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Non Technical Summary

Malta-Italy Gas pipeline interconnection

Report Type

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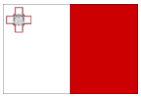

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DISCLAIMER

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Acronyms

Acronimo	Termine
AO	Ante operam
ARPA	Agenzia Regionale per la Protezione dell'Ambiente
ASI	Area di Sviluppo Industriale
BBCC	Beni Culturali
BVS	Stazione Blocco Valvole
CEF	Connessione delle Infrastrutture Europee
CO	Corso d'opera
D.Lgs.	Decreto Legislativo
DM	Decreto Ministeriale
DPCM	Decreto del Presidente del Consiglio dei Ministri
DPR	Decreto del Presidente della Repubblica
EUAP	Elenco Ufficiale delle Aree Naturali Protette
FESR	Fondo Europeo per lo Sviluppo Regionale
IBA	Important Bird Area
ICD	International Classification of Diseases
IPA	Idrocarburi Policiclici Aromatici
IRSAP	Istituto Regionale per lo Sviluppo delle Attività Produttive
ISTAT	Istituto Nazionale di Statistica
LCC	Land Capability Classification
LR	Legge Regionale
MATTM	Ministero dell'Ambiente e della Tutela del Territorio e del Mare
MTG	Melita TransGas
OMS	Organizzazione Mondiale della Sanità
PAI	Piano Stralcio di Bacino per l'Assetto Idrogeologico
PCI	Project Common Interest
PEARS	Piano Energetico Ambientale Siciliano
PMA	Piano di Monitoraggio Ambientale
PNIEC	Piano Nazionale Integrato per l'Energia e il Clima
PO	Post operam
PRG	Piano Regolatore Generale
PRRI	Progetti di Riconversione e Recupero Industriale
PTA	Piano di Tutela delle Acque
PTCP	Piano Territoriale di Coordinamento Provinciale
PTPR	Piano Territoriale Paesistico Regionale
PTR	Piano Territoriale Regionale
RD	Regio Decreto
ROV	Remotely Operated Vehicle
ROW	Right Of Way (fascia di servitù, indica la pista di lavoro)
SEN	Strategia Energetica Nazionale
SIA	Studio di Impatto Ambientale
SIAS	Servizio Informativo Agrometeorologico Siciliano
SIC	Sito di Interesse Comunitario
SIN	Sito di Interesse Nazionale

Acronimo	Termine
SITAP	Sistema Informativo Territoriale Ambientale Paesaggistico
SITR	Sistema Informativo Territoriale Regionale (Regione Siciliana)
SMR	Rapporto Standardizzato di Mortalità
SRG	Snam Rete Gas
TOC	Trivellazione Orizzontale Controllata
VIA	Valutazione di Impatto Ambientale
ZPS	Zona di Protezione Speciale
ZSC	Zona Speciale di Conservazione

1.0 INTRODUCTION TO THE PROJECT AND LOCALIZATION

1.1 Introduction

This document constitutes the Non-technical Summary of the Environmental Impact Study relating to the project called "Melita Transgas (MTG) Pipeline", presented by the company Melita Transgas Company Ltd.

The project, which was initiated with the aim of ending the isolation of the island of Malta from the European Gas Network through the supply of natural gas from Sicily to Malta, is listed among European Projects of Community Interest (European Project of Common Interest, in short PCI), with the denomination: 5.19 Delimara Malta - Gela Sicily, Italy and it is subject to the procedure of Environmental Impact Assessment in both Countries involved, in accordance with the ESPOO Convention on Environmental Impact Assessment in a Transboundary Context[1].

The project has been previously submitted to the Scoping phase, as a first step of the EIA procedure. At the end of this procedure, Opinion No. 2554 of 17/11/2017 of the Ministry of the Environment and the Protection of the Territory and the Sea was issued; it represent the main reference for the preparation of the Environmental Impact Study.

To start EIA procedure two types of documentation are prepared (art. 22 D.Lgs. 152/2006 and ss.mm.ii.):

- an extended scientific and technical study, defined as "Environmental Impact Assessment (SIA)", drawn up in accordance with international legislation, national and regional in force and is articulated in particular in accordance with Annex VII of Legislative Decree no. 152/2006 as amended by Legislative Decree no. 104/2017;
- the other, the present, called "Non-technical Synthesis", in which the key contents of the SIA are summarised in non-technical language.

Basing on of this documentation, the Authorities conduct the procedure for assessing the environmental compatibility of the project, and the public can express opinions (in the manner provided for by current legislation) to be taken into account.

The Authority responsible for issuing the Decree on environmental compatibility is the Ministry of the Environment and Protection of the Territory and the Sea (MATTM), which exercises its powers in agreement with the Ministry of Cultural Heritage and Activities (MIBAC) for the preparatory activities relating to the EIA procedure (art.7 bis of Legislative Decree 152/2006 and ss.mm.ii.).

[1] *Directive 2014/52/EU, ratified by Italy with Law n. 79/2016 and by Malta with Law n. 412/2017 .*

1.2 Localization

Localization of the whole project is shown in the following image (Figure 1), where the *offshore* section of pipeline is presented in blu and Italian *onshore* section in red.

The area covered by the Italian ground-based project is located in the Region of Sicily, in the municipality of Gela, part of the free municipal consortium of Caltanissetta (already regional province).

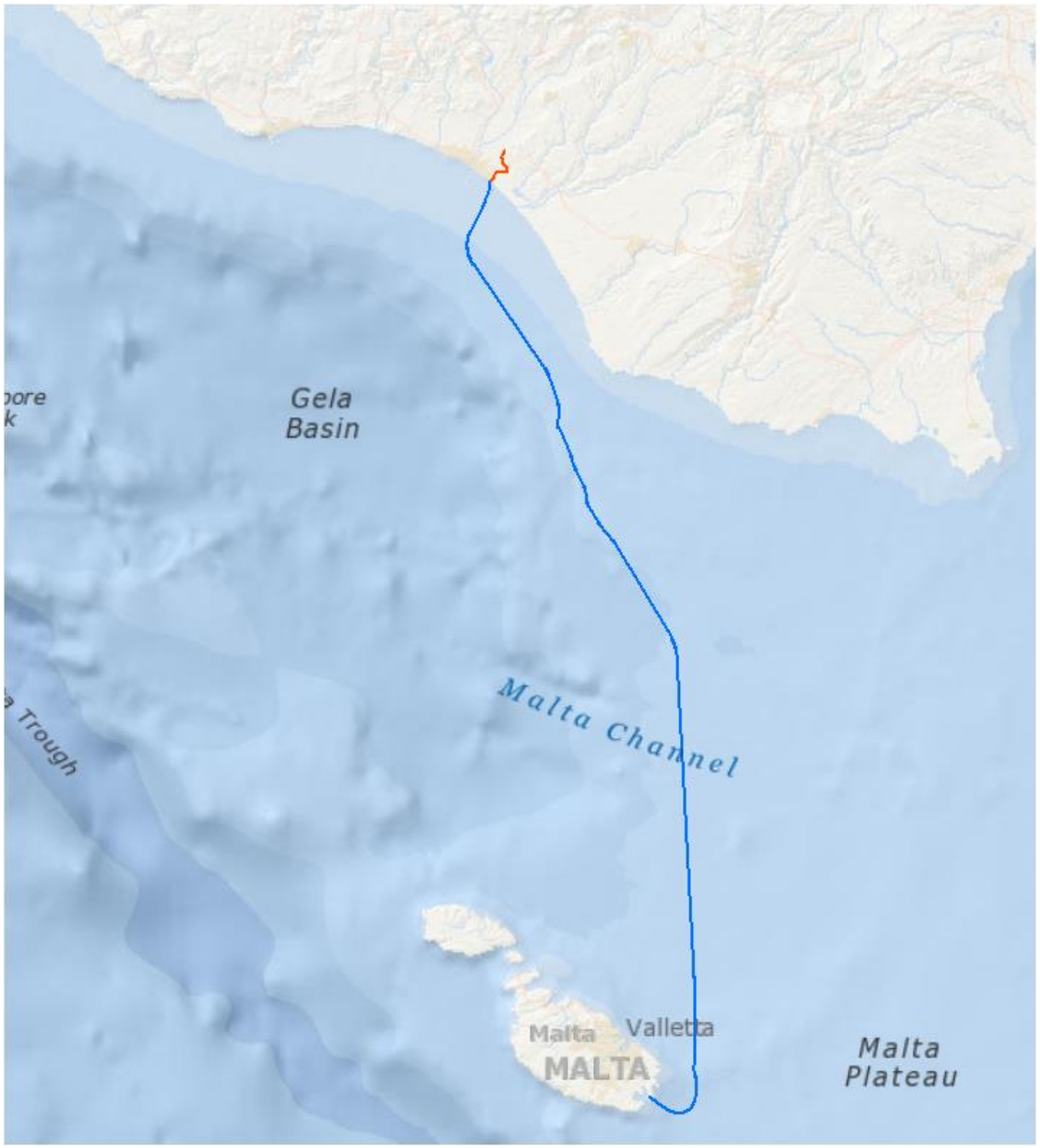

Figure 1: Localization of the whole project

1.3 Brief description of the Project

The project involves the construction of a pipeline of about 159 km in total, consisting of an *onshore* section[2] of about 7 km on the Italian territory and of about 0,8 km on Malta, and an *offshore* one[3] with a length of 151 km, of which about 63 km fall in Italian territorial waters and about 28 km in the waters between the Italian territorial limit and the midline between Italy and Malta.

In Italy it is also planned to build a terminal[4] for connection to the national network Snam Rete Gas (SRG) and three block valve stations[5] (or interception, called BVS).

The land section in Italy will fall exclusively in the Municipality of Gela, belonging to the free municipal consortium of Caltanissetta (already regional province).

Finally, the project includes the construction of a terminal in Malta, in the locality of Delimara.

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[2] *The onshore section of the pipeline is defined as the terrestrial section; for the description of the onshore pipeline in Italian territory see §* ***Errore. L'origine riferimento non è stata trovata.***

[3] *The offshore section of the pipeline is defined as the section falling at sea; for the description of the offshore pipeline in Italian territorial waters see § 4.6.*

[4] *For Terminal description see §4.2.*

[5] *For Block Valve Station (BVS) description see § 4.3.*

2.0 PROJECT JUSTIFICATION

The conclusions of the European Council of 04 February 2011 establish that "*No Member State of the European Union should remain isolated from the European Gas and Electricity Network after 2015 or see its security put at risk by the lack of an appropriate connection*"; also in the conclusions of the European Council of October 2014, Malta is specifically mentioned as a country that needs special attention in the context of the development of Projects of Community Interest. The European Council of March 2015 called for the acceleration of infrastructure projects, "*including interconnections, especially in peripheral regions*" and a Strategic Structure for a Resilient Energy Union with a long-vision climate policy and that ends energy islands from main gas and energy networks.

To meet these objectives the government's policy is promoting independent investment in Malta's energy infrastructure in the form of new facilities, favoring the import of natural gas and new high efficiency generating plants at the site of existing Delimara Power Station.

The project will connect Malta to the European gas network and contribute to the integration of the Internal Energy Market; moreover, the project shall:

- Replace the importation of LNG for the production of electricity;
- Contribute to the system's overall flexibility and interoperability in that it will offer the possibility of capacity for reverse flows in the future.
- Complement the Energy Union's strategy towards the diversification of sources, routes and suppliers of natural gas.
- Guarantee greater security of energy supply to the island;
- Give Malta easier access to the natural gas resources and market integration;
- Support objectives of sustainability as it will contribute towards the reduction of GHG emissions by delivering natural gas more efficiently;
- Eliminate the need for liquefaction, shipping and re-gasification, as the case with LNG.

The project has been identified as a "Project of Common Interest (PCI)" under priority corridor *"North-South gas interconnections in Western Europe"* in 2013 and its PCI status has been reconfirmed in the 2nd, 3rd and 4th PCI lists adopted in November 2015, November 2017 and October 2019 respectively. The current PCI denomination is: 5.19 - Connection of Malta to the European gas network — pipeline interconnection with Italy at Gela.

As stipulated in Regulation 347/2013 on guidelines for Trans-European Energy Infrastructure, projects labelled as PCI benefit from accelerated permit granting, improved regulatory treatment and financial support through grants for both works and studies under the Connecting Europe Facility program (CEF).

3.0 ALTERNATIVE ASSESSMENT

The analysis of the alternative routes began from the early stages of the development of the Project and was part of the decision-making process and design up to the current definition, with the aim of:

- To Identify the optimal route of the pipeline;
- to minimise the residual environmental and social impact;
- to involve the national, regional and local authorities involved in the implementation of the Project.

The route solution presented at the end of this process is to be considered the result of a continuous process of improvement within the Project, which since the preliminary stages has analyzed the different design and localization aspects, with the aim of minimising the social, environmental and cultural heritage impact.

A specific Study of the Alternatives has been annexed to EIA Report (*Annex 1 – Studio delle alternative – doc. R_ALT_003*), particularly focused on the routing assessment of the different large scale solution, in order to identify the best possible route of the gas pipeline between Italy (Sicily) and Malta, from a technical and environmental point of view.

The study of alternatives included the following methodological steps:

- The scenario assessment of the environmental and territorial context of reference of the localisation assumptions at wide area level presented during the Scoping phase.
- Analysis of localised hypotheses and identification of the best solution from a technical and environmental point of view.
- Description and in-depth analysis of the design and environmental optimizations of the selected solution.

4.0 DIMENSIONAL AND FUNCTIONAL CHARACTERISTICS OF THE PROJECT

The project consists in:

- No. 1 *onshore* pipeline composed of an underground part in Italy, of about 7 km, and an underground part in Malta, of about 0,8 km (§ 4.1);
- No. 1 terminal in Italy (Gela), for the connection with the national network (Snam Rete Gas - SRG), with a gas pressure regulating system and a launch and reception "Pig" equipment (§ 4.2);
- No. 3 Block Valve Stations (BVS) in Italy, along the *onshore* pipeline (§4.3);
- No.1 *offshore* pipeline, of about 151 km, of which about 63 km are in Italian territorial waters and about 28 km are in the waters between Italian territorial limit and midline between Italy and Malta (§ 4.6);
- No. 1 terminal in Malta (Delimara).

The proposed installations are listed in the following Table 1, where the location is indicated compared to progressive kilometers (KP), that starts with Gela Terminal (KP= 0 km +000m) and ends in Delimara terminal (KP=159 km+310 m).

Table 1: Installations of Melita Transgas Pipeline

N.	Intallations	Location (KP)	Fenced Area (m^2)	Access road (m)
1	GELA TERMINAL PLANT	0+000	6160	60
2	BVS 1	2+990	245	230
3	BVS 2	4+340	245	22
4	BVS 3	6+170	245	35
5	DELIMARA TERMINA PLANT	159+310	6855	202

The activities in the Italian section are described in the following.

4.1 Onshore pipeline

4.1.1 Onshore pipeline construction

The construction works of an *onshore* gas pipeline and related plants normally consist of the execution of sequential phases distributed throughout the territory along the selected route. Therefore, each individual operation is contained in a limited section of the project route and will advance progressively along the ROW (approximatively with a speed of about 50 to 60 m per day).

The installation activities for the onshore section of the pipeline in the project are divided into the following operating phases:

- **Preconstruction survey**: the route of the pipeline to be installed shall be marked on the basis of contractual documentation. During this activity the verification of the project documentation with the actual situation of the territory will also be done.
- **Demining (UXO):** mine clearance in the range of the operations, aiming to guarantee the safety of all personnel working under hazardous conditions, will be executed prior to the entrance of the working teams into the field in accordance with the demining plan.
- **Construction of temporary infrastructures (working areas):** the temporary working/storage area (of about 18,000 m^2) has been identified inside the ASI area (industrial area of Gela, under development), close to the ROW and with a good connection to the existing roads.
- **Right of way preparation:** the ROW will be as continuous as possible and will have a width that allows the safety execution of the works and the transit of the service and emergency vehicles (generally from 18 to 21 m) and it will be bordered with suitable fencing in order to limit the access to the working areas. In the event that the cutting of the plants must be foreseen, this will be carried out using the best forestry techniques and removing the stumps. In the agricultural areas, the functional continuity of any irrigation and drainage works will be guaranteed and where necessary, in the presence of tree crops, provision will be made for the temporary anchoring of the structures supporting them. The equipment used to clear and prepare the ROW will be mainly wheel loaders, crawler excavators and trucks.
- **Construction of temporary access roads to the right of way:** Accessibility to the ROW will normally be ensured by the existing ordinary roads, which will be used to reach the working strip at the start of activities and for the logistic services (i.e. personnel movement). Construction equipment will use only the ROW. The access roads to the ROW, even if they exist, may require upgrading works (e.g. re-profiling, widening, arrangement of existing overpasses, etc.) in order to guarantee the safe passage of the vehicles.
- **Pipes stringing along the right of way:** the pipes are transported from the storage areas and placed along the ROW, preparing them head to head for welding. For these operations, pipe-laying tractors (sideboom) and/or crawler excavators suitable for line pipe handling will be used.
- **Line pipes welding and non-destructive testing:** the pipes will be electric arc welded with continuous wire or manual welding machines. Root runs will be conducted using suitable method (i.e. TIG welding) in order to prevent any slag inside the pipe. The equipment used in this phase will be essentially pipe laying (sidebooms), excavators, engine-driven-welders and air compressors.
- **Trench excavation:** the trench will be excavated after welding of the pipeline with the use of excavator machines suitable for the morphological and lithological characteristics of the ground encountered (excavators in loose soil, rock hammers in case of rocky soil). At Gela, loose soil is expected. The trench excavation will have a depth of about 2,6 m and a width at the trench's base of about 1,2 m. The excavated material will be deposited on one side, along the working strip, to be reused in the pipeline backfill phase.

- **Field joints coating and holiday detection:** with suitable polyethylene heat-shrinkable strips.
- **Laying of the pipeline:** once the verification of the perfect coating integrity has been completed, the welded pipe string will be raised and placed in the trench using pipe-laying tractors (sideboom) or excavators qualified for laying.
- **Backfilling of the pipeline**: the pipeline laid will be completely covered using the excavated material from trenching set aside along the working strip.
- **Hydraulic testing, tie-ins connection and final construction works:** once the pipeline is completely laid, connected and the trench backfilled the hydraulic test of the onshore section will be executed by filling the pipe with fresh water and pressurizing it, and recording the results during the test after the pressure and temperature stabilization. After the mechanical completion of the pipeline a further check will be carried out on the integrity of the pipeline coating.

The crossings of watercourses, infrastructures and particular morphological areas are carried out with small construction sites, which operate simultaneously with the progress of the main route construction works, so as to guarantee their realization before the pipeline installation along the ROW will arrive at the crossing point.

The crossing methodologies can be divided in two main categories: open trench crossings or underground excavation crossings (thrust boring or Horizontal Directional Drilling (HDD) [6]).

The phases related to the preparation of the right of way, pipes stringing, welding, ditching, laying and backfilling are relevant to the main works along the route and will be performed in a coordinated and sequential manner in the territory. On the contrary, the plant and crossings constructions will be done with small autonomous working teams that operate simultaneously with the construction of the main line.

The onshore pipeline construction works include also the shore approaches in Italy and Malta and the construction of the Terminal Plant at Delimara.

Figure 2: Example of Demining activity along the ROW

[6] *For more details see § 4.6..*

Figure 3: Example of Temporary Working/Storage Area

Figure 4: Example of Right of Way

Figure 5: Laying of the pipeline string

Figure 6: Backfilling of the pipeline

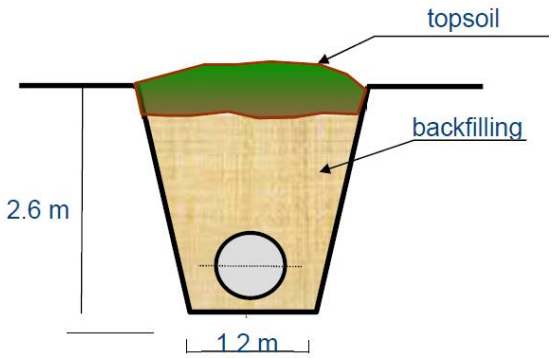


Figure 7: Typical trench section

4.1.2 Onshore pipeline description

The pipeline route starts about 5 kilometers towards the North-East from the area called "Piana del Signore" where, from this point forward, the launching/receiving trap station (Gela Terminal) is expected to be installed. Downstream of the Terminal, the route continues, in the Southern direction and crosses the Provincial Road No. 82, using trenchless crossing (thrust boring). Then the pipeline route passes near farmlands.

Around the kilometer point/post 2 the pipeline route turns to the East; forward, he use of a trenchless methodology is envisaged for about 540 m to reach the top of the hill in the east side of the Farello cemetery.

Then the pipeline route arrives at the first BVS area, located upstream of the railway "Gela-Catania" in the flat area of River Priolo.

Downstream of BVS No.1, the pipeline crosses in succession the railway "Gela-Catania" (elevated railway), a municipal road (unpaved) with trenchless technology (thrust boring), and an Oil Pipeline with open trench. Then the pipeline crosses the River Priolo, the State Highway S.S. No.115 and five underground water supply pipes with trenchless technology (thrust boring).

Downstream of these crossings, the route passes through open fields with some deviations in order to maintain the safety distances from the existing buildings, infrastructures and protected areas.

At about kilometer points/post 4+321 the installation of BVS No. 2 is needed to guarantee the minimum distance between the plants. Close to the plant, the route crosses the Provincial Road No. 51 with trenchless technology (thrust boring). Following this section, the pipeline route has some deviations in order to limit the interferences with the present vineyards.

The pipeline then turns towards the west and crosses an arable land and a vineyard. The crossing of the railway "Canicattì-Siracusa" will be made with trenchless technology (thrust boring).

Around the kilometric progressive 6+170 the BVS No.3 is to be installed. Downstream of BVS No.3 the pipeline route turns towards the southern direction. The onshore route in this final section up to the shore is located under an unpaved road in order to avoid an area with excavations (probably a quarry), and some protected areas.

The route arrives close to the beach where the connection point between the onshore pipeline and the offshore pipeline is foreseen. Horizontal Directional Drilling method is selected for the 22" pipeline shore approach at Gela.

The project, which will have the purpose of transporting natural gas, is foreseen to be laid underground for the whole length with the only exception of limited parts inside the terminal plants.

Along the pipeline in Italy, a Fiber Optic Cable shall be installed and it will be used to remotely control and monitor the block valve stations.

4.2 Terminal plant – connection with SRG network

The terminal plant of this project is equipped with a system for the control and internal cleaning of the pipeline and with pressure regulating equipment; it will also be able measure the amount of transferred gas.

All the equipment will be installed above ground for an easy operation and maintenance, while the connection piping will be buried to limit the visual impact.

Terminals will also include a building to locate the electrical and control apparatus and also a workshop for maintenance works. The terminal will be fenced with panels in galvanized iron grating, painted in green colour. These panels shall be 2.5 m high from the plant floor.

The following 3D photo simulations represent the Terminal project.

Figure 8: Terminal (North-West view)

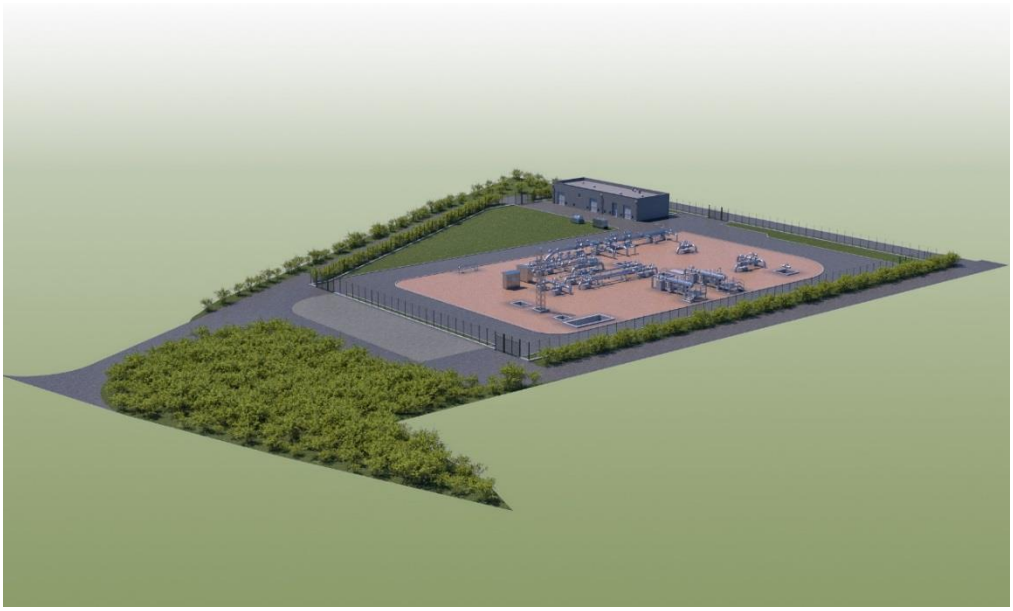


Figure 9: Terminal (South-East view)

4.3 Block Valve Stations

The valve station consists of underground pipes with the exception of the handling system and the required cold vent for the evacuation of the gases to the atmosphere (carried out, exceptionally, for extraordinary maintenance operations). The plant therefore includes underground shut-off valves, underground bypass, equipment for the control and monitoring of the system, the cathodic protection of the pipeline and a building for the equipment and control instruments.

