







Integrated ESIA Greece Annex 1.1 - Route Alternatives Appraisal Indicators

 	Page 2 of 66				
	Area Code	Comp. Code	System Code	Disc. Code	Doc. Type
Project Title: Trans Adriatic Pipeline – TAP Document Title: Integrated ESIA Greece Annex 1.1 - Route Alternatives Appraisal Indicators	GPL00-ASP-642-Y-TAE-0050 Rev.: 01 / at02				

List of Tables



Table 1-1.....Route Selection Indicators	5
Table 1-2.....Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_1S	11
Table 1-3.....Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_2N	20
Table 1-4.....Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_3S	30
Table 1-5.....Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_4S	40
Table 1-6.....Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_5N	49
Table 1-7.....Indicator Matrix for Route Alternatives S0 and N1 (N1 status before the minor reroutings in the PPC and the Larco area)	58

 		Page 3 of 66				
		Area Code	Comp. Code	System Code	Disc. Code	Doc. Type
Project Title:	Trans Adriatic Pipeline – TAP	GPL00-ASP-642-Y-TAE-0050 Rev.: 01 / at02				
Document Title:	Integrated ESIA Greece Annex 1.1 - Route Alternatives Appraisal Indicators					

1 Route Alternatives

The following Tables are presented in this Annex:

- *Table 1-1– Route Selection Indicators* is an example of the ‘impact indicators’ used for each discipline for the route appraisal and selection process in 2009 / 2010. These indicators were used to highlight and appraise the features of the analysed route alternatives that could be related to key potential impacts of a standard gas pipeline project, and also on the specificities of the study area (i.e. based on the findings of the desk study and field survey).
- *Table 1-2 – Indicator Matrix for Kirki Area Route, GRE Base Case, and Route Alternative, and Southern Alternative, GRE Alt_1S*, is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal. The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation.
- *Table 1-3 – Indicator Matrix for Kavala Mountains Area Route, GRE Base Case, and Route Alternative Northern Alternative, GRE Alt_2N*, is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal. The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation.
- *Table 1-4 – Indicator Matrix for Turf Area Route, GRE Base Case, and Route Alternative, Southern GRE Alt_3S*, is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal. The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation.
- *Table 1-5 – Indicator Matrix for Provatas Area Route, GRE Base Case, and Route Alternative Southern Alternative, GRE Alt_4S*, is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal. The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation.
- *Table 1-6 – Indicator Matrix for Kamilokorfes Area Route, GRE Base Case and Route Alternative, Northern Alternative, GRE Alt_5N*, is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal.

 	Page 4 of 66				
	Area Code	Comp. Code	System Code	Disc. Code	Doc. Type
Project Title: Trans Adriatic Pipeline – TAP Document Title: Integrated ESIA Greece Annex 1.1 - Route Alternatives Appraisal Indicators	GPL00-ASP-642-Y-TAE-0050 Rev.: 01 / at02				

The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation.

- *Table 1-7 – Indicator Matrix for Route Alternatives N_1 and S_0* is an example of a matrix developed using the list of indicators presented in *Table 1-1*. The matrix presents environmental, socioeconomic and cultural heritage detail of the alternative routes used in the appraisal. The matrix was developed on the basis of detailed baseline information gathered through further field work, desktop studies and public consultation

Please note that the indicator definitions used to build the comparison matrix were based on the TAP Project assumptions of 2009 / 2010. Some of these definitions have changed over time as the design has evolved. For example, the working strip width was assumed to be 40 m, while the current specification is 38 m. The Pipeline Protection Strip (PPS) was assumed to be 10 m, while it is now known to be 8 m.

For clarity it should be emphasized that a standard working strip of 38 m and a PPS of 8 m is used throughout the ESIA document with the exception of this Annex where for historical reasons 40 m and 10 m have been used for comparative purpose only.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-1 Route Selection Indicators

<i>Indicator</i>	<i>Definition</i>	<i>Relevance to the Appraisal</i>
<i>Technical Indicators</i>		
Length of the pipeline onshore	Length Kipoi to GR/AL border	Construction time and cost related
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	Increased construction effort; cost related
	Highest elevation to be crossed	
Block valves	Number of required block valves	Influence on permanent land use
Number of river crossings	RV - 1: large river / channel > 30m	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related
	RV - 2: river / wide channel > 5m ≤ 30m	
	RV - 3: creek / channel ≤ 5m	
Number of road crossings	RD – 1: highway, national road	Influence on temporary land use close by the crossing and cost related.
	RD – 2: main road	
	RD – 3: secondary road	
	RD – 4: carriage way/ track	
Number of railway crossings	Single / double track	Influence on temporary land use close by the crossing and cost related.
Site accessibility	In general (qualitative description)	Influence on permanent land use and potential for further development of the affected region.
	Upgraded carriage ways/ tracks	
Investment costs	Cost comparison in relation to S ₀	Investment
Soil and rock classification	Cl. I: soil, loose rock or stones	Cost related (excavation possible with excavator)
	Cl. II: weak rock	Cost related (heavy excavation required; ripping)
	Cl. III: hard rock	Cost related (drill and blast)
Expected high groundwater level	Percentage of the entire route length	Cost and additional HSE related (additional technical effort required)
Overall technical route characteristics	Route classification factor	Construction time and cost related
	Route length classified as 'Uncritical'	Routine pipeline construction
	Route length classified as 'Minor'	Minor construction compensation measure required

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Relevance to the Appraisal</i>
	Route length classified as 'Major'	Major influence on construction; cost and additional HSE related
	Route length classified as 'Severe'	Severe influence on construction; cost and additional HSE related
	Route length classified as 'Extreme'	Areas to be avoided by route alignment
Longitudinal slopes	Cl. I: 0 – 8 degree	Cost related (flat terrain)
	Cl. II: 8 – 18 degree	Cost related (hilly; appropriate for trucks)
	Cl. III: > 18 degree	Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)
Transversal slopes	Cl. I: 0 – 7 degree	Cost related (flat terrain)
	Cl. II: 7 – 18 degree	Cost related (moderately inclined; side cuts required)
	Cl. III: > 18 degree	Cost and additional HSE related (steep special construction measure required)
Quaternary faults	Number of potential crossing points	Potential impact on design, construction, availability and costs
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	Cost related (impact on design and construction)
Qualitative risk assessment	Societal risk	Additional risk for population close by the pipeline (Dense populated areas)
	Location class 2 (BS 8010-1)	
<i>Environmental Indicators</i>		
Total length of the Alternative	Total length of each Alternative within the Study Area	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar sites and National Woodland parks (Natura 2000 sites not considered).	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)
Length within Important Bird Areas (IBA)	Total length within important bird areas	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)
Total area of non-urbanised and non-	Total clearance area along the 40 m wide Working Strip	Non-urban and non agricultural areas in general have a higher

