


# TAP

Trans Adriatic Pipeline




## ESIA Albania Document Guide

 	Page 2 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.- Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	<b>AAL00-ERM-641-Y-TAE-1001</b> <b>Rev.: 00</b>					
Document Title: <b>ESIA Albania - Document Guide</b>						

## TABLE OF CONTENTS



1	INTRODUCTION	3
2	DOCUMENT MAP	4
3	ACRONYMS	7
4	GLOSSARY	13
5	REFERENCES	18
5.1	ESIA Section 1	18
5.2	ESIA Section 2	18
5.3	ESIA Section 3	19
5.4	ESIA Section 4	20
5.5	ESIA Section 5	21
5.6	ESIA Section 6	22
5.7	ESIA Section 7	38
5.8	ESIA Section 8	39
5.9	ESIA Annex 11 - HDA Report	39
6	PROJECT ESIA TEAM	42

 	Page 3 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title: <b>ESIA Albania - Document Guide</b>	Rev.: 00					

## 1 INTRODUCTION



This document presents the following ancillary materials to guide and assist in the reading of the Environmental and Social Impact Assessment (ESIA) for the Albanian section of the Trans Adriatic Pipeline (TAP):

- A **document map** providing a visual representation of the ESIA documentation structure (including document references);
- A list of **acronyms** used throughout the ESIA documentation;
- A **glossary** of technical terms used throughout the ESIA documentation;
- A full list of literature, data sources and websites used as **references** or background information during the ESIA process; and
- An **overview of the ESIA team**.

 	Page 4 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title: <b>ESIA Albania - Document Guide</b>	Rev.: 00					

## 2 DOCUMENT MAP



Environmental and Social Impact Assessment	
<b>Section 0</b> Non-Technical Summary - AAL00-ERM-641-Y-TAE-1002	
<b>Section 1</b> Introduction AAL00-ERM-641-Y-TAE-1003	
<b>Section 2</b> Project Justification AAL00-ERM-641-Y-TAE-1004	<b>Annex 1</b> Route Alternatives Appraisal Indicators AAL00-ERM-641-Y-TAE-1004-at01
<b>Section 3</b> Legal Framework AAL00-ERM-641-Y-TAE-1005	<b>Annex 2</b> Albanian National Legislative Framework AAL00-ERM-641-Y-TAE-1005-at02
<b>Section 4</b> Project Description AAL00-ERM-641-Y-TAE-1006	<b>Annex 3</b> Project Description Maps and Figures AAL00-ERM-641-Y-TAE-1006-at01 Annex 3.1 General Overview Route Map AAL00-ERM-641-Y-TAE-1006-at02 Annex 3.2 General Overview Route Map - Albania AAL00-ERM-641-Y-TAE-1006-at03 Annex 3.3 Detailed Route and Logistics Map AAL00-ERM-641-Y-TAE-1006-at04 Annex 3.4 Technical Drawings - Construction Activities AAL00-ERM-641-Y-TAE-1006-at05 Annex 3.5 Technical Drawings - Layouts and Flow Diagrams AAL00-ERM-641-Y-TAE-1006-at06 Annex 3.6 Technical Drawings - Working Strip, Construction Methods and Crossings AAL00-ERM-641-Y-TAE-1006-at07
<b>Section 5</b> Baseline and Impact Assessment Methodology AAL00-ERM-641-Y-TAE-1007	<b>Annex 5</b> Baseline and Impact Assessment Criteria AAL00-ERM-641-Y-TAE-1007-at01

 	Page 5 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title: <b>ESIA Albania - Document Guide</b>	Rev.: 00					

**Section 6** Environmental, Socioeconomic and Cultural Heritage Baseline  
AAL00-ERM-641-Y-TAE-1008

- Annex 4** Baseline Maps and Photographic Reports  
AAL00-ERM-641-Y-TAE-1008-at01
- Annex 4.1 Environmental Field Survey Map  
AAL00-ERM-641-Y-TAE-1008-at02
- Annex 4.2 Environmental Protected and Designated Areas Map  
AAL00-ERM-641-Y-TAE-1008-at03
- Annex 4.3 Areas of Environmental Interest  
AAL00-ERM-641-Y-TAE-1008-at04
- Annex 4.4 Landscape Characterisation Photographic Report  
AAL00-ERM-641-Y-TAE-1008-at05
- Annex 4.5 Socioeconomic Characteristics Maps  
AAL00-ERM-641-Y-TAE-1008-at06
- Annex 4.6 Cultural Heritage Field Survey Map  
AAL00-ERM-641-Y-TAE-1008-at07