An example of Block Valve Station is reported in the following figure.

Figure 10: Example of Block Valve Station

4.4 Equipment used for the construction phase

For the execution of the onshore construction works in Italy the utilization of different main equipment/vehicles is envisaged, which will operate inside the working areas (ROW).

During the works, approximately n. 20 daily passages of cars and vans for the access of the working personnel to the construction site are envisaged, and with less frequency a two-axle tanker for the supply of fuel for work vehicles.

At completion of the works, the expected traffic is limited to control and maintenance vehicles (cars or vans type Ducato) to reach the plants. For this operation no more than one monthly pass is expected, therefore the induced traffic during operation is considered negligible.

4.5 Shore approach

A Horizontal Directional Drilling (HDD) installation method is selected for the 22" pipeline shore approach at Gela.

The 22" pipeline entry point is located at KP 6+862, at a ground level of +10m above the MSL. The drilling section crosses the beach and an underwater archaeological area at a suitable depth (more than 10 m) and ends offshore at KP 8+362 at a water depth of approx. 10m below the MSL.

A pre-trenched transition pit shall be realized at the offshore exit point to facilitate the installation of the 22" pipeline string from the seafloor into the drilled hole (the pipeline string will be prefabricated offshore by an installation vessel). The HDD string preinstalled offshore will be pulled inside the HDD tunnel from offshore to shore. The terminal head will be recovered by the lay barge, that will continue the installation of the 22" offshore pipeline towards Malta.

The drilling activity will be done from offshore to onshore because it is difficult to collect the sea water in quantities and flowrates needed to support continuous HDD operations close to the beach, where the temporary working area will be erected. Consequently, the rig will be

mounted on a jack up barge approximatively 1500 m offshore from the coastline, outside the Bulala archaeological area.

The jack up shall be aligned with the offshore pipeline route, 150 m away from the drilling entry point and after trench transition preparation is completed. A casing pipe is required as support of the drill rods and BHA (Bottom Hole Assembly). Several goal posts with horizontal cross members shall be installed to support the casing. The casing will be installed by means of a pipe rammer. Saltwater used for the drilling fluids will be pumped from the sea, in quantities and flowrates needed to support continuous HDD operations.

Drilling fluid management will be done on the jack up where the fluids and spoil are separated for the re-use and disposal.

A second rig shall be set up in a temporary working area erected close the beach for onshore activates.

The main phases are described below:

- **Pilot drill:** the BHA (Bottom Hole Assembly) consists of a 12.25" drill bit (jetting or mud motor), a bent sub, and a steering tool (optical gyro / tensor). Drilling of the pilot hole will continue along the proposed drilling path. Drilling fluid returning to the surface is collected in a mud returns tank on the jack up and then pumped through a mud cleaning and recycling system, where the cuttings are removed, and the cleaned bentonite recycled for use in the drilling operation. The amount of drilling fluid blowing out at sea is minimal since the mud will be conveyed on the jack up by the support casing.
- **Reaming passes**: the reamer is pulled from the rig offshore while drill rods are added onshore. A second rig onshore is required to support the drilling operations. The second rig shall be adequately sized for the 22" pipe string pull back. This operation will be repeated until the final hole diameter will be achieved.
- **Pull back**: the product pipeline is prepared by the Offshore construction spread. The pipe will be laid offshore at approximately 200 m from exit point to allow for the drilling operation at the exit point, aligned to the drill path.

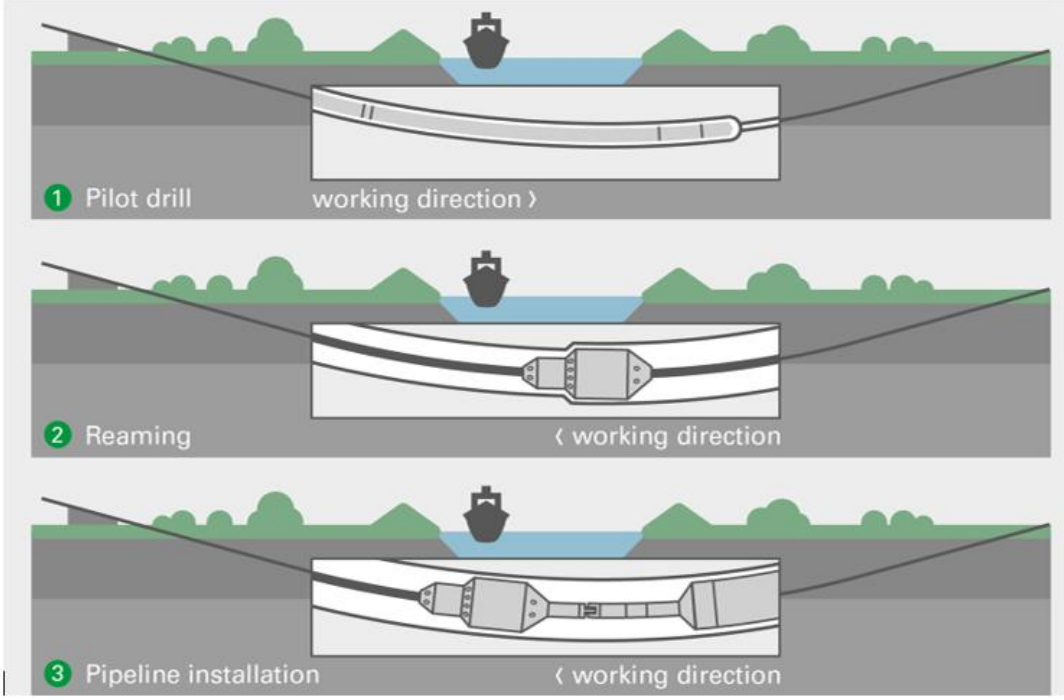


Figure 11: HDD Main work phases

4.6 Offshore pipeline

4.6.1 Offshore pipeline construction

Main activities to be made for the installation of the *offshore* pipeline are briefly described below:

- **Pre-lay survey**: a pre-construction route survey is requested to verify any omission and discrepancies relevant to the scope of Work and to ascertain the changes if any from the pre-engineering to pre-installation period as well as collect data relevant to installation, if required.
- **Lay corridor preparation works**: they in particular are modifications of the natural seabed to reduce the actions from waves and current, to protect the existing pipelines or cables in connection with crossings, to reduce the free span heights to reduce the forces due to over-trawling.
- **Pipeline Installation**: the floating factory will be basically a laybarge where the pipe joints are welded on to the pipeline as it is installed (S-lay method). The coated pipe joints are transported to the laybarge on pipe supply ships and stored on deck.
- **Laydown**: Both shore approaches P/L strings are laid down in accordance with laydown procedure.
- **Post-lay activities**: the pipeline is located in a seabed trench (post-trenching). This activity is foreseen on the Italian side between offshore HDD bore hole exit (KP 8.362 approx.) and WD=32m, corresponding to KP 16.200 approx. If necessary, artificial backfilling will be made at the bore hole offshore exit in the Italian shore approach, to reinstate the natural seabed layer.
- **Protection and stabilization**: if necessary, pipeline's protection systems will be made through gravel installation.

» **Pre-commissioning:** Pre-commissioning activities for an offshore pipeline section typically consist of the following phases: flooding, cleaning, gauging, testing, dewatering and drying.

Figure 12: Preparation Works at HDD Offshore Bore Hole Exit – Example of Cutter Suction Dredger Vessel

Figure 13: Preparation Works at HDD Offshore Bore Hole Exit - Example of Backhoe Dredger

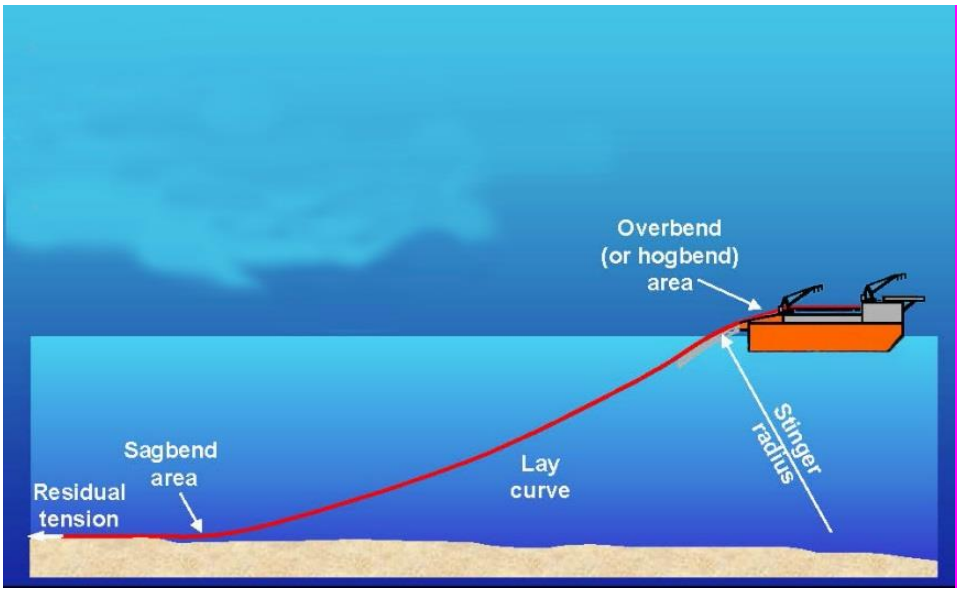


Figure 14: S-lay General Arrangement – Typical Layout

4.6.2 Offshore pipeline description

The *offshore* pipeline, about 151 km , starts from the Gela gulf; the first part of the pipeline will be realized with HDD technology, for a length of 1500 m to reach 20 m depth under the seabed, ensuring the absence of potential interferences with the marine archaeological area.

From the exit point of HDD, post trenching will be made (7,5 km) to reach a depth of 7,5 m. S-lay installation methodology apply to all the remaining pipeline route.

The general layout of offshore pipeline is shown in the Figure 15.

Trenchless solutions are proposed both at the Italian and Malta shore approaches to avoid archaeological & environmental areas on the Italian side and to cross a difficult shore approach rocky area at the Maltese approach.

Figure 15: Overall Route Layout

4.7 Construction schedule

The first activities will be performed in Malta where preliminary construction works are needed to prepare the site (i.e. new access road construction and land reclamation). The shore approach in Malta will be done first; the offshore pipeline installation will start from Malta towards Gela.

The construction activities in Gela (near shore, shore approach and onshore) may be performed in parallel with the construction activities in Malta utilizing dedicated teams. The selected period may be adjusted considering possible restriction in the working dates due to the presence of environmental protected areas.

The final precommissioning activities (i.e. drying and purging) and the commissioning will be performed on the whole pipeline from one terminal to the other after the final tie-in of the different constructed sections.

The realization is carried out over a period of 16/24 months from approval of the project, in compliance with D.P.R. 327/2001 and ss.mm.ii.

4.8 Reinstatement and visual mitigation

The project includes environmental reinstatement and visual mitigation works, as briefly outlined below:

- **Final clean-up and restoration of ROW,** those necessary operations to bring back the areas to the preexisting state; in particular they include:
  - morphological restoration works that aims to create optimal conditions for water drainage and slope consolidation both to ensure stability to the work areas in order to prevent landslides and surface erosion phenomena;
  - hydrogeological reinstatement: if necessary, appropriate operational measures will be adopted before, during and at the end of the works, aimed at preserving the pre-existing water regime and recovering the drained flow rates;
  - vegetation reinstatement that aims to restore, in an optimal and rapid way, the conditions of the natural ecosystems present before the pipeline installation works (grassing; planting of trees and shrubs; cultivation treatments, etc.);
  - pipeline plants visual mitigation.
- **Planting of trees and shrubs:** all the arboreal-shrub formations subjected to shear will be reconstituted through vegetational reinstatement that will consist essentially in the laying of forest species. The species used will be of clear local origin and will aim at reconstituting the pre-existing forest top with the exception of weed species.
- **Visual mitigation**: the aim is to mask the plants aboveground, through the planting of autochthonous trees and shrubs as strawberry tree (*Arbutus unedo*) and common tamarisk (*Tamarix gallica*), laurel (*Laurus nobilis*) and lentisk (*Pistacia lentiscus*)

4.9 Operation and maintenance of the plant

Following the pre-commissioning/commissioning activities, the pipeline will be filled with gas flowing from the Italian National Grid (from Snam Rete Gas interconnection plant at Gela).

During the first phase of activities the gas always will flow from Gela to Malta and the operations will be controlled from the Terminal Plant in Delimara (Malta) where a control room will be constructed.

When the gas will be available in Malta, the pipeline may be operated in reverse flow (gas from Malta to Italy). The plants will be equipped to manage the reverse flow phase and therefore the Control System will be set-up (e.g. set points, closure/opening of valves, etc.) to manage this operating condition. Also, in this phase the pipeline system will be monitored/controlled from the Control Room in Delimara.

In addition to the above, Melita Transgas will have inspection and maintenance teams to ensure safe gas transportation.

4.10 Pipeline system life and de-commissioning

Pipeline system lifetime, despite of the design life, is function of the continuous technical and strategic objective, that motivated its realization, during the years.

The operation technical parameters are constantly kept under control by carrying out the inspection and the ordinary and extraordinary maintenance operations (see §4.9), which ensure that the gas is transported in safe conditions. If, on the other hand, Melita Transgas Pipeline evaluates that the pipeline and related systems are no longer usable for the transport of gas, they are put out of service. In this case, putting the pipeline out of service consists of carrying out the following main operations:

- empty the pipeline
- fill the line with inert gas (i.e. Nitrogen)
- maintain the cathodic protection in function
- leave the easement strip and concessions (e.g. at crossings)
- continue the inspections and controls along the line.

Alternatively, the pipeline may be removed, where it is possible.

These two alternatives require different activities with a different impact on the environment and on the territory. The first alternative (the pipeline is put out of service) is less impacting since the works are very limited, but the infrastructure will remain in place with the relevant constraints; the second alternative requires works similar to the construction of a new pipeline with the relevant impacts.

It is highlighted that the offshore pipeline involved in this project is not removable, therefore this activity is applicable only to the onshore pipeline in the sections installed with an open cut method (also the sections installed with trenchless methodology at deep depth cannot be removed).

5.0 LEGISLATION FRAMEWORK

5.1 Environmental and landscape constraints and protection

This chapter provides a summary of the results obtained from analysing the constraints in the field of study; protected natural areas and/or those of natural interest are also identified.

The sources used for this are:

- Cartography of the Landscape Plan of the Province of Caltanissetta (through the Sicily SITR [Regional Territorial Information System] Geoportal[7]) and of the General Regulatory Plan of the Municipality of Gela;
- SITAP (Territorial Environmental and Landscape Information System) portals[8], Constraints on the Network[9,] National Geoportal[10] and Ministry of the Environment and Protection of the Territory and the Sea.

5.1.1 Landscape constraints and cultural heritage

Landscape constraints in the state of national legislation are governed by Legislative Decree No. 42 of 22 January 2004, *Code of Cultural and Landscape Heritage*, modified with Legislative Decree No. 157 of 24 March 2006. The provisions of the Code governing landscape restrictions are Article 136 and Article 142 of Legislative Decree 42/2004.

Article 136 identifies *the buildings and areas of considerable public interest* to be subject to landscape restrictions with a specific administrative provision: the so-called "individual beauties" ("immovable property", "villas and gardens", "parks", etc.) and the so-called "overall beauties" ("complexes of immovable property", "panoramic beauties", etc.) form part of this.

Article 142 identifies the areas protected by law and having landscape interest per se, such as marine "coastal territories", "rivers and waterways", "parks and natural reserves", "territories covered by woods and forests", "Alpine and Apennine reliefs", etc.

In addition to the areas indicated in Articles 136 and 142, the buildings and typified areas are subject to restrictions, identified and protected by landscape plans, ***Article 134***, Legislative Decree 42/2004.

With regard to the national heritage of "cultural assets", this is recognised and protected by ***Article 10*** of Legislative Decree 42 of 22/01/2004, as modified and integrated by Legislative Decree No. 156 of 24 March 2006.

The following table indicates the interferences between the project and the landscape and cultural constraints: see D_EIA_TAV. 2.2.1, D_EIA_ TAV.2.6.1 and D_EIA_ TAV._2.8.1 for the location of the indicated assets.

[7] *http://www.sitr.regione.sicilia.it/geoportale/it/Home/GeoViewer?resourceLocatorId=1471*
[8] *http://www.sitap.beniculturali.it/*
[9] *http://vincoliinretegeo.beniculturali.it/vir/vir/vir.html*
[10] *http://www.pcn.minambiente.it/viewer/*

LANDSCAPE ASSETS *(Legislative Decree 42/04, modified with Legislative Decree 157/06)*	**COHERENCE OF THE PROJECT WITH THE REGIME OF CONSTRAINTS AND PROTECTIONS**
Article 134 *"Buildings and characterize areas, identified and protected by landscape plans"*	Absence of assets: there is no interference of the onshore and offshore route with the type of asset indicated
Article 136 "*Buildings and areas of considerable public interest"*	***Onshore section.*** For a section, the project interferes with the area called "*area of Lake Biviere, the last remnant of the swamp characterised by banks made of reeds and with some islet shelter of very rich birdlife in the Municipality of Gela".* ***Offshore section***. No interference ***BVS 3.*** It falls within the area called "*Zone of Lake Biviere in the territory of the Municipality of Gela*".
Article 142 *"areas protected by law"*	***Onshore section.*** At some points, the project layout interferes with these assets (*): coastal territories included in a strip 300 metres deep from the shoreline (letter a) buffer zones for water bodies (letter c) territories covered by forests and woods (letter g) ***Nearshore section.*** Interference with assets: coastal territories included in a strip 300 metres deep from the shoreline (letter a) ***BVS 2.*** It falls within the buffer zone for water bodies (letter c)
CULTURAL HERITAGE	***COHERENCE OF THE PROJECT WITH THE REGIME OF CONSTRAINTS AND PROTECTIONS***
Legislative Decree 42/04, modified with Legislative Decree 156/06 **Article 10** *"Cultural assets"*	***Onshore section***. Absence of constrained cultural assets in the area of intervention for the terrestrial part: the assets closest to the examined area are at distances greater than 3.5 km: therefore there is no interference of the project with the assets. ***Offshore section***. For a stretch of about 1200 m, it involves a marine area of archaeological protection located in front of Contrada Bulala (**)
PPTP Caltanissetta **Article 17 NTA (Technical Implementation Rules)** "*Isolated assets*" **Article 18 NTA** "*Historic roads*" **Article 19 NTA** *"Panoramic points and routes"*	***Onshore section.*** In the study area there is the isolated asset B3 – Cemeteries, ossuaries (religious architecture), about 120 m from the project route; in addition, the route crosses historical routes and a panoramic route.

Gela GRP (General Regulatory Plan) **Article 65** NTA	***Onshore section.*** The Gela GRP identifies isolated assets and architectural features in the agricultural green area according to three types: a. historical assets bound by the Superintendency for Cultural and Environmental Assets of Caltanissetta b. historical assets reported by the Regional Landscape Plan c. rural construction reported by the GRP In the study area there are assets of type b) and c): the project does not interfere with these assets, located at least 180 m away from it.
**The pipeline falls in protected areas pursuant to Legislative Decree 42/2004 and subsequent amendments, therefore it is necessary to prepare the document for the verification of landscape compatibility pursuant to Article 146, paragraph 5 of Legislative Decree 42/04 and subsequent amendments)* ***The design of the works has taken into account the presence of the Bulala area and plans to lay the pipeline in correspondence with this area using the no-dig technique of Controlled Horizontal Drilling (HDD) which will make it possible to reach a buffer depth from the seabed of about 20 m, ensuring the absence of potential interference with the marine archaeological area.*	

Part of the *onshore* route falls in areas subject to hydrogeological constraint which does not preclude the possibility of intervening on the territory, but involves integrating the work with the territory, which must remain intact and usable even after human action, while respecting the environmental landscape values.

5.1.2 Protected Areas and Natura 2000 Network

The protected areas of natural interest taken into consideration are the EUAP (Official List of Protected Areas), the areas belonging to the Natura 2000 Network and the IBA (Important Bird Areas).

Law 394/91 "Framework law on protected areas" defines the classification of protected natural areas and establishes the Official List of Protected Areas, which registers all areas that meet the criteria established by the National Committee for Protected Areas. The system of protected natural areas is classified into National Parks, Regional and Interregional Natural Parks, Nature Reserves, Wetlands of International Interest, Other Protected Natural Areas (oases of environmental associations, suburban parks, etc.).

Natura 2000 Network is the main tool of the European Union policy for the conservation of biodiversity. It is an ecological network spread throughout the Union to guarantee the long-term maintenance of natural habitats and threatened or rare species of flora and fauna at Community level. It is made up of Sites of Community Importance (SIC), subsequently designated as Special Areas of Conservation (ZSC) and also includes Special Protection Areas (ZPS).

The Important Bird Areas (IBA) are areas considered to be a priority for conservation, defined on the basis of quantitative ornithological criteria, by non-governmental associations belonging to "BirdLife International". In Italy the project is managed by LIPU (Italian representative of BirdLife International).

The areas indicated in the following table have been identified in the study area: for their location in the area, refer to *D_EIA_TAV. 2.3.1.*

CODE / AREA	NAME	COHERENCE OF THE PROJECT WITH THE PROTECTED AND/OR SAFEGUARDED AREAS
EUAP		
EUAP0920 - RNO	Biviere di Gela Oriented Nature Reserve	Absence of interference: the route is approximately 2 km away from the area
EUAP1131 - RNO	Sughereta di Niscemi Oriented Nature Reserve	Absence of interference: the route is approximately 5.4 km from the area
EUAP1155 - RNO	Bosco di Santo Pietro Oriented Nature Reserve	Absence of interference: the route is approximately 11 km away from the area
NATURA 2000 SITE (*)		
ITA050012 - ZPS	Torre Manfria, Biviere and Gela Plain	***Onshore section***. It falls entirely on the site. **Offshore *section.*** It falls on the site for about 2 km
ITA050001 - ZSC	Biviere and Macconi di Gela	***Onshore section.*** About 80% of it falls on the site
**Following the route's direct interference with the areas of the Natura 2000 Network, in compliance with the current legislation (Article 5 of Presidential Decree No. 357/1997), the Ecological Impact Study was drawn up to analyse the incidence of such interference on habitats, plant and fauna species reported in Natura 2000 Sites, and assessing the intervention's compatibility with the conservation objectives of the sites*		

In addition to the EUAP, ZPS and ZSC areas indicated in the table, the presence of Wetland of International Importance No. 397 pursuant to the Ramsar Convention of 1987 and IBA 166 (Biviere and Gela Plain) is highlighted. The project, in the onshore section, falls entirely within the IBA, while only a part of the offshore section concerns this area.

5.2 Territorial planning

Following the analysis of the constraints and protections present in the study area, the environmental and planning regulatory context was outlined for the territory affected by the implementation of the project, falling in the Province of Caltanissetta, Municipality of Gela. Therefore, the instruments of the territorial government that concern the project area are reported, with the aim of verifying the proposed intervention's compatibility with the indications and prescriptions of the different Plans and current legislation.

The instruments in force in the energy, socio-economic, landscape and environmental protection and territorial sectors were identified and analysed at various levels (starting from the European and/or national scales down to provincial and municipal). An overview of the instruments analysed and the project's coherence with them are reported.