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Relevance to the Appraisal
agricultural land crossed (pipeline construction)	classified neither urban nor agricultural by the official Forestry Maps classification	biodiversity and sensitivity to impacts than those less affected by anthropogenic activities
Total area of non-urbanised and non-agricultural land crossed within Pipeline Protection Strip (PPS) ¹ (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	Forested areas (including shrublands) will be permanently cleared during pipeline operation
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>platanus</i> sp species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>platanus</i> sp species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation
Beech dominated forests (<i>Fagus</i> sp) clearance (pipeline construction)	<i>Fagus</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	<i>Fagus</i> sp forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.
Beech dominated forests (<i>Fagus</i> sp) to be cleared within the PPS (pipeline operation)	<i>Fagus</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	<i>Fagus</i> sp forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation
Oak dominated forests (<i>Quercus</i> sp.) clearance (pipeline construction)	<i>Quercus</i> sp. dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	<i>Quercus</i> sp. forests count among the most valuable forest in the region. Its clearance constitutes a long term effect
Oak dominated forests (<i>Quercus</i> sp.) to be cleared within the PPS (pipeline operation)	<i>Quercus</i> sp. dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	<i>Quercus</i> sp. forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation
Chestnut dominated forests (<i>Castanea</i> sp.) clearance (pipeline construction)	<i>Castanea</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	<i>Castanea</i> sp forests are very rare in Greece. Its clearance constitutes a long term effect
Chestnut dominated forests (<i>Castanea</i> sp) to be cleared within the PPS (pipeline operation)	<i>Castanea</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	<i>Castanea</i> sp forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect
Area of coniferous forests ² to be cleared	Total area to be cleared within the Working Strip (40 m width)	Clearance of this natural habitat during construction works will constitute

¹ The Alternatives Appraisal exercise considered that Project operation will require a 10 metre wide permanent corridor is maintained free of deep rooting plants to protect the integrity of the pipeline – the Pipeline Protection Strip (PPS) or Safety Protection Strip (SPS). Since the appraisal was completed the design of the PPS/SPS has been reduced to an 8 metre width.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Relevance to the Appraisal
(pipeline construction)	supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	a long term effect
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats
Area covered by brown bear range ³ crossed (pipeline construction)	Total area within the 2 km corridor suitable for bear habitat identified during field survey and based on brown bear distribution maps ('bear spread')	Brown bears are a protected species and an apex predator and keystone species within Greece which rely on large habitat ranges largely free from human disturbance. Their habitat is sensitive to disturbance and fragmentation
Area covered by brown bear range ⁴ crossed (pipeline construction)	Total area within the 2 km corridor suitable for bear habitat identified during field survey and based on brown bear distribution maps ('bear reappearance areas')	Brown bears are a protected species and an apex predator and keystone species within Greece which rely on large habitat ranges largely free from human disturbance. Their habitat is sensitive to disturbance and fragmentation
Total area of 'wetland' type habitats ⁵ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).
Total number of river crossings ⁶ in rivers of perennial flow	Number of expected river crossings, considering only those rivers with a permanent flow (rivers of ephemeral – rivers of permanent flow).	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40 m wide Working Strip of each Alternative on slopes >33°	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturality should be achieved.

² *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

³ Sites with regular bear appearance.

⁴ Sites recently colonized by bears.

⁵ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

⁶ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS).

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Relevance to the Appraisal
Area of serpentine soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	Serpentine soils comprise spots where several rare or endemic species are found.
Socio-Economic Indicators		
Regional government stakeholders	Total number of regions crossed by each alternative	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.
Local government stakeholders	Total number of communes/municipalities crossed by each alternative	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each alternative.	The number of people living within the corridors in each alternative is relevant in assessing the magnitude of potential impacts on local communities.
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each alternative.	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.
Area of agricultural lands along corridor alternative	Area of the 2 km corridor for each alternative classified as agricultural land.	Agricultural land constitutes one of the main sources of livelihoods for population within the study area.
Area of agricultural lands within working strip	Area of the 40 m working strip for each alternative classified as agricultural land.	Agricultural land constitutes one of the main sources of livelihoods for population within the study area.
Area of grazing lands along corridor	Area of the 2 km corridor for each alternative classified as grazing land.	Grazing is the main livelihood in mountainous communes in the study area.
Area of grazing lands affected during construction works (working strip)	Overall weight of grazing lands along working strip (40 m) (pipeline construction)	Land use potentially disturbed during construction (short term).
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the study area.
Area of active mineral extraction within the 2 km corridor	Area of the 2 km corridor for each alternative classified as having active mineral activities.	Mineral extraction, including queries, represents a significant land use in some areas crossed by the corridors.
Area of active mineral extraction affected during construction works (working strip)	Area of the 40 m working strip classified as having active mineral activities	Mineral extraction, including queries, represents a significant land use in some areas crossed by the corridors.
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each alternative classified as industrial and commercial area by the CORINE Land Cover database	Industrial areas are often the result of strategic investments and key to the economic development of an area.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Relevance to the Appraisal</i>
Area occupied by industrial and commercial units working strip	Area of the 40 m working strip classified as industrial and commercial area by the CORINE Land Cover database	Industrial areas are often the result of strategic investments and key to the economic development of an area.
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each alternative for which the primary source of income is work in mines or quarries (2001 census data)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.
<i>Cultural Heritage Indicators</i>		
Archaeological Site	Number of known or suspected archaeological sites within the corridor	Time (high) and cost related of excavation or avoidance
Monument (old above ground structure)	Number of known monuments with the corridor	Time and cost related of rerouting
Intangible Heritage (ICH)	Heritage site with current, usually, local use	Time (modest) and cost related of consultation and / or rerouting
Archaeological Potential	Potential of corridor to contain undiscovered archaeological sites	Time (high) and cost related of chance finds during construction

