variation (°C)	6.8 - 15.1	

Measured Values dB(A)	
$L_{day\ 07:00\ 19:00}$	52,2
$L_{evening\ 19:00\ 23:00}$	44,1
$L_{night\ 23:00\ 07:00}$	44,0
L_{den}	51,8
$L_{Aeq(24h)}$	49,8
L_{max}	89,9

Time of Day	L_{Aeq}	L_{max}	L_{01}	L_{10}	L_{50}	L_{90}	L_{95}	L_{99}
07:00-08:00	44,5	78,2	49,1	45,9	43,1	40,8	40,1	39,0
08:00-09:00	49,1	83,8	56,5	49,8	44,4	41,6	40,9	39,7
09:00-10:00	52,1	83,8	61,4	54,3	46,6	42,1	41,1	39,4
10:00-11:00	52,2	68,0	60,6	56,0	49,0	42,9	41,8	39,9
11:00-12:00	50,5	78,8	58,8	54,3	46,8	41,8	40,8	39,4
12:00-13:00	49,3	78,8	57,5	52,1	45,4	41,5	40,5	39,2
13:00-14:00	48,1	70,0	56,7	50,6	44,9	41,5	40,6	39,2
14:00-15:00	50,9	68,0	59,0	53,9	46,9	42,3	41,3	39,7
15:00-16:00	52,5	69,8	60,2	54,8	47,8	43,1	42,1	40,6
16:00-17:00	54,8	89,9	59,4	48,3	44,7	41,9	41,1	39,8
17:00-18:00	58,0	89,9	65,2	49,0	44,8	42,1	41,4	40,1
18:00-19:00	47,4	81,8	53,9	46,2	43,2	40,1	39,3	38,0
19:00-20:00	43,8	58,5	49,2	45,9	43,1	40,2	39,4	38,2
20:00-21:00	43,7	57,9	47,9	45,9	43,2	40,7	40,1	39,0
21:00-22:00	44,5	57,9	48,5	46,5	44,0	41,7	41,0	39,8
22:00-23:00	44,1	53,1	48,2	46,3	43,5	40,9	40,1	38,9
23:00-00:00	43,4	53,1	47,5	45,5	42,8	40,4	39,8	38,7
00:00-01:00	44,2	70,7	48,0	45,4	42,7	40,2	39,6	38,6
01:00-02:00	45,1	70,7	48,8	45,4	42,5	40,0	39,3	38,4
02:00-03:00	43,7	59,9	47,7	45,7	43,2	41,0	40,4	39,4
03:00-04:00	44,0	59,9	48,0	45,9	43,3	41,0	40,4	39,3
04:00-05:00	43,0	51,3	47,0	45,1	42,7	40,4	39,7	38,6
05:00-06:00	43,6	51,0	47,1	45,5	43,2	41,1	40,5	39,5
06:00-07:00	44,4	62,9	47,9	46,2	43,9	41,5	40,9	39,9

Graph of Hourly distribution



Notes:

Απόσταση από άξονα δρόμου: 9m

IGI Poseidon

NOISE MEASUREMENT RESULTS

PROJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

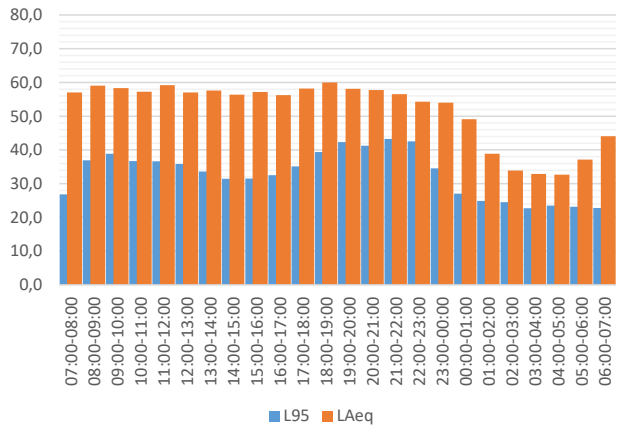
Acoustics Consultancy Company

Measuring Position	**02**	**Agia**
Coordinates	X =	185 913,26
(GGRS 87)	Y =	4 357 625,69
Microphone Height (m)	4,00	
Start	29/1/18 9:15	
End	30/1/18 9:16	
Meaasured By	Αλέξανδρος Γαλατάς	
Report By	Αλέξανδρος Γαλατάς	
Measuring Instrument	Cirrus CR:811A S/N B19372FD	
Mic. Sensiticity before / after	-24,7 dB / -24,6 dB	
Field calibrator	Cirrus CR:511E S/N 43636	
Calibration Date	17/4/2015	
Calibration Laboratory	Norsonic Calibration Labs	
Average wind (m/sec)	1,77	
Major wind direction	NE	
Temperature variation (°C)	6.8 - 15.1	

Measured Values dB(A)	
$L_{day\ 07:00\ 19:00}$	57,9
$L_{evening\ 19:00\ 23:00}$	56,9
$L_{night\ 23:00\ 07:00}$	46,7
L_{den}	57,9
$L_{Aeq(24h)}$	56,1
L_{max}	90,9

Time of Day	L_{Aeq}	L_{max}	L_{01}	L_{10}	L_{50}	L_{90}	L_{95}	L_{99}
07:00-08:00	57,0	90,9	65,0	49,7	39,4	28,2	26,9	25,0
08:00-09:00	59,0	90,9	70,8	58,3	43,8	37,7	36,9	35,9
09:00-10:00	58,3	83,4	69,8	61,3	47,1	40,1	38,9	37,1
10:00-11:00	57,3	82,6	68,2	61,0	47,8	38,4	36,7	34,5
11:00-12:00	59,2	85,1	69,6	61,9	48,2	38,4	36,6	34,2
12:00-13:00	57,0	85,1	68,8	58,3	44,7	37,1	35,8	34,1
13:00-14:00	57,6	81,0	69,9	59,8	42,7	35,0	33,6	31,5
14:00-15:00	56,4	81,0	69,0	56,7	41,5	32,8	31,4	29,4
15:00-16:00	57,2	88,5	68,7	56,2	40,2	32,3	31,5	30,1
16:00-17:00	56,3	88,5	68,2	57,3	40,3	33,7	32,5	30,9
17:00-18:00	58,2	88,2	69,8	59,8	43,9	36,5	35,1	33,1
18:00-19:00	60,0	88,6	71,8	61,3	46,2	40,2	39,4	38,2
19:00-20:00	58,1	88,6	69,0	60,1	48,1	43,1	42,3	40,8
20:00-21:00	57,8	84,9	69,5	59,7	47,0	42,1	41,2	39,7
21:00-22:00	56,5	84,9	68,1	56,9	46,3	43,7	43,3	42,6
22:00-23:00	54,3	82,8	66,0	52,7	44,5	42,8	42,5	42,0
23:00-00:00	54,0	81,3	66,1	48,7	41,8	36,5	34,6	30,6
00:00-01:00	49,1	81,3	59,8	42,7	32,5	28,1	27,1	25,1
01:00-02:00	38,9	71,3	45,7	40,8	29,1	25,5	24,9	23,9
02:00-03:00	33,9	60,8	41,8	40,8	28,3	25,1	24,5	23,5
03:00-04:00	32,9	46,6	41,5	40,5	26,4	23,5	22,7	21,7
04:00-05:00	32,7	46,6	41,6	40,3	26,8	24,3	23,5	22,8
05:00-06:00	37,2	65,8	41,7	40,7	26,7	23,7	23,2	22,7
06:00-07:00	44,0	69,9	51,4	41,9	36,8	23,9	22,8	21,8

Graph of Hourly distribution



Notes:

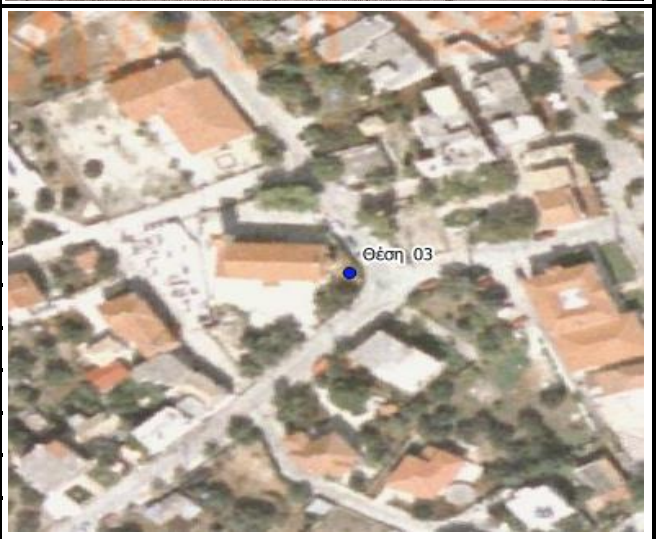
IGI Poseidon

NOISE MEASUREMENT RESULTS

PROJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

Acoustics Consultancy Company

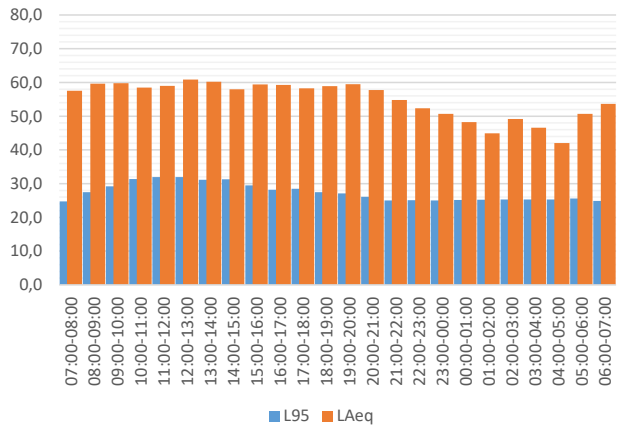
Measuring Position	**03**	**Perdika**
Coordinates	X =	188 291,59
(GGRS 87)	Y =	4 365 418,86
Microphone Height (m)	4,00	
Start	30/1/18 10:22	
End	31/1/18 11:54	
Meaasured By	Αλέξανδρος Γαλατάς	
Report By	Αλέξανδρος Γαλατάς	
Measuring Instrument	Cirrus CR:811A S/N B19372FD	
Mic. Sensiticity before / after	-24,9 dB / -24,8 dB	
Field calibrator	Cirrus CR:511E S/N 43636	
Calibration Date	17/4/2015	
Calibration Laboratory	Norsonic Calibration Labs	
Average wind (m/sec)	1,47	
Major wind direction	NE	
Temperature variation (°C)	3.4 - 14.2	



Measured Values dB(A)	
$L_{day\ 07:00\ 19:00}$	59,2
$L_{evening\ 19:00\ 23:00}$	56,9
$L_{night\ 23:00\ 07:00}$	49,5
L_{den}	59,2
$L_{Aeq(24h)}$	57,2
L_{max}	90,8

Time of Day	L_{Aeq}	L_{max}	L_{01}	L_{10}	L_{50}	L_{90}	L_{95}	L_{99}
07:00-08:00	57,6	86,3	69,3	55,1	32,7	25,8	24,7	23,8
08:00-09:00	59,6	82,8	71,2	63,2	38,7	28,6	27,5	26,3
09:00-10:00	59,8	81,3	71,3	63,9	40,0	30,2	29,2	27,9
10:00-11:00	58,5	81,8	70,2	62,0	39,9	32,2	31,3	30,0
11:00-12:00	59,0	85,3	70,9	61,9	39,4	32,8	32,0	30,6
12:00-13:00	60,8	89,2	71,7	61,7	38,6	32,8	31,9	30,7
13:00-14:00	60,2	89,2	71,2	61,6	37,5	31,8	31,2	30,1
14:00-15:00	58,0	86,2	69,7	61,0	37,1	32,0	31,3	30,2
15:00-16:00	59,4	90,8	70,0	60,9	36,6	30,8	29,5	28,3
16:00-17:00	59,2	90,8	70,3	61,3	35,7	29,3	28,2	27,1
17:00-18:00	58,3	84,4	69,9	61,6	36,5	29,5	28,5	26,9
18:00-19:00	58,9	85,3	69,8	62,1	37,0	29,1	27,5	25,6
19:00-20:00	59,5	87,5	70,6	60,5	35,0	28,3	27,1	25,8
20:00-21:00	57,8	87,5	69,9	58,6	31,2	26,7	26,1	25,4
21:00-22:00	54,8	75,8	68,5	49,1	27,7	25,4	25,0	24,6
22:00-23:00	52,3	76,3	66,7	38,7	26,8	25,3	25,1	24,7
23:00-00:00	50,7	76,3	65,1	34,9	26,9	25,3	25,1	24,8
00:00-01:00	48,2	75,2	59,7	31,6	27,0	25,4	25,1	24,8
01:00-02:00	44,9	71,5	53,6	30,0	26,6	25,4	25,2	24,9
02:00-03:00	49,1	80,9	56,3	31,6	26,4	25,4	25,3	25,1
03:00-04:00	46,6	80,9	44,4	29,6	26,2	25,4	25,3	25,2
04:00-05:00	42,1	71,6	41,3	28,7	26,1	25,4	25,3	25,0
05:00-06:00	50,7	83,2	56,1	37,3	28,0	25,8	25,6	25,1
06:00-07:00	53,7	86,3	65,2	44,4	30,1	25,3	24,9	24,3

Graph of Hourly distribution



Notes:

Απόσταση από άξονα δρόμου: 9.40m

IGI Poseidon

NOISE MEASUREMENT RESULTS

PROJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

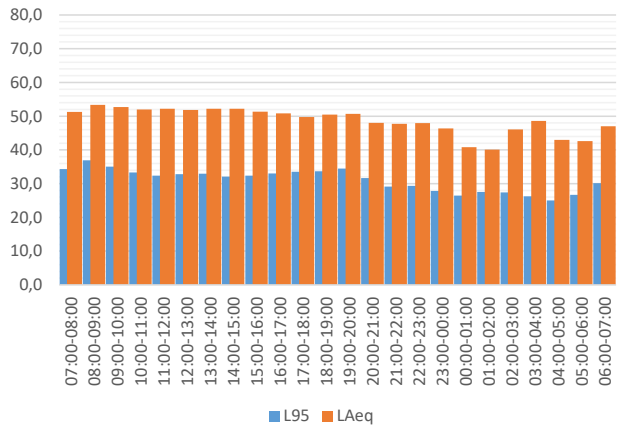
Acoustics Consultancy Company

Measuring Position	**04**	**Karteri**
Coordinates	X =	181 210,50
(GGRS 87)	Y =	4 363 982,09
Microphone Height (m)	4,00	
Start	30/1/18 11:37	
End	31/1/18 12:51	
Meaasured By	Αλέξανδρος Γαλατάς	
Report By	Αλέξανδρος Γαλατάς	
Measuring Instrument	Cirrus CR:811A S/N B19377FD	
Mic. Sensiticity before / after	-25,1 dB / -25,1 dB	
Field calibrator	Cirrus CR:511E S/N 43636	
Calibration Date	17/4/2015	
Calibration Laboratory	Norsonic Calibration Labs	
Average wind (m/sec)	0,85	
Major wind direction	NE	
Temperature variation (°C)	3.4 - 14.2	

Measured Values dB(A)	
$L_{day\ 07:00\ 19:00}$	51,8
$L_{evening\ 19:00\ 23:00}$	48,8
$L_{night\ 23:00\ 07:00}$	45,2
L_{den}	53,0
$L_{Aeq(24h)}$	50,0
L_{max}	82,3

Time of Day	L_{Aeq}	L_{max}	L_{01}	L_{10}	L_{50}	L_{90}	L_{95}	L_{99}
07:00-08:00	51,3	73,3	63,3	51,8	41,7	35,6	34,4	32,8
08:00-09:00	53,4	72,6	65,1	56,6	44,3	38,2	36,9	35,1
09:00-10:00	52,7	72,6	64,4	55,8	43,5	36,4	35,0	33,3
10:00-11:00	52,0	82,3	63,3	54,8	41,4	34,6	33,3	31,4
11:00-12:00	52,2	82,3	63,3	54,1	40,5	33,4	32,4	30,7
12:00-13:00	51,8	81,9	63,9	53,9	40,7	34,0	32,8	31,3
13:00-14:00	52,2	77,7	64,0	55,1	41,4	34,4	32,9	30,8
14:00-15:00	52,2	77,7	63,9	55,0	40,2	33,3	32,1	30,1
15:00-16:00	51,4	71,3	63,3	54,5	39,6	33,5	32,4	30,4
16:00-17:00	50,8	71,3	63,1	53,0	39,6	34,3	33,0	31,2
17:00-18:00	49,8	72,9	62,4	50,8	40,0	34,7	33,5	31,6
18:00-19:00	50,5	79,4	62,3	51,8	40,3	35,0	33,7	31,5
19:00-20:00	50,7	79,4	61,7	52,5	40,9	36,0	34,4	32,1
20:00-21:00	48,1	77,3	59,4	48,7	38,8	33,3	31,7	29,8
21:00-22:00	47,8	76,3	59,0	46,8	36,9	30,1	29,1	28,0
22:00-23:00	48,0	73,6	59,4	48,0	38,2	30,3	29,3	28,4
23:00-00:00	46,4	68,3	57,0	48,1	36,5	29,1	27,9	26,7
00:00-01:00	40,8	68,5	52,6	41,3	30,9	27,4	26,5	25,6
01:00-02:00	40,1	68,5	50,2	40,7	30,7	27,8	27,5	27,2
02:00-03:00	46,1	75,4	52,7	45,0	31,1	27,7	27,4	27,0
03:00-04:00	48,6	75,4	60,1	48,8	29,0	26,5	26,2	25,7
04:00-05:00	43,0	72,0	53,1	42,5	27,2	25,2	25,0	24,7
05:00-06:00	42,6	72,0	50,9	39,8	30,8	27,1	26,7	26,2
06:00-07:00	47,0	73,3	59,4	46,3	36,3	30,9	30,1	29,3

Graph of Hourly distribution



Notes:

Απόσταση από άξονα δρόμου: 24.90m

IGI Poseidon

NOISE MEASUREMENT RESULTS

PROJECT: BASELINE NOISE STUDY FOR 'FLOROVOUNI' COMPRESSION STATION

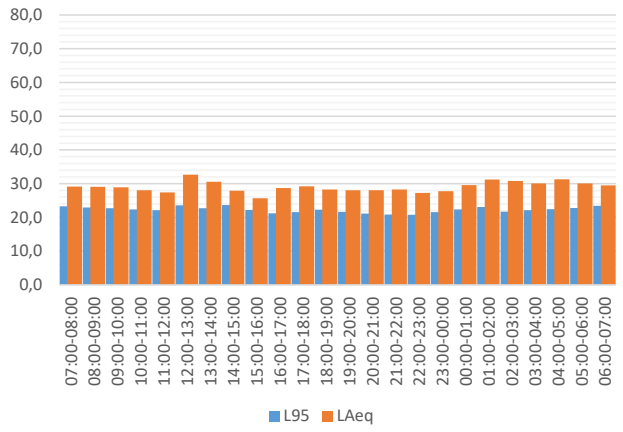
Acoustics Consultancy Company

Measuring Position	**05**	**Site**
Coordinates	X =	185 433,54
(GGRS 87)	Y =	4 362 983,39
Microphone Height (m)	4,00	
Start	10/12/15 15:00	
End	11/12/15 15:00	
Meaasured By	Αλέξανδρος Γαλατάς	
Report By	Αλέξανδρος Γαλατάς	
Measuring Instrument	Norsonic N-140 S/N 1403508	
Mic. Sensiticity before / after	-25,0 dB / -25,0 dB	
Field calibrator	Cirrus CR:511E S/N 43636	
Calibration Date	17/4/2015	
Calibration Laboratory	Norsonic Calibration Labs	
Average wind (m/sec)	1,62	
Major wind direction	NE	
Temperature variation (°C)	3.4 - 15.1	

Measured Values dB(A)		
	$L_{day\ 07:00\ 19:00}$	29,1
	$L_{evening\ 19:00\ 23:00}$	27,9
	$L_{night\ 23:00\ 07:00}$	30,2
	L_{den}	36,1
	$L_{Aeq(24h)}$	29,3
	L_{max}	63,0

Time of Day	L_{Aeq}	L_{max}	L_{01}	L_{10}	L_{50}	L_{90}	L_{95}	L_{99}
07:00-08:00	29,1	42,1	35,7	32,1	27,4	23,8	23,3	22,3
08:00-09:00	29,0	41,0	35,3	31,6	27,3	23,6	23,0	22,2
09:00-10:00	28,9	46,6	27,1	31,0	26,8	23,3	22,7	22,0
10:00-11:00	28,0	46,6	29,9	30,2	26,3	22,9	22,3	21,3
11:00-12:00	27,4	41,5	32,7	29,9	26,5	22,8	22,1	21,3
12:00-13:00	32,7	57,5	35,4	30,6	27,1	24,4	23,6	22,4
13:00-14:00	30,6	57,5	35,0	29,8	26,5	23,6	22,7	21,6
14:00-15:00	27,9	44,4	34,3	29,3	26,6	24,3	23,7	22,7
15:00-16:00	25,7	54,5	36,8	29,0	24,8	22,6	22,2	21,5
16:00-17:00	28,7	54,5	35,2	28,6	24,6	22,2	21,2	20,4
17:00-18:00	29,2	52,5	37,3	29,1	24,8	22,3	21,6	20,8
18:00-19:00	28,3	63,0	45,0	36,7	25,9	22,7	22,3	21,6
19:00-20:00	28,1	63,0	40,2	33,2	25,7	22,2	21,6	20,7
20:00-21:00	28,1	62,1	45,4	35,3	25,6	21,7	21,2	20,5
21:00-22:00	28,3	62,1	40,5	33,3	24,8	21,4	20,9	20,1
22:00-23:00	27,3	41,0	35,6	29,9	24,3	21,3	20,8	19,8
23:00-00:00	27,7	45,3	36,5	29,8	25,1	22,2	21,6	20,7
00:00-01:00	29,5	45,3	36,2	31,8	27,0	23,0	22,4	21,4
01:00-02:00	31,2	41,8	38,1	33,9	27,7	23,6	23,1	22,1
02:00-03:00	30,8	41,8	37,4	33,2	27,8	22,6	21,7	20,9
03:00-04:00	30,1	41,6	36,3	33,0	28,4	23,0	22,1	21,1
04:00-05:00	31,3	42,2	37,4	33,5	28,5	23,5	22,4	21,4
05:00-06:00	30,1	42,2	36,5	32,4	27,7	23,5	22,8	21,7
06:00-07:00	29,5	42,1	35,8	32,1	28,0	24,1	23,4	22,2

Graph of Hourly distribution



Notes:

Απόσταση από επαρχιακή οδό Πέρδικας - Καρτερίου: 1280m χωρίς οπτική επαφή

11.4 Soil Baseline Report

ENVIRONMENTAL SITE ASSESSMENT

AT THE PLOT OF THE FUTURE

NATURAL GAS COMPRESSION TERMINAL

IN FLOROVOUNI-THESPROTIA, GREECE

Owner of Project: **ASPROFOS SA**
283, El. Venizelou Avet
Kallithea, Athens
GREECE

Contractor: **INTERGEO**
Environmental Technology Ltd
Industrial Area of Thermi,
GR-57 001, Thessaloniki
P O Box 60 040

J.N. *Z:\PROJECTS\ASPROFOS\G3226 ESA FLOROVOUNI\REPORT\G3226-180118-FlorovouniI soil rep.doc*

Study Group:

Dr. Stylianos Papadopoulos	**Chemist**
Dr. Christos Vatseris	**Hydrogeologist**
Lazaros Patrelis	**Geologist**

CONTENTS	
1	Technical report – 17 pages
3	Appendixes

Thessaloniki, 18.01.2018

TÜV AUSTRIA HELLAS
EN. ISO 9001:2008 No: 010160061
EN. ISO 14001:2004 No: 04014122
OHSAS 18001:2007 No: 03015076

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Austria · Germany · Italy · Switzerland · Latvia · Czech Republic · Slovakia · Hungary · Romania · Poland · Bulgaria
Greece · Cyprus · Turkey · Ukraine · Russia · Georgia · Egypt · Argentina · Nigeria · India · South Africa

INTERGEO

INDEX

INTERGEO

1. SUMMARY

An assignment for an Environmental Site Investigation at the plot where the future Natural Gas compression Terminal will be constructed in Florovouni-Thesprotia, Greece was given to **INTERGEO** Environmental Technology Ltd, after the approval of the relevant technical and financial offer of INTERGEO (30/11/17).

The plot area is located north-west from the town of Parga, west from the village of Perdika and south-west from the village of Karteri. The distance of the plot area from the sea is about 5.300m approximately. The approximate geographic location and a satellite view of the investigated area are shown in the attached figures 1 and 2 (Appendix A).

This investigation was performed in order to obtain a representative overview of the type and extent of contamination that might be present at the site.

The Environmental site investigation included the performance of surface soil sampling in selected locations.

The complete project included the following stages:

1. Site investigation field works:
   - Performance of seven (7) surface soil sampling points.
2. Performance of chemical analyses for Residue at 105° C, Fraction sieved 2mm dry basis at 105° C , Heavy Metals (Sb, As, Be, Cd, Co, Cr, CrIV, Hg, Ni, Pb, Cu, Se, Sn, Tl, V, Zn), TPH index, PCBs and PAHs (totally 7 surface soil samples).
3. Evaluation and interpretation of results
4. Report completion.

The locations of all surface soil sampling points are shown in figure 3 (Appendix A).

For the purposes of the specific study, INTERGEO performed specific field work at the site in order to obtain a representative overview of the surface soil condition at the specific plot area. The site investigation started and completed on **14/12/17.**

Based on the results of the environmental assessment, the following synoptic conclusions about the surface soil at the investigated site could be drawn:

- The soil was found in satisfactory condition regarding the **petroleum hydrocarbons.** The **TPH (Total Petroleum Hydrocarbons)** and **PAHs** concentration in all the examined surface soil samples remained below the detection limit (1mg/kg for TPH and 0,05mg/kg for PAH).

- All **PCBs** concentrations remained below the detection limit (0,01mg/kg).

- Not any significant **heavy metals** concentration was recorded in the examined surface soil samples in comparison to the New Dutch List optimum and action value limits.

The concentration of **Nickel (Ni), Cadmium (Cd), Beryllium (Be) and Vanadium (V)** in all of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Furthermore, the concentrations **of Zink (Zn), Copper (Cu). Cobalt (Co) and Thallium (Tl)** in the majority of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Their presence is attributed to the lithology of the local geological formations and not due to any anthropogenic influence. All the rest **heavy metals** concentrations remained below action and optimum value limit of the New Dutch List.

According to the overall evaluation of the investigation results, not any significant inorganic and organic contamination was detected in the surface soil of the investigated plot area. Moreover, no contamination inflow was recorded at the site from activities irrelevant to the plot area. The absence of any contamination load in the surface soil makes the plot suitable for the implementation of any further future use (industrial, residential, commercial etc).

Based on the investigation results, the **environmental sensitivity of the investigated plot area in Florovouni-Thesprotia** should be defined **as low. This arises from** its distance from the coastline (5.300m) and the absence of any underground receptors (relative deep groundwater > 30 m bgs). Furthermore hydrogeologically, the site is underlain by impermeable geological layers at the shallow depth **that do not allow the downward migration of potential contaminants to the groundwater table**.

Finally, taking under consideration all available information and findings of the performed investigation, planned future site usage **the environmental risk associated with the specific site** should be characterized **as low** (not any surface soil contamination present, within a location of low environmental sensitivity due to absence of potential receptors).

2. PRELIMINARY INVESTIGATION

2.1 Location

The plot area is located north-west from the town of Parga, west from the village of Perdika and south-west from the village of Karteri. The distance of the plot area from the sea is about 5.300m approximately. The approximate geographic location and a satellite view of the investigated area are shown in the attached figures 1 and 2 (Appendix A).

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2.2 Historic site land use

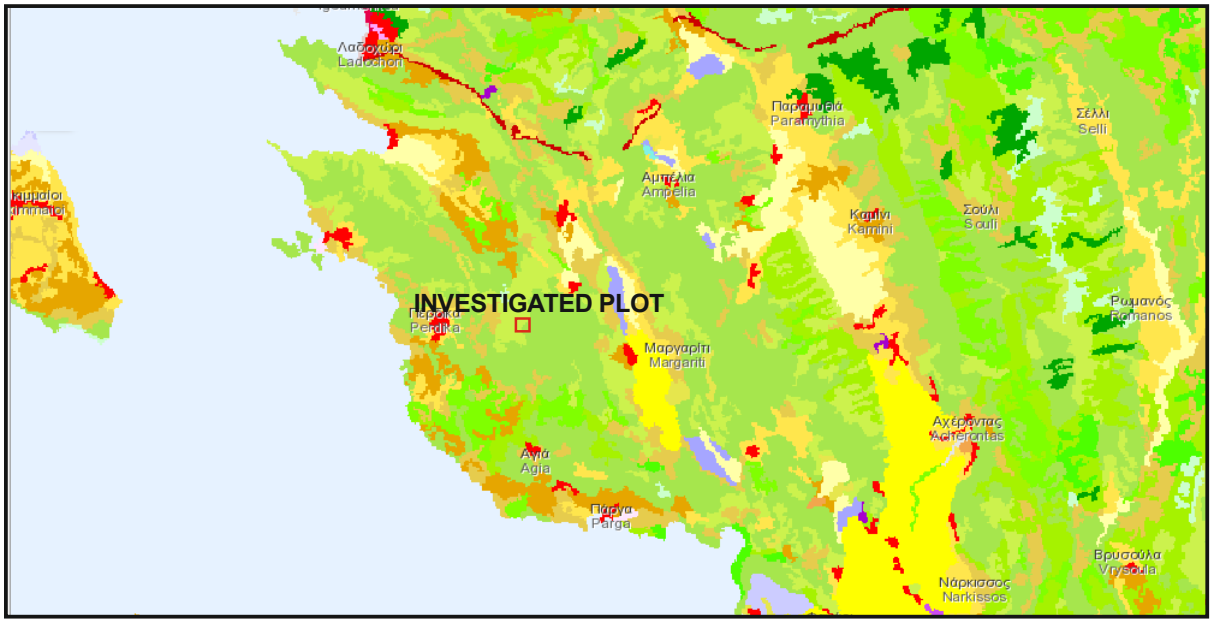
At the investigated area not any previous industrial activities took place in the past. Furthermore, not any hazardous or debris materials were encountered at the site during a walk over survey.

2.3 Surrounding land use

Generally, the site is is located north-west from the town of Parga, west from the village of Perdika and south-west from the village of Karteri. Adjacent to the plot area there is a bullpen. Not any other industrial activity was recorded in the vicinity. Adjacent to the plot area the land use is for agriculture purposes and as grassland (see figure 1 and figure 2 Appendix A).

Based on the land use map (Corine 2000), the area is used as natural grassland, in the immediate vicinity of agriculture areas and remote from the urban network.

Below is shown the land use map (Corine 2000) of the investigated plot.



LEGEND

- Woodland (sclerophyllous vegetation)
- Natural Grassland
- Agriculture area
- Mixed Agriculture area
- Olive groves
- Industrial or commercial zone
- Quarries
- Airports
- Discontinuous urban area

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3. INVESTIGATION METHODS

3.1 Surface soil sampling

Totally seven (7) surface soil samples were collected within the investigated area. The surface soil sampling was performed by means of hand auger equipment and reached the maximum depth of 30cm below ground surface.

The geographical coordinates of the seven (7) surface soil sampling points are the following :

Surface sample	Coordinates	
Ss1	39°21'36.20"N	20°21'2.00"E
Ss2	39°21'36.50"N	20°21'5.90"E
Ss3	39°21'39.40"N	20°21'5.30"E
Ss4	39°21'40.70"N	20°20'59.70"E
Ss5	39°21'42.30"N	20°21'2.70"E
Ss6	39°21'41.80"N	20°21'4.50"E
Ss7	39°21'44.40"N	20°21'3.90"E

The location of the surface soil sampling points are indicated in Appendix A (see figure 3) and respective photos are given in Appendix C.

All soil samples were collected and stored in cool conditions. Moreover, all soil samples were analysed in certified laboratory according to **EN ISO 17025** international standards.

The soil samples that collected were submitted to a series of chemical analyses such as: Residue at 105° C, Fraction sieved 2mm dry basis at 105° C , Heavy Metals (Sb, As, Be, Cd, Co, Cr, CrIV, Hg, Ni, Pb, Cu, Se, Sn, Tl, V, Zn), TPH index, PCBs and PAHs (totally 7 surface soil samples)

All chemical analyses results are presented in table 7 in Appendix B.