ENERGY PLANNING AND PROGRAMMING	
PLANS/POLICIES/PROGRAMMES AND MAIN OBJECTIVES	COHERENCE OF THE PROJECT WITH THE PLAN
European Energy Strategy *The current intervention programme is determined on the basis of the global integrated climate and energy policy adopted by the European Council on 24 October 2014 and revised in December 2018.* • ensure the functioning of the internal energy market and the interconnection of energy networks • ensure security of energy supply in the EU to ensure a reliable supply of energy when and where needed • promote energy efficiency, energy saving, the development of new and renewable energy sources • decarbonise the economy and move to a low carbon economy • stimulate research, innovation and competitiveness	The objectives of integrating the Internal Energy Market, overall flexibility, greater security of supply and interoperability of the system, placed at the basis of the project's realisation, are in line with those of the European Union's energy policy, both as regards improved functioning of the internal energy market and the interconnection of energy networks, and increasing the security of the energy supply in the European Union.
National Energy Strategy (NES) – 2017 *Adopted with Ministerial Decree of the Ministry of Economic Development and the Ministry of the Environment and the Protection of the Territory and the Sea on 10 November 2017* Objectives: • improve the country's competitiveness, in order to reduce the price gap and the cost of energy compared with the EU • sustainably achieve environmental and decarbonisation targets by 2030 • improve security of supply and flexibility and security of systems and infrastructures	In line with European policies, the National Energy Strategy pursues, among its objectives, the improvement of security of supply and the flexibility and security of systems and infrastructures. For this reason, coherence is found between the project in question and the national planning/programming.
Integrated National Plan for Energy and Climate (INPEC) 2030 *Plan sent in December 2019 by the Ministry of Economic Development to the European Commission* Objectives: • accelerate the decarbonisation process • promote the evolution of the energy system • ensure adequate supplies of conventional sources (security and continuity of supply) • promote energy efficiency in all sectors • promote electrification of consumption • research and innovation • adopt objectives and measures that reduce the potential negative impacts of energy transformation • continue the process of integrating the national energy system into that of the Union	In line with European policies, the INPEC pursues, among its objectives, that of promoting the evolution of the energy system and continuing the process of integrating the energy system into that of the Union. For this reason, coherence is found between the project in question and national planning/programming.

Regional Environmental Energy Plan of the Sicilian Region (REEPS) *approved with Regional Council Resolution No. 1 of 3 February 2009. The plan was updated and on 12 February 2019 a first draft of the preliminary REEPS document was shared* Objectives: • Promote the development of RES, minimising the use of fossil sources • Promote the reduction of energy consumption in end uses • Reduce climate-altering gas emissions • Promote the sustainable development of energy infrastructures • Promote the green economy on Sicilian territory	The project does not conflict with the plan indications, which indicate fossil sources as an important supply source still in the medium-long term.

SOCIO-ECONOMIC PLANNING AND PROGRAMMING	
PLANS/POLICIES/PROGRAMME AND MAIN OBJECTIVES	COHERENCE OF THE PROJECT WITH THE PLAN
European Regional Development Fund Operational Programme (OP ERDF Sicily 2014/2020) *Approved by the European Commission with Decision C(2015)5904 of 17/08/2015 - Resolution No. 267 of 10/11/2015. The new version was approved with Regional Government Decree No. 369 of 12/10/2018 and adopted by the European Commission with Decision (C) 8989 of 18/12/2018* The plan contributes to the European Strategy for smart, sustainable and inclusive growth, directing it to recover the structural delays of the Sicilian Region and achieve greater economic, social and territorial cohesion	The project does not interfere with the objectives and requirements set out in the European Regional Development Fund Operational Programme (OP ERDF) envisaged at the regional level.
Guidelines for the construction of mariculture plants in Sicily *Drafted in 2008 with reference to the requirements of the 2007-2013 Fishing Operational Programme. They are currently being updated.* The objective is to identify criteria aimed at identifying marine areas potentially suitable for mariculture in Sicily, criteria for identifying terrestrial spaces for the construction of hatchery, breeding and related infrastructures, and to provide indications for monitoring aquaculture activities, all in order to limit the impact on the environment deriving from these activities.	In the Province of Caltanissetta there are no mariculture plants. Considering the characteristics of the intervention area, which reflects most of the criteria indicated in the guidelines for exclusion from mariculture activities, it is to be considered unsuitable for mariculture activities. Therefore it can be said that the project in question does not involves interference with the provisions of the guidelines.
Industrial Reconversion and Redevelopment Project (PRRI) *The Programme Agreement for the implementation of the IRRP was signed on 23 October 2018*	There is no interference between the project for constructing the gas pipeline and the Industrial Reconversion and Redevelopment

The IRRP foresees the relaunch of the complex industrial crisis area of Gela, through financial support for investments to strengthen and redevelop the production sector, attracting new investments, enhancing logistics and relaunching employment.	Project (IRRP) which affects the industrial area of Gela adjacent to the area of intervention.

LANDSCAPE AND ENVIRONMENTAL PROTECTION PLANNING AND PROGRAMMING	
PLANS/POLICIES/PROGRAMMES AND MAIN OBJECTIVES	COHERENCE OF THE PROJECT WITH THE PLAN
Regional Landscape Territorial Plan (RLTP) structured in terms of Guidelines approved with Departmental Decree No. 6080 of 21 May 1999 *Landscape Plan of areas 6-7-10-11-12 and 15 falling within the provincial territory of Caltanissetta approved with Decree No. 1858 of 02/07/2015 of the Department of Cultural Heritage and Sicilian Identity* The main objectives indicated by the RLTP guidelines are: • ecological stabilisation of the regional environmental context, the defence of the soil and biodiversity, with particular attention to risk and critical situations • enhancement of the identity and particularities of the regional landscape, both as a whole and in its various specific configurations • improvement of the social usability of the regional environmental heritage, both for current and future generations The provincial landscape plan defines, for each local area (Local Landscape) into which the territory is divided, specific prescriptions and forecasts, plus landscape quality objectives consistent with the RLTP's general objectives. The project falls within local landscapes 16 and 18, for which the following aspects have been taken into consideration: • landscape components • regulatory regimes • landscape assets	Given the project's characteristics, it is always compliant with the Plan's indications because it does not preclude achieving the landscape quality objectives set by the Plan. *Landscape components*: The project in question envisages the construction of a completely underground gas pipeline and some related works (terminals and interception stations) which will have reduced volumes and will not be visible either at medium, nor, at least, at long distance. This considered, the project does not preclude achieving the landscape quality objectives set by the Plan and can therefore be considered compliant with it. As for the individual components, it should be noted that the project: does not conflict with the Plan rules for the geomorphological component; does not conflict with the rules for protecting the vegetation component (if vegetation cuts are necessary, specific authorisation will be required from the competent bodies); does not conflict with the rules on the hydrological component because the course or composition of the water is not changed; as regards the sites of significant landscape-environmental interest, is not among those activities not permitted by the Plan rules; moreover, the interventions do not conflict with the established guidelines; complies with the plan guidelines in the case of an agricultural landscape; is located near an isolated asset (cemeteries and ossuaries). This asset will not be affected in any way, either directly or indirectly by the realisation of the project, which provides for an exclusively underground gas pipeline; does not preclude the preservation of historic roads and scenic routes as the *onshore*

As regards the *landscape components*, the objectives of *landscape quality* are: • safeguarding the widespread landscape, environmental, morphological and perceptual values • visual use of scenarios and panoramas • promoting actions for natural and ecosystem rebalancing • environmental-landscape redevelopment • conserving historical and cultural heritage and maintaining agro-pastoral activity As regards the regulatory regimes, specific protection and enhancement objectives for the landscape heritage are indicated for each one	pipeline will be built underground, while the terminal will be visually mitigated thanks to the creation of green barriers on the perimeter. *Regulatory regimes*: The project in question, in areas with protection level 3), does not envisage the construction of buildings, nor any other construction. In fact, only a short section of the gas pipeline will be built, for which visual mitigation works will not be necessary once the works are completed, as it will not be visible, being completely underground. Considering the provisions for areas with protection level 1) and 2), the project does not conflict with them. *Landscape assets*: The type of project in question is not among those disallowed by the Plan rules; moreover, the interventions do not conflict with the established guidelines and can therefore be considered compliant.
Provisional Plan for the Regional Hydrogeological Structure (PHS). *After the Extraordinary Plan for the Hydrogeological Structure, approved with the Decree of 4 July 2000, the Sicilian Region adopted the Provisional Basin Plan for the Hydrogeological Structure (PHS)* *Provisional Basin Plan for the Hydrogeological Structure of the Gela River Basin and Territorial Area between the Gela River Basin and the Acate River Basin* *Approved with Presidential Decree of 27 March 2007. Presidential Decree No. 523 of 14/12/2011 approved the first "one-off" update relating to CTR No. 639010 for the territory of the Municipality of Piazza Armerina (EN). In 2018, a partial update of the PHS for the municipal area of Gela was carried out*	The project route: does not fall in areas with instability and therefore landslide danger which, even if present within the study area, do not affect the project route being placed at distances greater than 250 m; does not interfere with danger areas and geomorphological risk, absent in the study area; with reference to the hydraulic risk, does not interfere with areas at risk from flooding of nearby waterways. There are also no areas subject to hydraulic hazard; the scope of study does not fall into flood areas due to the hypothetical collapse of the barrier of the Cimia and Disueri reservoirs.
Water Protection Plan (WPP) *Approved with Ordinance No. 333 of 24 December 2008* Objectives: • pollution prevention • remediation of polluted water bodies • sustainable and lasting use of water resources • maintenance of the natural ability of water bodies to purify themselves and	The field of study does not concern significant water bodies affected by the project. In relation to the type of intervention, the project does not run counter to the objectives set by the pollution prevention plan, remediation of polluted water bodies and sustainable use of water resources

to support large and diverse communities of animals and plants	
Regional Plan to Protect Air Quality *Approved with Resolution No. 268 of 18 July 2018 of the Sicilian Region Council* Objective: to guarantee the maintenance of air quality in Sicily – where it is good – and its improvement, in cases where critical elements have been identified	The scope of intervention falls within the "Industrial Areas" zone where there are a significant number of large industrial complexes. These are mainly thermal power plants, refineries, petrochemical and cement plants, industrial activities characterised by high fuel consumption and significant volumes of emissions into the atmosphere. The project in question, with the construction of the underground gas pipeline, is such as not to affect the air quality.
Regional Remediation Plan *Approved with Presidential Decree No. 26 of 28 October 2016* Objective: environmental remediation, with subsequent restitution of the reclaimed land for public and/or private use, of those areas of the regional territory that are polluted by accidental or intentional interventions, with consequent situations of both environmental and health risk	Among the actions envisaged in the plan is the intensification of land remediation in sites of national interest (SIN) through promoting and activating programme agreements with the Ministry of the Environment. For the SNI, environmental remediation and restoration of industrial areas and the marine area in front, remediation of wet areas and surface water bodies, and landfill remediation are envisaged: the project falls, in its offshore section, into the aforementioned SNI. The planned work does not interfere with what is indicated in the plan.

TERRITORIAL PLANNING AND PROGRAMMING	
PLANS/PROGRAMMES/POLICIES	COHERENCE OF THE PROJECT WITH THE PLAN
<u>*Gela General Regulatory Plan (GRP)*</u> *approved with General Director Decree No. 169 of 12/10/2017 published on GURS (Official Gazette of the Sicilian Region) No. 51 of 24/11/2017* Municipal zoning: Homogeneous Territorial Zone *E – Agricultural Green* (governed by Chapter IX, Articles62 - 63 - 64 of the Technical Implementation Rules). Article 63 (*Agricultural green intervention criteria*) reads "*Regardless of the fact that the building interventions concern areas subject to constraints of protection and safeguarding of the territory and landscape, all interventions (building, production, cultivation, infrastructure and roads) aimed at changing the state of the places must also be analysed from the perspective of protecting the landscape in order not to compromise the historical, cultural and constitutive elements of the territory itself."*	Much of the route falls in the E1 – Agricultural Green area, is not in contrast with the provisions of the Plan rules for this intended use, and is therefore consistent with it. As regards the constraints and protections identified, the project does not conflict with what is prescribed by the Plan; in addition, given the interference with Natura 2000 Network sites, it will take into account the provisions in force on the matter. From analysis of the cartography of the Municipality of Gela's GRP it emerges that a short section of the pipeline falls into the area D6 – ASI Area; however, it should be noted that the perimeter of this area, in reality and as verified for the purpose of drafting the expropriation parcel plan, stands along the road that runs west of the planned pipeline, and therefore does not actually fall into the ASI area, but into the agricultural area, like the rest of the route."

6.0 ENVIRONMENTAL IMPACT ASSESSMENT

6.1 Air quality

6.1.1 Baseline

The study area falls within the Municipality of Gela, in the Province of Caltanissetta, along the southern coast of the Region of Sicily. The climate in the area is mid-latitudes temperate.

The climatological analysis was carried out using the "*Climate Atlas of Italy*" by the Meteorological Service of the Italian Air Force (data from year 1971 to 2000), and the data of the Gela station (altitude 45 m above sea level) belonging to the Sicilian Agrometeorological Information Service Network (SIAS) published in "*Climatology of Sicily*" by the Agrometeorology Unit of the Sicilian Region (data from year 1968 to 1994).

The thermal regime has the following characteristics: the coldest months are January and February, with an average temperature of about 12 °C. The hottest month is August, with an average temperature of about 25 °C. The average annual temperature is about 20 °C (the highest in the entire region), and the average annual temperature range is relatively low.

The pluviometric regime is typically Mediterranean maritime, with main peak in late autumn and main minimum in summer, with a gradual decrease from January to June.

The wind characteristics of the area are the result of the superimposition of the local sea-land breeze regime to the large-scale anemological pattern. In general, the high frequency winds come from the NE-SW axis, where a regime of coastal breeze is established, and high frequency and intensity winds from the West. The night is characterized by winds of lower intensity and frequent calm conditions.

The meteorological characterization in the most recent years, based on the observations of six local meteorological stations pertaining to the SIAS network (Sicilian Agrometeorological Information Service), confirms the above description.

The current state of air quality is assessed in accordance with European (Directive 2008/50/EC) and national (D. Lgs. n.155 of 13 August 2010 and following changes and additions) laws. In compliance with current legislation, the Sicilian Region has divided the territory into five areas according to their air quality level and the presence of significant sources of air pollution (major urban areas, industrial areas and major ports on the coast of the Region). The municipality of Gela, of primary interest for the purposes of this study, is included in IT1914 "Industrial areas".

The air quality in the area is monitored by stations belonging to the continuous air quality regional network measuring the concentrations of pollutants. Five stations operate in the IT1914 zone and are in the Municipality of Gela. The data published by ARPA Sicilia in the air quality annual reports from 2015 to 2017 show that in general there are no critical issues for any of the parameters monitored. The values of particulate matter (PM_{10}), nitrogen oxides (NO_X), sulphur dioxide (SO_2), and carbon monoxide (CO) are below the air quality standards. Heavy Metals (Pb, As, Cd, Ni) and benzo(a)pyrene, show no critical air concentrations in the area under investigation.

Regarding Ozone (O_3), exceedances of both the target value for the protection of human health, and the target value for vegetation protection have been observed at the "Gela - Biviere" monitoring station highlighting the need of attention for this pollutant.

Finally, the analysis was extended to the non-methane hydrocarbons (NMHC) concentrations recorded by the monitoring stations in the Municipality of Gela. Although there is no regulatory limit for such pollutant to date, the data showed possible disturbances in the area due to the level of these pollutants.

A specific survey was carried out for a detailed assessment on the territory interfered by the project. The survey identified all sensitive receptors in the vicinity of the onshore route. The identified receptors are listed in Table 2 below and their location is indicated in the *Carta dei ricettori acustici* to the EIA Study (see § *D_eia_tav.4.6.1, D_eia_tav.4.6.2).*

The analysis of the 99 identified receptors suggests that the route of the pipeline crosses a territory with little residential receptors and no sensitive receptors such as schools and hospitals. The Farello cemetery, more than 150 meters far away from the route is the only receptor that can be considered sensitive.

Additionally, the residential receptors closest to the line of excavation of the pipeline are at distances of not less than 40 meters. Almost all of the route, however, is kept at a distance of more than 100 meters from residential receptors. The buildings closest to the track are: R5 (warehouse), R17 (warehouse), R20 (warehouse) and R42 (ruins).

RECEPTORS	DISTANCE FROM THE PIPILINE ROUTE	MODE OF USE
R1	231	PRODUCTION AREA
R2	74	OTHER (LANDFILL)
R3	185	OTHER (STORAGE)
R4	215	RESIDENTIAL
R5	33	OTHER (STORAGE)
R6	75	OTHER (STORAGE)
R7	45	PRODUCTION AREA
R8	187	RESIDENTIAL
R9	185	RESIDENTIAL
R10	183	OTHER (STORAGE)
R11	107	RESIDENTIAL
R12	120	PRODUCTION AREA
R13	54	RESIDENTIAL
R14	45	RESIDENTIAL
R15	71	RESIDENTIAL
R16	32	OTHER (STORAGE)
R17	17	OTHER (STORAGE)
R18	29	OTHER (STORAGE)
R19	39	OTHER (STORAGE)
R20	27	OTHER (STORAGE)
R21	50	OTHER (STORAGE)
R22	66	OTHER (STORAGE)
R23	67	OTHER (STORAGE)
R24	80	OTHER (STORAGE)
R25	52	PRODUCTION AREA
R26	109	OTHER (STORAGE)
R27	163	NOT ACCESSIBLE
R28	128	NOT ACCESSIBLE
R29	115	NOT ACCESSIBLE
R30	118	OTHER (STORAGE)
R31	148	RESIDENTIAL
R32	218	RESIDENTIAL
R33	87	PRODUCTION AREA
R34	91	OTHER (STORAGE)
R35	146	OTHER (STORAGE)
R36	190	PRODUCTION AREA
R37	228	RESIDENTIAL
R38	92	NOT ACCESSIBLE
R39	120	NOT ACCESSIBLE
R40	92	OTHER (STORAGE)
R41	54	RESIDENTIAL
R42	29	RUIN
R43	113	RESIDENTIAL
R44	147	RESIDENTIAL
R45	110	RESIDENTIAL
R46	145	RESIDENTIAL
R47	222	RUIN
R48	51	RUIN
R49	119	RUIN
R50	68	OTHER (STORAGE)
R51	135	RUIN

RECEPTORS	DISTANCE FROM THE PIPILINE ROUTE	MODE OF USE
R52	134	RUIN
R53	57	OTHER (STORAGE)
R54	68	RESIDENTIAL
R55	106	OTHER (STORAGE)
R56	199	OTHER (STORAGE)
R57	115	OTHER (STORAGE)
R57 BIS	155	OTHER (STORAGE)
R58	99	OTHER (STORAGE)
R59	112	OTHER (STORAGE)
R60	122	OTHER (STORAGE)
R61	132	OTHER (STORAGE)
R62	157	OTHER (STORAGE)
R63	91	OTHER (STORAGE)
R64	284	RUIN
R65	282	RUIN
R66	290	RUIN
R67	190	NOT ACCESSIBLE
R67 BIS	250	OTHER (STORAGE)
R68	116	RESIDENTIAL
R69	124	PRODUCTION AREA
R70	220	OTHER (STORAGE)
R71	215	RESIDENTIAL
R72	222	RESIDENTIAL
R73	165	NOT ACCESSIBLE
R74	170	SENSITIVE (CEMETERY)
R75	148	COMMERCIAL
R76	149	NOT ACCESSIBLE
R77	291	COMMERCIAL
R78	261	NOT ACCESSIBLE
R79	275	NOT ACCESSIBLE
R80	187	NOT ACCESSIBLE
R81	105	RESIDENTIAL
R82	173	RESIDENTIAL
R83	205	OTHER (STORAGE)
R84	224	RESIDENTIAL
R85	239	RESIDENTIAL
R86	66	OTHER (STORAGE)
R87	61	RESIDENTIAL
R88	78	RESIDENTIAL
R89	79	COMMERCIAL
R90	103	OTHER (STORAGE)
R91	39	RESIDENTIAL
R92	67	OTHER (STORAGE)
R93	33	OTHER (STORAGE)
R94	25	OTHER
R95	107	OTHER (STORAGE)
R96	209	NOT ACCESSIBLE
R97	153	NOT ACCESSIBLE
R98	88	PRODUCTION AREA
R99	206	PRODUCTION AREA

Table 2: Census of receptors in the study area

6.1.2 Impact Assessment

6.1.2.1 Construction and decommissioning phases

The assessment of potential impacts on the atmosphere was carried out identifying the activities with dust and gas releases to the atmosphere. Emissions estimation and assessment of their effects on air quality was then performed. Such analysis was carried out for the construction phase ("onshore" activities, "*offshore"* activities*, "pre-commissioning"* activities*),* the operating phase, and for the decommissioning phase.

For the *onshore construction phase*, the activities generating air emissions are essentially related to transport vehicles and operating machines, through the main processes of engine

combustion and handling and transport of dusty materials, including soil processing. Emissions were estimated using national, European and international reference methodologies. In general, dust emissions can be effectively limited by taking all necessary measures to contain them (such as wetting surfaces and cleaning machines and construction equipment).

Regarding the *offshore implementation phase*, the activities generating emissions into the atmosphere are mainly associated with naval vessels, through the combustion processes of the engines.

As for the "*pre-commissioning" phase*, the relevant activity is the "hydrotesting", performed by means of stationary diesel pumps and compressors in continuous operation for several days.

The assessment of the impacts on the air quality induced by the construction phase was carried out by comparing the effects, in terms of pollutant concentrations due to the release of the above-mentioned emissions and the applicable air quality standards. The effects of the release of the emissions in the atmosphere was executed by a state of art air quality modeling system. The three-dimensional reconstruction of meteorology was achieved by WRF and CALMET model, the emission dispersion in the atmosphere by CALPUFF model.

The following pollutant were modelled: particulate matter (PM_{10}), nitrogen oxides (NO_X), carbon monoxide (CO) and sulphur dioxide (SO_2).

The following emission scenarios were defined:

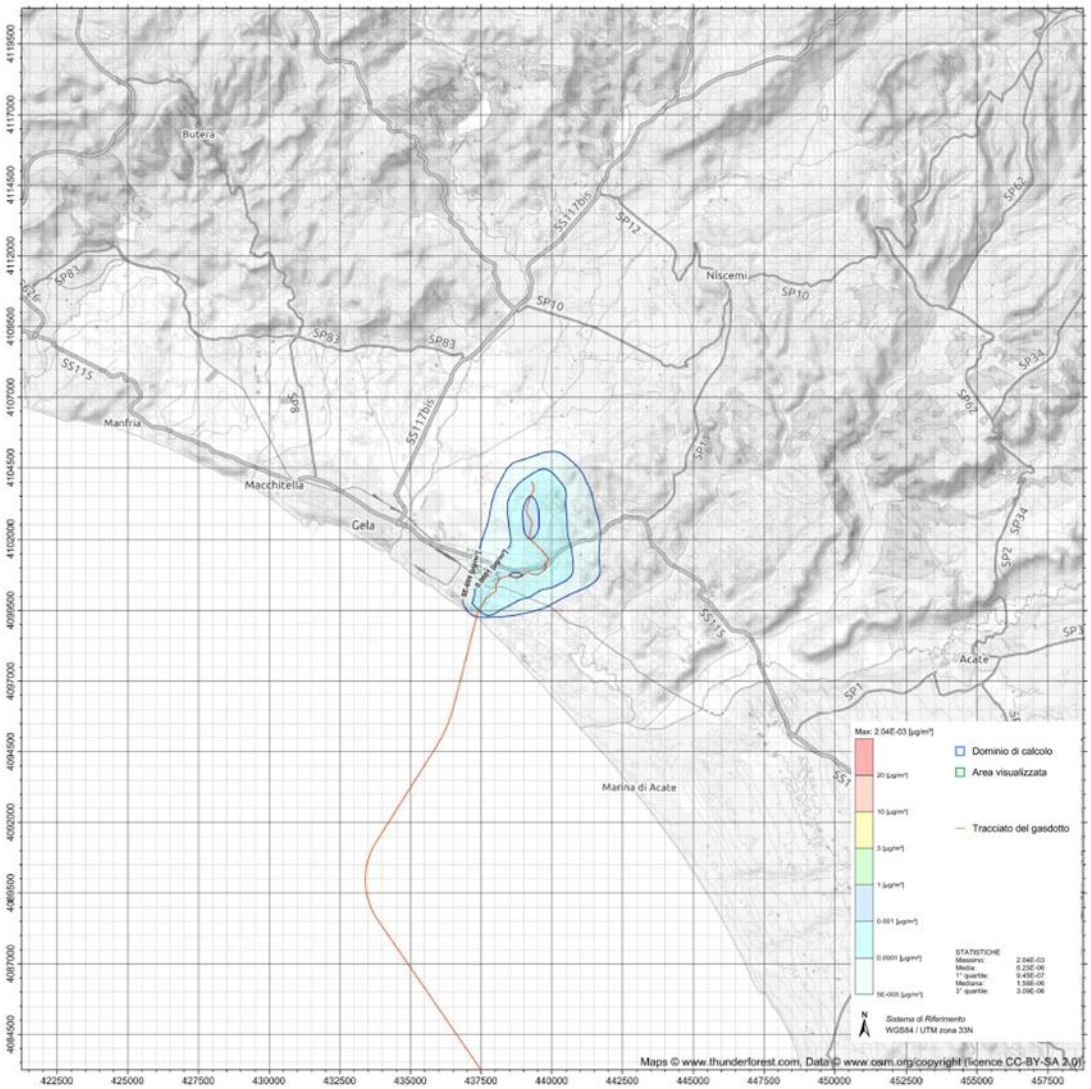
a) Scenario "***onshore*-row"**: includes all onshore activities along the route of the pipeline; the activities are expected for 8 hours a day (from 8 to 12 and from 14 to 18);
b) Scenario "***onshore*-areas"**: includes all onshore activities within the construction sites, namely the terminal, the BVS, the pitches subservient to drilling "trenchless" and temporary areas; the activities are expected for 8 hours a day (from 8 to 12 and from 14 to 18);
c) Scenario "**hdd-drilling"**: includes *onshore HDD drilling operations*; the activities are expected for 24 hours a day;
d) "Offshore" scenario: includes offshore activities; the activities are expected to last 24 hours a day;
e) "Hydrotesting" scenario: includes emissions associated with hydrotesting activities expected to last 24 hours a day.

