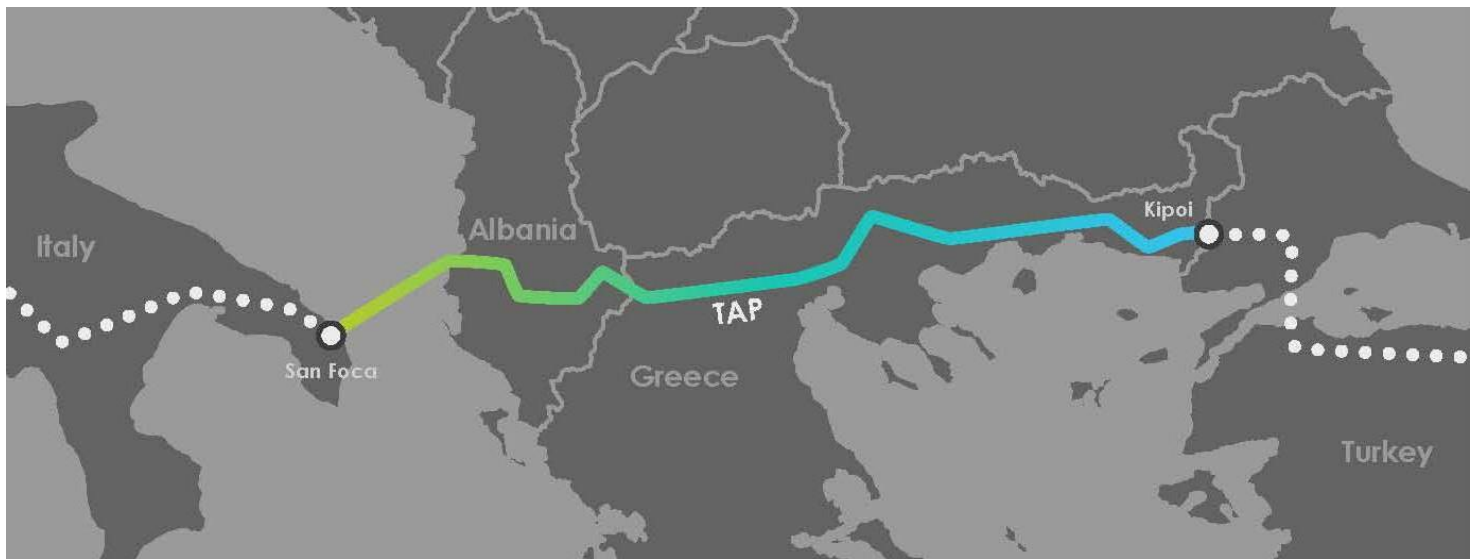






Trans Adriatic  
Pipeline



## Soil Erosion and Reinstatement Plan

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## 1. Introduction

This document is the Soil Erosion and Reinstatement Plan (SERP) for the Trans Adriatic Pipeline (TAP) Project. This document describes the framework and approach that will be applied by TAP (Company) and its Contractors to manage soil erosion, sediment control and reinstatement during construction and during pipeline operations, in accordance with the requirements of the ESIA, the ESCH management system, the ESMP and relevant contract documents including CCPs and specifications.

This plan is supported by the Erosion Control & Reinstatement CCP and is subordinate to, and should be read in conjunction with, the Company ESMP (CAL00-PMT-601-Y-TTM-0006). The ESMP is the overarching framework document for the Company ESCH Management System, and provides an overview of all Company environmental, socio-economic and cultural heritage aspects and how impacts will be identified, avoided, mitigated or managed in accordance with Project requirements.

### 1.1 Purpose


The purpose of this plan is to present a clear framework of the tools and processes in place to manage and guide reinstatement, soil erosion and sediment control to achieve the physical reinstatement of all Project-disturbed sites to their original condition, as far as possible, upon completion of construction.

Where necessary, this document refers to other parts of the TAP Project ESCH Management system, which provide supplementary technical details relevant to reinstatement, soil erosion and sediment control.

### 1.2 Document Hierarchy

As described in section 1.1 of the Environmental and Social Management Plan, TAP has developed an Environmental, Social and Cultural Heritage Management system to support implementation of the applicable project standards. This management plan supports the implementation of the:


- TAP erosion control and reinstatement standard and specifications, these include:
  - Specification for Erosion Protection Measures
  - Specification for Reinstatement
- TAP erosion control and reinstatement Contractor Control Plan (CCP) and ESIA commitments
- TAP Geohazard Construction Quality Plan & TAP SME Onsite Assurance of EPC's Soil Erosion Control in Greece and Albania (CPL00-PMT-100-Y-TTA-0001)
- EPC Contractor Erosion control and reinstatement implementation plans – each of the EPC contractors is required to issue

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### 1.3 Context

To prevent soil erosion and manage sediment, establishing vegetative cover is the most effective and feasible mitigation measure over the life of the Project. Establishment of an appropriate level of vegetation cover, supplemented with engineering structures (e.g. gabions or rockwork) where vegetation cover is not immediately feasible or applicable, is a primary aim of this plan to meet the broader objective of providing stable soils across disturbed areas.

It is not technically or financially feasible to completely avoid risks of soil erosion and sediment loss associated with large linear infrastructure projects of the scale of TAP. Therefore, consideration has been given to development of a management framework that is risk based – aiming to reduce risks to the environment, communities and relevant infrastructure to acceptable levels in accordance with Project requirements.

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## 1.4 Abbreviations and Definitions


The Project Design Documents listed in the Contract shall be read in conjunction with this plan.

### 1.4.1 Abbreviations


Abbreviation/ Acronym	Description
AGI	Above Ground Installation
ALARP	As Low As Reasonably Practicable
CCP	TAP Contractor Control Plan
ESIA	Environmental Social Impact Assessment
ESIP	Contractor Environmental & Social Implementation Plan
ESMP	Environmental and Social Management Plan (overarching framework document that describes accountabilities as well as how project environmental, social and cultural heritage requirements are identified, managed and reported upon)
ESCH	Environmental, Social and Cultural
PCP	Pollution Control Plan
ROW	Right of Way
SERP	Soil Erosion and Reinstatement Plan
SME	Subject Matter Expert
TAP	Trans Adriatic Pipeline (also referred to as Company)
USLE	Universal Soil Loss Equation
WMP	Waste Management Plan

### 1.4.2 Definitions

Term	Meaning
ALARP	For a risk (or impact) to be ALARP it must be possible to demonstrate that the cost involved in reducing the risk/impact further would be grossly disproportionate to the benefit gained. The ALARP principle arises from the fact that infinite time, effort and money could be spent on the attempt of reducing a risk/impact to zero. It should not be understood as simply a quantitative measure of benefit against detriment. It is more a best common practice of judgement of the balance of risk and societal benefit.
Aggregate stability:	Wet strength of a soil particle. Synonymous to soil consistence. Resistance to slaking.
Assurance (Tier 3)	Assurance refers to the highest level of checking (Tier 3) to measure compliance of project activities by personnel not directly involved in the activities being checked. Assurance is primarily conducted through targeted audits but is also undertaken as formal reviews. Assurance activities are typically detailed and focussed upon defined risk areas or guided by feedback from the results of the self-verification and oversight activities. Assurance activities are intended to provide an additional layer of assurance above and beyond self-verification and oversight activities.
Company Representative:	Construction Manager (Senior Site Representative).
Company:	Company or Company Representative.