4. GEOLOGICAL AND HYDROGEOLOGICAL SITUATION

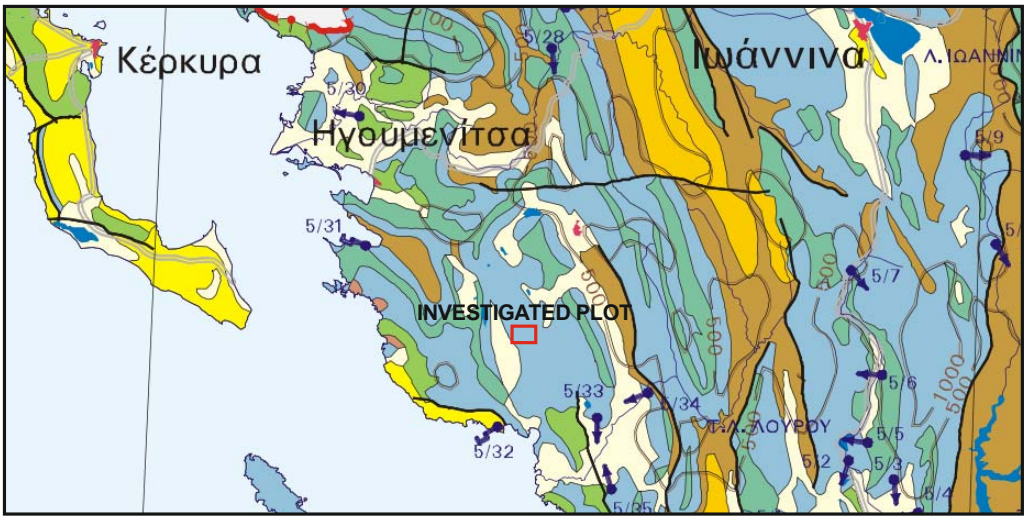
The study area belongs to the Adriatic-Ionian geotectonic zone, which extends along the western mainland of Greece with the North-South direction. It is geotectonically characterized as a continental basin with semi-pelagic-pelagic sedimentation, on the Apulian continental plate that was detached from Godvana during the Triassic and settled in Eurasia the Tertiary.

Lithologically this zone is composed exclusively of Alpine sedimentary rocks. Evaporites (gypsum and salt deposits) are the first alpine sediment, Permian-Triassic age and a total

thickness (based on drilling) of 1500m. Above the evaporites, carbonate rocks from the Middle Triassic to the Eocene are grown uninterruptedly. These are the Limestone Pantocrator (1000m thick) of the Upper Triassic, limestones of Vigla of Upper Jurassic - Upper Cretaceous and finally the flysch from the end of Eocene to the Lower Miocene.

Based on the lithology of the area, which is found in carbonate formations (limestone, dolomite etc.), hydrogeologically it is expected to grow karst aquifers. The depth of the aquifers is unpredictable from point to point, due to the chaotic geometry presented by the karts, through which the movement of the groundwater takes place. Generally, groundwater is encountered approximately at the depth >30m below ground surface.

Below is shown a hydrolithological map of the investigated plot.



LEGEND

Permeable Formations

- Granular alluvial deposits of varying permeability
- Granular non alluvial deposits with medium to low permeability
- Granular molassic deposits of low permeability

Karst Formations

- Limestones and marbles of extensive development with medium to high permeability
- Limestones and marbles of limited development with varying permeability
- Triassic limestone breccia of the Ionian zone, with low to medium permeability

Impermeable Formations

- Flysch
- Metamorphic rocks
- Igneous and volcanic rocks

Based on the site morphology the groundwater flow should take place generally towards the coastline.

Regarding topography, the site is located in a rough area, which is characterised by a significant relief (elevation above sea level approximately 390m).

5. CHEMICAL ANALYSES RESULTS

After the completion of investigation works at the site the obtained surface soil samples were delivered in accredited laboratories in central Europe and submitted to a series of chemical analyses.

Till today, there is no active legislation in terms of set values for soil and/or groundwater contamination in Greece. In future, the Greek Authorities responsible for environmental legislation and protection will set up specific limit values for different land use sites, based on a range of soil quality parameters.

According to the obligation of Greece to be harmonized with the legislation of the European Union in future, the soil and groundwater conditions have to be assessed for all sites. Moreover, according to proposal EU Direction No 2006/0086 (COD), a soil report is required in cases where selling or buying sites or plots where potential contamination activities may have taken place.

Currently, when the environmental Authorities are involved in a contamination case, usually after an accusation by a third party, they generally refer to international accepted standards for the soil and groundwater. These are for example the **New Dutch list standards** that are preferred by the local authorities due to the absence of relevant regulatory list in Greece.

If there is a contamination in the soil and/or groundwater when compared to these standards the local Authorities can enforce financial penalties to the polluters and also require additionally the polluter to proceed with remediation actions. The “polluter pays” principle is endorsed by Presidential Decree 148/2009, which was implemented by the Environmental Liability Directive 2004/35/EC. The principle was already present in pre-existing legislation, as introduced by law 1650/1984. The operator of a polluting activity bears the costs for preventive and remedial actions taken pursuant to the law for the prevention and restoration of environmental damage caused. Furthermore, in the event that there is an imminent threat of environmental damage, the operator is obliged to investigate the subject property for contamination and undertake instantly, under its own judgment, any preventive measures and must inform the competent authorities.

Also with reference to groundwater contamination, law 3199/2003 implementing the Water Framework Directive (2000/60/EC) provides for administrative fines and criminal sanctions.

There is no specific procedure for the decision of implementation of soil remedial measures in contaminated sites. However, if contamination becomes public, then a special study is required (Remedial Action Plan) by experienced engineers describing the most appropriate decontamination alternatives, taking under consideration the existing environmental and health and safety risk caused by the detected contamination. This study has to be approved by the local environmental authorities. The remedial actions are paid by those deemed responsible for the contamination.

If prosecuted by third parties, the polluter may be ordered to pay special fines or penalties.

A variety of provincial regulations exist within the European Union, setting limits for contaminants in soil and groundwater. In Germany, for example, each province has its own list for the tolerable concentration of various contaminants.

According to the **New Dutch List**, the regulatory list, which is valid in many European countries, two different values are given for the concentration of each pollutant.

***Optimum value*:** determines the average concentration in the soil and water,

***Action value*:** determines the concentration above which the application of decontamination measures is compulsory.

All chemical analyses results are presented in Appendix B.

5.1 Surface soil samples

5.1.1 Heavy Metals

Seven (7) surface soil samples were tested according to **EN ISO 11885, DIN EN ISO 12846, DIN 19734** and **DIN EN ISO 17294-2 (E 29)** Standard Methods to define their concentration in selected Heavy Metals (Sb, As, Be, Cd, Co, Cr, CrIV, Hg, Ni, Pb, Cu, Se, Sn, Tl, V, Zn). The Standard Methods applied for the determination of each metal are shown in the table of chemical analysis results in Appendix B.

According to the New Dutch List, the limit values of metal contaminants in the soil are given in the following Table 1:

Table 1 : Limit Values (New Dutch List) for metal contaminants in the soil.

Metal Contaminant	Optimum Value (mg/kg)	Action Value (mg/kg)
Arsenic (As)	29	55
Cadmium (Cd)	0,8	12
Total Chromium (Cr)	100	380
Copper (Cu)	36	190
Mercury (Hg)	0,3	10
Nickel (Ni)	35	210
Lead (Pb)	85	530
Zink (Zn)	140	720
Beryllium (Be)	1,1	30

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Metal Contaminant	Optimum Value (mg/kg)	Action Value (mg/kg)
Selenium (Se)		100
Vanadium (V)	42	250
Cobalt (Co)	20	240
Thallium (Tl)	1	15
Antimony (Sb)	3	15
Tin (Sn)		900

Not any significant **heavy metals** concentration was recorded in the examined surface soil samples in comparison to the New Dutch List optimum and action value limits. The concentration of **Nickel (Ni), Cadmium (Cd), Beryllium (Be) and Vanadium (V)** in all of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Furthermore, the concentrations **of Zink (Zn), Copper (Cu). Cobalt (Co) and Thallium (Tl)** in the majority of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Their presence is attributed to the lithology of the local geological formations and not due to any anthropogenic influence. All the rest **heavy metals** concentrations remained below action and optimum value limit of the New Dutch List.

The Table 2 below shows the range of the recorded concentrations of heavy metals in the examined soil samples:

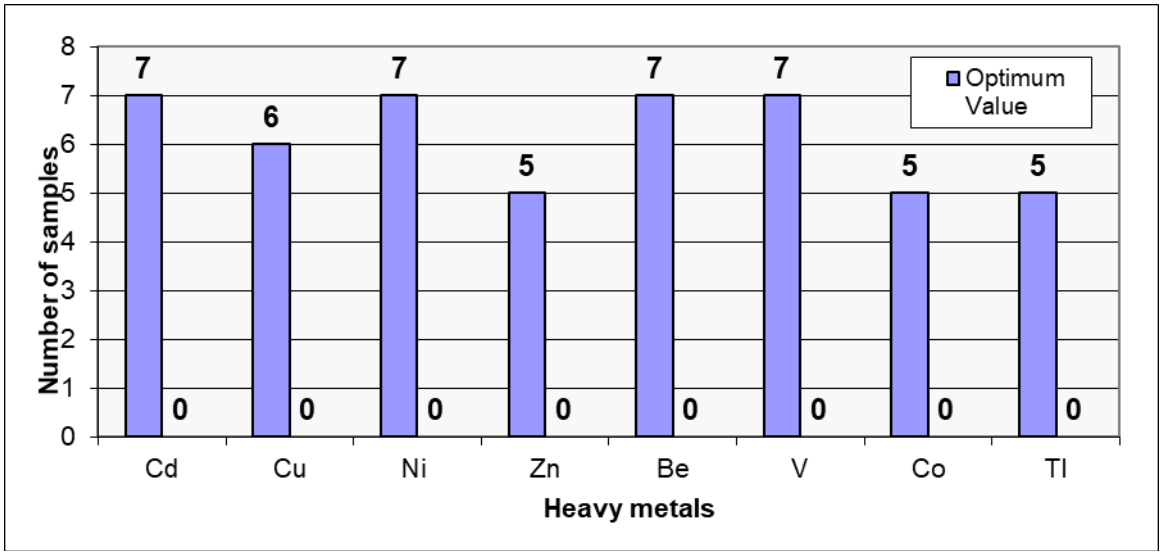
Table 2 : Range of the recorded concentrations of heavy metals in the examined surface soil samples

Metal Contaminant	Number of examined samples	Optimum Value (mg/kg)	Action Value (mg/kg)	Minimum concentration mg/kg	Maximum concentration mg/kg	Number of samples exceeding optimum value of NDL	Number of samples exceeding action value of NDL
Arsenic (As)	7	29	55	6,8	12	--	--
Cadmium(Cd)	7	0,8	12	1	3,5	7	--
Chromium(Cr)	7	100	380	47	89	--	--
Copper (Cu)	7	36	190	23	56	6	--
Mercury (Hg)	7	0,3	10	n.d.	0,08	--	--
Nickel (Ni)	7	35	210	40	83	7	--
Lead (Pb)	7	85	530	18	36	--	--
Zink (Zn)	7	140	720	69,2	189	5	--
Beryllium (Be)	7	1,1	30	2	3	7	--

Metal Contaminant	Number of examined samples	Optimum Value (mg/kg)	Action Value (mg/kg)	Minimum concentration mg/kg	Maximum concentration mg/kg	Number of samples exceeding optimum value of NDL	Number of samples exceeding action value of NDL
Selenium (Se)	7		100	n.d.	n.d.	--	--
Vanadium (V)	7	42	250	51	125	7	--
Cobalt (Co)	7	20	240	12	25	5	--
Thallium (Tl)	7	1	15	0,7	1,3	5	--
Antimony (Sb)	7	3	15	n.d.	n.d.	--	--
Tin (Sn)	7		900	1	3	--	--

n.d. not detected NDL New Dutch List

The graph below show the range of the recorded concentration of heavy metals in the surface soil samples.



All heavy metals analyses results are presented in table 7 in Appendix B. The distribution of the concentration in four (4) selected heavy metals (Cu, Ni, Zn and Tl) in the surface soil is illustrated in figures 4, 5, 6 and 7 for the investigated plot area.

5.1.2 Total Petroleum Hydrocarbons (TPH)

A variety of provincial regulations exist within the European Union, setting limits for contaminants in the soil. In Germany, for example, each province has its own list for the tolerable concentration of (total) mineral oil hydrocarbons. The limit concentration varies between 300 and 1000 mg/kg, with a dominantly accepted maximum tolerable concentration the one of 5000 mg/kg.

The limit values for the concentration of Total **Petroleum Hydrocarbons (TPH)** in soil are:

Limit values of the soil contamination	TPH mg/kg	Range of the examined soil samples (mg/kg)	Number of samples exceeding optimum value of NDL	Number of samples exceeding action value of NDL	Number of samples exceeding limit value according to European Community decision 2003/33
Optimum value (New Dutch list)	50	n.d. – n.d.	--	--	--
Action value (New Dutch list)	5000				
Limit value according to European Community decision 2003/33	500				

n.d. not detected NDL New Dutch List

Totally seven (7) soil samples were analysed for their concentration in TPH according to **ISO 16703**.

The soil was found in satisfactory condition regarding the **petroleum hydrocarbons.** The **TPH (Total Petroleum Hydrocarbons)** concentration in all the examined soil samples remained below the detection limit (1mg/kg).

All TPH analyses results are presented in table 7 in Appendix B.

5.1.3 Polycyclic Aromatic Hydrocarbons (PAHs)

All obtained surface soil samples (totally 7) were tested according to **Leaflet LUA NRW No. 1** Standard Method to define the concentration of Polycyclic Aromatic Hydrocarbons (PAHs). Specifically, the analyses with regards to this group of compounds included the following parameters:

Table 3: Polycyclic Aromatic Hydrocarbons (PAHs)

Parameters			
Naphthalene	Phenanthrene	Benzo(a)anthracene	Benzo(a)pyrene
Acenaphthylene	Anthracene	Chrysene	Dibenzo(ghi)perylene
Acenaphthene	Fluoranthene	Benzo(b)fluoranthene	Benzo(ghi)perylene
Fluorene	Pyrene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene

According to the New Dutch List, the limit values of the PAHs contaminants in the soil are given in the following Table 4:

Table 4: Limit Values (New Dutch List) for Polycyclic Aromatic Hydrocarbons (PAHs) in the soil.

Parameter	Optimum Value (mg/kg)	Action Value (mg/kg)
Total PAHs	1	40

The results of the analyses did not show any contamination of PAHs in the examined surface soil samples. All concentrations remained in not detectable level. The analyses results are presented in table 7 in APPENDIX B.

5.1.4 PCBs

Totally seven (7) soil samples were analysed for their concentration in PCBs according to **DIN EN 15308**.

According to the New Dutch List, the limit values of the PCBs contaminants in the soil are given in the following Table 5:

Table 5: Limit Values (New Dutch List) for PCBs in the soil.

Parameter	Optimum Value (mg/kg)	Action Value (mg/kg)
PCBs	0,02	1

The results of the analyses did not show any contamination of PCBs in the examined surface soil samples. All concentrations remained in not detectable level. The analyses results are presented in table 7 in APPENDIX B.

5.1.5 Fraction sieve analysis

A sieve analysis (or gradation test) is a practice or procedure used (commonly used in civil engineering) to assess the particle size distribution (also called gradation) of a granular material.

The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, soil, a wide range of manufactured powders, grain and seeds, down to a minimum size depending on the exact method. Being such a simple technique of particle sizing, it is probably the most common

During sieving the sample is subjected to horizontal or vertical movement in accordance with the chosen method. This causes a relative movement between the particles and the sieve, depending on their size the individual particles either pass through the sieve mesh or are retained on the sieve surface. The likelihood of a particle passing through the sieve mesh is determined by the ratio of the particle size to the sieve openings, the orientation of the particle and the number of encounters between the particle and the mesh openings.

The sieve analyses results are presented in the following Table 6:

Table 6: Sieve analysis in the surface soil samples.

Surface sample	Cobles (%)	Sand (%)	Silt-Clay (%)	Clay (%)
Ss1	--	6	94	--
Ss2	--	7	93	--
Ss3	--	5	95	--
Ss4	--	4	96	--
Ss5	--	5	95	--
Ss6	--	7	93	--
Ss7	--	6	94	--

6. INTERPRETATION OF THE RESULTS-SUGGESTED FURTHER ACTIONS

Aim of the project was to detect any possible contamination in the surface soil at the site and, if detected, to identify the type and extent of this contamination.

For the purposes of the specific study, INTERGEO performed specific field work at the site in order to obtain a representative overview of the surface soil condition at the specific area. The site investigation started and completed on 14/12/17.

Till today, there is no active legislation in terms of set values for soil and/or groundwater contamination in Greece. In future, the Greek Authorities responsible for environmental legislation and protection will set up specific limit values for different land use sites, based on a range of soil quality parameters.

According to the obligation of Greece to be harmonized with the legislation of the European Union in future, the soil and groundwater conditions have to be assessed for all sites. Moreover, according to proposal EU Direction No 2006/0086 (COD), a soil report is required in cases where selling or buying sites or plots where potential contamination activities may have taken place.

Currently, when the environmental Authorities are involved in a contamination case, usually after an accusation by a third party, they generally refer to international accepted standards for the soil and groundwater. These are for example the **New Dutch list standards** that are preferred by the local authorities due to the absence of relevant regulatory list in Greece.

If there is a contamination in the soil and/or groundwater when compared to these standards the local Authorities can enforce financial penalties to the polluters and also require additionally the polluter to proceed with remediation actions. The “polluter pays” principle is endorsed by Presidential Decree 148/2009, which was implemented by the Environmental Liability Directive 2004/35/EC. The principle was already present in pre-existing legislation, as introduced by law 1650/1984. The operator of a polluting activity bears the costs for preventive and remedial actions taken pursuant to the law for the prevention and restoration of environmental damage caused. Furthermore, in the event that there is an imminent threat of environmental damage, the operator is obliged to investigate the subject property for contamination and undertake instantly, under its own judgment, any preventive measures and must inform the competent authorities.

Also with reference to groundwater contamination, law 3199/2003 implementing the Water Framework Directive (2000/60/EC) provides for administrative fines and criminal sanctions.

There is no specific procedure for the decision of implementation of soil remedial measures in contaminated sites. However, if contamination becomes public, then a special study is required (Remedial Action Plan) by experienced engineers describing the most appropriate decontamination alternatives, taking under consideration the existing environmental and health and safety risk caused by the detected contamination. This study has to be approved by the local environmental authorities. The remedial actions are paid by those deemed responsible for the contamination.

If prosecuted by third parties, the polluter may be ordered to pay special fines or penalties.

Therefore, the results of the performed chemical analyses were compared to the New Dutch list standards due to the absence of relevant regulatory list in Greece till that moment and the general practice that the Greek Authorities always use this list if they are involved.

Based on the results of the environmental assessment, the following synoptic conclusions about the surface soil at the investigated site could be drawn:

- The soil was found in satisfactory condition regarding the **petroleum hydrocarbons.** The **TPH (Total Petroleum Hydrocarbons)** and **PAHs** concentration in all the examined surface soil samples remained below the detection limit (1mg/kg for TPH and 0,05mg/kg for PAH).
- All PCBs concentrations remained below the detection limit (0,01mg/kg).
- Not any significant **heavy metals** concentration was recorded in the examined surface soil samples in comparison to the New Dutch List optimum and action value limits. The concentration of **Nickel (Ni), Cadmium (Cd), Beryllium (Be) and Vanadium (V)** in all of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Furthermore, the concentrations **of Zink (Zn), Copper (Cu). Cobalt (Co) and Thallium (Tl)** in the majority of the examined surface soil samples was higher than the optimum value but lower enough than the action value of the New Dutch List. Their presence is attributed to the lithology of the local geological formations and not due to any anthropogenic influence. All the rest **heavy metals** concentrations remained below action and optimum value limit of the New Dutch List.

According to the overall evaluation of the investigation results, not any significant inorganic and organic contamination was detected in the surface soil of the investigated plot area. Moreover, no contamination inflow was recorded at the site from activities irrelevant to the plot area. The absence of any contamination load in the surface soil makes the plot suitable for the implementation of any further future use (industrial, residential, commercial etc).

Based on the investigation results, the **environmental sensitivity of the investigated plot area in Florovouni-Thesprotia** should be defined **as low. This arises from** its distance from the coastline (5.300m) and the absence of any underground receptors (relative deep groundwater > 30 m bgs). Furthermore hydrogeologically, the site is underlain by impermeable geological layers at the shallow depth **that do not allow the downward migration of potential contaminants to the groundwater table**.

Finally, taking under consideration all available information and findings of the performed investigation, planned future site usage **the environmental risk associated with the specific site** should be characterized **as low** (not any surface soil contamination present, within a location of low environmental sensitivity due to absence of potential receptors).

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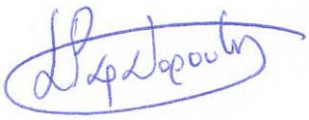

Dr. Stylianos A. Papadopoulos

Dr. Christos Vatseris

Lazaros Patrelis

APPENDIX A : FIGURES

Figure 1 : Geographic location of the plot at Florivouni-Thesprotia, Greece

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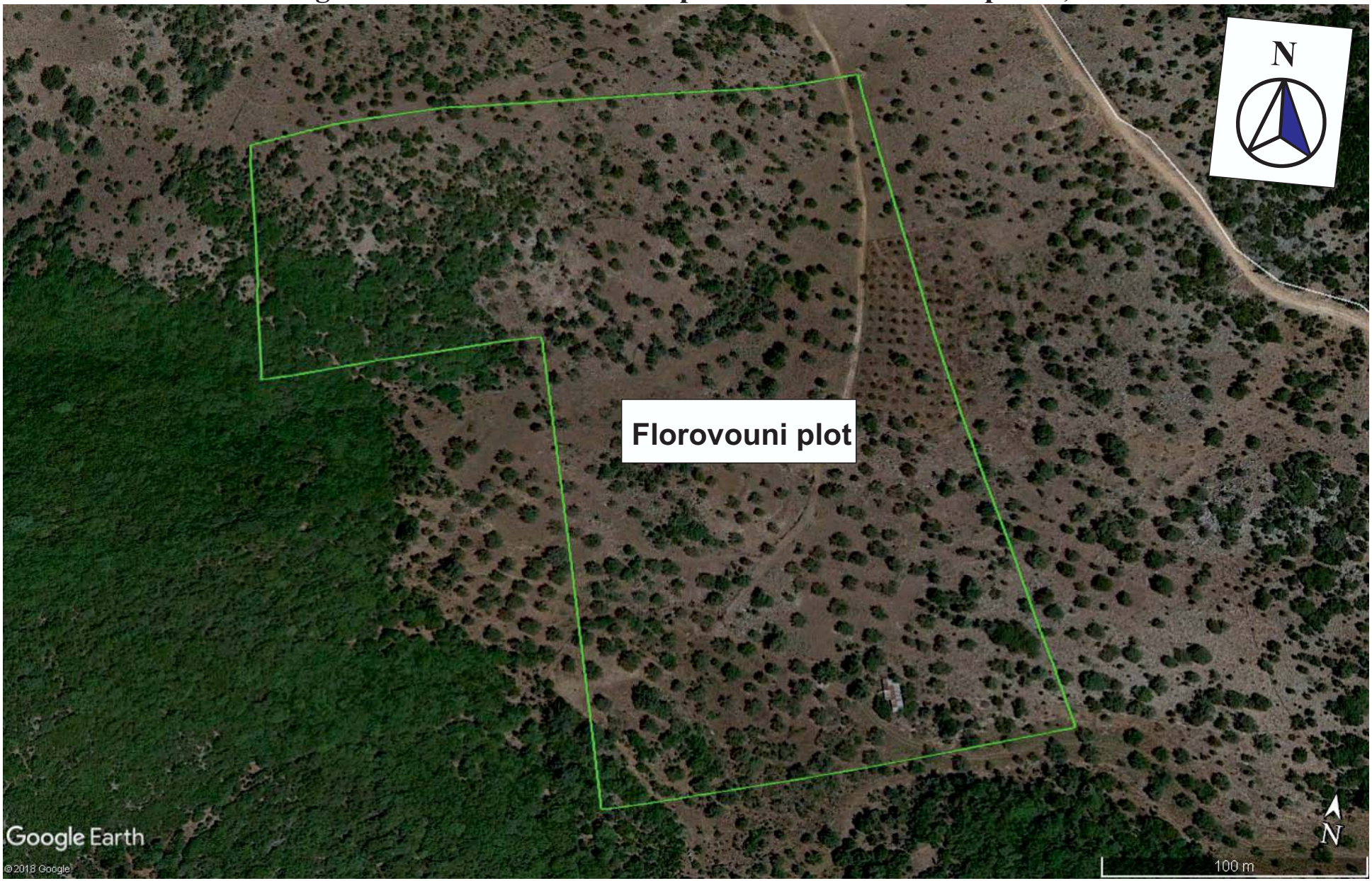
Figure 2 : Satellite view of the plot at Florovouni-Thesprotia, Greece



G3226-Florovouni sat map2.cdr

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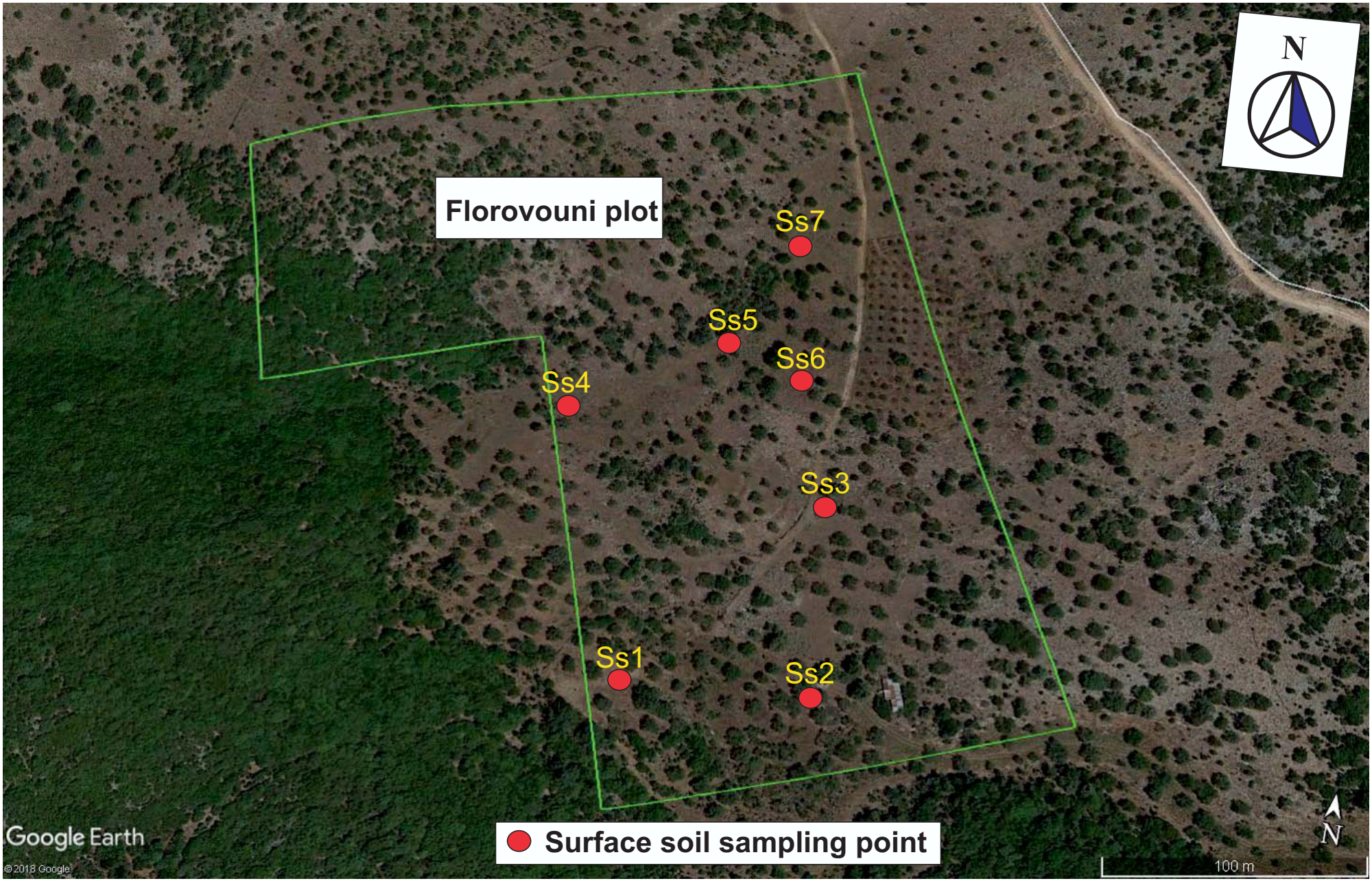
Figure 3 : Location of the surface soil sampling points at the plot in Florovouni-Thesprotia, Greece (Satellite view)



G3226-Florovouni inv map.cdr

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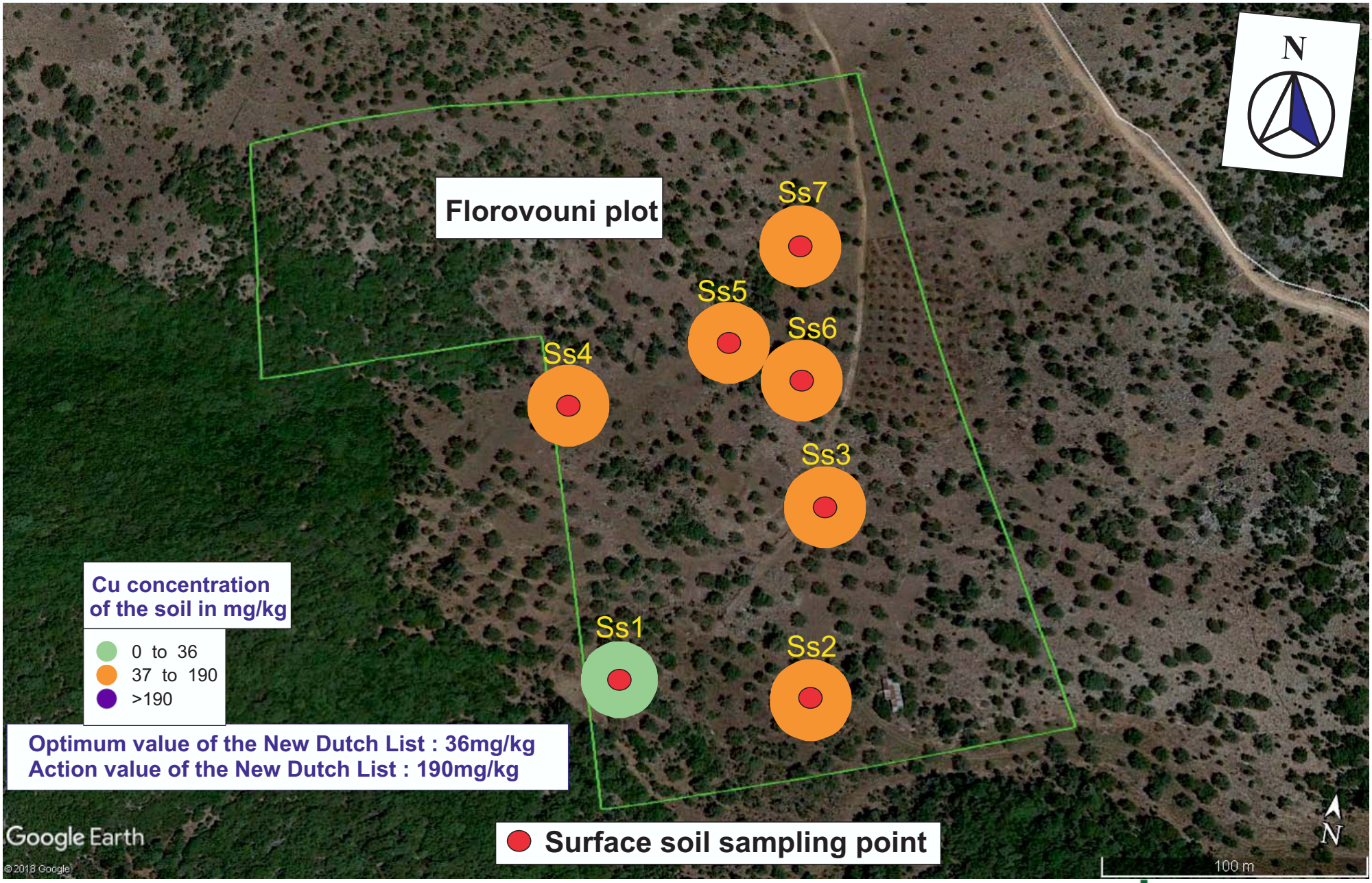
Figure 4 : Distribution of the Cu concentration in the surface soil at the plot in Florovouni-Thesprotia, Greece