It is important to consider that, for each scenario, the air dispersion simulation assumed the simultaneous release of all the estimated emissions, although the activities will be carried out at different times. In particular, both linear and sequential activities are also modelled as simultaneous emission distributed along the entire route. This choice, on one hand allows a precautionary representation of the potential impact attributable to the activities, on the other hand gives an unrealistic picture, with a substantial overestimation of the impact. The results of the simulation must therefore be read not as expected values, but as the maximum footprint of the releases in the worst scenario. The exact timing and duration of the work activities will be possible only during the executive design phase. The assessment presented

is adequate for purpose of this study. It shall be also considered that the impact during the implementation phase of the project will be also monitored in order to verify the compliance with the air quality standards.

The analysis carried out identified the areas most affected by the emissions during the construction activities. The spatial distribution of modelled air concentrations is presented in the tables annexed to the EIA Report which also provide comparisons between estimated values at identified sensitive receptors and their relative applicable limits.

The following Figure 16 shows an excerpt from the above tables concerning the average annual concentration of SO_2.



D_EIA_Tav.5.1.01.a

Scenario "onshore-row"

Ricadute delle emissioni

SO_2 - Concentrazione media annua [µg/m³]
(protezione della vegetazione)

Livello Critico D.Lgs. 155/2010: 20 [µg/m³]

Figure 16: Excerpt from Map D_EIA_Tav.5.1.01.a - SO_2 average annual concentration

The modelled concentration values of SO_2, PM_{10} and CO are lower than the limit values and critical levels foreseen by D. Lgs. 155/2010.

As regards nitrogen dioxide (NO_2), modelling estimates do not show any critical average concentration. Exceedances of the threshold value in terms of hourly percentiles (maximum hourly average concentration values) are possible. However, considering the highly precautionary criteria assuming in the model application, and given the intrinsic temporary nature and complete reversibility of the effects, the impacts can be considered acceptable when combined with specific air quality monitoring campaigns in the areas identified as being more sensitive.

The decommissioning phase takes place at the end of the lifetime. This phase will be carried out in accordance with the legislation in force at that date and in collaboration with the competent authorities. The main alternatives for this phase are the pipeline removal, where technically feasible, or non-removal. The two alternatives require different activities, which have a substantially different impact on the environment and the territory. The first alternative (out of service of the pipeline) has a reduced impact on the environment, but does not remove the infrastructure and leaves its constraints unchanged, the second alternative requires work similar to the construction phase of the work, with impacts on the environment. The decommissioning of the not removable part of the offshore pipeline consists of its in-situ inertization by inspection, air flushing and filling with suitable material in order to prevent future collapse.

6.1.2.2 Operating Phase

No significant emissions are expected during the ordinary operation of the infrastructure. Gas emissions will be possible in case of unusual and non-routine events, in case of emergency or maintenance. Such events will be minimized as much as possible: for example, in case of need of depressurization of the pipeline, the gas is generally pushed into the next section.

6.2 Water

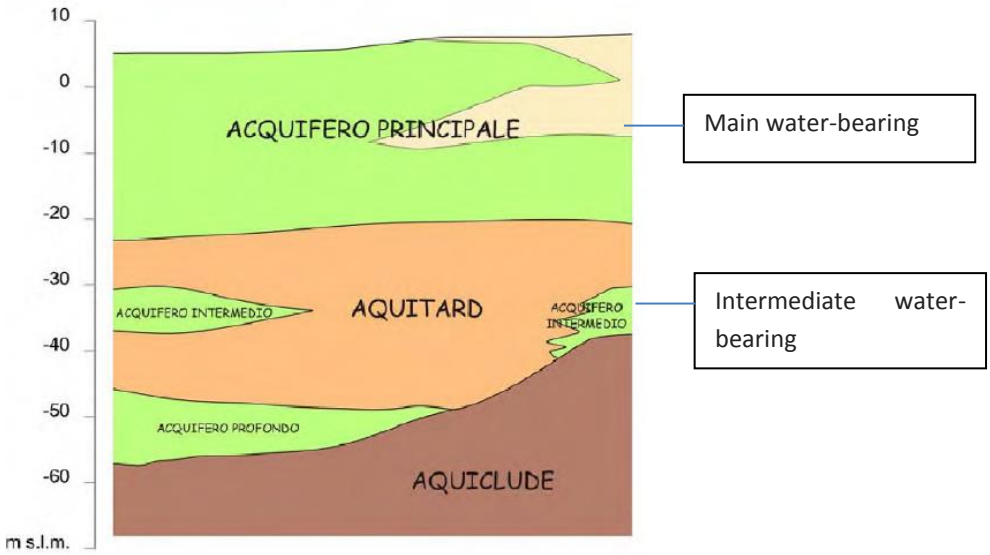
6.2.1 Baseline

6.2.1.1 Groundwater

The hydrogeological structure of the area has a multi-layer aquifer system, consisting of potentially aquifer levels located a few metres from the countryside.

The lower base is made up of impermeable Pleistocene clays, below which the presence of water circulation in deeper confined aquifers is not verified.

According to the "Water Protection Plan" of the Sicily Region, the main (or deep) aquifer is housed in the sandy horizon with the highest permeability, located at the base of the alluvial succession. The base of this horizon, at a regional level, plunges from the north, where it lies a few metres deep from the terrain level, to the south, where it can be detected at 20-40 m from the terrain level.



Source: Study of the hydrogeology and underground hydrodynamics of the Gela Multi-Company Facility, October 2009

Figure 17: General scheme of hydrostratigraphic relationships in the facility area

As regards the piezometric level of the main aquifer, the main direction of the aquifer's outflow is oriented NE – SW, perpendicular to the coastline, in accordance with what has been observed on the scale of the entire Gela Plain.

Seasonal recharge of the aquifer is concentrated in the period December-April.

The aquifer's altitude is around 8-10 m from the terrain level.

- *Groundwater quality*

From a qualitative point of view, the following hydrogeological problems prevail in the coastal area where the project is inserted:

- Low subsidence and intrinsic vulnerability of the aquifer to pollution
- Insalination of the aquifer

The results of the 2011-2017 monitoring activity were used to evaluate, at the level of each monitoring station and for each year the monitoring was carried out, the exact chemical status of the underground water bodies.

From 2011 to 2017 the Sicily ARPA (Regional Environmental Protection Agency), in compliance with Directive 2000/60/EC and pursuant to Legislative Decree 30/2009, carried out the monitoring of the underground water bodies identified by the Management Plan of the Hydrographic District of Sicily. The chemical status detected for this aquifer in the period 2011-2017 is "Poor".

Codice CIS	Nome CIS	Codice Stazione	Nome Stazione	Tipo Staz	SCAS 2011	Parametri critici 2011	SCAS 2012	Parametri critici 2012	SCAS 2013	Parametri critici 2013	SCAS 2014	Parametri critici 2014	SCAS 2015	Parametri critici 2015	SCAS 2016	Parametri critici 2016	SCAS 2017	Parametri critici 2017	SCAS 2011-2017	Stato chimico CIS	Grado affidabilità valutazione
ITR19 PGCS 01	Piana di Gela	ITR19PGCS01 P01	Mignechi biviere	pozzo									Scarso	1 principio attivo di pesticidi, Piombo, Cloruri, Solfati, Conducibilità					Scarso	Scarso	Alto
ITR19 PGCS 01	Piana di Gela	ITR19PGCS01 P02	PZ3	piezometro													Scarso	Boro, Cloruri, Conducibilità, Solfati, Nichel	Scarso		
ITR19 PGCS 01	Piana di Gela	ITR19PGCS01 P03	PZ9	piezometro													Scarso	Boro, Cloruri, Conducibilità, Solfati	Scarso		
ITR19 PGCS 01	Piana di Gela	ITR19PGCS01 P04	PZ4	piezometro													Scarso	Boro, Cloruri, Conducibilità, Solfati, Nichel	Scarso		
ITR19 PGCS 01	Piana di Gela	ITR19PGCS01 P05	PZ19	piezometro													Scarso	Ammoniaca, Arsenico, Boro, Cloruri, Conducibilità, Solfati	Scarso		

Figure 18: Chemical status of the groundwater body close to the power plant for each monitoring station in the seven-year period 2011-2017

- *Contaminated sites*

The *onshore* and *offshore* sections of the planned gas pipeline are respectively adjacent and fall within the Site of National Interest (SIN) of Gela, established with Law 426 of 1998 and having a total area of approximately 5,955 ha. The area includes 795 ha on the onshore part and around 4,560 ha at sea, demarcated by the Ministerial Decree of 10 January 2000.

The area falls close to the inhabited centre, which has developed over the years according to the development of the industrial centre. The plants that caused the pollution belong to different categories:

- petrochemical and refinery plants (two atmospheric plants and one vacuum distillation plant, two for coking, one for catalytic cracking and one alkylation plant, to name just a few), belonging to Agip Petroli, Eni (Agip division), Sviluppo Sardegna, Syndial and Polimeri Europa (both formerly Enichem)
- a 262 MW thermoelectric power plant powered by petcoke, which powers the refinery plants
- chemical plants belonging to ISAF and Polimeri Europa

The soil and groundwater of the Petrochemical Site are the matrices that were most affected by the impact of these plants, due to the high concentration of heavy metals (arsenic, selenium, mercury, nickel, lead, cadmium, iron and manganese), aromatic hydrocarbons, carcinogenic chlorinated compounds, ammonia, benzene, toluene and polychlorinated biphenyls (PCBs). There can be no overlooking the contamination of the coastal marine area which, as well as the spillage of process and cooling waters from the industrial centre's processes, has also shown the presence of uncleaned civil waste and waste from port activities; furthermore, one of the largest landfill sites in Europe is in the area.

6.2.1.2 Surface water

From a hydrographic point of view, the Gela plain is crossed by numerous rivers mainly of a torrential nature, exploited since ancient times to irrigate the fields with the creation of

"outlets", once navigable in its final section with the exception of Gela. The rivers that develop in correspondence with or in the immediate vicinity of the pipeline route are:

- The Gela river, which originates from the reliefs north-west of Piazza Armerina, receives numerous tributaries along its course including the Maroglio river, which in turn is fed by the Cimia stream diverted into the dam of the same name, which flows east of Gela near the industrial area. The Gela is diverted into the large artificial basin called Disueri Lake.
- The Priolo canal, the minor water catchment area between the Gela and Acate basins, originates in the Niscemi area and flows into the Signore Plain.
- The Acate river, which represents the provincial border with Ragusa, originates in the Hyblean plateau and, after being diverted into the Ragoleto dam and feeding the Biviere di Gela lake, flows east of the latter.

Figure 19: Location of the hydrographic network near the Project Area

- *Surface water quality*

The two bodies of water affected by the pipeline route (Canal Priolo and artificial canal) are not part of the Quality Status monitoring plan for the river bodies in Sicily envisaged by ARPA Sicily and consequently there is no data on their status of ecological quality and chemistry.

For this reason, in the underlying Figure 20, the quality indexes of the Ecological and Chemical Statuses relating to neighbouring water bodies are reported, monitored by ARPA Sicily in the period 2011-2015.

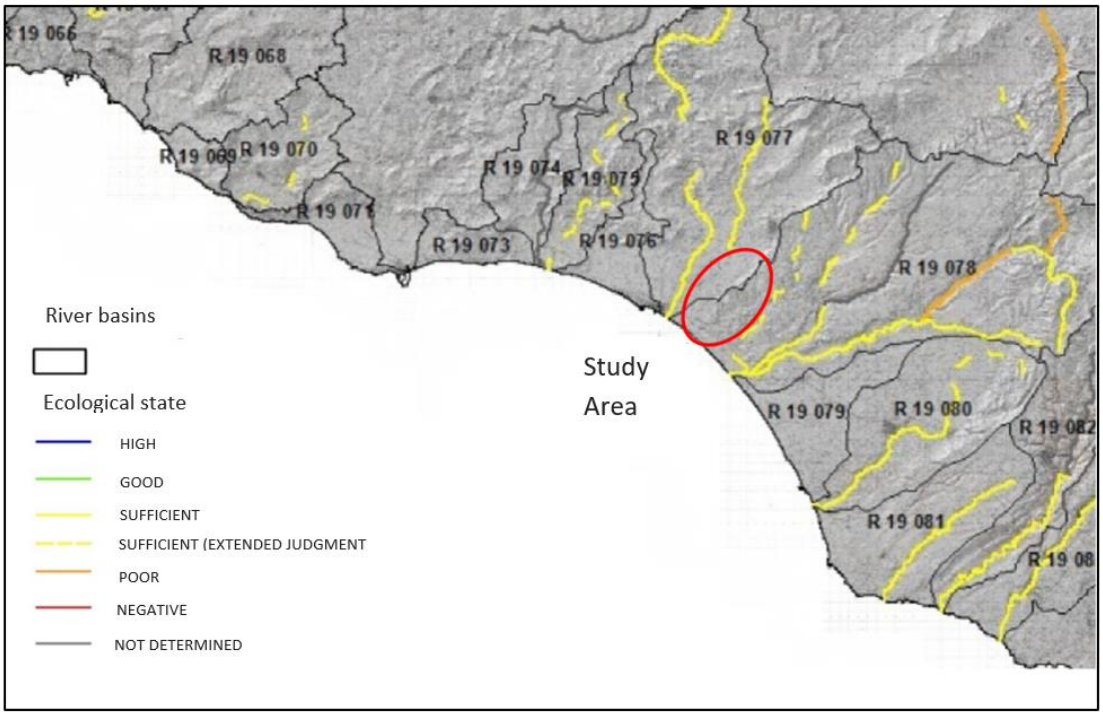


Figure 20: Ecological status of river water bodies in Sicily (2011-2015) Source: ARPA SICILY - Regional yearbook of environmental data 2015

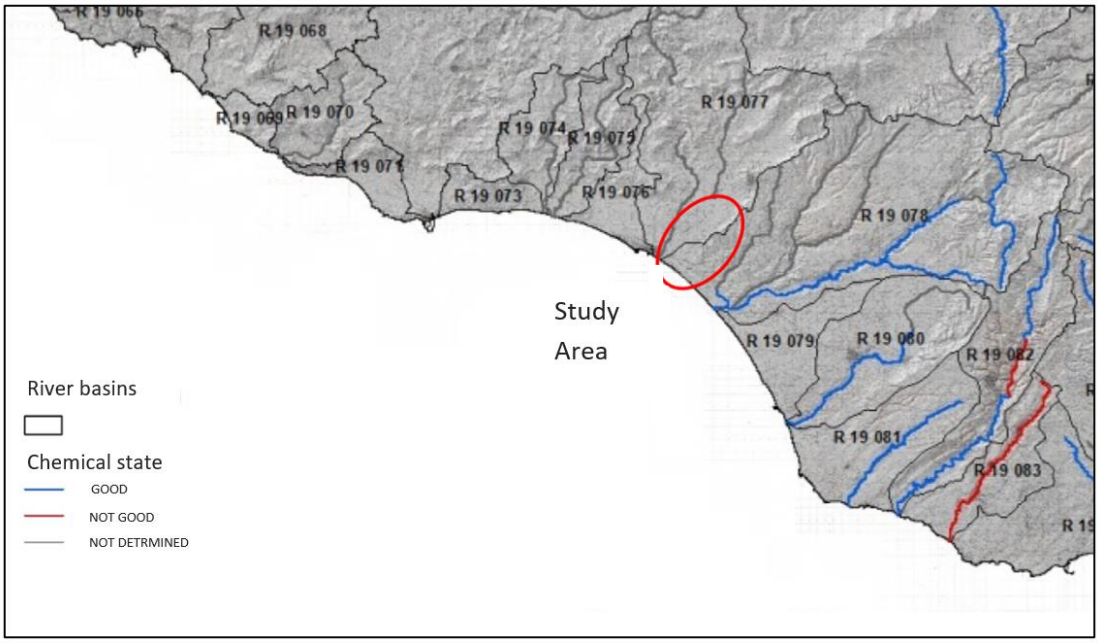


Figure 21: Chemical status of river bodies in Sicily (2011-2015) Source: ARPA SICILY - Regional yearbook of environmental data 2015

Below is a summary of information regarding the quality status of the two adjacent rivers, namely the Gela River and the Acate Dirillo.

As regards the Canal Priolo, as mentioned, quality data is not currently available as no analysis has been carried out by ARPA.

Gela River

The results obtained from the monitoring campaign carried out by ARPA Sicily in the period July 2005-June 2006 show that the monitoring station of the Gela river is characterised by a "sufficient" status of the water's ecological and environmental quality, deriving from a level of pollution from macro-descriptors equal to 3 and an extended Biotic index of Class II, corresponding to an environment where the values of the biological quality elements show signs of alteration deriving from human activity.

In 2011, ARPA carried out analysis of chemical-physical parameters functional to determining the LIMeco index on the Gela River, highlighting a status of "**good**" quality.

With the update of the PdG (2016), the water body (and consequently the ecological status) has been assigned a "not good" status for macrophytes and macroinvertebrates. The water body has been practically dry since April 2017 with pools of still water and complete coverage of the riverbed by reeds and various piles of solid waste (see § Figure 22).

Figure 22: Gela River – section at the PdG monitoring station

Acate Dirillo River

The monitoring carried out revealed an overall poor quality of macroinvertebrates, which are worse in spring than in summer (see §. Figure 23Figure 23).

Figure 23: Acate Dirillo River – section at the valley monitoring station

For the classification of the chemical status, the priority substances of Table 1/A of Ministerial Decree 260/2010 were determined, whose concentrations are lower than the Environmental Quality Standards (EQS) both in 2015, during which the presence of nickel and chlorfenvinphos was detected, and in the other years of monitoring. The Chemical Status was therefore good.

- *Quality of marine-coastal waters*

The Region of Sicily, in accordance with Annex II of Directive 2000/60/EC and Ministerial Decree 131/2008, and on the basis of the natural geomorphological characteristics, or morphology of the submerged coastal area (including the adjacent mainland area) and nature of the substrate and hydrological characteristics, or vertical stability of the water column, examined the entire Sicilian coastal strip in the Management Plan of the Hydrographic District of Sicily for the purpose of typing coastal waters.

From the monitoring carried out on 30 water bodies identified within the 30 coastal stretches considered homogeneous, it is highlighted that the coastal stretch where the project is inserted has a "sufficient" Ecological Quality.

The coastal stretch where the project is inserted has a "good" chemical status.

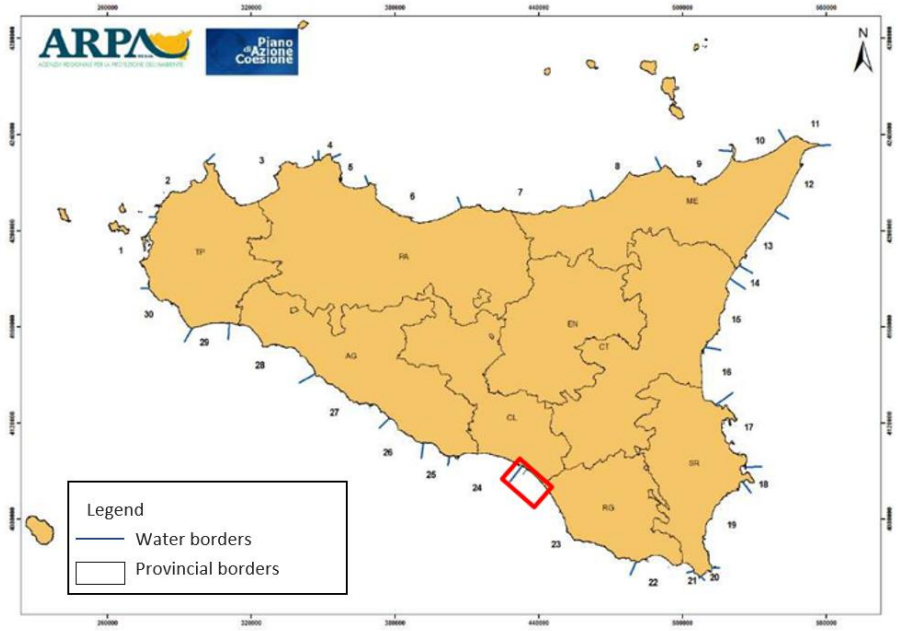


Figure 24: Location of marine-coastal water bodies identified in the DAR (Regional Department of Water and Waste) Convention. The project area is in the red box

6.2.2 *Impact assessment*

6.2.2.1 *Construction and decommissioning phase*

The impacts during the construction phase on the surface and underground water environment component are attributable to:

- potential water contamination at the crossing of the Valle Priolo canal:
- possible interference with the outflow in the riverbed of the Valle Priolo canal
- possible interference with the river buffer zones
- construction site water supplies

- *Potential water contamination at the crossing of the Valle Priolo canal*

The foreseeable perturbations towards the surface and underground water environment, which can occur during the construction phase of an underground pipeline, have a transitory character. In the case in question, the only watercourse crossed is the course of the Valle Priolo canal as, once passed, it develops parallel to an artificial canal until it reaches the coast line.

The possible interference with the underground water environment can only be reported against the surface water table of limited thickness and hydrogeological potential, which varies seasonally according to meteoric recharge.

The levels of potential impact by the planned gas pipeline on the surface water environment are mainly negligible in relation to the characteristics of the crossing of the Valle Priolo canal and the absence of hydraulic risk areas (there are no areas of flooding defined by the current PAI).

During the construction phase, particular attention must be paid to the possible spillage of polluting fluids that can infiltrate the soil, reaching the underground aquifer, or that can spread superficially in the waters of the hydrographic network, consequently worsening their quality.

The resulting material from the excavations, usually set aside on the side of the trench, must be positioned in such a way that it does not obstruct the outflow of surface water, organised or diffused, which could cause it to run away and/or create stagnation.

- *Possible interference with the outflow in the riverbed of the Valle Priolo canal*

The crossing of the Valle Priolo canal has been designed in such a way as to exclude possible direct interference with the runoff waters of the waterway, which has a seasonal regime.

In fact, suspended structures in the riverbed, such as the air bridge, were avoided and *trenchless* techniques were used which in fact do not interfere in any way with the existing riverbed configuration. Due to the expected operating methodology, it will not be necessary to carry out restoration work.

- *Possible interference with the river buffer zones*

As indicated in the project drawings, the land route of the gas pipeline falls within the buffer zone of the "Valle Priolo Canall" waterway, 150 m wide.

To remedy the possible interference with the river system's hydraulic balance, it should be noted that the pipeline will be completely buried for the route's entire progress, with the pipe's depth from the ground level to the extrados being at least 2 m, as shown in the figure below.

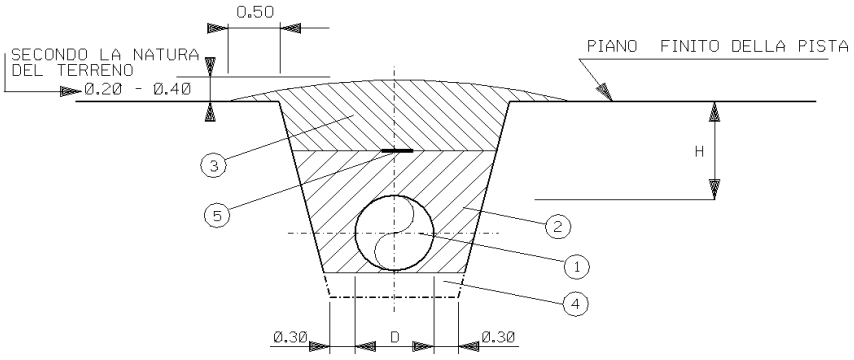


Figure 25: Typical Section of the Excavation

The complete burial and restoration of the pre-works morphological conditions of the section involved in the work will in any case guarantee the normal outflow of surface water which falls into areas not affected by flooding processes and not subject to hydraulic risk.