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-2 Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_1S

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length (in the pipeline section from Kipoi to the Albanian border)	km	Construction time and cost related	25.4	25.1
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	15.5	8.8
	Highest elevation to be crossed	m a.s.l.		611	573
Block valves	Number of required block values	No.	Influence on permanent land use	1	1
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	0	0
	RV - 2: river / wide channel > 5m ≤ 30m	No.		1	1
	RV - 3: creek / channel ≤ 5m	No.		11	11
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	1	1
	RD – 2: main road	No.		1	1
	RD – 3: secondary road	No.		7	7
	RD – 4: carriage way/ track	No.		8	8
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	2	2
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km			
Investment costs	Cost comparison in relation to S ₀	%	Investment		
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	18	6
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	19	8
	Cl. III: hard rock	%	Cost related (drill and blast)	63	86
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	13	13
Overall technical route characteristics	Route classification factor	-	Construction time and cost related		

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
	Route length classified as ‘Uncritical’	km	Routine pipeline construction	25.4	25.1
	Route length classified as ‘Minor’	km	Minor construction compensation measure required	0	0
	Route length classified as ‘Major’	km	Major influence on construction; cost and additional HSE related	0	0
	Route length classified as ‘Severe’	km	Severe influence on construction; cost and additional HSE related	0	0
	Route length classified as ‘Extreme’	km	Areas to be avoided by route alignment	0	0
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	23.4	24.0
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	2.0	1.0
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	0	0.1
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	24.9	25.1
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	0.5	0
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	0
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	0	0
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		0	0
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	0	0
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)			
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased	25.4	25.1

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	(bigger Project footprint, longer construction time required more access requirements, etc.) IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	20.8	18.8
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	18.1 / 72.4	18.8 / 75.2
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	1.1/ 4.4	0/0
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	70	13.2
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	17.5	3.3
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	58.8	23.6
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	14.7	5.9

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_ 1S
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus</i> sp species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	58.8	24.0
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus</i> sp species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	14.7	6.0
Beech dominated forests (<i>Fagus</i> sp) clearance (pipeline construction)	<i>Fagus</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus</i> sp forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	0	0
Beech dominated forests (<i>Fagus</i> sp) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus</i> sp forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Oak dominated forests (<i>Quercus</i> sp.) clearance (pipeline construction)	<i>Quercus</i> sp. dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus</i> sp. forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	58.8	23.6
Oak dominated forests (<i>Quercus</i> sp.) to be cleared within the PPS (pipeline operation)	<i>Quercus</i> sp. dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus</i> sp. forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	14.7	5.9
Chestnut dominated forests (<i>Castanea</i> sp.) clearance (pipeline construction)	<i>Castanea</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea</i> sp forests are very rare in Greece. Its clearance constitutes a long term effect	0	0
Chestnut dominated forests (<i>Castanea</i> sp) to be cleared within the PPS (pipeline operation)	<i>Castanea</i> sp dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea</i> sp forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_ 1S
Area of coniferous forests / to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	0	0
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	0	0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	5	15.5
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	50.3	40.8
Total area of 'wetland' type habitats ⁸ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	0	0

⁷ *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

⁸ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
Total number of watercourses crossed ⁹ with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	0	0
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturality should be achieved.	0.4	0
Area of unstable soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	Serpentine soils often comprise spots where several rare or endemic species are found.	0	0
<i>Socio-Economic Indicators</i>					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	1	1
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	2	2
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	239	58,051

⁹ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	1	3
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	3,478.0	3,080.0
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	136.2	119.2
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	284	574
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	8	15.5
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	62.7	92.4
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	80	70
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data) .	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	6	12
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_ 1S</i>
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	14	18
<i>Cultural Heritage Indicators</i>					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	5	4
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	3	0
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	14	3
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (ie land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	32	46

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-3 Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_2N

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_2N</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length (in the pipeline section from Kipoi to the Albanian border)	km	Construction time and cost related	10.1	8.6
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	5.5	4.7
	Highest elevation to be crossed	m a.s.l.		557	613
Block valves	Number of required block values	No.	Influence on permanent land use	0	0
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	0	0
	RV - 2: river / wide channel > 5m ≤ 30m	No.		0	0
	RV - 3: creek / channel ≤ 5m	No.		4	4
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	0	0
	RD – 2: main road	No.		0	0
	RD – 3: secondary road	No.		1	3
	RD – 4: carriage way/ track	No.		2	2
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	0	0
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km			
Investment costs	Cost comparison in relation to S ₀	%	Investment		
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	3	0
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	0	0
	Cl. III: hard rock	%	Cost related (drill and blast)	97	100
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	6	4

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_2N</i>	
Overall technical route characteristics	Route classification factor	-	Construction time and cost related			
	Route length classified as 'Uncritical'	km	Routine pipeline construction	10.1	8.6	
	Route length classified as 'Minor'	km	Minor construction compensation measure required	0	0	
	Route length classified as 'Major'	km	Major influence on construction; cost and additional HSE related	0	0	
	Route length classified as 'Severe'	km	Severe influence on construction; cost and additional HSE related	0	0	
	Route length classified as 'Extreme'	km	Areas to be avoided by route alignment	0	0	
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	4.8	4.3	
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	4.7	3.8	
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	0.6	0.5	
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	6.1	6.5	
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	4.0	2.1	
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	0	
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	0	0	
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		0	0	
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	0	0	
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)				

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_2N
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)	10.1	8.6
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	0	0
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	3.8/ 15.2	0.7/ 2.8
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	173.2	26.4
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	43.3	6.6
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	10.0	7.6