G3226-Cu.cdr

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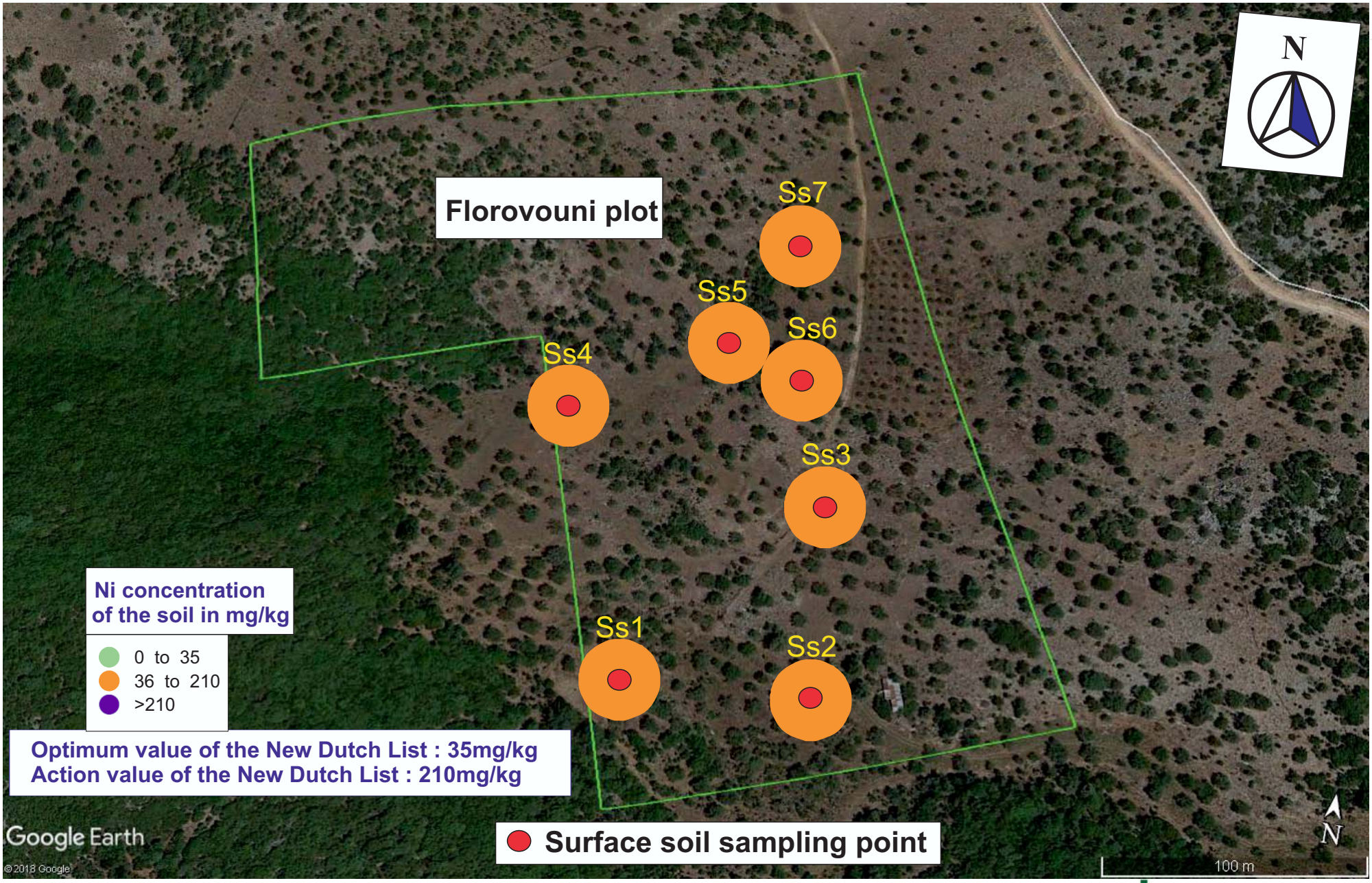
Figure 5 : Distribution of the Ni concentration in the surface soil at the plot in Florovouni-Thesprotia, Greece



G3226-Ni.cdr

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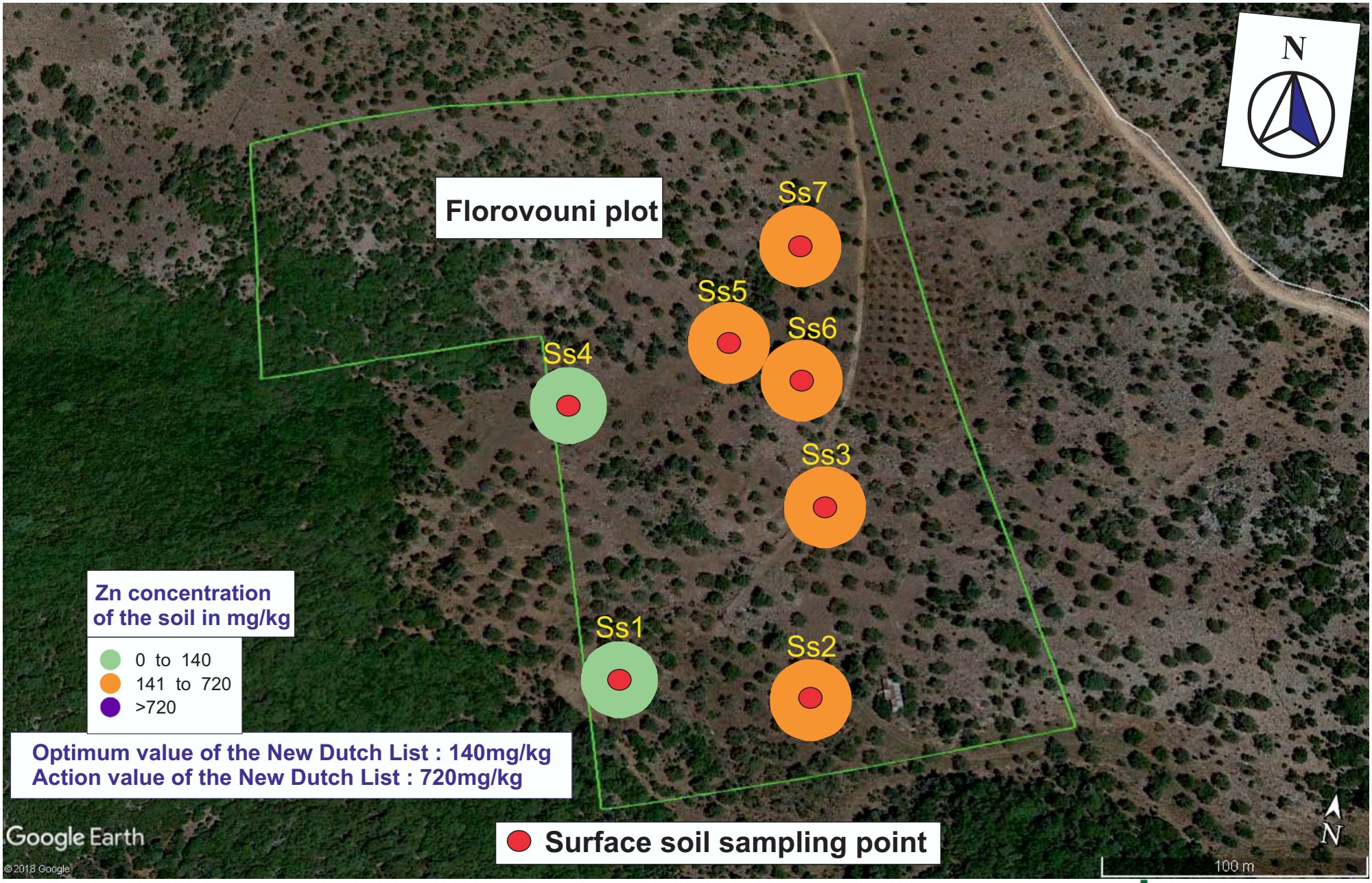
Figure 6 : Distribution of the Zn concentration in the surface soil at the plot in Florovouni-Thesprotia, Greece



G3226-Zn.cdr

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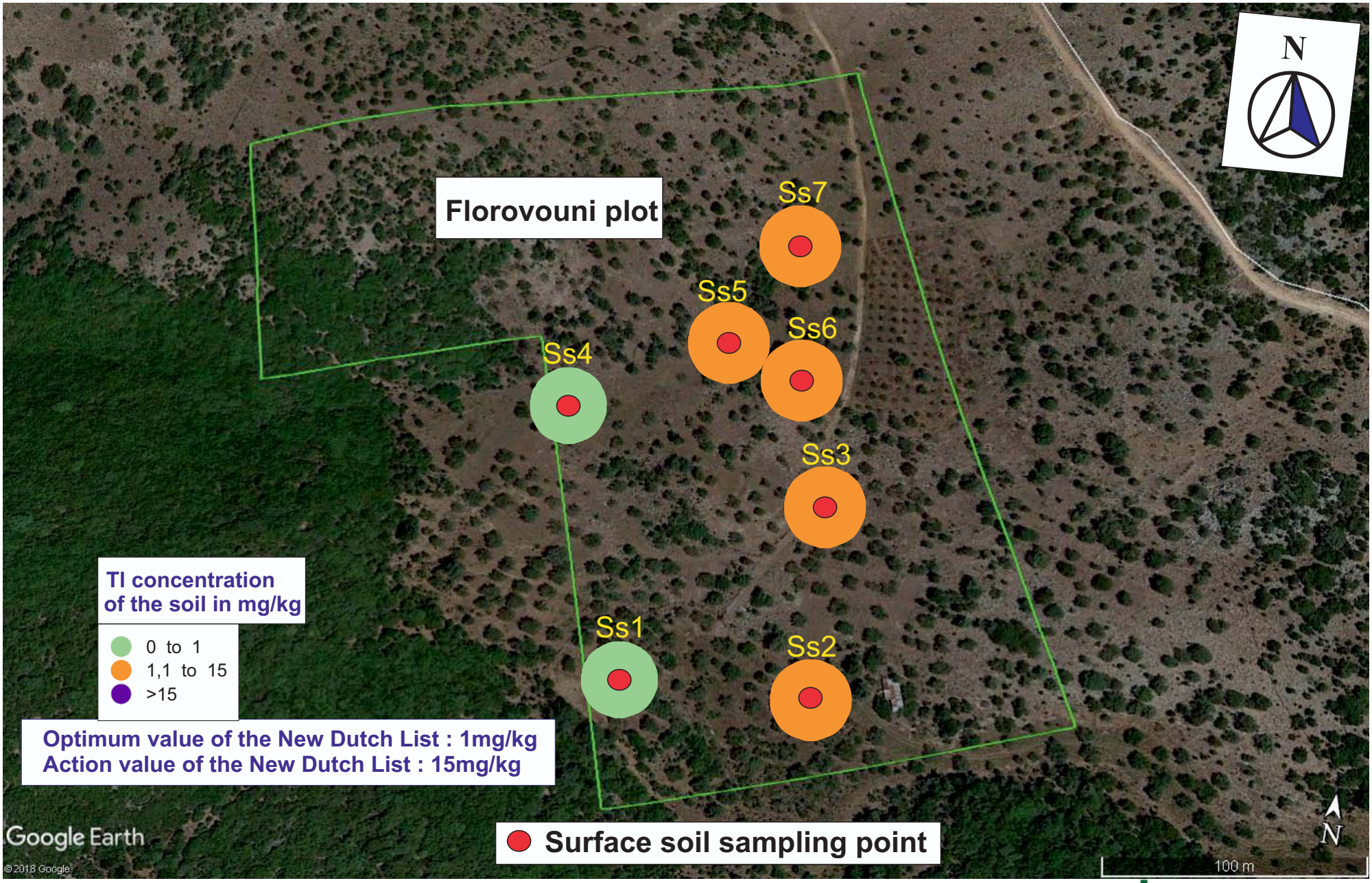
Figure 7 : Distribution of the Tl concentration in the surface soil at the plot in Florovouni-Thesprotia, Greece



G3226-Tl.cdr

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APPENDIX B : CHEMICAL ANALYSES RESULTS

Table 7 : Chemical analyses results in surface soil samples

Parameter	Method of analysis	Detection limit in	opt. value	act. value	Ss1	Ss2	Ss3	Ss4	Ss5	Ss6	Ss7
Heavy metals		**mg/Kg**									
Mercury (Hg)	DIN EN ISO 12846	0,05	0,3	10	0,06	0,08	0,07	n.d.	0,06	0,07	0,08
Total Chromium (Cr)	DIN EN ISO 11885	1	100	380	47	89	85	55	76	72	72
Hexavalent Chromium (IV Cr)	DIN 19734	0,1			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Lead (Pb)	DIN EN ISO 11885	4	85	530	18	36	31	24	30	29	29
Nickel (Ni)	DIN EN ISO 11885	1	35	210	40	83	78	60	78	73	78
Cadmium (Cd)	DIN EN ISO 11885	0,2	0,8	12	1	2,7	3,5	2	2,9	3,3	2,8
Zinc (Zn)	DIN EN ISO 11885	2	140	720	69,2	164	189	125	159	165	164
Copper (Cu)	DIN EN ISO 11885	1	36	190	23	56	55	46	53	52	55
Arsenic (As)	DIN EN ISO 11885	2	29	55	6,8	12	10	9,3	12	11	12
Beryllium (Be)	DIN EN ISO 11885	1	1,1	30	2	3	3	2	3	3	3
Selenium (Se)	DIN EN ISO 17294-2 (E 29)	2		100	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Vanadium (V)	DIN EN ISO 11885	3	42	250	51	93	97	125	91	84	89
Cobalt (Co)	DIN EN ISO 11885	3	20	240	12	25	21	19	25	21	23
Thallium (Tl)	DIN EN ISO 17294-2 (E 29)	0,1	1	15	0,7	1,3	1,3	0,9	1,2	1,1	1,2
Antimony (Sb)	DIN EN ISO 17294-2 (E 29)	2	3	15	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Tin (Sn)	DIN EN ISO 17294-2 (E 29)	1		900	1	3	2	1	2	2	2
PAHs											
Naphthalene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Acenaphthylene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Acenaphthene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Fluorene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Phenanthrene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Anthracene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Fluoranthene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Pyrene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Benzo(a)anthracene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Chrysene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Benzo(b)fluoranthene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Benzo(k)fluoranthene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Benzo(a)pyrene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Dibenzo(ghi)perylene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Benzo(ghi)perylene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Indeno(1,2,3-cd)pyrene	Leaflet LUA NRW No. 1	0,05			n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Total PAH	Leaflet LUA NRW No. 1	0,05	1	40	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
PCBs	DIN EN 15308	0,01	0,02	1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
TPH index	ISO 16703	1	50	5000	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
		%									
Dry mater	DIN EN 14346	0,1			70,9	72,5	70,6	66,2	74,9	70,7	68,2

n.d. not detected

APPENDIX C : PHOTOGRAPHS

PHOTOS

LOCATION: Florovouni-Thesprotia, Greece

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11.5 Groundwater Baseline Report

INTERGEO

REPORT

ON THE GROUNDWATER SAMPLING FROM EXISTING PRIVATE WELL ADJACENT TO THE PLOT OF THE FUTURE NATURAL GAS COMPRESSION TERMINAL IN FLOROVOUNI-THESPROTIA, GREECE

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Study Group:

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Dr. Christos Vatseris	**Hydrogeologist**
Lazaros Patrelis	**Geologist**

CONTENTS

Thessaloniki, 12.02.2018

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EN. ISO 9001:2008 No: 010160061
EN. ISO 14001:2004 No: 04014122
OHSAS 18001:2007 No: 03015076

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INTERGEO

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INTERGEO

1. SUMMARY

In the frame of the Environmental Site Investigation at the plot where the future Natural Gas compression Terminal will be constructed in Florovouni-Thesprotia, Greece, INTERGEO Environmental Technology Ltd. performed on 25/01/2018 a groundwater sampling from existing private well located adjacent and downstream from the plot where the future Natural Gas compression Terminal will be constructed.

The existing private well is located north-west from the plot where the future Natural Gas compression Terminal will be constructed and at a distance of about 2.000m from the plot. The specific existing private well belongs to the Hydrogeological system of Parga (GR 0500170). The plot where the future Natural Gas compression Terminal will be constructed belongs also to the Hydrogeological system of Parga (GR 0500170). Thus, in spite the 2.000m distance between the existing private well and the plot, the performed groundwater sampling can be characterized acceptable, as both the existing private well and the plot belongs to the same Hydrogeological system. The hydrogeological system is categorized according to the approved Epirus Water Management Plan (ΥΔ05). The approximate geographic location and a satellite view of the existing private well are shown in the attached figures 1 and 2 (Appendix A). It has to be noticed that owner of the private well is Mr Konstantinos Iakovou. The existing private well is operating for irrigation purposes.

The Aim of the specific groundwater sampling program is to test the chemical and physico-chemical properties of the groundwater at the specific location adjacent and downstream from the plot where the future Natural Gas compression Terminal will be constructed, in order to control the groundwater condition and to detect any possible impact of the groundwater by various organic and inorganic pollutants.

The obtained groundwater sample was sent for further chemical analyses as shown below:

- Anions: Cl, PO4, Nitrate, Sulfate
- Metals: Al, As, Be, Cd, Co, Cr, CrIV, Cu, F, Fe, Li, Mn, Mo, Ni, Pb, Se, V, Tl, Zn, Sb, B, Hg
- Total oil, TPH and animal and vegetable oil and fat
- PAHs: Total PAH,
- Total coliforms,
- BOD5,
- total COD,
- TDS,
- TOC

- Sum trichlorethylene and tetrachlorethylene

According to the organoleptical observation, **no smell of any petroleum product** was detected in the examined groundwater sample. Additionally other physicochemical parameters were measured on site.

All the performed chemical analyses were conducted by an accredited laboratory according to **EN ISO 17025.**

According to the chemical analyses results **groundwater was found in satisfactory condition**. Almost all examined parameters remained in very low values and in some cases **in not detectable level**.

Regarding the heavy metal analyses results only Iron (Fe), Manganese (Mn), Boron (B) and Lithium (Li) concentrations were detected. The Iron (Fe) concentration (1.100μg/l) exceeded the maximum accepted concentration value (200μg/l) of some contaminants in the drinking water **according to Y.A. Y2/2600/2001.**

All VOCs, PCBs and PAHs concentrations remained in not detectable level.

All examined anions and cations concentrations, the pH and the electrical conductivity (EC) remained in the normal range **according to Y.A. 1811/2011 and Y.A. Y2/2600/2001**.

Regarding the microbiological analyses results only the coliform bacteria was recorded 230cfu/100ml and exceeded the maximum accepted concentration value (0cfu/100ml) of some contaminants in the drinking water **according to Y.A. Y2/2600/2001.**

2. INVESTIGATION METHODS

2.1. Groundwater sampling - On site measurements

On 25/01/2018 groundwater sampling was conducted from existing private well located adjacent and downstream from the plot where the future Natural Gas compression Terminal will be constructed, in order to control the groundwater condition.

The groundwater sample was collected directly from the existing well by means of the existing submersible pump operation and after 10 minutes operation period. The collection, conservation, storage and transport of the samples took place according to specifications **EN ISO 5667-3** (General Information for Sample Recovery and Preservation).

No groundwater level measurements were carried out at the site due to sealed cover cap of the existing well. The following physicochemical parameters were measured on site with the help of special equipment: Conductivity, temperature and pH of the groundwater.

The measured physicochemical parameters are shown in table 1.

Table 1: On site measurements in existing private groundwater well in Florovouni-Thesprotia, Greece (on 25/01/2018)

Monitoring well	Depth of the well in m	Conductivity in μS/cm	Temperature in ^{o}C	pH	Organoleptical observation
GW1	90	864	18,0	7,30	No smell

The EC value in the examined private groundwater well was measured from 864μS/cm indicating normal condition (decreased salinity). Temperature was found in normal range expected at the specific time period. The pH value that was determined for the obtained groundwater sample was within the normal range.

According to organoleptic observation, **no smell of any petroleum product** was recorded in the obtained groundwater sample.

The groundwater sample was afterwards analyzed, in order to define its concentration in various organic and inorganic pollutants. The results are shown in table 7 in Appendix B.

3. CHEMICAL ANALYSES RESULTS

Since December 2011, legislation is established by the Greek Authorities, which is further clarified in 2012, concerning the quality standards and the highest accepted concentrations of some parameters in the groundwater.

The recent active legislation in Greece concerning the groundwater quality is**: Υ.Α. οικ. 1811/2011** (ΦΕΚ 3322/Β`/30.12.2011) "Maximum allowed concentration in the groundwater, in accordance of paragraph 2 of article 3 of No 39626/2208/E130/2009 ministry decision (2075/B)".

Table 2 below shows the quality standards and maximum accepted concentration values of contaminants in the groundwater and contamination indicators according to Y.A. 1811/2011

Table 2: Quality standards and maximum accepted concentration values of contaminants in the groundwater and contamination indicators according to Y.A. 1811/2011

PART A	
Contaminant	**Quality standards of Groundwater**
Nitrates (NO_3^-)	50 mg/l
Pesticides active substances	0,1 μg/l 0,5 μg/l (total)
PART B	
Parameter	**Maximum accepted value**
pH	6,50 – 9,50
Electrical Conductivity (EC)	2500μS/cm
Arsenic (As)	10 μg/l
Cadmium (Cd)	5 μg/l
Lead (Pb)	25 μg/l
Mercury (Hg)	1,0 μg/l
Nickel (Ni)	20 μg/l
Chromium total (Cr)	50 μg/l
Aluminum (Al)	200 μg/l
Ammonium (NH_4^+)	0,50 mg/l
Nitrite (NO_2^-)	0,50 mg/l
Chloride (Cl^-)	250 mg/l
Sulfates (SO_4^{2-})	250 mg/l
Sum of Trichloroethylene and Tetrachloroethylene	10 μg/l

Moreover, another active legislation in Greece concerning the drinking water quality is : **Y.A. Y2/2600/2001** (ΦΕΚ 892/11.07.2001) "Quality of the drinking water consumption"

Table 3 below shows the quality standards and maximum accepted concentration values of some contaminants, related to the chemical analyses results, in the drinking water and contamination indicators according to Y.A. Y2/2600/2001.

Table 3: Quality standards and maximum accepted concentration values of some contaminants in the drinking water and contamination indicators according to Y.A. Y2/2600/2001

Parameter	Maximum accepted value
Iron (Fe)	200 μg/l
Manganese (Mn)	50 μg/l
Antimony (Sb)	5 μg/l
Boron (B)	1,0 mg/l
Copper (Cu)	2,0 mg/l
Arsenic (As)	10 μg/l
Selenium (Se)	10 μg/l
Cadmium (Cd)	5 μg/l
Lead (Pb)	10 μg/l
Mercury (Hg)	1,0 μg/l
Nickel (Ni)	20 μg/l
Chromium total (Cr)	50 μg/l
Aluminum (Al)	200 μg/l
Chloride (Cl^-)	250 mg/l
Sulfates (SO_4^{2-})	250 mg/l
Nitrate (NO_3^-)	50 mg/l
Dissolved Hydrocarbons – Oil grease	10 μg/l
PAHs	0,1 μg/l
Sum of Trichloroethylene and Tetrachloroethylene	10 μg/l
pH	6,50 – 9,50
Electrical Conductivity (EC)	2500μS/cm
Escherichia coli (E. coli)	0/100ml
Coliform bacteria	0/100ml

According to the New Dutch List the value limits for heavy metals are shown in the below Table 4:

Table 4 : Limit Values (New Dutch List) for heavy metals in the groundwater

	Optimum Value (μg/l)	Action Value (μg/l)
Heavy metal Contaminant		
Arsenic (As)	10	60
Cadmium (Ca)	0,4	6

	Optimum Value (µg/l)	Action Value (µg/l)
Copper (Cu)	15	75
Chromium (Cr)	1	30
Mercury (Hg)	0,05	0,3
Nickel (Ni)	15	75
Lead (Pb)	15	75
Zinc (Zn)	65	800
Barium (Ba)	50	625
Molybdenum (Mo)	5	300
Vanadium (V)	1,2	70

The corresponding optimum and action values from ‘‘**New Dutch list**’’ for Total Petroleum Hydrocarbons (TPH) concentration in groundwater are shown below:

Limit values of the new Dutch List	TPH mg/l
Optimum value	0,05
Action value	0,6

According to the New Dutch List, the limit values of the Polycyclic Aromatic Hydrocarbons (PAHs) contaminants in the groundwater are given in the following Table 5:

Table 5 : Limit Values (New Dutch List) for Polycyclic Aromatic Hydrocarbons (PAHs) concentration in the groundwater

PAHs	Optimum value µg/l	Action value µg/l
Naphthalene	0,1	70
Acenaphthylene	--	--
Acenaphthene	--	--
Fluorene	--	--
Phenanthrene	0,03	5
Anthracene	0,02	5
Fluoranthene	--	--
Pyrene	--	--
Benzo(a)anthracene	0,002	0,5
Chrysene	0,002	0,05
Benzo(b)fluoranthene	--	--

PAHs	Optimum value µg/l	Action value µg/l
Benzo(k)fluoranthene	0,001	0,05
Benzo(a)pyrene	0,001	0,5
Dibenzo(ghi)perylene	--	--
Benzo(ghi)perylene	0,0002	0,05
Indeno(1,2,3-cd)pyrene	0,0004	0,05

According to the New Dutch List, the limit values of the Volatile Organic Compound (VOC) contaminants in the groundwater are given in the following Table 6:

Table 6 : Limit Values (New Dutch List) for Volatile Organic Compound (VOC) in the groundwater.

VOC	Optimum value µg/l	Action value µg/l
Benzene	0,2	30
Ethylbenzene	0,2	150
Toluene	0,2	1000
Xylene	0,2	70
Vinil cloride	--	0,7
Dichloromethane	0,001	1000
Dichoroethene, trans	0,01	20
Dichoroethene, cis	0,01	20
1,2 Dichoroethane	0,01	400
Trichloromethane	0,01	400
1,1,1-Trichloroethane	0,01	40
Trichloroethene	0,01	500
Tetrachloromethane	0,01	10
Tetrachloroethane	0,01	40

4. INTERPRETATION OF THE RESULTS – SUGGESTED FURTHER ACTIONS

According to the chemical analyses results **groundwater was found in satisfactory condition**. Almost all examined parameters remained in very low values and in some cases **in not detectable level**.

Regarding the heavy metal analyses results only Iron (Fe), Manganese (Mn), Boron (B) and Lithium (Li) concentrations were detected. The Iron (Fe) concentration (1.100µg/l) exceeded the maximum accepted concentration value (200µg/l) of some contaminants in the drinking water **according to Y.A. Y2/2600/2001.**

All VOCs, PCBs and PAHs concentrations remained in not detectable level.

INTERGEO

All examined anions and cations concentrations, the pH and the electrical conductivity (EC) remained in the normal range **according to Y.A. 1811/2011 and Y.A. Y2/2600/2001**.

Regarding the microbiological analyses results only the coliform bacteria was recorded 230cfu/100ml and exceeded the maximum accepted concentration value (0cfu/100ml) of some contaminants in the drinking water **according to Y.A. Y2/2600/2001.**

In any case, a periodic and documented monitoring of the groundwater quality in the future is strongly recommended by sampling of the existing private well at least once a year.

The proposed action will detect any possible influence of the future Natural Gas compression Terminal, during construction and operation period, in the groundwater.

INTERGEO
Environmental Technology

Dr. Stylianos A. Papadopoulos

Dr. Christos Vatseris

Lazaros Patrelis

APPENDIX A : FIGURES

Figure 1 : Geographic location of the existing private groundwater well (GW1) at Florivouni-Thesprotia, Greece

G3226-Florovouni sat map1 gw.cdr

INTERGEO
Environmental Technology Ltd.

Figure 2 : Satellite view of the existing private groundwater well (GW1) at Florivouni-Thesprotia, Greece

G3226-Florovouni sat map2 gw.cdr

INTERGEO
Environmental Technology Ltd.

APPENDIX B : CHEMICAL ANALYSES RESULTS

Table 7 : Chemical analyses results in groundwater sample	INTERGEO Environmental Technology Ltd.				
Parameter	**Method of analysis**	**Detection limit**	**opt. value**	**act. value**	**GW1**
Heavy metals		**µg/l**			
Mercury (Hg)	EN 1483	0,2	0,05	0,3	n.d.
Total Chromium (Cr)	DIN EN ISO 17294-2 (E29)	5	1	30	n.d.
Hexavalent Chromium (IV Cr)	DIN ISO 15293-1 (D49)	5			n.d.
Aluminium (Al)	DIN EN ISO 17294-2 (E29)	20			n.d.
Iron (Fe)	DIN EN ISO 17294-2 (E29)	50			1100
Manganese (Mn)	DIN EN ISO 17294-2 (E29)	5			20
Boron (B)	DIN EN ISO 17294-2 (E29)	10			120
Lithium (Li)	DIN EN ISO 17294-2 (E29)	5			20
Lead (Pb)	DIN EN ISO 17294-2 (E29)	3	15	75	n.d.
Nickel (Ni)	DIN EN ISO 17294-2 (E29)	5	15	75	n.d.
Cadmium (Cd)	DIN EN ISO 17294-2 (E29)	0,5	0,4	6	n.d.
Zinc (Zn)	DIN EN ISO 17294-2 (E29)	10	65	800	n.d.
Copper (Cu)	DIN EN ISO 17294-2 (E29)	5	15	75	n.d.
Arsenic (As)	DIN EN ISO 17294-2 (E29)	3	10	60	n.d.
Beryllium (Be)	DIN EN ISO 17294-2 (E29)	5			n.d.
Selenium (Se)	DIN EN ISO 17294-2 (E29)	1			n.d.
Vanadium (V)	DIN EN ISO 17294-2 (E29)	4	1,2	70	n.d.
Cobalt (Co)	DIN EN ISO 17294-2 (E29)	5			n.d.
Thallium (Tl)	DIN EN ISO 17294-2 (E29)	5			n.d.
Antimony (Sb)	DIN EN ISO 17294-2 (E29)	0,5			n.d.
Molybdenum (Mo)	DIN EN ISO 17294-2 (E29)	5	5	300	n.d.
VOC		**µg/l**			
Acetone	DIN EN ISO 10301-F4	50			n.d.
Butylacetate	DIN EN ISO 10301-F4	10			n.d.
Decane	DIN EN ISO 10301-F4	5			n.d.
Ethylacetate	DIN EN ISO 10301-F4	10			n.d.
Nonane	DIN EN ISO 10301-F4	5			n.d.
Octane	DIN EN ISO 10301-F4	1			n.d.
Tetrahydrofuran	DIN EN ISO 10301-F4	50			n.d.
Dodecane	DIN EN ISO 10301-F4	10			n.d.
n-Hexane	DIN EN ISO 10301-F4	5			n.d.
n-Undecane	DIN EN ISO 10301-F4	10			n.d.
p,m-ethyltoluene	DIN EN ISO 10301-F4	1			n.d.
1,1,2-Trichlorotrifluoroethane (R113)	DIN EN ISO 10301-F4	0,5			n.d.
Trichlorotrifluoroethane (R11)	DIN EN ISO 10301-F4	0,5			n.d.
2-Butanone	DIN EN ISO 10301-F4	10			n.d.
4-Methyl-2-pentanone	DIN EN ISO 10301-F4	10			n.d.
Vinyl chloride	DIN EN ISO 10301-F4	0,5		0,7	n.d.
1,1-Dichloroethene	DIN EN ISO 10301-F4	0,5			n.d.
Dichloromethane	DIN EN ISO 10301-F4	0,5	0,001	1000	n.d.
1,2-Dichloroethane	DIN EN ISO 10301-F4	0,5	0,01	400	n.d.
cis-1,2-Dichloroethene	DIN EN ISO 10301-F4	0,5	0,01	20	n.d.
trans-1,2-Dichloroethene	DIN EN ISO 10301-F4	0,5	0,01	20	n.d.
Trichloromethane	DIN EN ISO 10301-F4	0,5	0,01	400	n.d.
Tetrachloromethane	DIN EN ISO 10301-F4	0,5	0,01	10	n.d.
1,1,1-Trichloroethane	DIN EN ISO 10301-F4	0,5	0,01	40	n.d.
Trichloroethene	DIN EN ISO 10301-F4	0,5			n.d.
Tetrachloroethene	DIN EN ISO 10301-F4	0,5	0,01	500	n.d.
Benzene	DIN EN ISO 10301-F4	0,5	0,2	30	n.d.
Toluene	DIN EN ISO 10301-F4	0,5	0,2	1000	n.d.
Ethylbenzene	DIN EN ISO 10301-F4	0,5	0,2	150	n.d.
m,p-Xylene	DIN EN ISO 10301-F4	0,5	0,2	70	n.d.
o-Xylene	DIN EN ISO 10301-F4	0,5	0,2	70	n.d.
Cumene	DIN EN ISO 10301-F4	0,5			n.d.
Styrene	DIN EN ISO 10301-F4	0,5			n.d.
Mesitylene	DIN EN ISO 10301-F4	0,5			n.d.
1,2,3-Trimethylbenzene	DIN EN ISO 10301-F4	0,5			n.d.
1,2,4-Trimethylbenzene	DIN EN ISO 10301-F4	0,5			n.d.
n-propylbenzene	DIN EN ISO 10301-F4	0,5			n.d.
thrichloroethylene	DIN EN ISO 10301-F4	0,5			n.d.
tetrachlorethylene	DIN EN ISO 10301-F4	0,5			n.d.
Chlorobenzene	DIN EN ISO 10301-F4	0,5			n.d.
Total VOC					n.d.
PAHs		**µg/l**			
Naphthalene	DIN 38407-F39	0,1	0,1	70	n.d.
Acenaphthylene	DIN 38407-F39	0,1			n.d.
Acenaphthene	DIN 38407-F39	0,1			n.d.
Fluorene	DIN 38407-F39	0,1			n.d.
Phenanthrene	DIN 38407-F39	0,1	0,03	5	n.d.