- *Construction site water supplies – Possible interference with the underground water table*

As indicated in the project documents, there are water requirements necessary for mixing cement (from local supplies) and for restoring the trees of visual mitigation (provided by authorised nurseries). The project foresees that drinking water will be used for wetting the work areas (to limit the dispersion of dust in the atmosphere), for reinforced concrete works, for hydraulic tests of the ground sections (pipes and systems) and for civil uses (for staff).

6.2.2.2 Operating phase

Given the particular features of the underground aquifer, characterised by low permeability, the burial of the pipeline represents a practically negligible reduction in permeability. Furthermore, the project route has a longitudinal development that is sub-parallel or slightly inclined with respect to the underground runoff lines, thus not determining a possible "barrier effect".

The complete burial of the pipeline does not cause changes that can interact with the surface runoffs, so the potential impact levels on the surface water environment are negligible.

6.3 Soil and Subsoil

6.3.1 Baseline

The study area is sited in the Gela Plain, which subsoil is characterized by the presence of chaotic rocky bodies covered by more recent clay-sandy deposits.

The area of the project is affected by the presence of terraced floods represented by deposits having limited extension, morphologically flat, with thicknesses not exceeding 10-15 m and consisting of sand, well-rounded gravel and pebbles up to decimetric dimensions.

From the strictly lithological point of view, the territorial context is constituted by a lithological complex exclusively of alluvial type, while to the West emerge calcareous lithologies, calcareous-marly to which chalky formations are associated. The gentle slopes are occupied by clay and marly clays. Specific geognostic and geophysical surveys have been carried out along the planned route for the implementation of the gas pipeline, in order to define the local litho-stratigraphic and geotechnical features.

The investigations showed a certain lithological heterogeneity: the presence of fine elements has been identified, ranging from the compact grey clay, to the hazel clay and sandy clay, up to dark brown silty sands and coarse sand. It has also been found the presence of a clay layer of yellow ochre with limited levels of sandy conglomerate with heterogeneous centimetric pebbles.

From the geomorphological point of view, the Gela Plain is a morphological element of the late-quaternary age derived from the modeling by the tectonics and the oscillations of the sea level of the emerged front of the Sicilian chain. It consists of an extensive coastal plain that slopes slightly towards the sea, with an average gradient of 2-3% in the South-South West direction. The only modifications to the flat landscape are represented by the incisions of the water streams that cross it and by the high morphological isolates usually set on more tenacious rocks. There is no particular instability in the area.

Gela Terminal and the SRG station will be placed in external area to areas of instability and/or geomorphological dangerousness. In addition, the route does not interfere with any areas of geomorphological hazard.

The Municipality of Gela is located in seismic zone 2. On the basis of historical seismicity data, the area of the Gela Plain is not particularly subject to macro seismic phenomena.

The pedological characteristics of the sites under investigation are strongly influenced by the clayey nature of the substratum and by the flat morphology of the area. As a pedogenetic factor, the precipitation regime is characterized by prolonged periods of drought in the spring and summer months.

Taxonomically, they are basically alluvial soils – Vertisols, typical of areas of mainly alluvial nature, with flat or sub-flat morphology. Horizons are generally underdeveloped.

On the basis of soil quality index map drawn up by the Sicilian Region, and taking into account that the crossed territory has a low susceptibility to erosion, a medium degree of stoniness, a depth from high to moderate, a low gradient, good drainage capacity and a texture having a good ability to retain water and to resist erosion, it is possible to assume that, based on the definition of the Land Capability Classification (LCC) classes, the soils involved by the project

fall into Capacity Class II or I or that they are soils with few or moderate limitations to agricultural use.

Concerning morphological characterization of the seabed, the area facing the landing is characterized by very gentle slopes (average gradient 2°) and becomes deeper moving towards the open sea. From the bathymetric reconstructions carried out in the design phase, in the area immediately close to the coast we can observe the presence of the Greenstream pipeline and the presence of a trench in the NE-SW direction on the north-eastern side of the detection corridor.

The surveys carried out as part of the project analysis revealed a regular seabed, slightly sloping covered by sediments with medium-fine particle size and marine vegetation mostly consisting of *Cymodocea Nodosa*. Vegetation distribution is not homogeneous within the area.

In the area there are no elements that suggest important phenomena of sediment transport. Moving away from the coastal area, the seabed is flat with gentle slopes (1°) and becomes progressively deeper towards the south-east. In this case it is noted on the seabed the presence of rocky outcrops with slopes up to 9° and buried landslide deposits.

The coast is characterized by a shallow sandy coast and homogeneous seabed consisting of medium sands passing *offshore* to fine sands, characterized in the first meters of depth by a long series of bars and/ or seams submarine.

The stretch of coast affected by the landing is characterized by a beach width of up to 20 m; in addition, the beach is bordered by a sandy cliff, originating from marine erosion, varying in height between 3 and 7 m; it is subject to erosion which causes the shoreline to recede. On the base of historical data, the regression of the stretch of involved coast is continuous since the end of 1800, with a total regression of the variable coastline between 210 and 260 m.

In the framework of the analyses carried out during the design phase, water and marine sediment collection campaigns were carried out in March 2019. The document detailing the findings of these surveys is called "FINAL REPORT. Environmental Campaigns" and is attached to the project of the works. A series of samples were also carried out in a section close to the coast of the pipeline at Gela. From the results obtained, sediments are classified as loamy sands, sandy silt, sandy-loamy silt and sandy-loamy/loamy silt.

The qualitative characterization of sediments near the Gela landing, particularly referred to metals, hydrocarbons, Pcbs, Pahs, is presented in the following.

For metals, all concentrations detected are above the detection limit (LR) except thallium, tin, chromium (VI) and antimony. For the other elements a definite trend is observed, except few analytes (mercury, arsenic and vanadium). In more than half of the sampling stations the total hydrocarbon concentrations (C 12) are above the detection limits with a range between 0,48 and 7,1 mg / kg.

In most sampling stations the total hydrocarbon concentrations (C> 12) are below the detection limit. At all sediment sampling stations the values of chlorinated biphenyl compounds (Pcbs) are below the detection limit, except for a station where the total PCB was detected of 0.00054mg /kg.

With regard to Pahs, very often the concentrations detected are below the detection limits separately in some samples where concentrations are however detected.

Concerning biological characterisation carried out in sediment sampling campaigns, which can be summarised using specific biotic reference indices, the following results are available:

- AMBI INDEX: values range from 0 to 1.2. The result is an unpolluted site with a normal benthic community health in 5 stations and an impoverished benthic community in all 15 other stations.
- M-AMBI INDEX: values range from 0,5 to 1,0. The result indicates that the ecological status in 8 good stations, while in 8 stations are classified as high; only in one station the ecological status is moderate.
- BENTIX INDEX: values range from 0,5 to 5,7. According to index values, sampling sites are uncontaminated in 12 stations; slightly polluted in 3 stations and extremely polluted / azotic in 2 stations.

As part of the geognostic surveys, summarized in the Geological Report attached to the project, a preliminary chemical characterization of the soil and rocks excavated was carried out, with the aim of assessing their environmental compatibility in order to be able to be reused directly on the production site, during the restoration phase of the areas, without any treatment other than normal industrial practice as defined in the DPR 120/17 s.m.i. These analyses shown that, for all the samples taken, all the values of the elements analysed are within the limit of *"Contamination threshold concentrations for sites for public, private green use*" defined in Table 1 / A, Annex 5, Part IV, Title V, of D.Lgs 152/06 and s.a.s.; according to these results, therefore, the soil can be reused in the same place after excavation.

6.3.2 Impact assessment

6.3.2.1 Construction and Decommissioning phases

Potential working phase impacts on soil and subsoil are:

- Soil occupation of construction sites
- Problems of stability and/or interference with hydrogeological risk areas
- Land handling and waste generation
- Potential contamination of sea bottom and marine sediments during excavation

For the implementation of the piping the project foresees reduced work areas along the path that will move progressively along the route. In general, for the installation of such a kind of pipeline, a width of the total site area (including the trench) of 21 m (9m + 12m from the pipe axis) is provided. This width can be reduced to 18 m for a limited section in case of particular conditions (such as obstacles, protected trees, etc.).

In the Italian *onshore* section of the pipeline there is also a temporary working site to be used for the whole period of construction, of about 18,000 square meters. At the end of the construction this temporary yard area will be restored as *ante operam*.

Another working temporary area is near the landing point dedicated to the activities. Also this area will be restored at the end of the works.

As far as possible, the pipeline will be built in close proximity to existing infrastructure, especially in road corridors, so as to ensure the minimisation of interference with agricultural areas and the use, even in part temporary, of productive soil.

Finally, techniques will be adopted that minimise potential interference with soil, waterways and infrastructure in the event of crossing them, such as the horizontal directional drilling method (HDD).

Given the above, the impact in terms of land occupation at the construction site has to be consider limited and reversible.

Concerning the relationship of the project with the morphology of the places, the planned interventions for the laying of the pipeline involve sub-mountainous and hilly areas that are not characterized by particular problems of stability; in addition, the route follows as far as possible existing road corridors, which, in these places, are not subject to specific factors of instability. Anyway, at the end of implementation of the pipeline operations morphological and hydraulic restoration of the places will be done.

The only critical area, the landing area, is crossed through the Horizontal Controlled Drilling methodology. The escarpment is overcome by adopting the HDD system starting from the yard area planned for the landing; the inlet point of the pipeline is located at 10 m a.s.l.. This avoids a possible contribution to the coastal erosion to which the coast is subject.

The installation of the pipeline to the ground requires a linear excavation activity, therefore earth movements are expected especially during the excavation of the trench. The excavation material will be set aside at the edges of the work area and will then be transferred to the same point from which it was taken, to cover the pipe; this operation will be performed avoiding the mixing between this material and the layer of soil (humus) set aside for the final cover and the recomposition of the soil.

In Italy, the earthworks associated with the construction of the pipeline are excluded from the waste legislation (D.Lgs. 152/06 and subsequent modifications and additions), as the excavated material will be reused at the same place of production.

A soil characterization campaign will be conducted before the start of the construction works, in order to verify that soil and rocks in the area are uncontaminated and therefore they are suitable to be reused on the site of production, as required by Decree D.P.R. 120/2017.

A preliminary estimate of the earth movements in the Italian *onshore* section provides for a total excavation volume of about 94,000 cube meters and the aforesaid earth movements are evenly distributed over the whole route; as already said, all excavation material will not be transported out of the work area and will be reused *in situ*. There is no surplus material except in cases where horizontal drilling is used to cross water courses or infrastructure. This material (about 320 m^3, equal to 0.34% of the earth handled) will be treated as waste, according to Legislative Decree 152/06, subject to characterization and disposal in authorized landfills.

A 'trench excavation activity in offshore area is planned at the port or exit point / inlet of the pipeline. This activity will involve the displacement of about 1,200 m^3 of land from the bottom of the sea. During drilling, the solid part of the excavation material extracted from the drilling will be separated from the aqueous-based suspension. At the end of the works the solid material will be characterized and delivered in landfills authorized according to Italian law,

due to the fact that the landing section is within the "Site of National Interest" of Gela. A preliminary disposal volume of approximately 1,000 m^3 is planned.

Given the above considerations, therefore, it appears that most of the excavated land will be reused *in situ* and the management of the excavated land and rocks for the implementation of the interventions in the project is in any case subject to the limits and procedures by the D.P.R. 120/17.

As regards the potential risk of soil contamination, this may be caused by accidental spills from vehicles, tanks and storage of chemicals, metal-working residues, from welding residues and from waste and processing effluents. It is stressed that the project provides all the necessary measures to avoid possible contamination even following any accidental events. A particularly important element could be represented by the drilling fluids used for the commissioning of the piping through HDD processes, for example at the landing. However,mixtures of drilling fluids consisting of present materials in nature as water, bentonite and biodegradable additives will be used, therefore any leakage of fluids should be considered as a harmless action and not as an unnecessary onerous problem.

Based on the above considerations, it is considered that in terms of the risk of an accident and soil contamination, the activities envisaged by this project have a minimal, short-term, reversible and closely local impact.

6.3.2.2 Operating phase

During the operating phase the impacts on the soil and subsoil will be very limited and due to:

- Soil occupation and contribution to the risk of desertification of areas;
- Potential contamination of soil and marine sediment;Seismic risk.

The long-term occupation is determined by the presence of the planned SRG terminal connection in Gela and the pipeline's right of way area. Concerning the risk of desertification of the involved territory, it should be noted that the amount of waterproofed soil that will be subtracted from current agricultural uses is about 6,900 m^2, or less than one hectare of land.

The concerned soil has good production capacity and it can still be returned to agricultural uses once the plant is decommissioned. Furthermore, it will not be waterproofed and the surface layer of soil (humus) will be restored after the piping has been laid, using a working method ensuring the proper maintenance of the agronomic quality of the soils being handled.

In conclusion, given the extremely limited long-term occupation of soil and the possibility of implementing everything possible to reduce the risk of soil impoverishment, it is considered that the choices made are those that ensure impact minimization.

Potential soil contamination during the operation phase may be associated with waste handling/disposal practices. However, due to the waste management plan and to a proper waste management, the impact will be controlled and/or minimised.

Impacts on the seabed during the operation of the pipeline are related to the potential accumulation of sediment and/or by sinking/erosion, resulting from the presence of the pipeline, and not by actual contamination problems. The route of the pipeline will avoid major rocky outcrops, where the effects described could be more noticeable. It is considered, in any case, that this impact is extremely limited in the section of interest for the substantial absence

of important rocky outcrops that, based on the optimization of the offshore track, can be easily avoided.

As regards the seismic risk, based on the available databases for the determination of the historical seismicity of the area, it appears that the area is not associated with any specific earthquake, but only to events of reflection for epicenters placed in the area of Catania.

6.4 Terrestrial biodiversity

6.4.1 Baseline

The study of the natural factors characterising the territory helps examine the potential interferences and critical issues induced by the realisation and operation of the project infrastructure. Considering the type of work, the potential critical issues with respect to the terrestrial ecosystem are essentially attributable to the activities relating to the construction phase for laying the gas pipeline. During the operating phase, the problems are to be considered limited with respect to this environmental factor.

The examination of the Natura 2000 network, carried out in the vast area where the project is inserted, highlighted the presence of ZSCs (Sites of Community Importance where specific conservation measures have been adopted, which offer a greater guarantee to stop loss of biodiversity) and ZPSs. In particular, the Project intercepts the following sites directly:

NATURA 2000 SITE	CODE	NAME	RELATIONSHIPS WITH THE PROJECT
ZPS	ITA050012	Torre Manfria, Biviere and Gela Plain	Direct interference – the *onshore* section falls entirely on the site, the *offshore* section falls there for about 2 km
ZSC	ITA050001	Biviere and Macconi di Gela	Direct interference – about 80% of the *onshore* section falls on the site

Figure 26: Location of the route with respect to Natura 2000 Sites

The project's interference with the Natura 2000 network sites was analysed in detail in the document *Annex 2 – Appropriate Assessment (R_VIEC_004),* attached to the EIA.

As can be seen from the Land Use Charter attached to the SIA (see §. *D_EIA_TAV.4.4.1*), the element characterising the landscape affected by the project is represented by agricultural activities and the large-scale presence of greenhouses for vegetables which essentially cover the entire coastal sector

The natural plant physiognomies falling within the study corridor approximately 2 km wide across the pipeline being projected, and in particular those intercepted or close to the route, have a limited distribution. These are the infesting vegetation of uncultivated plants attributable to *Stellarietae mediae* and *Echio-Galactition*), the psammophilous vegetation in

the dune and retrodunal belt, the coastal chamaephytic vegetation of the *Ononidion* and the vegetation of the river and lake environments (dominating reeds *Phragmites communis*).

As far as the wildlife population is concerned, the field of study into which the project falls, while retaining biotopes of considerable wildlife interest for the wintering, nesting and stopping of various species of ornithic, migratory and sedentary fauna, is significantly influenced by the strong anthropisation found in the area, the presence of waste that represents a source of degradation, and repeated fires that alter the vegetation.

The presence of important wetlands in the area under consideration and the funnel shape of the Gulf of Gela makes the Gela Plain an ideal place for numerous birds to stop during their annual movements. Among the most interesting migratory species are the garganey (*Anas querquedula)* and the ferruginous duck (*Aythya nyroca*), whose populations number in the thousands. Among the migratory species in the SPA of Torre Manfria, Biviere and Gela Plain, among the falconiform birds of prey are Eleonora's falcon (*Falco eleonorae*), the emery (*Falco columbarius*), the lesser kestrel (*Falco naumanni*) and the red-footed falcon (*Falco vespertinus*). It is worth noting the presence of the Egyptian vulture (*Neophron percnopterus*), a species of particular conservation interest due to the sharp population decline it has suffered in recent years; it is also included in the IUCN red list in the "In Danger" category.

The coastal sector represents an ideal wintering place for many species of community interest including Scopoli's shearwater (*Calonectris diomedea*), the golden plover (*Pluvialis apricaria*) and the wood sandpiper (*Tringa glareola*).

The agricultural areas destined for greenhouse cultivation are frequented by numerous ornithic species belonging to the Passeridae, Sturnidae and Meropidae families, for trophic purposes.

For the Ecological Network, the main nodes are represented by the SACs of Biviere and Macconi di Gela, Sughereta di Niscemi and Bosco S. Pietro included in the Natura 2000 Network; in the first SAC, the Biviere di Gela represents a treasure trove of biodiversity, where animal species can perform vital functions for their livelihood. The primary function of an ecological corridor in the territories of a large area is represented by the river courses of the main rivers present, including the Dirillo river and the adjoining strips of arboreal, shrubby vegetation that develops on its margins.

6.4.2 Impact assessment

6.4.2.1 Construction and decommissioning phase

Regarding the type of the project and the activities during construction, it is clear that the main source of impact is the preparation of the work areas and the occupation of the land. As far as vegetation and flora are concerned, these are mostly direct impacts due to the occupation of the work areas; indirect interference is related to the alteration of abiotic factors.

The potential impacts on the fauna component present in the study area include different types of disturbance, mainly attributable to the construction phase. These are both of a direct type, such as the removal of habitats and/or the introduction of barriers that can hinder their

free movement, and "indirect" impacts, such as noise emissions and increased traffic (with consequent increase in the risk of collisions).

Analysis of the territory affected by the planned pipeline shows that the soils involved in the work for laying the pipeline are currently destined for simple arable crops and extensive herbaceous crops, in which weed communities spread where practices are abandoned. Woody crops occupy very limited territorial portions. The olive trees explanted as a result of the construction activities will be transferred and replanted within the owner's agricultural parcels; other individual trees will also be replanted in other chosen fields.

Considering the state of the places and the vegetational impairment in progress, it is believed that the occupation of the soil causes low interference with respect to the vegetation. The temporary nature of the construction phase and the restoration of the soils envisaged at the end makes it possible to affirm the possibility of the vegetation cover recovering.

As regards the route's potential interference with respect to the hygrophilous vegetation of river environments (*Phragmites communis* reeds, *Tamerix* vegetation), the sector concerned consists of crossing the Priolo Canal, characterised by a medium-quality riparian zone in relation to the degree of maturity. From analysis of the project, compared to the chosen design solution which consists in crossing the watercourse (KP 3+365) with the trenchless method (underground), it is evident that there is negligible interference with respect to the vegetation present along the riparian strip.

As regards the coastal sector, the underground design solution (HDD) makes it possible to rule out interference with the vegetation established in the first coastal sector, such as dune vegetation with *Ammophila arenaria*, coastal halo-nitrophilic vegetation with *Cakile marittima*, and coastal vegetation with *Retama gussonei*. The HDD solution will be used for the landing area, in order to avoid any impact on the coast, where plant communities of medium-high importance are widely present.

The impacts on vegetation can be considered essentially temporary, since almost all the areas affected by the construction site activities will subsequently be restored to the pre-works conditions. The level of interference with respect to natural vegetation can be considered modest, by virtue of the temporary nature of the processes, the modest extent of the areas involved and the natural level that characterises the plants present.

The permanent removal of soil and vegetation only refers to the areas involved in the Gela Terminal and to the interception points of the line, which occupy a very limited agricultural area.

As regards the Fauna, construction site activities could cause disturbance to the species present in the area, though they are adapted to live in an anthropised context where the presence of railway, road and industrial settlements conditions the noise climate at present.

Should there be a departure by ornithic and terricolous species, which can stop near the construction site, this would however have a temporary nature since it is linked to transitory construction activities. In the first phase of departure, the species would tend to seek similar ecological conditions in the surrounding areas, followed by a period in which the species would tend to re-occupy these habitats mainly for trophic purposes.

In light of the foregoing, it can be stated that the potential noise disturbance with respect to local fauna, induced by the works during the construction phase, is limited overall in terms of area of impact and contained given the temporary nature of the work.

The pipeline project intercepts two corridors recognised as part of the ecological network, the Valle Priolo canal and the territorial belt that connects the Gela Plain with the hinterland (see §. Figure 27). The design solution chosen in both cases consists in the underground passage (crossing the Priolo Canal by means of a pipe pusher and crossing the hill near the Farello cemetery by HDD), which will help limit the interference with respect to areas of interest. In this way, habitat fragmentation and noise will be extremely limited, since the works will also be limited both in terms of space (linear extension of the fences) and time (duration of the construction phase). It is believed that the interference with respect to the elements of the Ecological Network can be considered very low.

Figure 27: Excerpt on orthophoto with project location (in red) with respect to ecological corridors (yellow backgrounds)

6.4.2.2 Operating phase

During the project's operating phase, impacts on vegetation, fauna and habitats are not foreseeable.

With regard to land occupation and vegetation removal, at the end of the construction phase, the processing areas, such as the working track to allow the excavation of the trench and the laying of the gas pipeline, the landing area and the temporary storage, will be restored to greenery, according to the configuration prior to the start of construction.

The only area of intervention whose occupation remains during the operating phase is that of the Gela Terminal and the line's interception points. These are very limited areas that do not have repercussions on the status of the places.

Considering the restoration proposed during the construction phase, the potential impacts indicated for the environmental factors of Vegetation, Flora and Fauna will be substantially removed.

During the operating phase, ordinary maintenance activities will not be responsible for causing interference with the ecosystems present.

6.5 Marine biodiversity

6.5.1 Baseline

The study of the marine ecosystem of the Italy–Malta connecting pipeline, from a physical and biological point of view, aimed to assess the potential critical issues induced by the project infrastructure. The scope of study relates to the coastal area in front of the Gela landing (nearshore section) and the deepest *offshore* area up to the boundary between Italian and Maltese waters.

As part of the design of the Italy–Malta pipeline, whose route falls entirely within the physiographic domain of the Hyblean plateau and within the flat plateau of Malta in the Sicilian Channel, preliminary surveys were carried out along the marine gas pipeline's route to collect geophysical data, ROV images to verify the morphological trend of the seabed and the presence of any objects and obstacles.

In the nearshore area, all the sediments involved in the project were classified as silty sands, sandy silts and sandy clays. Chemical surveys showed exceedances for arsenic (the measured values, between 14 and 24 mg/kg, exceed the regulatory limits, set at 12 mg/kg, at all the sampling stations).

Environmental investigations carried out in the nearshore area at Gela have highlighted the presence of 21 taxa including Gastropods (4 species, including *Tritia mutabilis, Tritia incrassata*), Bivalves (5 species, including *Fabulina fabula*, *Moerella pulchella*), Malacostracans (6), Scaphopods (1) and Polychaetes (5, of which 3 unknown).

The seabed involved in the project features the presence of the following sensitive marine habitats:

- *Cymodocea nodosa* grasslands in the coastal area of Gela
- biogenic constructions along the *offshore* section of the pipeline route

In the Gulf of Gela, the presence of ***Cymodocea nodosa*** had already been reported in the course of previous surveys, as documented in the Biviere Macconi di Gela Management Plan. An endemic species of the western Mediterranean, it is found in shallow waters (from a few cm to a depth of 2.5 m) but can reach a depth of 30-40 m, usually on sandy substrates and sheltered sites.