- Annex 6** Baseline Data  
AAL00-ERM-641-Y-TAE-1008-at09
- Annex 6.1 Onshore Physical Environment  
AAL00-ERM-641-Y-TAE-1008-at10
- Annex 6.2 Onshore Biological Environment  
AAL00-ERM-641-Y-TAE-1008-at11
- Annex 6.2.1 Terrestrial Ecology  
AAL00-ERM-641-Y-TAE-1008-at12
- Annex 6.2.1.1 List of Terrestrial Flora  
AAL00-ERM-641-Y-TAE-1008-at13
- Annex 6.2.1.2 List of Terrestrial Fauna  
AAL00-ERM-641-Y-TAE-1008-at14
- Annex 6.2.1.3 Medicinal and Aromatic Flora  
AAL00-ERM-641-Y-TAE-1008-at15
- Annex 6.2.1.4 List of Habitats – Flora  
AAL00-ERM-641-Y-TAE-1008-at16
- Annex 6.2.1.5 List of Habitats – Fauna  
AAL00-ERM-641-Y-TAE-1008-at17
- Annex 6.2.1.6 Field Data Sheets Flora  
AAL00-ERM-641-Y-TAE-1008-at18
- Annex 6.2.1.7 Field Data Sheets Fauna  
AAL00-ERM-641-Y-TAE-1008-at19
- Annex 6.2.1.8 Field Data Sheets Large Carnivores  
AAL00-ERM-641-Y-TAE-1008-at20
- Annex 6.2.1.9 Field Data Sheets Forestry  
AAL00-ERM-641-Y-TAE-1008-at21
- Annex 6.2.2 Aquatic Ecology  
AAL00-ERM-641-Y-TAE-1008-at22
- Annex 6.2.3 Protected Areas System in Albania  
AAL00-ERM-641-Y-TAE-1008-at23
- Annex 6.3 Onshore Socioeconomic Environment  
AAL00-ERM-641-Y-TAE-1008-at24
- Annex 6.4 Onshore Cultural Heritage  
AAL00-ERM-641-Y-TAE-1008-at25
- Annex 6.5 Final Report Environmental Survey  
Albanian Landfall  
AAL00-ERM-641-Y-TAE-1008-at26

 	Page 6 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title: <b>ESIA Albania - Document Guide</b>	Rev.: 00					

**Section 7** Stakeholder Engagement  
AAL00-ERM-641-Y-TAE-1009

**Annex 7** Stakeholder Engagement Data  
AAL00-ERM-641-Y-TAE-1009-at01

**Section 8** Assessment of Impacts and Mitigation Measures  
AAL00-ERM-641-Y-TAE-1010



**Annex 8** Impact Assessment Data  
AAL00-ERM-641-Y-TAE-1010-at01  
Annex 8.1 Impact Assessment Data  
AAL00-ERM-641-Y-TAE-1010-at02  
Annex 8.2 ACS02 Noise Study ESIA AL Layout  
AAL00-ERM-641-Y-TAE-1010-at03  
Annex 8.3 ACS03 Noise Study ESIA AL Layout  
AAL00-ERM-641-Y-TAE-1010-at04

**Annex 9** Sediment Dispersion Modelling Report (DHI)  
AAL00-ERM-641-Y-TAE-1010-at05

**Annex 10** HRIA Summary and Main Findings (ERGON)  
AAL00-ERM-641-Y-TAE-1010-at06



**Annex 11** **Habitat Directive Assessment Report**  
Annex 11.1 Environmental Protected and Designated Areas maps  
AAL00-ERM-641-Y-TAE-1010-at08  
Annex 11.2 Environmental Field Survey map  
AAL00-ERM-641-Y-TAE-1010-at09  
Annex 11.3 Survey Data Sheets  
AAL00-ERM-641-Y-TAE-1010-at10  
Annex 11.4 Sensitivity Criteria  
AAL00-ERM-641-Y-TAE-1010-at11

**Section 9** Environmental, Social and Cultural Heritage Management and Monitoring  
AAL00-ERM-641-Y-TAE-1011

 		Page 7 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	<b>AAL00-ERM-641-Y-TAE-1001</b> <b>Rev.: 00</b>					
Document Title:	<b>ESIA Albania - Document Guide</b>						