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_2N
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	2.5	1.9
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	4.4	7.6
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	1.1	1.9
Beech dominated forests (<i>Fagus sp</i>) clearance (pipeline construction)	<i>Fagus sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus sp</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	0	0
Beech dominated forests (<i>Fagus sp</i>) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus sp</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Oak dominated forests (<i>Quercus sp.</i>) clearance (pipeline construction)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus sp.</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	4.4	7.6
Oak dominated forests (<i>Quercus sp.</i>) to be cleared within the PPS (pipeline operation)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus sp.</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	1.1	1.9
Chestnut dominated forests (<i>Castanea sp.</i>) clearance (pipeline construction)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance constitutes a long term effect	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt. 2N
Chestnut dominated forests (<i>Castanea sp</i>) to be cleared within the PPS (pipeline operation)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0	0
Area of coniferous forests ¹⁰ to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	5.6	0
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	1.4	0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	8.0	8.9
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	4.4	1.2

¹⁰ *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_2N
Total area of 'wetland' type habitats ¹¹ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	0	0
Total number of watercourses crossed ¹² with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	0	0
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturalness should be achieved.	1.1	1.4
Area of unstable soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	Serpentine soils often comprise spots where several rare or endemic species are found.	0	0
Socio-Economic Indicators					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	1	1

¹¹ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

¹² The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_2N</i>
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	1	1
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	194	194
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	1	1
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	405	1,994
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	3.7	1.3
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	336	342
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	6.3	5.6
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt. 2N
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	51.2	0
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	29.5	0
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_2N</i>
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	47	42
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data).	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	28	35
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	0	0
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	25	23
<i>Cultural Heritage Indicators</i>					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	1	2
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt. 2N</i>
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	0	0
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (i.e. land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	62	20

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-4 Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_3S

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_3S</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length (in the pipeline section from Kipoi to the Albanian border)	km	Construction time and cost related	28.6	38.2
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	0	0
	Highest elevation to be crossed	m a.s.l.		123	126
Block valves	Number of required block values	No.	Influence on permanent land use	1	1
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	1	1
	RV - 2: river / wide channel > 5m ≤ 30m	No.		0	0
	RV - 3: creek / channel ≤ 5m	No.		35	41
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	1	1
	RD – 2: main road	No.		1	1
	RD – 3: secondary road	No.		5	8
	RD – 4: carriage way/ track	No.		10	10
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	0	0
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km			
Investment costs	Cost comparison in relation to S ₀	%	Investment		
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	100	94
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	0	0
	Cl. III: hard rock	%	Cost related (drill and blast)	0	6
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	100	100

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_3S</i>
Overall technical route characteristics	Route classification factor	-	Construction time and cost related		
	Route length classified as 'Uncritical'	km	Routine pipeline construction	28.6	32.4
	Route length classified as 'Minor'	km	Minor construction compensation measure required	0	1.1
	Route length classified as 'Major'	km	Major influence on construction; cost and additional HSE related	0	0
	Route length classified as 'Severe'	km	Severe influence on construction; cost and additional HSE related	0	4.7
	Route length classified as 'Extreme'	km	Areas to be avoided by route alignment	0	0
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	28.6	38.0
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	0	0.2
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	0	0
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	28.6	38.2
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	0	0
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	0
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	2	11
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		0	6.4
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	0	0
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)			

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_3S
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)	28.6	38.2
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	0	0
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0.2/ 0.8
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	0.4	0.3
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	0.1	0.1
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	0	1.2

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_3S
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	0	0.3
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	0	1.2
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	0	0.3
Beech dominated forests (<i>Fagus sp</i>) clearance (pipeline construction)	<i>Fagus sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus sp</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	0	0
Beech dominated forests (<i>Fagus sp</i>) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus sp</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Oak dominated forests (<i>Quercus sp.</i>) clearance (pipeline construction)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus sp.</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	0	1.2
Oak dominated forests (<i>Quercus sp.</i>) to be cleared within the PPS (pipeline operation)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus sp.</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0.3
Chestnut dominated forests (<i>Castanea sp.</i>) clearance (pipeline construction)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance constitutes a long term effect	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_3S
Chestnut dominated forests (<i>Castanea sp</i>) to be cleared within the PPS (pipeline operation)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0	0
Area of coniferous forests ¹³ to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	0	0
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	0	0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	0	0
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	114.0	148.4

¹³ *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_3S
Total area of 'wetland' type habitats ¹⁴ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	0	0
Total number of watercourses crossed ¹⁵ with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	0	0
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturalness should be achieved.	0	0
Area of unstable soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	Serpentine soils often comprise spots where several rare or endemic species are found.	114.4	0
Socio-Economic Indicators					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	1	1

¹⁴ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

¹⁵ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_3S
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	2	3
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	1,326	7,142
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	3	6
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	5,743	6,655
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	229.7	144.7
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	36.2	36.2
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	0	0
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_3S</i>
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0.5
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	16.2	25.6
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_3S</i>
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	92	87
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data) .	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable then those who rely solely on the land, but more vulnerable then those with diversified economies	4	6
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable then those with diversified economies	0	0
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	4	7
<i>Cultural Heritage Indicators</i>					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	1	11
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	0	1

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_3S</i>
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	0	0
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (ie land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	23	30

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-5 Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_4S

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_4S</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length (in the pipeline section from Kipoi to the Albanian border)	km	Construction time and cost related	10.1	8.8
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	0	0
	Highest elevation to be crossed	m a.s.l.		105	45
Block valves	Number of required block values	No.	Influence on permanent land use	0	0
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	1	1
	RV - 2: river / wide channel > 5m ≤ 30m	No.		1	1
	RV - 3: creek / channel ≤ 5m	No.		16	12
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	2	0
	RD – 2: main road	No.		1	1
	RD – 3: secondary road	No.		7	5
	RD – 4: carriage way/ track	No.		18	15
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	0	0
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km			
Investment costs	Cost comparison in relation to S ₀	%	Investment		
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	- 0	0
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	100	100
	Cl. III: hard rock	%	Cost related (drill and blast)	0	0
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	100	100