Bioconstructions, coral outcrops, typical underwater marine landscapes of the Mediterranean, including coral algal structures that grow in low light conditions, are the result of algae and animal construction activities, counterbalanced by physical and biological erosion processes

The sector facing the landing of the gas pipeline at Gela from KP 0.097 to KP 9.705 features a slightly inclined seabed (main slope < 2°) in which the water's depth varies from 0.6 m to 38 m (see §. Figure 28 .). The seabed is covered with fine sediments and an alternation of dense and scattered *Cymodocea nodosa* grasslands that settle from KP 0.643 (at 5 m depth) up to KP 7,273 (at 19.4 m depth), as confirmed by visual inspection (see Figure 28 - right).

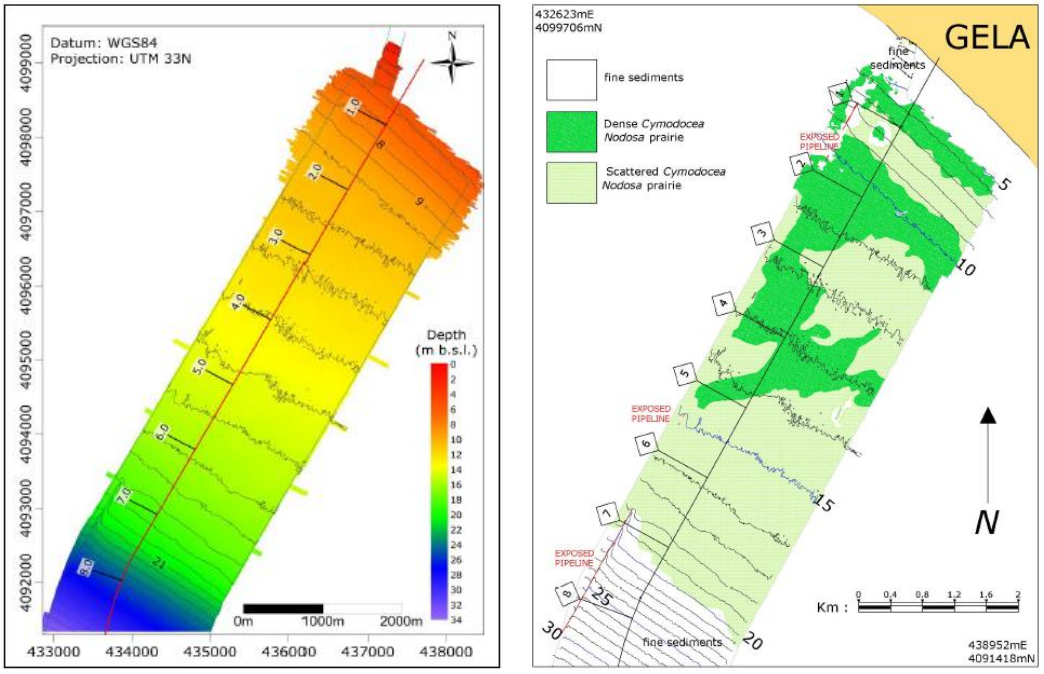


Figure 28: Nearshore Gela: Bathymetric map(left) – Mapping of Cymodocea nodosa (right)

The ROV inspections for the nearshore section did not reveal the presence of *Sabellaria alveolata* reefs.

In the offshore area, the inspection by the underwater ROV (Remotely Operated Vehicle) for Sicily from progressive kilometrage 9.705 to 84.8, showed a sandy bottom interspersed with outcrops and bioconstructions.

From KP 40.500 (depth 118.5 m) to KP 41.600 (depth 122 m), the combined interpretation of SSS/SBP/MBES data allowed the detection of a large structural relief surrounded by some scattered rocky outcrops with slopes up to 9°. The route of the proposed pipeline is a minimum distance of 39.6 m from this relief. Biogenic concretions are found on rocky substratum surrounded by fine sediments, at a depth of 105 to 120 m (coralligenous *Scleractinia*).

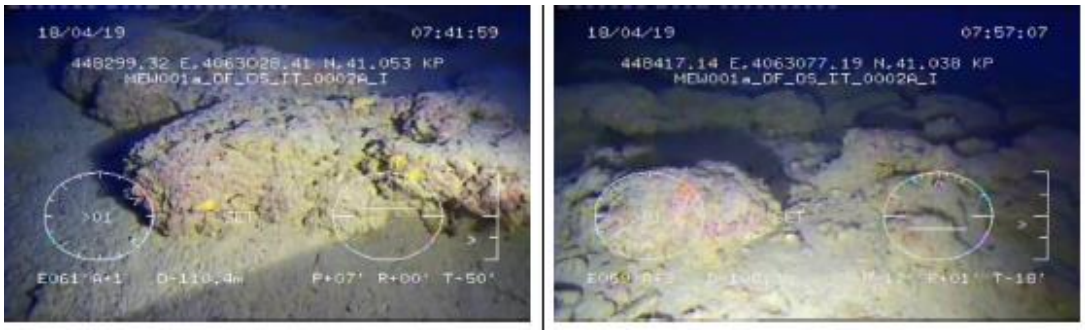


Figure 29: Biogenic concretions (ROV image, KP 41)

As far as marine vertebrate fauna are concerned, as part of the Italy–Malta interconnection pipeline project, the activities envisaged in the MMOP (Marine Mammal Observation Plan) were carried out, aimed at collecting data on the presence of marine fauna (sampling period between 14/12/2018 and 01/02/2019). During the survey campaign, 6 sightings of *Tursiops truncatus* were made for a total of 24 animals, at low depths (10-350 m) in accordance with the literature data; and 3 sightings of Caretta caretta for a total of 5 individuals, at depths between 120 and 140 m. Both species are reported within the *Torre Manfria, Biviere and Gela Plain ZPS.*

At a general level and in the ZSC and ZPS system of Gela, the Mediterranean population of Tursips truncatus is probably decreasing due to illegal fishing and maritime traffic disturbance whose noise pollution causes the numerous strandings (source: Biviere Macconi di Gela Management Plan).

6.5.2 Impact assessment

During the design process, the route solution was defined to limit the interference with the phanerogam meadows present, whose distribution was defined through specific surveys conducted to support the design. The pipeline route winds on a seabed made up of fine sediments, on which there are various phenotypes of *Cymodocea nodosa,* up to a depth of 20 m.

The presence of the ZPS ITA050012 "Torre Manfria, Biviere and Gela Plain", which also includes a stretch of coastal strip, involved preparing a specific study, annexed to the SIA, (*Annex 2 – Appropriate Assessment (R_VIEC_004)*, with the aim of identifying any impact factors caused by implementing the project on the habitats, plant and fauna species reported in the following Natura 2000 Sites. The study showed that during the construction and decommissioning phase, the impact on habitats and species is not significant as the disturbance is temporary and limited to the areas surrounding the work. During the operating phase, analysis revealed that the project does not induce significant negative effects on the integrity of the Natura 2000 Network site and does not compromise the conservation objectives.

6.5.2.1 *Construction and decommissioning phase*

The realisation of the HDD for the passage of the gas pipeline in the nearshore area constitutes, in itself, a mitigation intervention for the potential impacts on marine phanerogam formations, making it possible to cancel the physical damage to the seabed in the low depth areas where phanerogams can settle.

The landing of the gas pipeline inside the Gulf of Gela is foreseen by means of an underground excavation 1500 m long, which will make it possible to reduce the interference with the seabed in the *nearshore* area. This design choice avoids direct interference with the protected or restricted areas (landscaping, archaeological sites, Gela Port Harbour Order No. 27/2019), minimises the movement of land and backdrops and limits the disturbance during installation solely to the two areas of construction at both ends. In the marine environment, the HDD entry point is foreseen at KP 8,632 (sequentially on the project route), at a depth of 8 m; dredging activities are planned for this sector to prepare a trench used to execute drilling activities.

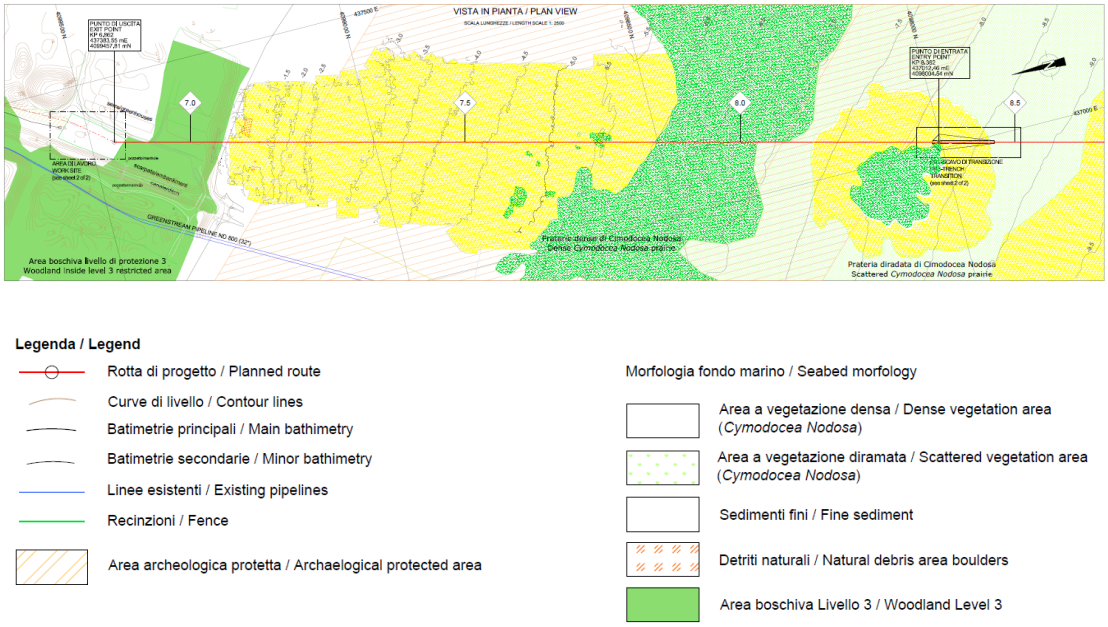


Figure 30: Excerpt of the project in the section in HDD

Given the type of project and the work envisaged, it should be noted that the most critical area with regard to altering the habitats present on the seabed is the HDD entry point, which takes place at the project KP 8,362 (depth 8 m). In fact, in this sector of the seabed, the project foresees the predisposition of a transition trench, to allow the drilling activities to be carried out. The excavation of the trench intercepts the edge of a dense coverage Cymodocea nucleus, resulting in a limited occupation of the prairie on an area of about 70 m² (see §. Figure 31).

Considering the distribution and extension of the *Cymodocea* prairie in the section of the seabed involved in the project, it is believed that the physical occupation of the prairie due to work envisaged by the HDD is very limited and does not significantly compromise the development of the prairie itself.

From the HDD exit point up to a depth of 20 m (maximum depth where the prairie settles), the operation of positioning the pipeline on the seabed by post-trenching (i.e. positioning the pipeline in a trench dug in the seabed after its laying) involves a very limited occupation of prairie, considering the dimensions of the pipeline and the band of seabed concerned. It is believed that this operation during the construction phase does not constitute a critical issue for the intercepted grasslands.

Due to the results of the survey, it is ruled out that laying the submarine pipeline could interfere with *Sabellaria alveolata* reefs, since no such formation was found along the corridor examined by the ROV inspections.

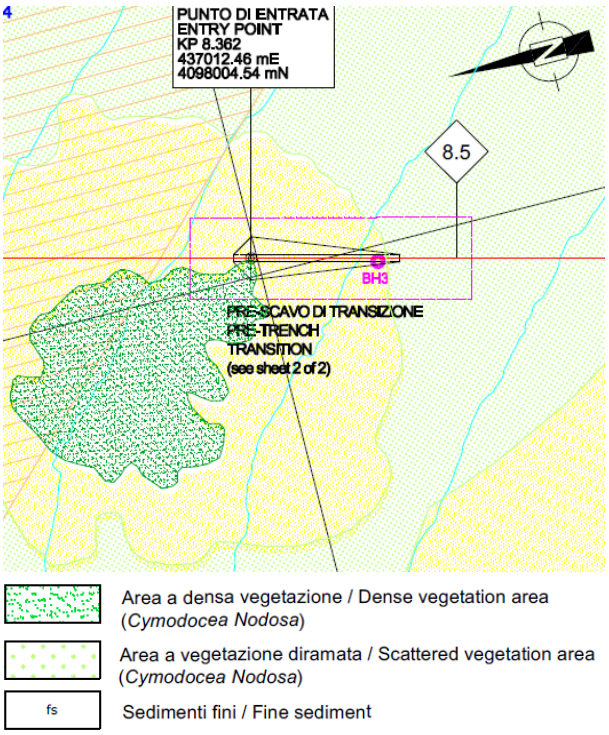


Figure 31: Excerpt of the mapping of Cymodocea nodosa at the HDD point of entry

The dredging activities planned at the HDD entry entail a change in the sediment's composition, which can cause alteration of the structure of the benthic community. The physical disturbance borne by the seabed affected by the dredging and excavation of the trench is limited to a localised area, the area to be dredged (dredged material volume 2500 m^3). The impact is to be considered reversible in the short term, since the area will be recolonised once the laying activities have been completed.

The same considerations regarding the limited interference with respect to benthic populations apply to activities related to the positioning of the pipeline.

The increased turbidity in the water column due to suspended sediments is mainly associated with the trench construction at the HDD offshore exit point (pre-excavation) and to a lesser extent with activities related to laying the pipeline, including post-trenching activities.

The results of the sediment dispersion model, conducted to simulate the effect induced by the activities at the HDD entry, showed that a concentration of 10 mg/l can be reached at a maximum distance of about 1.2 km from the dredged area, along the direction parallel to the

coast and 800 m in a perpendicular direction. The concentration value of 50 mg/l is only achieved in an area around the dredged trench with a diameter of about 500 m.

The results in terms of persistence over time of certain concentration values show that during the entire period of dredging operations (50 hours), the concentration exceeds 10 mg/l for no more than 30 hours and 50 mg/l for a maximum of 21 hours, and the longest persistence time is found in the area near the trench. The dense meadows of Cymodocea nodosa around the dredged area are affected by concentrations higher than 10 mg/l only for a maximum duration of about 6 hours during dredging operations and only for a very limited portion, while concentrations higher than 50 mg/l are not reached.

The deposition of sediments on the seabed during dredging operations involves a limited portion of the domain. Only in proximity of the dredged trench, up to about 200-300 m, is the deposition greater than 1 cm. The deposition decreases as soon as the distance from the dredged area increases: it is in fact only 1 mm at a distance from the dredged area of about 2600 m parallel to the coast and 800 m perpendicular to the coast. From a distance from the focus area of 500-600 m in the NW-SE direction and 200-300 m SW-NE, the deposition is less than 0.1 mm.

It is believed that the phenomenon of resuspension along the water column is very contained during the sinking of the pipeline and could take place in a limited time, so as not to harmfully alter the biocoenoses present. Furthermore, the potential interference may be limited by the adoption of specific mitigation measures, such as the use of booms.

As for the disturbance induced by the propagation of underwater noise regarding the presence of Cetaceans, it is estimated that, in relation to the pipeline laying activities, there are no foreseeable actions such as to cause a permanent (PTS) and temporary (TTS) loss of auditory sensitivity for this cetacean species.

As regards the species *Tursiops truncatus*, the disturbance thresholds and relative distances from the noise source are to be considered precautionary, since the auditory range indicated for the species is estimated between 150 Hz and 160 kHz (range indicated for the species at medium frequency), higher than those attributed to the planned noise source, indicated at 63 Hz and 125 Hk. It is believed that the pipeline laying activities do not constitute a source of disturbance on the cetofauna present in the project area, also considering the temporary nature of the activities and the limited area surrounding the noise source, where an increase can potentially occur compared to the threshold values.

6.5.2.2 Operating phase

During the operating phase, there are no actions that could cause the onset of critical issues for the biocoenoses that form part of the ecosystem surveyed.

During the operating phase, interference with the seabed consists of occupation limited to the physical presence of the pipeline. For benthic communities and seagrass meadows, the presence of the pipeline does not constitute an additional impact which has not already been taken into consideration for the construction phase. There are no impacts on plankton associated with the operating phase, as well as for vertebrate fauna (fish fauna, reptiles, cetaceans).

6.6 Noise and vibration

6.6.1 Baseline

The territory crossed by the gas pipeline, scarcely populated, has rural features and is mainly intended for agricultural activities. The main communication routes in the area are, in addition to the aforementioned SS115 and SP189, the Siracusa-Gela-Canicattì railway line, the SP51 and the SP82. With reference to the receptors present, the Farello municipal cemetery is located near the SS115. The other sporadic receptors present are residential or productive.

As can be seen by observing the *Carta dei ricettori acustici* attached to the SIA (see §. *D_EIA_Tav.4.6.1, D_EIA_Tav.4.6.2*), the route in question crosses a territory with little presence of residential receptors and without sensitive receptors such as schools and hospitals. The only receptor that can be considered sensitive is the cemetery mentioned above, which is at a distance of over 150 metres from the track.

In order to characterise the study area, a phonometric measurement campaign was carried out, in July 2019, which chose those receptors impacted by the noise sources present in the area's current state (road and rail traffic) and those located a shorter distance from the planned route, uniformly distributed along it, with particular regard to sensitive areas (Ferello municipal cemetery) and around the SRG connection terminal.

Figure 32: Survey area with indication of the measurement sites

Furthermore, among the residential receptors identified, those closest to the pipeline excavation line are at distances of not less than 40 metres. However, almost all of the route remains at a distance of more than 100 metres from the residential receptors. From a reading of the receptor map, the buildings closest to the layout are: R5 (warehouse), R17 (warehouse), R20 (warehouse) and R42 (ruins).

Based on the instrumental surveys, the most impacting noise source was road traffic along the SS115, while rail traffic along the Siracusa-Gela-Canicattì railway line affected by sporadic railway transits (12 transits were detected in the 24 hours of measurement) was found to be a source with little impact on the noise level. The Gela petrochemical site represents a further source of noise capable of essentially influencing background noise panorama (percentile L95); other less significant sources of noise can be traced back to anthropogenic activities in the area and very sporadic vehicle transit along the remaining road network.

In general, the values found are significantly lower than the regulatory limits adopted, highlighting a noise climate free from critical issues.

As far as vibrations are concerned, the type of work envisaged, essentially involving excavation and earth moving, does not generally represent a source of possible impact from vibrations, which could be the case conversely, for example, with beating poles into the ground or demolishing concrete artefacts.

6.6.2 Impact assessment

6.6.2.1 Construction and decommissioning phase

To assess the impacts during the construction phase and, in analogy, during the decommissioning phase, the individual construction activities were analysed, to identify those most responsible for a potential noise impact on the territory.

Having identified the noise sources to explore further in the appropriate assessments, the sound power levels of the machines used in the activities analysed were estimated and assimilated to typological scenarios representative of the real work in the field.

Finally, typological modelling simulations were carried out, making it possible to estimate the impacts produced by the work at various distances from the construction areas, along the entire route of the Work, thus assessing their environmental compatibility.

From the noise analyses carried out, it was found that the noise impact produced on the territory during the construction works is contained in compliance with the regulatory indications in force for daytime.

If, on the other hand, the operations also take place during the night, in the absence of derogations for the noise limits, it will be appropriate to provide mitigation work for the identified receptors near which the measured regulatory limit of 55 dB (A) would be exceeded.

However, it should be noted that the noise impact for the nighttime would still have a rather limited duration, taking into account the work's speed of progress, estimated at around 50-60 m/day.

In conclusion, with reference to the noise climate, it is believed that during the construction phase the project has a "low" impact and any problems can easily be solved by means of targeted acoustic mitigations on the few potentially impacted receptors.

Regarding the construction phase of the offshore route, the submarine noise, for the case in question, will be mainly attributable to the sound source of the ship used to transport and lay the pipeline on the seabed. The noise emitted by the ship during laying is largely attributable to its propulsion and direction organs and is non-impulsive.

Taking as reference the environmental impact study conducted in the same portion of the marine area for laying an electrical interconnection from Italy to Malta[11], aiming to evaluate the effects of underwater noise produced during the laying phase on marine mammals, it was possible to observe that, for pipeline laying activities, there are no foreseeable actions such as to determine a permanent (PTS) and temporary (TTS) loss of auditory sensitivity for the cetacean species identified in the area under consideration. It is also noted that the rules of good navigation should impose buffer distances between boats substantially greater than the threshold distances for disturbing these marine species.

The decommissioning phase, which takes place at the end of the pipeline's useful life, will be carried out in accordance with the legislation in force on that date and in collaboration with the competent authorities. The main alternatives are removal of the pipeline, where technically feasible, or non-removal. The first alternative (decommissioning the pipeline) has a reduced impact on the environment, but does not remove the infrastructure and leaves its constraints unchanged, while the second alternative requires work similar to the construction phase, with impacts on the environment. The decommissioning of the offshore pipeline, which cannot be removed, entails inerting it in situ by inspection, flushing it with air and filling it with suitable material to prevent future collapses.

6.6.2.2 Operating phase

As far as the operating phase is concerned, it can be observed that there are no noteworthy noise emissions: the Work in question is in fact completely underground for the *onshore* section, with the exception of the three BVS stations and the terminal for connection to the SRG network. These artefacts do not normally feature particularly relevant noise emissions and will be positioned in areas with limited presence or absence of receptors.

From analysis of the territory carried out with regard to the Noise component, it emerged that only 7 residential receptors are located at distances of less than 100 metres from the route, and the closest residential building is however about 40 metres from the work band.

Taking into account the dissipative effects during the propagation of vibrations, as the distance from the source to the receptor increases, it is therefore ruled out that the foreseen processes represent an appreciable source of disturbance for people, in reference to the main industry standards.

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[11]"220 kV Italy-Malta Interconnection – Section between the SE of Ragusa and the limit of territorial waters", presented by the company Enemalta, for which the Ministry of the Environment and the Protection of the Territory and the Sea, in concert with the Ministry for Cultural Heritage and Activities, decreed environmental compatibility (DVADEC – 2012 – 0000739 of 20/12/2012)

6.7 Landscape and Visual impact

6.7.1 Baseline

The project is sited in the southern area of the Province of Caltanissetta, in a territory that hosts valuable natural areas, including the protected area Biviere di Gela, which safeguards one of the most important wetlands in Sicily and the natural reserve of "Sughereta di Niscemi", with a large wooded area.

Figure 33: Hilly landscape behind the Gela Plain (view from Castelluccio)

The urban system of Gela consists of the town center and the adjacent industrial settlements along the coast. Over time, the city has expanded, first along the coast to the west and then to the north, shaping a basin surrounded by hills.

The urban system of Gela develops in an homogenous orthogonal grid and follows the one of the medieval city. The city contains many buildings of historical and architectural interest, such as churches (*Chiesa Madre, San Biagio, del Carmine, Santi Salvatore e Rosario, S. Francesco d'Assisi, S. Agostino, S. Francesco da Paola and S. Giovanni Battista*) and monuments. Recent residential construction derives from the housing needs that arose following the development of the industrial area adjacent to the city center.

Figure 34: Industrial area of Gela

The coastal territory, characterized by the wide large and compact dunes from Scoglitti go beyond Gela, has been strongly modified by marine erosion, greenhouse plants and

residential and industrial structures, that arrives almost till the shoreline. High human pressure related to the numerous crops and greenhouses risk altering the coastal conformation and the wetland itself, now protected by a natural reserve.

The area involved by the project is characterized by strongly contrasting elements: on the one hand the signs of the ancient culture of the territory are still legible, on the other hand it has been the subject of sudden and widespread urbanization, densification and sprawl processes, particularly along the coast, leading to a widespread and parceled constructions.

The Terminal will be built in an area currently used for agricultural purposes, near the Provincial Road 82 (unpaved road) that connects the city of Niscemi to the North, and the highway 115 coming from Ragusa, to the South. The area presents some buildings marked as rural buildings in the City Master Plan: Casa Nobile, Casa Portolana and Casa Tenda.

Figure 35: Terminal area, before its construction, seen from the agricultural equipment shelter in the North East of the site

The Block Valve Station nr.1 (BVS 1) will also be installed in the agricultural area, at the foot of the slope belonging to the South/East side of the hill on which the *Farello* Cemetery stands. The eastern boundary of the site is delimited by the Gela-Catania railway, which passes adjacent to the *Priolo* stream. In the area, about 500 m away, to the east of the main road 115, there is also the farmhouse called *Casa Spinasanta*, a rural complex marked by the City Master Plan. Small houses and some agricultural garages on the edge of cultivated land are spread in the area. In particular, the chosen area borders a fenced-in field cultivated with vines.

The Block Valve Station nr.2 (BVS 2) will be developed within a land bordering an inhabited block of flats, adjacent to Provincial Road 51. Near the area there is a raised, unfinished and inaccessible road link, which dominates the landscape and is the most striking element in the area under examination.

