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Ecological Management Plan

CAL00-PMT-601-Y-TTM-0007

Appendix 11

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APPENDIX 11
SEAGRASS MANAGEMENT PLAN (ITALY)

Purpose of this document

The purpose of this Seagrass Management Plan document is to:

- Introduce the rationale and objectives for seagrass management at the Trans Adriatic Pipeline (TAP) Italy landfall and nearshore, where sea grass is present.
- Define consenting conditions relating to seagrass.
- Define the specific mitigation measures in place to satisfy these conditions.
- Define how these measures will be enacted, monitored and reported.

This document links with, and defers to, the work undertaken for the Environmental Monitoring Project[1] and provisions made within the Preliminary Environmental Study for the Micro-tunnel[2] which enact parts of the Italian Ministerial Decree no. 223/2014. The expected outcome of this Seagrass Management Plan will be the minimisation of any impact on the seagrass adjacent to the revised micro-tunnel exit area. In addition to *Posidonia oceanica* triggering critical habitat when present as Annex I meadow habitat (which is not in the vicinity of the construction works), it has also been identified along with *Cymodocea nodosa* as a Priority Biodiversity Feature (PBF). In accordance with lender requirements, the project must ensure No Net Loss (NNL) to PBFs as a result of the project.

This Seagrass Management Plan is a 'live' document that will be adapted through the detailed design and construction phases of the TAP project. This draft plan provides the general overview required to demonstrate implementation of the mitigation hierarchy and measures required to ensure compliance with ESIA commitments, consent requirements and lender performance standards.

This draft provides a structured framework for the plan where more specific details will be added nearer the time of construction, as more construction information becomes available (e.g. refined consent conditions, appropriately responsible contractor personnel).

TAP in-country offices will develop and maintain this and associated documents, with inputs from local experts as required, immediately prior to and during the construction phase of the TAP project.

This plan should be read in conjunction with the EMP.

Introduction

The proposed TAP landfall in Italy is located between San Foca and Torre Specchia Ruggeri in the municipality of Melendugno. This landfall will be constructed by means of micro-tunnelling techniques to minimise potential for environmental impacts. One of the primary reasons that this technique was employed was to avoid scattered *Posidonia oceanica* seagrass and significantly

[1] IAL00-ERM-643-Y-TAE-1028
[2] IAL00-ERM-643-Y-TAE-1000

reduce the potential impact on another seagrass species, *Cymodocea nodosa*, both known to be present in the general area. The selected method for micro-tunnel drilling involves the use of a tunnel boring machine. The micro-tunnel entry point onshore will be 600m from the shore line and the tunnel will be drilled for approximately 1.5km seawards, exiting at a water depth of approximately -28m. The seabed at the exit point will be dredged to produce a trench which extends approximately 88m seawards and be excavated to a depth of 6.5m below the existing seabed level of -21m. At the exit point, the dredged area will be approximately 48m wide at the existing seabed and 6m wide at the base.

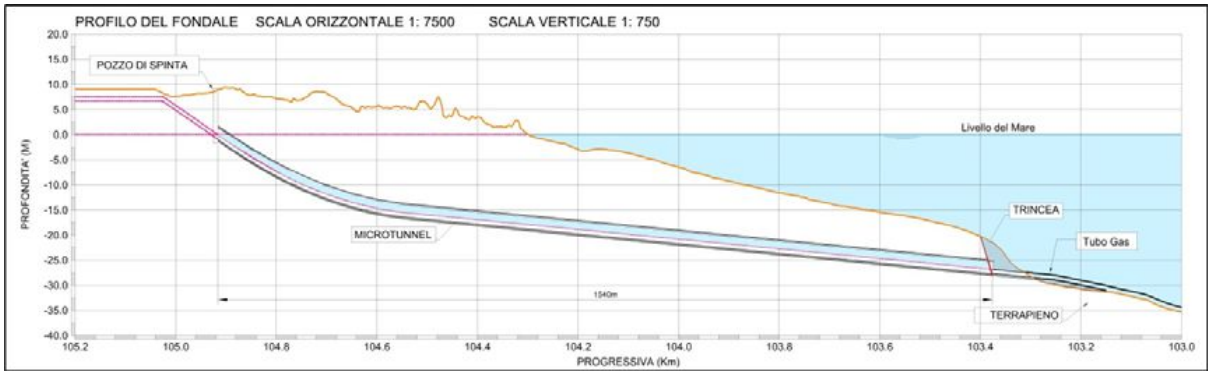

Figure 1: micro-tunnel longitudinal profile.