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_4S</i>
Overall technical route characteristics	Route classification factor	-	Construction time and cost related	0	0
	Route length classified as 'Uncritical'	km	Routine pipeline construction	10.1	8.8
	Route length classified as 'Minor'	km	Minor construction compensation measure required	0	0
	Route length classified as 'Major'	km	Major influence on construction; cost and additional HSE related	0	0
	Route length classified as 'Severe'	km	Severe influence on construction; cost and additional HSE related	0	0
	Route length classified as 'Extreme'	km	Areas to be avoided by route alignment	0	0
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	10.1	8.8
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	0	
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	0	
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	10.1	8.8
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	0	0
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	0
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	2	0
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		0.7	0
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	0	0
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)			

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_4S</i>
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)	10.1	8.8
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	0	0
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	0	0
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	0	0
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	0	0
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_4S
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	0	0
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	0	0
Beech dominated forests (<i>Fagus sp</i>) clearance (pipeline construction)	<i>Fagus sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus sp</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	0	0
Beech dominated forests (<i>Fagus sp</i>) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus sp</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Oak dominated forests (<i>Quercus sp.</i>) clearance (pipeline construction)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus sp.</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	0	0
Oak dominated forests (<i>Quercus sp.</i>) to be cleared within the PPS (pipeline operation)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus sp.</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Chestnut dominated forests (<i>Castanea sp.</i>) clearance (pipeline construction)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance constitutes a long term effect	0	0
Chestnut dominated forests (<i>Castanea sp</i>) to be cleared within the PPS (pipeline operation)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_4S
Area of coniferous forests ¹⁶ to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	0	0
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	0	0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	0	0
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	39.8	34.6
Total area of 'wetland' type habitats ¹⁷ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	0.7	0.8
Total number of watercourses crossed ¹⁸ with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	1	1

¹⁶ *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

¹⁷ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

¹⁸ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_4S</i>
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturality should be achieved.	0	0
Area of unstable soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	Serpentine soils often comprise spots where several rare or endemic species are found.	0	0
<i>Socio-Economic Indicators</i>					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	1	1
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	2	2
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	1700	2000
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	2	3
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	2,196.9	1,887.5
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	39.8	34.6
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_4S
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	0	0
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_4S
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	95	95
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data) .	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	0	0
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	0	0
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	5	5
Cultural Heritage Indicators					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	0	0
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	0	0
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_4S</i>
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (ie land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	15	10

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-6 Indicator Matrix for GRE Base Case and Route Alternative GRE Alt_5N

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_5N</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length (in the pipeline section from Kipoi to the Albanian border)	km	Construction time and cost related	30,8	35.9
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	13.1	12.7
	Highest elevation to be crossed	m a.s.l.		665	590
Block valves	Number of required block values	No.	Influence on permanent land use	1	1
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	1	1
	RV - 2: river / wide channel > 5m ≤ 30m	No.		1	0
	RV - 3: creek / channel ≤ 5m	No.		23	36
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	3	1
	RD – 2: main road	No.		7	1
	RD – 3: secondary road	No.		38	5
	RD – 4: carriage way/ track	No.		25	5
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	0	0
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km			
Investment costs	Cost comparison in relation to S ₀	%	Investment		
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	47	60
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	0	0
	Cl. III: hard rock	%	Cost related (drill and blast)	51	40
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	40	56
Overall technical route characteristics	Route classification factor	-	Construction time and cost related		

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_5N</i>
	Route length classified as 'Uncritical'	km	Routine pipeline construction	30,8	35.9
	Route length classified as 'Minor'	km	Minor construction compensation measure required	0	0
	Route length classified as 'Major'	km	Major influence on construction; cost and additional HSE related	0	0
	Route length classified as 'Severe'	km	Severe influence on construction; cost and additional HSE related	0	0
	Route length classified as 'Extreme'	km	Areas to be avoided by route alignment	0	0
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	28.9	35.8
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	1.9	0.1
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	0	0
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	29.3	35.9
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	1.5	0
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	0
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	0	3
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		0	3.3
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	0	0
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)			

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_5N
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)	30.8	35.9
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	0	0
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0 / 0	6.6 / 26.4
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	0	0
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	25.4	45.4
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	6.4	11.4
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	6.2	37.2
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	1.6	9.3

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_5N
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	6.2	37.2
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> , <i>Castanea</i> and <i>Platanus sp</i> species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	1.5	9.3
Beech dominated forests (<i>Fagus sp</i>) clearance (pipeline construction)	<i>Fagus sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus sp</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	0	0
Beech dominated forests (<i>Fagus sp</i>) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus sp</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	0	0
Oak dominated forests (<i>Quercus sp.</i>) clearance (pipeline construction)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus sp.</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	6.2	37.2
Oak dominated forests (<i>Quercus sp.</i>) to be cleared within the PPS (pipeline operation)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus sp.</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	1.6	9.3
Chestnut dominated forests (<i>Castanea sp.</i>) clearance (pipeline construction)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance constitutes a long term effect	0	0
Chestnut dominated forests (<i>Castanea sp</i>) to be cleared within the PPS (pipeline operation)	<i>Castanea sp</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea sp</i> forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_5N
Area of coniferous forests ¹⁹ to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	0	0
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	0	0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	0	0
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	77.8	100.6
Total area of 'wetland' type habitats ²⁰ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	1	0
Total number of watercourses crossed ²¹ with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	1	0

¹⁹ *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

²⁰ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

²¹ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_5N</i>
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturality should be achieved.	0.1	0
Area of unstable soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	Serpentine soils often comprise spots where several rare or endemic species are found.	2	5.2
<i>Socio-Economic Indicators</i>					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	1	1
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	3	2
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	2,900	3,664
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	6	7
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	3,360.0	5,101.3
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	77.8	110
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	21.3	42

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_5N</i>
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	0	0
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	0	0
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity .	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	0	0
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0	0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Indicator	Definition	Units	Relevance to the Appraisal	GRE Base Case	GRE Alt_5N
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	95	90
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data).	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	3	6
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	0	0
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	2	4
Cultural Heritage Indicators					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	2	2
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	0	0
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	0	0

Area Code	Comp. Code	System Code	Disc. Code	Doc.-Type	Ser. No.
-----------	------------	-------------	------------	-----------	----------

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece
 Annex 1.1 - Route Alternatives Appraisal Indicators**

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>GRE Base Case</i>	<i>GRE Alt_5N</i>
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (ie land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	40	41