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Bio-restoration	The restoration of flora and fauna and the establishment of vegetation to return the vegetation cover and species diversity to pre-construction conditions, where practical (i.e. no trees can be planted on an 8m corridor centred on the pipeline).
Boulders:	Coarse stone larger than 10-inches (25.4cm) diameter.
Cohesion:	Holding together; force holding a solid or liquid together, owing to attraction between like molecules. In hydraulics - particles in the silt or clay size range (<0.06mm in diameter) where there is an electrostatic attraction between particles (c.f. sands and gravels, where the force is absent).
Contract:	Governing this scope of work.
Contractor:	Construction Contractor.
Floodplain:	Nearly level land on either side of a channel subject to flooding.
Freeboard:	Vertical distance between the maximum water surface elevation anticipated in design and the top of retaining banks or structures provided to prevent overtopping because of unforeseen conditions.
Gypsic:	More than 40% by weight of carbonates (expressed as CaCO <sub>3</sub> ) plus gypsum, and the gypsum is >35% of the sum of carbonates and gypsum.
Operations:	Pipeline operations.
Oversight (Tier 2)	Oversight activities represent the next tier of checking above 'self-verification'. Oversight is typically performed by the TAP (Company) site E&S teams and the ESCH Experts. Oversight activities ensure that the self-verification conducted by Contractors has been carried out sufficiently. Oversight activities include review of E&S reports/documentation/monitoring data/procedures & plans, undertaking formal inspections (checklists), undertaking quarterly reviews, internal Company reporting on E&S performance and attendance of meetings with Contractors to drive performance.
Pre-Construction Surveys	A Pre-Construction Survey is an inspection of the existing condition of a Project area (along the R.O.W.) and associated facilities before the commencement of construction. The purpose of a Pre-Construction Survey is to verify Company provided information (ESIA, survey reports etc.) and to provide an accurate record of the conditions of the Project's areas, as well as the adjacent areas, land & properties, local communities & other stakeholders, and Cultural Heritage (CH) Sites, that may be affected by the project. The Pre-Construction survey is also required for off-ROW sites in accordance with Reinstatement CCP and Additional Land Take CCP. Pre-construction surveys will be used as a guide during reinstatement.
Reinstatement	<p>The process of restoring the area to its prior state after pipeline installation (includes replacement of topography, topsoil, fences, etc. installation of erosion control, to all disturbed areas associated with the construction of the pipeline or pipeline facilities after their installation).</p> <p>In the context of this plan, the term reinstatement refers to the stabilisation of soils through the methodologies outlined, rather than to re-establishment of pre-existing floristics, which is considered further under the bio-restoration plan and therefore outside the scope of this plan.</p>
Reynold's number:	<p>Erosive Reynolds number is calculated by the following formula:</p> $Re \equiv \frac{V \cdot d}{\nu}$ <p>, where V is mean velocity in profile, d is median diameter of bed sediment, and <math>\nu</math> is kinematic viscosity of water.</p>
Riparian:	Land or vegetation along the banks of a stream or other body of water.
Soil consistence:	The degree of cohesion or adhesion of the soil mass. Terms used for describing consistence of dry soil materials and degrees of cementation include loose, soft, slightly hard, hard, very hard, and extremely hard; terms


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	used for describing cementation include weakly cemented, strongly cemented, and indurated.
Soil erosion class:	Classification of soils according to the magnitude of soil erosion that has occurred. Class 4 soil erosion means the topsoil is largely truncated and the surface is covered by rills and gulying
Soil Erosion and Risk Assessment Registers	A live register will be maintained by the TAP In-country IPMT re-instatement inspector. The register will highlight at-risk sections (based upon Company risk assessment processes including application of the Universal Soil Loss Equation – or USLE) in conjunction with predicted erosion class information before and after proposed (or equivalent) mitigation measures for the entire pipeline route in Greece and Albania.
Soil structure:	The combination or arrangement of primary soil particles into secondary particles, units or peds; secondary units are characterised and classified based on size, shape, and degree of distinctness into classes, types and grades, respectively.
Soil texture:	The relative proportions of the various soil separates (particle sizes) as described by the classes of soil texture: sand, loamy sand etc.
Self-Verification (Tier 1)	Self-verification refers to the checking by the implementing party on itself, to demonstrate compliance with commitments or requirements, and provides evidence to self-verify that it is meeting its' obligations. Examples include Contractor E&S checklists, monthly E&S reports, KPI reporting, monitoring data, management plans etc.
Thalweg:	The line following the deepest part of the channel.
Tractive shear (boundary shear stress):	The shear stress (the force acting on a unit area) of water at the channel's bed.
Turbidity:	The capacity of a liquid to convey light.
Universal Soil Loss Equation (USLE)	The Universal Soil Loss Equation (USLE; Wischmeier and Smith, 1978; Renard et al. 1991; see <a href="http://www.ars.usda.gov/Research/">http://www.ars.usda.gov/Research/</a> ) is a simple and practical method for estimating soil loss. It was developed initially for agricultural land in the USA east of the Rocky Mountains, but has been widely used in many countries of the world and has been extended for application to construction sites and pipeline RoWs (e.g. Morgan et al, 2005).
Wetland:	Seasonally flooded basins or flats. To be classed as a wetland, it must have one or more of the following attributes: (a) the land supports predominantly hydrophytes; (b) the substrate is predominantly undrained hydric soil; and (c) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

## 1.5 References

This plan is part of Company's over-arching ESCH Management System and as such interfaces with several other management plans. It should be read in conjunction with all other Company ESCH plans, Contractor Control Plans (CCPs) and Contractors' management system including Environmental and Social Implementation Plans (ESIPs) that have been developed for this Project.

The following documents listed are key references applicable to this plan. Reference documents of the EPC contractors have not been listed.

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CAL00-PMT-601-Y-TTM-0006	Environmental and Social Management Plan
CAL00-PMT-601-Y-TTM-0005	Environmental & Social Compliance Assurance Plan
CAL00-PMT-601-Y-TSP-0001	ESMS Project Standards
CAL00-RSK-601-Y-TTM-0001	Contractor's ESMS Framework Document
AAL00-PMT-601-Y-TLX-0001	ESIA Commitments Register (Albania)
GAL00-PMT-601-Y-TLX-0001	ESIA Commitments Register (Greece)
IAL00-PMT-601-Y-TLX-0001	ESIA Commitments Register (Italy)
TAP-HSE-PR-0011	H&S and ESCH Data, Incident Reporting & Investigation
CAL00-PMT-000-V-TPQ-0001	Nonconformity Management Procedure
GAL00-ENT-601-Y-TTM-0003	Erosion Control & Reinstatement CCP (Greece)
GAL00-ENT-601-Y-TTM-0008	Greece Waste Management CCP
AAL00-RSK-601-Y-TTM-0008	TAP Albania ESMS Onshore Waste Management CCP
GAL00-ENT-601-Y-TTM-0002	Greece Pollution Prevention CCP
AAL00-RSK-601-Y-TTM-0002	TAP Albania ESMS Onshore Pollution Prevention CCP
CPL00-ENT-100-F-TSA-0071	Specification for Onshore Pipeline Construction
CPL00-CME-120-FD-TSX-0002	Specification for Erosion Protection Measures
CPL00-CME-121-F-TSX-0001	Specification for Reinstatement
CPL00-CME-120-F-TSX-0001	Specification for ROW Preparation
CAL00-PGC-125-F-TSX-5002	River Crossing Specification
CAL00-PGC-125-F-TSX-5000	Watercourse Civil Protection Works Specification
CAL00-PMT-601-Y-TTM-0002	Bio-restoration Management Plan
CPL00-PMT-100-Y-TTA-0001	Geohazard Construction Quality Plan & TAP SME Onsite Assurance of EPC's Soil Erosion Control in Greece and Albania