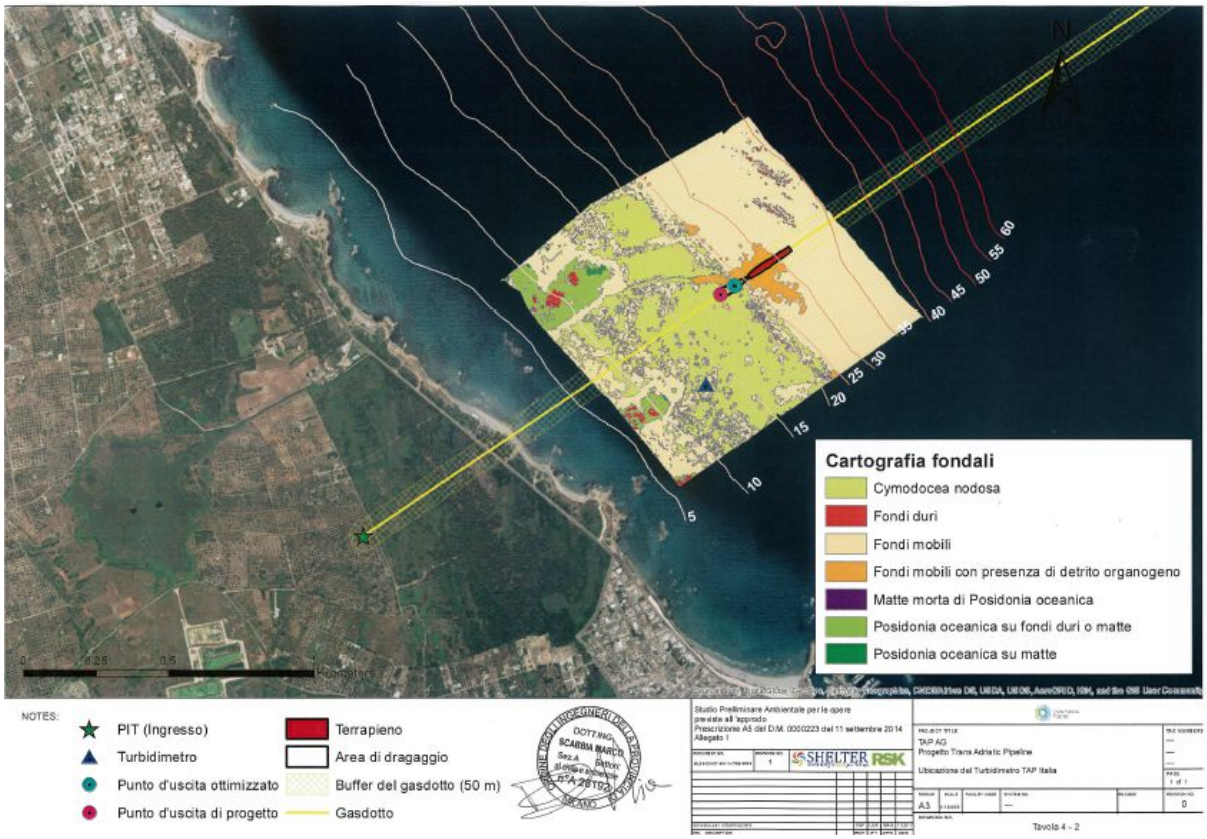

Figure 2 (refined route): the pipeline route (yellow line) and microtunnel exit area (red circle) in relation to seagrass and seabed type, and the turbidity monitoring location (blue triangle). Beige: mobile seabed. Red: hard seabed. Orange: mobile seabed with organic debris. Purple: dead patches of *Posidonia oceanica*. Yellow/green: *Cymodocea nodosa*. Light green: *Posidonia oceanica* patches on hard seabed. Dark green: *Posidonia oceanica* patches. Burgundy: embankment.

As noted in the TAP ESIA for Italy, seagrass is present at the landfall location. A TAP-commissioned survey in June-July 2016 (*Fugro EMU Limited, 2016*) confirmed that, within the immediate vicinity of the micro-tunnel exit area, the seabed is comprised of bare sand and is adjacent to a sparse area of *Cymodocea nodosa*. Small isolated patches of *Posidonia oceanica* were also present but were located more than 50m from the micro-tunnel exit. A further survey in June 2017 confirmed the presence of *Cymodocea nodosa* and found that where *Posidonia oceanica* was present it had been replaced by a meadow of *Cymodocea nodosa.* This regression of *Posidonia* and substitution with *Cymodocea* is seen elsewhere in the Adriatic. Suspended sediment created by construction activity will be limited to the immediate micro-tunnel exit area and has been demonstrated by modelling to not have the potential to cause impacts beyond this area. There will therefore be no impacts on *Le Cesine,* a nearby Site of Community Importance (SCI), 2.3 km north of the landfall, which is designated for the presence of *Posidonia* meadows. N.B.: it should be noted, however, that the Critical Habitat Assessment for TAP found that *Posidonia oceanica* triggered critical habitat under Criterion 4 (Threatened Ecosystems) for *Posidonia oceanica* beds (i.e. the designated SCI) as a priority Annex I habitat under the Habitats Directive.

Seagrasses are flowering plants that require light for photosynthesis and can therefore be impacted by increases in suspended solids, which creates turbidity and decreases light penetration. There is the potential, therefore, for impacts to seagrass during the temporary construction phase of the TAP project from increases in suspended sediment as a result of seabed works. Physical damage may also be possible to a small area of *Cymodocea*, not greater than 400m^2.