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

Table 1-7 Indicator Matrix for Route Alternatives S₀ and N₁ (N₁ status before the minor reroutings in the PPC and the Larco area)

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
<i>Technical Indicators</i>					
Length of the pipeline onshore	Length Thessaloniki to GR/ AL border	km	Construction time and cost related	191	202
Pipeline characteristics in mountainous areas	Hilly and mountainous areas	km	Increased construction effort; cost related	44	36
	Highest elevation to be crossed	m a.s.l.		1,300	1,500
Block valves	Number of required block values	No.	Influence on permanent land use	9	10
Number of river crossings	RV - 1: large river / channel > 30m	No.	Increased construction effort depending mainly on the site conditions, geometry of riverbed, geology and discharge of the river section and cost related	14	15
	RV - 2: river / wide channel > 5m ≤ 30m	No.		9	5
	RV - 3: creek / channel ≤ 5m	No.		5	4
Number of road crossings	RD – 1: highway, national road	No.	Influence on temporary land use close by the crossing and cost related.	3	3
	RD – 2: main road	No.		10	14
	RD – 3: secondary road	No.		52	87
	RD – 4: carriage way/ track	No.		2	3
Number of railway crossings	Single / double track	No.	Influence on temporary land use close by the crossing and cost related.	3	3
Site accessibility	In general (qualitative description)	-	Influence on permanent land use and potential for further development of the affected region.	good	good
	Upgraded carriage ways/ tracks	km		30	20
Investment costs	Cost comparison in relation to S ₀	%	Investment	94	100
Soil and rock classification	Cl. I: soil, loose rock or stones	%	Cost related (excavation possible with excavator)	149	176
	Cl. II: weak rock	%	Cost related (heavy excavation required; ripping)	32	23
	Cl. III: hard rock	%	Cost related (drill and blast)	10	3
Expected high groundwater level	Percentage of the entire route length	%	Cost and additional HSE related (additional technical effort required)	64	66
Overall technical route characteristics	Route classification factor	-	Construction time and cost related	1.47	1.54
	Route length classified as 'Uncritical'	km	Routine pipeline construction	127	124
	Route length classified as 'Minor'	km	Minor construction compensation measure required	28	24

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
	Route length classified as 'Major'	km	Major influence on construction; cost and additional HSE related	25	48
	Route length classified as 'Severe'	km	Severe influence on construction; cost and additional HSE related	11	6
	Route length classified as 'Extreme'	km	Areas to be avoided by route alignment	0	0
Longitudinal slopes	Cl. I: 0 – 8 degree		Cost related (flat terrain)	160	181
	Cl. II: 8 – 18 degree		Cost related (hilly; appropriate for trucks)	18	14
	Cl. III: > 18 degree		Cost and additional HSE related (mountainous; accessible for tracked vehicles, rope ways)	13	7
Transversal slopes	Cl. I: 0 – 7 degree		Cost related (flat terrain)	174	185
	Cl. II: 7 – 18 degree		Cost related (moderately inclined; side cuts required)	17	13
	Cl. III: > 18 degree		Cost and additional HSE related (steep special construction measure required)	0	4
Quaternary faults	Number of potential crossing points	No.	Potential impact on design, construction, availability and costs	7	4
	Length of parallelism with fault, where the pipeline runs in close vicinity of the route	km		11	25
Potential liquefaction areas	Length of sections which have might be vulnerable for liquefaction in case of an earthquake	km	Cost related (impact on design and construction)	69	48
Qualitative risk assessment	Societal risk	-	Additional risk for population close by the pipeline (Dense populated areas)	Acceptable	Acceptable
	Location class 2 (BS 8010-1)	km (%)		68 (36)	44 (22)
<i>Environmental Indicators</i>					
Total length of the Alternative	Total length of each Alternative within the Study Area	km	The longer the distance the higher the potential for impacts as the overall magnitude of works is increased (bigger Project footprint, longer construction time required more access requirements, etc.)	191	202

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Length within Important Bird Areas (IBA)	Total length within important bird areas	km	IBAs constitute areas of conservation interest for birds which, in Greece, are considered as a standard requirement within ESIA process	1.5	2.1
Total length and surface clearance (pipeline construction) within Protected Areas (excluding Natura 2000 sites)	Total length and clearance area along the 40 m Working Strip within National Parks, Ramsar Sites and Wildlife Refuges (Natura 2000 sites not considered).	km / ha	Existing protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	11.4 / 45	11.8 / 47
Total length and surface clearance (pipeline construction) within Natura 2000 Network	Total length and clearance area along the 40 m Working Strip within sites of conservation interest under Directive 92/43 EEC	km / ha	EU protected areas by statutory designation affected constitute areas of high environmental interest (ecological, landscape, flora and fauna species, etc.)	1.4 / 5.7	2.0 / 8.2
Total area of non-urbanised and non-agricultural land crossed (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a higher biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	159	188
Total area of non-urbanised and non-agricultural land crossed within PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified neither urban nor agricultural by the official Forestry Maps classification	ha	Non-urban and non agricultural areas in general have a lower biodiversity and sensitivity to impacts than those less affected by anthropogenic activities	39.6	47.0
Total forest clearance (pipeline construction)	Total clearance area along the 40 m wide Working Strip classified as forests by the official Forestry Maps classification	ha	Forest clearance, in opposition to herbaceous and agricultural areas, will be generally a long term effect	70.5	74.0
Total forest clearance within the PPS (pipeline operation)	Total clearance area along the 10 m wide PPS in areas classified as forests by the official Forestry Maps classification	ha	Forested areas (including shrublands) will be permanently cleared during pipeline operation	17.6	18.5
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> and <i>Castanea</i> species to be cleared (pipeline construction)	Total clearance area along the 40 m wide Working Strip within areas classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. These areas to be cleared during construction count among the most valuable habitats in the region and will constitute a long term effect	54.1	34.7