## 2. Scope

### 2.1 General


This plan addresses the reinstatement of areas disturbed by construction works that are not required permanently by the project. It is applicable to the ROW and all other project areas that are used to support construction, including (but not limited to) construction camps, pipe lay down areas, maintenance areas, roads and other transport facilities; and waste management and disposal sites.

The plan includes a description of the tools and processes that will be used to achieve appropriate sediment control, soil erosion mitigation and therefore acceptable reinstatement. A summary of the key types of temporary and permanent erosion control measures that are intended to be utilised is provided, however further technical details are included in subordinate documents and referenced where applicable. Throughout this plan, wherever erosion control is mentioned, this may also be interpreted to include an intrinsic reference to the management of sediment, where relevant.

### 2.2 Reinstatement on land or facilities other than TAP ROW

Reinstatement of land or facilities, not required as part of Company operations, shall commence immediately following discontinuation of use of the land or individual facility, once it is no longer required for the construction/commissioning phases. The reinstated condition of such land and facilities shall be to a condition at least as good as that prevailing before project usage of the land or establishment of the facilities.



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Contractor shall permanently reinstate all areas to the satisfaction of Company. In addition, as applicable the reinstatement will be to the satisfaction of the relevant regulatory authority and landowner. Written approval from Company, the appropriate regulatory authority (as applicable) and/or the landowner (as applicable) will be used to confirm that the level of reinstatement is sufficient to meet Project requirements. Contractor's pre-construction survey records, including photographs of the condition of the area prior to construction shall be utilised to compare before and after condition.


Contractor shall fully reinstate any land disturbance due to third party assets/activities. This is applicable to disturbance within the TAP ROW or so close to the TAP ROW or project area that reinstatement is necessary in order secure the effective reinstatement and stabilisation of the project area. This principle applies to, but is not limited to third party pipelines, railways, roads and buildings.

## 2.3 Roles and Responsibilities

Company is ultimately responsible for meeting the Project requirements regarding reinstatement and soil erosion management, as outlined in the ESIA, the ESCH Management System, the ESMP and subordinate documents including this plan. During the construction and contract maintenance phases, Contractors take significant responsibility for design, construction and monitoring of the objectives of this plan, while Company manages this through oversight and assurance processes. Reference is made to the Company Environmental & Social Compliance Assurance Plan (CAL00-PMT-601-Y-TTM-0005) and the Geohazard Construction Quality Plan & TAP SME Onsite Assurance of EPC's Soil Erosion Control in Greece and Albania, which provides an overview of applicable assurance processes.

### 2.2.1 Company will be responsible for:

- Contractor management and assurance compliance with the requirements of this Plan;
- Communication to Contractors of requirements and commitments made in the ESIA, permit requirements, consultation related requirements and in any other matter;
- Consultation with government departments and authorities, non-governmental organisations, landowners and other interested and affected parties throughout the lifetime of the project;
- Ongoing dissemination of information about the project to interested and affected parties during planning, design, construction and operation, including landowners, government authorities, and non-governmental organisations;
- On-site assurance of specific reinstatement requirements, including regular inspections to reinstated sections of the pipeline easement to assess suitability of erosion control measures that are being implemented;
- Participating in joint walk throughs of sections of the pipeline easement where permanent erosion control measures have been installed to prepare formal punch lists.
- Monitoring and audit of Contractors performance with respect to reinstatement including the final approval and acceptance of Contractor reinstatement works;
- Ongoing monitoring and maintenance of reinstatement works following final acceptance of Contractor reinstatement works based on the criteria established in section 3.2;
- Quarterly assurance inspections by Company geotechnical and geohazards subject matter experts to ensure soil erosion control measures meet risk based criteria and examine specific sites which are not performing as Company requires and providing expert advice on mitigation requirements

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- All training needs of Company Staff in relation to this plan.
- Upon handover from the Contractor, the ROW and project affected areas are to be maintained by Company Operations to an Erosion Class 3 or better.

### **2.2.2 Contractor will be responsible for:**


- The Contractor shall operate a Quality Management System in accordance with the requirements defined within the Contract.
- Implementation of all reinstatement works in accordance with the requirements of the Contract and of this Plan (including Contractors project specific plans and procedures, commitments stated in Environmental Impact Assessment (ESIA)) to the satisfaction of on-site Company Inspectors;
- The provision of an experienced project manager supported by project personnel who can demonstrate full knowledge of reinstatement and the contents of the requirements;
- Development of details required by this plan as it pertains to the Contractors scope of work;
- Development and implementation of site-specific method statements for the reinstatement of all areas, where deemed necessary, based upon risk;
- Performance of all appropriate pre-construction surveys to facilitate the development of site specific reinstatement method statements, where deemed necessary, based upon risk;
- Consultation (in association with Company) with each landowner regarding specific reinstatement requirements and fulfilment of these requirements to the satisfaction of the landowner;
- Ensuring compliance of Contractor appointed sub-contractors;
- All training needs of Contractor Staff in relation to Soil Erosion and Reinstatement requirements.
- Maintaining the integrity of the right-of-way (ROW) and relevant project affected areas during the maintenance term.
- Maintaining all temporary and permanent erosion measures during the contractual warrantee period.

## **2.4 Biorestoration**

The short-term goal of reinstatement (as focussed upon in this plan) is the stabilisation of soils to provide a suitable matrix for vegetation establishment, to aid in preventing erosion. The longer-term goal of re-establishment of species diversity over a longer period (i.e. bio-restoration), to aid ecological processes, is not addressed in this plan.

Bio-restoration can be achieved through passive revegetation (i.e. natural spontaneous revegetation after redistribution of topsoil) as well as assisted revegetation (e.g. seeding, hydroseeding and re-planting). Passive revegetation (i.e. regeneration of vegetation based on the seed bank preserved within the topsoil) will be the preferred method for revegetation. Areas requiring supplementary assisted revegetation (direct seeding, hydro-seeding and/or other techniques such as shrub or tree planting) shall be determined based on erosion risk, pre-construction conditions and reforestation permits.

For further information on bio-restoration, refer to Company Bio-restoration Management Plan (CAL00-PMT-601-Y-TTM-0002).