### 3 ACRONYMS

°C	Degree Celsius
AA	Appropriate Assessment
AC	Alternating Current
ACI	Area of Conservation Interest (CORINE biotope)
ADRIAMED	Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea
AHAP	Area of High Archaeological Potential
AIS	Automatic Identification System
AL	Albania
ALARP	As Low As Reasonably Practicable
ANCI	American National Standards Institute
ANTP	Albanian National Transport Plan
AOX	Absorbable Organic Halogens
ASCI	Areas of Special Conservation Interest (Emerald Site)
ASTER (GDEM)	Advanced Spaceborne Thermal Emission and Reflection Radiometer (Global Digital Elevation Model)
AWP	Albanian Workers' Party
AWTI	Above Water Tie-in
bar	Unit of pressure
barg	Unit of gauge pressure
BAP	Biodiversity Action Plan
BAT	Best Available Technology
BBOP	Business and Biodiversity Offsets Programme
bcm	billion cubic metres
bcm/yr	billion cubic metres per year
BEMIP	Baltic Electricity Market Interconnection Plan
BMP	Biodiversity Management Plan
BOD	Biochemical Oxygen Demand
BREF	BAT reference documents
BS	Base Saturation
BSAP	Biodiversity Strategy, Action Plan and National Report
BVS	Block Valve Stations
C	Carbon
CARDS	Community Assistance to Reconstruction, Development and Stabilisation
Cat	Category
CBD	Convention on Biological Diversity
CD	Conservation Dependant
CEC	Organic Carbon Exchange Capacity
CGPM	Commission Générale des Pêches pour La Méditerranée
CH	Cultural Heritage
CHMP	Cultural Heritage Management Plan
Cl	Chlorine
CITES	Convention on International Trade in Endangered Species of
CLOs	Community Liaison Officers
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
CONCAWE	European Oil Company Organisation for Environment, Health and Safety
CORINE	Coordination of Information on the Environment (European Programme under the European Commission)
CPA	Conservation Priority Areas
CR	Critically Endangered
CRTRA	Council of the Regulation of the Territory of the Republic of Albania
CS	Compressor Stations

 		Page 8 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title:	<b>ESIA Albania - Document Guide</b>	Rev.: 00					

CS02	Compressor Station 02
CS03	Compressor Station 03
CSR	Corporate Social Responsibility
CVD	cardiovascular Diseases
dB	Decibel
dBA	A-Weighted decibel
DC	direct current
DCM	Ministerial Decree
DCVG	Direct Current Voltage Gradient
DD	Data Deficient
DIN	German Institute for Standardization
DIV	Dutch Intervention Value
DO	Dissolved Oxygen
DPA	Democratic Party of Albania
DS	Dutch Standards
DTV	Dutch Target Value
DWD	Drinking Water Directive
EA	Ecosystem Approach
EASEE	European Association for the Streamlining of Energy Exchange
EBE	Extended Basic Engineering
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECNC	European Centre for Nature Conservation
ECoW	Ecological Clerk of Works
EEA	European Environmental Agency
EEC	European Economic Community
EEMUA	Engineering Equipment & Materials Users' Association
EEZ	Exclusive Economic Zone
EGIS	European Gas Pipeline Incident Data Group
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
EN	European Standards
EN	Endangered
ENT	E.ON New Build & Technology GmbH
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
EPT Index	A measure of macro invertebrate richness incorporating the number of species in the sample belonging to the more sensitive orders of Ephemeroptera, Plecoptera, and Trichoptera
ERE	Energy Regulatory Entity
ERM	Environmental Resources Management
ERP	Emergency Response Plan
E&S	Environment and Safety
ESAP	Environmental and Social Action Plan
ESCP	Erosion and Sediments Control Plan
ESD	Emergency Shut Down
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
Espoo Convention	UN Convention on Environmental Impact Assessment in a Transboundary Context
EU	European Union
EU LCPD	European Union Large Combustion Plant Directive
FAO	Food and Agriculture Organisation
F&G	Fire and Gas




 		Page 9 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title:	<b>ESIA Albania - Document Guide</b>	Rev.: 00					

GIS	Geographic Information System
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GPS	Global Positioning System
GR	Greece
GSA	Geographical Sub-Area
GT	Gross Tonnage
ha	hectare
HC	Hydrocarbons
HCl	Hydrochloride
HDA	Habitats Directive Assessment
HDD	Horizontal directional drilling
HIV/AIDS	Human Immunodeficiency Virus Infection / Acquired immunodeficiency Syndrome
H&S	Health and Safety
HPP	Hydropower Project
HR	Human Resources
HRIA	Human Rights Impact Assessment
HSE	Health, Safety & Environment
Hz	Hertz
IBA	Important Bird Area
ICH	Intangible Cultural Heritage
ICSS	Integrated Control and Safety System
ICZM	Integrated Coastal Zone Management
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
IFI	International project Finance Institutions
IHMA	Institute of Hydrometeorology of Albania
ILO	International Labour Organisation
INSTAT	Institute of Statistics Albania
IPA	Important Plant Areas
IPC	Integrated Permit Concept
IPRO	Immovable Property Registration Office
IPPC	Integrated Pollution Prevention and Control
IROPI	Imperative Reasons of Overriding Public Interest
ISO	International Standards Organization
IUCN	International Union for Conservation of Nature
JRC	Joint Research Centre
K	Kelvin
kg	kilogram
km	kilometre
km <sup>2</sup>	square kilometre
km/ha	kilometres per hectare
Kp	Kilometre point of pipeline (aka. 'chainage')
LC	Least Concern
LCA	Landscape Character Area
LCC	Local Control Centres
LCD	Local Content Development
l/d	Litres per day
LDS	Leak Detections System
LEA	Land and Easement Acquisition Strategy
LEL	Lowest Effect Level
L <sub>eq</sub>	Equivalent noise level

