

## 6.0 MANAGING ENVIRONMENTAL LAND, COMMUNITY AND SOCIAL ISSUES

### Summary

*The BTC project is being implemented within a comprehensive legal and policy framework, the main features of which are:*

- *An Inter-Governmental Agreement between the governments of Azerbaijan, Georgia and Turkey;*
- *Host Government Agreements which form a prevailing legal regime in the host countries;*
- *International Conventions in force in host countries;*
- *IFI policies; and*
- *BTC Co policies (based on BP policies).*

*The environmental, land, community and social issues associated with the pipeline project are being managed in accordance with the project's legal and policy framework. This is a systematic, ongoing process that is proceeding through planning, construction and operation of the pipeline and will only finish when the pipeline is de-commissioned at the end of its operational life.*

*The ESIA process is the core technique that has been used to ensure that any adverse environmental and social impacts are identified and addressed. Public consultation has formed an integral part of the ESIA process. Project Public Consultation and Disclosure Plans have been developed and documented. Considerable effort is being made to respond to the concerns raised by stakeholders including those of the National Governments and potential lenders.*

*Policy and governance, along with the impact assessment processes, manifest in specific performance measures. These begin with initial design procedures, working from a 'no impact base case' then modifying this to take account of many factors such as technical feasibility, cost, safety and partner policy. Performance measures move through routing, residual and cumulative impacts, risk assessment, oil spill response planning and environmental and social action plans, culminating in specific management control systems to guide the construction process.*

## 6.1 *Policy and Governance*

### 6.1.1 Introduction to legal and policy framework

The BTC project will be designed, built and operated in a manner intended to conform with a comprehensive set of legislative and regulatory requirements and other guidelines and policies, the main categories of which are:

- national legislation, including the Inter-Governmental Agreement (IGA) and Host Government Agreements (HGAs), which form a prevailing legal régime under domestic law in the host countries;
- international conventions in force in the host countries;
- International Finance Institution (IFI) policies;
- BP corporate and owner policies; and
- project environmental and social goals and objectives.

The standards set forth in international treaties (including the IGA and the HGAs) are considered an integral part of the respective host governments' national legal system and take precedence over national legislation – to the extent that such national legislation is inconsistent, with the exception of the Constitutions.

### 6.1.2 National Legislation

The national environmental legislation applicable to the BTC project embraces the following sources of law, listed hierarchically in accordance with the Constitution and other laws of the host government:

- the Constitution;
- the IGA and the HGAs;
- the existing laws of the host government on environmental protection, safety and emergency situations, to the extent they do not conflict with the IGA and/or HGAs; and
- other regulatory requirements as presented inter alia in various Presidential Decrees, to the extent they do not conflict with the IGA and/or HGAs.

The BTC project is being implemented within the framework of an IGA among the three transit countries (Azerbaijan, Georgia and Turkey). This framework comprises several documents including the IGA itself, three unexecuted forms of the HGAs and, with respect to Turkey, unexecuted forms of the Lump Sum Turnkey Agreement (LSTK) and the Government Guarantee. Ratified by each of the three parliaments, this IGA documentation constitutes the binding international law and the controlling domestic law governing the BTC project.

In October 2000, the BTC Co Owners executed one HGA with each of the three countries and, with respect to Turkey, the LSTK and the Government Guarantee. Table 6.1 depicts the IGA and HGA framework.

On the formation of BTC Co, the sponsors transferred their rights and obligations under the HGAs and associated agreements to BTC Co to allow it to implement the project on their behalf.

In an effort to ensure more uniform application of environmental, health, safety and technical standards across the three jurisdictions in which the BTC project will be constructed and operated, Article IV of the IGA states that “[such standards will be] in accordance with international standards and practices within the petroleum pipeline industry (which shall in no event be less stringent than those generally applied in the European Union).” This more general statement is subsequently elaborated in the relevant provisions of the HGAs.

**Table 6.1: IGA, HGAs and LSTK Project Agreement Matrix**

<b>Agreement</b>	<b>Azerbaijan</b>	<b>Georgia</b>	<b>Turkey</b>
<b>IGA</b> Signed and ratified by Governments together with unexecuted forms of the three HGAs, the LSTK and the Government Guarantee appended thereto	YES	YES	YES
<b>HGA</b> Signed by Governments and the BTC Owners as private law contracts	YES	YES	YES
<b>LSTK</b> Signed by BOTAŞ and BTC Owners as a private law contract	n/a	n/a	YES
<b>Government Guarantee</b> Signed by Turkish Government and BTC Owners as a private law contract	n/a	n/a	YES

In addition to its role as an integral component of the IGA, each HGA is also a contract entered into between the governments of Azerbaijan, Georgia and Turkey respectively, and the BTC Owners. Each HGA determines the following components of the regulatory framework for the conduct of BTC project activities:

- the overall regulatory framework within which the BTC project will be constructed and subsequently operated including the technical and design standards;
- the applicable foreign and international environmental standards and practices incorporated by reference into the national legislation by the HGA;
- the regulatory requirements applicable to the BTC project, and the administrative responsibilities of different government departments for the BTC project; and
- the liability of the BTC Owners to the State and to third parties for, inter alia, breaches of the national environmental legislation.

The HGAs also specify the work programme that the BTC Owners/BTC Co must undertake, including the environmental and social studies that need to be performed. These studies are referred to as the Environmental Strategy Product and Social Product (Box 6.1).

#### **Box 6.1 HGA Deliverable for each Country**

##### **Environmental Strategy Product**

- Environmental Scoping Study
- Environmental Risk Assessment
- Contaminated Land Baseline Study
- Environmental Impact Assessment
- Oil Spill Response Plan

##### **Social Product**

- Social Scoping Study
- Social Risk Assessment
- Social Impact Assessment

#### **6.1.3 International agreements, protocols and conventions**

There are many multilateral and regional environmental agreements relevant to the project. A selection of relevant agreements, protocols and conventions signed and ratified by at least one of the three host governments is outlined in Box 2. While one or more of the host governments may not have ratified or acceded to each of these agreements, due consideration has been given to them in the overall design of the project and the preparation of all three Environmental and Social Impact Assessments (ESIAs).

Article IV of the IGA requires that the environmental and safety standards for the construction, operation, repair, replacement, capacity expansion or extension and maintenance of the project facilities comply with (i) international standards and best practices within the petroleum pipeline industry which shall “in no event be less stringent than those generally applied in the member states of the European Union” and (ii) the requirements specified in the HGAs. The reference to EU standards provides a benchmark and floor for what will be considered “international standards and best practices” for purposes of the project – the IGA ensures that the BTC Project must meet or exceed EU standards.

The BTC Project is additionally bound by relevant international and national laws to the extent they do not conflict with the legal regime set forth in the IGA and HGAs, which shall in no event result in application of environmental or social standards that are less stringent than relevant EU standards. The ESIAs contain descriptions of relevant national laws, and list international conventions in force in each country, all of which apply to the project. BTC Co. is obligated to comply with these laws in the same manner as any other business operating in the respective countries. The description of national laws includes all relevant labour laws and the list of international conventions includes labour conventions such as ILO standards.

Security and human rights are also central issues, on which concerns have been raised by observers of the project. The parties to the IGA have formally committed to the goal of promoting respect for and compliance with human rights principles, including those set forth in the Universal Declaration of Human Rights, the United Nations Basic Principles on the use of Force and Firearms by Law Enforcement Officials, the European Convention on Human Rights and, in a manner consistent with the applicable national laws, the Voluntary

Principles on Security and Human Rights. Protocols to the IGA and HGAs are being drafted stating that all pipeline security operations must be conducted in accordance with these international norms and defining appropriate requirements and limitations.

#### **6.1.4 IFI policies and guidelines**

The BTC project is planned to be partly debt funded and this debt is likely to be sourced from a number of International Financing Institutions (IFIs). IFIs such as the International Finance Corporation (IFC) – the private sector lending arm of the World Bank Group – the European Bank for Reconstruction and Development (EBRD) and export credit agencies, require compliance with specified environmental and social policies during the term of any financing provided by them.

These policies will include environmental standards applicable to the project as well as guidelines covering resettlement and other actions involved in project development and operation. They will be set out in an environmental action plan included in the project loan documentation. Table 6.2 summarises a selection of policies and guidelines that may be deemed relevant, and details why they may be relevant and how they have been addressed in the project development.

## Box 6.2: Selected International Agreements Relevant to the BTC Project

*(Host countries that are signatories to the relevant convention are given in parenthesis)*

- Convention of Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), 1971, 1982 Protocol and 1987 Amendment to the Convention (Turkey, Azerbaijan, Georgia);
- Convention concerning Protection of the World Cultural and Natural Heritage (Paris Convention), 1972 (Turkey, Azerbaijan, Georgia);
- Convention on International Trade in Endangered Species (CITES), 1973 (Turkey, Azerbaijan, Georgia);
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1979 (Turkey, Azerbaijan);
- Convention on Long Range Transboundary Air Pollution (Geneva Convention), 1979 (Turkey, Georgia);
- Convention on the Protection of the Ozone Layer (Vienna Convention), 1985 (Turkey, Azerbaijan\*, Georgia);
- Montreal Protocol on Substances that Deplete the Ozone Layer, 1987 (Turkey, Azerbaijan, Georgia);
- Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), 1989 (Azerbaijan, Georgia);
- Convention on Environmental Impact Assessment In a Transboundary Context (Espoo Convention), 1991 (Azerbaijan);
- Convention on Prevention of Marine Pollution, 1992 (Turkey, Azerbaijan);
- Convention on Biodiversity, 1992 (Turkey, Azerbaijan, Georgia);
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1992 (Azerbaijan);
- United Nations Framework Convention on Climate Change, 1992 (Azerbaijan, Georgia);
- Convention on Combating Desertification, 1994 (Turkey, Azerbaijan, Georgia);
- International Convention on Oil Spill Preparedness, Response and Co-operation, 1995 (Georgia);
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 & Protocol & Amendments 1976 (Georgia); and
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice concerning Environmental Matters (Aarhus Convention), 1998 (Azerbaijan\*, Georgia).

*\* Denotes acceded but not yet ratified*

**Table 6.2: Summary of IFI Policies Considered**

Policy	Potential relevance to the BTC project	Compliance by the BTC project
<p>IFC OP4.01 Environmental Assessment (October 1998)</p>	<p>Requirement for environmental assessment (EA) of projects proposed for financing. BTC project has been classified as a Category 'A' project for the purpose of environmental screening. Projects are classified as Category A if they could have 'adverse impacts that may be sensitive, irreversible, and diverse' (OP4.01).</p> <p>EA for a Category 'A' project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives and recommends any measures need to prevent, minimise, mitigate, or compensate for adverse impacts and improve environmental performance.</p>	<p>Through the development of country-specific ESIA reports.</p>
<p>IFC OP4.04 Natural Habitats (November 1998)</p>	<p>OP4.04 embodies the 'no net loss' principle. Paragraphs 4 and 5 state:</p> <p>'The IFC will not invest in projects that significantly convert or degrade critical natural habitats or in projects that otherwise affect habitats supporting threatened or endangered species. They will also not invest in projects that significantly convert or degrade other natural habitats unless careful and comprehensive review and analysis indicate that:</p> <p>1) No feasible alternative exists for the project or its siting; 2) The project's overall benefits substantially outweigh its environmental costs; 3) Project plans include mitigation measures acceptable to IFC; 4) Project sponsors have the ability to implement necessary conservation and mitigation measures or the project includes plans that are acceptable for developing this capacity.'</p>	<p>The BTC project recognises the importance of protecting biological diversity, and in particular ensuring that protected natural habitats are avoided where at all possible through the route selection process. Where an overall project assessment indicates that this is not feasible, and the overall benefits substantially outweigh the environmental costs, direct mitigation measures have been developed and will be implemented to minimise the impact.</p> <p>Where a residual impact remains, the project will implement compensation plans. These are described in the Safeguard Policy document.</p>
<p>IFC OPN11.03 Management of Cultural Property (September 1986)</p>	<p>The World Bank Group's general policy regarding cultural properties is to assist in their preservation, and to seek to avoid their elimination.</p> <p>OPN11.03 states that the Bank normally declines to finance projects that will significantly damage non-replicable cultural property.</p> <p>'Cultural property' is defined as 'sites having archaeological, palaeontological, historical, religious and unique natural values'. Along the BTC pipeline route areas and sites have been identified that are important from an archaeological or cultural perspective.</p>	<p>Extensive non-intrusive integrated baseline surveys involving teams of national and international experts have been completed and sites of potential importance identified and avoided where possible through route selection. Intrusive surveys will be undertaken to define the extent of any potential sites prior to construction, enabling further avoidance measures to be taken. Pre-excavation of sites will take place if no alternative route can be identified, and the overall project benefits outweigh any costs. Direct site protection measures will be implemented during the construction phase. Plans are being developed to manage, record and preserve finds. Archaeological Management/Cultural Heritage Plans have been developed.</p>

**Table 6.2: Summary of IFI Policies Considered (continued)**

Policy	Potential relevance to the BTC project	Compliance by the BTC project
<p>IFC OD4.30 Involuntary Resettlement (June 1990)</p>	<p>The principal IFC instrument governing project impacts resulting from land expropriation is OD 4.30 Involuntary Resettlement<sup>1</sup>. World Bank OD 4.30 Involuntary Resettlement is invoked where the involuntary taking of land results in people experiencing economic or physical displacement through one or more of the following circumstances: (i) relocation or loss of shelter (ii) loss of assets or access to assets (iii) loss of income sources or means of livelihood, whether or not the persons must move to another location, and (iv) loss of access or restriction of access to communal resources and services. Projects entailing any of the foregoing impacts are required to prepare a Resettlement Action Plan (RAP).</p> <p>Through careful pipeline alignment and facilities siting, the BTC project will minimise impacts on livelihoods and avoid the need to physically relocate households.</p> <p>The project will involve impacts on land, productive assets, and livelihood through (i) temporary use of land for construction purposes (ii) permanent acquisition of land (or imposition of rights to construct and operate a pipeline under existing ownership) for the pipeline alignment and permanent above-ground installations (AGIs), and (iii) imposition of restrictions on land use above the pipeline. The project will impact privately-owned land, municipal and state land, some of which is leased to private entities and individuals.</p>	<p>Project land acquisition and associated livelihood impacts will be addressed in accordance with international good practice as embodied in the policies and guidelines of the IFC/World Bank Group. Requirements contained in Azerbaijani, Georgian and Turkish legislation and the project HGAs will also be complied with.</p> <p>The overarching goal of the BTC project is:</p> <p>To restore or enhance project-affected people's living standards, income earning capacity and production to at least without-project levels.</p> <p>The BTC project also has a goal of no resettlement of the local population.</p> <p>In compliance with OD4.30, the BTC project is completing a RAP. This document is currently under preparation using international and national specialists experienced in World Bank Group policies and national and international land acquisition procedures. The RAP will be prepared through consultation with project-affected people and will be publicly disclosed.</p>
<p>IFC Policy on Disclosure of Information (September 1998)</p>	<p>The World Bank Group requires consultation with project stakeholders including the potentially-affected population, NGOs and other interested parties about the project's environmental and social aspects, and to take their views into account. The consultation should begin at an early stage of the project design. IFC's publication 'Doing Better Business Through Effective Public Consultation and Disclosure – A Good Practice Guide' provides 'step-by-step' practical guidance on how to prepare a constructive public consultation programme and effectively disclose information.</p> <p>Under the World Bank Group policies, the project must complete a Public Consultation and Disclosure Plan (PCDP).</p>	<p>A PCDP has been prepared for each country in accordance with the World Bank Group policies.</p> <p>Public consultation and disclosure of information have been carried out through the design stages of the project and will continue throughout construction and operations.</p> <p>A scoping report was completed in consultation with NGOs, scientists, academic institutions, regulators and other interested stakeholders during the early engineering design phase. The report was disclosed and comments taken into consideration during the execution of the ESIA baseline studies and impact assessment. Consultation continued during the ESIA preparation.</p> <p>The draft ESIA's have been disclosed in accordance with the HGA and World Bank Group requirements.</p>

**Table 6.2: Summary of IFI Policies Considered (continued)**

Policy	Potential relevance to the BTC project	Compliance by the BTC project
<p>IFC Policy Statement on Child/Forced Labour (March 1998):</p>	<p>Consideration of this policy is a requirement for all World Bank Group investments and does not pre-suppose that the Bank believes that the project is involved in such practices.</p>	<p>The project or its contractors will not employ child or forced labour.</p> <p>The invitations to tender and contracts contain appropriate clauses to address this.</p>
<p>World Bank Environmental Guidelines for Oil and Gas Development (Onshore) (July 1998)</p>	<p>These guidelines address onshore oil and gas exploration, drilling and production operations</p>	<p>The project has been designed taking into consideration these guidelines, particularly in respect to air emissions, waste management and oil spill prevention.</p>
<p>EBRD Environmental Procedures (1996)</p>	<p>EBRD Environmental Procedures (1996) detail the environmental appraisal process and standards required of projects sponsored by the Bank. An EIA is required for all Category A projects, as listed in Annex 4 of the procedures, including large diameter oil and gas pipelines.</p> <p>It is the responsibility of the project developer to commission and conduct the necessary environmental investigations to the satisfaction of the Bank.</p> <p>EBRD operations are structured to meet national and existing European Union (EU) environmental standards. Where EU standards do not exist, national, World Bank standards and international agreements apply where relevant. EBRD encourages developers to comply with good international practice and standards.</p> <p>EBRD believes that effective public consultation is a way of improving the quality of operations. The EBRD requires project sponsors to ensure that national requirements for public consultation in the country of operation be met and that these in turn meet the procedures described in the Bank's Disclosure of Information Policy. For Category A projects the EBRD requires the project sponsors to provide the affected public and interested NGOs with notification about the nature of the operation. The EIA and Executive Summary should be available to the public in the local language, in accordance with relevant national legislation and allow sufficient time for public comment.</p>	<p>The BTC Owners have commissioned ESIA's that address the requirements of the EBRD procedures.</p> <p>The PCDDP (discussed above) details the project's consultation and disclosure programme.</p> <p>The ESIA's have been prepared in local languages (Azeri, Russian, Georgian, Turkish).</p> <p>Community information leaflets have been distributed (also in local languages).</p> <p>Non-Technical Executive Summaries have been produced in English, Azeri, Russian, Georgian and Turkish.</p> <p>The ESIA's have been distributed locally, nationally and internationally, as described in the PCDDPs.</p> <p>A website (<a href="http://www.caspiandevlopmentandexport.com">www.caspiandevlopmentandexport.com</a>) has been developed. The ESIA's are available on this site.</p>

1 Note: There are presently two involuntary resettlement policies in force within the World Bank Group. On the advice of the World Bank Group, the project has adopted OD4.30 which is directly applicable to private sector projects financed by IFC, rather than OD4.12 which is applied by the International Bank for Reconstruction and Development when loaning to governments.

### 6.1.5 BP corporate policies

The BTC Owners have nominated BP health, safety and environmental (HSE) policies as the basis on which the BTC project is developed.

BP corporate policy focuses on five areas:

- ethical conduct;
- employees;
- relationships;
- health, safety and environment; and
- control and finance.

They apply equally to all BP activities worldwide and are the foundation on which its business is built and carried out.