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### 3. Project Requirements

#### 3.1 Specifications, Codes & Standards

The respective contracts outline detailed requirements relating to Project requirements for Soil Erosion and Reinstatement control. The key document is the Erosion Control & Reinstatement CCP, which is supported by the Specification for Erosion Protection Measures (CPL00-CME-120-FD-TSX-0002) and the Specification for Reinstatement (CPL00-CME-121-F-TSX-0001). Additional references documents are included in the reference table (section 1.4). These documents require Project erosion protection works to comply with the requirements and provisions of the latest edition (including amendments) of the following European Standards:

- EN 1097 Tests for mechanical and physical properties of aggregates
- EN 1594 Gas supply systems - Pipelines for maximum operating pressure over 16 bar – Functional Requirements
- EN 1916 Concrete pipes and fittings, unreinforced, steel fibre and reinforced
- EN 1925 Natural stone test methods. Determination of water absorption coefficient by capillarity
- EN 1936 Natural stone test methods. Determination of real density and apparent density, and of total and open porosity
- EN 10218 Steel wire and wire products – General
- EN 10223.03 Steel wire and wire products for fences. Hexagonal steel wire netting for engineering purposes
- EN 10244.01 Steel wire and wire products. Non-ferrous metallic coatings on steel wire. General principles
- EN 10244.02 Steel wire and wire products. Non-ferrous metallic coatings on steel wire. Zinc or zinc alloy coatings
- EN 12224 Geotextiles and geotextile-related products. Determination of the resistance to weathering
- EN 12447 Geotextiles and geotextile-related products. Screening test method for determining the resistance to hydrolysis in water
- EN 13242 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
- EN 13249 Geotextiles and geotextile-related products. Characteristics required for use in the construction of roads and other trafficked areas (excluding railways and asphalt inclusion)
- EN 13251 Geotextiles and geotextile-related products - Characteristics required for use in earthworks, foundations and retaining structures
- EN 13253 Geotextiles and geotextile-related products. Characteristics required for use in erosion control works (coastal protection, bank revetments)
- EN 13383.01 Armourstone specification
- EN 13383.02 Armourstone test methods
- EN 13476.01 Plastics piping systems for non-pressure underground drainage and sewerage. Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). General requirements and performance characteristics
- EN 13476.03 Plastics piping systems for non-pressure underground drainage and sewerage. Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP)

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and polyethylene (PE). Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B

- EN 13562 Geotextiles and geotextile-related products. Determination of resistance to penetration by water (hydrostatic pressure test)
- EN 13719 Geotextiles and geotextile-related products. Determination of the long-term protection efficiency of geotextiles in contact with geosynthetic barriers
- EN 14030 Geotextiles and geotextile-related products. Screening test method for determining the resistance to acid and alkaline liquids
- EN ISO 1461 Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods
- EN ISO 9863.01 Geosynthetics. Determination of thickness at specified pressures. Single layers
- EN ISO 9864 Geosynthetics. Test method for the determination of mass per unit area of geotextiles and geotextile-related products
- EN ISO 9969 Thermoplastics pipes. Determination of ring stiffness
- EN ISO 10319 Geotextiles. Wide-width tensile test
- EN ISO 11058 Geotextiles and geotextile-related products -- Determination of water permeability characteristics normal to the plane, without load
- EN ISO 12236 Geosynthetics -- Static puncture test (CBR test)
- EN ISO 12956 Geotextiles and geotextile-related products -- Determination of the characteristic opening size
- EN ISO 13433 Geotextiles and geotextile-related products. Dynamic perforation test (Cone drop test)


In addition, the Contractor is required to ensure that the works comply with the requirements of National codes, standards, legislation and regulations.

### 3.2 TAP Performance Criteria Guidance

The Erosion Control & Reinstatement CCP, the Specification for Erosion Protection Measures (CPL00-CME-120-FD-TSX-0002) and the Specification for Reinstatement (CPL00-CME-121-F-TSX-0001) contain stringent requirements for Contractors to meet. These can be summarised as follows:

- The application of erosion protection measures ensures that the natural character of the soils and slopes after pipeline construction is maintained, while potential pipeline exposure due to the collection and flow of surface and subsurface water within the loose pipe backfill is avoided;
- The working width (ROW), as well as any other areas (such as storage sites, access roads, existing roads, construction camps, construction sites at bored and HDD crossings, etc.), shall be reinstated to their original condition by Contractor.
- CONTRACTOR shall be responsible for completing the physical reinstatement of all project-disturbed sites to their original condition, as far as possible, upon completion of construction.

These criteria provide a high standard to which Contractors will be held accountable. In addition, Company has adopted performance criteria guidance to assist in objective interpretation of the specification requirements. The performance criteria guidance is addressed in this section.

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### 3.2.1 Erosion Classes

Surface erosion of the RoW cannot be stopped completely. As a result, most major pipeline projects define an acceptable level of impact which can be used as a performance criterion or target against which control measures can be designed and / or assessed.

Levels of erosion that can lead to pipeline exposure (Classes 5 to 7) or local damage to the RoW (Classes 4 and 5) are generally considered unacceptable. A minimum erosion performance target of 3 class is widely used in the pipeline industry, and has been adopted here as guidance in interpreting the specification requirements of returning the working width (ROW), as well as any other areas, to their original condition. The table below gives an industry recognised definition of erosion classes and their severity.

Erosion Class		Erosion rate (t/ha/y-)	Visual assessment
1	Very slight	< 2	No evidence of compaction or crusting of the soil. No wash marks or scour features. No splash pedestals or exposed roots or channels.
2	Slight	2-5	Some crusting of soil surface. Localised wash but no or minor scouring. Rills (channels < 1m <sup>2</sup> in cross-sectional area and < 30cm deep) every 50-100m. Small splash pedestals where stones or exposed roots protect underlying soil.
3	Moderate	5-10	Wash marks. Discontinuous rills spaced every 20-50m. Splash pedestals and exposed roots mark level of former surface. Slight risk of pollution problems downstream.
4	High	10-50	Connected and continuous network of rills every 5-10m or gullies (> 1m <sup>2</sup> in cross-sectional area and > 30cm deep) spaced every 50-100m. Washing out of seeds and young plants. Reseeding may be required. Danger of pollution and sedimentation problems downstream.
5	Severe	50-100	Continuous network of rills every 2-5m or gullies every 20m. Access to site becomes difficult. Revegetation work impaired and remedial measures required. Damage to roads by erosion and sedimentation. Siltation of water bodies.
6	Very severe	100-500	Continuous network of channels with gullies every 5-10m. Surrounding soil heavily crusted. Integrity of the pipeline threatened by exposure. Severe siltation, pollution and eutrophication problems.
7	Catastrophic	> 500	Extensive network of rills and gullies; large gullies (> 10m <sup>2</sup> in cross-sectional area) every 20m. Most of original surface washed away exposing pipeline. Severe damage from erosion and sedimentation on-site and downstream.