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Total broadleaved forest dominated by <i>Fagus</i> , <i>Quercus</i> and <i>Castanea</i> species to be cleared within the PPS (pipeline operation)	Total surface to be cleared within the 10 m wide PPS classified as broadleaved forest by the official Forestry Maps classification	ha	Broadleaved forests count among the most valuable forest types. Areas within the PPS will be permanently cleared during pipeline operation	13.5	8.7
Beech dominated forests (<i>Fagus sylvatica</i>) clearance (pipeline construction)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Fagus sylvatica</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect.	22.7	2.7
Beech dominated forests (<i>Fagus sylvatica</i>) to be cleared within the PPS (pipeline operation)	<i>Fagus sylvatica</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Fagus sylvatica</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	5.7	0.7
Oak dominated forests (<i>Quercus sp.</i>) clearance (pipeline construction)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Quercus sp.</i> forests count among the most valuable forest in the region. Its clearance constitutes a long term effect	31.3	29.7
Oak dominated forests (<i>Quercus sp.</i>) to be cleared within the PPS (pipeline operation)	<i>Quercus sp.</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Quercus sp.</i> forests count among the most valuable forest type. Clearance within the PPS will be permanent during pipeline operation	7.8	7.4
Chestnut dominated forests (<i>Castanea sativa</i> .) clearance (pipeline construction)	<i>Castanea sativa</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 40 m wide Working Strip	ha	<i>Castanea sativa</i> forests are very rare in Greece. Its clearance constitutes a long term effect	0.0	2.3
Chestnut dominated forests (<i>Castanea sativa</i>) to be cleared within the PPS (pipeline operation)	<i>Castanea sativa</i> dominated areas, according to the official Forestry Maps classification, to be cleared within the 10 m wide PPS	ha	<i>Castanea sativa</i> forests are very rare in Greece. Its clearance within the PPS constitutes a permanent effect	0.0	0.6
Area of coniferous forests ²² to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during construction works will constitute a long term effect	2.4	0

²² *Pinus nigra* and / or *Pinus sylvestris* pure or mixed forest. It does not involve conifer afforestations.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Area of coniferous forests to be cleared within the PPS (pipeline operation)	Total area to be cleared within the PPS (10 m width) supporting coniferous forests (mainly <i>Pinus sp.</i>), according to the official Forestry Maps classification	ha	Clearance of this natural habitat during operation of the pipeline will constitute a permanent effect	0.6	0.0
Area of montane and subalpine grasslands, meadows and pastures to be cleared (pipeline construction)	Total area of grasslands and montane meadows according to the official Forestry Maps classification to be cleared within the Working Strip (40 m width) at an altitude > 800 m a.s.l.	ha	This habitat counts among the most valuable environments in the region as it commonly hosts several endemic or protected species	46	56
Total area of agricultural lands and plantations to be cleared (pipeline construction)	Total area to be cleared within the Working Strip (40 m width) in areas classified as agricultural land (including permanent and yearly crops) in the official Forestry Maps classification	ha	Agricultural land and plantations have a higher degree of anthropogenic disturbance and are less sensitive to impacts than natural habitats	598	605
Area covered by brown bear range ²³ crossed (pipeline construction)	Total area within the 2 km corridor suitable for bear habitat identified during field survey and based on brown bear distribution maps ('bear spread')	ha	Brown bears are a protected species and an apex predator and keystone species within Greece which rely on large habitat ranges largely free from human disturbance. Their habitat is sensitive to disturbance and fragmentation	3,280	1,809
Area covered by brown bear range ²⁴ crossed (pipeline construction)	Total area within the 2 km corridor suitable for bear habitat identified during field survey and based on brown bear distribution maps ('bear reappearance areas')	ha	Brown bears are a protected species and an apex predator and keystone species within Greece which rely on large habitat ranges largely free from human disturbance. Their habitat is sensitive to disturbance and fragmentation	17,146	13,991

²³ Sites with regular bear appearance.

²⁴ Sites recently colonized by bears.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Total area of 'wetland' type habitats ²⁵ (standing water, lagoons, running waters incl. river crossings, saltmarshes...) (pipeline construction)	Area of the Working Strip (40 m width) supporting all wetland habitats including running and standing water.	ha	Lagoons, saltmarshes and river habitats are scarce environmental features which support a range of specialist species, particularly water birds. These areas provide a crucial resource for a range of vertebrate species such as freshwater fishes, amphibians and mammals (some of which, like Otter (<i>Lutra lutra</i>) are protected).	2.3	1.8
Total number of watercourses crossed ²⁶ with perennial flow	Number of expected river crossings, considering only those rivers with a perennial flow (Not including the irrigation channels located east of Potamos River)	Number of crossings	Rivers are habitats sensitive to construction impacts, which also support a range of vulnerable and protected species.	38	21
Area with slope degree <33° (slope lower 2V:3H)	Area of the 40m wide Working Strip of each Alternative on slopes >33°	ha	Areas with slopes < 33° are less susceptible to erosion and likely to be quicker to re-colonise. After restoration and maintenance a high degree of naturalness should be achieved.	760	807
Area of serpentine soils to be cleared (pipeline construction)	Total area within the Working Strip (40 m width) potentially supporting critical areas for endemic plant species identified during field survey and based on geological features.	ha	<i>often comprise spots where several rare or endemic species are found.</i>	11.2	7.7
Socioeconomic Indicators					
Regional government stakeholders	Total number of regions crossed by each Alternative	No. of regions	Regional authorities are key stakeholders in the development of the Project and should play an important enabling role.	2	2
Local government stakeholders	Total number of communes/ municipalities crossed by each Alternative	No. of communes/ municipalities	Commune level stakeholders are also key stakeholders in the development of the Project. For example Heads of Commune are responsible for future land use and planning and development initiatives.	10	9

²⁵ The calculation on the wetlands has to be taken with a precautionary approach as there is a relatively high degree of uncertainty due to the scale of the cartography (GIS layers) and the variable and constantly changing nature of the particular landscape feature. Nevertheless it is presented here as a rough estimate to assess potential differences between corridors.

²⁶ The number of river crossings includes all those rivers and streams that have running water throughout the year. Data on the hydrological status of the rivers are according to the Hellenic Military Geographical Service (HMGS). Water bodies east of Veroia (east of River Potamos) are not taken into account because the vast majority comprises channelized streams and/or irrigation works.