BP is committed to good stewardship of the environment. Its HSE policy embodies this commitment, and is shared by all BP personnel at all levels of the organisation. The company's goal is based on the conduct of all operations in a safe and environmentally responsible manner.

*BP goal: 'no accidents, no harm to people and no damage to the environment.'*

This goal is pursued through adherence to a common set of policies, commitments and expectations that identify policy and regulatory requirements and provide the tools to assist in compliance and performance improvement throughout the business. These are locally owned and administered by all Business Unit (BU) employees. Local management systems are arranged so they accommodate Group HSE performance targets pertaining to, for example, reductions in carbon dioxide (CO<sub>2</sub>) emissions, Environmental Management System (EMS) certification requirements, biodiversity and sustainable development.

BP's approach to defining environmental expectations for the BTC project has been derived from two internal policy documents:

- *Upstream Environmental Expectations; and*
- *Upstream Environmental Performance Guidelines for New Projects and Developments.*

The first of these is structured into two basic elements:

- general expectations that reiterate and reinforce commitments presented in *Getting HSE Right (GHSER)*; and
- focus on specific areas of performance, with specific target dates for implementation.

The second policy document provides a consistent process for complying with the environmental expectations. The purpose of these guidelines is to help new projects and developments achieve the corporate goal described above of *'no damage to the environment'* in the most cost-effective manner. They explain the key technical and operational elements that contribute towards the final performance level, and the process

that should be followed to achieve the best achievable environmental performance in any project.

#### **6.1.6 Project environmental and social goals and objectives**

Project environmental and social goals have been agreed for BTC in accordance with BP corporate policies. The project has aimed to achieve these goals in terms of overall project design, and will continue to make progress towards them. These include:

- no combustion emissions;
- no loading or offloading emissions;
- zero discharge of oil or chemicals to land or surface waters;
- maximising efficiency of net energy exported;
- minimizing project footprint (including Right of Way (ROW), temporary facilities and access roads);
- no net damage to protected ecological areas or archaeological sites;
- no creation of access routes to otherwise inaccessible areas;
- restoration of habitat and hydrological regimes;
- no loss of containment of product;
- no resettlement of local population; and
- no permanent disruption to the livelihood of the local population.

<b>Further information</b>
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Further information about the policy and governance of managing the environmental, land, community and social issues associated with the project can be found in:

- *The separate project ESIA's produced for Azerbaijan, Georgia and Turkey, including the Addenda (Response to Comments from Disclosure Phase).*

These can be accessed via the project's website  
[www.caspiandevlopmentandexport.com](http://www.caspiandevlopmentandexport.com).

## 6.2 Process

### 6.2.1 Introduction

BTC Co is managing the environmental, land and social issues associated with the pipeline project, in a systematic way, that conforms with internationally recognised best practice and also the formal requirements of the national governments concerned and the lending institutions.

This is an ongoing process that began with the initial concept for the project, is proceeding through planning, construction and operation of the pipeline and will only finish when the pipeline is decommissioned at the end of its operational life. The management of environmental, land and social issues proceeds hand-in-glove with the engineering process of designing, operating and decommissioning the pipeline. The key phases of the project lifecycle are summarised in Table 6.3.

**Table 6.3: The key phases of the project life-cycle**

<i>Engineering Stages</i>	<i>Environmental and Social Stages</i>
<b>INITIAL PLANNING PHASE</b>	
Conceptual development	Environmental and Social Screening
Front-end Engineering Design (Basic Engineering)	Preliminary environmental and Social Scoping and Initial Consultation Development of Environmental and Social Goals and Objectives
<b>CORE ESIA PHASE</b>	
Detailed Design and Engineering	ESIA Preparation (including consultation and review)
<b>MITIGATION, MANAGEMENT AND MONITORING PHASE</b>	
Construction and Commissioning	Environmental and Social Mitigation, Management and Monitoring
Pipeline operations	Environmental and Social Mitigation, Management and Monitoring
Pipeline Decommissioning and Abandonment	Environmental and Social Mitigation, Management and Monitoring Any abandonment plan would be accompanied by a further ESIA

During the initial planning phase, when the project engineering concepts were being developed, a number of preliminary environmental and social screening activities and risk assessments were undertaken, associated for example with the consideration of the environmental settings of the alternative pipeline routes. Having settled on a preferred route and commenced detail design and engineering work for this, the formal ESIA process was undertaken. This process constitutes a systematic and detailed evaluation of the proposed design alternative in the context of the natural, regulatory and socio-economic environment in which the development is proposed. The formal ESIA process is described more fully below.

As the project moves into the construction and operational phase, the mitigation management and monitoring actions identified in the ESIA are systematically applied to control the environmental and social concerns identified. By the time the BTC oil export programme is completed and the system approaches its design life (30-40 years), best practice techniques for decommissioning may have changed. Any decommissioning and abandonment plan would therefore be supported by Best Practicable Environmental Option (BPEO) studies and a further, dedicated, ESIA.

## **6.2.2 The Environmental and Social Impact Assessments**

The ESIA process is the core technique that has been used to ensure that any adverse environmental or social impacts arising from pipeline construction and operation are identified, the positive impacts are maximised, and where possible, negative impacts are eliminated or minimised through early response to the issue. The ESIA process also provides a mechanism for community participation and dissemination of information.

All ESIA work for the BTC project has been carried out in accordance with IFC and European Bank for Reconstruction and Development (EBRD) requirements, and conforms with the EU Environmental Impact Assessment Directive, ensuring that good international environmental practices are adopted. It also conforms to the agreements and regulatory regimes of the three host countries and BP corporate policies (see Section 6.1 above). One specific outcome has been the production of country-specific ESIA, one for each of the three host governments, as prescribed in the individual HGAs (note that for contractual reasons the study is referred to as an EIA in Turkey).

The ESIA process incorporated a number of discrete, yet related steps, culminating in the production of a draft ESIA report for each country. This was followed by a 60-day consultation, disclosure and review stage as defined in each country's HGA. Comments received during the review stage were then incorporated, as appropriate, into a final ESIA report and addendum for each country. These reports were then submitted to the host government for review and approval (Tables 6.4 and 6.5). The subsequent implementation of management and monitoring plans will ensure that the commitments made in the ESIA are delivered throughout the life of the project.

The HGAs required the preparation of country-specific ESIA by independent, international consultants, who have worked in conjunction with national consultants. The consultants adopted a common structure for the Azerbaijani and Georgian ESIA while ensuring that each assessment was prepared independently. The Turkish EIA adopted a structure that reflected the need to assess the impacts of the pipeline and the new marine terminal at Ceyhan (Box 6.3a and b). The Turkish EIA was undertaken by independent international consultants on behalf of BOTAŞ (environmental assessment) as part of the Lump Sum Turnkey Agreement (LSTK) and BTC Co (social assessment).

**Table 6.4: Formal ESIA Process**

<b>ESIA element:</b>	
1. Detailed scoping and confirmation of key issues	Involves public consultation and participation (both national and international)
2. Baseline environmental and socio-economic studies and assessments	
3. Environmental hazard and risk assessment workshops	
4. Identification of project environmental aspects	
5. Assessment of environmental and social impacts (including cumulative and transboundary)	
6. Draft ESIA/EIA*	Formal public disclosure and regulatory review
7. Final ESIA/EIA (incorporating comments)	Submit to national regulators
8. Approved ESIA/EIA (plus conditions)	

\*ESIA: Azerbaijan and Georgia; EIA Turkey

The schedule for the completion of the ESIA's and the disclosure and approval process is shown in Table 6.5. All of the ESIA's have now been formally approved by the relevant host government.

**Table 6.5: ESIA disclosure and in-country approval schedule in Azerbaijan, Georgia and Turkey**

<b>Element</b>	<b>Date</b>
Draft ESIA's/EIA issued for public and regulatory review and comment	May/June 2002
Public disclosure (60 days)	May/June to July/Aug 2002
Incorporate comments (30 days)	July/Aug to Aug/Sept 2002
Government review and approval (30 days)	Aug/Sept to Sept/Oct 2002

### **Box 6.3 (a) and (b): ESIA Table of Contents**

#### **Box 6.3 (a) Azerbaijan and Georgia**

##### *Main Volumes*

- Section 1, Executive Summary
- Section 2, Glossary
- Section 3, Introduction
- Section 4, Project Alternatives
- Section 5, Project Description
- Section 6, Legal and Policy Framework
- Section 7, ESIA Methodology
- Section 8, Environmental Baseline
- Section 9, Social Baseline
- Section 10, Environmental Impacts and Mitigation
- Section 11, Social Impacts and Mitigation
- Section 12, Residual Impacts
- Section 13, Cumulative Impacts
- Section 14, Mitigation and Monitoring Plan
- Section 15, Overall Project Assessment
- Section 16, Consultation
- Section 17, ESIA Contributors
- Section 18, References

##### *Appendices*

#### **Box 6.3 (b) Turkey**

##### *Volume 1: Background*

- Section 1, Introduction;
- Section 2, Project Development and the Evaluation of Alternatives; and
- Section 3, Approach and Methodology.

##### *Volume 2: The Pipeline*

- Section 4, The Pipeline Project;
- Section 5, Overview of the Baseline;
- Section 6, Impacts and Mitigation along the Pipeline Route during Construction;
- Section 7, Operational Impacts and Mitigation; and
- Section 8, BTC Pipeline – Accidental Operational Events and Incidents.

##### *Volume 3: The Marine Terminal*

- Section 9, The Marine Terminal;
- Section 10, Baseline: Terrestrial;
- Section 11, Baseline: Marine; and
- Section 12, Terrestrial.

##### *Volume 4: Summary*

- Section 13, Summary of Key Residual Impacts;
- Section 14, Cumulative Impacts;
- Section 15, Management and Implementation; and
- Section 16, Overall Project Assessment.

##### *Appendices*

While the main output of the ESIA process is the actual impact assessment report for each country, numerous technical reports have also been produced on a range of issues prior to the preparation of the ESIAs. Some of these investigations date back to 1997 and underline the depth and diversity of the information gathered and considered as part of the

impact assessment process (Table 6.6, and Addendum 1). The social baseline descriptions and impact assessments undertaken during preparation of the ESIAs, are the first of their kind to have been completed in Azerbaijan and Georgia, and are being shared with a range of governmental authorities, humanitarian and aid agencies, and international and national, non-government organisations (NGOs).

**Table 6.6: Summary of principal environmental investigations and reports**

<b>Activity/report</b>	<b>Period</b>
Western Route Export Pipeline, Northern Route Export Pipeline EIAs	1995-1997
Preliminary routing studies and constraints mapping and consideration of alternatives	1998-1999
Preliminary Environmental Risk Assessments	1998
Baseline studies – environmental and social and detailed routing studies	1997-2002
Early consultation – environmental and social data gathering	1998-2001
Consultation for scoping studies	2000-2001
Environmental and social scoping studies	2000-2001
Environmental and social risk assessments	2000-2002
Contaminated land assessments	2000-2002
<b>ESIAs/EIA</b>	<b>2001-2002</b>
Non-technical Executive Summary	2002
Community information leaflets	2002
Public Consultation and Disclosure Plans	2000 – continuing
Resettlement Action Plan	2001-2002
Guide to Land Acquisition and Compensation	2002
Framework for oil spill response plans	2001-2002
Oil Spill Response Plans*	2002-2004*
Review of the Economic, Environmental and Social Implications of AGC and BTC in the National and Regional Context	2001-2002
BTC Environmental and Social Overview	2002
Updated BTC Environmental and Social Overview	This document

\* HGA deliverables subject to Government approval

## 6.2.3 Public consultation and disclosure

### 6.2.3.1 BTC Co consultation objectives

Consultation has formed an integral part of the environmental and social management of the project, and especially in relation to issues surrounding resettlement, land acquisition and compensation. From the outset, BTC Co has sought to develop a basis of mutual respect and understanding with stakeholders with a view to establishing good, long-term relationships.

There has been regular dialogue with potentially affected communities and individuals along the route, as well as with other key stakeholders, including the national regulators, scientific community, the World Bank Group and international and national non-governmental organisations.

This close liaison has allowed BTC Co to accurately identify the real issues of concern, as well as the socio-economic and environmental issues on the ground. As a result, the most appropriate mitigation measures have been developed. Ongoing dialogue throughout the lifetime of the project will contribute towards the early identification of issues and appropriate discussion of proposed mitigation measures. The BTC project consultation objectives are summarised in Box 6.4

#### Box 6.4: BTC Project Consultation Objectives

- All stakeholders should have access to project information;
- The information provided should be easily understood;
- Locations for consultation should be accessible to all who want to attend;
- Measures are put in place which ensure that vulnerable or minority groups are consulted;
- A high level of awareness among communities and other stakeholders about the nature of the project, its likely impact and proposed mitigation measures should be established;
- Input from stakeholders on proposed mitigation measures, in particular through consultation with a representative sample of communities along the pipeline route and in relation to specific types of project activities, should be achieved; and
- Expectations among communities and other stakeholders should be managed.

### 6.2.3.2 HGA and IFI requirements

Consultation and disclosure activities have taken place within the framework of specific HGA and IFI requirements in relation to ESAs (Box 6.5). These requirements include the development of Public Consultation and Disclosure Plans (PCDPs) that set out the programme for consultation and information disclosure that will occur during the planning, construction and implementation phases of the project. The World Bank Group also specify that Resettlement Action Plans (RAPs), including appropriate consultation and disclosure arrangements, must be prepared for projects requiring physical or economic displacement. Whilst the pipeline does not involve any physical resettlement, the project has prepared Resettlement Action Plans to address issues surrounding land acquisition and compensation (see Section 6.3.3).

#### Box 6.5: Key HGA and IFI Consultation and Disclosure Requirements for ESIA

**HGAs:**

- The HGAs for each country define the mechanisms, including the period of time (60 days) during which the findings of the draft ESIA in the local language should be made available for public review and comment.

**IFIs:**

Specific World Bank group requirements for disclosure of documentation resulting from the ESIA process include:

- Preparation and publication of a Public Consultation and Disclosure Plan (PCDP);
- Disclosure of the draft ESIA in public places in-country and the World Bank Infoshop (120 days prior to the IFC Board date), including a non-technical summary in the local language to local stakeholders; and
- Preparation of an Environmental and Social Action Plan (ESAP) containing social as well as environmental measures designed to manage, mitigate and monitor the impacts identified during development of the ESIA. This must be released to the World Bank Infoshop and be made available locally prior to presentation of the project to the IFC board.

#### 6.2.3.3 PCDPs and RAPs

IFC have summarised the core components of a PCDP in: *‘Doing Better Business Through Effective Public Consultation and Disclosure, A Good Practice Manual’*, and this guideline has been followed in preparing the three project PCDPs:

- PCDP: Azerbaijan;
- PCDP: Georgia; and
- PCDP: Turkey.

Each PCDP is appended to the country-specific ESIA and translated as appropriate and contains the following main elements:

- roles and responsibilities;
- project description;
- regulatory context;
- public consultation and disclosure plan;
- stakeholders consulted;
- plans for document disclosure;
- questionnaires used; and
- leaflets and other supporting information.

The consultation and disclosure requirements for RAPs are covered by World Bank Operational Directive 4.30: Involuntary *Resettlement* and outlined in IFC's: '*Handbook for Preparing a Resettlement Action Plan*'. This guide has been used to prepare four RAP documents:

- - RAP Part A, Overview;
- - RAP Part B, Azerbaijan;
- - RAP Part C, Georgia; and
- - RAP Part D, Turkey.

The key consultation and disclosure elements of the RAPs for each country are complementary to the corresponding PCDPs and include:

- identification of stakeholders and mechanisms for stakeholder feedback;
- informing representatives of affected people, e.g. local government and village leaders;
- briefing all project managers and staff who will interact with affected people;
- arranging for governments to issue formal notice to prevent the construction of new buildings or capital improvements in areas to be affected by the project;
- preparing an illustrated information booklet on eligibility, rates of compensation and other entitlements, a timetable for implementation and all applicable grievance procedures;
- getting feedback on RAP implementation for each sub-group of affected groups and communities;
- launching participatory monitoring and evaluation processes; and
- preparing and issuing regular RAP information updates.

#### 6.2.3.4 *Consultation and disclosure activities*

The implementation of the PCDPs and RAPs has ensured that project consultation in all three countries has been thorough and is ongoing. Consultation and disclosure activities have been intensive during the 12-month RAP preparation period and have involved one-to-one meetings, household surveys, focus groups and public hearings covering many thousands of stakeholders and project affected people, as well as in-country distribution of resettlement principles pamphlets and a *Guide to Land Acquisition and Compensation* (GLAC). Activities will continue in the lead up to and during land negotiations with the 17,700 affected households, and in the period prior to land being occupied by the construction contractor.

In line with the requirements of the HGAs, the ESIA documents including their Executive Summaries, have been through a 60-day process of public disclosure in each country. This process was completed between May and August 2002.

IFIs require further disclosure of the environmental assessment documents for a minimum period of 120 days in public places in-country and the World Bank Infoshop, including a non-technical summary in the local language to local stakeholders. The IFI-required disclosure period will commence once the IFIs have reviewed all project environmental and social documents and deemed them compliant with their policy requirements. The disclosure period is likely to start during the second quarter of 2003.

The following locations are indicative of those that were used to disclose and receive comment on the draft ESIA's in Azerbaijan, Georgia and Turkey. Full disclosure details are provided in the PCDDPs:

Translated community information leaflets, as well as Non-Technical Executive Summaries of the ESIA's, were also distributed to project-affected communities, explaining the findings of the draft ESIA's and the actions the project will take to mitigate these impacts. In addition, they provided information on issues of particular interest to local communities such as employment, construction camps, community liaison, noise, infrastructure, land use, land acquisition, and compensation procedures. A summary of the full range of consultation and disclosure activities undertaken in each country is given in Box 6.6.

**Box 6.6: In-country Consultation and Disclosure Activities**

***Stakeholder identification and analysis (commenced mid 2000):***

- Identification of project stakeholders;
- Preparation of preliminary stakeholder consultation strategy (became the PCDDP); and
- Training for project staff on World Bank resettlement principles, consultation techniques and dispute resolution.

***Preliminary meetings with State, provincial and Local Government (from mid 2000):***

- Presentation of preliminary information about the project, land requirements, procedures and programme; and
- Analysing feedback and suggestions from government officials.

***Village level consultations (Nov 200 to end 2002):***

- Meetings with village heads and key informants in affected communities;
- Presentation of project information including likely impacts and benefits; and
- ESIA socio-economic baseline survey.

***Civil Society Consultations (commenced October 2000 and on-going):***

- Meetings held with broad cross-section of NGOs with specific discussion on land and compensation issues.

***Land Identification Survey and RAP census (commenced 2001):***

- Land and survey teams interacted with project affected people during the course of land parcel identification surveys, census of affected people.

***RAP Socio-economic Surveys (May to October 2002):***

- Household surveys with project affected owner and user households;
- Follow-up consultations with vulnerable and other special groups; and
- Identification of socio-economic baseline conditions and project impacts.

## Box 6.6: In-country Consultation and Disclosure Activities (continued)

### ***ESIA Disclosure and Road Show (May to June 2002):***

- Meetings in project affected communities and regional centres;
- Meetings with NGOs, academic and research institutions;
- Release of 5-page Resettlement principles pamphlet to all pipeline villages;
- Extensive discussion on land and compensation issues in all countries; and
- Documented written and verbal feedback invited and received.