The adoption of erosion class 3 as guidance in interpreting the specification requirements, will assist to manage a range of sediment, erosion control and reinstatement risks, as follows;

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- The design depth of cover above the pipeline will be managed to minimise risks to pipe integrity;
- Erosion control measures will be installed to reduce impacts to natural revegetation or active bio-restoration through washing-out of seeds and plants.
- Continuous networks of channels over the slopes will be prevented, ensuring that the depth of material above the pipe is not reduced.

In conjunction with the above, where there is an unacceptable risk of sediment contaminating water bodies, sediment interception devices shall be installed to reduce risks of off-site pollution to acceptable levels in accordance with international best practice and/or the Project Standards listed in section 1.4.

### 3.2.2 Performance Assessment

The Contractor is required to meet international best practice to ensure that the reinstatement and erosion control of disturbed areas achieves Project requirements. Company will provide assurance and technical support by assessing performance using the guidance outlined above.


Applicable ROW and disturbed areas will be assessed by Company using Erosion Class 3 or better as guidance benchmarks for soil stability for short-term reinstatement criteria. Medium to long-term bio-restoration objectives are detailed in Company Bio-restoration Management Plan (CAL00-PMT-601-Y-TTM-0002).

Areas that do not perform as per contractual requirements will require re-evaluation and implementation of further erosion control measures by the Contractor. Such areas will be identified through Company performance monitoring.

## 4. Risk Assessment

Negligible landscape impact is likely when soil erosion is in balance with the rate of soil formation. Although soil erosion from soil laid bare by construction can easily approach several hundred tonnes per hectare per year, with appropriate mitigation, soil loss can be significantly reduced to levels that are compatible with pre-construction conditions. Achievement of Erosion Class 3 as detailed in section 3 of this plan (between 5-10 T/ha/y soil loss), is considered to represent an appropriate guideline to be used for interpreting the specification requirements of returning the working width (ROW), as well as any other areas, to their original condition.

Company has applied a risk assessment to quantify likely soil loss along the pipeline easement in Greece and Albania to identify and manage erosion risk. The risk assessments have adopted the Universal Soil Loss Equation (USLE) to estimate the erosion risk of the terrain that the TAP pipeline transverses for all pipeline construction Lots in both Albania and Greece. This assessment has resulted in the designation of predicted erosion classes to each section of the ROW (without mitigation). Based on these designations, Company has developed Soil Erosion and Risk Assessment Registers that identify areas of risk, where projected erosion control measures are required to reduce the erosion risk to a Class 3 or lower. This risk assessment process forms a key component of Company oversight and assurance of sediment, erosion control and reinstatement management.

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This section aims to provide an overview of the risk assessment methodology, as well as describing how the risk assessment process is implemented as an oversight and assurance tool in the field.

## 4.1 Risk Assessment Methodology

The method used to assess soil loss is an application of the Universal Soil Loss Equation (USLE). It calculates the soil loss for a design storm (the 1-hour storm with a 10-year return period) occurring in the 1st year after construction i.e. before reinstatement work has become effective. Soil losses from the Right of Way (RoW) are estimated in tonnes/ha during this event. An erosion class is assigned to each section of the RoW, based on the estimated soil loss, prior to mitigation measures being applied.

Levels of erosion that can lead to pipeline exposure (Classes 5 to 7) or local damage to the RoW (Classes 4 and 5) are generally considered unacceptable. A minimum erosion performance target of 3 class is widely used in the pipeline industry, and is considered an appropriate guideline to be used for interpreting the specification requirements of returning the working width (ROW), as well as any other areas, to their original condition. The application of the risk assessment can be described through the following steps.

### 4.1.1 Desk Based Risk Assessment

The USLE is used to calculate the soil loss for a design storm (the 1-hour storm with a 10-year return period) occurring in the 1st year after construction i.e. before reinstatement work has become effective. The USLE predicts the soil loss (A in t/ha) as the product of several simple factors:

$$A = R \times K \times L \times S \times C \times P$$

Where

A = Soil loss (t/ha)

R = Design storm rainfall erosivity factor (MJ.mm/ha.h)

K = Soil erodibility factor (t.ha.h/ha.MJ.mm)

S = Slope steepness factor (dimensionless)


L = Slope length factor (dimensionless)

C = Crop management factor (dimensionless)

P = Erosion control practice factor (dimensionless)

When applied to an individual design storm, the prediction indicates a mean response rather than an actual erosion rate. However, since the aim of this assessment is to determine an erosion class for sections of the RoW rather than an absolute erosion rate, predicting the mean response is generally considered sufficient.

Site specific desk top assessments have been undertaken for Lots 1, 2 & 3 in Greece as well as for Albania. The results are used to predict unacceptable levels of soil loss during the design storm (10-year return period, maximum 1-hour duration storm), without mitigation measures. This desk top review therefore provides the basis for where erosion control measures are likely to be required to reduce the risk to acceptable levels (i.e. erosion class 3 or lower).

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#### 4.1.2 Validation Visits & Development of Soil Erosion & Risk Assessment Registers

Following completion of the desk based risk assessments described above, a series of rapid field visits are undertaken to provide assurance monitoring and validate desk based predictions of representative sites. The validation visits are conducted by Subject Matter Experts (SME), in conjunction with Company in-country teams, and comprise the following;

- review of contractors' field investigation and construction activities;
- field visits to representative sites in different terrain and geological/soil settings;
- review of contractor's engineering and construction efforts related to soil erosion control;
- review of technical documents relevant to the implementation of soil erosion control;

The validation visits will be used to verify desk based predictions and produce Soil Erosion & Risk Assessment Registers, which can then be utilised as key Assurance tracking documents, to capture high risk areas for ongoing monitoring and management. The Soil Erosion & Risk Assessment Registers are intended to be live documents, that can be monitored and updated to include site specific detailed information to manage dynamic erosion risks. The following data will be included in the registers, and updated regularly as required:


- Slope ID & location
- Slope length & elevation
- Slope angle
- Site specific rainfall erosivity
- Calculation factors for soil, slope, steepness, terrain shape, crop cover and management
- Design storm losses (untreated)
- Predicted erosion class (untreated)
- Erosion control measure guidance
- Design storm losses (mitigated)
- Predicted erosion class (mitigated)

#### 4.1.3 Ongoing Oversight of Contractor Performance

The Soil Erosion & Risk Assessment Registers derived through the steps outlined above, form the basis for in-country field teams to maintain ongoing oversight of Contractor performance with respect to permanent erosion control, sediment management and reinstatement. Field teams will utilise the Soil Erosion & Risk Assessment Registers to identify areas where specific mitigation measures are required, and will monitor Contractor performance in these and other areas, based on dynamic ongoing risk assessment and input from SMEs.

The Soil Erosion & Risk Assessment Registers are living documents, that will be reviewed and updated as new sediment, erosion and reinstatement information becomes available. Site data is entered into the Soil Erosion & Risk Assessment Registers by EFMs within input from Contractor personnel (as appropriate). The EFMs capture sites on an ongoing basis from: i) project documentation, and ii) field observation, as part of their routine work, and submit Soil Erosion & Risk Assessment Register site entry updates to the TAP Environmental Advisor, who then queries, verifies and loads the entries into the respective Soil Erosion & Risk Assessment Register. The TAP Environmental



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Advisor will complete a regular review of the REIRs to ensure the latest information is captured within each regular update.