 		Page 10 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title:	<b>ESIA Albania - Document Guide</b>	Rev.: 00					



LGU	Local Government Unit
LNG	Liquefied Natural Gas
L <sub>p</sub>	Noise pressure level
LPA	Landscape Protected Areas
LR	Low Risk
LRF	Livelihood Restoration Framework
LRP	Livelihood Restoration Plan
LTC	Long-term contracts
LU&SQ	Land Use and Soil Quality
L <sub>w</sub>	Sound power level
m	metre
m <sup>2</sup>	square metre
m <sup>3</sup>	cubic metre
m <sup>3</sup> /sec	cubic metre per second
MAFCP	Ministry of Agriculture, Food and Consumer Protection of Albania
MAP	Mediterranean Action Plan
max	maximum
masl	metres above sea level
MEET	Methodology for Estimate Air Pollutant Emissions from Transport
METI	Ministry of Economy, Trade, and Industry
MoEFWA	Ministry of Environment Forestry and Water Administration
MFS	Mediterranean Forecasting System
Mg	Magnesium
mg/kg	milligrams per kilogram
mg/l	milligrams per litre
mg/m <sup>3</sup>	milligrams per cubic metre
mg/Nm <sup>3</sup> .	milligrams per normal cubic metre
mg/Sm <sup>3</sup>	milligrams per standard cubic metre
min	minimum
mm	millimetres
MNR	Managed Nature Reserve
MV	Medium Voltage
MW	Megawatt
µg/kg	micrograms per kilogram
µg/m <sup>3</sup>	micrograms per cubic metre
Na	Sodium
n/a	not available
N <sub>2</sub>	Nitrogen
NAE	Albanian National Agency of Energy
NASA	United States National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
Natura 2000	Network of Protected Areas under the European Commission
NATM	New Austrian tunnelling Method
NCA	National Council of Archaeology
NCAR	U.S. National Center for Atmospheric Research
NCD	Non-Communicable Diseases
NCR	National Council of Restoration
NDT	Non-destructive testing
NEA	National Environment Agency
NGO	Non-Governmental Organization
NIVA	Norwegian Environmental Research Institute
NM	Nature Monuments
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen Oxides
NP	National Park
NT	Near Threatened

 		Page 11 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.- Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	<b>AAL00-ERM-641-Y-TAE-1001</b> <b>Rev.: 00</b>					
Document Title:	<b>ESIA Albania - Document Guide</b>						

NTS	Non-Technical Summary
NTU	Turbidity Value
O&G	Oil and Gas
OMEE	Ontario Ministry of Environment and Energy
OOPEC	Office for Official Publications of the European Communities
OSCP	Oil Spill Contingency Plan
P	Phosphorous
PA	Protected Areas
PAH	Polycyclic aromatic hydrocarbons
PAP	Pipeline Abandonment Plan
PCB	Polychlorinated biphenyls
PE	Polyethylene
PEEN	Pan-European Ecological Network
PIMS	Pipeline Integrity Management System
PM	Particulate Matter
PPE	Personal Protection Equipment
PPS	Permanent Pipeline Strip
PR	Performance Requirements
PRG	Preliminary Remediation Goals
PRT	Pipeline Receiving Terminal
PS	Performance Standard
QRA	Quantitative Risk Assessment
QTTB	Soil Department of Agricultural Technology Transfer Centre
Ramsar	Convention on Wetlands, denoting Wetlands of International Importance
ROW	Right of Way
RVX	River Crossing
SAA	Stabilisation and Association Agreement
SBR	Sequence Batch Reactor
SCADA	Supervisory Control and Data Acquisition Systems
SCC	Supervisory Control Centre
SCS	Station Control System
SEI	Social and Environmental Investment
SEL	Severe Effect Level
SEP	Stakeholder Engagement Plan
SIX	Swiss Exchange
SO <sub>2</sub>	Sulphur dioxide
SO <sub>x</sub>	Sulphur oxides
SOPEP	Shipboard Oil Pollution Emergency Plan
SP	Sampling Point
SPA	Socialist Party of Albania
SSC	Suspended Sediment Concentration
STDs	Sexually Transmitted Diseases
t/ton	Tonns
TAP	Trans Adriatic Pipeline
TAP AG	Trans Adriatic Pipeline joint venture company
TB	Tuberculosis
TBM	Tunnel boring machine
TCS	Telecommunication System
TEN-E	European Union's Trans European Energy Network
TIBL	Thermal Internal Boundary Layer
T.L	Transmission Line
TMP	Traffic Management Plan


 	Page 12 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	<b>AAL00-ERM-641-Y-TAE-1001</b> <b>Rev.: 00</b>					
Document Title: <b>ESIA Albania - Document Guide</b>						