Table 7 : Chemical analyses results in groundwater sample	INTERGEO Environmental Technology Ltd.				
Parameter	**Method of analysis**	**Detection limit**	**opt. value**	**act. value**	**GW1**
Anthracene	DIN 38407-F39	0,1	0,02	5	n.d.
Fluoranthene	DIN 38407-F39	0,1			n.d.
Pyrene	DIN 38407-F39	0,1			n.d.
Benzo(a)anthracene	DIN 38407-F39	0,1	0,002	0,5	n.d.
Chrysene	DIN 38407-F39	0,1	0,002	0,05	n.d.
Benzo(b)fluoranthene	DIN 38407-F39	0,1			n.d.
Benzo(k)fluoranthene	DIN 38407-F39	0,1	0,001	0,05	n.d.
Benzo(a)pyrene	DIN 38407-F39	0,1	0,001	0,5	n.d.
Dibenzo(ghi)perylene	DIN 38407-F39	0,1			n.d.
Benzo(ghi)perylene	DIN 38407-F39	0,1	0,0002	0,05	n.d.
Indeno(1,2,3-cd)pyrene	DIN 38407-F39	0,1	0,0004	0,05	n.d.
Total PAH					n.d.
		µg/l			
PCBs	DIN 38407-F39	0,1			n.d.
		mg/l			
TPH index	EN ISO 9377-2	0,1	0,05	0,6	n.d.
		mg/l			
Total Oil & Grease (TOG)	EN ISO 9377-2	0,1			n.d.
		mg/l			
Total Organic Carbon (TOC)	EN 1484	5			n.d.
		mg/l			
Total Dissolved Solids (TDS)	EN 15216	0,1			610
Anions-Cations		**mg/l**			
Chloride (Cl-)	DIN ISO 15923-1 (D49)	1			23
Fluoride (F-)	DIN 38405-4 (D4)	0,02			n.d.
Phosphate (PO43-)	DIN EN ISO 6878:2004	0,06			n.d.
Nitrate (NO3-)	DIN ISO 15923-1 (D49)	1			n.d.
Sulfate (SO4-2)	DIN ISO 15923-1 (D49)	2			70
		mg/l			
Chemical oxygen demand (COD)	DIN 38409-41-2 (H41-2)	10			n.d.
		mg/l			
Biochemical oxygen demand (BOD5)	EN 1899-1	2			3
		cfu/100ml			
Coliform Bacteria	ISO 9308-1:2014				230
		cfu/100ml			
Escherichia coli	ISO 9308-1:2014				n.d.
n.d. not detected					

APPENDIX C : PHOTOGRAPHS

PHOTOS

LOCATION: Florovouni-Thesprotia, Greece

INDEX

photo 1

photo 2

11.6 Stakeholders Engagement Documentation

The present section includes the proper documentation for the environmental permitting of the project. It is noted that no documentation/ correspondence exchanged during the preparation of acquired permits is submitted, considering that they are covered by the corresponding permit (i.e. ETA, Preliminary ETA, etc.).

Table below includes the correspondence exchanged during the preparation of the present ETA Amendment Study.

s/n	Stakeholder	Competent Authority (1st Level)	Competent Authority (2nd Level)	Competent Authority (3rd Level)	Abbreviation	Reference Number	Date	Comments
1	Municipality of Igoumenitsa	Directorate of Technical Services	Department of Studies and engineering structures	-		1379	02803/2018	No approved limitation exists regarding land uses and the provisions for building outside town plan are valid (HGG 270 D/1985). In addition, the area is located in area 2A and 2b „Areas outside town plan“ of SHOAP where such activities are allowed.
2	Minister of Culture and Sports	General Directorate of Antiquities and Cultural Heritage	Regional Authorities	Ephorate of Antiquities of Thesprotia	-	3747	07-12-2017	No objection
3	Hellenic Electricity Distribution Network Operator S.A.	Regional Directorate of Peloponnese and Epirus	-	-	HEDNO	3431	14-03-2018	No significant modifications to initial correspondence.

s/n	Stakeholder	Competent Authority (1st Level)	Competent Authority (2nd Level)	Competent Authority (3rd Level)	Abbreviation	Reference Number	Date	Comments
4	Decentralized Administration of Epirus and Western Macedonia	General Directorate of Forestry and Agricultural affairs	Forest Directorate of Thesprotia					Application for Forest Characterization Act has been filed. Decision is pending
5	Hellenic Hydrocarbons Resources Management	-	-	-	HHRM			Letter has been sent (reference number LT–C&M–AUT–P581–043/15-01-2018). Reply is pending

1. Municipality of Igoumenitsa/ Department of Studies and engineering structures

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΝΟΜΟΣ ΘΕΣΠΡΩΤΙΑΣ
ΔΗΜΟΣ ΗΓΟΥΜΕΝΙΤΣΑΣ
Δ/ΝΣΗ ΤΕΧΝΙΚΩΝ ΥΠΗΡΕΣΙΩΝ & ΔΟΜΗΣΗΣ

Ταχ. Δ/νση : Σουλίου 3
Ταχ. Κώδικας : 461 00 Ηγουμενίτσα
Πληροφορίες : Γ. Τζοβάρα
Τηλέφωνο : 26653 61234
Fax : 26653 61123

Ηγουμενίτσα 02 / 03 / 2018

Αριθ. Πρωτ.: 1379

Προς :
ΑΣΠΡΟΦΟΣ Τεχνική Εταιρεία Α.Ε.
Ελευθερίου Βενιζέλου 284
Τ.Κ.17675 Καλλιθέα, ΑΘΗΝΑ

Κοινοποίηση:
Γραφείο Δημάρχου

ΘΕΜΑ : Διαβούλευση στα πλαίσια του φακέλου Τροποποίησης ΑΕΠΟ του Υποθαλάσσιου Τμήματος του Έργου - Σταθμός Συμπίεσης Διασυνδετήριο αγωγό Φυσικού Αερίου Ελλάδας – Ιταλίας «ΠΟΣΕΙΔΩΝ».

Σχετ: Το με αριθμό 043/25-01-2018 έγγραφο της Ασπροφος Τεχνική Εταιρεία Α.Ε.

Σε απάντηση του παραπάνω εγγράφου σας ενημερώνουμε ότι η έκταση βρίσκεται σε περιοχή όπου δεν υπάρχει εγκεκριμένο Γενικό Πολεοδομικό Σχέδιο ή Ζ.Ο.Ε. ή άλλος περιορισμός από πλευράς χρήσεων γης και ισχύουν οι διατάξεις της εκτός σχεδίου δόμησης (ΦΕΚ 270/Δ/31-05-1985), όπου επιτρέπεται η λειτουργία σταθμού συμπίεσης, όπως φαίνεται από τα στοιχεία που μας υποβλήθηκαν.

Επιπλέον η έκταση βρίσκεται σε περιοχή όπου σύμφωνα και με το Σχέδιο Χωρικής και Οικιστικής Οργάνωσης Ανοιχτής Πόλης Μαργαριτίου (Σ.Χ.Ο.Ο.Α.Π.), το οποίο βρίσκεται στη Β2 Φάση: Οριστικές Προτάσεις είναι σε περιοχή με κωδικό 2Α και 2Β: Λοιπές εκτός σχεδίου περιοχές όπου επιτρέπονται ανάλογες δραστηριότητες.

ΕΣΩΤΕΡΙΚΗ ΔΙΑΝΟΜΗ:
1. Αρχείο
2. Γ. Τζοβάρα

ASPROFOS
ΑΡ. ΠΡΩΤΟΚ. | ΗΜ. ΛΗΨΕΩΣ
067 | 14/3/2018
Τ. ΒΑΙΤΣΗΣ
ΟΜΑΔΑ ΕΡΓΟΥ
Γ. ΠΡΟΤΟΠΑΠΑ
ΑΡΧΕΙΟ

Ο Δ/ντης
Τεχνικών Υπηρεσιών & Δόμησης
Δήμου Ηγουμενίτσας
κ.α.α

Λάμπρος Γιαννακός
Τοπογραφος Μηχανικός

2. Minister of Culture and Sports/ Ephorate of Antiquities of Thesprotia

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Ημ/νία: 06/12/2017
Α. Π.: ΥΠΠΟΑ/ΓΔΑΠΚ/ΕΦΑΘΕΣ/508776/337512/3747
Ημ/νία Έκδοσης 06/12/2017
Απάντηση στο έγγραφο: ΥΠΠΟΑ/ΓΔΑΠΚ/ΕΦΑΘΕΣ/508776/337512/3747

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΟΛΙΤΙΣΜΟΥ ΚΑΙ ΑΘΛΗΤΙΣΜΟΥ
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΑΡΧΑΙΟΤΗΤΩΝ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ
ΕΦΟΡΕΙΑ ΑΡΧΑΙΟΤΗΤΩΝ ΘΕΣΠΡΩΤΙΑΣ
Ταχ. Δ/νση: Κύπρου 68 - Ηγουμενίτσα
Ταχ. Κώδ.: 461 00
Πληρ/ρίες: Κασ. Λάζαρη
Τηλέφωνα: 26650.29177 / 8
FAX: 26650.25133
E-mail: efathe@culture.gr

Ηγουμενίτσα, 06.12.2017

ASPROF
ΑΡ. ΠΡΩΤΟΚ. 085 13/12/17
Τ. ΒΑΪΤΣΗΣ
Ε ΠΡΩΤΟΠΑΠΠΑ
Δ. ΧΟΥΡΜΟΥΖΙΑΔΗΣ
Γ. ΒΑΜΒΑΚΗΣ
Μ. ΓΕΩΡΓΟΠΟΥΛΟΥ
ΑΡΧΕΙΟ ΕΡΓΟΥ

ΠΡΟΣ: Asprofos Engineering
Ελ. Βενιζέλου 284
176 75 Καλλιθέα - Αθήνα

ΚΟΙΝ.: 1. Υπουργείο Πολιτισμού και Αθλητισμού
α) ΓΔΑΠΚ/ΔΙΠΚΑ/ Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας
β) ΓΔΑΠΚ/ΔΒΜΜ/Τμήμα Αρχαιολογικών Χώρων, Μνημείων και Αρχαιογνωστικής Έρευνας
Μπουμπουλίνας 20 – 106 82 Αθήνα
2. ΕΦ.Α. Πρέβεζας
Εθνικής Αντίστασης 109-111
48 100 Πρέβεζα

ΘΕΜΑ: «Διασυνδετήριος αγωγός φυσικού αερίου Ελλάδας - Ιταλίας»

ΣΧΕΤ.: (α) Η με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/24269/1319/12.05.2010 απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Α
(β). Η με αρ. πρωτ. ΥΠΠΟΤ/ΓΔΑΠΚ/ΑΡΧ/Β1/Φ33/40850/1337/17.05.2011 απόφαση της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Α.
(γ). Το με αρ. πρωτ. 3607/29.11.2011 έγγραφο της ΛΒ΄ Ε.Π.Κ.Α.
(δ). Το με αρ. πρωτ. 6550/02.12.2011 έγγραφο της 8ης Ε.Β.Α
(ε). Τη με αρ. πρωτ. 145493/21.01.2015 Υπουργική Απόφαση για την έγκριση των Περιβαλλοντικών Όρων του έργου
(στ). Το με αρ. πρωτ. 486/29.11.2017 έγγραφό σας

Σε συνέχεια των (α) ~ (ε) σχετικών και σε απάντηση του (στ), σας γνωρίζουμε ότι η Υπηρεσία μας δεν έχει καταρχήν αντίρρηση για την προτεινόμενη μικρής έκτασης αλλαγή στα όρια του χώρου κατασκευής του σταθμού συμπίεσης του διασυνδετήριου αγωγού φυσικού αερίου Ελλάδας – Ιταλίας στη θέση Φλωροβούνι της Π.Ε. Θεσπρωτίας, εφόσον τηρηθούν τα αναφερόμενα στις (α) και (β) σχετικές αποφάσεις της Γενικής Διεύθυνσης Αρχαιοτήτων και Πολιτιστικής Κληρονομιάς του ΥΠ.ΠΟ.Α., καθώς και στην (ε) σχετική Απόφαση έγκρισης των Περιβαλλοντικών Όρων του έργου, όσον αφορά στην προστασία των αρχαιοτήτων.

Παραμένουμε στη διάθεσή σας για κάθε διευκρίνιση.

Ακριβές Αντίγραφο
Άννα Μηνά
ΤΕ Λογιστών

Ο Προϊστάμενος της Εφορείας
κ.α.α.

Γεωργία Πλιάκου
Αρχαιολόγος

3. Hellenic Electricity Distribution Network Operator S.A.

ΔΕΔΔΗΕ

Διεύθυνση Περιφέρειας Πελοποννήσου – Ηπείρου
Σμύρνης 1, 262 22 Πάτρα

Πληροφορίες:
Α. Νικολετάτος
T 2610 368149
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Αρ./ΗΜ.: ΔΠΠ-Η/ 3431

14 ΜΑΡ. 2018

Προς: ΑΣΠΡΟΦΟΣ
Τεχνική Εταιρεία Α.Ε.
Λεωφόρος Ελ. Βενιζέλου 284,
176 75 Καλλιθέα

Περίληψη: Παροχή στοιχείων για την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης του έργου "Υποθαλάσσιος Διασυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδος – Ιταλίας" στη θέση Φλωροβούνι, του Δήμου Ηγουμενίτσας, της Π. Ε. Θεσπρωτίας.

Σχετικά : α) Το με αριθ. πρωτ. 503/24.02.2011 έγγραφο της εταιρείας "IGI Poseidon".
β) Το με αριθ. πρωτ. ΔΠΠ-Η/1262/04.05.2011 έγγραφο.
γ) Το με αριθ. πρωτ. ΔΠΠ-Η/2271/19.07.2011 έγγραφο.
δ) Το με αριθ. πρωτ. 485/29.11.2017 έγγραφο της εταιρείας "ΑΣΠΡΟΦΟΣ".

Σε συνέχεια του δ' σχετικού, που αφορά την ηλεκτροδότηση του Σταθμού Μέτρησης και Συμπίεσης του έργου "Υποθαλάσσιος Διασυνδετήριος Αγωγός Φυσικού Αερίου Ελλάδος – Ιταλίας" και μετά από το αίτημά σας για νέα εκτιμώμενη απαιτούμενη ισχύ 6.000 KVA, σας γνωρίζουμε τα εξής :

ASPROFOS
ΑΡ. ΠΡΩΤΟΚ. | ΗΜ/ΝΙΑ
068 | 15/3/18
Τ. ΒΑΝΤΕΗΣ

1. Για τη χορήγηση της παραπάνω ισχύος απαιτείται η κατασκευή νέας εναέριας γραμμής Μ.Τ. με αγωγούς ACSR διατομής 95 mm^2 μήκους 14 km περίπου, από τον Υ/Σ 150/20 kV Μούρτου έως τη θέση του έργου της περίληψης. Επιπρόσθετα, σας γνωρίζουμε ότι για την εξασφάλιση της εφεδρικής ηλεκτροδότησης του Σταθμού σας, σε περίπτωση βλάβης της ως άνω κύριας γραμμής Μ.Τ, θα υπάρχει η δυνατότητα τροφοδότησης της παροχής σας από άλλη ροηφόρο γραμμή με κατασκευή νέας διακλάδωσης Μ.Τ. εναέριου δικτύου αγωγών ACSR διατομής 95 mm^2 μήκους 1,3 km περίπου. Η διαδικασία εναλλαγής τροφοδοσίας της παροχής σας από το κύριο στο εφεδρικό δίκτυο θα γίνεται από τεχνικό προσωπικό της Υπηρεσίας μας.
2. Σύμφωνα με σχετική προμελέτη της Υπηρεσίας μας και στο πλαίσιο των αναφερομένων στην προηγούμενη παράγραφο, η συνολική συμμετοχή σας για την ηλεκτροδότηση των εγκαταστάσεων σας τόσο με κύρια όσο και με εφεδρική παροχή υπολογίστηκε βάσει του Συστήματος Συμμετοχών Πελατών Μ.Τ. που ισχύει για όλη την επικράτεια και της αιτούμενης Συμφωνημένης Ισχύος. Η συνολική συμμετοχή ανέρχεται στο ποσό των 1.194.106,39 € πλέον ΦΠΑ 24% για Εξωτερική Παροχή Μ.Τ. ή σε 1.213.567,72 € πλέον ΦΠΑ 24% για Εσωτερική Παροχή Μ.Τ. εντός κτιρίου. Το ποσό αυτό προκαταβάλλεται και αναλύεται ως εξής :
   - Κόστος έργων της παραγράφου 1 για την κύρια παροχή, το οποίο ανέρχεται συνολικά στο ποσό των 484.000,00 € πλέον ΦΠΑ 24% και περιλαμβάνει το κόστος κατασκευής της νέας γραμμής Μ.Τ. από τον Υ/Σ 150/20 kV Μούρτου, και την εγκατάσταση νέου Διακόπτη Ισχύος στον ίδιο Υ/Σ.

- Συμμετοχή Σπ στις δαπάνες παροχής, η οποία ανέρχεται στο ποσό των 5.472,30 € πλέον ΦΠΑ 24% και αντιστοιχεί στο κόστος των απαιτούμενων έργων για την κατασκευή της παροχής Μ.Τ. Εξωτερικού Τύπου και την εγκατάσταση της μετρητικής διάταξης που θα τοποθετηθεί έξω από τις εγκαταστάσεις του Σταθμού σας. Στην περίπτωση κατασκευής της παροχής Μ.Τ. σε εσωτερικό χώρο εντός κτιρίου, τότε η αντίστοιχη συμμετοχή σας Σπ ανέρχεται στο ποσό των 24.933,63 € πλέον ΦΠΑ 24%.
- Συμμετοχή Σ1 στις δαπάνες λόγω ενισχύσεως των εγκαταστάσεων Μεταφοράς τάσεων 150 kV ή 400 kV, η οποία ανέρχεται στο ποσό των 354.200,00 € πλέον ΦΠΑ 24%.
- Συμμετοχή για την χορήγηση της εφεδρικής τροφοδότησης του Σταθμού σας, η οποία ανέρχεται στο ποσό των 350.434,09 € πλέον ΦΠΑ 24%.

3. Οι παραπάνω προϋποθέσεις ηλεκτροδότησής σας ισχύουν για χρονικό διάστημα δύο μηνών από έκδοσης της παρούσας επιστολής. Εάν επανέλθετε μετά την παραπάνω ημερομηνία, η ηλεκτροδότησή σας θα επανεξεταστεί σύμφωνα με τις προϋποθέσεις ηλεκτροδότησης που θα ισχύουν τότε. Επισημαίνουμε ότι τα αντίστοιχα ποσά έχουν υπολογισθεί από προμελέτη των απαιτούμενων έργων ηλεκτροδότησης. Όταν θα μας ενημερώσετε για την αποδοχή των ως άνω όρων και ξεκινήσει η τελική διαδικασία ηλεκτροδότησής σας, θα προχωρήσουμε στην οριστική μελέτη των απαιτούμενων έργων, αφού προηγουμένως προκαταβάλλεται το 8% του προϋπολογισμού τους, και θα σας γνωρίσουμε το οριστικό ποσό της συμμετοχής σας.
4. Επιπρόσθετα, σας γνωρίζουμε ότι εξακολουθούν να ισχύουν τα αναφερόμενα στο γ' σχετικό μας.
5. Περιμένοντας να μας γνωρίσετε εγγράφως το αργότερο μέχρι την 20.04.2018 τις απόψεις σας για όσα αναφέρονται στις προηγούμενες παραγράφους, παραμένουμε στη διάθεσή σας για οποιεσδήποτε συμπληρωματικές πληροφορίες ή διευκρινίσεις επιθυμείτε.

Γεώρ. Ι. Ρέγκλης
Διευθυντής Περιφέρειας Πελ/σου - Ηπείρου

4. Decentralized Administration of Epirus and Western Macedonia/ Forest Directorate of Thesprotia

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ ΔΗΜΟΣ ΗΡΑΚΛΕΙΟΥ ΑΤΤΙΚΗΣ

ΕΝΤΥΠΟ ΑΙΤΗΣΗΣ ΓΙΑ ΤΗΝ ΕΚΔΟΣΗ ΠΡΑΞΗΣ ΧΑΡΑΚΤΗΡΙΣΜΟΥ

ΑΠΟΚΕΝΤΡΩΜΕΝΗ ΔΙΟΙΚΗΣΗ Δ. ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΗΠΕΙΡΟΥ ΓΕΝ. Δ/ΝΣΗ ΔΑΣΩΝ & ΑΓΡ. ΥΠΟΘΕΣΕΩΝ Δ/ΝΣΗ ΔΑΣΩΝ ΘΕΣΠΡΩΤΙΑΣ	ΑΡΙΘ. ΠΡΩΤΟΚΟΛΛΟΥ[1]
Ημερομηνία υποβολής:	ΗΜΕΡΟΜΗΝΙΑ[1]

Α. ΣΤΟΙΧΕΙΑ ΑΙΤΟΥΝΤΑ:

Α.1.1 ΣΤΟΙΧΕΙΑ ΦΥΣΙΚΟΥ ΠΡΟΣΩΠΟΥ

Επώνυμο: ΚΩΣΤΟΠΟΥΛΟΣ			
Όνομα: ΓΙΩΡΓΟΣ			
Τόπος γέννησης: ΑΘΗΝΑ		Ημ/νία γέννησης: *(Ημέρα/μήνας/έτος)*	2 1 0 6 6 3
Α.Φ.Μ. 0 4 3 3 7 5 5 1 6		Αριθμός Ταυτότητας/Διαβατηρίου	Ρ - 673867
Εκδούσα Αρχή		Ημερομηνία Έκδοσης: *(Ημέρα/μήνας/έτος)*	
Επώνυμο Πατρός: ΚΩΣΤΟΠΟΥΛΟΣ		Όνομα Πατρός: ΑΝΤΩΝΙΟΣ	
Επώνυμο μητρός: ΚΩΣΤΟΠΟΥΛΟΥ		Όνομα μητρός: ΑΓΓΕΛΙΚΗ	
Επώνυμο συζύγου		Όνομα συζύγου	

Α.1.2 ΣΤΟΙΧΕΙΑ ΝΟΜΙΚΟΥ ΠΡΟΣΩΠΟΥ

Επωνυμία: ΥΑΦΑ ΠΟΣΕΙΔΩΝ ΑΕ		Διακριτικός τίτλος: IGI POSEIDON S.A.	
Νομική Μορφή: ΑΕ	Ημερομηνία σύστασης: 12.06.2008	Έδρα: ΜΑΡΙΝΟΥ ΑΝΤΥΠΑ 92	Α.Φ.Μ. 998382239

Α.1.3 ΣΤΟΙΧΕΙΑ ΕΠΙΚΟΙΝΩΝΙΑΣ ΦΥΣΙΚΟΥ/ΝΟΜΙΚΟΥ ΠΡΟΣΩΠΟΥ

Τόπος Κατοικίας: ΝΕΟ ΗΡΑΚΛΕΙΟ ΑΤΤΙΚΗΣ	Οδός: ΜΑΡΙΝΟΥ ΑΝΤΥΠΑ	Αριθμός: 92	Ταχ. Κώδικας: 14121
Τηλέφωνο σταθερό: 2102701050	Τηλέφωνο κινητό: 6932280361	FAX: 2102751067	E-mail: g.kostopoulos@depa.gr

Α.2.1 ΟΡΙΣΜΟΣ ΣΤΟΙΧΕΙΑ ΕΚΠΡΟΣΩΠΟΥ[1] (Για κατάθεση αίτησης ή παραλαβή τελικής διοικητικής πράξης): Σε περίπτωση που δε συντάσσεται η εξουσιοδότηση στο παρόν έντυπο απαιτείται προσκόμιση εξουσιοδότησης με επικύρωση του γνήσιου της υπογραφής από δημόσια υπηρεσία ή συμβολαιογραφικού πληρεξουσίου.

Επώνυμο: ΤΥΡΟΓΙΑΝΝΗΣ	Όνομα: ΚΩΝΣΤΑΝΤΙΝΟΣ	Επώνυμο Πατρός: ΤΥΡΟΓΙΑΝΝΗΣ	Όνομα Πατρός: ΒΑΣΙΛΕΙΟΣ
Τόπος Κατοικίας: ΜΑΡΟΥΣΙ ΑΤΤΙΚΗΣ	Οδός: ΨΑΡΟΥ	Αριθμός: 12	Ταχ. Κώδικας: 15125
Τηλέφωνο σταθερό: 2102701281	Τηλέφωνο κινητό: 6949935274	FAX:	E-mail: c.tyrogiannis@depa.gr

Με ατομική μου ευθύνη και γνωρίζοντας τις κυρώσεις[2], που προβλέπονται από τις διατάξεις της παρ. 6 του άρθρου 22 του Ν. 1599/1986, δηλώνω ότι

έχω έννομο συμφέρον επί της υπό χαρακτηρισμό έκτασης, από την οποία προβλέπεται να διέλθει το υποθαλάσσιο τμήμα του αγωγού ΠΟΣΕΙΔΩΝ

(1) Εξουσιοδοτώ τον/την πιο πάνω αναφερόμενο/η να καταθέσει την αίτηση ή/και να παραλάβει την τελική πράξη. (Διαγράφεται όταν δεν ορίζεται εκπρόσωπος).

(2) «Όποιος εν γνώσει του δηλώνει ψευδή γεγονότα ή αρνείται ή αποκρύπτει τα αληθινά με έγγραφη υπεύθυνη δήλωση του άρθρου 8 τιμωρείται με φυλάκιση τουλάχιστον τριών μηνών.Εάν ο υπαίτιος αυτών των πράξεων σκόπευε να προσπορίσει στον εαυτόν του ή σε άλλον περιουσιακό όφελος, βλάπτοντος τρίτον ή σκόπευε να βλάψει άλλον, τιμωρείται με κάθειρξη μέχρι 10 ετών, εάν το όφελος ή η βλάβη υπερβαίνουν το ποσό των είκοσι πέντε εκατομμυρίων (25.000.000) δρχ. (αντικ. της παρ. 6 από την παρ. 13 του άρθρου 2 του Ν. 2479/97, ΦΕΚ-67 Α').

(Ημερομηνία).....

(Υπογραφή)

[1] Συμπληρώνονται από την υπηρεσία

Β. ΣΤΟΙΧΕΙΑ ΕΚΤΑΣΗΣ ΣΤΗΝ ΟΠΟΙΑ ΑΦΟΡΑ Η ΕΚΔΟΣΗ ΠΡΑΞΗΣ ΧΑΡΑΚΤΗΡΙΣΜΟΥ (στα πλαίσια της διαδικασίας του άρθρου 14 του Ν. 998/79 (ΦΕΚ 289/Α /28-12-1979 όπως ισχύει)			
Περιφερειακή Ενότητα	Θεσπρωτίας	Δήμος	Ηγουμενίτσας
Δημοτική Ενότητα	Πέρδικας	Τοπική /Δημοτική Κοινότητα	
Τοπώνυμιο ή αριθμός κτηματολογικής μερίδας			
Εμβαδόν έκτασης (τ.μ.)	746235.38 μ^2		
Οι κορυφές του πολυγώνου της έκτασης προσδιορίζονται στο έδαφος		ΝΑΙ ☐	ΟΧΙ ☑

Γ. ΠΛΗΡΟΦΟΡΙΑΚΑ ΣΤΟΙΧΕΙΑ - ΑΠΑΙΤΟΥΜΕΝΑ ΔΙΚΑΙΟΛΟΓΗΤΙΚΑ		
	ΤΙΤΛΟΣ ΔΙΚΑΙΟΛΟΓΗΤΙΚΟΥ	
1	Φωτοαντίγραφο αστυνομικής ταυτότητας	☑
2	Υπεύθυνη δήλωση με περιεχόμενο ότι «έχω έννομο συμφέρον επί της υπό χαρακτηρισμό έκτασης», στην οποία και να δικαιολογείται το έννομό συμφέρον αυτό.	☑
3	Εξουσιοδότηση ορισμού εκπροσώπου για την υποβολή της παρούσας αίτησης και τις απαιτούμενες ενδεχομένως ενέργειες αντί αυτού (με επικύρωση του γνησίου της υπογραφής).	☑
4	Τίτλοι ή αποδεικτικά κυριότητας ή άδειες νομίμου αλλαγής χρήσης της έκτασης σύμφωνα με τις διατάξεις της δασικής νομοθεσίας ή διάθεσή τους σύμφωνα με τις διατάξεις της αγροτικής νομοθεσίας στην περίπτωση των εποικιστικών δασικών εκτάσεων (Φωτοαντίγραφα).	☐
5	Αριθμός .....15.....(...) τοπογραφικά διαγράμματα[2] (σε ψηφιακή και αναλογική μορφή) αρμοδίως υπογεγραμμένα, τα οποία έχουν συνταχθεί σύμφωνα με τα υποδείγματα και τα περιεχόμενα των τοπογραφικών διαγραμμάτων εκτός σχεδίου, που έχουν αναρτηθεί στον ιστότοπο του ΥΠΕΚΑ στις 17.01.2013, κατ' εφαρμογή των διατάξεων του ν.4030/2011. Από τα ανωτέρω υποδείγματα δεν κρίνονται απαραίτητα τα κάτωθι στοιχεία: *«α) Πλήρη υψομετρική αποτύπωση του γεωτεμαχίου. Απόδοση υψομέτρων στις κορυφές του γεωτεμαχίου και όπου απαιτείται απόδοση υψομετρικών καμπυλών ή άλλων χαρακτηριστικών υψομετρικών σημείων. β) Φωτογραφίες του ακινήτου και απεικόνιση της θέσης λήψης αυτών.»*	☑

ΠΑΡΑΤΗΡΗΣΕΙΣ

ΚΕΠ (0855) ΔΗΜΟΥ ΗΡΑΚΛΕΙΟΥ ΑΤΤΙΚΗΣ
Βεβαιώνεται το γνήσιο της υπογραφής
του ΚΩΝΣΤΑΝΤΙΝΟΥ
ΓΕΩΡΓΙΟΥ
με ΑΔΤ Ρ 673867 / 1995
Ηράκλειο Αττικής 25/4/2018
Ο/Η Υπ/λος του ΚΕΠ
ΝΙΞΗΣ ΑΝΑΣΤΑΣΙΟΣ
Δ.Ε. ΔΙΕΚΠ. ΥΠΟΘ. ΠΟΛΙΤΩΝ

Ημερομηνία ...../...../201
Ο/Η ΑΙΤΩΝ/ΟΥΣΑ
(Υπογραφή)
Γεώργιος Κωστόπουλος
Τεχνικός Διευθυντής
ΥΑΦΑ ΠΟΣΕΙΔΩΝ Α.Ε.

[2] Ο αριθμός των τοπογραφικών διαγραμμάτων είναι σύμφωνα με το πίνακα διανομής.

*: Στην περίπτωση ηλεκτρονικής υποβολής της αίτησης ο αιτών υποχρεούται εντός δέκα (10) ημερών να αποστείλει τα απαιτούμενα δικαιολογητικά προκειμένου να εξετασθεί η υπόθεσή του. Σε περίπτωση αυτοπρόσωπης υποβολής της αίτησης τα δικαιολογητικά κατατίθενται με την αίτηση.

5. Hellenic Hydrocarbons Resources Management

Προς
Ελληνική Διαχειριστική Εταιρεία Υδρογονανθράκων (ΕΔΕΥ Α.Ε.)
Μάργαρη 18, Τ.Κ. 11525, Αθήνα
Υπόψη κας Νταφοπούλου
Κοιν.: κος. Σ. Μπέλας

Αθήνα, 15.01.2018
Αρ.Πρωτ. C&M: 40025/18
Αρ.Πρωτ.Έργου:LT–C&M–AUT–P581–043

Έργο : ΟΡΙΣΤΙΚΗ ΜΕΛΕΤΗ ΚΑΙ ΠΑΡΟΧΗ ΥΠΗΡΕΣΙΩΝ ΑΔΕΙΟΔΟΤΗΣΗΣ ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΑΓΩΓΟΥ ΠΟΣΕΙΔΩΝ

Θέμα : **Συλλογή στοιχείων με σκοπό την επιλογή της χάραξης του χερσαίου Ελληνικού τμήματος του αγωγού στο πλαίσιο του ως άνω Έργου**

Κύριοι,

Σας πληροφορούμε ότι η εταιρεία **Υποθαλάσσιος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας / Υ.Α.Φ.Α. Ποσειδών Α.Ε (IGI Poseidon S.A.)**, στην οποία συμμετέχουν ισομερώς η Δημόσια Επιχείρηση Αερίου (ΔΕΠΑ) και η ιταλική EDISON, είναι ο Κύριος του έργου: **Αγωγός Ποσειδών ("Poseidon Pipeline Project").**

Το έργο Αγωγός Ποσειδών ("Poseidon Pipeline Project") περιλαμβάνει την ανάπτυξη, το σχεδιασμό, την προμήθεια και την κατασκευή του αγωγού και των συνοδών εγκαταστάσεων μεταφοράς αερίου από τα ελληνοτουρκικά σύνορα στην Ελλάδα και την Ιταλία.