### ***Guide to Land Acquisition and Compensation (GLAC) (commenced October 2002):***

- Plain language, explanatory brochures for each country;
- Total of 40,000 brochures distributed; and
- Delivered to all affected villages, regional centres and key NGOs and (in Turkey) all project affected households.

### ***RAP In-country Disclosure (commenced Dec 2002):***

- Copies made available in a wide range of government offices, public libraries, academic institutions and NGO resource centres.

### ***Ongoing Information Dissemination and Disclosure (Dec 2002 and on-going):***

- Community preparation meetings ahead of construction;
- Community liaison by contractor and BTC Co Community Liaison Officers;
- Grievance processing and redress; and
- Ongoing information dissemination about employment, community investment programmes and other issues and opportunities.

## 6.2.4 Responding to stakeholders

### 6.2.4.1 National governments

Considerable effort is being made to respond to the concerns raised by stakeholders as the project develops. All comments received during the 60-day formal public disclosure period for the draft ESIA's undertaken in May/Sept 2002, have been collated in dedicated databases for each country. This includes the detailed, written responses that were received from government departments in the countries concerned, and other organisations such as the BP Research and Monitoring Group and a number of international NGOs.

The feedback recorded has been analysed and detailed Addendum reports to the draft ESIA's have been published, to provide supplementary information in response to the issues raised. These addenda, together with the ESIA drafts for disclosure documentation, constitute the final ESIA submissions to the host governments for approval. All public concerns raised during the public review and comment process have been addressed in the Addendum reports, in conformance with Appendix 3, section 3.9 (iii) of the HGAs. A final Executive Summary is also included with the each Addendum.

### 6.2.4.2 Lenders

In addition, following the 60-day public disclosure undertaken in 2002, further comments were received from IFIs, based on the IFI Lenders Group review of the documentation. Separate supplementary information packs (SLIPs) have been produced for each country, to respond to IFI comments, and these can also be viewed on the project website. The SLIPs contain summaries of all of the key issues raised by the lenders during consultation and the resulting response or action. In addition, updated PCDPs and complete

Resettlement Action Plans (RAPs) have also been submitted to the IFIs and have been publicly disclosed in the respective countries.

### **6.2.5 On-going consultation**

In keeping with its policy objectives and IFI guidelines, BTC Co is committed to maintaining a high-level of consultation with potentially affected groups, throughout the lifetime of the project.

The PCDPs for each country are regarded as 'living documents' and as such will continue to be revised over time to reflect project developments. The PCDPs have been already been revised following the 60-day public disclosure of the draft ESIA's, to ensure that the description of the overall consultation process is up to date. In particular, following approval of the ESIA's by the national governments during the last quarter of 2002, the focus of the PCDPs has moved towards extensive consultation with communities directly affected by construction activities. Consultation will take the form of workshops and community meetings held prior to and during construction in each area. The process will be lead by construction contractor community liaison officers, project community liaison teams, and project land teams. A grievance mechanism has also been established, intended to deal with all complaints received from communities affected by the project.

Finally, the project will continue to hold specific meetings with key interested NGOs and international stakeholders to discuss issues and respond to comments.

<b>Further information</b>
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Further information about the process of managing the environmental, land, community and social issues associated with the project can be found in:

- *The separate project ESIA's produced for Azerbaijan, Georgia and Turkey, including the Addenda (Response to Comments from Disclosure Phase).*

These can be accessed via the project's website  
[www.caspiandevlopmentandexport.com](http://www.caspiandevlopmentandexport.com).

## 6.3 Performance

### 6.3.1 Design approach

The design approach used by the BTC project has been based on BP's Upstream Environmental Performance Guidelines for New Projects and Developments. These guidelines describe the process of establishing a 'no impact base case' and then modifying this after consideration of technical feasibility, safety, legislation, company/joint venture partner policy, good engineering practice, environmental cost factors and reputation issues.

Another central feature of the approach has been the development of project-specific environmental and social goals and objectives. These goals are, by definition, aspirations and are designed to drive environmental and social performance. The environmental and social goals established for the BTC project are presented in Box 6.7. They are complemented by a set of social objectives developed specifically for the BTC project in recognition of the social sensitivities of the region (Box 6.8).

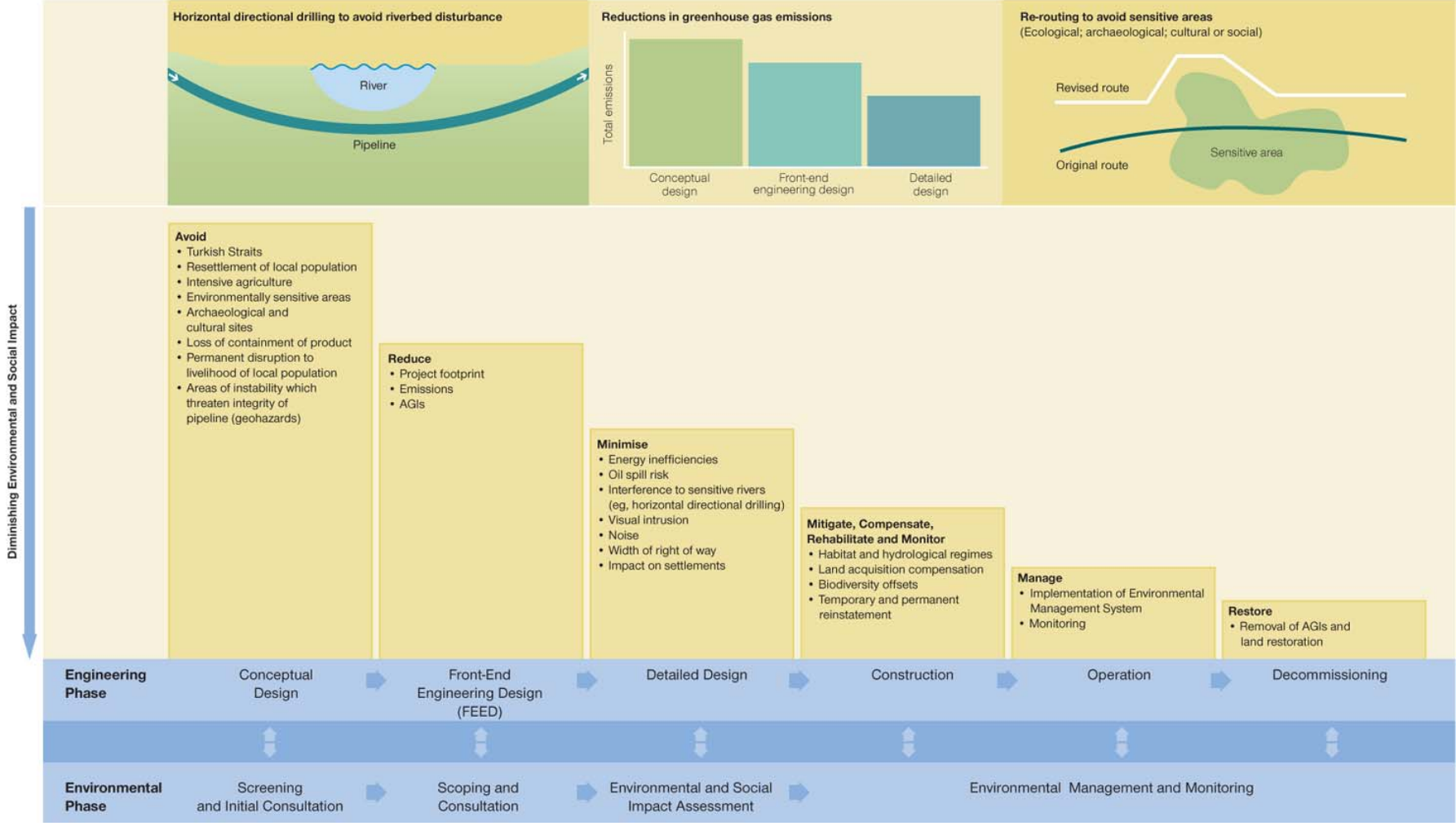
Formal adoption of goals and objectives necessarily required consideration of environmental and social issues at the conceptual development stage of the project. This in turn has maximised the opportunity to avoid, remove or reduce significant environmental and social impacts during the front-end engineering phase of the project.

This approach has the potential to deliver significant environmental and social gains that far outweigh the effects of specific and locally-applied mitigation measures.

#### **Box 6.7: BTC Project Environmental and Social Goals**

- Goal 1: No combustion emissions;
- Goal 2: No loading and offloading emissions;
- Goal 3: Zero discharge to land or surface waters (eg, oil, chemicals, wastes);
- Goal 4: Maximise efficiency of net energy exported;
- Goal 5: Minimise project footprint (including right of way, temporary facilities, access roads);
- Goal 6: No net damage to protected ecological areas or archaeological sites;
- Goal 7: No creation of access routes to otherwise inaccessible areas;
- Goal 8: Restoration of habitat and hydrogeological regimes;
- Goal 9: No loss of containment of product;
- Goal 10: No resettlement of local population; and
- Goal 11: No permanent disruption to the livelihood of the local population.

**Figure 6.1: Reducing Potential Impact by Design**



## Box 6.8: BTC Project Social Objectives

The BTC project will:

- Minimise potential negative social impacts through identification and mitigation, in particular via a social impact assessment and environmental and social action plan;
- Publish regular updates on the environmental and social aspects of the project, and conduct regular dialogue with interested organisations;
- Maintain regular contact with communities along the pipeline route through a team of community liaison officers prior to, during and following the construction period;
- Compensate for damage to land and property in a legal, transparent and ethical manner that respects the interests of those involved;
- Manage expectations on employment opportunities, by providing information on the level and duration of employment requirements;
- Seek opportunities to favour employment of country nationals, and in particular those in villages along the pipeline route, subject to availability of appropriate skills;
- Establish recruitment procedures that are transparent, public and open to all regardless of ethnicity, religion, gender, or sexuality;
- Provide periodic training to enhance the skills and capacity of both employees and contractors;
- Draw up procedures and management plans for all construction camps, in relation to contacts with local communities;
- Provide periodic training on liaison with local communities to all staff employed by the BTC project and contractors; and
- Establish a community investment programme that delivers mutual benefits to BTC Co and communities along the pipeline route.

### 6.3.1.1 Pipeline specifications and supporting infrastructure

The assessment of alternative routing options (see Sections 4.2 and 6.3.2) required consideration of many pipeline design issues, as well as decisions regarding the number and location of supporting facilities such as pump stations. Many of these decisions were interrelated and therefore called for optimisation assessments. Almost all had environmental implications and these were factored into the alternatives assessment process.

The main design issues were as follows:

- Surface or buried pipeline;
- Pipeline diameter;
- Pipeline wall thickness;
- Number and location of pump stations;
- Pump driver selection, including choice of fuel; and
- Number and location of valve stations.

The options considered for each of these issues are summarised in Table 6.7, together with an outline of important factors that were included in the evaluation and the preferred option. Table 6.7 also provides a summary of the environmental consequences of the preferred option, and relates the decision to the project's environmental and social goals.

**Table 6.7: Summary of Alternatives Assessment – Design Options**

Issue	Options	Key considerations	Preferred option and benefit
<b>Buried or surface laid pipe</b>	1) Buried 2) Surface 3) Combination.	1) Security 2) Accidental third-party damage 3) Visual intrusion 4) Stock, wildlife, human movement 5) Post-construction land use	Buried pipeline: benefits include improved security, reduced accidental damage, reduced long-term land use impact, and elimination of a potential barrier to the movement of stock and wildlife .
<b>Pipeline diameter</b>	34" diameter 36" diameter 42" diameter 46" diameter 48" diameter Combination of the above	1) Capacity of pipeline 2) Number of pump stations, with smaller diameter pipeline requiring more pump stations and hence greater land take; fuel requirements for pump drivers; emissions, noise and maintenance and materials 3) Location of pump stations 4) Width of ROW (greater diameter may mean greater ROW width) 5) Capital and operating costs	42" for the Azerbaijani and Turkish sectors (with the exception of the last 120km of the Turkish sector which is 34"). 46" for Georgia (and short section across the Turkish border of 46" line). Benefits include reduced air and noise emissions, and land requirements resulting from one less pump station than the base case, and deferral of one pump station by several years (see below).
<b>Number and location of pump stations</b>	Appraisal base case: Five pump stations in Azerbaijan and Georgia in combination with 42" pipe diameter, and five in Turkey Options: 10 different system design scenarios (ie, different number of pump station/pipe diameter combinations)	1) Capital and operating costs 2) Environmental impact (land take, atmospheric and noise emissions (from pump drivers), visual impact 3) Location of pump station and flexibility in location 4) Pipe diameter 5) Operating pressures	Eight pump stations with dual diameter pipeline system design of 42" in Azerbaijan, 46" in Georgia, and 42" in Turkey. This configuration allows one less pump station than the base case, and deferral of one station in Azerbaijan by three years.

**Table 6.7: Summary of Alternatives Assessment – Design Options** (continued)

Issue	Options	Key considerations	Preferred option and benefit
<b>Pump driver selection</b>	<ol style="list-style-type: none"> <li>1) Reciprocating engines (fuelled with crude oil from BTC pipeline)</li> <li>2) Gas-fired reciprocating engines. This option is available for Turkey with a natural gas supply assured via branch line connections to the existing East Anatolian Natural Gas Pipeline</li> <li>3) Gas turbines – for Azerbaijan and Georgia; these would need to be run on a crude oil distillate until gas was available from the proposed SCP</li> </ol>	<ol style="list-style-type: none"> <li>1) Absence of reliable energy source (electricity) from national grids</li> <li>2) Lack of gas supply (in the short and possibly long term in Azerbaijan and Georgia)</li> <li>3) CO2 and GHG emissions</li> <li>4) Regulatory requirements particularly NOx and SO2 emissions</li> <li>5) Air quality requirements at nearest receptors</li> <li>6) Energy efficiency</li> <li>7) Logistical (transport) issues (reciprocating engines are very large)</li> <li>8) Lack of track record / experience with some options</li> <li>9) Capital and operating costs</li> </ol>	<p>For Azerbaijan and Georgia: dual fuel turbines, operating on distillate and subsequently on gas. Benefits include low NOx emissions, proven track record, and relatively easy conversion to gas.</p> <p>For Turkey: gas-fuelled reciprocating engines. Benefits include high efficiency and relatively low emissions due to gas operation.</p>
<b>Location of valve stations</b>	Variable locations, nominally at 30km spacings, adjusted to reduce environmental risk	<ol style="list-style-type: none"> <li>1) Environmental risk based on: <ul style="list-style-type: none"> <li>• historical pipeline failure rates</li> <li>• location of sensitive receptors (eg, surface water, groundwater, land use, natural habitats, archaeological sites)</li> <li>• calculated oil spill volumes</li> <li>• presence of natural and other hazards that could result in damage to the pipeline</li> </ul> </li> </ol>	Variable spacing resulting in reduced environmental risk by minimising the potential release volumes in environmentally sensitive areas.

**Table 6.7: Summary of Alternatives Assessment – Design Options** (continued)

Issue	Options	Key considerations	Preferred option and benefit
<b>Marine loading facility</b>	Jetty Single Point Mooring (SPM)	1) Environment and safety 2) Operational risks 3) Construction impact 4) Costs	Jetty: avoids need for 10-12km of offshore pipeline and associated disturbance to benthic habitats; streamlined operational procedures conducted under the control of a single management structure; lower potential oil spill volumes during loading operations; faster response to oil spills. Simplified and safer systems for vapour recovery.

### 6.3.1.2 *Marine loading facility*

There are two main concepts that can be used for loading hydrocarbon fluids on to ships for export: a conventional jetty structure or a single point mooring (SPM). These alternatives were examined during the basic engineering phase of the project.

Initially, the following criteria were applied:

- environmental considerations and risks;
- safety aspects;
- operational considerations and risks;
- construction impact; and
- cost considerations.

Subsequently cost was excluded from the evaluation.

Based on consideration of these criteria, the jetty solution was found to be the optimal solution for the BTC project (see Table 6.7).

### 6.3.1.3 *Construction materials supply*

A number of modes of transport have been assessed for transporting line pipe and other large items of equipment to and within the host countries. Options considered included:

- sea;
- land (rail and road);
- air; and
- a combination of the above.

Each option was evaluated in terms of accessibility, the quantities of pipe and material requiring transport, delivery schedules, safety, environmental impact and cost. An overriding factor in this assessment was the difficulty of accessing Azerbaijan by sea owing to the land-locked geography of the Caspian and the seasonal constraints on the operation of the Volga-Don canal.

It was determined that the best option was to import pipe and other large items of equipment into Georgia via existing ports on the Black Sea coast such as Poti and Batumi. These ports generally have good unloading facilities with road and rail connections for onward transport to the designated sites. Five ports in Turkey may be used to receive pipeline material: Mersin, Iskenderun, Samsun, Trabzon, and Hopa.

Rail transport is the preferred primary mode of transportation for moving pipe and equipment from the ports to the project areas, particularly in terms of fuel efficiency, air emissions, social impact, safety, noise and road congestion. Some upgrade of existing rail spurs will be required to improve the available infrastructure, and provide access to identified storage areas. In addition, the railway network in Azerbaijan and Georgia generally follows the pipeline route more closely than the road network. The condition of inland road infrastructure in all three countries is generally poor; in any case key access roads will require substantial upgrading to accommodate the anticipated vehicle loads and volumes.

#### *6.3.1.4 Construction camps, pipe yards and associated access roads*

Field surveys have identified a number of potential locations for construction camps, pipe yards and the associated access roads from these locations to the pipeline right of way (ROW). These potential locations have been subject to environmental and social assessment, and optimised accordingly. Community consultation has been conducted in areas adjacent to these sites.

If the construction contractor proposes any previously unidentified camps or storage yards they must undertake community consultation and environmental and social assessments of these locations to the same standard as the BTC project.

### **6.3.2 National and local-level routing**

As has been outlined in Section 4, the importance of a robust and thorough route selection process was recognised at the outset as being the key to avoiding and managing potential environmental and social impacts. This is reflected in the HGAs and route corridor evaluation activities.

Numerous field investigations were conducted of the defined 10 km corridor in order to determine the optimum location of the construction corridor. This process involved review of a wide range of issues and sometimes competing claims and interests. Processes and measures have been developed to manage and resolve these issues.

Key considerations and constraints that influenced the route refinement process are summarised in Box 6.9.

The final outcome is a route that meets the technical, environmental and social criteria for the project as well as avoiding the need to relocate any communities or households. The route avoids all internationally-designated environmentally sensitive areas, including all IUCN Category I to VI sites, as well as Ramsar (wetland) sites. It also avoids a number of nationally-designated protected areas, intensive agricultural regions, archaeological sites, and areas with known security concerns.