ToC	Table of Contents
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TPP	Thermal Power Plant
TSS	Total Suspended Solids
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
UPS	Uninterruptible Power Supply
USA	United States of America
US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Metric
UXO	Unexploded Ordnance
VHR	Very High Resolution
VOC	Volatile Organic Compound
VTC	Terrigenous coastal mud / Coastal Terrigenous Muds bioceonosis
VU	Vulnerable
WBG	World Bank Group
WFC	Water Field Capacity
WFD	Water Framework Directive
WHO	World Health Organization
WMO	World Meteorological Organization
WMP	Waste Management Plan
WP	Waypoint
ZTV	Zone of Theoretical Visibility

 		Page 13 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	Trans Adriatic Pipeline – TAP		AAL00-ERM-641-Y-TAE-1001				
Document Title:	ESIA Albania - Document Guide		Rev.: 00				

#### 4 GLOSSARY

- Aggregate:** Broad category of coarse particulate material used in construction, including sand, gravel, crushed stone, slag, recycled concrete and geosynthetic aggregates. Aggregates are a component of composite materials such as concrete and asphalt concrete; the aggregate serves as reinforcement to add strength to the overall composite material.
- Auger boring:** Auger boring is a technique for forming a horizontal bore hole through the ground, from a drive shaft to a reception shaft, by means of a rotating cutting head. As the bore progresses the ground is cut and the spoil material is transported back to the drive shaft by the rotation of helical-wound auger flights within the steel casing pipe. The common practice is to simultaneously jack the steel casing with the boring operation. If uncased auger boring is permitted, it should be limited to soil conditions with sufficient stand-up time and when short, small diameter bores are used. Auger boring provides a safe method of installing pipes and cable ducts while supporting the ground during the bore.
- Bucket ladder excavators:** A mechanical excavator whose digging mechanism consists of a series of buckets that move in a continuous chain.
- Cleaning pigs:** Pigs are used to perform various maintenance operations on a pipeline such as remove dust or fluids and drying. This can be done without stopping the flow of the product in the pipeline. The pig is inserted into a 'pig launcher' (or 'launching station') - a funnel shaped Y section in the pipeline. The launcher / launching station is then closed and the pressure driven flow of the product in the pipeline is used to push it along down the pipe until it reaches the receiving trap - the 'pig catcher' (or receiving station). There are several types depending on the device built-in to perform the cleaning tasks: Foam or Brush pigs. The pipe cleaning process by means of pigs is usually known as pigging or swabbing.
- Cesspit:** A cesspit, or cesspool is a pit, conservancy tank, or covered cistern, which can be used to dispose of urine and feces, and more generally of all sewage and refuse. Traditionally, it was a deep cylindrical chamber dug into the earth.
- Commissioning Phase:** Is the process of assuring that all systems and components of a building or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client
- De-commissioning Phase:** Is the process of demolition of project structures and building and the reinstatement of the area affected by the project.
- De-watering method with drainage system in pipe trench:** Dewatering is the removal of ground or surface water from a construction site (in this case the trench) to allow construction to be done "in the dry" (as opposed to under wet conditions). Water is usually removed using well points and power driven pumps or, if feasible, by trench drains or siphons which conduct the water to lower ground. A well consists of a pump, hose and a vertical well casing. The pump intake is at the bottom of the well casing. The water is pumped up the hose, out of the well casing, and to a suitable discharge location.
- Flysch:** Thick and extensive deposit largely of sandstone that is formed in a geosyncline. A geosyncline is essentially a large linear deepening basin along a continental margin, which becomes deformed and then uplifted in parts as a mountainous region.
- Gauge plate:** Gauge plate is a special tool of carbon steel, manufactured to exact dimensions, installed in the PIGs to clean and monitoring the internal pipeline.
- Horizontal directional** Directional boring, commonly called horizontal directional drilling or HDD, is a steerable trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface launched drilling rig, with

 		Page 14 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	Trans Adriatic Pipeline – TAP	AAL00-ERM-641-Y-TAE-1001					
Document Title:	ESIA Albania - Document Guide	Rev.: 00					

**drilling (HDD):** minimal impact on the surrounding area's surface. The drilling rig is formed by a continuous string of steel drilling rod. Directional boring is used when trenching or excavating is not practical. It is suitable for a variety of soil conditions for road, landscape and river crossings. Installation lengths up to 6,500' (2,000 m) have been completed, and diameters up to 56" (1,420 mm) have been installed in shorter runs. Pipes can be made of materials such as PVC, polyethylene, polypropylene, ductile iron, and steel if the pipes can be pulled through the drilled hole. Directional boring is not practical if there are voids in the rock or incomplete layers of rock. The best material is solid rock or sedimentary material. Soils with cobble stone are not recommended.