Η εταιρεία Υ.Α.Φ.Α. Ποσειδών Α.Ε έχει αναθέσει στη Σύμπραξη των εταιρειών C&M Engineering A.E.-ΑΣΠΡΟΦΟΣ ΤΕΧΝΙΚΗ ΕΤΑΙΡΕΙΑ Α.Ε. την εκπόνηση της Οριστικής Μελέτης και την παροχή Υπηρεσιών Αδειοδότησης για το Χερσαίο Τμήμα του αγωγού και των συνοδών εγκαταστάσεων του ανωτέρω έργου στην Ελληνική Επικράτεια.

Η Εταιρεία C&M Engineering A.E., ως μέλος της ανωτέρω Σύμπραξης, έχει αναλάβει μεταξύ άλλων τη διεξαγωγή των απαιτούμενων επαφών με τις αρμόδιες Αρχές και την υποβολή των σχετικών αιτήσεων προς αυτές για τη συλλογή όλων των απαιτούμενων στοιχείων / πληροφοριών που εμπίπτουν στην αρμοδιότητά τους με σκοπό την επιλογή και οριστικοποίηση της χάραξης του χερσαίου τμήματος του αγωγού από τα ελληνο - τουρκικά σύνορα μέχρι το Φλωροβούνι του νομού Θεσπρωτίας, ονομαστικής διαμέτρου 48" (1.219 mm.) και της χωροθέτησης των συνοδών του εγκαταστάσεων στο πλαίσιο εκπόνησης της Οριστικής Μελέτης και της παροχής Υπηρεσιών Αδειοδότησης, όπως αναφέρεται και στη συνημμένη στο παρόν Εξουσιοδότηση της Υ.Α.Φ.Α. Ποσειδών Α.Ε, (βλέπε Συνημμένο 1).

Με βάση τα παραπάνω επισυνάπτονται σε ηλεκτρονική μορφή σχέδια με την προτεινόμενη χάραξη του αγωγού με υπόβαθρο Χαρτών Γ.Υ.Σ., σε κλίμακα 1:50.000.
Τα σχέδια περιλαμβάνουν την προτεινόμενη χάραξη

i) ανά Περιφερειακή Ενότητα (Νομό) που διασχίζει ο αγωγός, και συγκεκριμένα:

- Περιφερειακή Ενότητα Έβρου: 4 σχέδια
- Περιφερειακή Ενότητα Ροδόπης: 4 σχέδια
- Περιφερειακή Ενότητα Ξάνθης: 2 σχέδια
- Περιφερειακή Ενότητα Καβάλας: 3 σχέδια
- Περιφερειακή Ενότητα Δράμας: 2 σχέδια
- Περιφερειακή Ενότητα Σερρών: 5 σχέδια
- Περιφερειακή Ενότητα Κιλκίς: 3 σχέδια

- Περιφερειακή Ενότητα Θεσσαλονίκης: 2 σχέδια
- Περιφερειακή Ενότητα Ημαθίας: 4 σχέδια
- Περιφερειακή Ενότητα Κοζάνης: 3 σχέδια
- Περιφερειακή Ενότητα Γρεβενών: 4 σχέδια
- Περιφερειακή Ενότητα Τρικάλων: 1 σχέδιο
- Περιφερειακή Ενότητα Ιωαννίνων: 4 σχέδια
- Περιφερειακή Ενότητα Θεσπρωτίας: 2 σχέδια

ii) στο σύνολο του χερσαίου Ελληνικού τμήματος (Overview Map)

Παρακαλούμε όπως μας πληροφορήσετε για πιθανές εμπλοκές με υφιστάμενες / εν εξελίξει / προγραμματισμένες μελλοντικές δραστηριότητες, υποδομές και έργα σας, τους όρους και τους τυχόν περιορισμούς, καθώς και οποιαδήποτε άλλα στοιχεία αρμοδιότητάς σας που αφορούν στην περιοχή ενδιαφέροντος προκειμένου αυτά να ληφθούν υπόψη στην οριστικοποίηση της χάραξης του αγωγού μεταφοράς φυσικού αερίου και την εκπόνηση της Οριστικής Μελέτης.

Λόγω ενδεχόμενων τροποποιήσεων της χάραξης του αγωγού μέχρι την οριστικοποίησή της, θα θέλαμε να σας διευκρινίσουμε ότι οι ανωτέρω πληροφορίες αρμοδιότητάς σας είναι απαραίτητες στην κατά το δυνατόν ευρύτερη απόσταση εκατέρωθεν της χάραξης.

Σε περίπτωση που οι πληροφορίες / στοιχεία μπορούν να παρασχεθούν ψηφιακά από την Υπηρεσία σας, θα διευκολύνατε πολύ περισσότερο το έργο μας.

Για οποιαδήποτε περαιτέρω διευκρίνηση ή πληροφορία, παρακαλούμε όπως επικοινωνήσετε με την εταιρεία C & M ENGINEERING A.E. :

Στοιχεία επικοινωνίας:

C & M Engineering A.E.

Πρατίνου 99 – Τ.Κ. 116 34 - Αθήνα

κα. Κοντοδήμα Θεοδώρα, τηλέφωνο επικοινωνίας: 2107220014, εσ. 2004,

κα. Μπακατσούλα Δήμητρα, τηλέφωνο επικοινωνίας: 2107220014, εσ. 2602,

καθώς και στην ηλεκτρονική διεύθυνση sfortotira@cmengineering.gr.

Παρακαλούμε για τις ενέργειές σας και ευχαριστούμε εκ των προτέρων για την συνεργασία σας.

Με εκτίμηση
Για τη C&M Engineering A.E.

Μ. Καλιοράκης
Διευθυντής Έργου

Συνημμένα :

1. Εξουσιοδότηση της Υ.Α.Φ.Α. Ποσειδών Α.Ε (IGI Poseidon S.A.)

2. Ηλεκτρονικά αρχεία με την προτεινόμενη χάραξη του αγωγού σε επεξεργάσιμη μορφή (dwg, ARCGIS V 10.3, kmz) και σε μορφή pdf με υπόβαθρο Χάρτες Γ.Υ.Σ. σε κλίμακα 1:50.000 ανά Περιφερειακή Ενότητα (Νομό) που διασχίζει ο αγωγός, καθώς και στο σύνολο του χερσαίου Ελληνικού τμήματος (Overview Map)

IGI Poseidon

Έργο : **ΟΡΙΣΤΙΚΗ ΜΕΛΕΤΗ ΚΑΙ ΠΑΡΟΧΗ ΥΠΗΡΕΣΙΩΝ ΑΔΕΙΟΔΟΤΗΣΗΣ ΓΙΑ ΤΟ ΧΕΡΣΑΙΟ ΤΜΗΜΑ ΤΟΥ ΑΓΩΓΟΥ ΠΟΣΕΙΔΩΝ**
(FRONT END ENGINEERING & DESIGN AND PERMITTING SERVICES FOR THE POSEIDON PIPELINE PROJECT – ONSHORE SECTION)

ΕΞΟΥΣΙΟΔΟΤΗΣΗ

Η εταιρεία **Υποθαλάσσιος Αγωγός Φυσικού Αερίου Ελλάδας – Ιταλίας / Υ.Α.Φ.Α. Ποσειδών Α.Ε (IGI Poseidon S.A.)**, η οποία είναι ο Κύριος του έργου: **Αγωγός Ποσειδών ("Poseidon Pipeline Project")**, έχει αναθέσει στη Σύμπραξη των εταιρειών: C&M Engineering A.E. και ΑΣΠΡΟΦΟΣ ΤΕΧΝΙΚΗ ΕΤΑΙΡΕΙΑ Α.Ε. την εκπόνηση της Οριστικής Μελέτης και την παροχή Υπηρεσιών Αδειοδότησης για το Χερσαίο Τμήμα του αγωγού του ανωτέρω έργου.

Στο πλαίσιο εκτέλεσης του ανωτέρω έργου, οι Εταιρείες C&M Engineering A.E. και ΑΣΠΡΟΦΟΣ ΤΕΧΝΙΚΗ ΕΤΑΙΡΕΙΑ Α.Ε. ως μέλη της ανωτέρω Σύμπραξης, είναι υπεύθυνες για την Παροχή Υπηρεσιών εκπόνησης Μελετών και Αδειοδότησης που αφορούν στο χερσαίο τμήμα του αγωγού και τις συνοδές του εγκαταστάσεις στην Ελληνική επικράτεια.

Στο Αντικείμενο Υπηρεσιών της ανωτέρω Σύμπραξης περιλαμβάνονται μεταξύ άλλων οι επαφές με τις αρμόδιες Αρχές, για τη συλλογή όλων των απαιτούμενων στοιχείων / πληροφοριών που εμπίπτουν στην αρμοδιότητά τους με σκοπό την επιλογή της χάραξης του χερσαίου Ελληνικού τμήματος του αγωγού και της χωροθέτησης των συνοδών του εγκαταστάσεων στο πλαίσιο εκπόνησης της Οριστικής Μελέτης και την παροχή Υπηρεσιών Αδειοδότησης.

Με την παρούσα, η εταιρεία Υ.Α.Φ.Α. Ποσειδών Α.Ε. εξουσιοδοτεί τα μέλη της Σύμπραξης των εταιρειών C&M Engineering A.E. και ΑΣΠΡΟΦΟΣ ΤΕΧΝΙΚΗ ΕΤΑΙΡΕΙΑ Α.Ε. όπως προβούν σε όλες τις απαιτούμενες επαφές με όλες τις αρμόδιες Ελληνικές αρχές και στην υποβολή των σχετικών αιτήσεων προς αυτές, καθώς και σε όλες τις απαραίτητες ενέργειες για την εξασφάλιση όλων των απαιτούμενων στοιχείων / πληροφοριών για την επιλογή της χάραξης του χερσαίου Ελληνικού τμήματος του αγωγού και τη χωροθέτηση των συνοδών του εγκαταστάσεων στο πλαίσιο υλοποίησης του ως άνω έργου.

Ως εκ τούτου, οι Αρχές και οι λοιποί εμπλεκόμενοι φορείς που θα απευθυνθούν οι ανωτέρω εταιρείες / μέλη της Σύμπραξης, παρακαλούνται όπως προσφέρουν την υποστήριξη και συνεργασία τους και γενικότερα να βοηθήσουν στην έγκαιρη υλοποίηση του έργου.

Για την Υ.Α.Φ.Α. Ποσειδών Α.Ε.

Elio Ruggeri
Διευθύνων Σύμβουλος

92, Marinou Antipa Ave
141 21 Heraklio Attikis
Athens – GREECE
Tel.: +30 210 2701050
Fax: +30 210 2751067
www.igi-poseidon.com

11.7 Environmental Terms Approval

This annex includes the decision on Environmental Terms Approval 145493/21-01-2015 along with two general maps of the submitted EIA.

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ,
ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΗΣ ΠΟΛΙΤΙΚΗΣ
ΔΙΕΥΘΥΝΣΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΗΣ ΑΔΕΙΟΔΟΤΗΣΗΣ
(ΔΙΠΑ)
ΤΜΗΜΑ Β'
Ταχ. Δ/νση : Λ. Αλεξάνδρας 11
Τ.Κ. : 114 73
Πληροφορίες : Κ. Γιαβής
Τηλέφωνο : 210 64.17.802
FAX. : 210 64.51.914

Αθήνα, 21 Ιανουαρίου 2015

Α.Π. οικ. 145493

ΠΡΟΣ: IGI Poseidon
Μαρ. Αντύπα 92, 141 72 Αθήνα
(συν: 1 αντ. φακέλου ΜΠΕ)

ΑΠΟΦΑΣΗ
ΥΠ. ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ

Θέμα : Έγκριση Περιβαλλοντικών Όρων (ΕΠΟ) για την Κατασκευή και Λειτουργία του έργου: «*ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ (ΑΦΑ) ΔΙΑΣΥΝΔΕΣΗΣ ΕΛΛΑΔΑΣ-ΙΤΑΛΙΑΣ & ΣΥΝΟΔΕΥΤΙΚΕΣ ΕΓΚΑΤΑΣΤΑΣΕΙΣ – ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ*».

Έχοντας υπόψη:

1. Το Ν.1650/1986 (Α' 160) «για την προστασία του περιβάλλοντος», όπως τροποποιήθηκε και ισχύει
2. Το Ν.4014/2011 (Α' 209) «για την περιβαλλοντική αδειοδότηση έργων και δραστηριοτήτων, ρύθμιση αυθαιρέτων σε συνάρτηση με δημιουργία περιβαλλοντικού ισοζυγίου και άλλες διατάξεις αρμοδιότητας Υπ. Περιβάλλοντος» όπως τροποποιήθηκε και ισχύει.
3. Την Κοινή Υπουργική Απόφαση Η.Π. 11014/703/Φ104/14.3.03 (ΦΕΚ 332/Β/20.3.2003) «Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α.) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο.), σύμφωνα με τα άρθρο 4 του Ν.1650/86 (Α'160) όπως αντικαταστάθηκε με το άρθρο 2 του Ν. 3010/02 "Εναρμόνιση του Ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ.... και άλλες διατάξεις (Α' 91)"»
4. Το Ν. 998/1979 (Α' 289) «περί προστασίας των δασών και των δασικών εν γένει εκτάσεων της χώρας», όπως τροποποιήθηκε και ισχύει.
5. Το Ν. 3028/2002 (Α' 153) για την προστασία των Αρχαιοτήτων και εν γένει της Πολιτιστικής Κληρονομιάς
6. Το Ν. 2289/1995 (Α' 27) που ρυθμίζει θέματα της κατασκευής του Αγωγού Φυσικού Αερίου.
7. Την ΥΑ Η.Π. 1958/2012 (Β' 21) «κατάταξη δημόσιων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες σύμφωνα με το άρθρο 1 παράγραφος 4 του Ν. 4014/2011, όπως τροποποιήθηκε και ισχύει.
8. Την ΚΥΑ Η.Π. 37111/2021/2003 (Β' 1391) «Καθορισμός τρόπου ενημέρωσης και συμμετοχής του κοινού κατά την διαδικασία έγκρισης περιβαλλοντικών όρων των έργων και δραστηριοτήτων σύμφωνα με τη παράγραφο 2 του άρθρου 5 του

Ν.1650/1986 όπως αντικαταστάθηκε με τις παραγράφους 2 και 3 του άρθρου 3 του Ν.3010/2002».

9. Την ΚΥΑ 21398/2012 (Β' 1470) για την Ίδρυση και λειτουργία δικτυακού τόπου για την ανάρτηση των ΑΕΠΟ.
10. Την ΥΑ 15277/2012 (Β' 1077) «Εξειδίκευση διαδικασιών για την ενσωμάτωση στις ΑΕΠΟ της προβλεπόμενης από τις διατάξεις της Δασικής Νομοθεσίας έγκρισης επέμβασης, για τα έργα και δραστηριότητες κατηγοριών Α και Β της ΥΑ 1958/2012 (Β' 21), σύμφωνα με το άρθρο 12 του Ν. 4014/2011».
11. Την υ.α. υπ' αρ. οικ. 48963/5.10.2012 (Β΄ 2703), στην οποία καθορίζονται προδιαγραφές περιεχομένου των αποφάσεων έγκρισης περιβαλλοντικών όρων σύμφωνα με το άρθρο 2 παρ. 7 του ν. 4014/2011.
12. Το Προεδρικό Διάταγμα 100/2014 (Α' 167), Οργανισμός ΥΠΕΚΑ, όπως τροποποιήθηκε με τις διατάξεις του άρθρου 40 του Ν. 4305/2014.
13. Την υπ' αρ. ΕΥΠΕ/ΥΠΕΚΑ οικ. 130221/17.09.2010 θετική γνωμοδότηση για Προκαταρκτική Περιβαλλοντική Εκτίμηση & Αξιολόγηση του έργου του θέματος, όπως τροποποιήθηκε με την υπ' αρ. ΕΥΠΕ/ΥΠΕΚΑ οικ. 200088/08.07.2011 θετική γνωμοδότηση.
14. Τα υπ' αρ. 747/05.06.12 και 787/10.09.12 έγγραφα της IGI POSEIDON με συνημμένο φάκελο ΜΠΕ και συμπληρωματικά αντίγραφα αντίστοιχα για το έργο του θέματος (Α.Π. ΕΥΠΕ 198779/05.06.12, 201697/11.09.12)
15. Το με α.π. οικ. 201757/13.09.12 έγγραφο της ΕΥΠΕ με συνημμένο φάκελο ΜΠΕ προς το Περιφερειακό Συμβούλιο της Περιφέρειας Ηπείρου, για δημοσιοποίηση και ενημέρωση του κοινού καθώς και στις συναρμόδιες Υπηρεσίες για απόψεις.
16. Το με α.π. 2436/05.10.12 έγγραφο της ΛΒ' ΕΠΚΑ, όπου δεν διατυπώνεται αντίρρηση- γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 202346/11.10.12)
17. Το με α.π. 47865/08.10.12 έγγραφο της Γεν. Γραμ. Χωροταξίας & Αστικού Περιβάλλοντος του ΥΠΕΚΑ, χωρίς αντίρρηση για το έργο (α.π. ΕΥΠΕ 202425/12.10.12).
18. Το με α.π. 5236/8.10.12 έγγραφο της Εφορείας Εναλίων Αρχαιοτήτων, όπου αναφέρεται ότι έχει γνωμοδοτήσει με το υπ' αρ. 5057/5.10.12 έγγραφο, προς τη Δ/νση Προϊστορικών & Κλασικών Αρχαιοτήτων του Υπ. Πολιτισμού & Αθλητισμού (α.π. ΕΥΠΕ 202584/19.10.12)
19. Το με α.π. 94622/3592/31.10.12 έγγραφο της Επιτροπής Περιβάλλοντος Χωρικού Σχεδιασμού & Ανάπτυξης της Περιφέρειας Ηπείρου, με συνημμένα τα στοιχεία δημοσιοποίησης του φακέλου ΜΠΕ, καθώς και την υπ' αρ. 12/89/2012 απόφασή της για αναβολή της συζήτησης του εν λόγω φακέλου του έργου του θέματος (α.π. ΕΥΠΕ 202965/6.11.12)
20. Το με α.π. Δ3/Α/οικ. 19435/05.11.12 έγγραφο της Δ/νσης Εγκαταστάσεων Πετρελαιοειδών του ΥΠΕΚΑ, χωρίς αντίρρηση για το προτεινόμενο έργο (α.π. ΕΥΠΕ 202970/7.11.12, 203310/22.11.12)
21. Το με α.π. 8221.Λ17/15.11.12 έγγραφο της Διεύθυνσης Λιμενικών Υποδομών τμήμα Β-Μελετών και Έργων του Υπουργείου Ναυτιλίας και Αιγαίου, όπου δεν εκφράζονται αντιρρήσεις για το έργο- γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 203179/16.11.12, 202182/3.10.12)
22. Το υπ. αρ. 5879/12.11.12 έγγραφο της ΛΓ' ΕΠΚΑ σύμφωνα με τα οποίο δεν εκφράζεται αντίρρηση για το προτεινόμενο έργο-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 203256/21.11.12)
23. Το με α.π. 3201/30.10.12 έγγραφο της 18ης Εφορείας Βυζαντινών Αρχαιοτήτων, όπου δεν διατυπώνεται αντίρρηση-γνωμοδότηση υπό όρους (α.π. ΕΥΠΕ 203319/22.11.12)

24. Το με α.π. 57622/14.12.12 έγγραφο της Δ/νσης Δασών Θεσπρωτίας χωρίς αντίρρηση για το προτεινόμενο έργο (α.π. ΕΥΠΕ 203926/19.12.12, 203953/20.12.12)
25. Το με α.π. 114621/4362/18.12.12 έγγραφο της Επιτροπής Περιβάλλοντος Χωρικού Σχεδιασμού & Ανάπτυξης της Περιφέρειας Ηπείρου, με συνημμένη την υπ' αρ. 13/95/3.12.2012 Απόφασή της (ΑΔΑ:Β4ΜΒ7Λ9-0Ι3), σύμφωνα με την οποία γνωμοδότησε κατά πλειοψηφία θετικά για το περιεχόμενο της Μελέτης Περιβαλλοντικών Επιπτώσεων του έργου (α.π. ΕΥΠΕ 203984/21.12.12).
26. Το με α.π. 76191/6473/20.12.12 έγγραφο της Δ/νσης Συντονισμού και Επιθεώρησης Δασών της Αποκεντρωμένης Διοίκησης Ηπείρου-Δυτικής Μακεδονίας, με συνημμένο το υπ' αρ. 57622/5465/14.12.12 έγγραφο της Δ/νσης Δασών Θεσπρωτίας (α.π. ΕΥΠΕ 165789/04.02.13)
27. Το με α.π. 18325/1357/10.04.13 έγγραφο της Δ/νσης Συντονισμού και Επιθεώρησης Δασών της Αποκεντρωμένης Διοίκησης Ηπείρου-Δυτικής Μακεδονίας, με συνημμένο το υπ' αρ. 57379/3135π.ε./08.03.13 έγγραφο της Δ/νσης Δασών Πρέβεζας, όπου δεν εκφράζεται αντίρρηση για το προτεινόμενο έργο-υπό όρους γνωμοδότηση (α.π. ΕΥΠΕ 167592/15.04.13)
28. Το με α.π. 879/4.3.13 έγγραφο του IGI Poseidon με συνημμένα στοιχεία κοινοποίησης της ΜΠΕ του έργου σύμφωνα με τη σύμβαση ESPOO (α.π. ΕΥΠΕ 166793/11.3.13)
29. Το με α.π. 38606/9.8.13 έγγραφο της Δ/νσης Β7, Διεθνών Ενεργειακών Θεμάτων, του Υπ. Εξωτερικών, με το οποίο ζητούνται συμπληρωματικά στοιχεία για την τήρηση της διαδικασίας κοινοποίησης προς το Ιταλικό Υπουργείο Περιβάλλοντος (α.π. ΕΥΠΕ 169922/12.8.13)
30. Το με α.π. 940/4.10.13 έγγραφο του IGI Poseidon με συνημμένα συμπληρωματικά στοιχεία προς το Υπ. Εξωτερικών (α.π. ΕΥΠΕ 170929/7.10.13)
31. Το γεγονός ότι τηρήθηκε η διαδικασία που προβλέπεται από τη σύμβαση ESPOO για την εκτίμηση των διασυνοριακών περιβαλλοντικών επιπτώσεων μεταξύ Ελλάδας – Ιταλίας.
32. Την υπ' αρ. 681/2014 απόφαση της Ρυθμιστικής Αρχής Ενέργειας (ΡΑΕ) με την οποία εγκρίνεται το Πρόγραμμα Ανάπτυξης Εθνικού Συστήματος Φυσικού Αερίου (ΕΣΦΑ) 2014-2023.
33. Το με α.π. 119067/3106/30.12.14 έγγραφο της Δ/νσης Διαχείρισης Δασών & Δασικού Περιβάλλοντος του ΥΠΕΚΑ, όπου εκφράζεται θετική-υπό όρους-γνωμοδότηση για το έργο του θέματος (α.π. ΔΙΠΑ 145097/8.1.15)
34. Το γεγονός ότι το προτεινόμενο έργο αποτελεί έργο εθνικής σημασίας, δημόσιας ωφέλειας και γενικά δημοσίου συμφέροντος., σύμφωνα με το ν. 4001/2011.

α π ο φ α σ ί ζ ο υ μ ε

Την έγκριση των κάτωθι περιβαλλοντικών όρων και περιορισμών, η εφαρμογή των οποίων αποτελεί απαραίτητη προϋπόθεση για την κατασκευή και λειτουργία του ελληνικού τμήματος του έργου: «ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ (ΑΦΑ) ΔΙΑΣΥΝΔΕΣΗΣ ΕΛΛΑΔΑΣ-ΙΤΑΛΙΑΣ & ΣΥΝΟΔΕΥΤΙΚΕΣ ΕΓΚΑΤΑΣΤΑΣΕΙΣ – ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ».

1. Είδος και μέγεθος δραστηριότητας

1.1 Γενικά στοιχεία του Έργου

Το έργο αφορά στην κατασκευή και λειτουργία του ελληνικού τμήματος του Ελληνο-Ιταλικού υποθαλάσσιου διασυνδετήριου Αγωγού Φυσικού Αερίου (ΑΦΑ) Υψηλής Πίεσης, καθώς και των συνοδευτικών του εγκαταστάσεων.

Ο υποθαλάσσιος αγωγός στο σύνολό του (σε Ελλάδα και Ιταλία) περιλαμβάνει το υποθαλάσσιο τμήμα συνολικού μήκους περίπου 205km, έναν Σταθμό Μέτρησης και Συμπίεσης στην Ελλάδα, έναν Σταθμό Μέτρησης στην Ιταλία, καθώς και δύο χερσαία τμήματα που συνδέουν στην Ελλάδα τον Σταθμό Μέτρησης και Συμπίεσης με τις ακτές της Ηπείρου, ενώ στην Ιταλία τον Σταθμό Μέτρησης με τις ακτές του Οτράντο, στην περιοχή της Απουλίας.

Η διάμετρος του αγωγού είναι 32'' (81,3 cm) και η μέγιστη πίεση λειτουργίας 140 bar (πίεση σχεδιασμού στα 160bar). Το έργο θα έχει αρχικά παροχετευτική ικανότητα εννέα δισεκατομμυρίων κυβικών μέτρων φυσικού αερίου (9 bcm) το έτος με δυνατότητα επέκτασης σε δώδεκα δισεκατομμύρια κυβικά μέτρα φυσικού αερίου (bcm) το έτος.

1.2 Περιγραφή του αγωγού και των συνοδευτικών του εγκαταστάσεων

Το ελληνικό τμήμα του Έργου, περιλαμβάνει τα εξής τμήματα:

α) το υποθαλάσσιο τμήμα από το σημείο προσαιγιάλωσης, θέση ΟΜΠΡΕΛΛΑ 2, στις ακτές του Ν. Θεσπρωτίας έως το μέσο του θαλάσσιου στενού μεταξύ Ελλάδας και Ιταλίας, μήκους περίπου 146km.
β) το σταθμό Μέτρησης/Συμπίεσης στη θέση ΦΛΩΡΟΒΟΥΝΙ. Ο Σταθμός Μέτρησης θα χρησιμοποιείται για την μέτρηση των διερχόμενων ποσοτήτων φυσικού αερίου. Ο Σταθμός Συμπίεσης περιλαμβάνει αρχικά την εγκατάσταση τεσσάρων Μονάδων Συμπίεσης, ισχύος περίπου 30-32 MW η κάθε μία, εκ των οποίων οι τρεις θα λειτουργούν και η τέταρτη θα είναι εφεδρική.
Στη $2^{η}$ φάση λειτουργίας (12 bcm/έτος), θα προστεθεί μία επιπλέον μονάδα συμπίεσης, ίδιας ισχύος, δηλαδή κατά την φάση αυτή θα είναι εγκατεστημένες συνολικά 5 μονάδες συμπίεσης, εκ των οποίων οι τέσσερις θα λειτουργούν κα η μία θα είναι εφεδρική.
Στον χώρο του σταθμού μέτρησης/συμπίεσης, θα χωροθετηθούν και οι συνοδές εγκαταστάσεις που είναι απαραίτητες για τη λειτουργία του αγωγού (ξεστροπαγίδα, κτίριο λειτουργίας, κλπ).
γ) το χερσαίο τμήμα του αγωγού από το σημείο προσαιγιάλωσης της θαλάσσιας όδευσης μέχρι το σταθμό μέτρησης/συμπίεσης, μήκους περίπου 8,2 km για την προτεινόμενη χάραξη.
δ) ένα βαλβιδοστάσιο, σε απόσταση περίπου 600m ανάντη του σημείου προσαιγιάλωσης

Επίσης στις συνοδευτικές εγκαταστάσεις περιλαμβάνονται οι προσωρινοί εργοταξιακοί και αποθηκευτικοί χώροι κατά την διάρκεια κατασκευής, οι δρόμοι πρόσβασης, κλπ.

1.3 Το συνολικό έργο κατατάσσεται στην υποκατηγορία Α1 της 11ης ομάδας «Μεταφορά Ενέργειας, καυσίμων και χημικών ουσιών», της υ.α. 1958/2012 (Β΄ 21) όπως ισχύει.

1.4. Ο σχεδιασμός του έργου περιγράφεται στο κεφάλαιο 5 της ΜΠΕ. Η χερσαία όδευση και το πρώτο τμήμα της υποθαλάσσιας όδευσης απεικονίζονται στο σχέδιο 7240-AU-ON-01(αναθ. 2), κλίμακας 1:50.000, ενώ το υποθαλάσσιο τμήμα, στα σχέδια 7240-AU-OM-02 (αναθ. 1, φυλ. 1 έως 2), κλίμακας 1:100.000, που συνοδεύουν τον φάκελο ΜΠΕ.

1.5 Φορέας υλοποίησης του έργου είναι η Εταιρεία ΥΑΦΑ Ποσειδών (IGI Poseidon), με έδρα την Ελλάδα.

2. Θεσμοθετημένα βασικά χαρακτηριστικά περιοχής έργου και ευαίσθητα στοιχεία περιβάλλοντος

2.1. Χωρικός σχεδιασμός και χρήσεις γης

2.1.1. Σύμφωνα με τις κατευθύνσεις του Γενικού Πλαισίου Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης (Α' 128/2008) σχετικά με την ενέργεια, προτείνεται η ενίσχυση του διεθνούς ρόλου της χώρας ως κέντρου μεταφοράς ηλεκτρικής ενέργειας, φυσικού αερίου και πετρελαίου. Επίσης προβλέπεται ότι η ένταξη των υποδομών ενέργειας στρατηγικής εμβέλειας στον εθνικό χωροταξικό σχεδιασμό επιβάλλει την ολοκλήρωση, σύμφωνα με τον υφιστάμενο σχεδιασμό, του δικτύου φυσικού αερίου (κύρια διασύνδεση με την Ιταλία και την Τουρκία).

Επίσης, σύμφωνα με το Περιφερειακό Πλαίσιο Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης Ηπείρου, θεωρείται σημαντική για την ανάπτυξη της Περιφέρειας η σύνδεση με το δίκτυο φυσικού αερίου της χώρας (σύνδεση με Ανατολική Ελλάδα ή μέσω της σύνδεσης του δικτύου φυσικού αερίου Ελλάδος-Ιταλίας).

2.1.2. Σύμφωνα με την προτεινόμενη όδευση, το χερσαίο τμήμα του αγωγού διέρχεται από τα όρια των Δήμων Ηγουμενίτσας της Περιφερειακής Ενότητας Θεσπρωτίας και Πάργας της Περιφερειακής Ενότητας Πρέβεζας, της Περιφέρειας Ηπείρου.

2.1.3. Σύμφωνα με το χάρτη χρήσεων γης, ο αγωγός, στο χερσαίο τμήμα διασχίζει δασικές και θαμνώδεις εκτάσεις. Το σημείο προσαιγιάλωσης (όρμος Ομπρέλλα) είναι βραχώδης παραλία με έντονη παρουσία ογκόλιθων και βράχων.

2.2. Στοιχεία περιβαλλοντικής ευαισθησίας της περιοχής του έργου

2.2.1. Σύμφωνα με την προτεινόμενη χάραξη, ο αγωγός δεν διέρχεται από θεσμοθετημένες προστατευόμενες περιοχές (π.χ. του ευρωπαϊκού οικολογικού δικτύου NATURA 2000).

3. Ειδικές οριακές τιμές εκπομπής ρυπαντικών φορτίων και συγκεντρώσεων σύμφωνα με τις ισχύουσες διατάξεις

3.1 Οι οριακές τιμές και τα κρίσιμα επίπεδα ποιότητας της ατμόσφαιρας αναφέρονται στις ακόλουθες αποφάσεις:

3.1.1. Στην κ.υ.α. με α.η.π. 14122/549/Ε103/24.3.2011 (Β΄ 488), με την οποία καθορίζονται μέτρα για τη βελτίωση της ποιότητας της ατμόσφαιρας, σε συμμόρφωση με τις διατάξεις της οδηγίας 2008/50/ΕΚ.