#### **4.1.4 Ongoing Assurance Visits & Reporting**

Ongoing regular assurance visits are proposed to be conducted by Subject Matter Experts (SME), in conjunction with Company in-country teams. The assurance visits will review Soil Erosion & Risk Assessment Registers, and comprise follow up field visits and reviews of priority high risk sites.

The assurance visits will be used to confirm oversight and self-verification work is appropriate to meet Project requirements. SME will report the findings of the ongoing assurance visits to the TAP E&S Manager, and required actions will cascade to Contractor via Company in-country teams using the range of tools described in the Environmental & Social Compliance Assurance Plan (ECAL00-PMT-601-Y-TTM-0005).


The frequency of SME assurance monitoring is scheduled to be quarterly. The frequency of Oversight monitoring by TAP typically takes place daily, with ongoing formal assessments of reinstatement conducted regularly through site inspections, progress reports, monthly reporting and punch listing. Frequency of all monitoring will be reviewed on an ongoing basis, and may be increased or reduced, in response to ongoing assessment of project risks. Considerations in determining frequency of monitoring include climatic conditions (amount of precipitation forecast or recently experienced), seasonal risk factors, access availability, levels and type of construction activity, planned shut downs including winterization, extent of stabilisation that has already occurred as well as information available from pre-construction surveys and the Soil Erosion & Risk Assessment Registers. For example, it is likely that once the ROW is vegetated and considered stabilised, that monitoring frequency would be reduced during the Operations phase.

#### **4.1.5 Completion & Handover Reviews**

Reinstatement shall be carried out in accordance with local country codes, regulations and relevant specifications as referenced in this document to meet Project requirements. The Contractor shall, after backfilling, clean up all areas affected by the construction works. The final site condition shall be equal to, or better than the site situation prior to the start of the works (as interpreted using the processes, guidance and tools identified in this plan, including Erosion Classes).

The Contractor shall, upon completion of reinstatement, accompany the Company Representative on an inspection of all areas which have been reinstated before demobilising. A snag list (punch list) shall be compiled and agreed and the Contractor shall complete all remedial work to his own cost. Reinstatement shall be undertaken in accordance with the requirements of the specifications referenced in this Plan to the complete satisfaction of the Company Representative. The work required under the specification(s) shall not be deemed complete until final approval is made by the Company Representative.

Further details regarding completion and handover processes are described in the Specification for Onshore Pipeline Construction (CPL00-ENT-100-F-TSA-0071).

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#### 4.1.6 Longer Term Operational Monitoring

The scope of this document is heavily biased towards the Construction and Commissioning phases. However, Company acknowledges that the scope for sediment, soil erosion and reinstatement management continues throughout the entire operation phase and into decommissioning. The Project is committed to longer term operational monitoring of sediment, erosion control and reinstatement as outlined at Section 6 of this plan.

#### 4.1.7 Geohazard Management

The Project has undertaken a comprehensive program to mitigate geohazards that pose a potential risk to the pipeline. Principal geohazard risks to pipelines include landslides, river lateral and vertical scour, soil slope erosion, active tectonic faults, liquefaction, seismic wave propagation, and ground collapse in karst terrain.


Geohazard mitigation is undertaken in five phases which include:

1. Preliminary investigation, routing avoidance, and preliminary engineering in FEED
2. detailed field investigation and engineering by the EPC contractor in the detailed design phase.
3. Construction and installation of Geohazard mitigations by the EPC contractor and production of a generic version of the ROW monitoring plan based on known threats and likely mitigation measures
4. Completion of risk assessments and updating the ROW monitoring plan with input from operations that is based on the final pipeline installed design
5. Implementation of field measuring equipment as agreed in the final approved ROW monitoring plan

TAP have also developed a Geohazards Monitoring Plan (CPL00-PMT-100-Y-TTM-0001) which outlines the process in place to ensure that all onshore Geohazards have been recognised, documented, risk assessed, prioritised, managed or mitigated in a systematic manner. Included within the plan is a comprehensive Geohazards register which reflects residual risks to the integrity of the pipeline. This risk register will be updated throughout the operational life of the asset. The monitoring plan covers:

1. Landslides
2. River crossings
3. Soil slope erosion
4. Flood risks of above ground installations (AGI's) particularly Fier Compression Station
5. Fault crossings
6. Seismicity/Ground shaking
7. Potential liquefaction areas
8. Karst.

As for almost all major international hydrocarbon pipelines constructed in mountainous terrain, landslides and rivers will dominate the Geohazards risk register.

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## 5. Implementation & Assurance Processes

Implementation and assurance processes for soil erosion, sediment control and reinstatement measures throughout the construction and commissioning phases occur broadly across three distinct levels or 'tiers', which combine both Contractor and Company implementation processes. The three tiers have been designed to operate in parallel to optimise compliance assurance monitoring and provide an appropriate and robust system for ensuring Project requirements are monitored and implemented.


- **Tier 1** involves Contractor monitoring ('self-verification') of its own management system, in alignment with the principles of ISO14001, which requires a plan-do-check-review cycle.
- **Tier 2** 'oversight' checks are conducted by Company of Contractor compliance, to provide independent monitoring for the purposes of compliance assurance.
- **Tier 3** 'assurance' is also performed by Company of both Contractor and Company activities, by personnel who are not directly involved in the works being checked.

These three tiers comprise the ESCH compliance assurance program for the Project, and are applicable to soil erosion, sediment control and reinstatement. Processes and details for assurance are further defined in the Environmental & Social Compliance Assurance Plan (CAL00-PMT-601-Y-TTM-0005). In relation to soil erosion, sediment control and reinstatement, an overview of these are presented below.

### 5.1 EPC Contractor Processes

As part of its construction planning Contractors are required to prepare their own ESCH Management System, with specific subordinate ESIPs setting out how they meet and comply with the specific Project commitments set out in the CCPs developed by the Company. Specifically, in relation to erosion, sediment control and reinstatement, these requirements include:

- Development of an Erosion & Reinstatement ESIP that addresses the requirements of the Erosion & Reinstatement CCP, applicable to the respective Contractor scope of work
- Development of subordinate plans, procedures, method statements, work instructions and associated documentation, to address erosion control, sedimentation and reinstatement requirements in detail
- Undertaking Pre-construction surveys and ESCH assessments to identify and manage ESCH risks, including soil erosion, sedimentation and reinstatement risks.
- Preparing pre-construction survey reports that compile information collected during the pre-construction surveys, including photographs, site descriptions and/or video footage, that are sufficient to characterise the site for later comparison at reinstatement and handover phase.
- Contractor E&S inspection and monitoring program (self-verification) as described in their respective management system
- Contractor monthly reporting, including KPI
- Non-conformance notification
- Incident notification
- Action Tracking System
- Participating in completions, close-out and handover processes, to return land to its previous condition

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- Participating in punch listing processes and addressing punch list items
- Monitoring, response and maintenance of the RoW and disturbed areas during the project warrantee period

## 5.2 EPC Contractor Measures

Contractors will adopt the following general reinstatement and erosion control measures (or approved equivalents), in conjunction with the processes described above and the specific technical content of reference documentation.