**Hydraulic excavators:** Hydraulic excavators are high-performance excavators especially useful for work areas that are more confined and less amenable to conventional equipment. They are used in applications ranging from the construction of roads and pipelines to mining and the excavation of rocks containing diamonds and gold. All movement and functions of a hydraulic excavator are accomplished through the use of hydraulic fluid (usually oil), with hydraulic cylinders and hydraulic motors (in comparison to cable-operated excavators)

**Hydro-testing:** Hydrotesting (or hydrostatic testing) is the most common method for testing the integrity of the pipeline and checking for any potential leaks (e.g. from faulty welds or cracked pipe work) prior to commissioning. The test involves placing water inside the pipeline at a certain pressure to check that the pipeline is not damaged and will not leak during operation.



**masl:** Metres Above Sea Level, in contrast to m AGL which applies to metres above groundwater level.

**Micro-tunnelling:** Microtunneling is a digging technique used to construct small tunnels by means of a microtunnel boring machine (MTBM) operated remotely. In most microtunneling operations the pipe is inserted from the entry and pushed behind the machine. This is a process often called 'pipe jacking'. As the machine advances, more tunnel liner is pushed from the entrance. Thus, the speed of the advancing machine is controlled by the speed at which the pipe is inserted into the entrance. In order to minimize friction generated around the pipe over-cutting is used to give a slight gap between the inner edge of the tunnel and the outer edge of the liner together with the injection of a drilling fluid, often bentonite slurry.


**Mops:** Mop absorber, a special type of rope which dipped into the contaminated liquid, remove both the liquid and the oil.

**Non-destructive methods (NDT):** Non-destructive testing (NDT) is a wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage to it. NDT does not permanently alter the article being inspected. Common NDT methods include ultrasonic, magnetic particle, liquid penetrant, radiographic, and eddy-current testing.

**Pipeline Inspection Gauge (pig):** Pipeline Inspection Gauge, a piece of equipment that is sent down a pipeline and propelled by the pressure of air or the product in the pipeline itself, used for Internal cleaning of pipelines and monitoring of the condition of pipeline.



 		Page 15 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	Trans Adriatic Pipeline – TAP	AAL00-ERM-641-Y-TAE-1001					
Document Title:	ESIA Albania - Document Guide	Rev.: 00					

<b>Pipeline Protection Strip (PPS):</b>	A permanent <i>Pipeline Protection Strip (PPS)</i> with a width of 8 m will be established (i.e. 4 meters either side of the centreline). Farming of annual crops and associated shallow ploughing down to a maximum depth of 30 cm will be allowed, but cultivation of deep routing system plants such as vineyards, fruit trees, or any other bushes or trees will be restricted. Similarly, no houses and no construction will be allowed. The PPS will also ensure that access is available for inspection of the pipeline and for pipeline maintenance at any time.
<b>Pipestack:</b>	Pipestack is a set of pipes that are piled up or stacked together. A pipestack becomes “one unit” where the round pipes are transformed into one solid block that can be easily picked up and moved with the help of a forklift or other lifting machine, avoiding moving each pipe one by one, improving manoeuvrability and reducing the space needed for storage.
<b>Primary Contractors:</b>	An individual or entity that has a direct contractual relationship with the client or owner of the project. The primary contractor is responsible for providing either by itself or through subcontract arrangements with other individuals or entities, all of the design of services and activities required for the project.
<b>Receiving Facility:</b>	Pipeline Receiving Terminal (PRT), the terminal point of the TAP pipeline and will constitute the connection with the Italian national grid. The main functions of the PRT will be to control the pressure and temperature to meet the grid requirements and measure the flow for fiscal requirements.
<b>Route Refinement:</b>	The process undertaken to narrow down the initial 50 km wide TAP Project corridor to a 2 km wide corridor and define a number of viable alternatives. A number of sites for the pipeline’s supporting facilities were also appraised.
<b>Safety Zone (Inner):</b>	The construction of new third party structures will be restricted to an ‘inner’ safety zone of 40 m (i.e. 20 m from each side of the centreline) along the pipeline route. However, it will be possible to re-build greenhouses or irrigation pump houses in this zone following pipeline construction.
<b>Safety Zone (Enlarged):</b>	The establishment of new cluster of houses and/or industrial infrastructure will be restricted within the ‘enlarged’ safety zone - a corridor of 400 m (i.e. 200 m to both sides of the centreline) (i.e. no facilities >100 people and no dwelling clusters > 300 people). The preferred route was selected considering this constraint, and distance to settlements allows sufficient space also for future developments of communities neighbouring the pipeline.
<b>Scarring and nicking:</b>	Potential damages in the pipeline generated by the friction and abrasion that occurs when the pipe is introduced and advances through a bore drilled in trenchless construction methods. These damages can be avoided by the generation of a small gap between the pipe and the inner edge of the tunnel with the help of the cuttings generated during the drilling process and the injection of a drilling fluid.
<b>Siphon:</b>	A siphon is an asymmetrical tube in an inverted U shape which causes a liquid to flow uphill, above the surface of the reservoir, without pumps, powered by the fall of the liquid as it flows down the tube under the pull of gravity, and is discharged at a level lower than the surface of the reservoir. Liquid is transferred to the lower level, from one vessel to another, by the action of the pressure of the atmosphere in forcing the liquid up the shorter branch of the pipe immersed in it, while the continued excess of weight of the liquid in the longer branch (when once filled) causes a continuous flow. The flow takes place only when the discharging extremity of the pipe is lower than the higher liquid surface, and when no part of the pipe is higher above the surface than the one the same liquid will rise by atmospheric pressure; that is, about 10 m for water near the sea level.
<b>Southern Gas Corridor:</b>	A European Commission initiative to supply natural gas to Europe from the Caspian and Middle Eastern regions.