3.1.2. Στην κ.υ.α. με α.η.π. 22306/1075/Ε103/29.5.2007 (Β΄ 920), με την οποία καθορίζονται τιμές − στόχοι και όρια εκτίμησης των συγκεντρώσεων του αρσενικού, του καδμίου, του υδραργύρου, του νικελίου και των πολυκυκλικών αρωματικών υδρογονανθράκων στον ατμοσφαιρικό αέρα, σε συμμόρφωση με τις διατάξεις της οδηγίας 2004/107/ΕΚ.

3.2. Για τα υγρά απόβλητα ισχύουν:

3.2.1 Η υ.α. υπ' αρ. οικ. 5673/400/1997 (Β΄ 192), με την οποία καθορίζονται μέτρα και όροι για την επεξεργασία αστικών λυμάτων, όπως τροποποιημένη ισχύει.

3.2.2 Η υπ' αρ. Ε1β/221/1965 (Β΄ 138) υγειονομική διάταξη περί διαθέσεως λυμάτων και βιομηχανικών αποβλήτων, όπως τροποποιημένη εξακολουθεί να ισχύει.

3.2.3 Ειδικές διατάξεις που ενδέχεται να έχουν επιβληθεί στην περιοχή του έργου.

3.3. Για τη διαχείριση των χρησιμοποιημένων ορυκτελαίων ισχύει το π.δ. 82/2004 (Α΄ 64).

3.4. Στις εργασίες που προβλέπονται για την υλοποίηση και λειτουργία του έργου, δεν περιλαμβάνεται διαχείριση αποβλήτων κατά την έννοια των διατάξεων που αφορούν στο πλαίσιο παραγωγής και διαχείρισης αποβλήτων.

4. Ειδικές οριακές τιμές στάθμης θορύβου και δονήσεων σύμφωνα με τις ισχύουσες διατάξεις

4.1. Για το θόρυβο που εκπέμπεται από τον εξοπλισμό κατασκευής του έργου, ισχύουν τα προβλεπόμενα στην κ.υ.α. με α.η.π. 37393/2028/29.3.2003, στην οποία καθορίζονται μέτρα και όροι για τις εκπομπές θορύβου στο περιβάλλον από εξοπλισμό προς χρήση σε εξωτερικούς χώρους (Β΄ 1418), όπως τροποποιήθηκε με την κ.υ.α. 9272/471/2.3.2007 (Β΄ 286).

4.2. Για το θόρυβο που εκπέμπεται κατά τη φάση λειτουργίας του έργου, εφαρμόζονται οι προβλέψεις του π.δ. 1180/1981 (Α΄ 293) «Περί ρυθμίσεως θεμάτων αναγομένων εις τα της ιδρύσεως και λειτουργίας βιομηχανιών, βιοτεχνιών πάσης φύσης μηχανολογικών εγκαταστάσεων και αποθηκών και της εκ τούτων διασφαλίσεως περιβάλλοντος εν γένει», όπως τροποποιήθηκε και ισχύει.

5. Όροι, μέτρα και περιορισμοί που πρέπει να λαμβάνονται για την αντιμετώπιση (πρόληψη – ελαχιστοποίηση – επανόρθωση – αποκατάσταση) των δυνητικών περιβαλλοντικών επιπτώσεων

5.1. Γενικοί όροι

5.1.1. Ο φορέας υλοποίησης και λειτουργίας του έργου, καθώς και τα φυσικά ή νομικά πρόσωπα στα οποία ανατίθενται εργασίες υλοποίησης ή λειτουργίας του (εφεξής αναφερόμενα ως «τρίτα μέρη»), φέρουν την ευθύνη για την τήρηση των περιβαλλοντικών όρων, μέτρων και περιορισμών που επιβάλλονται με την παρούσα απόφαση.

5.1.2. Ο φορέας υλοποίησης και λειτουργίας του έργου υποχρεούται να λαμβάνει όλα τα απαραίτητα μέτρα ώστε να εξασφαλίζεται:

5.1.2.1. Η τήρηση των περιβαλλοντικών όρων από το σύνολο όσων συμμετέχουν ή συμβάλουν στην υλοποίηση και λειτουργία του έργου.

5.1.2.2. Η δυνατότητα αντιμετώπισης και αποκατάστασης δυσάρεστων περιβαλλοντικά καταστάσεων οφειλομένων σε ενέργειες ή παραλείψεις κατά παράβαση των περιβαλλοντικών όρων.

5.1.3. Κατά τις διαδικασίες σύναψης συμφωνιών μεταξύ φορέα υλοποίησης του έργου και τρίτων μερών, καθώς και των τελευταίων μεταξύ τους, θα πρέπει να προβλέπονται όροι συμμόρφωσης με τις απαιτήσεις τήρησης των περιβαλλοντικών όρων της παρούσας απόφασης. Ανάλογη απαίτηση ισχύει για τους φορείς λειτουργίας και τα τρίτα μέρη που ενδέχεται να μετάσχουν στη λειτουργία του έργου.

5.1.4. Ο φορέας υλοποίησης και λειτουργίας του έργου θα πρέπει να ορίσει στέλεχος ή επιχειρησιακή μονάδα που θα έχει την ευθύνη παρακολούθησης της τήρησης των περιβαλλοντικών όρων της παρούσας απόφασης και της κατάθεσης των απαιτούμενων εκθέσεων περιβαλλοντικής παρακολούθησης.

5.1.5 Από τις δαπάνες για την κατασκευή και λειτουργία του έργου, θα πρέπει να εξασφαλίζονται κατά προτεραιότητα αυτές που αφορούν στα έργα προστασίας και αποκατάστασης του περιβάλλοντος, τα οποία απαιτούνται για την πλήρη τήρηση των όρων και περιορισμών της παρούσας απόφασης.

5.1.6 Επιμέρους έργα και δραστηριότητες που αφορούν στις εργασίες κατασκευής ή στις δραστηριότητες λειτουργίας, εκτός αυτών που περιγράφονται στη ΜΠΕ και ως εκ τούτου περιλαμβάνονται στο αντικείμενο της παρούσας, αδειοδοτούνται περιβαλλοντικά σύμφωνα με τα οριζόμενα στα άρθρα 5 και 6 του ν. 4014/2011. Εφόσον πρόκειται για εγκατάσταση της οποίας η γενική εκτίμηση των επιπτώσεων περιλαμβάνεται στη ΜΠΕ και η παρούσα απόφαση προβλέπει γενικούς ή και ειδικούς όρους και περιορισμούς για τέτοιου τύπου εγκαταστάσεις και εργασίες, είναι δυνατή η υποβολή από το φορέα του έργου Τεχνικής Περιβαλλοντικής Μελέτης (ΤΕΠΕΜ), η οποία αξιολογείται και εγκρίνεται από την περιβαλλοντική αρχή που είναι αρμόδια για το έργο, βάσει της κατάταξής του κατά την υ.α. 1958/2012 (Β΄ 21).

5.2. Οριστικοποίηση σχεδιασμού – προγραμματισμός υλοποίησης

5.2.1. Πριν την έναρξη των εργασιών κατασκευής θα πρέπει να:

5.2.1.1. Έχουν εξασφαλισθεί οι απαιτούμενες άδειες.
5.2.1.2. Έχουν ολοκληρωθεί όλες οι πρόδρομες εργασίες, όπως γεωλογικές/ γεωτεχνικές μελέτες, τοπογραφήσεις, σημάνσεις.

5.3. Φάση Κατασκευής του Έργου

5.3.1 Τα απαραίτητα για το έργο υλικά, όπως αδρανή ή γαιώδη υλικά, σκυρόδεμα και ασφαλτόμιγμα, θα πρέπει να εξασφαλισθούν από υφιστάμενες μονάδες που λειτουργούν νομίμως και τηρούν τις υποχρεώσεις που προβλέπουν οι περιβαλλοντικές διατάξεις. Απαγορεύεται η δημιουργία δανειοθαλάμου ή η απόληψη υλικών από κοίτες ποταμών ή χειμάρρων για υλικά που πιθανά απαιτηθούν για την κατασκευή του έργου.

5.3.2. Η διαχείριση των στερεών αποβλήτων (περιλαμβανόμενων των αποβλήτων εκσκαφών), όσων άλλων αποβλήτων απαιτούν ειδική διαχείριση (π.χ. χρησιμοποιημένα λιπαντικά), καθώς και όσων εμπίπτουν στα επικίνδυνα ή τοξικά απόβλητα, θα πραγματοποιείται σύμφωνα με τις απαιτήσεις της πάγιας σχετικής νομοθεσίας για κάθε είδος αυτών. Για τον σκοπό αυτόν, θα πρέπει να εκπονηθεί και να εφαρμόζεται σχέδιο διαχείρισης αποβλήτων, το οποίο θα καλύπτει τις εξής τουλάχιστον απαιτήσεις:

5.3.2.1. Προεκτίμηση είδους και ποσότητας αποβλήτων, για κάθε επικείμενο στάδιο κατασκευής.
5.3.2.2. Απαιτήσεις της νομοθεσίας για τη διαχείριση καθενός από τα είδη αποβλήτων που θα προκύψουν στο στάδιο κατασκευής.
5.3.2.3. Διαθέσιμες λύσεις για τη διαχείριση του καθενός από τα είδη αποβλήτων και τεκμηρίωση της συμμόρφωσης της κάθε λύσης με τις αντίστοιχες ισχύουσες διατάξεις.
5.3.2.4. Απαιτήσεις προς όσα τρίτα μέρη πρόκειται να εμπλακούν στο επερχόμενο στάδιο κατασκευής, οι οποίες θα αφορούν αφενός στη διαχείριση των αποβλήτων σύμφωνα με το σχέδιο και αφετέρου στην παρακολούθηση της ορθής διαχείρισης, με καταγραφές και τεκμηριώσεις.

5.3.3. Η εκπόνηση του σχεδίου διαχείρισης αποβλήτων θα πραγματοποιηθεί με ευθύνη του φορέα υλοποίησης του έργου, είτε αυτοτελώς είτε σε συνεργασία με τα τρίτα μέρη. Με ανάλογο τρόπο θα πρέπει να πραγματοποιούνται τροποποιήσεις ή επικαιροποιήσεις του σχεδίου, διασφαλίζοντας πάντως ότι ικανοποιούνται πλήρως οι απαιτήσεις που τέθηκαν παραπάνω.

5.3.4. Κατά την εφαρμογή του όρου 5.1.3 θα πρέπει να προβλέπεται όρος για συμμόρφωση με το σχέδιο διαχείρισης αποβλήτων.

5.3.5. Τα υλικά εκσκαφών που δεν θα χρησιμοποιηθούν για την κατασκευή επιχωμάτων και επανεπιχώσεων του έργου, μπορούν να διατεθούν μόνο σε νόμιμους προς τούτο χώρους διάθεσης. Σε κάθε περίπτωση απαγορεύεται η απόθεση των πλεοναζόντων ή ακατάλληλων προϊόντων εκσκαφής σε θέσεις που επηρεάζουν την επιφανειακή ροή των υδάτων.

5.3.6. Οι εργασίες εκσκαφών κατά τη διάρκεια κατασκευής του έργου να γίνεται με τον ηπιότερο δυνατό τρόπο και κατά προτίμηση με ελαχιστοποίηση της χρήσης εκρηκτικών υλών εφόσον τούτο είναι απαραίτητο.

5.3.7. Η τακτική συντήρηση του εξοπλισμού κατασκευής θα διεξάγεται εκτός της ζώνης εκτέλεσης. Για τις περιπτώσεις έκτακτης συντήρησης θα τηρείται αρχείο από το φορέα επίβλεψης. Για τις περιπτώσεις αυτές:

5.3.7.1. Η διαχείριση των χρησιμοποιημένων ορυκτελαίων θα πραγματοποιείται σύμφωνα με το π.δ. 82/2004 (Α΄ 64), με το οποίο καθορίζονται μέτρα, όροι και πρόγραμμα για την εναλλακτική διαχείριση των αποβλήτων των λιπαντικών ελαίων.

5.3.7.2. Εάν προκύψουν άχρηστα ελαστικά, θα παραδίδονται προς εναλλακτική διαχείριση σε πιστοποιημένο φορέα.

5.3.8. Για την προστασία του εδάφους και των υδάτων:

5.3.8.1. Σε όλη τη διάρκεια της κατασκευής, θα πρέπει να αποτρέπεται η ρύπανση των επιφανειακών και υπογείων νερών από κάθε είδους απορροές, καθώς και η απόρριψη οποιωνδήποτε μη βιοδιασπώμενων ουσιών επί του εδάφους.

5.3.8.2. Η τελική μορφή του έργου μετά την επίχωση του αγωγού, να επιτρέπει την απορροή των ομβρίων ώστε να αποφευχθούν φαινόμενα διάβρωσης ή πλημμύρισης εδαφών.

5.3.8.3 Οι παροχετευόμενες ροές να είναι απαλλαγμένες από φερτές ύλες (π.χ. αιωρήματα ή λάσπες) και μη-βιοδιασπώμενες ουσίες (π.χ. λιπαντικά, καύσιμα κ.ά.).

5.3.8.4. Για την αντιμετώπιση ατυχημάτων, ο φορέας του έργου ή κάθε Τρίτο Μέρος που συμμετέχει στην κατασκευή του έργου, θα πρέπει να διαθέτει επιτόπου και σε ετοιμότητα τα κατάλληλα υλικά π.χ. ειδικά προϊόντα δέσμευσης, βιοδιάσπασης ή συλλογής ελαίων και λιπαντικών κ.ά.

5.3.9. Για τον περιορισμό της εκπομπής ρύπων και σκόνης στον αέρα:

5.3.9.1. Όλα τα οχήματα που χρησιμοποιούνται κατά την κατασκευή του έργου θα πρέπει να διαθέτουν σε ισχύ πιστοποιητικό συμμόρφωσης με τα εκάστοτε όρια αερίων ρύπων.

5.3.9.2. Σε κάθε κατασκευαστική δραστηριότητα όπου υπάρχει πιθανότητα εκπομπής σκόνης, αιωρούμενων σωματιδίων ή οσμηρών ουσιών, θα πρέπει να υιοθετηθούν διαδικασίες και εξοπλισμός που θα εξασφαλίζουν τη δραστική μείωση αυτών των εκπομπών, ενώ οι χρόνοι των διαδικασιών αυτών πρέπει να ελαχιστοποιούνται.

5.3.9.3. Οι φορτώσεις-αποθέσεις χαλαρών υλικών και οι διαδρομές των οχημάτων κατασκευής εντός της ζώνης κατασκευής του έργου, κατά τις ξηρές περιόδους του έτους θα πρέπει να γίνονται υπό διαβροχή ή με ισοδύναμο τρόπο περιορισμού της σκόνης.

5.3.9.4. Η εκπομπή σκόνης από την επίδραση του ανέμου σε σωρούς υλικών που έχουν προσωρινά δημιουργηθεί στη ζώνη του έργου, πχ με κάλυψη των σωρών ή με διαβροχή τους.

5.3.10. Να τηρηθούν οι κάτωθι όροι, σύμφωνα με τις γνωμοδοτήσεις των αρμόδιων Υπηρεσιών του Υπουργείου Πολιτισμού και Αθλητισμού.

5.3.10.1. Όλες οι εκσκαφικές εργασίες που προβλέπονται στο φάκελο ΜΠΕ, θα πραγματοποιούνται με την παρακολούθηση των αρμόδιων Αρχαιολογικών Υπηρεσιών, οι οποίες θα πρέπει να ειδοποιηθούν εγγράφως εγκαίρως ώστε να χορηγείται η σχετική άδεια.

5.3.10.2. Λόγω της μεγάλης έκτασης του έργου και για την αποφυγή καθυστερήσεων, θα πρέπει να προβλεφθεί πίστωση από το φορέα εκτέλεσής του για την πραγματοποίηση αρχαιολογικών ερευνών και εργασιών, στις οποίες, σύμφωνα με την ισχύουσα νομοθεσία (άρθρο 36 του ν. 3028/2002, άρθρο 25 του ν. 3614/2007 όπως αυτό ισχύει), συμπεριλαμβάνεται και η παρακολούθηση του συνόλου των εκσκαφικών εργασιών του έργου.

5.3.10.3. Για την πραγματοποίηση των εργασιών θα υπογραφεί σχετικό Μνημόνιο Συνεργασίας μεταξύ του φορέα εκτέλεσης του έργου και των συναρμόδιων Εφορειών Αρχαιοτήτων. Σε περίπτωση που κατά τη διάρκεια των εκσκαφικών εργασιών βρεθούν αρχαιότητες, οι εργασίες θα διακοπούν στο τμήμα που θα κρίνει απαραίτητο η αρμόδια Εφορεία για την προστασία των αρχαιοτήτων και θα πραγματοποιηθεί ανασκαφική έρευνα από ειδικό συνεργείο, αμειβόμενο από τις πιστώσεις του έργου ενώ θα ακολουθήσει επικαιροποίηση του Μνημονίου Συνεργασίας με τα νεότερα στοιχεία των εργασιών.

5.3.10.4 Εφόσον κριθεί απαραίτητο, αυτή η ανασκαφική έρευνα είναι δυνατόν να επεκταθεί και πέραν των ορίων του εκτελούμενου έργου, ενώ μόνο μετά την ολοκλήρωσή της δύναται η αρμόδια Υπηρεσία να γνωματεύσει, όσον αφορά στην πορεία των εργασιών στο συγκεκριμένο τμήμα του έργου.
Το απαραίτητο επιστημονικό και εργατοτεχνικό προσωπικό θα προσληφθεί κατόπιν υποδείξεως των συναρμόδιων Εφορειών Αρχαιοτήτων.

5.3.11 Όσον αφορά στην χορηγούμενη δια της παρούσας απόφασης, έγκριση επέμβασης σε δάση και δασικές εκτάσεις, κατά τα προβλεπόμενα από το άρθρο 12 του Ν. 4014/2011, να τηρούνται τα ακόλουθα:

5.3.11.1. Πριν την έναρξη των εργασιών υλοποίησης του έργου, θα πρέπει να τηρηθούν τα προβλεπόμενα από την Υ.Α. 15277 (Β' 1077), σχετικά με τον χαρακτηρισμό της έκτασης επέμβασης (σύμφωνα με το άρθρο 14 Ν.998/79) και το ιδιοκτησιακό καθεστώς αυτής.

5.3.11.2. Οι εκσκαφές να περιορισθούν στις απολύτως αναγκαίες και η οποιαδήποτε φθορά της δασικής βλάστησης να περιορισθεί στην ελάχιστη δυνατή και μόνο στη ζώνη κατάληψης του έργου.

5.3.11.3. Να μη γίνει εναπόθεση υλικών εκσκαφής και υλικών κατασκευής σε ρέματα και χείμαρρους για την εξασφάλιση της ελεύθερης ροής των υδάτων τους, σε δασικού χαρακτήρα εκτάσεις εκτός της ζώνης κατάληψης του έργου.

5.3.11.4. Από το φορέα του έργου να λαμβάνεται μέριμνα για την προστασία του περιβάλλοντος, κυρίως στην πρόληψη των πυρκαγιών κατά τη διάρκεια κατασκευής και λειτουργίας του έργου και λαμβάνονται μέτρα φύλαξης του χώρου του έργου για την αποφυγή ατυχημάτων.

5.3.11.5. Οι επεμβάσεις σε δασικού χαρακτήρα εκτάσεις με σκοπό την υλοποίηση του εν λόγω έργου θα πρέπει να γίνει με τους όρους, τις προϋποθέσεις και τη διαδικασία που προβλέπεται από τη Δασική Νομοθεσία.

5.3.11.6. Εκτός των ορίων του υπό μελέτη έργου δεν θα γίνει καμία εγκατάσταση, ούτε θα αποτεθεί ή απορριφθεί οποιοδήποτε υλικό.

5.3.11.7. Απαγορεύεται η μεταβολή χρήσης της έκτασης πέραν του εγκεκριμένου σκοπού.

5.3.11.8. Πριν την έναρξη εργασιών υλοποίησης του έργου, σε δάση και δασικές εκτάσεις, να υποβληθεί για έγκριση στα αρμόδια Δασαρχεία Ειδική Δασοτεχνική προμελέτη όπως προβλέπεται από την με αριθμ. 15277/2012 (Β'1077) Υ.Α. για την αποκατάσταση της δασικής βλάστησης και τη βελτίωση της αισθητικής του τοπίου από την κατασκευή του έργου. Τα είδη φυτών που θα χρησιμοποιηθούν να είναι αυτόχθονα και να μην είναι ξένα προς τη φυσική φυτοκοινωνία της περιοχής. Οι εργασίες φύτευσης να αρχίζουν αμέσως σε κάθε τμήμα του έργου στο οποίο έχουν περατωθεί οι χωματουργικές εργασίες και έχουν διαμορφωθεί οι τελικές επιφάνειες. Οι φυτεύσεις να συντηρηθούν για τα 3 πρώτα χρόνια με ευθύνη του φορέα του έργου.

5.3.11.9. Οι εγκαταστάσεις των εργοταξίων να αναπτυχθούν σε θέσεις όπου δεν υφίσταται δασική βλάστηση. Αν αυτό δεν είναι εφικτό, ο ανάδοχος να αναλάβει την ευθύνη της αποκατάστασης αυτών με το τέλος του έργου.

5.3.11.10. Οι υλοτομίες και η ενδεχόμενη εκρίζωση δένδρων να περιορισθούν στις απολύτως αναγκαίες, τα δε προϊόντα υλοτομίας να διατεθούν από την τοπική δασική υπηρεσία, σύμφωνα με τις διατάξεις της δασικής νομοθεσίας.

5.3.11.11. Να αποφευχθούν οι σοβαρές χωματουργικές εργασίες κατά την περίοδο των έντονων βροχοπτώσεων.

5.3.11.12. Η μη τήρηση των ανωτέρω όρων συνεπάγεται την ποινική δίωξη των υπευθύνων κατά τις διατάξεις του άρθρ. 71 του Ν. 998/1979 και σε περίπτωση υποτροπής την ανάκληση της παρούσας απόφασης.

5.3.11.13. Η δασική υπηρεσία ουδεμία ευθύνη φέρει για τυχόν αξιώσεις, εκνίκηση και προβλήματα που πιθανόν δημιουργηθούν εκ μέρους τρίτων και επί εκτάσεων εκτός των ανωτέρω οριζομένων δια της παρούσης απόφασης.

5.3.11.14. Με την Α.Ε.Π.Ο. που θα εκδοθεί δε θίγονται εμπράγματα δικαιώματα του Δημοσίου επί της έκτασης.

5.3.11.15. Η παρακολούθηση και εφαρμογή των όρων της Απόφασης που θα εκδοθεί, που αφορούν εφαρμογή των διατάξεων της δασικής νομοθεσίας, ανατίθεται στα αρμόδια Δασαρχεία.

5.4. Φάση Λειτουργίας του έργου

5.4.1. Να υπάρχει εγκατάσταση δικτύου πυρόσβεσης εγκεκριμένη από την Πυροσβεστική Υπηρεσία, σε όλες τις εγκαταστάσεις του έργου (βανοστάσιο, σταθμός Μέτρησης και Συμπίεσης).

5.4.2. Να τηρηθούν οι περιβαλλοντικοί όροι που προτείνονται στη ΜΠΕ που συνοδεύει την παρούσα απόφαση και δεν έρχονται σε αντίθεση με τα παραπάνω.

5.5. Επιπρόσθετα μέτρα που πρέπει να λαμβάνονται κατά την κατασκευή και λειτουργία του έργου και σχετίζονται με το θαλάσσιο περιβάλλον:

5.5.1 να ληφθούν όλες οι απαιτούμενες άδεις και εγκρίσεις σύμφωνα με το Ν. 2971/2001 (Α’ 285) και τις λοιπές κείμενες διατάξεις

5.5.2. ο φορέας του έργου να είναι σε συνεχή επαφή και συνεννόηση με τις αρμόδιες Λιμενικές Αρχές, κατά την διάρκεια εκτέλεσης του έργου και την μετέπειτα λειτουργία του και να εκτελεστούν οι όροι και προϋποθέσεις που αυτές θέτουν, σύμφωνα με τα προβλεπόμενα από τη νομοθεσία

5.5.3 να μην γίνει περαιτέρω επέμβαση και κάθε μορφής κατασκευή στην ευρύτερη περιοχή, χωρίς να υπάρχουν οι νόμιμες εγκρίσεις

5.5.4 ο φορέας του έργου να συμμορφώνεται με τις διατάξεις του Ν. 743/1977 (Α' 319), όπως κωδικοποιήθηκε με το Π.Δ. 55/98 «Προστασία του Θαλάσσιου περιβάλλοντος» (Α' 58) και να λαμβάνει όλα τα απαραίτητα μέτρα, καθώς και τυχόν πρόσθετα που θα του υποδειχθούν από τις αρμόδιες Λιμενικές Αρχές, για την αποφυγή ρύπανσης της θάλασσας.

5.5.5 να λαμβάνονται τα κατάλληλα μέτρα για την αποφυγή διαρροών στη θάλασσα, που μπορεί να προκαλέσουν ρύπανση σε περίοδο βροχοπτώσεων – πιθανών βλαβών κλπ από τους χώρους των εγκαταστάσεων του έργου.

5.5.6 η απόρριψη οποιωνδήποτε υλικών/ουσιών στη θάλασσα δεν επιτρέπεται παρά μόνο σε εξαιρετικές περιπτώσεις. Συγκεκριμένα, για την τυχόν απόρριψη βυθοκορημάτων/υλικών εκσκαφής στη θάλασσα, απαιτείται άδεια της αρμόδιας λιμενικής Αρχής, η οποία χορηγείται κατόπιν θετικής γνωμάτευσης κατάλληλου εργαστηρίου, από την οποία θα προκύπτει ότι τα υλικά αυτά δεν είναι επιβλαβή για το θαλάσσιο περιβάλλον και σύμφωνης γνώμης των αρμόδιων Υπηρεσιών.

5.5.7 στα υλικά εμποτισμού, επάλειψης, βαφής, συγκόλλησης του αγωγού, δεν πρέπει να συμπεριλαμβάνονται ουσίες που θεωρούνται επικίνδυνες για το θαλάσσιο και γενικότερα το υδάτινο περιβάλλον.

5.5.8 τα αδρανή υλικά που θα χρησιμοποιηθούν για την κατασκευή του υφάλου να μην περιέχουν συστατικά βλαπτικά/επικίνδυνα για το θαλάσσιο περιβάλλον.

5.5.9 να εκπονηθεί και να εγκριθεί «Σχέδιο Εκτάκτου Ανάγκης αντιμετώπισης περιστατικού ρύπανσης», το οποίο θα είναι συμβατό με το «Εθνικό Σχέδιο Έκτακτης Ανάγκης για την αντιμετώπιση περιστατικών ρύπανσης από πετρέλαιο και άλλες επιβλαβείς ουσίες» [ΠΔ 11/2002 (Α' 6)] που θα εφαρμόζεται για την αντιμετώπιση περιστατικών ρύπανσης της θάλασσας κατά τη λειτουργία του έργου.

5.6 Παρακολούθηση

5.6.1. Στη φάση κατασκευής, ο φορέας του έργου οφείλει να παρακολουθεί την εφαρμογή των περιβαλλοντικών όρων. Για το σκοπό αυτό, ο υπεύθυνος περιβαλλοντικής παρακολούθησης που ορίσθηκε κατ' εφαρμογή του όρου 5.1.4, μεριμνά για τη συλλογή στοιχείων που αφορούν τη συμμόρφωση των εργασιών κατασκευής με τους περιβαλλοντικούς όρους. Ο φορέας του έργου μέσω των τρίτων μερών φροντίζουν να συλλέγουν και να διαθέτουν στον υπεύθυνο περιβαλλοντικής παρακολούθησης τα σχετικά στοιχεία που αφορούν σε εργασίες ευθύνης των τρίτων μερών, κατ' εφαρμογή των όρων 5.1.2 και 5.1.3.

5.6.2. Στη φάση λειτουργίας, ο φορέας του έργου που έχει την ευθύνη περιβαλλοντικής παρακολούθησης κατά την παρούσα, οφείλει να εκπονήσει σχετικό πρόγραμμα και να συντονίζει την εφαρμογή του ώστε να παρακολουθείται η περιβαλλοντική επίδραση του έργου και η εφαρμογή των περιβαλλοντικών όρων που αφορούν στη λειτουργία του.

5.6.3. Ο φορέας του έργου υποχρεούται, λαμβάνοντας υπόψη τα ανωτέρω, στην υποβολή ετήσιας έκθεσης περιβαλλοντικής παρακολούθησης στο τέλος Μαρτίου κάθε έτους.

6. Χρονικό διάστημα ισχύος της απόφασης έγκρισης περιβαλλοντικών όρων – Προϋποθέσεις για την ανανέωση και τροποποίησή της

6.1. Οι περιβαλλοντικοί όροι της παρούσας απόφασης ισχύουν για δέκα έτη από την έκδοσή της, εφόσον δεν επέρχεται μεταβολή των δεδομένων βάσει των οποίων εκδόθηκε.

6.2. Πριν από την παρέλευση αυτού του χρονικού διαστήματος, ο φορέας του έργου οφείλει να εκκινήσει τη διαδικασία ανανέωσης των περιβαλλοντικών όρων, κατά τα οριζόμενα στο άρθρο 5 του ν. 4014/2011. Σύμφωνα με το ίδιο άρθρο, εάν ο φάκελος ανανέωσης υποβληθεί εμπροθέσμως (τουλάχιστον δύο μήνες πριν τη λήξη ισχύος), για το χρονικό διάστημα μέχρι την ολοκλήρωση της διαδικασίας ανανέωσης, οι περιβαλλοντικοί όροι διατηρούνται σε ισχύ.

6.3. Για τον εκσυγχρονισμό, βελτίωση, επέκταση ή τροποποίηση του έργου, σύμφωνα με τους περιβαλλοντικούς όρους, απαιτείται η τήρηση του άρθρου 6 του ν. 4014/2011.

6.4. Σε περίπτωση που από τις τακτικές και έκτακτες περιβαλλοντικές επιθεωρήσεις διαπιστωθούν σοβαρά προβλήματα υποβάθμισης του περιβάλλοντος ή αν παρατηρηθούν επιπτώσεις στο περιβάλλον που δεν είχαν προβλεφθεί από τη ΜΠΕ και την παρούσα απόφαση, επιβάλλονται πρόσθετοι περιβαλλοντικοί όροι ή τροποποιούνται οι όροι της απόφασης αυτής, όπως προβλέπεται στην παρ. 9 του άρθρου 2 του ν. 4014/2011, σε συνδυασμό με το άρθρο 6 του ίδιου νόμου.

7. Άλλες διατάξεις

7.1. Η παρούσα απόφαση:

7.1.1. Δεν καλύπτει θέματα ασφάλειας έναντι ατυχημάτων ή ασφάλειας και υγιεινής του προσωπικού, τα οποία εξακολουθούν να ρυθμίζονται από τις πάγιες σχετικές με αυτά διατάξεις.

7.1.2. Δεν απαλλάσσει τον φορέα του έργου από την υποχρέωση έκδοσης όσων άλλων αδειών, εγκρίσεων ή κανονιστικών πράξεων προβλέπονται από την ισχύουσα νομοθεσία για το έργο.

7.1.3. Έχει εκδοθεί χωρίς να εξεταστούν οι τίτλοι ιδιοκτησίας του χώρου υλοποίησης του έργου, καθώς και οι όροι και περιορισμοί δόμησης γηπέδων.

7.1.4. Δεν συνεπάγεται νομιμοποίηση οποιωνδήποτε αυθαίρετων υφιστάμενων κατασκευών, για τις οποίες ισχύουν οι διατάξεις της κείμενης νομοθεσίας.

7.1.5. Όσα από τα ανωτέρω (7.1.1 - 7.1.4) στοιχεία εξετάστηκαν στη ΜΠΕ, έχουν παρατεθεί με ευθύνη του φορέα του έργου.

7.2. Η παρούσα απόφαση ισχύει με την επιφύλαξη ότι δεν αντίκειται σε πολεοδομικές και άλλες ειδικές διατάξεις που κατισχύουν αυτής.

8. Υποχρεώσεις σχετικά με τον έλεγχο τήρησης των περιβαλλοντικών όρων

8.1. Η παρούσα απόφαση, η θεωρημένη ΜΠΕ, καθώς και επόμενοι φάκελοι ανανέωσης, τροποποίησης, τεχνικών περιβαλλοντικών μελετών μαζί με σχετικές αποφάσεις, θα πρέπει να είναι διαθέσιμες στο χώρο του έργου κατά τη φάση υλοποίησής του και στην έδρα του φορέα λειτουργία τους στη συνέχεια. Τα στοιχεία αυτά θα πρέπει να επιδεικνύονται από τον υπόχρεο φορέα σε κάθε αρμόδιο, σύμφωνα με τη νομοθεσία, ελεγκτικό όργανο.