### 5.2.1 Temporary Erosion Control


The Contractor is responsible for installing and maintaining temporary erosion control measures from initial land disturbance to establishment of permanent erosion control in accordance with the Erosion Control & Reinstatement CCP. The CCP defines the mitigation measures necessary to manage soil erosion and sediment from the RoW and reasonably prevent associated impacts to sensitive resources to levels as low as reasonably practical (ALARP), in accordance with the requirements of the ESIA. Contractor shall describe the measures to be used in its Erosion Control and Reinstatement ESIP.

The following temporary sediment and erosion control measures (or approved equivalent measures) will be incorporated along the ROW and at disturbed areas.

- On longitudinal slopes with open trenches, hard plugs of unexcavated material shall be left in the trench to interrupt surface flow and prevent scouring of the trench bottom.
- Stumps should be left in place wherever possible to provide soil stabilisation.
- Drainage channels or diverter berms shall be installed on required longitudinal and transverse slopes.
- Silt fences or equivalent measures shall be installed at watercourses and diverter berm outlets, as deemed appropriate through risk assessment.
- Flumes shall be installed across the ROW, where necessary to carry water from drainage sumps on the upslope.
- Final grading of all cut or filled soil slopes shall be restricted to a maximum gradient in accordance with Company approved site specific designs.
- The ROW shall be monitored to prevent:
  - Subsidence of the pipeline trench (below natural grade);
  - Breaching of diversion berms (also called slope breakers);
  - Slope wash from improperly placed berms;
  - Slumping and soil movements from cut and fill slopes;
  - Loss of stored topsoil, subsoil or cuttings.

### 5.2.2 Permanent Erosion Control

The Contractor is responsible for installing and maintaining permanent erosion control measures during final reinstatement in accordance with Project requirements. To the extent practicable, the restoration process will start as soon as possible after the pipe is backfilled and will continue until the construction work area is reinstated and revegetated. Contractor shall describe the measures


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to be used in its Erosion Control and Reinstatement ESIP, and (as appropriate), additional sub-plans, method statements and site-specific drawings or procedures.

Permanent Erosion Control measures will be implemented along reinstated areas, to manage soil erosion risk to acceptable levels in accordance with the Erosion Control & Reinstatement CCP, the Specification for Erosion Protection Measures (CPL00-CME-120-FD-TSX-0002), the Specification for Reinstatement (CPL00-CME-121-F-TSX-0001) and other reference documents outlined in Table 1.4 as appropriate.

The following permanent erosion control measures (or approved equivalent measures) will be incorporated along the ROW and at disturbed areas.

- **Diverterter berms** - the most typical and standard erosion control measures, these comprise compacted earthen berms, built across slopes to reduce slope length and remove runoff from disturbed areas to discharge into stabilised outlets like natural channels, vegetated areas or lined chutes (depending on the site-specific risk).
- **Erosion Matting** - comprises intermediate protection to the soil surface through the installation of a blanket, which allows sufficient vegetation cover to establish. Erosion matting prevents raindrop impact from washing out topsoil and seeds, while also enhancing micro-climatic conditions in reinstated topsoil to promote more rapid vegetation growth. Erosion matting shall typically be Geojute or a similar, approved equivalent. In some instances, hydro mulching may be utilised as erosion matting, if it provides a bonded fibre matrix 'blanket' that is demonstrated to perform an equivalent level of protection as geojute, to Company satisfaction.
- **Seeding** - vegetation seeding may be undertaken in conjunction with erosion matting for the purposes of erosion control, where topsoil quality assessment indicates an unacceptable erosion risk is presented without active revegetation through supplementary seeding. This may be necessary in areas of poor quality topsoil, naturally lower fertility soils or in instances where viable seed content in available topsoil has been reduced. Where seeding is implemented in conjunction with erosion matting, topsoil preparation and seeding shall be undertaken prior to laying erosion matting. Seed type and mix shall be selected from Company approved seed mix as included in the Bio-restoration Management Plan.
- **Gabions and Reno mattresses** - comprise flexible, permeable, monolithic structures such as retaining walls, revetments and structures for earth retention. Gabion walls or reno mattresses may be constructed to permanently stabilise high risk areas on the right of way and other disturbed areas. These are engineering structures which protect against scour and slope collapse, typically along major river banks and on steep slopes or batters. Gabions and mattresses shall be designed and constructed in accordance with the manufacturer's specifications and approved method statements.
- **Additional measures** – a range of additional measures, as outlined in the reference documents including specifications, plans, alignment sheets and standard drawings may also be implemented. Such measures will be determined based upon risk assessment and are subject to Company monitoring and acceptance, through the processes described in this plan.


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### 5.2.3 Earthworks & Construction Management

The Contractor is responsible for managing earthworks (including preservation of topsoil) throughout the construction phase to ensure that sufficient topsoil is preserved for reuse at reinstatement. Contractor shall describe earthworks and construction management measures to be used in its Erosion Control and Reinstatement ESIP and subordinate plans, procedures and documents including work instructions, method statements or equivalent site-specific procedures.


A range of specifications, drawings, and reference documents include requirements for earthworks and construction management that are relevant to management of soil erosion and reinstatement risks (identified at section 1.4). The following general earthworks and construction management measures will be incorporated along the ROW and at disturbed areas. Further details can be found in the reference documents.

- **Topsoil Management** – topsoil shall be carefully stripped to its full depth (up to 300mm) and stored separately, for re-spreading during reinstatement. Topsoil shall be stored and preserved in a manner so as not to be compacted by vehicles, contaminated or subject to excessive loss and/or degradation. Topsoil stockpiles will typically be a maximum of 2-3 m in height and topsoil will be re-spread as close as reasonably practical to its origin. Contractor will maintain the integrity of the topsoil stockpile during the storage period to the satisfaction of Company and is responsible for the maintenance of suitable drainage, aeration and erosion control measures as necessary. Topsoil stock piles will be lightly compacted and shaped to ensure minimal erosion as well as ensure the maximum depth of soil within the stockpile within relation to exposed surface of the pile is <1m
- **Subsoil Management** - subsoil will be excavated from the pipe trench and, in some cases, from ROW levelling or benching on side slopes. In general, subsoil shall be placed in stockpiles along the ROW and returned to the excavated area from where it originated during backfilling and reinstatement. This is also applicable to wetland and watercourse soils. Subsoil stockpiles shall be placed to ensure that they are free draining, with gaps to permit reasonable access and drainage across the RoW. The creation of surplus excavated material shall be minimised, and all material that is excavated shall be re-used on-site to the maximum extent practicable.
- **Trenching** – pipeline installation in steep slopes, and through watercourses and wetlands requires consideration of subsurface seepage and flow through the permeable trench backfill. Ditch breakers (trench plugs) incorporating trench drains will be installed in accordance with the Specification for Erosion Control Measures (CPL00-CME-120-F-TSX-0002). In summary, the specification requires the installation of ditch breakers that control subsurface seepage within pipe backfill to prevent subsidence, prevent erosion and control subsurface lateral drainage from wetlands and watercourses.
- **Waste Soil & Rock** – Contractor shall produce a waste minimisation statement as part of its Waste Management ESIP justifying the extent to which surplus material will be minimised and reuse maximised. In this context, blasting will only be used where other excavation methods are considered technically infeasible or uneconomic, and it shall be demonstrated to, and approved by, Company, that the blasting will minimise over-break of ground and minimise the generation of spoil material. Notwithstanding the project commitment to minimise surplus excavated material, in some cases this may be unavoidable. In such cases, where possible the materials will be used elsewhere on the project where there is insufficient fill

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material (with preference given to sites located proximate to the excess soil/rock); while recognising that logistical issues may preclude this. Alternatively, surplus materials may be reused outside the project area, subject to appropriate ESCH assessment, approved by Company. As a last resort, material remaining surplus after final reinstatement that is not able to be reused as a beneficial product on or off the ROW, shall be removed as inert waste and managed in accordance with the Waste Management CCP requirements.