 		Page 16 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
Document Title:	<b>ESIA Albania - Document Guide</b>	Rev.: 00					

<b>Stacking:</b>	The process of piling up pipes to create a pipestack. The maximum height of the pipestack has to be carefully calculated to avoid damages on pipecoatings due to the weight. Stacking for pipes is commonly used as a logistic strategy when storing large quantities of pipes in order to reduce the space needed and the manoeuvrability of the pipes.
<b>Stringing trucks:</b>	Stringing trucks are steerable pole trailers that enable long loads to be transported (e.g. pipes into storage yards and pipeline right of way). The steerable pole trailers are equipped with large blocks that are adjusted so the pipe is held precisely in place while being transported over uneven terrain. The trailers are engineered so the rear tandem axle steers near the same tracks as the tractor by using cables that alternate from one side of the tractor to the opposite sides of the trailer.
<b>Study Area:</b>	A general 2 km wide corridor (1 km either side of the proposed centreline) along the entire length of the preferred route (also referred to as the 'base case' route).
<b>Supporting Facilities:</b>	Additional infrastructure required to operate the pipeline, including: Compressor Stations to maintain pressure in the pipeline and help the transportation of gas from one location to another; and Block Valve Stations installed approximately every 30 km of the pipeline to enable the interruption of gas flow and isolate specific segments of the line if maintenance is required or in case of an emergency.
<b>Swabbing:</b>	It is the method of cleaning the inside of a pipeline by insertion of bullet shaped poly pigs or swabs into the pipeline system. Hydraulic or pneumatic pressure pushes the pig through the pipeline while it cleans the pipe and removes debris.
<b>TAP AG:</b>	The Albanian section of the Trans Adriatic Pipeline. This will consist of an approximately 209 km onshore section of pipeline, a nearshore section approximately 7 km in length and an offshore section approximately 60 km in length.'
<b>The Trans Adriatic Pipeline (TAP):</b>	A natural gas pipeline that will start in Greece near Thessaloniki, cross Albania and the Adriatic Sea and come ashore in southern Italy, allowing gas to flow directly from the Caspian region to European markets.
<b>The Project</b>	The Albanian section of the Trans Adriatic Pipeline. This will consist of an approximately 209 km onshore section of pipeline, a nearshore section approximately 7 km in length and an offshore section approximately 60 km in length.'
<b>Thermal input:</b>	The rate at which fuel can be burned, at maximum continuous rating, multiplied by the net calorific value of the fuel and expressed as megawatts thermal (MWth).
<b>Thrust-boring:</b>	Thrust boring is a 'jack and bore' drilling method typically used for installing steel pipe casing beneath an existing surface where the risk of hole collapse whilst installing larger diameter pipes has been identified or where the grade is critical. The thrust boring machine is capable of drilling in a variety of ground conditions from sand through to reasonably hard rock. This boring method generally utilises an auger that is placed inside a section of steel pipe. A large rectangular pit is usually dug on each side of the work area to accommodate the steel pipe and machinery used in this procedure. The pipe casing is jacked into place as the drilling is performed with any excess soil transferred out of the pipe by the auger's blades. Thrust boring generally works best in soils that are located above the groundwater table. When groundwater is present during a boring operation, special dewatering measures must be taken to prevent the steel pipe casing from being flooded with water. After finishing installation any remaining space is usually filled with a high flow grout. Once the installed pipe work is connected to existing or new infrastructure both the entry and exit pits can be backfilled.
<b>Waste management hierarchy:</b>	The waste management hierarchy refers to the three (or four) Rs of reduce, reuse, recycle, (and recover) which classify waste management strategies according to their desirability. It has taken many forms over the past decade but the basic concept has remained the cornerstone of most waste minimization strategies. The aim of the waste



 	Page 17 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.- Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001 Rev.: 00					
Document Title: <b>ESIA Albania - Document Guide</b>						

hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

**Weld end valves:**



In this type, the ends of a valve are socketed to receive plain-end pipe. A circumferential weld is made on the outside of the pipe so that 'icicles' and weld spatter are unable to enter the pipeline. Socket-weld ends are used only on steel valves, and as a rule they are limited to sizes of 50 mm and smaller for higher pressure/temperature applications in pipelines not requiring frequent dismantling.