**Box 6.9 Considerations and Constraints in Route Refinement**

MACRO	<p><b>Avoidance</b></p> <ul style="list-style-type: none"> <li>Terrain and geohazards</li> <li>Security Issues</li> <li>Protected areas</li> <li>Population centres</li> <li>Constructability</li> <li>Land use</li> <li>Hydrology and hydrogeology</li> <li>Existing pipeline corridors (eg WREP)</li> <li>Major development projects (eg dams)</li> </ul>
MESO	<p><b>Reduction and minimisation</b></p> <ul style="list-style-type: none"> <li>River crossings and surface stability</li> <li>Natural habitats</li> <li>Communities and villages</li> <li>Archaeology and cultural heritage</li> <li>Intensive agriculture with long-term investments eg forests and orchards</li> <li>Infrastructure</li> <li>Excavation and proximity to borrow pits</li> </ul>
MICRO	<p><b>Optimisation</b></p> <ul style="list-style-type: none"> <li>Proximity to houses, villages and orchards</li> <li>Access to specified corridor</li> <li>Rehabilitation and compensation of acquired land</li> <li>Location of AGIs</li> <li>Canals and irrigation channel crossings</li> <li>Habitat fragmentation</li> </ul>

**6.3.2.1 The unique challenge of routing in Georgia**

Several possible routes were considered in Georgia: the Western Corridor, the Central Corridor and the Eastern Corridor.

Routing procedures throughout the project have involved extensive constraints mapping to ensure that risks of every kind are reduced to an absolute minimum. In some cases there has been a need for exceptionally painstaking research and analysis, involving many more iterations than would be normal, where numerous constraints conflict with each other. Such has been the case in parts of Georgia.

During assessment of geopolitical security constraints, initial consultation with the Georgian Government resulted in feedback suggesting avoidance of the administrative district of Akhalkalaki.

Issues assessed, in terms of impact, probability, risk and manageability, in the geopolitical security constraints analysis included:

- Terrorism;
- Sabotage;
- Military riot;
- Separatism;
- Civil unrest;
- Criminality;
- External influence; and
- Kidnapping

The assessment showed that risks were particularly high in this district. The Georgian Government's view that the Akhalkalaki was too high a security risk was then confirmed in writing in February 2003, in a letter from the President of Georgia addressed to the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD).

The Central Corridor passes through the Akhalkalaki Administrative District with close proximity to the Russian Federation military base and associated areas of activity. Although the corridor is further from the centre of this activity, as compared with the Eastern Corridor, the ability of central government or any outside party to exert influence over the area is restricted. This limits ability to prevent interference with construction or operational activities and to exert control of the pipeline Right of Way to ensure access for routine and emergency maintenance and guarantee integrity of the pipeline.

A security evaluation of the Central Corridor identified high levels of risk with low manageability, indicating an unacceptable level of overall risk for the pipelines. The Eastern and Western Corridors, however, were also rejected on the basis of a combination of very serious environmental and safety risks, as well as major economic challenges and geohazards.

Having rejected the main corridor options, BTC Co. began to study a corridor to the north of the Central Corridor that would not encroach on the Akhalkalaki District. The Georgian government supported this approach. This corridor became known as the Modified Central Corridor. Detailed research revealed that any pipeline corridor that must pass to the north of Akhalkalaki District is confined to a corridor lying between the Akhalkalaki district (to the south) and the Borjomi Kharagauli National Park and the State Nature Reserve (to the north).

When the severe terrain geohazards are superimposed on the area between Akhalkalaki district (to the south) and the Borjomi Kharagauli National Park and the State Nature Reserve (to the north), it is immediately apparent that BTC Co. has selected the only feasible corridor, skirting around an area designated as "severe" in terms of terrain and geohazards.

The Modified Central Corridor was therefore selected as the 10km Corridor of Interest. This route optimises the overall length which crosses relatively good pipeline terrain, minimises potential problems associated with scour at river crossings, gullies and landslides, maximises reinstatement potential and, at the same time, was assessed to be acceptable from a security standpoint.

#### 6.3.2.2 *Borjomi Groundwater – a site of particular vulnerability*

The Borjomi resort is the largest health centre in Georgia, and Borjomi mineral water has been famous for its therapeutic and drinking qualities since the early 19th century. Today, the mineral water business is still rapidly developing and demand for Borjomi mineral water is steadily increasing both in Georgia and abroad. The value of the Borjomi mineral water combines with the unique hydrogeology of the area to make the issue an exceptionally sensitive one.

As a result, there has been extensive evaluation of many alternative routes in an effort to avoid this unique region and to minimise the impact of the pipeline on the surrounding area. The area contains stunning landscapes, primary forests of high conservation value and sensitive water resources. The latter are particularly sensitive in the context of a pipeline development, because the surface waters around Tsikhisjvari drain into the Borjomola river that flows through the Borjomi mineral water park.

Alternative routes to the south of the Tsikhisjvari area have been evaluated as part of the detailed pipeline route development process. The terrain through these areas is extremely rugged with steep narrow rocky ridges, separated by valleys containing deep soils prone to erosion and inherent instability problems. Construction of two large diameter pipelines through this type of terrain would be extremely difficult. Major earthworks, blasting and removal of vast quantities of surplus material to establish a ROW would result in irreversible damage and unacceptable environmental impact to the surrounding area.

Reinstatement through this type of terrain is also very difficult due to the presence of rock, steep gradients, thin soils and high potential for erosion. The visual impact following reinstatement would be significant and the ROW would remain visible through areas of natural beauty.

Taking into consideration the constraints imposed by the rugged terrain to the north and the requirement to avoid the Akhalkalaki district (because of the presence of Russian military bases), the only feasible route through this part of Georgia is the selected route via the Tskhratskaro pass, Tsikhisjvari and the Kodiana pass. This route avoids the majority of rugged terrain and the final alignment has been chosen to maximise reinstatement potential.

#### *Precautions planned for pipeline construction and operation*

The overriding aim has been to eliminate any environmental risks identified, by good planning and design, or to reduce risks to the absolute minimum possible. The measures that have been integrated into the design, construction and operation of the pipeline in order to protect water resources from contamination, are believed to bring the project as close to 'zero risk' as possible. These measures have focused on:

- reducing the possibility of any pipeline failure which could result in a loss of oil;
- surveillance to ensure that, in the highly unlikely event that a loss should occur, it would be quickly detected and the amount of oil lost minimised by shutting down the pipeline and isolating any damaged sections; and
- developing effective response plans to contain any loss of oil and to prevent damage resulting from any incident.

Specific control measures include the following:

### *Pipeline failure*

- the detailed pipeline route has been selected to avoid the possibility of geohazards such as faults and landslides causing damage to the pipeline;
- the pipeline will have thick walls and be constructed of high grade steel;
- the pipeline will be buried to a depth of 1 metre to avoid accidental and collision damage;
- the steel pipe sections will have a special coating to prevent corrosion;
- a cathodic corrosion protection system will also be installed;
- an automatic sensor system will be installed to detect earth movements, illegal excavations or other third party intrusions;
- regular maintenance monitoring of the pipeline will take place to check for any internal or external faults; and
- a year-round, permanent, unarmed security presence equipped with all terrain vehicles and communication systems will patrol the pipeline route.

### *Loss detection*

- special marker tape with an electronic alarm will be used to detect breakage;
- pressure variations in the flow of oil will be detected by a supplementary automatic leak detection system, capable of responding to small subsurface leaks;
- additional monitoring of the pipeline by special patrols will take place;
- a year-round monitoring programme will check for the presence of oil contamination in groundwater reserves, drinking water supplies and Borjomola river water; and
- increased community awareness programmes will be established to assist in reporting any issues.

### *Loss containment*

- the central operations control facility will immediately shutdown the pipeline in the event of a leak being detected;
- in addition, two block valves and two check valves, installed between KP 176 and KP 194, will be closed in the event of a leak being detected and this would effectively limit the amount of oil that could be lost in the event of an incident;
- secondary oil spill/leak containment systems will be installed, designed to limit the spread of any losses of oil escaping from the pipeline;
- a comprehensive emergency response plan will be implemented by internationally-trained oil spill response personnel, stationed locally;
- the emergency response team will have access to specially designed oil spill response equipment strategically located in the area;
- the emergency response team will implement surface water protection measures that meet or exceed the requirements of the project spill risk assessment; and
- close liaison will be maintained with the commercial mineral water company and local villages in the event of a spill, to ensure that mineral water wells are temporarily shutdown and that vulnerable drinking water supplies are not used.

A performance-based approach will be used to ensure that the control measures identified are implemented effectively throughout the life of the project. This approach will

incorporate performance targets to be met by each contractor involved in the project and an audit procedure that BTC will use to ensure that these targets are met or exceeded. A series of Contractor Control Plans (CCPs) have been developed to cover specific areas of work by contractors. These plans describe in detail the approach that the contractor must follow to ensure that the environmental mitigation measures described in the source ESIA documents and approved by the national governments are successfully applied during the construction phase of the project. Contractors will be required to document a Contractor Implementation Plan (CIP) for all relevant activities, demonstrating exactly how the requirements of the corresponding CCP will be met. The CIP will be approved by BTC in advance of the contractor commencing work and will form the basis of regular auditing of contractor performance (see Section 6.3.6).

### 6.3.3 Residual impacts and mitigation

**Table 6.8 Summary of Predicted Residual Impacts Based on Significance Levels**

<b>Residual Impact</b>		<b>Azerbaijan</b>	<b>Georgia</b>	<b>Turkey</b>
Adverse	Soils	Low-medium	Low	Low-high
	Landscape and visual amenity	Low-high	Medium-high	Low-high
	Surface water	Low-medium	Low	Low
	Groundwater	Low-medium	Low	Low-medium
	Biological environment	Low-high	Low-high	Low-medium
	Air quality	Low-medium	No significant impact	Low-medium
	Noise and vibration	Medium	Low-medium	Low-high
	Traffic and transport	Low-high	No significant impact	Low-medium
	Archaeology and cultural heritage	No significant impact	No significant impact	Low-medium
	Socio-economic	Low-high	Low-high	Low-high
Beneficial	Soils			X
	Landscape and visual amenity			X
	Surface water			X
	Traffic and transport	X	X	X
	Archaeology and cultural heritage	X	X	X
	Socio-economic	X	X	X

### 6.3.3.1 *Environmental*

#### **Natural habitats and biodiversity**

##### ***Potential impacts***

The following potential impacts on sites and natural habitats of conservation importance have been identified and considered for the project area:

- temporary and permanent disturbance and loss of habitat and component species within and adjacent to the construction corridor and associated pipeline facilities, the marine terminal, and related infrastructure such as access roads;
- temporary and permanent fragmentation of habitats;
- temporary and permanent creation of barriers between areas of ecological value;
- drying out of wet areas due to alterations in the natural drainage régime;
- damage to adjacent habitat and species as a result of the incursion of machinery and personnel into nearby sites not directly required for construction purposes; and
- disturbance to adjacent habitats and species during construction activities due to dust generation, changes in air quality, noise, accidental spillage of potentially polluting materials and general human activity.

The long-term significance of these potential impacts will be limited as a result of careful route selection and refinement, and the adoption of a range of general and site-specific mitigation measures. Long-term recovery will also be dependent upon the successful re-creation of a stable landform, and the restoration of soils, their structure, chemistry and drainage characteristics. These efforts underpin the following generic mitigation measures and the complementary measures that are detailed below for each specific residual impact.

##### **Mitigation measures**

General mitigation measures that will apply are as follows:

- Seasonal factors will be taken into account when scheduling construction activities;
- Key sensitive species will be re-located prior to construction activities;
- The ROW will be reduced wherever practicable in areas of important conservation value;
- The ROW will be reinstated taking into account nature conservation issues, as well as recognising one of the primary aims of reinstatement which is to stabilise the replaced soils against consequent erosion;
- Special measures will be taken to ensure that the possibility of adverse effects on threatened or protected species, or on features of ecological interest, is minimised. These measures will be formalised in working method statements that will be agreed prior to the commencement of construction in those specific areas;
- Potential impacts associated with activities that might disturb sensitive species, including blasting, will be avoided wherever practicable, or minimised, through the careful management of construction activities and personnel, and appropriate scheduling of works. For example, seasonal constraints will be imposed at certain river crossings to avoid disturbance to migrating and spawning fish;
- At the commencement of construction, the ROW will be clearly delineated by signs (and in some cases such as near villages, by the use of exclusion fencing); and

- The workforce will not be allowed to undertake leisure activities (such as lighting camp fires, barbecues, etc) or to hunt.

Significant efforts have been taken to avoid areas of high biodiversity, primarily through route selection and careful siting of AGIs. It is recognised, however, that there will be some unavoidable potential impacts on natural habitats. In line with BP policy and to meet the requirements of the IFC on Natural Habitats (OP 4.04), extensive direct mitigation measures aimed at the removal or reduction of potential adverse impacts on natural habitats or their functions have been developed and will be implemented during the project execution. These include measures to restrict conversion (narrowing the ROW in sections of forested areas), restore degraded habitats (eco-compensation through replanting a suitable number of trees for those cleared from the ROW), and strategic species retention (translocation and propagation of rare species) among others. Additionally, reinstatement practices will also ensure that effects on natural habitats are minimised through adherence to erosion control and bio-restoration standards.

In addition to the above direct mitigation and management measures, an Environmental Investment Programme (EIP) is being developed in order to go beyond direct mitigation by investing in offset projects, and in doing so, meet BP's commitment to maintaining and enhancing biodiversity (see Section 7).

## **Residual impacts**

### ***Azerbaijan***

The extensive nature of the Gobustan desert and the proposed Gobustan State National Park, and their proximity and position that has them substantially surrounding the Sangachal Terminal, means that it is not possible to completely avoid these areas with any pipeline route originating at the terminal. The Gobustan Cultural Reserve acts as a further constraint and while the Reserve has been designated for its cultural heritage (specifically rock art sites) the area does encompass desert habitat with some ecological value, although the area is heavily degraded in places. Also, avoiding the Cultural Reserve would have added a further 12km to the length of pipeline directly affecting the proposed State National Park.

In accordance with the project approach, alternative routes have been assessed (Sections 4.0 and 6.3.2) to minimise the impact on the sensitive natural habitats that characterise the area. The outcome of this process is that the pipeline will cross through 19.5km (KP0-19.5) of non-designated, but botanically sensitive, desert habitat, and 9km of the proposed State National Park (KP19.5-28.5). The 9km sector is the shortest route across the proposed park. It is also relevant to note that the areas crossed by the pipeline route are significantly degraded in places due to human activity including grazing, off-road traffic, and military uses. The area also accommodates other pipelines.

The general mitigation measures outlined above will considerably reduce impacts on the habitats and soils of the desert, but the residual impact on the Gobustan desert habitat is classified as 'high' as it is expected to take over 10 years to fully reinstate.

In order to minimise the impact on the Gobustan desert, various alternative working methods have been considered, including:

- topsoil stripping the entire ROW, storing the topsoil and then reinstating; and
- only removing topsoil from the trenchline and running vehicles directly on the existing vegetation.

For the section between KP5-27, the second alternative is proposed because:

- it allows a reduction in the ROW and therefore the extent of habitat disturbance;
- the topsoil horizon containing the seed bank is particularly thin in this area, so it reduces the risk of topsoil and subsoil mixing and therefore dilution of the seedbank; and
- it reduces the risk of wind erosion which would also deplete the seedbank.

From KP27-28.3 (the edge of the proposed Gobustan State National Park) the ROW will be dictated by the definition of a safe working platform along the mud volcano ridge.

After installation of the pipeline the ground will be lightly scarified. Re-vegetation will be primarily by germination of indigenous seeds entrained in the topsoil, but may be supplemented by seeding with locally sourced material or with a standard grass mix plus some planting out of desert species developed in local nurseries, initially from root cuttings. A specialist in the reinstatement of arid environments is currently evaluating potential seed sources, application methods and sowing rates. Information from this study will be supplied to the construction contractor and will be incorporated into the detailed reinstatement plan for Gobustan and appropriate Contractor Control Plans (CCPs).

The recovery of the Gobustan desert habitat will be monitored during the operations phase until fully reinstated. Corrective action will be taken as necessary to ensure that the developing flora reflect adjacent undisturbed areas.

In addition to the above direct mitigation measures, in order to meet the 'no net loss' principle reflected in IFC Natural Habitats Policy 4.04 and the project's environmental goals (Box 6.7), the management of an area of desert habitat outside the project area is under consideration as part of the EIP (see Section 7) and would offset the temporary habitat loss within Gobustan.

### **Georgia**

The two most important areas in Georgia where high-ranking residual impacts to flora will occur owing to clearing of the ROW are Tetrtskaro (KP84-92) and Tsikhisjvari/Sakire (KP182-204). The overall area of forested area impacted by the ROW is approximately 55 ha. The forest is also an important habitat for a range of animals.

The clearance of forest along the ROW will necessarily mean that a large number of trees of high conservation value will be lost. Mitigation of impacts will only be partially achievable through conservation, with net losses being compensated through the eco-compensation program which will rehabilitate forest habitats off the ROW.

Other high-level residual impacts are predicted to occur on a small area of natural habitat located in the Potskhovi area at the Potskhovi North River Crossing (KP238-238.5). Construction activities will result in the loss of riparian habitat for an overall width of approximately 100m. The habitat will be permanently lost within the immediate vicinity (4m either side) of the installed pipeline. The riparian vegetation is of medium-to-high conservation value. The species present in the area include willows (*Salix alba*, *S. triandra*), poplar (*Populus nigra*) and alder (*Alnus barbata*).

A population of the GRDB species globe-daisy (*Globularia trichosantha*) is also present in the Potskhovi region and the area is known as an important feeding ground for bird populations and an important habitat for fish. Pasque flower (*Pulsitilla georgica*), a GRDB listed species, also occurs in forest meadows at Tetrtskaro, while populations of endemic squill (*Scilla rosenii*), gentian (*Gentiana angulosa*) and snowdrop (*Galanthus caucasicus*) (proposed GRDB) occur in meadows in the area from Tkhrastskharo Pass to Kodiana.

Construction of the ROW will also require the removal of several hectares in total of rhododendron scrub on the slopes of Mt Taukvetili (KP151-157). This scrub is habitat for the protected Caucasian black grouse (*Tetrao mlokosiewiczii*) and its removal could potentially result in a high-level faunal impact. Specific mitigation measures will include the removal of the habitat prior to the breeding/nesting season in order to minimise the loss of individuals during construction. The habitat will be restored as part of reinstatement activities and study of the threats to Black Grouse and their habitat, which are not well understood in Georgia, will be undertaken as part of the EIP.

The following specific measures will be adopted to mitigate the effects of construction in the areas described above:

- Undertake pre-clearance surveys to identify, transplant or otherwise manage rare and endangered botanical species and fauna that are likely to be affected by the clearance operations. In the case of the black grouse, ROW clearance prior to the breeding/nesting season will minimise any loss of individuals;
- Mark individual trees and shrubs of high conservation value and preserve wherever possible;
- Small branches from trees felled along forested areas of the ROW will be provided to local communities for firewood. A suitable number of trees will be replanted for every tree felled as part of the ROW clearance operations. To ensure adequate habitat restoration, compensation planting at a ratio of 1.5:1 will be carried out (ie, 150 trees will be replanted for each 100 trees felled); and
- Local tree species will be used for compensation planting.

#### 6.3.3.2 Soils

##### **Potential impacts**

The most significant potential impact to soils will be changes in structure and quality as a result of erosion and compaction. Whether the soils undergo erosion or compaction, and the extent to which it occurs, will be dependent on their properties.