The Block Valve Station nr.3 (BVS 3) will be built not far from the eastern border of the Gela petrochemical plant, in an area surrounded by cultivated fields and greenhouses (whose access is private), alternating with uncultivated soil. In this place the road network is composed of dirt roads, used by agricultural and industrial vehicles. Among the not valuable elements, in addition to industrial buildings, are several greenhouses and a quarry. Little less than a kilometer south of the site is the coast, where dune landscape alternates with strongly anthropized one.

6.7.2 Impact assessment

6.7.2.1 Construction and decommissioning phases

The main impacts on the visual amenity during the construction phase and during the decommissioning phase will mainly derive from the movement of the machinery needed for the entire phase, especially in areas where the pipeline will cross and/or skirt existing roads or pass close to them. However, due to the low site frequency and the temporary nature of the activities, the potential visual impacts during the construction phase can be considered low and completely reversible at the end of the activities.

6.7.2.2 Operating phase

Descriptive and perceptive surveys were carried out to assess the potential impacts of the project on the landscape. The first ones investigate the systems of signs of the territory from the natural, anthropic, historical-cultural point of view, while the perceptive ones are aimed at assessing the visibility of the work. The main phases of the analysis conducted are the following:

- identification of morphological, natural and anthropic elements that may be present in the area of investigation, through analysis of the cartography;
- description and definition of the visual space of the project and analysis of the existing visual conditions through the analysis of the cartography (contour lines, morphological and natural elements identified) and subsequent verification of the intervisibility basin of the project, verified through dedicated surveys;
- definition and choice of sensitive points within the area and identification of significant points of view for the impact assessment, through simulations of landscape integration of the works in the project (photo-simulation);
- assessment of the magnitude of the impacts on the visual and landscape context, with identification of possible mitigation and/or compensation measures.

Given the contained dimensional characteristics of the project and given the presence of wooded areas in the surrounding territory, it will be visible, almost never in its entirety, exclusively from the surrounding areas, also thanks to the planned visual mitigation interventions. In particular:

- the Terminal will be visible from the areas located in a maximum radius of about 600-700 m; the limit of the basin is guaranteed in particular by the presence of the vegetation that marks out the agricultural properties;
- the Block Valve Station nr.1 will be visible from the areas located in a maximum radius of about 250-300 m; in this case the basin is delimited by the railway running South/West-North/East near the rail station and by the fact that it is located at a lower altitude than the surrounding area, in cultivated areas rich in fruit trees;
- the Block Valve Station nr.2 will be visible from the areas located at a maximum radius of about 100-150 m, the limit of the basin is placed, in addition to the vegetation along the existing main road, also from the houses located east of the station;
- the Block Valve Station nr.3 will be visible from the areas located at a maximum radius of about 600-700 m; the basin is more extended towards East because there are agricultural areas with low cultivations. The basin is in any case limited to privately owned areas that are not accessible.

From the analysis carried out, also supported by the processing of the photo-simulations (see Figure 36), it is believed that the implementation of the proposed above-ground interventions (terminals, block valve stations) does not involve a significant change in the landscape analyzed, generating an impact on the visual and perceptual context assessed as low entity and reversible in the short term.

Figure 36: Terminal area after its construction (the red arrow indicates the terminal position)

As regards the potential impacts on the landscape generated by the pipeline construction, the *onshore* section will be laid underground and the areas affected by its construction will be restored once the work is completed. In fact, the project foresees the conservation of the

surface soil removed along the pipeline route and its reuse in a subsequent restoration phase. If necessary, vegetation cuttings (woodland, vegetation and tree crops) will be carried out by applying correctly the main silvicultural techniques.

The *offshore* section, in correspondence of the archaeological marine area of *Bulala*, will be realized with the technique of Directional Drilling, at depths such as not to interfere with the elements of the protected area.

The following table summarizes the potential impacts generated by the project, in relation to the main elements of landscape characterization of the area.

Main types of landscape-territorial modification and alteration	Project Assessment
Morphological changes	The project foresees the construction of the underground pipeline; for the onshore section, however, no earthworks are foreseen that would compromise the morphology of the concerned areas. The *offshore* section will be constructed using the Horizontal Directional Drilling (HDD) technique in the section corresponding to the marine archaeological area of Bulala. Starting from the exit point of the HDD at sea, a trench (post trenching) will be excavated for approximately 7.5 km, up to a depth of 32 m. The next section of the pipeline will be laid on the seabed.
Ecological and natural changes	The project will be implemented mainly in rural areas. In these areas, during the pipeline construction phase, it is planned to guarantee the functional continuity of any irrigation and drainage systems and, where necessary, in the presence of tree crops, temporary anchoring of supporting structures will be provided. No further activities that may have an ecological/landscape impact are planned.
Vegetation change	Concerning the *onshore* section, the pipeline will be laid underground and the areas affected by its construction, once the works are completed, will be restored; in fact, the project foresees the conservation of the superficial soil removed along the pipeline route and its reuse in a subsequent restoration phase. If necessary, vegetation cuttings (woods, vegetation and tree crops) will be carried out by applying correctly the main silvicultural techniques.
Skyline modification (natural or anthropic)	Considering the rather limited expected volumes, and their location in areas not placed at higher altitudes than the main points of fruition, no changes are expected in the skyline, often characterized not only by hilly backdrops (towards the North), but also by the considerable vertical volumes of the industrial pole of Gela (towards the South).
Change in historical/urban and/or agricultural/cultural context	Given that the pipeline will be built exclusively underground and that the connection terminal and block valve stations will occupy a limited area currently used for agricultural purposes, it can be said that the project will not entail any significant changes to the agricultural/cultural area. In addition, recognisable historical tracks (such as the traditional agricultural mesh and/or existing historical tracks - *Trazzere*) will not be eliminated.
Modification of the perceptive, scenic and panoramic structure	Considering the expected volumes, rather contained, and their location in areas far from panoramic viewpoints, the project will not

Main types of landscape-territorial modification and alteration	Project Assessment
	modify the visual relations existing today and will not interfere with the historical/cultural and/or symbolic elements.

6.8 Cultural Heritage

6.8.1 Baseline

From a historical-archaeological point of view, the first traces of settlement in the area affected by the Project date back to the early Neolithic period (5th millennium b.C.). In Greek times Gela occupied the plateau of the hill overlooking the sea and was extended in an East-West direction and included the acropolis, the kilns for the production of pottery, houses, sacellums, shops and walls, the Hippodamus road system, the holy area with the temple, the Emporium including workshops and warehouses. On the other side of the river Gela, opposite the acropolis, in the locality of *Bitalemi*, there are the ruins of a 7th-4th century b.C. sanctuary consecrated to Demeter, a Roman farm of the 1st-3rd century a.D. and a necropolis of the Frederician age (13th century a.D.). Gela, destroyed by the Carthaginians in 405 b.C., was rebuilt in the 4th century b.C.; the new residential quarters, organized according to a precise regular pattern, rose in the western part of the hill. At that time also a thermal baths, a house shop and a residential villa were built.

Today there are numerous discoveries and areas brought to light thanks to the excavations. Among these are mentioned:

- in the locality of *C.de Piano Tenda* and *Chiancata*, materials from the Hellenistic period and numerous finds from the Roman period linked to ancient rural settlements;
- in the locality *Spinasanta*, still visible today, a Necropolis containing burials of the Greek-Arcic period (VII-VI century b.C.);
- in the *Farello* area important finds of Greek ceramics, currently on display in the Archaeological Museum of Gela;
- in the *Casa Mastro* area a settlement of the Roman Imperial Age with Christian-Byzantine evidence;
- along the banks of the river *Maroglio* the archaeological site of *Grotticelle-Rinazze*, datable around the IV century a.D.;
- in the *Settefarine* area the remains of a prehistoric village and a necropolis of the final phase of the Eneolithic reused later in the Greek age;
- in *Piano Camera* the stratified remains of several rural settlements dating back to different historical periods ranging from prehistory to the late ancient period;
- l along the *Lido of Manfria* two important archaeological areas: the first presents the evidence of a prehistoric village of the ancient Bronze Age and the remains of Greek farms dating back to the fourth century b.C.; the second consists of an important cemetery complex of the early Christian age (fifth century a.D.).

As far as cultural heritage is concerned, in accordance with art. 10 of Italian Legislative Decree 42/2004, we would like to point out the presence in the area of Gela's municipal territory of:

- Forest area owned by the state property with remains of the Greek city of Gela, in *Bosco Littorio*;
- Acropolis of the Greek city that insists on pre-protohistoric settlement, in *Molino a Vento*;
- Remains of the Tesmophorion of Demeter, a Roman farm and 13th century church in *Bitalemi*;
- Catacombal complex dating back to the 5th century a.D., in *Grotticelle - Rinazze*;
- Remains of masonry structures belonging to sacred and artisan destination complexes, in *Ex Scalo Ferroviario*;
- Seat of ancient human settlements with wall structures of an archaic sanctuary and medieval buildings, in Piazza Calvario.

There is also the presence of a Greek wreck, of archaic age. In the sea near *Bulala* were found 2 other Greek wrecks with their loads, including amphorae, ceramics, marble and votive objects. These findings fall within the marine area of archaeological protection, bound under Article 10 of Italian Legislative Decree 42/2004.

As regards the areas of archaeological interest, protected pursuant to art. 142, c.1), letter M) of Italian Legislative Decree no. 42/2004, the presence of the following landscape assets is noted in the vast area of investigation:

- Archaic votive stipe linked to surrounding buildings of worship of the Greek era, in *Predio Sola*;
- Sacred area of Greek-Roman times, in *Madonna d'Alemanna*;
- Necropolis with burials of Greek-archaic age, in *Spinasanta*.

Finally, in the area of investigation there are some architectural assets of public interest, pursuant to art. 12 of Italian Legislative Decree 42/2004, among which are the Castle of Gela, in *Molino a Vento*; the remains of the Church of St. Mary of Bethlehem, in *Bitalemi*; the Church of St. Mary of Alemanna, in the city centre; the *Presa Diga Grotticelle*, in *Grotticelle*.

Any traces and anomalies on the ground were also identified by analysing the images of the flights made available by the Ministry of the Environment. The results of this analysis were then further verified through specific visual inspections. The surface reconnaissance campaigns were conducted in April 2019 and focused in particular on the areas affected by the pipeline construction. In this regard, it was decided to check the land, where possible, for a buffer of at least 300 m.

In order to better characterize the archaeological potential of the area affected by the Interconnection Project, dedicated surveys were conducted for the *onshore* and *offshore* sections of the Project.

With regard to the presence of potential areas of archaeological interest in the onshore part of the route, the area affected by the Project route has been divided into Territorial Units (UT), divided into Risk classes.

The research carried out made it possible to locate archaeological presences, in particular the UT06 and UT20 (see §. Figure 37 and Figure 38). Finally, it should be remembered that preventive geophysical surveys will be carried out along the proposed route for the new conduct, in order to confirm the absence of archaeological records along the route.

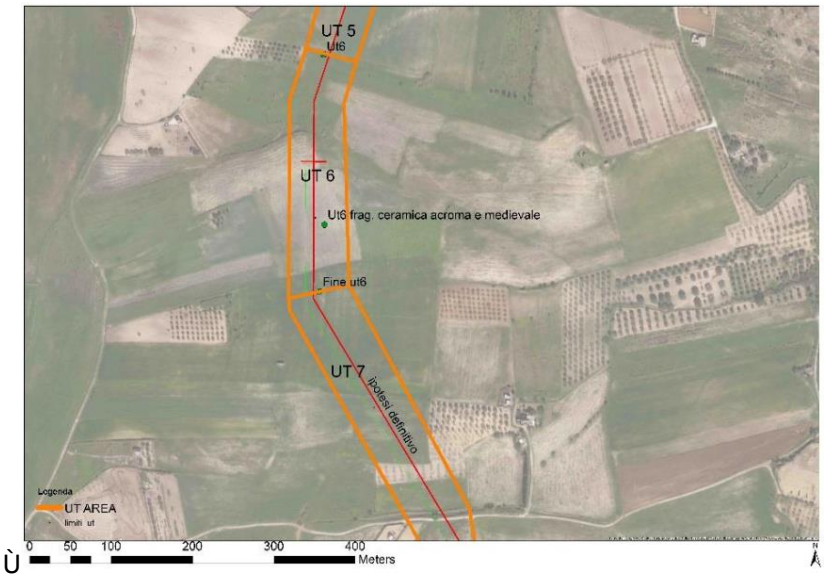


Figure 37: Territorial Unit n.6

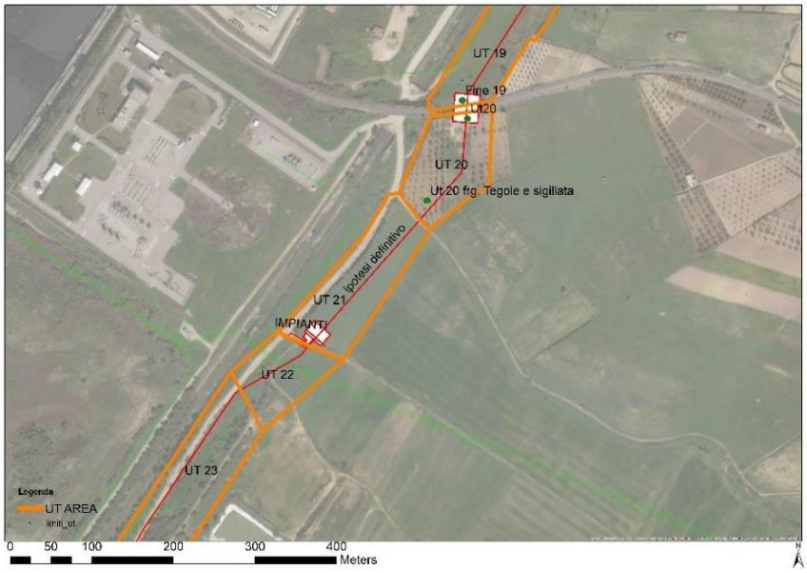


Figure 38: Territorial Unit n.20

With regard to the marine route of the pipeline, given the presence along the Sicilian coastal area and in the sea area affected by the project, the marine protected area of *Bulala*, in order to identify the presence of further surface archaeological evidence and to verify any pre-existing evidence, a marine survey was carried out. In particular, *offshore* geophysical surveys were carried out, which made it possible to draw a picture of the area affected by the project.

In the first section below the coast (inshore) the survey highlighted the presence of objects of human origin, in particular a trawl and an anchor, 2 iron objects as well as two partly exposed pipelines.

In the next section, existing pipelines were identified, as well as thick vegetation consisting of *Cymodeocea nodosa* and objects of metallic and non-metallic nature, but not of archaeological nature. The survey confirmed the presence of other underground pipelines.

6.8.2 Impact Assessment

6.8.2.1 Construction and decommissioning phases

From the analysis of the risk cartography carried out, it is clear that the entire area affected by the planned route presents medium-high archaeological risk. In fact, with the exception of the area affected by the project located South-South/East and South of the cemetery, near the road junction, which presents a low risk, the areas affected by the project present a medium, medium-high and high risk (these in particular are located in *Contrada Farello* and *Piano Rizzuto*).

In view of this, the surveys conducted will be further detailed, as defined in agreement with the Superintendence *BB.CC.AA. of Caltanissetta*, through non-invasive preventive geophysical surveys.

With regard to the section of pipeline to be built offshore, the first section presents an explicit Risk, due to the presence of the marine protected area of *Bulala*.

Detailed investigations have been carried out along the pipeline offshore route, using the Side Scan Sonar (SSS) and the Magnetometer (MAG), from which it appears that no archaeological evidence has been found along the route of the pipeline planned and therefore a low risk can be associated with the pipeline exit point, since it is in a favourable position in a surrounding area with positive results, but where there is very little, if any, concrete evidence of the presence of archaeological assets.

The design of the works has taken into account the presence of the *Bulala* area in order to preserve the archaeological context and provides for the construction of the pipeline in correspondence with this area using the no-dig technique of Directional drilling. This technique will affect the first offshore section of the pipeline for a length of about 1500 m and will allow to reach depths of respect of the seabed, equal to about 12 m at the mouth of the drilling, at a distance of 1500 m from the coast, and then remain at a depth of about 20 m starting from 1400 m from the coast, towards the landfall. This type of technique will preserve the marine archaeological context of the protected area.

6.8.2.2 Operating phase

No impact on the cultural heritage component is expected during pipeline operation.

6.9 Public health and socio-economic aspects

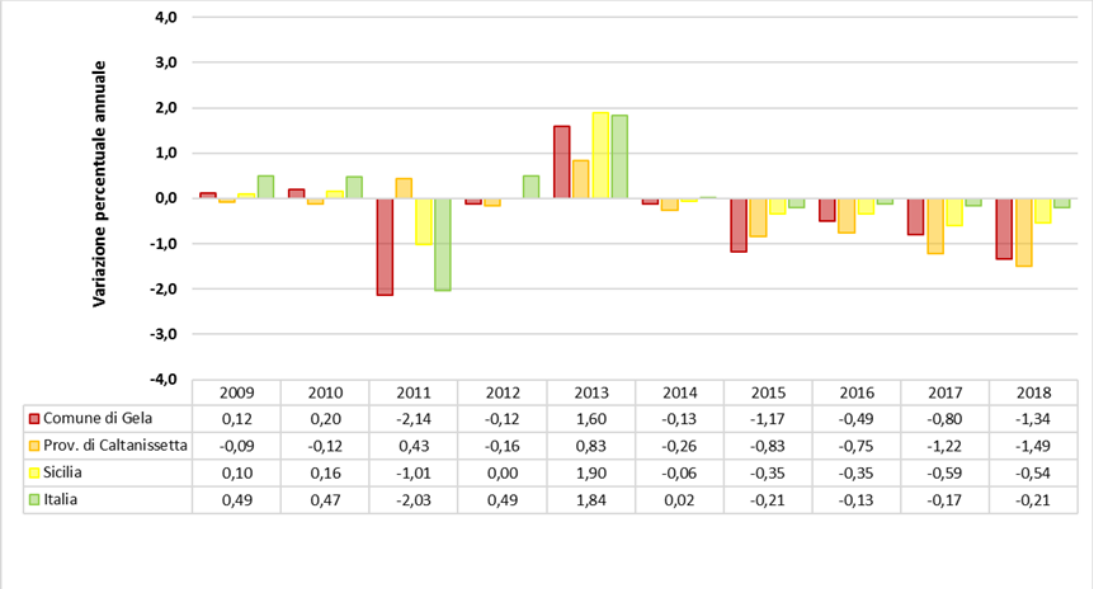
6.9.1 Baseline

The analysis of the public health and socio-economic aspects was carried out by characterising the demographics of the area involved in the project, followed by an analysis of the socio-economic data and the health characterisation of the population residing in the same area.

The onshore section of the gas pipeline will be approximately 7 km long and will run through the southern area of the Sicily Region, falling exclusively in the Municipality of Gela, which belongs to the Free Municipal Consortium of Caltanissetta.

The demographic analysis was performed by processing ISTAT (Italian National Institute of Statistics) data and also making use of the data found on the website www.tuttitalia.it, which processes the information provided by the Institute. The survey was conducted in relation to the municipality affected by the interventions, making comparisons with provincial and regional data and in some cases with national data. In general, a time span was considered corresponding to the last 10 years, from 2009 to 2018; where available, demographic data since 2002 was assessed.

In figure below a comparison of the annual percentage variation of the population residing in the Municipality of Gela, in the Free Municipal Consortium of Caltanissetta, in the Region of Sicily and in Italy over the past ten years. The percentage change is valued at 31 December of the reference year.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Comune di Gela	0,12	0,20	-2,14	-0,12	1,60	-0,13	-1,17	-0,49	-0,80	-1,34
Prov. di Caltanissetta	-0,09	-0,12	0,43	-0,16	0,83	-0,26	-0,83	-0,75	-1,22	-1,49
Sicilia	0,10	0,16	-1,01	0,00	1,90	-0,06	-0,35	-0,35	-0,59	-0,54
Italia	0,49	0,47	-2,03	0,49	1,84	0,02	-0,21	-0,13	-0,17	-0,21

Figure 39: Annual percentage variation of the population of the Municipality of Gela, of the Province of Caltanissetta, of the Region of Sicily and of Italy from 2009 to 2018 (ISTAT data processing)

It can be observed that, after an increase in the population in 2013, from the following year there was a constant decrease in residents at municipal, provincial, regional and national levels, with more relevant percentages in the Municipality of Gela and in the Province of Caltanissetta. The values for 2011 were determined through the difference between the

census population and the registry population, in light of the data emerging from the General Census, conducted in Italy in October the same year.

With regard to socio-economic analysis, this considered data on the employment rate (source: ISTAT), available on a provincial and regional basis for the year 2018, divided by gender and age classes. The highest employment rate for the Province of Caltanissetta is recorded among males in the 35-44 age group. In this case the percentage employed is higher than the regional figure, but considering the age range between 15 and 64, without distinction of sex, the employment rate for the Province of Caltanissetta is lower than that for the Region of Sicily (39.2% against 40.7%). It is also noted that the percentage of employed women is generally lower than the regional figure, except for the age group between 25 and 34.

Sicily's territorial characteristics mean that in the economic field, sea fishing is one of the most profitable activities. These statistics, taken from the ISTAT website, report the figures relating to production and revenues deriving from sea and lagoon fishing for the Italian regions in 2016. Sicily is the first Italian region both for tons of fish and for millions of euros obtained from the sale of fish products; in particular, revenues for the Sicilian region amount to more than a quarter of the national total.

The sanitary characterisation was carried out by referring mainly to the Fifth SENTIERI Report (National Epidemiological Study of the Territories and Settlements Exposed to Pollution Risk). The period under study refers to the years between 2006 and 2013.

The causes of death are classified internationally according to a coding system called ICD (International Classification of Diseases), developed by the World Health Organization (WHO). As regards hospitalisations, the source is the national database of the Hospital Discharge Forms (HDF), available at the ISS (Higher Institute of Health) Statistics Office and based on the hospitalisation data provided by the Ministry of Health and on the data of the municipal populations provided by ISTAT.

The study analyzed the main causes of death for men and women on the Gela Site of National Interest, with the number of observed cases (OSS) and the standardised mortality ratio (SMR), together with the relative confidence interval (IC). The SMR is the most used statistical comparative mortality risk indicator. It expresses the ratio between the number of deaths observed in a population and the expected number of deaths in the same population, if the same specific mortality rates for some confounding variables act on a population taken as a reference; in this case the reference population is that of the Sicilian region. The confidence interval expresses the range of values within which the SMR value falls for predefined levels of probability, which in this case are equal to 90%.

The mortality profile at the Gela Site shows a general tendency to exceed risk estimates. An excess of risk is observed in both genders for all causes, the set of tumours, diseases of the urinary tract and, only among women, for diseases of the circulatory system.

6.9.2 Impact assessment

6.9.2.1 Construction and decommissioning phase

As regards socio-economic aspects, the employment market could be positively influenced during the Project's construction phase, as job opportunities for individuals and companies should be created through the direct, indirect and induced employment associated with realising the work.

138 workers will be needed to build the onshore section of the pipeline and the activity requiring the largest number of employees (24) will be the construction of the Gela terminal. The manufacture of the landing place will require 54 technicians and workers. The operations requiring greater employment in terms of time will be those related to drilling, excavation and earth moving. Many of the activities carried out will require the use of specialised manpower, for example welding. Therefore, despite the presence in the study area of workers and contractors operating in the construction sector, it is foreseeable that various specialised positions will be occupied by international workers.

Therefore, during the construction phase it is estimated that the work will have a positive impact on the level of employment.

As regards commercial fishing, the offshore construction phase is expected to last for about 6 months. At some points in this period, there could be interference with fishermen's activity at sea in the study area, but these potential disturbances should be limited, both in terms of sea surface and time. In addition, a limited number of vessels will be used to lay the pipeline.

During construction activities, therefore, limited or temporarily interrupted access to certain areas of the offshore pipeline route could arise for fishing vessels.

However, considering the small size of the area concerned, the short duration of pipeline laying activities and the availability of alternative fishing areas in the immediate vicinity of the study area, negligible effects on commercial fishing are expected. Therefore, during the construction phase for the pipeline's offshore section, no significant impacts are expected on the livelihoods and income of the fishermen, nor on the fishing vessels operating in the study area.

With regard to public health, from the analyses carried out for the Air Quality component, it emerged that during the construction phase the estimates of contributions in ambient air provide concentration values of SO_2, PM10 and CO, always lower than the limit values and critical levels imposed by Legislative Decree 155/2010.