8.2. Ο φορέας υλοποίησης του έργου κατά τη φάση κατασκευής και ο φορέας λειτουργίας στη συνέχεια, θα πρέπει:

8.2.1. Να τηρεί στο εργοτάξιο του έργου ή στην έδρα του στοιχεία, βάσει των οποίων θα αποδεικνύεται η συμμόρφωση με τους περιβαλλοντικούς όρους του έργου (π.χ. τιμολόγια, συμβάσεις, παραστατικά έγγραφα, μητρώα καταγραφής στοιχείων κ.λπ.).

8.2.2. Να επιτρέπει την πρόσβαση στο έργο σε κάθε αρμόδιο ελεγκτικό όργανο και να διευκολύνει την διενέργεια του ελέγχου από αυτό.

8.2.3. Να παρέχει όλα τα απαιτούμενα στοιχεία και πληροφορίες.

8.2.4. Να διευκολύνει τον έλεγχο και να συμμορφώνεται στις συστάσεις – υποδείξεις των αρμόδιων ελεγκτικών οργάνων τήρησης των διατάξεων της περιβαλλοντικής νομοθεσίας.

8.3. Εάν ανακύψουν θέματα κατά την εφαρμογή της παρούσας απόφασης, τα οποία δεν καλύπτονται από τους όρους αυτής, η επίλυση τους πραγματοποιείται βάσει της ισχύουσας νομοθεσίας και όπου αυτό δεν είναι δυνατόν βάσει της θεωρημένης ΜΠΕ του έργου ή και επόμενων φακέλων σχετικών με την περιβαλλοντική του αδειοδότηση.

8.4. Σε περίπτωση πρόκλησης ρύπανσης ή άλλης υποβάθμισης του περιβάλλοντος ή παράβασης των όρων της απόφασης αυτής, επιβάλλονται στους υπεύθυνους του έργου οι κυρώσεις που προβλέπονται από τις διατάξεις των άρθρων 28, 29 και 30 του ν. 1650/1986, όπως τροποποιήθηκαν και ισχύουν.

9. Δημοσιοποίηση

Η επιβαλλόμενη από το νόμο δημοσίευση της παρούσας απόφασης πραγματοποιείται με την ανάρτησή της στον ειδικό δικτυακό τόπο, στη δικτυακή διεύθυνση aepo.ypeka.gr, όπως προβλέπεται στο άρθρο 19α του ν. 4014/11 και στην κ.υ.α. υπ' αρ. 21398/2.5.2012 (Β΄ 1470).

10. Νομικές δυνατότητες προσφυγής κατά της παρούσας απόφασης

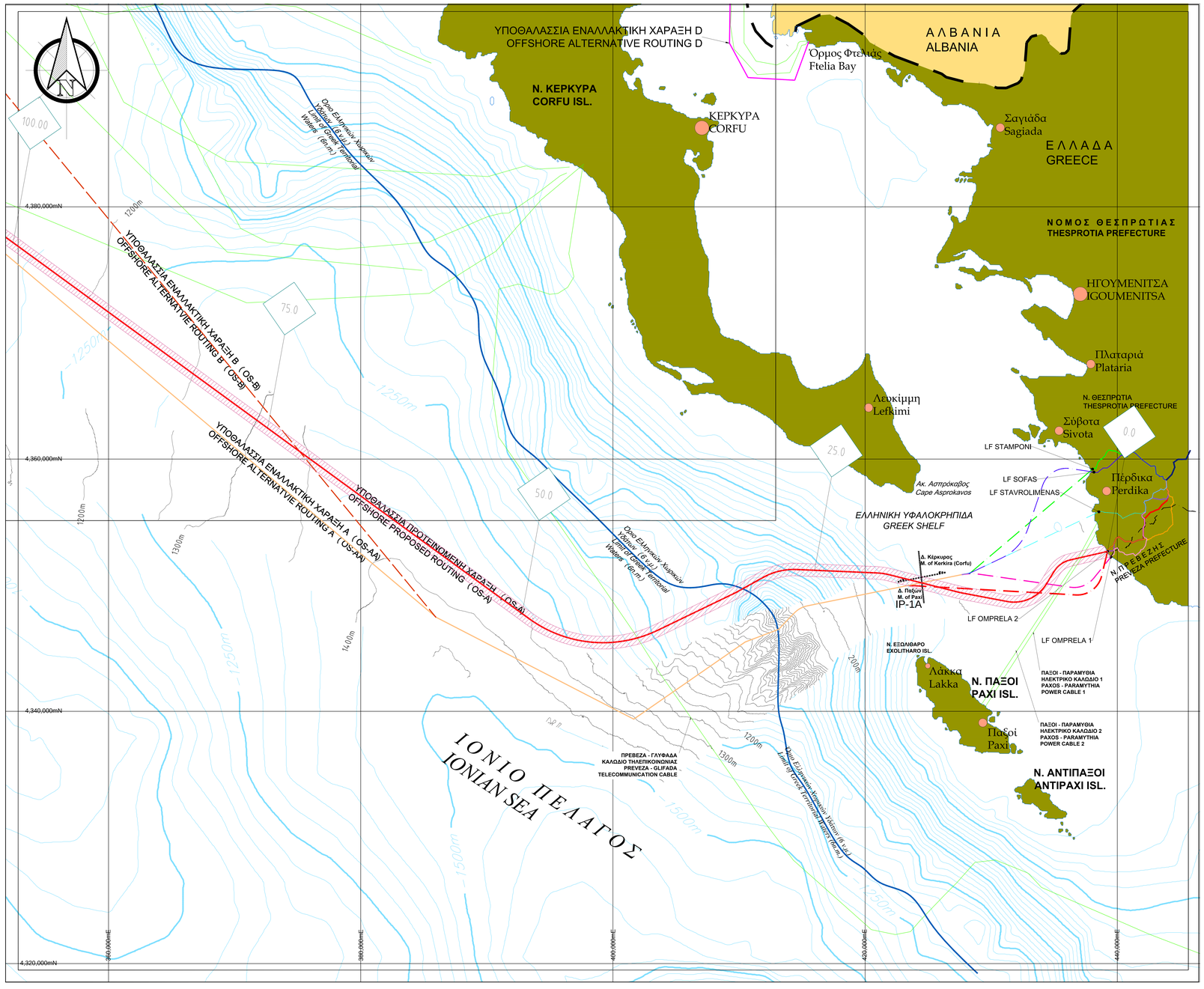
Κατά της απόφασης αυτής χωρεί αίτηση ακύρωσης ενώπιον του Συμβουλίου της Επικρατείας, εντός των πάγιων προθεσμιών που τίθενται από τις εκάστοτε ισχύουσες διατάξεις.

Ο ΥΠΟΥΡΓΟΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ
ΙΩΑΝΝΗΣ ΜΑΝΙΑΤΗΣ

ΕΣΩΤ. ΔΙΑΝΟΜΗ

1. ΔΙΠΑ
2. Χρον. Αρχείο
3. Τμήμα Β’
4. Κ. Γιαβής
5. Β. Πάτση
6. Γ. Μουζάκης

ΑΝΑΡΤΗΤΕΑ ΠΡΑΞΗ



ΣΤΟΙΧΕΙΑ ΧΑΡΑΞΕΩΝ/ ROUTES' DATA

ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ Α (OS-A) (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ OLF)
OFFSHORE PROPOSED ROUTING (OS-A) (FROM OMPRELA2 TO OLF)

	WGS84 - UTM Zone 34N		Local Geodetic System Greece		WGS84	
Location	Easting (m)	Northing (m)	Easting (m)	Northing (m)	φ	λ
OM2	438206	4352659	180414	4358694	39°19'17"	20°17'41"
IP-1a	435400	4351800	176578	4357952	39°18'47"	20°15'2"
IP-1b	433270	4348310	174330	4354530	39°16'54"	20°13'35"
IP-1c	427500	4349400	168592	4355813	39°17'27"	20°9'33"
IP-1d	421406	4350938	162545	4357554	39°18'15"	20°5'18"
IP-2a	413104	4351291	154248	4358184	39°18'24"	19°59'32"
IP-2b	409689	4349395	150767	4356400	39°17'21"	19°57'10"
IP-3	398110	4343811	138992	4351195	39°14'15"	19°49'10"
IP-4	348192	4380175	90232	4389263	39°33'28"	19°13'59"
IP-5a	319867	4403220	62643	4413288	39°45'36"	18°53'50"
IP-5b	316322	4405903	59183	4416094	39°46'60"	18°51'18"
IP-5c	313589	4407595	56503	4417881	39°47'52"	18°49'22"
IP-5d	310520	4409817	53505	4420209	39°49'2"	18°47'10"
IP-5e	308421	4411897	51473	4422363	39°50'8"	18°45'40"
IP-5f	305461	4413467	48561	4424035	39°50'56"	18°43'34"
IP-6	298974	4418400	42231	4429194	39°53'31"	18°38'56"
IP-6a	298033	4422841	41438	4433674	39°55'54"	18°38'11"
IP-6b	297321	4426685	40855	4437548	39°57'58"	18°37'37"
IP-7	294414	4440408	38408	4451390	40°5'20"	18°35'19"
IP-8	294034	4447101	38254	4458106	40°8'56"	18°34'55"
IP-9	288624	4449559	32919	4460751	40°10'11"	18°31'4"
OLF	287153	4446993	31359	4458231	40°8'47"	18°30'5"

ALT1 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΟΜΠΡΕΛΑ 2 ΣΕ IP-1A)
ALT1 - OFFSHORE ALTERNATIVE ROUTING (FROM OMPRELA2 TO IP-1A)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗΧ (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
OLF-2	4,358,706m	180,415m	4,352,680m	439,206m	39° 19' 17" N	20° 17' 41" E
IP-B1	4,355,174m	179,462m	4,349,123m	438,371m	39° 17' 21" N	20° 17' 07" E
IP-1A	4,356,528m	164,535m	4,349,980m	423,427m	39° 17' 45" N	20° 06' 43" E

ALT3 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΜΠΟΝΙ ΣΕ IP-1)
ALT3 - OFFSHORE ALTERNATIVE ROUTING (FROM STAMPONI TO IP-1)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗΧ (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
PLF-2	4,365,262m	179,447m	4,359,192m	438,022m	39° 22' 48" N	20° 16' 49" E
IP-1	4,357,351m	169,466m	4,350,964m	428,321m	39° 18' 18" N	20° 10' 07" E

ALT4 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΟΦΑ ΣΕ IP-C2)
ALT4 - OFFSHORE ALTERNATIVE ROUTING (FROM SOFA TO IP-C2)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗΧ (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
PLF-1	4,365,013m	179,559m	4,358,948m	438,142m	39° 22' 40" N	20° 16' 55" E
IP-C1	4,365,672m	176,027m	4,359,488m	434,594m	39° 22' 57" N	20° 14' 26" E
IP-C2	4,359,119m	173,552m	4,352,865m	432,34m	39° 19' 21" N	20° 12' 54" E

ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ ALT5 (ΑΠΟ ΟΜΠΡΕΛΑ1 ΣΕ IP-1)
OFFSHORE ALTERNATIVE ROUTING ALT5 (FROM OMPRELA1 TO IP-1)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗΧ (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
OLF-1	4,358,250m	180,672m	4,352,233m	439,477m	39° 19' 03" N	20° 17' 52" E
IP-A1	4,355,753m	178,508m	4,349,669m	437,400m	39° 17' 39" N	20° 16' 27" E
IP-1	4,357,351m	169,466m	4,350,964m	428,321m	39° 18' 18" N	20° 10' 07" E

ALT7 - ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΑΠΟ ΣΤΑΥΡΟΛΙΜΕΝΑ ΣΕ IP-1)
ALT7 - OFFSHORE ALTERNATIVE ROUTING (FROM STAVROLIMENA TO IP-1)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗΧ (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
SLF	4,361,840m	179,837m	4,355,789m	438,525m	39° 20' 58" N	20° 17' 12" E
IP-1	4,357,351m	169,466m	4,350,964m	428,321m	39° 18' 18" N	20° 10' 07" E

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Α (OS-AA) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΜΗΜΑΤΟΣ ΑΠΟ IP-1 ΣΕ ΟΤΡΑΝΤΟ, ΝΟΤΙΑ ΠΕΡΙΟΧΗΣ ΕΚΡΗΚΤΙΚΩΝ)
ALTERNATIVE ROUTING A (OS-AA)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
IP-1	4,357,351m	169,466m	4,350,964m	428,321m	39° 18' 18" N	20° 10' 07" E
IP-2	4,355,060m	155,793m	4,348,275m	414,750m	39° 16' 45" N	20° 00' 42" E
IP-3	4,353,387m	154,134m	4,346,500m	413,150m	39° 15' 49" N	19° 59' 36" E
IP-4	4,392,474m	151,449m	4,345,500m	410,500m	39° 15' 15" N	19° 57' 46" E
IP-5	4,346,643m	142,388m	4,339,380m	401,650m	39° 11' 53" N	19° 51' 40" E
IP-6	4,355,253m	126,963m	4,347,462m	385,972m	39° 16' 08" N	19° 41' 41" E
IP-IP7	4,429,479m	44,716m	4,418,760m	307,443m	39° 53' 44" N	18° 40' 39" E
IP-IP8	4,452,459m	38,198m	4,441,467m	294,169m	40° 05' 54" N	18° 35' 07" E
IP-11	4,457,231m	38,360m	4,446,232m	294,169m	40° 08' 28" N	18° 35' 02" E
IP-12	4,462,195m	31,959m	4,450,906m	287,620m	40° 10' 54" N	18° 30' 20" E
OLF-1	4,458,231m	31,359m	4,446,993m	287,153m	40° 08' 47" N	18° 30' 05" E

ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ Β (OS-B) (ΥΠΟΘΑΛΑΣΣΙΟΥ ΤΜΗΜΑΤΟΣ ΑΠΟ IP-6 ΣΕ IP-10, ΒΟΡΕΙΑ ΠΕΡΙΟΧΗ ΕΚΡΗΚΤΙΚΩΝ)
ALTERNATIVE ROUTING B (OS-B)

	ΕΓΣΑ '87		WGS '84 / UTM - ZONE 34		WGS '84	
ΣΗΜΕΙΟ	ΣΥΝ/ΝΗ Y (Ν)	ΣΥΝ/ΝΗ X (Ε)	ΣΥΝ/ΝΗ Y	ΣΥΝ/ΝΗ X	ΓΕΩΓΡ. ΠΛΑΤΟΣ (φ)	ΓΕΩΓΡ. ΜΗΚΟΣ (λ)
IP-6	4,355,253m	126,963m	4,347,462m	385,972m	39° 16' 08" N	19° 41' 41" E
IP-7	4,402,960m	90,345m	4,393,864m	347,847m	39° 40' 51" N	19° 13' 33" E
IP-8	4,432,521m	79,867m	4,422,983m	336,403m	39° 56' 28" N	19° 05' 07" E
IP-9	4,439,168m	46,746m	4,428,499m	303,142m	39° 59' 01" N	18° 41' 40" E
IP-10	4,452,459m	38,198m	4,441,467m	294,169m	40° 05' 54" N	18° 35' 07" E

Παρατήρηση: Ο κάνναβος αναφέρεται στο Σ.Σ. WGS '84/UTM-ZONE 34.

ΚΛΙΜΑΚΑ

ΧΙΛΙΟΜΕΤΡΑ
0 1 5 10
ΚΛΙΜΑΚΑ 1:100.000

ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS

ΑΡ. ΣΧΕΔΙΟΥ / DWG No.	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-14	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN

ΥΠΟΜΝΗΜΑ/ LEGEND

ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ / PROJECT COMPONENTS

1. ΥΠΟΘΑΛΑΣΣΙΑ ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ/ OFFSHORE PROPOSED ROUTE (OS-A)
2. ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ OFFSHORE ALTERNATIVE ROUTING A (OS-AA)
3. ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ OFFSHORE ALTERNATIVE ROUTING B (OS-B)
4. ΥΠΟΘΑΛΑΣΣΙΑ ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ OFFSHORE ALTERNATIVE ROUTING D
5. ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ PROPOSED ONSHORE ROUTE ALT1a
6. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT1b
7. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT1
8. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT2
9. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT3
10. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT4
11. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT5
12. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT6
13. ΕΝΑΛΛΑΚΤΙΚΗ ΧΕΡΣΑΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE ONSHORE ROUTE ALT7
14. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT1
15. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT3
16. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT4
17. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT5
18. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT7
19. ΣΗΜΕΙΟ ΠΡΟΣΑΓΗΣ/ΑΝΟΔΟΣ/ LANDFALL SITE
20. ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICALLY FEASIBLE ROUTING
21. ΠΕΡΙΟΧΗ ΛΕΠΤΟΜΕΡΟΥΣ ΘΑΛΑΣΣΙΑΣ ΕΡΕΥΝΑΣ/ DETAIL MARINE SURVEY AREA (10km)

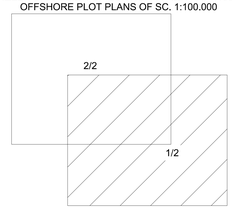
ΔΙΟΙΚΗΤΙΚΑ/ ADMINISTRATIVE

22. ΕΘΝΙΚΑ ΟΡΙΑ/ NATIONAL BORDERS
23. ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΕΝΟΤΗΤΑΣ/ REGIONAL BORDERS
24. ΟΡΙΑ ΔΗΜΩΝ/ MUNICIPALITIES BORDERS
25. ΠΟΛΕΙΣ/ CITIES

ΥΠΟΔΟΜΕΣ και ΛΟΙΠΑ ΣΤΟΙΧΕΙΑ/ INFRASTRUCTURE and OTHER DATA

26. ΥΠΟΘΑΛΑΣΣΙΟ ΚΑΛΩΔΙΟ
27. ΠΙΘΑΝΗ ΠΕΡΙΟΧΗ ΑΠΟΘΕΣΗΣ ΕΚΡΗΚΤΙΚΩΝ (ΠΕΡΙΟΧΗ ΥΨΗΛΗΣ ΑΝΑΚΛΑΣΤΙΚΟΤΗΤΑΣ) POSSIBLE UNEXPLODED ORDNANCE AREA (HIGH REFLECTIVITY AREA)

ΣΥΝΔΕΣΗ ΘΑΛΑΣΣΙΩΝ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΩΝ ΚΛ. 1:100.000
OFFSHORE PLOT PLANS OF SC. 1:100.000



0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	ΣΠΗ	ΟΠΗ	ΕΑΡ	ΓΜΣ
ΑΝΑΘΕΩΡΗ/ΤΡΟΠΟΠΟΙΗΣΗ REVISION	DATE	DESCRIPTION	ΠΡΟΕΤΟΙΜΑΣΘΗ PREPARED	ΕΛΕΓΧΘΗΚΕ CHECKED	ΕΓΚΡΙΘΗΚΕ APPROVED	

ΕΓΚΡΙΝΕΤΑΙ ΓΙΑ ΚΑΤΑΣΚΕΥΗ
APPROVED FOR CONSTRUCTION

ΑΝΑΘΕΩΡΗΣΗ/ REVISION NO.
ΗΜΕΡΟΜΗΝΙΑ/ DATE

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ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ/ PROJECT MANAGER

ΠΕΛΑΤΗΣ–CLIENT: IGI Poseidon — IGI Poseidon s.a.

ΥΠΟΓΡΑΦΗ/ SIGNATURE

ΟΝΟΜΑ/ NAME: PHILIPPOS SPANDIS

ΤΙΤΛΟΣ – TITLE
ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ 'ΠΟΣΕΙΔΩΝ' OFFSHORE NATURAL GAS PIPELINE "POSEIDON"
ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑ ΘΑΛΑΣΣΙΟΥ ΤΜΗΜΑΤΟΣ/ OFFSHORE RECORDING PLAN

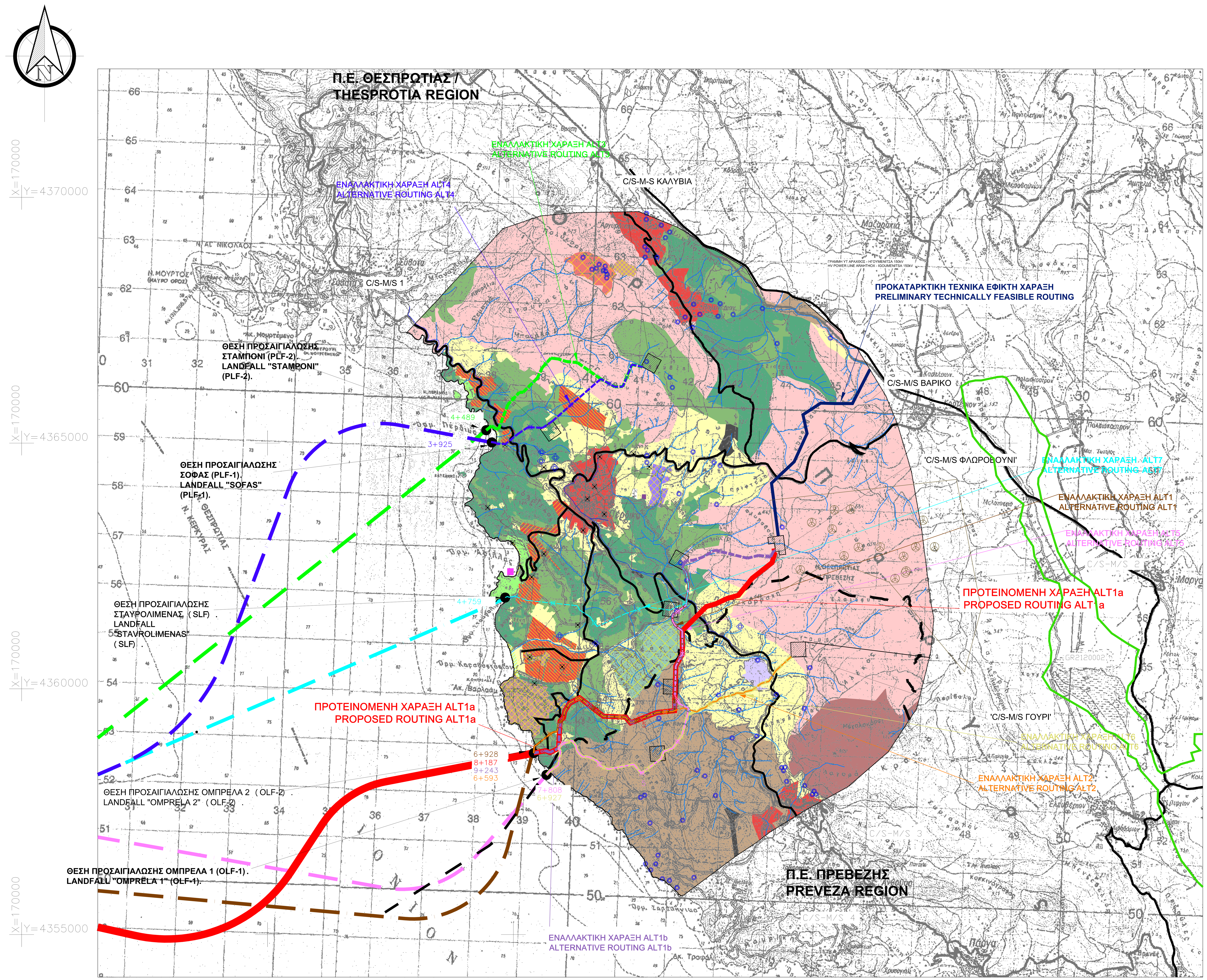
ΑΡ. ΣΥΜΒΟΛΑΙΟΥ/ CONTRACT No: AF-11-7240

ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΕ ΑΠΟ/ SUPERSEDES BY:

ΑΝΤΙΚΑΤΑΣΤΕΘΗ ΤΟ/ SUPERSEDES THIS:

ΚΛΙΜΑΚΑ/ SCALE	ΑΡ. ΣΧ. ΑΡ: AF. DWG No: 7240-AU-OM-02	ΦΥΛΛΟ/ SHEET	ΑΝΑΘΕΩΡΗΣΗ/ REVISION
		1 of 2	0
1:100.000	ΑΡ. ΣΧ. ΠΕΛΑΤΗ CLIENT DWG No:	ΦΥΛΛΟ/ SHEET	ΑΝΑΘΕΩΡΗΣΗ/ REVISION
		of	

Κωδ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ/ ELECTRONIC FILE Code: 7240-AU-OM-02, R0, ED1.dwg
ΤΕΛΕΥΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ/ LAST ACCESS DATE: 15.03.2012



ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS	
ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089–000–00–AU–11	ΧΑΡΤΗΣ ΧΡΗΣΕΩΝ ΓΗΣ/ LAND USES MAP

ΥΠΟΜΝΗΜΑ/LEGEND

ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT DATA

1. ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICALLY FEASIBLE ROUTE
2. ΠΡΟΤΕΙΝΟΜΕΝΗ ΧΑΡΑΞΗ/ PROPOSED ROUTE ALT1a
5. ΠΡΟΤΕΙΝΟΜΕΝΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ PROPOSED OFFSHORE ROUTE
7. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT1b
8. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT1
9. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT2
5. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT1
6. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT3
7. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT3
8. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT4
9. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ / ALTERNATIVE OFFSHORE ROUTE ALT4
10. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT5
11. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT6
12. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT5
13. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTE ALT7
14. ΕΝΑΛΛΑΚΤΙΚΗ ΥΠΟΘΑΛΑΣΣΙΑ ΧΑΡΑΞΗ/ ALTERNATIVE OFFSHORE ROUTE ALT7
15. ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΧΕΡΣΑΙΩΝ ΕΓΚΑΤΑΣΤΑΣΕΩΝ/ ALTERNATIVE ONSHORE FACILITIES SITE
16. ΕΝΑΛΛΑΚΤΙΚΕΣ ΘΕΣΕΙΣ ΠΡΟΣΑΙΓΙΑΛΩΣΗΣ/ ALTERNATIVE LANDFALL SITES
17. ΠΕΡΙΟΧΗ ΜΕΛΕΤΗΣ ΧΕΡΣΑΙΟΥ ΤΜΗΜΑΤΟΣ/ ONSHORE INVESTIGATED AREA

ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΚΑΙ ΠΟΛΙΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ/ ENVIRONMENTAL AND CULTURAL DATA

18. ΠΕΡΙΟΧΕΣ ΔΙΚΤΥΟΥ NATURA/ NATURAL SITES
19. ΚΑΤΑΦΥΓΙΟ ΑΓΡΙΑΣ ΖΩΗΣ/ WILD LIFE RESERVES
20. ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ/ RECREATION PARK
21. ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ/ ARCHAEOLOGICAL SITES

ΥΠΟΔΟΜΕΣ ΚΑΙ ΧΡΗΣΕΙΣ ΓΗΣ / INFRASTRUCTURE AND LAND USES

22. ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΕΝΟΤΗΤΑΣ/ REGIONAL BOUNDARIES
23. ΑΔΕΙΟΔΟΤΗΜΕΝΟ ΑΙΟΛΙΠΟ ΠΑΡΚΟ ΤΗΣ EDF EN A.E./ PROPOSED WINDFARM OF EDF EN S.A.
24. ΚΥΡΙΟ ΟΔΙΚΟ ΔΙΚΤΥΟ/ MAIN ROAD NETWORK
28. ΓΡΑΜΜΗ ΜΕΤΑΦΟΡΑΣ ΗΛ. ΡΕΥΜΑΤΟΣ ΜΕΣΗΣ ΤΑΣΗΣ/ MEDIUM VOLTAGE POWEL LINE
29. ΥΠΟΣΤΑΘΜΟΣ ΜΕΣΗΣ ΤΑΣΗΣ/ MEDIUM VOLTAGE SUBSTATION
30. ΥΔΡΟΓΡΑΦΙΚΟ ΔΙΚΤΥΟ/ WATER BODIES
31. ΑΓΩΓΟΣ ΥΔΡΕΥΣΗΣ/ WATER PIPE
32. ΥΔΡΕΥΤΙΚΗ ΓΕΩΤΡΗΣΗ/ WATER DRILLING
33. ΠΗΓΗ/ SPRING
34. ΒΙΟΜΗΧΑΝΙΚΟ ΠΑΡΚΟ/ INDUSTRIAL PARK
35. ΚΑΤΑΦΥΓΙΟ ΣΚΑΦΩΝ/ YACHT MARINA
36. ΥΦΙΣΤΑΜΕΝΗ ΠΟΛΕΟΔΟΜΙΚΗ ΠΕΡΙΟΧΗ/ EXISTING URBAN AREA
37. ΕΓΚΑΤΑΛΕΛΕΙΜΕΝΗ ΠΟΛΕΟΔΟΜΙΚΗ ΠΕΡΙΟΧΗ/ ABANDONED URBAN AREA
38. ΠΡΟΤΕΙΝΟΜΕΝΗ ΠΕΡΙΟΧΗ Α' ΚΑΤΟΙΚΟΙΑΣ/ PROPOSED AREA FOR A' RESIDENCE
39. ΠΡΟΤΕΙΝΟΜΕΝΗ ΠΕΡΙΟΧΗ Β΄ ΚΑΤΟΙΚΙΑΣ/ PROPOSED AREA FOR B' RESIDENCE
40. ΝΕΚΡΟΤΑΦΕΙΟ
41. ΧΩΜΑΤΕΡΗ/ LANDFILL
42. ΒΙΟΜΗΧΑΝΙΚΗ ΠΕΡΙΟΧΗ/ INDUSTRIAL AREA
43. ΒΙΟΤΕΧΝΙΚΗ ΠΕΡΙΟΧΗ/ MANUFACTURING AREA
44. ΛΑΤΟΜΙΚΗ ΠΕΡΙΟΧΗ/ QUARRY DEVELOPMENT AREA
45. ΤΟΥΡΙΣΤΙΚΗ ΠΕΡΙΟΧΗ/ TOURISM DEVELOPMENT AREA
46. ΚΤΗΝΟΤΡΟΦΙΚΗ ΠΕΡΙΟΧΗ/ STOCK FARMING AREA
47. ΠΕΡΙΟΧΗ ΕΛΑΙΩΝΩΝ ΕΚΤΟΣ ΣΧΕΔΙΟΥ/ AREAS OUTSIDE TOWN PLAN - OLIVE GROVES
48. ΛΟΙΠΕΣ ΠΕΡΙΟΧΕΣ ΕΚΤΟΣ ΣΧΕΔΙΟΥ/ AREAS OUTSIDE TOWN PLAN - OTHER
49. ΟΡΓΑΝΩΜΕΝΗ ΠΑΡΑΛΙΑ/ BEACH WITH AMENITIES
50. ΕΛΕΥΘΕΡΗ ΠΑΡΑΛΙΑ/ BEACH
51. ΤΟΠΙΟ ΙΔΙΑΙΤΕΡΟΥ ΦΥΣΙΚΟΥ ΚΑΛΛΟΥΣ/ SITE OF OUTSTANDING NATURAL BEATY
52. ΔΑΣΟΣ/ FOREST

ΑΝΑΘΕΩΡΗΣΗ REVISION	ΗΜΕΡΟΜΗΝΙΑ DATE	ΠΕΡΙΓΡΑΦΗ DESCRIPTION	ΠΡΟΕΤΟΙΜΑΣΙΑ PREPARED	ΣΧΕΔΙΑΣΗ DRAWN	ΕΛΕΓΧΟΣ CHECKED	ΕΓΚΡΙΣΗ APPROVED
2	28.05.12	ΕΝΣΩΜΑΤΩΣΗ ΣΧΟΛΙΩΝ/ DATA INCORPORATION	DPH	DPH	EAP	PMS
1	30.03.12	ΑΛΛΑΓΗ ΧΙΛΙΟΜΕΤΡΗΣΗΣ/ MILEAGE MODIFICATION	DPH	GLN	EAP	PMS
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS

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ΕΓΚΡΙΘΗΚΕ ΓΙΑ ΚΑΤΑΣΚΕΥΗ APPROVED FOR CONSTRUCTION

ΑΝΑΘΕΩΡΗΣΗ DWG REV. | ΗΜΕΡΟΜ. DATE

ΠΕΛΑΤΗΣ–CLIENT: IGI Poseidon s.a.

ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ PROJECT MANAGER
ΥΠΟΓΡΑΦΗ SIGNATURE ....
ΟΝΟΜΑ NAME PHILIPPOS SPANIDIS

ΤΙΤΛΟΣ – TITLE

ΥΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ 'ΠΟΣΕΙΔΩΝ'
OFFSHORE NATURAL GAS PIPELINE 'POSEIDON'
ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ΧΑΡΤΗΣ ΧΡΗΣΕΩΝ ΓΗΣ/ LAND USES MAP

ΑΡ. ΣΥΜΒΟΛΑΙΟΥ: CONTRACT No: **AF–11–7240**
ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΗ ΑΠΟ: SUPERSEDED BY:
ΑΝΤΙΚΑΘΙΣΤΑ ΤΟ: SUPERSEDES THE:

ΚΛΙΜΑΚΑ SCALE	ΑΡ. ΣΧ. AF: AF. DWG No: 7240–AU–LU–01	ΦΥΛΛΟ SHEET ..1..of..1..	ΑΝΑΘΕΩΡΗΣΗ REVISION 2
1: 30.000	ΑΡ. ΣΧ. ΠΕΛΑΤΗ: CLIENT DWG No:	ΦΥΛΛΟ SHEET ......of......	ΑΝΑΘΕΩΡΗΣΗ REVISION

Κωδ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ ELECTRONIC FILE Code: 7240–AU–LU–01, R2, ED0.dwg
ΤΕΛΕΥΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ LAST ACCESS DATE: 28.05.2012

ΥΠΟΒΑΘΡΟ ΤΟΠΟΓΡΑΦΙΚΩΝ ΔΙΑΓΡΑΜΜΑΤΩΝ Γ.Υ.Σ. 5110/2, 5110/4, 5110/6, 5110/8, 5111/1, 5111/3, 5111/5 ΚΑΙ 5111/7. BACKGROUND OF HMGS PLANS 5110/2, 5110/4, 5110/6, 5110/8, 5111/1, 5111/3, 5111/5 AND 5111/7/

ΕΝΔΕΙΚΤΙΚΟΣ ΠΡΟΣΩΡΙΝΟΣ ΧΩΡΟΣ ΕΡΓΟΤΑΞΙΟΥ. INDICATIVE TEMPORARY CONSTRUCTION SITE

'C/S-M/S ΦΛΩΡΟΒΟΥΝΙ'

ΑΔΕΙΟΔΟΤΗΜΕΝΟ ΑΙΟΠΑ ΤΗΣ EDF EN A.E. PROPOSED WINDFARM OF EDF EN S.A.

C/S-M/S ΒΑΡΙΚΟ

Π.Ε. ΘΕΣΠΡΩΤΙΑΣ. (Δ. ΗΓΟΥΜΕΝΙΤΣΑΣ) THESPROTIA REGION. (M. of IGOUMENITSA)

Π.Ε. ΠΡΕΒΕΖΑΣ. (Δ. ΠΑΡΓΑΣ) PREVEZA REGION. (M. of PARGA)

C/S-M/S 2

ΕΝΔΕΙΚΤΙΚΟΣ ΠΡΟΣΩΡΙΝΟΣ ΧΩΡΟΣ ΕΡΓΟΤΑΞΙΟΥ. INDICATIVE TEMPORARY CONSTRUCTION SITE

ΠΡΟΕΚΤΑΣΗ ΧΕΡΣΑΙΩΝ ΕΝΑΛΛΑΚΤΙΚΩΝ ΧΑΡΑΞΕΩΝ ALT2&6 - ΑΡΜΟΔΙΟΤΗΤΑΣ Δ.Ε.Σ.Φ.Α. EXTENSION OF ONSHORE ALTERNATIVE ROUTES ALT2&6 - DESFA COMPETENCE.

ΣΥΒΟΤΑ-ΠΑΡΓΑ SIVOTA-PARGA

'C/S-M/S ΓΟΥΡΙ'

C/S-M/S 3

5

ΣΧΕΤΙΚΑ ΣΧΕΔΙΑ / REFERENCE DRAWINGS

ΑΡ. ΣΧΕΔΙΟΥ / DWG No	ΤΙΤΛΟΣ / TITLE
8089-000-00-AU-02	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-03	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-04	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-05	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-06	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-07	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-08	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN
8089-000-00-AU-09	ΔΙΑΓΡΑΜΜΑ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑΣ/ RECORDING PLAN

ΥΠΟΜΝΗΜΑ/LEGEND

ΣΤΟΙΧΕΙΑ ΕΡΓΟΥ/ PROJECT DATA

1. ΠΡΟΚΑΤΑΡΚΤΙΚΗ ΤΕΧΝΙΚΑ ΕΦΙΚΤΗ ΧΑΡΑΞΗ/ PRELIMINARY TECHNICAL FEASIBLE ROUTING
2. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ (ΠΡΟΤΕΙΝΟΜΕΝΗ) / ALTERNATIVE ROUTING (PROPOSED) ALT1a
3. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT1b
2. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT1
3. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT2
4. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT3
5. ΕΝΑΛΛΑΚΤΙΚΗ ΧΑΡΑΞΗ/ ALTERNATIVE ROUTING ALT4
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13. ΠΑΡΚΟ ΑΝΑΨΥΧΗΣ
14. ΑΡΧΑΙΟΛΟΓΙΚΟΙ ΧΩΡΟΙ

ΥΠΟΔΟΜΕΣ ΚΑΙ ΔΙΟΙΚΗΤΙΚΑ ΟΡΙΑ/ INFRASTRUCTURE AND ADMINISTRATIVE BOUNDARIES

15. ΟΡΙΑ ΠΕΡΙΦΕΡΕΙΑΚΩΝ ΕΝΟΤΗΤΩΝ/ REGIONAL BOUNDARIES
16. ΟΡΙΑ ΔΗΜΩΝ/ MUNICIPALITIES BOUNDARIES
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16. ΚΥΡΙΟ ΟΔΙΚΟ ΔΙΚΤΥΟ/ MAIN ROAD NETWORK

ΧΡΗΣΕΙΣ ΓΗΣ/ LAND USES

17. ΟΙΚΙΣΤΙΚΗ ΠΕΡΙΟΧΗ/ RESIDENTIAL AREA
18. ΠΕΡΙΟΧΗ Β' ΚΑΤΟΙΚΙΑΣ/ SUMMER HOUSES AREA
19. ΒΙΟΜΗΧΑΝΙΚΟ ΠΑΡΚΟ/ INDUSTRIAL PARK
20. ΛΑΤΟΜΕΙΟ/ QUARRY

ΣΥΝΔΕΣΗ ΧΕΡΣΑΙΩΝ ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΩΝ Κ/Λ. 1:5.000
ONSHORE PLOT PLANS SC. 1:5.000 INDEX

1/5	
2/5	3/5
4/5	5/5

ΑΝΑΘΕΩΡΗΣΗ REVISION	ΗΜΕΡΟΜΗΝΙΑ DATE	ΠΕΡΙΓΡΑΦΗ DESCRIPTION	ΠΡΟΕΤΟΙΜΑΣΙΑ PREPARED	ΣΧΕΔΙΑΣΗ DRAWN	ΕΛΕΓΧΟΣ CHECKED	ΕΓΚΡΙΣΗ APPROVED
2	28.05.12	ΕΝΣΩΜΑΤΩΣΗ ΣΧΟΛΙΩΝ/ COMMENTS INCORPORATION	DPH	DPH	EAP	PMS
1	30.03.12	ΑΛΛΑΓΗ ΧΙΛΙΟΜΕΤΡΗΣΗΣ/ MILEAGE MODIFICATION	DPH	GLN	EAP	PMS
0	15.03.12	ΠΡΩΤΗ ΕΚΔΟΣΗ/FIRST ISSUE	DPH	DPH	EAP	PMS

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ΕΓΚΡΙΘΗΚΕ ΓΙΑ ΚΑΤΑΣΚΕΥΗ
APPROVED FOR CONSTRUCTION
ΑΝΑΘΕΩΡΗΣΗ DWG REV.
ΗΜΕΡΟΜ. DATE

ΔΙΕΥΘΥΝΤΗΣ ΕΡΓΟΥ
PROJECT MANAGER

ΥΠΟΓΡΑΦΗ SIGNATURE .....

ΟΝΟΜΑ NAME PHILIPPOS SPANIDIS

ΠΕΛΑΤΗΣ–CLIENT
IGI Poseidon
IGI Poseidon s.a.

ΤΙΤΛΟΣ – TITLE
ΠΟΘΑΛΑΣΣΙΟΣ ΑΓΩΓΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ "ΠΟΣΕΙΔΩΝ"
OFFSHORE NATURAL GAS PIPELINE "POSEIDON"
ΜΕΛΕΤΗ ΠΕΡΙΒΑΛΛΟΝΤΙΚΩΝ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΠΤΩΣΕΩΝ
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ΟΡΙΖΟΝΤΙΟΓΡΑΦΙΑ ΧΕΡΣΑΙΟΥ ΤΜΗΜΑΤΟΣ/ ONSHORE PLOT PLAN

ΑΡ. ΣΥΜΒΟΛΑΙΟΥ: CONTRACT No: AF-11-7240

ΑΝΤΙΚΑΤΑΣΤΗΘΗΚΕ ΑΠΟ: SUPERSEDED BY:

ΑΝΤΙΚΑΘΙΣΤΑ ΤΟ: SUPERSEDES THE:

ΚΛΙΜΑΚΑ SCALE	ΑΡ. ΣΧ ΑΡ: AF. DWG No: 7240-AU-LU-02	ΦΥΛΛΟ SHEET 3 of 5	ΑΝΑΘΕΩΡΗΣΗ REVISION 2
1:5.000	ΑΡ. ΣΧ ΠΕΛΑΤΗ: CLIENT DWG No:	ΦΥΛΛΟ SHEET ... of ...	ΑΝΑΘΕΩΡΗΣΗ REVISION
Κωδ. ΗΛΕΚΤΡ. ΑΡΧΕΙΟΥ ELECTRONIC FILE Code	7240-AU-LU-02, R2, ED0.dwg	ΤΕΛΕΥΤ. ΗΜΕΡ. ΠΡΟΣΒΑΣΗΣ LAST ACCESS DATE	28.05.2012

11.8 Legislative Framework Modifications

	Ισχύουσες Διατάξεις που αναφέρονται στην ΑΕΠΟ						Τροποποιητικές Διατάξεις					
	Στοιχεία ΦΕΚ						Στοιχεία ΦΕΚ					
Πεδίο Εφαρμογής	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**
Χωροταξικός Σχεδιασμός	03/12/2008	Β	2464	-	49828	Έγκριση ειδικού πλαισίου χωροταξικού σχεδιασμού και αειφόρου ανάπτυξης για τις ανανεώσιμες πηγές ενέργειας και της στρατηγικής μελέτης περιβαλλοντικών επιπτώσεων αυτού.	-	-	-	-	-	-
Χωροταξικός Σχεδιασμός	06/10/2009	Β	1451	-	25301	Έγκριση περιφερειακού πλαισίου Χωροταξικού Σχεδιασμού και Αειφόρου Ανάπτυξης Περιφέρειας Ηπείρου.	-	-	-	-	-	-
Οριακές και κατευθυντήριες τιμές ποιότητας της ατμόσφαιρας	30/03/2011	Β	488	-	14122/549	Μέτρα για τη βελτίωση της ποιότητας της ατμόσφαιρας, σε συμμόρφωση με τις διατάξεις της οδηγίας 2008/50/ΕΚ «για την ποιότητα του ατμοσφαιρικού αέρα και καθαρότερο αέρα για την Ευρώπη» του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της Ευρωπαϊκής ένωσης της 21ης Μαΐου 2008»	-	-	-	-	-	-
Οριακές και κατευθυντήριες τιμές ποιότητας της ατμόσφαιρας	08/06/2007	Β	920		22306/1075/Ε103	Καθορισμός τιμών – στόχων και ορίων εκτίμησης των συγκεντρώσεων του αρσενικού, του καδμίου, του υδραργύρου, του νικελίου και των πολυκυκλικών αρωματικών υδρογονανθράκων στον ατμοσφαιρικό αέρα, σε συμμόρφωση με τις διατάξεις της οδηγίας 2004/107/ΕΚ «Σχετικά με το αρσενικό, το κάδμιο, τον υδράργυρο, το νικέλιο και τους πολυκυκλικούς αρωματικούς υδρογονάνθρακες στον ατμοσφαιρικό αέρα» του Συμβουλίου της 15ης Δεκεμβρίου 2004 των Ευρωπαϊκών Κοινοτήτων»	13/04/2017	Β	1311	-	174505/607	Τροποποίηση των παραρτημάτων IV και V του άρθρου 8 της υπ' αριθμ. 22306/1075/2007 κοινής υπουργικής απόφασης (Β΄920) και των παραρτημάτων Ι, ΙΙΙ, VI και IX του άρθρου 30 της υπ' αριθμ. 14122/549/2011 κοινής υπουργικής απόφασης (Β΄488), σε συμμόρφωση με την οδηγία 2015/1480/ΕΕ «για την τροποποίηση ορισμένων παραρτημάτων των οδηγιών του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου 2004/107/ΕΚ και 2008/50/ΕΚ, οι οποίες ορίζουν τους κανόνες σχετικά με τις μεθόδους αναφοράς, την επικύρωση των δεδομένων και την τοποθεσία των σημείων δειγματοληψίας για την εκτίμηση της ποιότητας του ατμοσφαιρικού αέρα» της Ευρωπαϊκής Επιτροπής
Οριακές και κατευθυντήριες τιμές ποιότητας της ατμόσφαιρας							30/03/2011	Β	488	-	14122/549	Μέτρα για τη βελτίωση της ποιότητας της ατμόσφαιρας, σε συμμόρφωση με τις διατάξεις της οδηγίας 2008/50/ΕΚ «για την ποιότητα του ατμοσφαιρικού αέρα και καθαρότερο αέρα για την Ευρώπη» του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της Ευρωπαϊκής ένωσης της 21ης Μαΐου 2008»
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων	14/03/1997	Β	192	-	5673/400	Μέτρα και όροι για την επεξεργασία αστικών λυμάτων	03/04/2002	Β	405	-	48392/939/2002	Συμπλήρωση της 19661/1982/99 κοινής υπουργικής απόφασης «τροποποίηση της 5673/400/1997 κοινής υπουργικής απόφασης...κ.λπ.» (Β/192) - Κατάλογος ευαίσθητων περιοχών για τη διάθεση αστικών λυμάτων σύμφωνα με το άρθ. 5 (παρ. 1) της απόφασης αυτής (Β/1811) και ειδικότερα του άρθ. 2 (παρ. Β) αυτής
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							29/09/1999	Β	1811	-	19661/1982/1999	Τροποποίηση της 5673/400/1997 κοινής υπουργικής απόφασης «Μέτρα και όροι για την επεξεργασία αστικών λυμάτων» (Β/192) - Κατάλογος ευαίσθητων περιοχών για τη διάθεση αστικών λυμάτων σύμφωνα με το άρθ. 5 (παρ. 1) της απόφασης αυτής
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων	24/02/1965	Β	138		221/65	Περί διαθέσεως λυμάτων και βιομηχανικών αποβλήτων.	07/04/2014	-	-	-	ΔΥΓ2/Γ.Ρ. 22601	Εφαρμογή και ισχύς της Ε1β/221/65 Υγειονομικής Διάταξης «Περί Διάθεσης λυμάτων και βιομηχανικών αποβλήτων» μετά την έκδοση του άρθρου 59 παρ.2 του Ν. 4042/2012
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							03/12/2013	-	-	-	191645/2013	Εγκ. οικ. 191645/2013 - Διευκρινίσεις για τη διάθεση υγρών αποβλήτων σε επιφανειακούς υδάτινους αποδέκτες μετά την έκδοση του Ν. 4042/2012
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							13/02/2012	Α	24	4042	-	Ποινική προστασία του περιβάλλοντος – Εναρμόνιση με την οδηγία 2008/99/ΕΚ – Πλαίσιο παραγωγής και διαχείρισης αποβλήτων – Ρύθμιση θεμάτων Υπουργείου Περιβάλλοντος Ενέργειας και Κλιματικής Αλλαγής
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							21/09/2011	Α	209	4014	-	Περιβαλλοντική αδειοδότηση έργων και δραστηριοτήτων, ρύθμιση αυθαιρέτων σε συνάρτηση με δημιουργία περιβαλλοντικού ισοζυγίου και άλλες διατάξεις αρμοδιότητας Υπουργείου Περιβάλλοντος
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							09/10/2008	Β	2089	-	133551/2008	Υ.Α. Δ.ΥΓ2/Γ.Π.οικ. 133551/2008 - Τροποποίηση της περίπτωσης (γ) της παρ. 1 του άρθρου 8 της υπ αριθμ. Ε1β/221/65 Υγειονομικής διάταξης

	Ισχύουσες Διατάξεις που αναφέρονται στην ΑΕΠΟ						Τροποποιητικές Διατάξεις					
	Στοιχεία ΦΕΚ						Στοιχεία ΦΕΚ					
Πεδίο Εφαρμογής	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							09/08/1974	Β	801	-	1305/1974	Υ.Α. Γ4/1305/1974 - Περί τροποποιήσεως των υπ αριθμ. Ε1β 221/22.1.1965 (ΦΕΚ 138/Β/24.2.1965) και Γ1/17831/7.12.1971 (ΦΕΚ 986/Β/10.12.1971) υγειονομικών διατάξεων, «περί διαθέσεως λυμάτων και βιομηχανικών αποβλήτων
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων							10/12/1971	Β	986	-	17831/1971	Υ.Α. Γ1/17831/1971 - Περί τροποποιήσεως της υπ αριθμ. Ε1β/221/22 Ιαν. 1965 υγειονομικής διάταξης (ΦΕΚ 138/Β/34 Φεβρ. 1965)
Οριακές και κατευθυντήριες τιμές ποιότητας λυμάτων	02/03/2004	Α	64		Π.Δ. 82	Αντικατάσταση της κ.υ.α 98012/2001/96 «καθορισμός μέτρων και όρων για τη διαχείριση των χρησιμοποιημένων ορυκτελαίων» (40/Β) «μέτρα, όροι και πρόγραμμα για την εναλλακτική διαχείριση των Αποβλήτων Λιπαντικών Ελαίων»						
Οριακές και κατευθυντήριες τιμές στάθμης θορύβου και δονήσεων	01/10/2003	Β	1418		37393/2028	Μέτρα και όροι για τις εκπομπές θορύβου στο περιβάλλον από εξοπλισμό προς χρήση σε εξωτερικούς χώρους	02/03/2007	Β	286		9272/471/2007	Τροποποίηση του άρθρου 8 της υπ αριθμ. 37393/2028/2003 κοινής υπουργικής απόφασης (1418/Β), σε συμμόρφωση με τις διατάξεις της οδηγίας 2005/88/ΕΚ «για την τροποποίηση της οδηγίας 2000/14/ΕΚ για την προσέγγιση των νομοθεσιών των κρατών μελών σχετικά με την εκπομπή θορύβου στο περιβάλλον από εξοπλισμό προς χρήση σε εξωτερικούς χώρους», του Συμβουλίου της 14ης Δεκεμβρίου 2005.
Οριακές και κατευθυντήριες τιμές στάθμης θορύβου και δονήσεων	06/10/1981	Α	293		1180/81	Περί ρυθμίσεως θεμάτων αναγομένων εις τα της ιδρύσεως και λειτουργίας βιομηχανιών, βιοτεχνιών πάσης φύσης μηχανολογικών εγκαταστάσεων και αποθηκών και της εκ τούτων διασφαλίσεως περιβάλλοντος εν γένει	25/10/1990	Β	678	-	69269/5387/	Κατάταξη έργων και δραστηριοτήτων σε κατηγορίες, περιεχόμενο Μελέτης Περιβαλλοντικών Επιπτώσεων (ΜΠΕ), καθορισμός περιεχομένου ειδικών περιβαλλοντικών μελετών (ΕΠΜ) και λοιπές συναφείς διατάξεις, σύμφωνα με το ν 1650/86
Οριακές και κατευθυντήριες τιμές στάθμης θορύβου και δονήσεων							16/10/1986	Α	160	1650	-	Για την προστασία του περιβάλλοντος
Προστασία Περιβάλλοντος	16/10/1986	Α	160	1650	-	Για την προστασία του περιβάλλοντος	03/08/2016	Α	142	4411	-	Κύρωση της Σύμβασης του Συμβουλίου της Ευρώπης για το έγκλημα στον Κυβερνοχώρο και του Προσθέτου Πρωτοκόλλου της, σχετικά με την ποινικοποίηση πράξεων ρατσιστικής και ξενοφοβικής φύσης, που διαπράττονται μέσω Συστημάτων Υπολογιστών - Μεταφορά στο ελληνικό δίκαιο της Οδηγίας 2013/40/ΕΕ του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου για τις επιθέσεις κατά συστημάτων πληροφοριών και την αντικατάσταση της απόφασης – πλαισίου 2005/222/ΔΕΥ του Συμβουλίου, ρυθμίσεις σωφρονιστικής και αντεγκληματικής πολιτικής και
Προστασία Περιβάλλοντος							28/07/2016	Α	136	4409	-	Πλαίσιο για την ασφάλεια στις υπεράκτιες εργασίες έρευνας και εκμετάλλευσης υδρογονανθράκων, ενσωμάτωση της Οδηγίας 2013/30/ΕΕ, τροποποίηση του Π.δ. 148/2009 και άλλες διατάξεις
Προστασία Περιβάλλοντος							29/12/2014	Α	269	4315	-	Πράξεις εισφοράς σε γη και σε χρήμα – Ρυμοτομικές απαλλοτριώσεις και άλλες διατάξεις.
Προστασία Περιβάλλοντος							13/02/2012	Α	24	4042	-	Ποινική προστασία του περιβάλλοντος –Εναρμόνιση με την οδηγία 2008/99/ΕΚ – Πλαίσιο παραγωγής και διαχείρισης αποβλήτων – Ρύθμιση θεμάτων Υπουργείου Περιβάλλοντος Ενέργειας και Κλιματικής Αλλαγής.
Προστασία Περιβάλλοντος							21/09/2011	Α	209	4014	-	Περιβαλλοντική αδειοδότηση έργων και δραστηριοτήτων, ρύθμιση αυθαιρέτων σε συνάρτηση με δημιουργία περιβαλλοντικού ισοζυγίου και άλλες διατάξεις αρμοδιότητας Υπουργείου Περιβάλλοντος.
Προστασία Περιβάλλοντος							23/02/2007	Α	42	3536	-	Ειδικές ρυθμίσεις θεμάτων μεταναστευτικής πολιτικής και λοιπών ζητημάτων αρμοδιότητας Υπουργείου Εσωτερικών, Δημόσιας Διοίκησης και Αποκέντρωσης.
Προστασία Περιβάλλοντος							02/07/2003	Α	176	3146	-	Μητρώα Μελετητών, ανάθεση και εκπόνηση μελετών και παροχή συναφών υπηρεσιών και άλλες διατάξεις.
Προστασία Περιβάλλοντος							25/04/2002	Α	91	3010	-	Εναρμόνιση του ν. 1650/86 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ, διαδικασία οριοθέτησης και ρυθμίσεις θεμάτων για τα υδατορέματα και άλλες διατάξεις.

	Ισχύουσες Διατάξεις που αναφέρονται στην ΑΕΠΟ						Τροποποιητικές Διατάξεις					
	Στοιχεία ΦΕΚ						Στοιχεία ΦΕΚ					
Πεδίο Εφαρμογής	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**
Προστασία Περιβάλλοντος							07/10/1999	Α	207	2742	-	Χωροταξικός σχεδιασμός και αειφόρος ανάπτυξη & άλλες διατάξεις.
Περιβαλλοντική Αδειοδότηση	2011-09-21	Α	209	4014		Περιβαλλοντική αδειοδότηση έργων και δραστηριοτήτων, ρύθμιση αυθαιρέτων σε συνάρτηση με δημιουργία περιβαλλοντικού ισοζυγίου και άλλες διατάξεις αρμοδιότητας Υπουργείου Περιβάλλοντος	08/08/2014	Α	160	4281	-	Μέτρα στήριξης και ανάπτυξης της ελληνικής οικονομίας, οργανωτικά θέματα Υπουργείου Οικονομικών και άλλες διατάξεις.
Περιβαλλοντική Αδειοδότηση							18/04/2013	Α	90	4146	-	Διαμόρφωση Φιλικού Αναπτυξιακού Περιβάλλοντος για τις Στρατηγικές και Ιδιωτικές Επενδύσεις και άλλες διατάξεις.
Περιβαλλοντική Αδειοδότηση							25/01/2013	Α	18	4111	-	(…)
Περιβαλλοντική Αδειοδότηση							13/02/2012	Α	24	4042	-	Ποινική προστασία του περιβάλλοντος –Εναρμόνιση με την οδηγία 2008/99/ΕΚ – Πλαίσιο παραγωγής και διαχείρισης αποβλήτων – Ρύθμιση θεμάτων Υπουργείου Περιβάλλοντος Ενέργειας και Κλιματικής Αλλαγής.
Περιβαλλοντική Αδειοδότηση							13/01/2012	Β	21	-	1958	Κατάταξη δημοσίων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες και υποκατηγορίες σύμφωνα με το άρθρο 1§4 του Ν. 4014/21.9.2011 (ΦΕΚ 209/Α/2011).
Περιβαλλοντική Αδειοδότηση							25/11/2011	Α	249	4030	-	Νέος τρόπος έκδοσης αδειών δόμησης, ελέγχου κατασκευών και λοιπές διατάξεις.
Περιβαλλοντική Αδειοδότηση	20/03/2003	Β	332		11014/703/Φ104/ 2003	Διαδικασία Προκαταρκτικής Περιβαλλοντικής Εκτίμησης και Αξιολόγησης (Π.Π.Ε.Α.) και Έγκρισης Περιβαλλοντικών Όρων (Ε.Π.Ο.) σύμφωνα με το άρθρο 4 του Ν. 1650/1986 (Α' 160) όπως αντικαταστάθηκε με το άρθρο 2 του Ν. 3010/2002 'Εναρμόνιση του Ν.1650/1986 με τις οδηγίες 97/11/ΕΕ και 96/61/ΕΕ….και άλλες διατάξεις (Α'91).	-	-	-	-	-	-
Δασική Νομοθεσία	29/12/1979	Α	289	998	-	Περί προστασία των δασών και των δασικών εν γένει εκτάσεων της Χώρας.	πλήθος τροποποιήσεων					
Αρχαιολογική Κληρονομιά	28/06/2002	Α	153	3028	-	Για την προστασία των Αρχαιοτήτων και εν γένει της Πολιτιστικής Κληρονομιάς	20/07/2017	Α	100	4481	-	Συλλογική διαχείριση δικαιωμάτων πνευματικής ιδιοκτησίας και συγγενικών δικαιωμάτων, χορήγηση πολυεδαφικών αδειών για επιγραμμικές χρήσεις μουσικών έργων και άλλα θέματα αρμοδιότητας Υπουργείου Πολιτισμού και Αθλητισμού
Αρχαιολογική Κληρονομιά							09/07/2013	Α	156	4164	-	Συμπλήρωση των διατάξεων περί Εθνικού Κτηματολογίου και άλλες ρυθμίσεις.
Κατασκευή Αγωγών Φυσικού Αερίου	08/02/1995	Α	27	2289	-	Αναζήτηση, έρευνα και εκμετάλλευση υδρογονανθράκων και άλλες διατάξεις	28/07/2016	Α	136	4409	-	Πλαίσιο για την ασφάλεια στις υπεράκτιες εργασίες έρευνας και εκμετάλλευσης υδρογονανθράκων, ενσωμάτωση της Οδηγίας 2013/30/ΕΕ, τροποποίηση του Π.δ. 148/2009 και άλλες διατάξεις.
Εκμετάλλευση Υ/Α							08/08/2011	Α	179	4001	-	Για τη λειτουργία Ενεργειακών Αγορών Ηλεκτρισμού και Φυσικού Αερίου, για Έρευνα, Παραγωγή και δίκτυα μεταφοράς Υδρογονανθράκων και άλλες ρυθμίσεις.
Περιβαλλοντική Αδειοδότηση	13/01/2012	Β	21	-	1958	Κατάταξη δημοσίων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες και υποκατηγορίες σύμφωνα με το άρθρο 1 παράγραφος 4 του Ν. 4014/21.9.2011 (ΦΕΚ 209/Α/2011)	10/08/2016	Β	2471	-	37674	Τροποποίηση και κωδικοποίηση της υπουργικής απόφασης 1958/2012 - Κατάταξη δημοσίων και ιδιωτικών έργων και δραστηριοτήτων σε κατηγορίες και υποκατηγορίες σύμφωνα με το άρθρο 1 παράγραφος 4 του Ν. 4014/21.9.2011 (ΦΕΚ 209/Α/2011) όπως αυτή έχει τροποποιηθεί και ισχύει.
Περιβαλλοντική αδειοδότηση	29/09/2003	Β	1391		37111/2021	Καθορισμός τρόπου ενημέρωσης και συμμετοχής του κοινού κατά τη διαδικασία έγκρισης περιβαλλοντικών όρων των έργων και δραστηριοτήτων σύμφωνα με την παράγραφο 2 του άρθρου 5 του Ν.1650/1986 όπως αντικαταστάθηκε με τις παραγράφους 2 και 3 του άρθρου 3 του Ν.3010/2002.	14/01/2014	Β	45	-	1649/45	Εξειδίκευση των διαδικασιών γνωμοδοτήσεων και τρόπου ενημέρωσης του κοινού και συμμετοχής του ενδιαφερόμενου κοινού στη δημόσια διαβούλευση κατά την περιβαλλοντική αδειοδότηση έργων και δραστηριοτήτων της Κατηγορίας Α΄ της απόφασης του Υπουργού Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής υπ' αριθμ. 1958/2012 (ΦΕΚ 21/Α), σύμφωνα με τα οριζόμενα στο άρθρο 19 παράγραφος 9 του ν. 4014/2011 (ΦΕΚ 209/Α), καθώς και κάθε άλλης σχετικής λεπτομέρειας

	Ισχύουσες Διατάξεις που αναφέρονται στην ΑΕΠΟ						Τροποποιητικές Διατάξεις					
	Στοιχεία ΦΕΚ						Στοιχεία ΦΕΚ					
Πεδίο Εφαρμογής	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**	**Ημερομηνία**	**Τεύχος**	**Αριθμός**	**Νόμος**	**Αριθμός (ΚΥΑ/ ΥΑ/ ΠΔ κλπ)**	**Τίτλος**
Περιβαλλοντική Αδειοδότηση	03/05/2012	Β	1470	-	21398	Ίδρυση και λειτουργία ειδικού δικτυακού τόπου για την ανάρτηση των αποφάσεων έγκρισης περιβαλλοντικών όρων (ΑΕΠΟ), των αποφάσεων ανανέωσης ή τροποποίησης ΑΕΠΟ, σύμφωνα με το άρθρο 19α του Νόμου 4014/2011 (ΦΕΚ 209/Α/2011)	-	-	-	-	-	-
Περιβαλλοντική Αδειοδότηση	09/04/2012	Β	1077	-	15277	Εξειδίκευση διαδικασιών για την ενσωμάτωση στις Αποφάσεις Έγκρισης Περιβαλλοντικών Όρων ή στις Πρότυπες Περιβαλλοντικές Δεσμεύσεις της προβλεπόμενης από τις διατάξεις της Δασικής Νομοθεσίας έγκρισης επέμβασης, για έργα και δραστηριότητες κατηγοριών Α και Β της υπουργικής απόφασης με αριθμ. 1958/2012 (ΦΕΚ 21/Β/13.1.2012), σύμφωνα με το άρθρο 12 του Ν. 4014/2011						
Περιβαλλοντική Αδειοδότηση	5-10-112	Β	2703	-	48963	Προδιαγραφές περιεχομένου Αποφάσεων Έγκρισης Περιβαλλοντικών Όρων (Α.Ε.Π.Ο.) για έργα και δραστηριότητες κατηγορίας Α της υπ αριθμ. 1598/13.1.12 απόφασης του Υπουργού Περιβάλλοντος, Ενέργειας και Κλιματικής Αλλαγής (21/Β), όπως ισχύει σύμφωνα με το άρθρο 2 δ7 του Ν. 4014/11 (209/Α)	09/09/2013	Β	2220	-	191002	Τροποποίηση της υπ' αριθ. 145116/2011 κοινής υπουργικής απόφασης «Καθορισμός μέτρων, όρων και διαδικασιών για την επαναχρησιμοποίηση επεξεργασμένων υγρών αποβλήτων (354/Β) και συναφείς διατάξεις.
Περιβαλλοντική Αδειοδότηση							14/06/2013	Β	1450	-	36060	Καθορισμός πλαισίου κανόνων, μέτρων και διαδικασιών για την ολοκληρωμένη πρόληψη και τον έλεγχο της ρύπανσης του περιβάλλοντος από βιομηχανικές δραστηριότητες, σε συμμόρφωση προς τις διατάξεις της οδηγίας 2010/75/ΕΕ «περί βιομηχανικών εκπομπών (ολοκληρωμένη πρόληψη και έλεγχος της ρύπανσης)» του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της 24ης Νοεμβρίου 2010
Εκμετάλλευση Υ/Α	06/10/2010	Α	177	-	100	Ενεργειακοί επιθεωρητές κτιρίων, λεβήτων και εγκαταστάσεων θέρμανσης και εγκαταστάσεων κλιματισμού	28/07/2016	Α	136	4409	-	Πλαίσιο για την ασφάλεια στις υπεράκτιες εργασίες έρευνας και εκμετάλλευσης υδρογονανθράκων, ενσωμάτωση της Οδηγίας 2013/30/ΕΕ, τροποποίηση του π.δ. 148/2009 και άλλες διατάξεις.

12 SIGNATURE AND APPROVAL

12.1 Reporting Form Y

12.2 Copy of Environmental Consultant Degree

12.3 Formal Declaration