The following potential impacts may cause changes in soil structure and quality:

- removal and storage of topsoil may lead to minor changes in soil hydrology and small changes in the topsoil structure;
- provision of access along the ROW, and vehicle movement along it, may result in localised compression of subsoils;
- excavation during construction may lead to localised changes in soil structure;
- compaction of subsoils may alter drainage patterns and lead to increased waterlogging and surface ponding;
- accidental spillage of fuels and lubricant oils presents a potential contamination hazard to soils; and

- disturbance of potentially harmful materials in the areas previously used as landfill sites may result from excavation activities.

In some cases, soils may be further disrupted by construction close to the banks of watercourses. The loss of riparian vegetation will further reduce the stability of the soil along the banks. The resultant eroded soils may increase sediment loads in the water.

### **Mitigation measures**

The measures that will be used to minimise the extent to which soils are adversely affected during soil stripping and other construction activities, and which will be included in method statements and working practices as appropriate, are as follows:

- Effective drainage and construction procedures will be developed and implemented;
- Appropriate machinery and/or protective boarding will be used to prevent compaction during soil stripping (for example, machinery with tracks will be used where the soil conditions indicate that compaction is likely; should any compaction occur, the subsoil will be ripped prior to the replacement of topsoil);
- Top and subsoils and any parent material removed will be separately stripped, handled, stored and replaced;
- Soil stockpiles will be restricted to a maximum of 2m in height to prevent compaction under the weight of the soil;
- Topsoil storage periods will be kept to a minimum;
- Additional procedures will be employed for dealing with any compaction along the ROW or in other areas that might affect agricultural restoration (eg, subsoil ripping);
- Temporary drainage and water supplies will be provided where existing services will be disrupted. Drainage and water supplies will be fully reinstated on completion of construction activities;
- Arrangements will be made for the monitoring and aftercare of the ROW; and
- Measures to reduce the mobilisation of silt, such as covering stockpiles and constructing silt fences, will be undertaken where necessary, particularly on slopes, adjacent to sensitive habitats and land uses, and in the vicinity of watercourses.

Prior to the replacement of subsoil and topsoil, the contractor will ensure that these layers have been correctly stripped and stored in accordance with the requirements set out above and reflected in the CCPs. The following reinstatement principles will be adopted:

- Areas disturbed by pipeline construction activities will be restored to pre-construction conditions (eg, contours) to the greatest extent possible;
- Soils in disturbed areas will be stabilised, using both temporary and permanent controls, to protect the integrity of the pipeline and minimise the potential sediment and erosion impacts;
- Topsoil will be handled and stored to retain soil structure, viability of its seed bank, and its fertility;
- Topsoil and subsoil operations will be carried out in a way that minimises the risk of soil loss down-slope and into watercourses;
- Bio-restoration of disturbed areas will be designed to match pre-disturbance conditions;

- Surplus excavated material will be disposed of in an environmentally acceptable manner; and
- Reinstatement will be monitored until environmental requirements and goals have been achieved.

The pipeline contractor will reinstate the full width of the BTC ROW as the base case. Should the SCP be built immediately after the BTC pipeline, full reinstatement will only be carried out on areas that will not be disturbed by the SCP construction activities. Interim reinstatement will be carried out over the remaining portion of the ROW to cover the period between the installation of the two pipelines. If there is a delay of more than 12 months between carrying out interim reinstatement and the start of the SCP construction, then the whole of any section that is subject to potentially severe or very severe erosion will be fully reinstated.

Reinstatement of disturbed areas other than the ROW (eg, temporary facilities) will commence upon the removal of the facilities.

### **Residual impacts**

#### ***Turkey***

The principal residual impacts to soil will be increased potential for erosion and loss of soil productivity. The severity of these impacts will depend largely on the soil type and the stability of the pre-existing land surface.

Tuff and marls are soils that are particularly vulnerable to erosion, both in terms of their physical attributes and difficulties associated with reinstatement. Tuffs are derived from volcanic ash and are inherently infertile. They occur across large areas of north-eastern Turkey where they support low-density coniferous forest, xeric shrubs and coarse grasses. Marls are calcareous clays – they are more fertile than tuff and as a result support rain-fed agriculture. Erosion of marls can be intense.

Table 6.9 summarises where soil degradation due to the erosion of tuffs and marls has the potential to result in high-level residual impacts. Specific mitigation measures designed to limit the impacts are also outlined, although it should be noted that the measures employed will vary from site to site, depending on the nature and severity of the impact.

The BTC pipeline will be constructed generally parallel to the recently constructed East Anatolian NGP for approximately 331km of its length from KP263-692. Distances between the two laid pipes will be generally in the range of 12-18 m. In a number of areas pipeline installation has caused noticeable impacts in terms of land degradation (erosion, soil productivity and visual appearance) and damage to banks at some river crossings.

**Table 6.9: Residual Impacts on Soils (Turkey)**

Potential Impact	Location	Mitigation
Reduced soil productivity, soil erosion, erosion causing mobilisation of sediments, altered drainage	<p>Pipeline construction on mesic coarse-loamy Entic Dystrandep soils wherever tuff dominates the landscape will potentially give rise to major residual impacts between KPs 0-10, 16-45, 85-137, 156-171 and 192-238.</p> <p>Marl occurs as hills, plateaux and plateau scarps, and plains. Plains soils are classed as agricultural lands. Marl soils that are too steep to play a role in rain-fed agriculture, although they may support grazing, are generally present between KP 617-647.</p>	<p>Specified as 'Special Areas' in the BTC Reinstatement Plan, these are two typical soils that will require special attention during construction and reinstatement. Topsoil thickness will be established so that it can be stripped to a depth that minimises the degree of mixing with the unproductive subsoil. For tuff, shrubs and coarse grasses will be set aside for replanting.</p> <p>For marl, input on the most appropriate site-specific measures to be employed will be obtained through expert and landowner (or land user) consultation.</p> <p>In all instances, and throughout the work, soils specialists will be included in the on-site environmental management team. Even with these measures there is still a degree of uncertainty over how such fragile soils will respond to construction disturbance and reinstatement, and how quickly they will recover. A post-reinstatement programme of monitoring and after-care will be implemented so that any problems that arise can be rapidly remedied.</p>

The BTC project has developed a two-phase approach to reinstatement in the vicinity of the East Anatolian NGP. Phase I will entail the construction contractor undertaking remedial reinstatement measures prior to the commencement of BTC pipeline construction in order to remediate existing problems. Phase II will involve the BTC contractor undertaking any additional mitigation measures in specific areas across the two parallel pipeline corridors.

Specific areas identified as requiring restoration measures prior to, or during, reinstatement of the BTC pipeline, are as follows and will be fully addressed in accordance with the project Reinstatement Plan:

- General reinstatement;
- Adjacent agricultural land – for example, in areas of poor topsoil management;
- Hill slope reinstatement – for example, installation of slop breakers across entire parallel corridors;
- Erosion – for example, in areas of rill and gully development; and
- River crossings – for example, bank and bed erosion.

Actions designed to restore the East Anatolian NGP ROW will result in an indirect positive impact. However, the subsequent development of the BTC ROW is likely to result in significant residual impacts as reduced soil productivity and limited topsoil development in many areas will make reinstatement difficult, notwithstanding the proposed mitigation measures.

### 6.3.3.3 *Landscape*

#### **Potential impacts**

Potential landscape and visual impacts resulting from the construction of the pipeline and the establishment of temporary and permanent AGIs are broadly those that will result from physical changes to the landscape through which the pipeline will pass, and those which affect the visual amenity of the residents and others in the project area.

Impacts to landscape and visual amenity can also have potential indirect impacts, eg, to tourism.

Short-term impacts will result from:

- the stripping and temporary storage of topsoil along the ROW and at the sites of AGIs, and creating a corridor across the landscape, whose visibility will be dependent on local landscape character and the type of land cover to be reinstated at any given location;
- interruption of agricultural use of the ROW;
- disturbance to landscape features such as mature trees and habitats such as watercourses; and
- vehicle movements and the presence of construction teams, equipment, pipe yards and camps along and near the ROW throughout the construction phase.

Recovery rates will depend on the success of the reinstatement, especially of soils, and in turn the recovery of vegetation and the overall 'natural' appearance of the land. Local conditions will influence the ability of an area to revert to its original condition.

Long-term impacts will result from the presence of permanent structures such as pump stations and other AGIs, and sections of the ROW that are difficult to reinstate and that pass through forest areas, particularly at elevated and exposed locations.

#### **Mitigation measures**

Mitigation has included routing the pipeline and restricting the ROW to minimise the removal of mature trees and disturbance to watercourses. Similarly, landscape and visual amenity issues were taken into account when determining the best location for temporary construction facilities and the AGIs.

Further mitigation of landscape and visual impacts resulting from the pipeline project will be addressed primarily through the following activities:

- Wherever practical, individual mature trees will be avoided during the detailed consideration of the final alignment for the route;
- Wherever practical, the ROW will be limited to the minimum required for construction purposes in response to identified local sensitivities as specified on alignment sheets, and with due regard to safety; and
- On completion of works, all temporary structures, surplus materials and wastes will be completely removed.

Physical terrain, soils and vegetation will be reinstated as closely to their original condition as is practically possible. The success of this will be critical in determining the extent to which landscape impacts endure post-reinstatement.

Where the removal of existing landscape features (such as trees, shrubs, etc) is necessary, the species selected for replanting works will be appropriate and characteristic of that particular landscape area. Replanting works will also be carried out in a way that ensures that root growth will not compromise the integrity of the pipeline.

Landscaping plans will be developed for major AGIs, associated access roads, and areas of high landscape value where the residual impacts are potentially high.

## **Residual impacts**

### ***Azerbaijan***

At the locations along the route where extensive grading is required to provide a level working area, the residual impact of pipeline construction on topography is classified as high, since it is a permanent change. This particularly applies to the Mud Volcano Ridge area (KP26-28), the approaches to the Tovuzchay and Asrinchay Rivers (KP375.6-377), and the approaches to the Hasansu River (KP395.9-398).

The visual impact in these areas will be minimised by:

- Reducing the separation distance between the BTC pipeline and SCP (see Section 6.3.4, Cumulative Impacts);
- Dual lay of the BTC pipeline and SCP;
- Considering potential visual impacts when selecting spoil disposal locations if required; and
- Grading the edges of the levelled platform where practical.

At these locations it will not be possible to return the topography to its pre-existing form as this may exacerbate erosion risks and make access along the pipeline for inspection, maintenance or emergency response more difficult.

Immediately following construction the significance of the residual impact on the landscape and visual amenity around the future pump station PS-A2 is assessed as being 'high'. This will reduce to 'medium' after approximately five years once the proposed landscaping has developed and visually breaks up the outline of the facility. More extensive screening is not considered appropriate because trees are sparse in the local landscape. While it has been possible to locate the pump station itself on unutilised municipal land, the adjacent land is of agricultural value.

### ***Georgia***

High significance landscape impacts owing to the permanent modifications of high value landscapes are predicted to occur at the following locations:

- Tetrtskaro (KP84-92): permanent modification of forest landscape as a result of ROW construction and construction of the pump station PS-G2;
- Tskhratskaro pass to Sakire (KP175.5-204): permanent modification of forest landscapes;
- Mtkvari River West crossing (KP221): permanent modification of riparian landscape as a result of ROW construction; and
- Potshkovi River North crossing (KP238): permanent modification of riparian landscape as a result of ROW construction.

Landscaping plans will be developed for these areas as part of the standard suite of mitigation measures for areas of high intrinsic landscape value.

### **Turkey**

From the Georgian border to KP18, there will be a local, major visual impact where the pipeline exposes whitish tuff parent material. At a distance this will appear as a white line across the landscape. This impact will extend beyond the short term but will be reversible according to the degree of success of the soil reinstatement and recovery. While the impact will be mitigated as far as practicable through reinstatement, there will be a major residual impact, particularly in the hills around Posof, as standard reinstatement is unlikely to be fully effective.

Similar effects are predicted to occur where pale-coloured sandy-skeletal Cryochrept soils overlying tuff or parent material in low-lying areas are exposed during construction. These conditions occur between KP18-40, 100-115 and 154-197.

The scale of impact declines south of KP40 and is expected to be moderate-to-major between KP178-197 as visibility will depend on the precise location and character of the landscape. The impact is anticipated to be less pronounced in more intensively farmed and vegetated areas. However, the impact will be regional on the basis of its repetition through several landscapes.

As the land rises into the Allahuekber Mountains between KP115-134, the greater diversity of landform and land cover enhances the visual interest of the scenery and increases its sensitivity to change. Exposure of parent materials along this section of the route will create a highly visible strip, which will be mitigated to some extent on affected grasslands by the application of fertilisers on disturbed areas to encourage re-growth. The visual impact will persist in the short-to-medium term (from one growing season up to five or six years thereafter) across shallow-soiled grasslands.

As stated above (Section 6.3.3.2), the East Anatolian NGP ROW was not fully reinstated following construction. Proposed reinstatement works will occur before the beginning of the BTC construction programme, and lead to indirect positive impacts.

#### **6.3.3.4 Land and Community**

The main areas of potential impact on communities affected by the project are:

- land take and restriction of land use;
- employment and procurement of local goods and services (discussed in section 6.3.3.6, below);
- impacts on infrastructure and services;
- risks to health and safety of local people; and
- nuisance from noise and vibration.

The positive impacts of a major infrastructure development project such as BTC are often concentrated at the national level in the form of economic and strategic benefits. The ESIA process and associated work carried out more recently by the project have focused on identifying the areas where the project can bring more local benefits.

### *Land issues*

#### **Potential impacts**

While the project is designed to avoid any physical relocation of dwellings, it will disrupt (mostly temporarily) land use activities and the livelihoods of a large number of households to varying degrees. A “Resettlement Action Plan” has therefore been developed, conforming to World Bank/IFC standards, covering the associated mitigation measures. The main impact will be temporary disruption of cropping and grazing activities during construction and some permanent utilization of land for above ground facilities.

#### **Mitigation Measures**

The RAP is in 4 parts:

- Part A Overviews;
- Part B Azerbaijan;
- Part C Georgia; and
- Part D Turkey.

Part A Overview provides a summary of land acquisition and resettlement arrangements for the overall project. Parts B, C and D describe in detail the land acquisition and compensation frameworks to be applied in Azerbaijan, Georgia and Turkey respectively. In addition to the core RAP documents (Parts A-D), a plain language *Guide to Land Acquisition and Compensation* was produced for each country and made available in locally accessible locations along the pipeline route.

**The overarching goal of the RAP is ‘to ensure that people and enterprises affected by the project are compensated in accordance with good international practice (including World Bank/IFC policies and guidelines), and have the opportunity to fully restore or improve their living standards and income earning capacity to at least pre-project levels’**

This goal will be realised through meeting the following objectives. The project undertakes to:

1. Avoid physical relocation of people and their dwellings;
2. Minimize impacts on productive land and peoples’ livelihoods;
3. Undertake land acquisition through negotiation with affected landowners, users, and occupiers thereby avoiding the need to exercise powers of eminent domain, except as a last resort;
4. Pay fair compensation based on market value, full replacement cost or loss of income, as the case may be, for (i) temporary use of land for construction purposes; (ii) permanent acquisition of land; (iii) any loss of immovable assets; (iv) any loss of livelihood; and, (v) any restrictions on use that may limit productivity of land on areas adjoining the pipeline corridor and AGIs;
5. Carry out project land acquisition and resettlement in accordance with the laws and regulations of the transited countries, including the applicable Host Government

Agreements (HGAs), and in accordance with World Bank/International Finance Corporation (IFC) policies and guidelines on involuntary resettlement;

6. So far as possible, and subject to such restrictions on use as may be necessary to ensure public safety and integrity of the pipeline, to allow land owners and users to resume their pre-project agricultural activities on project affected land following construction completion;
7. Pay particular attention to vulnerable and disadvantaged groups including those without formal title to land, and where necessary to proactively implement measures to ensure they are not further disadvantaged and that they have equitable access to opportunities and benefits provided by the project;
8. To fully disclose the RAPs and to conduct ongoing full and thorough consultation with affected people during the land acquisition and reinstatement process and afterwards;
9. To provide straightforward avenues for people to lodge any complaints about the project and obtain redress;
10. Monitor the full and effective implementation of the RAP; and
11. Wherever possible, explore avenues for affected people to participate and benefit from the project's construction and operations.

Budgeted compensation levels for permanent land acquisition, temporary land use, loss of income from crops/grazing land, temporary loss of access, restrictions of use, lost structures and land attachments, agricultural land reinstatement, road and infrastructure reinstatement (as defined in RAP Parts B,C and D) are \$14,327,000 for Azerbaijan; \$8,600,000 for Georgia and \$79,700,000 for Turkey.

Roles and responsibilities for land acquisition, compensation and livelihood restoration are different in each country. Roles are defined by the Host Government Agreements (HGAs) that legally establish the respective obligations of each participating government and BTC Co. BTC Co. has also involved independent NGOs in each country to provide third party verification of the fairness and transparency of land acquisition proceedings, and to assist project affected people to understand their rights and obligations, and provide advice during negotiations, where necessary.

In **Georgia** and **Turkey**, a key mechanism initiated by BTC Co. to address gaps between local legislation and World Bank Group principles has been the establishment of 'RAP Funds'. In Azerbaijan, there has been no need to establish a RAP Fund, as the government has agreed to compensate in accordance with World Bank principles, even in cases where these exceed requirements under Azeri law. In Azerbaijan, very limited forest areas are affected by the project, and these are not generally utilised by local communities.

RAP Funds will be implemented according to following principles:

- They will be directed towards meeting OD 4.30 principles;
- They will be utilized in circumstances where local law does not provide for compensation;
- They will be supplemental to other household compensation entitlements for loss of land, assets and livelihood; and
- Funds will be disbursed taking into account the needs and preferences of affected people, or communities, as the case may be.

### Residual impacts

The project will result in the permanent loss of some agricultural land, as detailed in Section 5.23. Any loss of livelihood will be fairly compensated using the procedures established in the RAP.

**Table 6.10 Land Acquisition Progress to Date**

Milestone	Azerbaijan	Georgia	Turkey
Local disclosure of GLACs commenced	7 October 2003	28 October 2003	14 October 2003
Local disclosure of country RAPs commenced	13 December 2003	31 December 2003	12 December 2003
Commencement of land negotiations	Late November 2002	Early December 2003	11 November 2003
Signing of first land agreements	19 December 2003	Late January 2003	11 November 2003
Commencement of compensation disbursement	1 April 2003	Late January 2003 (Concurrent with agreement signing)	6 January 2003
Status as at 31 March 2003	100% of agreements for temporary use of land signed  Cash disbursement to commence 1 April 2003  46 land purchase agreements started - complete by end of April 2003	1,173 (40%) of agreements signed & compensation disbursed	10,890 land owners signed agreements. About 70 percent of these have received compensation. See RAP Part D Annex on Article 27 Implementation for more detail.
Projected completion of agreement signing and compensation payment	Late June 2003	Late June 2003	March-April 2004
Construction commencement	Late April / early May	Late April / early May	15 April 2003 (lot C)

A positive residual impact will be the clarification of the land tenure status of those lands that intersect the pipeline (within the construction corridor) without legal title deeds, particularly in Turkey. In order to award compensation payments, such legal clarification is required. This includes the ownership rights of heirs who have not registered their

inherited rights to land, and customary ownership rights. Clarifying land tenure status allows owners to use their land as collateral against which they can borrow money to invest in improving their future livelihood. It also helps to prevent future conflicts from arising over land rights.