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Population in settlements within the corridor routes.	Total number of residents within the 2 km corridor of each Alternative.	No. of residents.	The number of people living within the corridors in each Alternative is relevant in assessing the magnitude of potential impacts on local communities.	12,253	6,924
Settlements within the corridor routes	Total number of settlements within the 2 km corridor of each Alternative.	No. of settlements	Settlements are key receptors for both positive and negative socioeconomic impacts. It will also be necessary to engage with all settlements along the route.	22	33
Area of agricultural lands along corridor Alternative	Area of the 2 km corridor for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	29,386	29,016
Area of agricultural lands within Working Strip	Area of the 40 m Working Strip for each Alternative classified as agricultural land.	ha	Agricultural land constitutes one of the main sources of livelihoods for population within the Study Area.	650.6	654.2
Area of grazing lands along corridor	Area of the 2 km corridor for each Alternative classified as grazing land.	ha	Grazing is the main livelihood in mountainous communes in the Study Area.	107.2	95.0
Area of grazing lands affected during construction works (Working Strip)	Overall weight of grazing lands along Working Strip (40 m) (pipeline construction)	ha	Landuse potentially disturbed during construction (short term).	4.7	3.5
Area of permanent crops along the 2 km corridor	Area of the 2 km corridor for each Alternative classified as area of cultivation of permanent crops by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	1,317	1,380
Area of permanent crops affected during construction works	Area of the 40 m Working Strip for each Alternative classified as area of permanent crop cultivation of by the CORINE Land Cover database.	ha	Fruit trees, vineyards and olive tree plantations are permanent crops found in the study area that cannot be easily replaced should they be removed. These represent an important source of income for communities in the Study Area.	27.1	24.6
Area of active or planned mineral extraction within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as having active or planned mineral extraction or deposits by PPC.	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	532.0	0.0

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Area of active or planned mineral extraction affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as having active or planned mining activity or deposits by PPC.	ha	Mineral extraction, including lignite extraction, represents a significant land use in some areas crossed by the corridors.	6.2	0.0
PPC concession areas crossed by the corridor	Area of the 2 km corridor for each Alternative classified as PPC concession areas.	ha	Concession areas are not being actively mined but represent a potential conflicting land use along the corridors	5,402	3,652
PPC concession areas affected during construction works (Working Strip)	Area of the 40 m Working Strip classified as PPC concession areas.	ha	Concession areas are not being actively mined but represent a potential conflicting land use along the corridors	108.6	80.3
Area occupied by industrial and commercial units within the 2 km corridor	Area of the 2 km corridor for each Alternative classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0.5	41.2
Area occupied by industrial and commercial units Working Strip	Area of the 40 m Working Strip classified as industrial and commercial area by the CORINE Land Cover database	ha	Industrial areas are often the result of strategic investments and key to the economic development of an area.	0.0	0.0
Settlements reliant on agriculture as their main economic activity	Number of villages within the 2 km corridor for each Alternative that rely on crops, livestock, forestry, or hunting as their main source of livelihoods and income (2001 census data).	Number of settlements (% of total)	Reliance on agricultural production as the main or only source of income evidences high dependence on land in agricultural use as a means for economic development. Any alterations to agricultural land as a result of Project activities might have a high impact on the local economy. Disaggregated data on settlements relying on crop cultivation are not available, but primary data collected in the field suggest that this is the most common activity.	68%	87%
Settlements reliant on industry as their main economic activity	Number of villages within the 2 km corridor for each Alternative whose livelihood and main source of income is a work in industry or manufacturing (2001 census data) .	Number of settlements (% of total)	Reliance on industry suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	29%	8%

Project Title: **Trans Adriatic Pipeline – TAP**
 Document Title: **Integrated ESIA Greece**
Annex 1.1 - Route Alternatives Appraisal Indicators

GPL00-ASP-642-Y-TAE-0050
 Rev.: 01 / at02

<i>Indicator</i>	<i>Definition</i>	<i>Units</i>	<i>Relevance to the Appraisal</i>	<i>Alt. N₁ (2010)</i>	<i>Alt. S₀ (2010)</i>
Settlements reliant on mineral extraction as their main economic activity	Number of villages within the 2 km corridor for each Alternative for which the primary source of income is work in mines or quarries (2001 census data).	Number of settlements (% of total)	Reliance on Mineral Extraction suggests a community that is less vulnerable than those who rely solely on the land, but more vulnerable than those with diversified economies	3%	4%
Settlements with a diversified economy	Number of settlements within the 2 km corridor whose livelihood is based on a mixture of economic activities (agriculture, light industry, services, government jobs, etc.)	Number of settlements (% of total)	Communities that have a diversified economy have more capacity to deal with negative impacts and capitalise on Project benefits.	32%	44%
<i>Cultural Heritage Indicators</i>					
Archaeological Site	Number of known or suspected archaeological sites within the 2 km corridor	No.	Time (high) and cost related of excavation or avoidance	22	42
Monument (old above ground structure)	Number of known monuments within the 2 km corridor	No.	Time and cost related of rerouting	12	9
Intangible Heritage (ICH)	Heritage site with current, usually, local use within the 2 km corridor	No.	Time (modest) and cost related of consultation and / or rerouting	13	28
Archaeological Potential	Potential of 2 km corridor to contain undiscovered archaeological sites (ie land in highly productive agricultural areas)	%	Time (high) and cost related of chance finds during construction	37%	37%

Source: TAP (2011) Greece Route Alternatives Appraisal. Ref: GPL00-ILF-100-F-TRP-0001_00---TAP-FEED-GR-ROU-REP-1602--Greece Route Alternatives Appraisal

Trans Adriatic Pipeline AG – Greece (Branch Office)
21st Floor, Athens Tower, 2-4 Messogion Ave., 11527
Athens, Greece
Phone.: + 30 210 7454613
Fax: + 30 210 7454300
esia-comments@tap-ag.com
www.trans-adriatic-pipeline.com

Date 06/2013

Copyright Reserved: This document may not be copied, shown to or placed at the disposal of third parties without prior consent of TAP AG.
The latest version of the document is registered in the TAP Project's Database.