With regard to the noise climate, an impact on human health could be caused during the construction phase, linked to an increase in noise during the machinery work. However, from the studies conducted for the aforementioned component, it was found that the noise produced by construction of the work in question will not be such as to alter the noise climate that currently exists in the territory crossed. Therefore, the project's impact on public health due to the Noise component is negligible.

As regards Vibrations, based on the considerations made for this component, it emerged that during the construction phase a negligible impact is estimated. Therefore, in this case too the construction of the Work will have a negligible impact on public health.

6.9.2.2 Operating phase

During the operating phase, a negligible impact on employment is estimated, as the number of employees needed will be much lower and the type of activities carried out, consisting mainly of monitoring and maintenance, will involve a short-term use of the workforce.

As regards commercial fishing, once the pipeline has been installed, there will be no restrictions on the movement of boats in the area during operation, nor will restrictions be applied to traditional fishing equipment that can be used. However, although the pipeline should not present significant problems, it is recommended that trawling will be prohibited on the pipeline route for the safety of the trawling gear and the pipeline itself. In fact, the pipeline will be marked on nautical charts following construction.

During the pipeline ordinary operating phase, no impact on public health is expected, neither with regard to air quality, nor for the noise and vibrational climate.

7.0 MITIGATION AND MONITORING MEASURES

7.1 Mitigation

During the construction phase, the following mitigation measures and restoration interventions in the work areas are envisaged:

- Cleaning and restoration of the working track
- Morphological and hydraulic restorations
- Hydrogeological restoration
- Vegetational restoration
- Reforestation
- Air emissions mitigation interventions
- Noise mitigation interventions
- Soil and subsoil mitigation interventions
- Mitigation measures for marine ecosystem biodiversity
- Landscape mitigation interventions

The project envisages vegetational restoration interventions aimed at reconstituting, in the best way and in the shortest time possible, the natural and semi-natural vegetation cover present before the planned work, along the entire working track. In particular, particular attention will be paid to identifying the vegetational restoration work to be implemented to reconstruct the natural and semi-natural ecosystems in order to restore the landscape to its pre-works condition.

During the operating phase, landscape mitigation measures are planned to minimise the visual impact of the Gela terminal plant and the interception points positioned along the line.

The intervention will essentially consist in creating mixed rows of tree and shrub species on the four sides of the interception points of the line and the Terminal, where the species will be planted, even if on limited surfaces, in the most natural and least geometric way possible. The aim is to recreate the composition of the agricultural land or in any case of the spontaneous formations of vegetation present in the areas adjacent to the industrial plants.

7.2 Monitoring

In order to assess the effectiveness of the mitigation measures identified in the SIA, an Environmental Monitoring Plan (EMP) has been drawn up to define the monitoring activities needed to identify any possible changes induced on the environment due to construction of the works and, consequently, indicate the corrective measures for managing/resolving any such impacts.

The EMP foresees monitoring activities in the following phases:

- pre-works (PW), due to the "zero" state of the environment in the area affected by the planned works
- during works (DW), to analyse the evolution of environmental indicators detected in the previous phase

- after works (AW), to compare the status after the project's realisation with the pre-works one and verify the environmental compatibility of the works carried out

The EMP's purpose is to programme the monitoring of those environmental components which, in accordance with what is documented in the SIA (Doc. R_EIA_004), are involved in the project, both from the work's construction phase and from that of operation and decommissioning:

- Atmosphere
- Surface water environment
- Underground water environment
- Soil and subsoil
- Terrestrial biodiversity
- Marine ecosystem
- Noise
- Social environment
- Landscape

It should be noted that in order to characterize the distribution and conservation status of habitats and fauna populations present in the area involved in the project, a Plan for the monitoring of habitats and species and a Protocol to determine the bioaccumulation of contaminants in the collected fish samples (*Marine Ecological Survey, Gela, the collection of biota and its subsequent analysis to determine the bioaccumulation of contaminants in the collected samples - Method Statement. 28 April 2020*) has been prepared for the ante operam phase monitoring. These investigations respond to the specific request issued by the LIPU, as the Management Body of the Riserva Naturale Orientata Biviere di Gela (Prot.U 2557 of 18/10/2019).

As part of the characterization of the ecosystems involved in the project, it should be noted that the ante operam monitoring campaigns envisaged in the aforementioned Plan and Protocol are being carried out at this stage, both for the land and sea parts, which have been programmed taking into account account of the different surveys in the season considered most suitable considering the ecological needs of the different fauna taxa.

Specifically, the ground investigations for the purpose of assessing the ecological status of habitats and species related to the environmental systems involved in the project are as follows:

- Investigation A) Investigation of nesting ornithic populations
- Survey B) Vegetation survey for habitat characterization
- Survey C) Investigations of migratory and wintering bird populations
- Investigation D) Investigation of Reptiles
- Survey E) Amphibian survey
- Investigation F) Mammals Investigation

As regards the investigations on the marine ecosystem required by the LIPU, the following ante-operam monitoring campaigns are as follows:

- • Characterization of marine waters (TRIX, CAM, pH,Temp., Cond.,Eh, Al, Fe, Cd, Crtot., CrVI, Hg, Ni,Pb, Cu, Zn, As,V,• Trasparenza al disco di Secchi, Ipa totali e benzopirene, Tbt (tributilstagno);
- • Characterization of marine sediments (Al, Fe, Cd, Crtot., CrVI, Hg, Ni, Pb, Cu, Zn, As,V, radionuclidi (uranio), Ipa totali e benzopirene-Composti organoclorurati (pesticidi e relativi metaboliti)-Pcb (policlorofenili);-Tbt (tributilstagno) – Metilmercurio e altri eventuali composti organici del mercurio, livelli di radioattività;
- • Characterization of the tissues of bivalve molluscs, stationary fish species and marine phanerogams to detect the presence of contaminants.

The aforementioned plan and protocol are detailed in the document R_EIA_VIEC_004 - Annex 2 Appropriate Assessment, attached to the SIA.

7.2.1 Location of sampling points

The choice and final location of the sampling stations will be defined in detail prior to the execution phase, on the basis of the detailed project layout and the real environmental sensitivities that emerge (Natura 2000 Sites, closest anthropic receptors, main waterways crossed, etc.).

For each of the environmental components to be monitored, the environmental indices and indicators taken as a reference according to the specific monitoring objective of each one are shown below:

nvironmental component	Monitoring objective	Environmental indices and indicators
Air quality	Verification of the effectiveness of the mitigation measures put in place	Fine dust concentration PM_{10} – $PM_{2.5}$ nitrogen oxides (NO_X) and meteoclimatic parameters
Surface water	Preservation of the qualitative/quantitative characteristics of the water flows crossed in the open air	Hydrological, chemical-physical and microbiological parameters
Underground water	Preservation of the qualitative/quantitative characteristics of the underground water flows crossed	Hydrological and chemical-physical parameters
Soil and subsoil	Conservation of land use capacity	Chemical-physical parameters Biological quality of the soil
Terrestrial biodiversity	Conservation of natural ecosystems	Phytosociological surveys for Natura 2000 habitats Avifauna, herpetofauna and batracofauna surveys
Marine ecosystem	Verification of the quality status of benthic communities and marine phanerogams	Chemical-physical parameters of water and sediments Phenological characteristics of phanerogams
Noise	Verification of the effectiveness of the mitigation measures put in place	Pressure levels sound (emission limit in Leq in dB (A) daytime period (6-22); daytime differential limit; daytime immission limit)

Landscape	Verification of the implementation of measures to mitigate visual impact during construction and during operation	Working track widths Presence of fences to protect vegetation Presence of vegetation with visual screen function
Social environment	Disclosure of information, stakeholder involvement, perception of impacts and degree of consent	Demographic structure of the population, economic activities, services and infrastructures

Table 3: Monitoring objectives and environmental indicators

7.2.2 Air quality

The goal of air quality monitoring is to:

- identify any changes in air quality
- highlight conditions for possible exceeding of the limits applicable on the receptors present in the project area

The territory crossed by the gas pipeline, scarcely populated, has rural features and is mainly intended for agricultural activities. The main communication routes in the area are the SS115 and SP189, the Siracusa-Gela-Canicattì railway line, the SP51 and the SP82.

Based on the results of the impact assessment carried out within the SIA (see §. Doc R_EIA_004, § 5.1) the potential problems can be associated with the works' construction phase, in correspondence with the main construction areas. An area of potential exceedance of the hourly threshold of NO_2 is also identified in the area just north of the crossing of the SS115 road.

The monitoring campaign is aimed at characterising the current quality of the ambient air through instrumental surveys, focused on pollutants directly or indirectly released into the atmosphere in terms of concentration values on the ground.

In general, the measurement stations will be located near the perimeter of the construction site area, in areas less distant from the nearest sensitive receptor. The exact location can only take place downstream of inspections during the setup of the construction areas. Air quality monitoring will be divided into the following phases:

- *pre-works* (PW) phase: the *pre-works* air quality will be characterised through a campaign to be carried out in the year preceding the start of the work at all the points identified
- *during-work* (DW) phase: during the construction phases, the air quality monitoring will be ensured by a campaign to be carried out during the period of activity of the construction site concerned

7.2.3 Surface water

The impacts on the surface water environment component attributable to the construction phase have a transitory character. In the case in question, the only watercourse crossed is the course of the Valle Priolo canal as after this the pipeline route follows in underground, parallel to an artificial canal until it reaches the coastline.

The choice of points to be monitored was made by assessing the interference between the pipeline in question and the hydrographic network. The crossing point of the Valle Priolo Channel was considered, positioning a monitoring section upstream and one downstream from the point.

The monitoring of the surface water environment will be based on:

- Flow measurements and analysis of chemical and physical parameters in situ, detected directly by the use of a reel (or floats) and multi-parameter probes
- sampling for laboratory chemical analysis
- determination of the Extended Biotic Index.

The pre-works monitoring phase is characterised for each point by two campaigns of physical-chemical measurements every six months, two campaigns of chemical-bacteriological analysis and two to determine the Extended Biotic Index (EBI), to be carried out before the start of the works, upstream and downstream of the crossing.

The monitoring activities during the works will last as long as the construction site activities, with a monthly frequency for the physical-chemical measurements and the chemical-bacteriological analyses, which will be carried out downstream and upstream with respect to the route and for determining the EBI.

For the after-works monitoring activities, only one monitoring campaign has been scheduled for the physical-chemical measurements, chemical-bacteriological analyses and for determining the EBI, to be carried out upstream and downstream of the crossing.

7.2.4 Underground water

The possible interference with the underground water environment can only be reported against the surface water table of limited thickness and hydrogeological potential, which varies seasonally according to meteoric recharge.

During the construction phase, particular attention must be paid to the possible spillage of polluting fluids that can infiltrate the soil, reaching the underground aquifer, or that can spread superficially in the waters of the hydrographic network, consequently worsening their quality.

The monitoring points will be set up and equipped ad hoc in order to monitor the chemical-physical characteristics of the groundwater and quantitative ones, changes in the level of the groundwater, flow and/or the productivity of the wells and other water resources potentially interfered with by construction of the Work.

Installation is planned of 5 measuring points, to be built from scratch (open tube piezometers), that allow monitoring of the underground water resource along the planned underground path.

The piezometric readings will be carried out on each sampling point in order to catch any oscillations of the aquifer due to the different meteorological contributions.

Monitoring will be divided into the following phases:

- Pre-works phase: 4 measurements of the aquifer height, on a quarterly basis, and 4 water samples for chemical analysis with the same frequency, to be carried out during the year preceding the opening of the construction site;
- Construction phase: 1 quarterly reading of the aquifer height to be carried out in all piezometers; 1 water sampling for chemical analysis to be carried out downstream of the excavation phase, 1 water sampling downstream of the pipe backfilling phase. The sampling will be performed at the piezometer positioned closest to the section under execution.
- After-works phase: 2 measurements of the aquifer height and 2 water samples for chemical analysis, every six months, to be carried out in the year following the closure of the construction site.

7.2.5 Soil and subsoil

The work's impacts on the soil and subsoil component are mainly attributable to the construction phase and are potentially determined by the following factors:

- occupation of the construction site soil for construction of the works
- stability and/or interference problems with hydrogeological risk areas
- earth moving and waste production
- potential contamination of soils and marine sediments during excavation phases

The monitoring of the component will concern the areas intended for implementation of the *onshore* gas pipeline, for which agricultural and/or vegetational recovery is foreseen.

The monitoring points intended for *in situ* investigations and sampling will be positioned on the basis of criteria of representativeness of the pedological characteristics and use of the areas, to be defined in detail during the monitoring execution phase.

Based on the results of the impact assessment conducted within the SIA (Doc R_EIA_004), the soil of interest has a relatively homogeneous characterisation in terms of "*Soil quality index*", varying from high to medium. Therefore, to identify the monitoring points it is suggested to identify 4, spaced about 2 km from each other, so as to intercept soils with both a high and medium quality index. The physical-chemical characterisation of the soils for monitoring purposes will be carried out through:

- pedological surveys in situ, with the execution of profiles and boreholes
- laboratory analysis on soil samples, with determination of physical-chemical parameters

For each monitoring point, in addition to the geographical (including coordinates) and temporal references, the stationary characters of the area they belong to will be recorded: altitude, slope, exposure, land use, vegetation, pedogenetic substrate, outcropping rock, surface stoniness, other surface aspects, erosive state, permeability, groundwater depth.

Monitoring will be divided into the following phases:

- *pre-works* (PW) phase: soil characterisation will be carried out through 1 sampling, preferably in spring or autumn, inside parcel 1 falling in an undisturbed area ("white" area) and in particle 2, affected by the restorations

- *after-works* (AW) phase: following the project's implementation, annual surveys are planned, preferably in spring or autumn, for the 5 years following the restoration activities inside parcel 2 where morphological and vegetational restoration interventions were carried out. In the fifth year, sampling in parcel 1 will also be repeated.

7.2.6 Terrestrial biodiversity

The project's impacts on the terrestrial biodiversity component are essentially related to the construction phase, due to the preparation of the work areas and the use of machinery assigned to work.

By examining the territorial context, the monitoring points were identified within the main environmental systems affected by the project intervention and referable to the following:

- agricultural system
- river system (Valle Priolo canal)
- consolidated dune system
- system of halophytic vegetation environments

As part of the SIA and the Impact Assessment attached to the SIA, a survey was carried out of the environmental systems present in the context under study, interfered with by the pipeline project, paying particular attention to the presence of habitats and species of Community interest.

Reconnaissance of the Natura 2000 Network has, in fact, highlighted how the pipeline project intercepts the following sites for the onshore part:

- ZPS ITA050012 Torre Manfria, Biviere and Gela Plain
- ZSC ITA050001 Biviere and Macconi di Gela

The following surveys are deemed suitable for monitoring the ecological status of habitats and species related to the environmental systems involved in the project:

Monitoring of vegetation and fauna

A. Survey of nesting ornithic populations
B. Survey of vegetation in the habitats of the Natura 2000 Network
C. Survey of migratory ornithic populations
D. Surveys of wintering ornithic populations
E. Reptile surveys
F. Amphibian surveys
G. Mammal surveys

Monitoring will be divided into the following phases:

- Pre-works phase: the monitoring campaigns aimed at characterising the habitats and fauna populations present in the area will be carried out prior to the opening of the construction sites. To have a complete and exhaustive overview, it is necessary for the surveys to cover the time span of one year, to guarantee that the fauna census is conducted during the periods of activity of the different taxa
- Construction phase: monitoring campaigns will be scheduled for each year for the entire duration of the construction site

- After-works phase: the monitoring campaigns will be scheduled for one year at the end of the construction phase

7.2.7 Marine ecosystem

The impacts of the pipeline project on the marine ecosystem are essentially attributable to the construction phase, due to dredging and laying the underwater pipeline on the seabed, which can cause the following potential impacts:

- alteration of the quality characteristics and increase of the turbidity of coastal marine waters
- interference with the characteristics of the biocoenoses present

The purpose of monitoring for the 'Marine ecosystem' component is to characterise and control the ecosystem's quality from the point of view of marine waters, sediments and biota, in the areas directly affected by the installation of the submarine cable and in the surrounding areas that may be affected by disturbances connected with construction works.

The identification of the areas to be monitored took into account the results of characterisations of the quality of marine-coastal waters and of the sediments from previous studies related to the study area, as well as those carried out ad hoc for the design of the Work in question. The monitoring of the marine ecosystem involves investigations on the different matrices that comprise it, in order to offer a complete picture of the quality status and evaluate changes during the construction and operating phase.

The surveys relating to the marine ecosystem to be conducted during the monitoring are as follows:

A. Physical-chemical analysis of water
B. Physical-chemical analysis of sediments
C. Analysis of benthic communities
D. Analysis of phanerogams
E. Check for presence of marine cetaceans
F. Current measurement
G. Tissue surveys in fish species

The environmental monitoring project will be divided into three distinct phases:

- *Pre-works monitoring*, which ends before the start of construction activities;
- *During-works monitoring*, which includes the entire period of arranging the pipeline
- *After-works monitoring*, which roughly includes the first 2 years of the operating phase

7.2.8 Noise

Based on the noise analyses and simulations carried out for the construction activities identified as potentially impacting, it has been observed that the noise impact produced on the territory during the construction will be contained in compliance with the regulatory indications in force for the daytime. Therefore, if the works are limited to the daytime only, it will not be necessary to implement acoustic mitigation.

The territory crossed by the gas pipeline, scarcely populated, has rural features and is mainly intended for agricultural activities. The main communication routes in the area are, in addition

to the aforementioned SS115 and SP189, the Siracusa-Gela-Canicattì railway line, the SP51 and the SP82.

Based on the results of the impact assessment carried out within the SIA (Doc R_EIA_004), the potential problems can be associated with the construction phase of the gas pipeline in correspondence with receptors close to the construction site (100 m range).

The goal of noise monitoring will therefore be to:

- identify variations in the noise of the acoustic climate
- highlight any impacts on the receptors along the project route

From analysis of the territory affected by the works, it is observed that the areas potentially affected from noise impact are of a modest size, since the project crosses areas with a predominantly agricultural vocation with very few residential and/or sensitive nuclei.

The phonometric surveys concern the following types of measurements:

A. Construction site noise measurement (spot measurement) of short duration near the receptors identified along the pipeline route.
B. Vehicle traffic noise measurement (weekly measurement) aimed at assessing road traffic noise along the SS115.

The noise measurements will be divided into the following phases:

- pre-works (PW) phase: the pre-works acoustic climate will be characterised through a campaign carried out in the year preceding the start of the work at all the points identified
- during-work (DW) phase: during the construction phases, the noise monitoring will be ensured by a campaign carried out in conjunction with the most demanding activities in terms of number of vehicles and type of activity, and therefore capable of producing greater noise emissions

7.2.9 Landscape

As regards the impacts on this component, the impact during construction, and in analogy during decommissioning, will mainly be determined by the movements of the machinery necessary for the entire phase, especially in areas where the pipeline will cross and/or skirt existing roads or pass near them. However, thanks to the low attendance of the site and given the temporary nature of the activities, the potential visual impacts during the construction phase can be considered low and completely reversible at the end of the works. With regard to the operating phase, it is believed that the project in question does not involve any changes in the landscape analysed.

The Landscape Component is monitored in order to:

- evaluate the possible repercussions resulting from the construction of the Italy-Malta gas pipeline and related works, on the aesthetic, ecological, historical, socio-cultural and economic characteristics of the areas directly or indirectly affected
- evaluate the effectiveness of the mitigation measures envisaged

The intervisibility basin of the interventions is rather limited, since the pipeline will always be buried along its path. As for the above-ground works (terminals, valve block stations), given

the dimensional characteristics, which have limited volumes, and the presence of arboreal strips around the areas involved in the project, they will be visible, almost never in their entirety, solely from areas in the immediate surroundings, thanks in part to the envisaged visual mitigation measures.

The choice of monitoring points was therefore made within the intervisibility basin of the works, considering in particular the points of view selected to assess the impacts on the component, in correspondence with which the realistic photo insertions of the planned works were produced, as reported in the Environmental Impact Study (see §. Doc R_EIA_004, § 5.4.7.2 and Table 5.7.1) and in the Landscape Report (see §. Doc. R_RPAE_003, Tables Nos. 13, 14, 15, 16).

At each of the identified monitoring points and their respective area, inspections will be carried out to verify the impact on visual perception, which will also be documented through photographic shots.

The monitoring will be carried out through field surveys and will last for two years after the end of the restoration activities, a period also necessary to evaluate the project's acceptance in the local context. The field surveys will be carried out once a year, in correspondence with all the monitoring points foreseen and monitored *pre-works*.

The results of *after-works monitoring* will be evaluated and reported in annual reports.

7.2.10 Social environment

The objective of monitoring the social environment is to detect, analyse and explain the changes that occur during the work in the main socio-economic and socio-cultural variables of the living framework of the communities involved in the project, grasp citizens' opinions, perceive and promptly acknowledge the problems that arise in order to implement solutions.

The scope of intervention is focused on analysis of social perceptions and information flows generated by local media, in the territorial context of the municipality of Gela.

The surveys will concern the population directly affected by the project's realisation, that is, the people who live and/or work in the areas closest to the project route, as well as the population of the urban area of Gela, both residents and those who work in trade and tourism.

The monitoring structure will be divided into two distinct but related activities:

1. social perception monitoring, aimed at detecting perceptions of impacts and local communities' degree of consent to the project
2. media monitoring aimed at providing a rapid and constant barometer of the status of consent and capable of signalling potential perception risks in advance

As regards the monitoring of social perceptions, this involves two distinct areas:

- *desk research*, which consists of analysing the content of documents, applications, forums/blogs, products disseminated in the local area by individuals, groups of citizens, associations, bodies and institutions
- *in-depth interviews with local stakeholders*, which consist in verifying the needs and expectations emerging from the media and desk research, through face-to-face interviews with local stakeholders:

- political decision-makers
- economic decision-makers
- trade unions
- environmental associations
- commuter associations
- consumer associations

As far as Media Monitoring is concerned, this involves two distinct areas:

- *press:* consists of analysing the content of articles published on the work;
- *radio-television:* consists of analysing the content and semiotics of radio and TV items relating to the work.

8.0 CONCLUSIONS

Based on the impact analysis carried out within the Environmental Impact Study for each environmental component involved, the analysis of the environmental framework revealed the absence of critical issues in terms of air quality and noise pollution, the study area being characterised mainly by agricultural activities, absence of sensitive receptors and low vehicular traffic due to the absence of large road arteries near the intervention area. In general, no significant issues are expected during the ordinary operation of the work. Gas emissions will be possible in the event of uncommon and non-routine events, in an emergency or for maintenance. Therefore, no mitigation measures are envisaged during the operation of the pipeline.

In the project configuration, there is no evidence of the persistence of significant residual impacts, including with respect to the water environment and soil and subsoil components, which have not proved resolvable with the proposed environmental mitigation and design measures adopted.

The only significant elements are represented by the actual occupation of the soil for the external works, which is however very limited and in any case attributable to current uses once the work has been decommissioned, and by the risk of potential impoverishment of agricultural soils in the areas of excavation and installation of the pipeline. Although it is believed that the planned and previously described mitigation measures ensure the aforementioned impact is minimised, it seems appropriate for the substantial soil and subsoil element to be monitored over time.

As regards the marine ecosystem, the residual impacts are due to the physical occupation of the seabed by the pipeline, the dimensions of which are, however, very limited. Consequently, the main mitigation measures were envisaged in the construction phase only.

It is stressed that the residual impacts are the subject of the Environmental Monitoring Plan (see §. DOC. R_PMA_004), aimed at verifying the forecasts of environmental impacts, as well as the effectiveness of the mitigation measures adopted.

The presence of the terminal and valve block stations, which are configured as elements newly inserted into the landscape context, are the only interference factors. This residual impact relating to the landscape components has been subject to mitigation and implementation of interventions aimed at improving the work's insertion in the territory. The fact, therefore, that the residual interference of the work has been indicated for the landscape, indicates the simple permanence in the territorial context of elements that undeniably contribute to modifying it but which have also been identified with a view to harmonising the work's relationship with the context as much as possible, reducing its visual intrusion.

In conclusion, the study highlighted the absence of significant environmental impacts for the Project's new works. Both for the onshore and offshore parts, based on the information acquired and reported in this document, and on the assessments carried out, the works in the project do not have significant impacts on the environment.

9.0 EIA ANNEXES

Annexed to the EIA Study are Maps and the following studies:

- Annex 1 – Alternative Assessment (R_ALT_003)
- Annex 2 – Appropriate Assessment (R_VIEC_004)
- Annex 3 – Modelling study of marine sediments transport (R_SDM_001)
- Annex 4 – Noise measurement campaigns (R_RUM_001)
- Annex 5 – Environmental Monitoring Plan (R_PMA_004)