### *Impacts on infrastructure and services*

#### **Potential impacts**

- Use by the project could worsen the existing roads and supply of water and energy to local communities; and
- Opportunities exist to use the project infrastructure to improve local infrastructure.

#### **Mitigation measures**

Associated gas from the ACG project is owned by the Azerbaijan government, and it could supply Baku area power stations. The provision of Shah Deniz gas to Georgia as agreed under the HGA could be sufficient to generate about 20% of Georgia's winter peak load needs, or 80% of Tbilisi's peak load needs after the initial build-up period. In addition, revenues earned by the governments from project operations could help support energy infrastructure investments. However, the Governments recognise that sustained improvements in access to energy in Azerbaijan and Georgia will depend primarily on effective reform of the energy system, to address the existing technical, institutional and commercial constraints while providing a social safety net for disadvantaged people. The projects have already provided technical assistance to Azerbaijan to assess its gas infrastructure, which led to the development and implementation of a master gas plan. Similarly, management and technical assistance to Georgia is being provided to help the Government address its winter energy needs.

Some individual project partners have contributed to the winter heat assistance programme in Georgia, although continued financial assistance will not lead to sustainable improvements. As part of the projects' community and social investment programme, opportunities may also arise to work with local communities on a small-scale to help meet local community energy needs.

#### **Residual impacts**

The project will not make any existing infrastructure worse, as it will provide its own water, energy production and waste management, independently of community services. There may be temporary damage to roads, but roads will be restored to at least as good a condition as there were in before the project.

Significant benefits for local settlements will be realised should BTC Co and other parties be successful in linking project infrastructure needs into existing infrastructure and service plans (eg, road upgrades, sewage treatment, waste management and water supply), thus resulting in long-term benefits for local communities. These opportunities are particularly strong in relation to settlements that are located close to pump stations and have very limited infrastructure. Efforts by BTC Co to link infrastructure in this way will deliver additional benefits by strengthening relationships with residents and local communities.

## *Improved health awareness*

### **Potential impacts**

An influx of construction workers into an area can bring an increased risk of disease and infection to the local communities, and to the workers themselves. Health and safety standards on the project will be upheld to BP's international standards of excellence.

### **Mitigation measures**

Measures will include the training of all workers employed on the BTC project – including those from local communities – in health and safety (including hygiene and transferable disease awareness). In addition, the project is committed to working with district and provincial health authorities in awareness-raising on health issues for settlements close to construction camps and pump stations (via posters, leaflets, health clinics, community meetings).

### **Residual impacts**

Health risks to local communities should not be higher as a result of the project.

The mitigation measures will deliver benefits to local settlements in terms of raising awareness of important health issues.

## *Nuisance from Noise*

### **Potential impacts**

Construction of the pipeline will include the following noise-generating activities:

- ROW preparation and soil stripping;
- trenching and blasting;
- pipe stringing, welding and laying;
- backfilling; and
- movement of vehicles.

Generally, these activities involve mobile plant moving along the pipeline ROW. Construction activities will not occur continuously but in phases, with peaks of activity separated by longer periods of relative inactivity. Each construction team will progress along the works at an average of between approximately 700m and 1,000m per day, depending on local conditions. Each team will follow the previous activity after a period of a few days and will pass by at a similar rate of progress. At certain locations (primarily where the pipeline crosses roads or railways) trenchless crossing methods may be used. At these sites, activities could last in the order of three to four weeks (ie, the period from initial mobilisation to the equipment leaving the site). Noise-generating activities will occur intermittently, generally during the day. Sheet-piling may also be required for trenchless crossing locations, but during the daytime only. Sheet-piling can also give rise to vibration. However, levels of vibration generally fall to levels that are not perceptible beyond 100m.

Blasting may also be required in certain areas where rocky substrates prevent trenching by other means. This may give rise to noise and vibration at receptors located within the vicinity of the pipeline works.

Other potential sources of noise impact include fixed plant operating at night for limited times and durations (eg, generators for lighting or pumps).

After pipe laying, the line will be hydrotested. Provided that normal standards of noise control are in place (eg, exhaust silencers and acoustic screening if necessary), noise levels would be expected to be no greater than from the activities on the ROW. However, hydrotesting will take place on a continuous basis over a period of several days and attention will be paid during detailed design to ensure that pumps are appropriately located and acoustically screened if necessary, particularly with regard to night-time and weekend operation.

Construction noise will also have a potential disturbance effect on certain fauna. The significance of such effects is extremely difficult to predict since it can vary between species, individuals within a single species, and according to the time of year, seasonal animal activity (breeding, etc) and location/habitat type. Noise alone is not generally a critical factor and it is usually only when noise is accompanied by a perceived threat (eg, human movement) that fauna react. Reactions will be variable – some species may become acclimatised, others may temporarily leave the immediate working area.

### **Mitigation measures**

The mitigation measures described below will be employed during construction in the vicinity of noise-sensitive receptors (eg, residential dwellings and schools) to ensure that adverse noise impacts are avoided:

- Night-time work will be kept to a minimum and will be discussed and agreed in advance with BTC Co, or its nominated representative, and the relevant authorities and communities;
- A limited number of construction activities may have to continue on a 24-hour basis. These may include trenchless river crossings, hydrotesting, and other commissioning activities. Approval of the relevant authorities will be obtained prior to commencement of any night-time works. If required, additional noise-reduction techniques will be implemented in order to minimise the disturbance;
- Community consultation will be carried out to determine local sensitivities to noise; and
- Seasonal factors relating to animals (eg, breeding season) will be taken into account when scheduling blasting activities.

Noise emissions from construction plant will adhere to local requirements or World Bank standards, whichever is the more stringent.

### **Residual impacts**

#### ***Turkey***

Noise impacts are expected to occur during all phases of pipeline construction at the Yaylakent Sub-District Centre in Cayirli District, Erzincan Province. Yaylakent is located approximately 26m from the centreline of the pipeline route. Major noise impacts are expected to occur during all phases of construction at Yaylakent due to the proximity of the village to the pipeline route, although the application of mitigation measures will reduce the potential for disturbance for some phases. The duration will be short and the impacts temporary.

The settlement of Pirdede (Imranli District, Sivas Province) is located approximately 86m from the centreline of the pipe and is also located adjacent to a crossing of the East Anatolian NGP. Residents in close proximity to working areas will experience similar

impacts to those described above. Pirdede is also located within 100m of piling activities, so vibration impacts could also occur at the nearest properties.

Similar noise impacts are also expected to occur at Keklikoluk (Goksun District, Kahramanmaras Province) during all phases of the pipeline construction and at Mehmetbey (Goksun District, Kahramanmaras Province) during soil stripping, welding/lowering, backfilling, bending and trenching. Blasting works will also give rise to noise and vibration at Keklikoluk.

Similar impacts will also occur to noise-sensitive receptors at Kastal (approximately 100m from the centre of the pipeline and close to a provincial highway crossing) during soil stripping, welding/lowering and backfilling, and during excavation and piling works associated with the highway crossing. Blasting will also give rise to noise and vibration at Kastal.

The following specific mitigation measures will be applied to minimise residual impacts:

- use of silenced/low-noise construction plant and machinery;
- provision of routine checks and maintenance to ensure that the plant is operating efficiently and not giving rise to high noise levels;
- agreement on all hours of work with the relevant communities (and, as required, relevant authorities) prior to the commencement of works;
- siting plant and machinery away from inhabited buildings;
- use of existing screening, as well as that arising from the stockpiling of materials and spoil, wherever possible; and
- consideration of alternative accommodation provision for affected residents during certain construction phases.

The construction contractor will develop site-specific noise mitigation measures, such as the use of mobile noise barriers, for the duration of these activities. The contractor will also monitor the effectiveness of these measures and demonstrate that impacts will be minimised to the greatest extent possible as part of the Pollution Prevention and Control Plan.

#### *6.3.3.5 Social and Economic impacts*

The major residual social/economic impacts concern the following issues:

- Employment and procurement;
- Community and social investment (covered in section 7);
- Transparency and good governance; and
- Human Rights concerns.

## *Employment and procurement*

### **Potential impacts**

The greatest positive socio-economic contribution that the BTC pipeline project can bring to local settlements is direct employment and the stimulus that local purchasing can bring to the local economy. Employment estimates are summarised in Table 6.11.

Employees will directly benefit from secure, although short-term, income and will gain skills and experience that will assist them in seeking other employment. Local settlements will further benefit from the money spent by the workforce.

### **Mitigation measures**

The project has committed, wherever possible, to the preferential use of local workers and purchase of local goods and services. The key issues in determining the level to which this boosts local economies are the total number and duration of employment opportunities, the source of the workforce (local, national, international) and the degree of local procurement undertaken. While this will be determined with the contractor during contract negotiations, the project expects that:

- the vast majority of the unskilled workforce will come from settlements directly affected by pipeline construction;
- a high proportion of the semi-skilled workforce will come from the districts and provinces through which the pipeline passes; and
- a high proportion of the skilled workforce will be Azeri, Georgian and Turkish nationals.

In May 2002 BP opened an Enterprise Centre in Baku on behalf of its partners in AIOC, Shah Deniz, and the BTC pipeline project. The main aim of the Centre is to help local companies develop their business in support of major oil and gas and non-oil and gas developments in Azerbaijan. The Centre will act as a focal point for international and local suppliers in the oil and gas industry, and demonstrates the commitment of BP and its partners to sustainable economic development in Azerbaijan.

### **Residual impacts**

Targets for national employment levels range from 50–90% and will be mainly governed by skill requirements.

Half of the unskilled workforce will be employed on the pipeline spread for approximately two months' duration; the others will be employed at the construction camps and pump stations for up to 2.5 years. By ensuring that recruitment takes place at a number of locations along the route, more people will have an opportunity for employment, thereby spreading economic benefits more widely.

The projects will require a wide range of goods and services. Current estimates indicate that spending for goods and services sourced from within the three countries could be as high as \$4.8 billion through the construction phases. Expenditure during the operations phase of the upstream projects in Azerbaijan is forecast to peak by 2010 at around \$300 million per annum. For the pipeline projects, operational expenditure is forecast to peak by 2009 at \$200 million per annum for the three countries combined. All expenditure in-country is expected to have an additional "multiplier" effect on the local economies (estimated to be circa 1.4), under which monies spent trigger secondary spending on raw materials and other local goods and services, with corresponding employment and economic benefits.

There will be benefits in terms of the additional experience and skills gained by construction and operational workers, resulting in an enhancement of future employment prospects (e.g. information technology; driving; HSE; welding; languages; business practices and other transferable skills). This will apply to all workers, and will be of greatest significance for those participating in skills development programmes and for those skilled workers who will be employed for longer periods.

The potential to benefit from these enhanced skills depends to some extent on the ability of workers to find other construction jobs where their experience is valued. Professional (office-based) workers are likely to have enhanced employment prospects, as they will gain and/or enhance skills suitable for positions in other industries.

Skills developed by local businesses through contracting and procurement processes will enhance their ability to respond to other international tenders. These will include overall business management skills such as quality assurance and project management. The scale and distribution of this positive impact will depend on the number of contracts given to local contractors.

**Table 6.11: Estimated Total Direct Employment During Construction and Operation**

	<b>Azerbaijan</b>	<b>Georgia</b>	<b>Turkey</b>	<b>Total</b>
Construction phase	2,300	2,500	5,000	<b>9,800</b>
Operation phase	250	250	350	<b>850</b>

### *Transparency and Good Governance*

#### **Potential impacts**

- Corruption can threaten employees; unfairly deny people access to jobs; and restrict profitable management of the project;
- The project can take an exemplary stand against corruption, which is a concern in the region; and
- Providing a model of good governance could help better practice spread to other projects and institutions in the region.

#### **Mitigation measures**

The project aims to implement its activities in accordance with high standards of business ethics. As operator, BP has world-class business policies on health, safety and the environment, ethical conduct, employees, relationships, and finance and control. These policies have been and will continue to be integral to how its business is conducted. They include a prohibition on bribery, facilitation payments and corruption. The policies also cover BP’s contractors and, they are working proactively to ensure that they are adopted through all aspects of BP’s business activities, from contracting to hiring new recruits. Auditing by a number of internal and external groups will provide further emphasis on transparent and ethical behaviour across the projects. A 24-hour telephone hotline has been established so that any known or suspected breaches of policies can be reported confidentially and anonymously. Reported breaches will be investigated with integrity while respecting the law and individual human rights.

The projects have a positive role to play in relationships with external institutions – to assist in the exchange of information, ideas and experience. For example, the Enterprise Centre holds workshops with local companies on the ethical conduct standards adopted by the projects and what these standards mean in business practice.

The project has committed to developing, publicising and implementing strategies for recruitment and purchasing. These strategies will emphasise transparency and integrity through: the timely and widespread provision of information on employment and supply opportunities and procedures; establishing and reporting on targets; and putting in mechanisms for third-party oversight.

### **Residual impacts**

It is considered that this will set an important precedent in terms of the way in which recruitment, employment, contracting and purchasing are managed. This could potentially have a significant positive residual impact on future employment and sourcing practices in the regions in which the project occurs and more widely.

### *Human Rights*

### **Potential impacts**

Land requisition and security surrounding the pipeline is seen as a potential threat to the human rights of local people, particularly those from vulnerable groups.

### **Mitigation measures**

The RAP has identified project affected vulnerable groups within each country, and targeted measures will be taken to protect these groups. While RAP socio-economic survey results and related consultations did not find that ethnic minority groups such as the Kurds, or religious minority groups such as the Alevis, were any more likely to be adversely affected by the project than others, a specific focus of RAP monitoring will be to ensure that such groups are not discriminated against in terms of their access to compensation or other forms of project assistance.

Security will be provided by the host governments. BTC Co has worked closely with them to address concerns about provision of security and protection of human rights. In May 2003 a joint statement was released by the three governments which included the following:

*“We have heard concern that the IGA and HGAs could be read to require the host States, in fulfilling their commitments regarding protection of the project facilities and personnel, to take actions in breach of international human rights norms, or alternatively to prohibit the host States from taking actions that would prevent project personnel from violating international human rights norms. We reject such an interpretation of the IGA and HGAs, and the companies involved confirm that none of BTC Co or its shareholders, customers or contractors interpret the IGA or HGAs in this manner. The parties confirm to each other their mutual commitment to the goal of promoting respect for and compliance with human rights principles, including those set forth in the Universal Declaration of Human Rights, the United Nations Basic Principles on the use of Force and Firearms by Law Enforcement Officials, United Nations Code of Conduct for Law Enforcement Officials, the European Convention on Human Rights and, in a manner consistent with our national laws, the Voluntary Principles on Security and Human Rights (the “International Norms”). Moreover, given the importance all parties place on this commitment, we reaffirm their commitment promptly to conclude one or more protocols to the IGA and HGAs stating that*

*all pipeline security operations must be conducted in accordance with the International Norms, and set forth specific requirements and limitations in respect thereof.”*

#### 6.3.3.6 Cultural Heritage

A comprehensive staged investigation has been undertaken of cultural heritage resources to ensure, as far as possible, the avoidance of cultural property. This has included re-routing to avoid archaeological features. Where avoidance has not been possible, investigations have been undertaken to study the resource and preserve artefacts. The involvement of international experts in combination with national experts has enabled technology transfer and capacity building. In the one case (Gobustan Cultural Reserve in Azerbaijan) where a site designated on the basis of cultural resources would be affected the impacts have been minimised and offset mitigation put in place. A Strategic Environmental & Cultural Management Plan for the Gobustan area has been implemented with the involvement of international experts in conjunction with the Ministry of Environment and Natural resources, Ministry of Culture & Institute of Archaeology & other stakeholders.

### 6.3.4 Cumulative Impacts

#### 6.3.4.1 Introduction

The IFC Procedure for Environmental and Social Review of Projects (IFC, December 1998) states that environmental assessment should include consideration of:

*‘...cumulative impacts of existing projects, the proposed project and anticipated future projects.’*

To identify which other projects need to be considered alongside the project being assessed the IFC Procedure states that:

*‘Assessment of cumulative impacts would take into account projects or potential developments that are realistically defined at the time the environmental assessment is undertaken, where such projects and developments could impact on the project area.’*

Cumulative impacts are therefore those that may result from the combined or incremental effects of past, present or future activities. While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) occurring in the same geographical area and/or occurring at the same time, result in a cumulative impact that is, or has the potential to be, significant.

Cumulative impact assessments typically focus on areas directly influenced by the proposed project activities. Here the likely effects are generally within the influence and normally the control of the project sponsor, and can be mitigated and managed.

The spatial dimensions of the ‘area of influence’ will vary with project and environmental setting. From an ecological and socio-economic perspective the effects can be widespread, particularly if indirect and delayed outcomes are considered. It is inherently more difficult to quantify and predict these effects. They are also more difficult to manage, often because they exceed the remit and bounds of responsibility of the project sponsor. As a result indirect and delayed effects of projects have historically been less comprehensively addressed in conducting ESIA.

The BTC project has sought to overcome this important shortcoming in conventional impact assessment techniques, particularly as it applies to large trans-national infrastructure projects, at two levels. At the first level, cumulative impacts have been assessed using a conventional approach, in accordance with the IFC procedure outlined above. The results of this assessment are summarised in Sections 6.3.4.2 and 6.3.4.3 below.

BP also initiated a broad-based assessment of the economic, social and environmental implications of BTC, ACG and Shah Deniz/SCP projects at a national and regional level and from a sustainable development perspective. (See BP Azerbaijan: ACG, BTC and Shah Deniz projects: economic, social and environmental review in the national and regional context, 2002.)

While this particular investigation (generally referred to as the National and Regional Review) was not strictly an assessment of cumulative impacts per se, it does complement the BTC ESAs and provide insights into the key economic, social and environmental opportunities and risks associated with the projects, and the indirect and delayed outcomes referred to above. The study also provides information on how BP is responding to these issues. The key issues assessed in the National and Regional Review are outlined in Box 6.10. The full report was made available to the public via the project website in February 2003.

**Box 6.10: Key Issues Covered in the National and Regional Review**

- Revenue management
- Local employment and supply chain management
- The non-oil economy
- Poverty and inequality
- Human rights
- Governance and corruption
- Conflict
- Access to energy
- Regional export options
- Climate change
- Biodiversity
- Oil spills

#### 6.3.4.2 *Project activity*

There are numerous existing and proposed projects that will or have the potential to interact with the BTC pipeline project. These are described in detail in the ESIA's and the National and Regional Review, and listed below.

- ACG Full Field Development, Azerbaijan;
- Shah Deniz Gas Development and SCP project, Azerbaijan, Georgia and Turkey;
- WREP, Azerbaijan and Georgia;
- NREP, Azerbaijan and Russia;
- Northern Caspian oil fields and the Caspian Pipeline Consortium pipeline, Kazakhstan and Russia;
- Blue Stream gas pipeline, Russia and Turkey;
- Borjomi mineral water project, Georgia;
- Tbilisi-Baku highway/railway (Silk Route), Azerbaijan and Georgia;
- BOTAŞ Oil Pipeline, Iraq - Turkey Crude Oil Pipeline System;
- East Anatolian NGP, Iran and Turkey;
- Korogula dam, Turkey;
- Sugoza power plant, Turkey; and
- Sanko petrochemical plant, Turkey.