**Weighting:**

Protection system for pipelines designed to provide negative buoyancy and together with the coating, mechanical protection for pipelines in submarine and wet environments. This is achieved by the use of concretes of different weight.

**Working Strip:**

The width of the regular construction *working strip* for the TAP Project is 38 m, and can be reduced to 28 m where physical constraints require. In areas of potential ridge modification the width will be further reduced to a minimum 16 m corridor where physical, environmental, social or cultural heritage constraints require.

 		Page 18 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>		AAL00-ERM-641-Y-TAE-1001				
Document Title:	<b>ESIA Albania - Document Guide</b>		Rev.: 00				



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 		Page 19 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
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 		Page 20 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	Trans Adriatic Pipeline – TAP		AAL00-ERM-641-Y-TAE-1001				
Document Title:	ESIA Albania - Document Guide		Rev.: 00				

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		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
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 		Page 22 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>		AAL00-ERM-641-Y-TAE-1001				
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 		Page 23 of 43					
		Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001 Rev.: 00					
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 		Page 24 of 43					
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 		Page 25 of 43					
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Project Title:	<b>Trans Adriatic Pipeline – TAP</b>	AAL00-ERM-641-Y-TAE-1001					
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 		Page 33 of 43					
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Document Title:	ESIA Albania - Document Guide		Rev.: 00				

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Document Title:	<b>ESIA Albania - Document Guide</b>		Rev.: 00				

## 6 PROJECT ESIA TEAM

The development of this ESIA was led by ERM, on behalf of TAP AG, under direct support from local subcontractors.

ERM's team was led by Alberto Sambartolome (Programme Director and Partner) and Emma Bright (Project Coordinator/Manager), with the support of Cristina Ortuno, Ferran Climent, Lorenzo Danzi and Ben Pizii.

ERM technical leads contributing to the ESIA included:

- Environmental analysis and impact assessment by Duncan Lang and supported by Daniel Alonso and Jorge Sanchez for the physical environment and Fairul Jamal for the biological environment;
- Habitat Directive Assessment by Duncan Lang;
- Noise and Air quality analysis and impact assessment led by Jacopo Signorini and supported by Monica Agostinone and Marilena De Stefano;
- Social analysis and impact assessment lead by Esmeralda Francisco and supported by Natasha Ezekiel;
- Cultural Heritage analysis and impact assessment by Doug Park and Justin Bedard;
- GIS and mapping by Maria del Carmen Pena and Simone Poli;
- Landscape visual assessment and 3D simulation by Eimear O'Connor and supported by Aurora Finiguerra;
- Offshore assessment by Javier Odriozola.

Additional ERM technical leads who provided senior overview included Vicky Copeman for social and Emlen Myers for cultural heritage.

With respect to environmental, socioeconomic and cultural heritage baseline data collection, ERM was assisted by a team of local subcontracted specialists and support services:

### Environmental

- Fauna analysis - Ferdinand Bego supported by Enerit Sacdanaku and Grigor Jorgo;
- Wildlife analysis - Aleksander Trajçe and Blendi Hoxha;
- Botany - Alfred Mullaj supported by Julian Shehaj;
- Forestry analysis and Habitat Directive Assessment - Elvin Toromani supported by Saimir Ozuni;
- Soil, land use and land evaluation - Endrit Kullaj and Sulce Sulejman;
- Aquatic Ecology (macrohytes) - Lefter Kashta;

 	Page 43 of 43					
	Area Code	Comp. Code	System Code	Disc. Code	Doc.- Type	Ser. No.
Project Title: <b>Trans Adriatic Pipeline – TAP</b> Document Title: <b>ESIA Albania - Document Guide</b>	<b>AAL00-ERM-641-Y-TAE-1001</b> <b>Rev.: 00</b>					

- Aquatic Ecology (Benthic macroinvertebrates / Zoobenthos) - Sajmir Beqiraj;
- Water and sediment analysis Lirim Selfo supported by Gjergji Selfo;
- Hydrogeology – Ardian Shehu;
- Fresh water fish - Spase Shumka and supported by Arefi Caka;
- Freshwater Phytobenthos – Skerdilaid Xhulaj;
- Offshore Sediment Dispersion Modelling - DHI Italia;
- Laboratory analysis was conducted by Theolab, University of Tirana, Passam AG and Erinda Baze.

### **Social**

- A&B Business Consulting - Arta Gurabardi supported by Edim Iame and Blendi Ceka;
- M.E.I. - Mimoza Simixhiu;
- Human Rights Impact Assessment – Ergon Associates Ltd.

### **Cultural Heritage**

- Albanian Rescue Archaeology Unit (ARAU) – Iris Pojani and Lorenc Bejko.

### **Other Support**

- Logistical support for all fieldwork was provided by Odisea Travel and Rent a Car;
- Translation support was provided by Local Eyes;
- Editing support was provided by Catherine Borrovich.

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Date 01/2013

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