Mitigation and management measures

Mitigation

Consultation on construction techniques and mitigations during rock armouring and pipe lay is currently ongoing (Q4/17) with the relevant Italian authorities. Detailed mitigation measures agreed for the protection of seagrass will be provided within the next revision of this plan.

A number of existing measures have been incorporated into project planning that will mitigate the potential for impacts to the seagrass:

- **Use of micro-tunnelling**: the drilling of a micro-tunnel will remove the potential for significant impact to seagrass from direct damage using 'open-cut' techniques or similar.
- **Micro-tunnel exit:** survey results from adjacent areas show that the selected micro-tunnel exit point is likely to result in lesser impacts to seagrass than an exit point to the north, south, or west (an eastern exit point was not feasible, based on engineering considerations).
- **Seasonal restriction:** TAP has committed to not undertake dredging operations during mid-June to August. This restriction therefore removes any potential for temporary increases in suspended sediment during the key summer growing season for seagrass (when levels of suspended solids are naturally lower).
- **Use of sheet piles** to prevent increased dredge requirements resulting from slumping of slope.
- **Use of 'eco-bucket' to** reduce sediment/turbidity during dredging in order to limit the dispersion of the dredged sediments.
- **Extending the microtunnel exit** an additional 55m to further reduce the amount of dredging that could affect seagrasses.
- **Reducing the duration of dredging** from 60 to 17 days; this is possible as the volume of material to be excavated has been reduced in detailed design.
- **Backfilling only during evening/night hours (16.00 - 05.30)** to reduce impact on photosynthesis. N.B.: dredging will still occur on a 24-hour basis. Reinstatement works are expected to last approximately 8 days.
- **Installing fibre optic cable alongside the pipeline and within the micro-tunnel** to minimise total project footprint.
- **Site files:** upon completion of pre-construction data collection, Level 3 site files will be created to define site-specific management control measures.
- **Use of environmentally friendly products** for the drilling of the last stretch of micro-tunnel as detailed in Annex C of IAL00-C5577-601-Y-TRB-0006.
- **Development of** pollution prevention and emergency response procuedures for drilling activities.
- **Review of Baseline** during development of anchor handling plans to avoid impacts on seagrass

- **Use of temporary sheet piling** to reduce the volume of sediment dredged and the footprint of the excavated area.
- **Use of a smaller bucket and hydraulic pumps with closed cycle**, without discharge of seawater and suspended solids, to allow for accurate excavation at the sides of the tunnel -oring machine).
- **Use of 'geotextile curtains' or bubble curtains** will be investigated and implemented where possible to limit the dispersion of sediments suspended during the dredging and backfill works.

Turbidity monitoring

One of the Italian Prescriptions (A5) identifies the need to define a suspended solids concentration limit, and if suspended solids levels approach the limit during construction, mitigation measures will be put in place in order to decrease it.

A continuous seabed turbidity and current monitoring system was installed on the seafloor on 22 November 2016 to monitor the natural variations of turbidity and currents to determine the natural, pre-construction peaks of turbidity in the absence of interference from project activities. The continuous monitoring station was installed approximately 300m from the planned micro-tunnel exit in approximately 15m of water and within an existing seagrass area. The station is equipped with a multi-parameter probe (measuring conductivity, temperature, density, pressure, and turbidity) and an Acoustic Wave and Current (AWAC) sensor. The monitoring station location is indicated in Figure 2 above.

Site visits to the monitoring station will take place approximately every 21 days to download data and service the instruments. Separate turbidity measurements (using an electronic oceanographic CTD instrument) and individual discrete surface and bottom water samples will be collected simultaneously at sites WS1, WS2 and WS3 (Figure 2) during site visits. The discrete samples are sent to a laboratory for suspended sediment concentration (SSC) analysis. A linear correlation between the simultaneous turbidity and suspended solids measurements continues to be developed as the dataset grows. The relationship will then be applied to the continuous turbidity measurements collected from the monitoring station. The indicative threshold limit of 115 NTU was calculated from the maximum turbidity values collected between November 2016 and May 2017. Assessment of the threshold value will continue to incorporate one year's worth of data. Approaches to data processing and threshold setting are pending approval from the relevant authorities.

The number and location of monitoring will be developed based on consideration of location of seagrass relative to the constructions works afollowing consultation with the Italian authorities.

During the construction phase, turbidity data will be collected and made available in real-time. The turbidity meter will be connected to a modem which is mounted on a surface buoy. Turbidity data will be sent from the modem to various recipients for review. The immediate availability of the turbidity data will allow the application of the turbidity limit, ensuring that mitigation measures are enacted as quickly as possible.

The mitigation measures will include the reduction in intensity of dredging or backfilling works or their temporary cessation to allow the turbidity levels to decrease to below the limit.

Level 3 site files will be developed for all PBFs and CH which will include mitigation, monitoring and, if necessary, offset requirements to achieve No Net Loss (NNL) and Net Gain (NG).