Key projects with the potential to interact with the BTC project are summarised in Table 6.12. The emphasis of the summary table and the subsequent discussion is on route-level impacts, given the emphasis of the IFC procedure on the need to consider 'direct effects' in the 'project area', and given that the broader national and regional issues are covered in detail in the National and Regional Review. Projects are highlighted in Table 6.12 as having the potential to lead to significant cumulative impacts or that are deemed to be of particular public interest, are discussed in more detail in Section 6.3.4.3.

**Table 6.12: Summary of Cumulative Impacts**

Project description	Level of interaction between projects			Environmental and social significance of interaction			Key issues
	Azer	Geo	Tur	Azer	Geo	Turk	
<b>ACG FFD</b> (including Sangachal Terminal)	High	–	–	Med	–	–	The level of interaction will be very localised (specifically adjacent to the Sangachal Terminal). Short-term reductions in air quality and increases in noise will have low-level cumulative effects on a small and transitory population. Impacts on the ecology of the semi-desert habitats in the Gobustan area will be more significant. Increased demand for skilled labour has the potential to effect local wages, local labour content and possibly local prices. Local skill levels will increase. Local traffic levels will also increase, adding a burden to the existing road infrastructure. These effects will be short term and are deemed to be of medium significance; they are discussed in detail in the ESIA's.
<b>Shah Deniz and SCP</b>	High	High	Med	High	High	Low	Key issues include air quality (particularly dust, and the potential short-term effects on crop productivity), soil erosion, restoration of the ROW, ecology, water quality of rivers and streams, traffic and landscape. Positive socio-economic benefits are also predicted (direct and indirect employment, and stimulus of the local and national economy). The effects would be most significant during the construction phase, although the effects on landscape and visual amenity would be longer term. Significant positive benefits will be derived in the form of reduced GHG emissions from the use of SCP gas to fuel the drivers for the pump stations located in Azerbaijan and Georgia.
<b>WREP</b>	Med	Low	-	Med	Low	–	Issues addressed in the detailed ESIA cumulative assessment include soil erosion, hydrology, landscape and ecology. No significant cumulative effects are predicted for these issues. There is some residual resentment amongst communities along the WREP route concerning employment, land compensation and the reinstatement of worn and damaged infrastructure from previous construction activities. This could affect some people's attitudes towards the BTC project. The improved local, national and regional oil spill response capability that is expected to evolve as a result of initiatives associated with BTC will have a positive effect.

**Table 6.12: Summary of Cumulative Impacts (continued)**

Project description	Level of interaction between projects			Environmental and social significance of interaction			Key issues
	Azer	Geo	Turk	Azer	Geo	Turk	
<b>Borjormi Mineral Water project</b>	–	Low	–	–	Low	–	There is local concern that a spill or leak from the pipeline might contaminate the source of the Borjormi mineral water. The physical separation of the pipeline and the recharge zone, together with the local hydrogeological regime, will prevent this from occurring.
<b>NREP</b>	Low	–	–	Low	–	–	The NREP has a very low level of interaction with the BTC project and no negative cumulative effects are predicted. The improved local, national and regional oil spill response capability that is expected to evolve as a result of initiatives associated with BTC will have a positive effect
<b>Silk Route project</b> (road and rail infrastructure development, Baku to Tbilisi)	Med	Med	–	Low	Low	–	The project is generally not located near the proposed BTC route, however a number of support activities to BTC will share the same infrastructure. In addition, both projects will require significant quantities of aggregate material (sand and gravel) and will generate quantities of inert waste. Other issues assessed include air quality, noise, infrastructure (specifically roads), hydrology, demand for skilled workers and competition for goods and services. None of these issues was assessed as being of high significance
<b>Koroglu dam</b> , located in Ardahan province, Turkey, 8km east of the BTC pipeline route	–	–	Low	–	–	Med	Cumulative environmental effects are not expected to be significant because of the distance separating the two projects and the different construction schedules. There is however potential for cumulative social impacts, specifically resource ownership and use, and employment.
<b>Sanko petrochem plant</b> (4km south-west of the Ceyhan Marine Terminal)	–	–	Med	–	–	Low	Key environmental issues include air emissions, construction traffic, shipping and navigation. Social impacts assessed include issues associated with the construction camps, resource ownership and resource use, employment, infrastructure and services and safety.

**Table 6.12: Summary of Cumulative Impacts (continued)**

Project description	Level of interaction between projects			Environmental and social significance of interaction			Key issues
	Azer	Geo	Turk	Azer	Geo	Turk	
<b>Sugoza power plant</b> , coal-fired plant, presently under construction 5km south-west of the Ceyhan Marine Terminal	–	–	Med	–	–	Low	Key environmental issues include air emissions, construction traffic, shipping and navigation. Social impacts include issues associated with the construction camps, resource ownership and resource use, employment, infrastructure and services and safety
<b>East Anatolian NGP</b>	–	–	High	–	–	High	Key environmental issues include landscape and visual amenity, soil erosion and productivity, ROW reinstatement, hydrology and water quality; positive effects include the commitment by BOTAS to reinstate damaged areas prior to the commencement of construction of the BTC project, and the provision of fuel gas for the pump station drivers. The key socio-economic issue concerns the negative experiences associated with the NGP and the (incorrect) assumption that BTC will adopt similar standards.

### 6.3.4.3 *Projects with Potentially Significant Interactions with BTC*

#### **BTC and SCP (Azerbaijan and Georgia)**

The proposed SCP project has yet to receive partner sanction. Once sanctioned the SCP will be constructed alongside the BTC pipeline through Azerbaijan and Georgia. At the Georgian/Turkish border the pipeline will be extended by the Turkish Government roughly parallel to, but largely offset from, the BTC route for 224km. The offset distance ranges from less than 1km to approximately 25 kms. On the basis of the current schedule, the BTC and SCP projects will be completed largely sequentially.

The SCP project has the potential to interact with a number of elements of the BTC project and result in a number of positive cumulative effects and a number of potentially adverse cumulative impacts. Most of these impacts are predicted to occur during the construction phase of the projects, although the benefit of using SCP gas as a source of fuel for the BTC pump drives will have a significant positive effect on reducing greenhouse gases (GHGs). The benefits of this decision will be evident throughout the life of the project.

#### **ROW reinstatement**

The contiguous ROW for the two pipelines in Azerbaijan and Georgia will take up a 44m-wide strip of land. Therefore, the loss of habitat will be 12m or approximately 30% wider as a consequence of the co-existence of the projects than would be the case for a single 32m-wide ROW. It is, however, arguable that the land take would have been greater if the pipelines were located in separate corridors, as each would have potentially required a 32m-wide ROW (ie, 64m total) as opposed to 44m. In addition to the greater land take (and therefore habitat loss), there would also be a greater 'edge effect' on wildlife and habitat fragmentation with two corridors, compared with one.

The co-existence of the BTC and SCP projects in the same corridor will cause a delay in the commencement and therefore completion of full reinstatement operations within some sections of the ROW. The long-term effects on the ecology of the impacted area and adjacent margins are unlikely to be significant along most of the pipeline route. In selected areas of high ecological sensitivity and geological instability, however, the two pipelines are being laid simultaneously, for example the Kodiana Pass in Georgia.

The delayed permanent restoration of the ROW could also facilitate the onset of erosion with associated negative impacts to the soils and, in cases of extensive washout, to the natural habitats surrounding the ROW. It could also risk pipeline integrity. A reinstatement specification has been developed with the objective of minimising these impacts, and specifically addresses BTC and SCP sequential construction.

Construction access roads will be built for the BTC pipeline. If the SCP construction programme is to follow BTC, then the access roads will be left in place, thus eliminating the need for additional roads for the SCP project. This is a positive outcome that would not be possible if two geographically separated construction corridors were used.

If the SCP is delayed by more than a year, complete reinstatement of the ROW will occur following the BTC pipeline construction phase. The subsequent SCP construction programme would then require part of the same ROW to be re-stripped to allow pipeline installation, followed by a second reinstatement programme. While the overall time that bare earth is exposed would be reduced for this SCP construction scenario, the recovery time would be longer.

### **Greenhouse gas emissions**

The following factors have a significant bearing on the quantity of emissions generated from pipeline systems and overall system efficiency:

- Pipeline length;
- Terrain crossed by the pipeline;
- The nature of the product being transported;
- Pipeline diameter; and
- Efficiency of the pump drivers and compressors.

Reduction in the quantity of emissions to air has been a key objective of the engineering design team throughout the various phases of the project development and therefore all of the above areas were examined in detail.

The main source of emissions associated with the operational phase of the project was assessed as the pump stations. Refinements in pipeline design, for example pipeline diameter, allowed the elimination of a pump station in Georgia, resulting in a significant reduction in air emissions. Selection of pump drivers (and fuel type) was also a key component of the emissions reduction programme. The following fuel options were considered:

- Gas, available from the proposed SCP (Azerbaijan and Georgia) and East Anatolian Natural Gas Pipeline (Turkey);
- Crude oil (from the BTC mainline);
- Distillate (derived from the BTC mainline crude oil by a crude topping plant);
- Diesel; and
- Electricity\*

The decision was made to use 'dual fuelled' turbine drivers in Azerbaijan and Georgia (that is, capable of operating on either natural gas or liquid fuels), and natural gas-fired reciprocating engines in Turkey. The dual fuel requirement in Azerbaijan and Georgia is necessary because it is envisaged that the proposed SCP project will be completed after the commissioning of the BTC pipeline. The East Anatolian Natural Gas Pipeline is already operational and will therefore be able to provide gas immediately upon commissioning of BTC.

The following panel summarises some of the key decisions relating to the choice of pump drivers and pipeline diameter, and their combined effect on emissions. The overall effect of these and other modifications have led to a net base reduction in GHG emissions of 30%, which will be further reduced to 40% once SCP gas becomes available. Following these reductions, the total estimated lifetime GHG emissions arising from the BTC project, based on the current design, are approximately 30 million tonnes – or 25 million tonnes if SCP gas is used.

Project phase	Change	Impact on emissions (CO <sub>2</sub> and NO <sub>x</sub> )	
Front-end engineering design	Base case in Azerbaijan and Georgia changed from crude oil burning reciprocating engines to gas turbines on SCP gas, with crude oil fuelled drivers as back-up	Reduction	Reduction
Detailed engineering	Pipe diameter in Georgia increased to facilitate the removal of a pump station in a remote and sensitive part of the country	Reduction	Reduction
	SCP programme deferred requiring BTC pipeline to rely on crude oil supply to fuel drivers	Increase (until SCP comes online)	Increase (until SCP comes online)
	BOTAŞ revised design to 42" diameter pipeline	Increase	Increase
	BOTAŞ changed fuel from crude oil to gas	Reduction	Reduction

\*NB Electricity was not selected on the basis of inadequate local supplies; lack of power distribution infrastructure in the pump station locations; and the associated impact that drawing on already limited local supplies would potentially deny power to local communities. For these reasons it was discounted.

### **Land and land-based livelihoods**

The cumulative impacts of the two projects on land resources and livelihoods are complicated. Two pipelines sharing a contiguous ROW will involve less land and theoretically disrupt fewer livelihoods. Equally, the period of disruption would be greater, albeit for fewer people.

Clearly, the greater the temporal gap between the construction of the two pipelines, the greater the impact on the local community if access to the land remains restricted between the two construction periods.

The compensation measures outlined in the RAP recognise these issues and will ensure that appropriate compensation is calculated to take into account the duration of the impact associated with the use of a contiguous ROW.

Effective implementation of the RAP should ensure that there will be no long-term impact on the livelihoods of those affected. The significance of this cumulative impact is therefore predicted to be low.

### **Employment and local economic stimulus**

Employment recruitment will favour people in settlements and communities directly affected by the two projects, and particularly those where land is acquired by both projects. The cumulative benefits will therefore be more favourable with two projects, particularly since the projects will be sequential, and therefore result in longer potential employment periods.

The combined effects of these recruitment policies will have a positive, cumulative impact on employment levels and skills development.

Other cumulative benefits include increased cash flow into the local economies (and associated multiplier effects) and opportunities for the provision, by local suppliers, of goods and services. In addition, workers who have experience on more than one project will be more attractive to future employers, and opportunities for training and learning new skills for those employed will be extended. These combined outcomes will have a positive impact on the health of the local economy.

Increasing the extent and duration of temporary or short-term employment has a number of potential negative cumulative impacts. These include:

- workers may give up their normal employment (formal, self-employed or informal) for perhaps higher paid temporary employment during construction of the pipelines, resulting in a possible loss of longer-term livelihoods;
- wage levels could increase where there is a shortage of labour, making, for example the contracting of seasonal cultivators too expensive for local landowners. The likelihood of this occurring is, however, remote given the high levels of unemployment and underemployment along the length of the pipeline route; and
- increased spending power of employees may temporarily increase the cost of local and regional supplies.

Regionally high levels of unemployment (and under-employment), micro-credit schemes for local businesses, training programmes and other initiatives contained within the Community Investment Programme (see Section 7) will ensure that the potential adverse cumulative effects described above are minimised.

### **Infrastructure and services**

In accordance with international standards for best practice, the BTC and SCP projects will ensure that impacts to infrastructure and services are prevented or kept to a minimum and fully compensated and mitigated if they do occur. Measures will include:

- commitments to project self-sufficiency (in terms of service provision);
- restoration measures to ensure that infrastructure (such as roads) are restored to at least their pre-construction condition; and
- adequate consultation and prior notice (and compensation, where appropriate) for planned disruptions. However, with projects of this scale it is possible that despite best endeavours there will be instances when infrastructure or services are disrupted without notice or prior planning. Settlements that fall within the 'area of impact' for both the BTC and SCP projects are therefore vulnerable to such occurrences for both projects. This has implications for impacts on livelihoods and could lead to the deterioration in community relations for both projects.

Unplanned disruptions to irrigation channels could also have widespread impacts for numerous settlements beyond those located within the area of overlap for both projects.

By way of mitigation, a community relations team for the BTC project will identify all areas in Azerbaijan and Georgia where irrigation networks could potentially be impacted by the BTC and SCP projects, and the RAP and project teams will develop site-specific measures to address these.

### **Safety of residents**

Cumulative safety risks could potentially result during the construction phase, from shared access roads and associated traffic hazards. Once the access roads for the SCP have been identified, the community relations team for the BTC project will identify areas of overlap with the BTC project and ensure that the affected settlements receive safety awareness training. This will be particularly important in areas whose inhabitants are not accustomed to heavy traffic loads.

The BTC project will also implement a Traffic Management Plan that addresses, among other issues, the safety risks associated with the construction traffic for the SCP. This, together with the implementation of a Community Safety Management Plan, is expected adequately to address potential cumulative traffic hazards.

### **Community relations**

Relations between the BTC project and local communities could become strained as a result of dissatisfaction with the land acquisition and compensation process, cumulative nuisance factors, and unmet expectations regarding employment.

The cumulative employment associated with the BTC and SCP projects is expected to increase the number and duration of people employed and therefore the extent to which expectations are met. However, in instances where settlements (or individuals) do not gain employment (or their expectations are not fully met for any reason), the potential exists for high levels of frustration and resentment towards those who succeed in getting jobs, and also towards the project.

The projects will seek to manage employment expectations at both local and national levels. Dissemination of information on the number and likely duration of jobs has been an important part of the community consultation process. This process has continued in greater depth during the ESIA disclosure process. It also forms an important part of the responsibilities of CLOs and land teams appointed to the project team. During the recruitment process detailed job descriptions and minimum skill requirements will be provided to relevant communities and potential applicants. Relevant information will also

be provided to government, media and other interested stakeholders. In addition the Community Investment Programme (see Section 7) will attempt to maximise the benefits associated with the employment opportunities as well as to manage expectations.

### **Unplanned events**

Extensive risk assessment studies have been conducted for the SCP project to determine the likelihood of failure, the potential consequences of failure (eg, explosion) and the likely radius of impact. The types of failure scenarios for SCP that could lead to loss of containment are similar to those of BTC (ie, corrosion, geohazards, third-party interference, etc). This lost containment would then need to be able to mix with enough oxygen to be ignited and cause an explosion or fire of significant enough intensity to rupture the BTC pipeline. Such scenarios have been modelled and the results of the assessment were a major factor in determining the separation distance between the two pipelines, with the final separation distance between the SCP and BTC pipeline being greater than the likely radius of impact. Additionally, both BTC and SCP are buried to a minimum of 1m (except in rock where the minimum depth is 0.6m).

In addition, the SCP gas leak detection system and maintenance programme will minimise this risk to an even greater extent, as will an increased pipeline wall thickness in selected areas. Given these design parameters, the risk of BTC pipeline rupture due to SCP pipeline failure is conservatively estimated to be 3.24E-07 per kilometre – ie, extremely low.

### **BTC interaction with the Koroglu dam and SCP projects in Turkey**

The proposed Koroglu dam is located within Ardahan province in north-eastern Turkey, approximately 8km east of the BTC route. The area to be flooded by the dam is also crossed by the proposed Turkish extension of the SCP route. The construction schedule for the dam has not been finalised but is unlikely to begin within the next five years.

The construction of Koroglu dam will require the acquisition of 138 ha of land. Four towns will require resettlement: Cayagzi, Altas, Balikcilar and Olcek.

The dam project raises a number of socio-economic issues with the potential for cumulative impact. These are summarised below.

### **Resource ownership and resource use**

Cayagzi is the only settlement that has land that will be intersected (and acquired) by the BTC pipeline, SCP and Koroglu dam. More specifically: 1) Cayagzi is one of four settlements due to be resettled for the construction of the Koroglu dam); 2) Cayagzi falls just within the 2km radius of the BTC pipeline; and 3) it is directly adjacent to the currently proposed centreline for the SCP.

The significance of the associated cumulative impacts depends on the timing of the resettlement process. Should it occur after the construction of the BTC and SCP projects, Cayagzi will experience acquisition of land twice prior to its actual resettlement. However, should resettlement occur prior to the acquisition activities for the pipelines, this cumulative impact will not occur, as resettlement will be a one-off activity and all land belonging to Cayagzi (including that required by the BTC and SCP projects) would have been compensated for as part of the Koroglu dam acquisition process.

In a worst-case scenario, Cayagzi could potentially undergo land acquisition activities for the dam, BTC and SCP and result in a highly sensitised population less tolerant of the nuisance factors often associated with large-scale developments, such as noise, dust, traffic congestion, disturbance from construction workers, unplanned disruptions. This scenario could have an impact on community relations for all three projects.

In order to manage the possibility of tensions developing, the community relations teams for the BTC project will pay specific attention to Cayagzi. This will involve regular briefings regarding construction activities, safety awareness meetings, opportunities for constant community feedback regarding concerns and suggestions for improvement, and implementation of measures to address unplanned disruption to infrastructure and services. These efforts will only be required if resettlement of Cayagzi occurs after the construction of the BTC pipeline.