- **Soil & Topography Reinstatement** – the ROW and disturbed areas (as applicable) shall be reinstated to allow the affected areas to be returned to pre-project use and productivity. On return of the subsoil to the trench the subsoil shall be compacted to a similar compaction to that in the adjacent undisturbed area. Once the disturbed areas and subsoil have been re-contoured and compacted, topsoil shall be re distributed entirely over the disturbed areas. Upon completion of reinstatement, disturbed areas shall be inspected jointly by Contractor and Company for slope stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction. In barren areas, a semi-natural appearance is required: rocks or processed rock may be distributed over the final surface provided the particle size distribution is like that of adjacent undisturbed rocks.
- **Wetlands** - bog mats (or equivalent load spreading techniques) will be installed where necessary to minimise impacts in wetlands. Based on site specific conditions encountered during earthworks, sod / turf cuttings or other plant materials within wetland habitats will be removed and stored by Contractor for final reuse during reinstatement.
- **Watercourses** - the disturbed portions of river bed and banks shall be returned to pre-construction contours where possible and in compliance with Project requirements including design drawings. Any deviations shall be subject to Company approval. The backfill over the pipe shall be at least as scour-resistant as the original bed material. For gravel bed rivers, the armoured bed (the sediment forming the surface layer that is coarser than the underlying sediment) shall be recovered during construction and replaced on the bed during reinstatement. Crossing methodology, including erosion and sediment control devices shall be installed and maintained in accordance with the Erosion & Reinstatement CCP and associated reference documents included at section 1.4. Reinstatement at watercourses will be prioritised to address risks and where deemed necessary, immediate reinstatement will follow pipe installation, including removal of running tracks. For further technical details, refer to River Crossing Specification (CAL00-PGC-125-F-TSX-5002) and Watercourse Civil Protection Works Specification (CAL00-PGC-125-F-TSX-5000).
- **Access Restriction** – to prevent rutting, subsequent erosion problems, and damage to re-vegetated and riparian areas, measures should be taken to prevent unauthorised use of the reinstated ROW as a roadway. As soon as access is no longer required, access should be prevented, at locations specified by Company representatives, through the construction of barrier berms of sufficient height (or similarly effective means) to provide a barrier to vehicles.
- **Scheduling & ROW Exposure Management** – Contractor shall take special care to minimise the time from RoW clearing and trenching to pipe lowering in and reinstatement of the RoW. The Contractor shall provide and maintain erosion and sedimentation control structures as required by Project requirements or applicable regulations. Further details on the specific requirements are provided in the Specification for Onshore Pipeline Construction (CPL00-ENT-100-F-TSA-0071).

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### 5.3 TAP Company Processes

The Company is ultimately responsible for ensuring that all activities and site operations comply with relevant Project commitments as well as the requirements of the ESCH management system, including this document. Company achieves compliance assurance through three levels of compliance monitoring. These are ‘Self-verification’ by the Contractor of its own activities, described above as **Tier 1**. In addition, Company processes include ‘Oversight’ of Contractor activities (**Tier 2**) and ‘Assurance’ by Company of its own ESCH activities (**Tier 3**). The oversight and assurance processes conducted by Company relevant to sediment, erosion control and reinstatement are further described below.


**Tier 2. Oversight.** Oversight activities represent the next tier of checking above ‘self-verification’. Oversight is performed by Company E&S teams. Oversight activities ensure that the self-verification conducted by Contractors has been carried out sufficiently, providing Company with an additional layer of compliance assurance. Oversight activities include the following;

- Review of Contractor ESIPs, pre-construction surveys, work method statements, work instructions and relevant subordinate procedures relevant to sediment, erosion control and reinstatement;
- Risk-based attendance of relevant Company E&S staff at Contractor pre-construction surveys, reinstatement walkthroughs;
- Company monitoring of works implementation relevant to sediment, erosion control and reinstatement;
- Undertaking formal inspections (risk assessment validation, erosion & sediment control checklists, reinstatement checklists, reviews) of implementation relevant to sediment, erosion control and reinstatement. Company project teams will regularly monitor the performance of control measures installed by Contractor and will create reinstatement punch-list items to address any deficiencies.
- Use of compliance tools to identify and raise issues including Works Improvement Notices (WINS), non-conformance reports (NCR), incidents, internal Company reporting on E&S performance, attending meetings with Contractors to drive performance and raise issues, punch lists.
- Attending and participating in formal reinstatement punch listing at completions / handover stage;
- Ongoing risk based reinstatement monitoring, following construction and commissioning phases, and continuing into operations

**Tier 3. Assurance.** Assurance refers to the highest level of checking to measure compliance of project activities by personnel not directly involved in the activities being checked. Assurance is conducted through targeted audits / formal reviews. Assurance activities are typically detailed and focussed upon defined risk areas or guided by feedback from the results of the self-verification and oversight activities. Assurance activities are intended to provide an additional layer of assurance above and beyond tiers 1 and 2 assurance activities.

For sediment, erosion control and reinstatement, Assurance activities are conducted through Subject Matter Expert (SME) quarterly reviews and maintenance of the Soil Erosion & Risk Assessment Registers. This process is based upon the risk assessment processes described in section 4 of this



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plan to validate and assess erosion control measures being implemented by Contractor. Quarterly assurance visits are performed by Company geotechnical and geohazard SME who provide independent monitoring on the erosion control measures being implemented on the pipeline easement. Further details of the risk assessment process are provided in section 4.

Further details of Company overarching compliance and assurance processes are described in the Environmental & Social Compliance Assurance Plan (CAL00-PMT-601-Y-TTM-0005).

## 6. Plan Monitoring & Review

This plan has been written with a heavy bias toward the sediment, erosion and reinstatement risks associated with the construction and commissioning phases of the project. However, Company acknowledges that the scope for sediment, soil erosion and reinstatement management continues throughout the entire operation phase and into decommissioning.

This plan is subject to review and audit, in line with the philosophy outlined in the Environmental and Social Compliance Assurance Plan (CAL00-PMT-601-Y-TTM-0005). Company will review and re-issue this plan within the 6 months prior to commercial operation commencement, with a review focus on transition of the Project from the Construction phase to Operations phase.