### **Employment**

Based on an assumed 'sourcing radius' of 10km for unskilled workers, local residents within settlements affected by the BTC, SCP and Koroglu dam theoretically fall within the sourcing radius for all three projects. This excludes settlements to the east of the SCP route, as these fall outside of the BTC sourcing area for unskilled labour. However, it should be noted that Cayagzi is the only settlement that would be impacted by all three developments and which falls within the BTC priority area for unskilled labour. Although Cayagzi stands to benefit from cumulative employment opportunities, it is due to be relocated outside of this priority area. Delayed resettlement could, however, result in residents from this settlement securing employment with BTC and SCP projects. Similarly, other dam-affected settlements, which fall within the priority area for semi- and skilled labour (ie, Cayagzi, Altas, Balikcilar and Olcek) will also potentially be relocated outside of this 'sourcing radius'.

Settlements affected by both pipeline projects fall within the expected priority areas for semi- and skilled labour for all three projects (ie, intersected districts and provinces) and will therefore potentially benefit from cumulative employment within the broader project area. Cumulative opportunities for semi-skilled and skilled labour as well as those for the provision of local goods and services are also likely to be experienced on the district and provincial level.

#### **6.3.4.4. *Mitigation of cumulative impacts***

Potential impacts arising from the interaction of BTC project activities and existing, proposed or reasonable foreseeable third-party projects have been assessed and accounted for in the BTC design process (eg, route selection, minimum separation distances between BTC and SCP, contiguous ROW, provision for the use of SCP gas as a fuel source for pump stations, etc), and in the preparation of mitigation measures (eg, ROW reinstatement, environmental and Community Investment Programmes, traffic management and safety awareness training, RAP, etc). Ongoing management and monitoring of cumulative impacts will focus on prevention and minimisation using the same integrated approach that is being adopted for project-specific effects.

### **6.3.5 Environmental Risk Assessment and Oil Spill Response Planning**

The production and transportation of oil has inherent risks, where risk is defined as a combination of the probability of an event (such as an oil spill) combined with the severity or consequence of the event (related to the magnitude of the spill and the sensitivity of the resources affected) as shown in Box 6.11.

### **Box 6.11: Environmental Risk Equation**

Environmental Risk = Likelihood of Failure x Spill Volume x Environmental Sensitivity

A more detailed summary of the potential hazards and consequences associated with oil transportation is illustrated in Figure 6.2

Oil spill prevention through good engineering design, route selection and development of stringent operational policies has been a major focus for the BTC project. This is reflected in the project goals that were established at the outset of the project and that governed the engineering approach (Box 6.12).

### **Box 6.12: Relevant Project Goals**

Goal 3: Zero discharge of oil or chemicals to land or surface waters  
Goal 6: No net damage to protected ecological areas or archaeological sites  
Goal 9: No loss of containment of product.

An important environmental risk associated with the construction and operation of the BTC pipeline is that of an oil spill resulting from a pipeline leak or rupture, a release from an AGI, or an incident occurring during tanker loading operations at the BTC Marine Terminal.

Each of the above potential sources of spill was subject to a risk assessment to identify possible options for reducing risk through design modifications, and through the development of specific mitigation measures aimed at minimising the consequences of a spill.

The following summary of project risks is organised into four parts: the first describes the risks associated with the pipeline component of the project, the second and third outline the risks associated with the land and marine facilities respectively at the BTC terminal, while the fourth describes the measures that will be adopted in the unlikely event of an oil spill.

#### **6.3.5.1 Pipeline risk assessment**

Historical performance data for Western European pipeline failure and leakage events (based on CONCAWE - Conservation of Clean and Water in Europe – Report No 98: Western Europe Cross-Country Oil Pipelines 25-Year Performance Statistics) were used to develop an initial spill frequency benchmark for the BTC pipeline (Table 6.13).

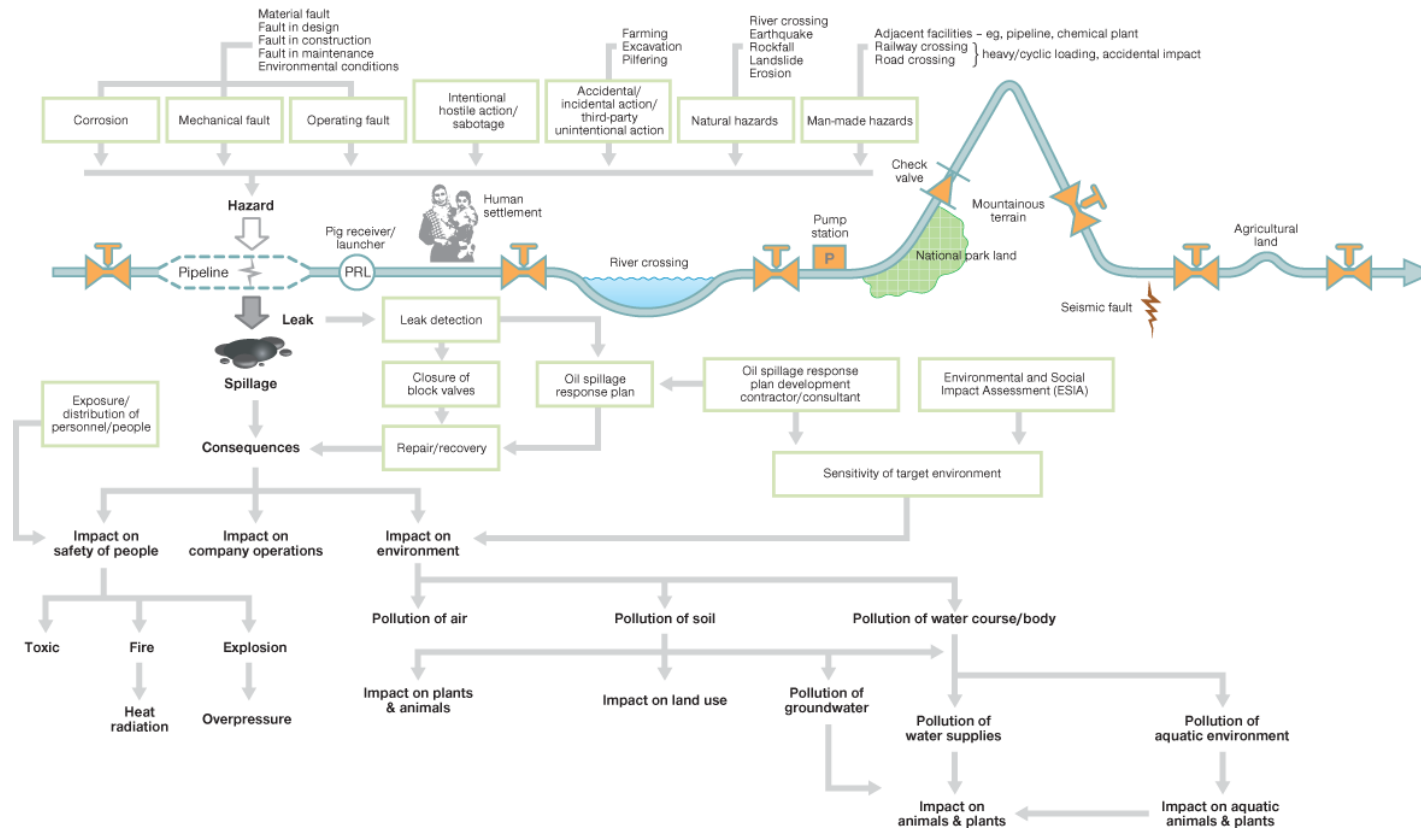
The benchmark data record historical performance over a 25-year period, during which time considerable improvements in pipeline performance and design have occurred. The established benchmark is therefore regarded as conservative.

The CONCAWE data were then modified to take account of local conditions such as fault crossings, landslide areas, river erosion hazards, etc, to determine location-specific spill occurrence frequencies. This information was then used together with spill volume calculations and environmental sensitivity analyses to define the relative environmental risk along the pipeline on a kilometre-by-kilometre basis.

The conventional approach to oil spill risk assessment focuses on spill size and frequency. The approach described above goes a step further by considering environmental sensitivity as well, thereby allowing more scope for modifying the pipeline design to reduce the size and likelihood of a release, and devising contingency measures to minimise potential damage.

The results of the first phase of the assessment indicated how the relative environmental risk varied along the length of the pipeline and, importantly, where the risk occurred. This information formed the basis of an iterative assessment process aimed at reducing areas of high risk through design modifications or through the implementation of mitigation measures to minimise the potential effects of a spill. This iterative, design-refinement process continues.

**Figure 6.2: Potential Hazards and Consequences Associated with Oil Transportation**



**Table 6.13: Historical Oil Spill Data (CONCAWE)**

<b>Spill cause</b>	<b>Statistical Frequency of Spillage (incidents/km/yr)</b>
Mechanical failure <ul style="list-style-type: none"> <li>• Line pipe failure</li> <li>• Valves and fittings</li> <li>• (Subtotal)</li> </ul>	8.44 E-52 5.06 E-5 (1.35 E-4)
Operational fault (system malfunction/human error)	4.78 E-5
Corrosion related <ul style="list-style-type: none"> <li>• External corrosion</li> <li>• Internal corrosion</li> <li>• (Subtotal)</li> </ul>	5.35 E-5 4.22 E-5 (9.56 E-5)
Natural hazards	
Third-party damage <ul style="list-style-type: none"> <li>• Accidental/incidental</li> <li>• Intentional/malicious</li> <li>• (Subtotal)</li> </ul>	1.55 E-4 1.41 E-5 (1.72 E-4)
<b>TOTAL</b>	<b>4.64 E-4</b>

The iterative approach is first used to modify pipeline design, then mitigation measures are applied during ongoing assessments. These may typically include:

- increased numbers of block valves to reduce spill volumes;
- optimisation of valve locations with respect to sensitive environmental areas;
- daily route surveillance;
- increased community awareness programmes to reduce the likelihood of accidental third-party damage;
- mobilisation of oil spill containment and response equipment to key areas;
- training of personnel to assist in responding to oil spills;
- groundwater monitoring;
- use of additional markers; and
- increased pipeline patrols.

These measures are all in addition to the primary goal of oil spill prevention through the use of international design standards and the adoption of equally stringent operational practices.

The outputs from the risk assessment have also allowed a better understanding of the types of activities that pose the largest risk to the pipeline (Figure 6.3). This Figure indicates that while there are some local, high-risk areas associated with fault crossings

(see Seismic Risk panel below) and other natural hazards, the largest overall risks are associated with human activities. These risks could theoretically occur at any point along the pipeline.

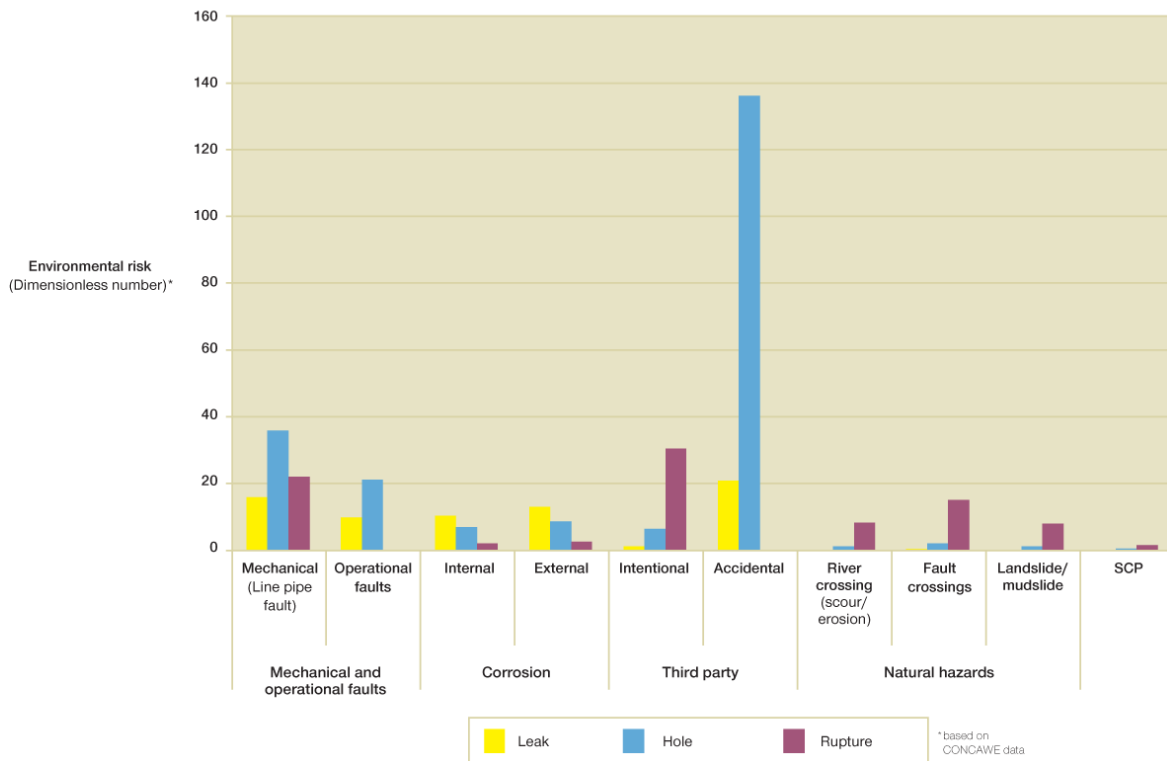
The information presented in Figure 6.3 forms an important part of the Oil Spill Response Plans (OSRPs) that have been prepared for each country, as it allows the development of specific mitigation and response measures, as described above and in Section 6.3.5.2.

**Box 6.13 Seismic Risk**

Thorough analysis of seismic risk has demonstrated that there are five sites along the BTC pipeline route where faults are classified as active – ie they have moved in the last 10,000 years. In crossing these faults, the trench design has been modified to allow the pipe to move without losing integrity/containment during a seismic event. The pipeline and trench (trench configuration, backfill and wall thickness) are designed to accommodate the maximum predicted movement with a significant safety margin. Based on experience operating the WREP and following implementation of the appropriate mitigation measures, the installation of seismic detection systems is considered to be neither necessary nor effective.

The leak detection system and pipeline pressure and flow rates will be closely monitored at all times in these areas. In the event of indicated leak or unexplained pressure/flow rate change the pipeline will be shut down or the Oil Spill Risk procedures initiated. Specially trained pipeline technicians are on hand to deal with such eventualities in the unlikely even of a critical seismic event.

**Figure 6.3: Summary of Environmental risks for Different Pipeline Failure Modes**



The consequence of oil spills will depend upon the interaction of a number of factors such as the volume of oil spilled, environmental sensitivity of the impacted area, local hydrological régime, soil characteristics, topography, seasonal factors, speed of response and containment, etc. Oil spill modelling was therefore undertaken at selected environmentally sensitive locations along the pipeline to determine the effects of overland flow of the oil, dispersion in surface watercourses and migration in groundwater. The results of this assessment are summarised below. A summary of the possible effects of oil spills on selected habitats and land use types found along the pipeline route is presented in Box 6.13.

### **Overland flow**

The overland flow simulations indicated that, with the light crude oil that will be transported through the BTC pipeline, infiltration into the sub-surface is likely to be limited. It is therefore predicted that the pathway of spilled crude oil will be generally controlled by topography. The speed of migration of the oil is clearly dependent on the gradient of the terrain where the spill occurs, and the initial amount of spilled oil. With small leaks it is unlikely that the spilled oil would rise to the surface, given that the pipeline will be buried to an average depth of about 1m, and therefore no overland flow was simulated. With medium leaks it can be assumed that a proportion of the oil would rise to surface and that gravity-driven overland flow would subsequently occur. With a full rupture, overland flow would be initially driven by the spill pressure and subsequently by gravity. In this case it is possible that the erosive forces of the oil flow could create preferential channels in the land and thus accelerate oil dispersal.

### **Surface water flow**

A minor leak into a surface watercourse is predicted to have negligible long-term effects in most cases due to the high rates of dilution that would typically result. The only appreciable impact to surface water quality or freshwater ecology would result from a small leak into a semi-dry stream of limited size and flow. Long-term effects would depend on local site conditions and ecology.

The extent of oil migration beyond the point of entrance into the watercourse will vary significantly with the flow conditions of the river. A spill on a dry river is likely to result in the accumulation of oil in surface depressions and potentially in riparian habitats. The same spill in the same river at full flow may result in no accumulation on the banks and mass transport of the oil to downstream receptors.

The speed of migration of a medium or large spill beyond the point of entrance of the oil into the watercourse would be far greater than any realistic oil spill response time. Therefore, mitigation measures will focus on preventing oil reaching surface water bodies.

### **Groundwater transport**

The simulation of an oil spill in groundwater was carried out for five scenarios in Georgia involving high permeability aquifers and shallow water tables. This combination was seen as a worst-case scenario in terms of potential groundwater impact along the pipeline route. The conclusions of the modelling exercises serve as a guide as to what could happen in similar situations in Azerbaijan and Turkey, and were as follows:

- A spill would result in the formation of a crude oil lens floating over the water table and a plume of hydrocarbon dissolved in the groundwater. The area of the oil lens would depend on the size of the spill and local geology. The extent of the plume of dissolved hydrocarbon would depend on the gradient of the water table at any given location (see third point below);
- The crude oil lens would have a negligible horizontal migration velocity thus making any clean-up operation effective, regardless of the response time for intervention; and

- The migration velocity of the dissolved product would be very low, and far lower than the velocity of groundwater flow. This is due to the dilution that would occur and the tendency of the oil to be adsorbed to organic particles in the soil. All simulations showed that the dissolved contamination plume would extend no more than 10km from the spill site if no oil recovery were carried out and assuming worst-case aquifer characteristics.

On this basis it is concluded that oil recovery using cut-off walls/interceptor trenches in shallow unconfined conditions and groundwater bores in situations where there is a greater depth to groundwater, would be effective in initially containing the sub-surface movement of the spill, and ultimately in clean-up operations. These actions would minimise the risk of significant offsite lateral migration and damage through groundwater transport.

#### Box 6.14: Possible Effects of Oil Spills on Selected Habitats and Land Use Types

**Desert and semi-desert** – Heavy oiling, eg, with pools of oil in depressions, can kill shrubs and bushes. Information on the structure of desert root systems provides some indication of likely vulnerability. The most vulnerable group of plants is likely to be the shallow-rooted perennials (many of the low desert shrubs), whose finely branched root systems are concentrated in the top 200mm of soil. Deep-rooted perennials such as Tamarix (which has recorded rooting depths of up to 20m) are less likely to be affected by surface oiling. There could be serious effects on ephemeral species according to the time of year. Summer oiling is likely to kill plants before seed is set, which will affect the following year's production. Oiling of seeds in late winter and early spring can reduce germination.

**Scrub and woodland** – Severe oiling with heavy penetration of the soil can kill trees by affecting the root systems. A more commonly reported effect is temporary stress (as evidenced by leaf drop) followed by recovery within a year. If the soil is very wet or flooded this probably gives some protection to tree root systems.

**Wetlands** – Robust, productive perennial plants with substantial underground root systems dominate many wetlands. These underground systems, with their food reserves and protected buds, provide some potential for recovery from surface damage, including oil spill damage. There is an annual cycle of winter dieback, rapid growth from subterranean buds in the spring, and transfer of nutrients to underground reserves in the autumn. This seasonal cycle has a bearing on plant performance following damage to emergent shoots from oil pollution and clean-up. Re-growth from secondary buds is quick after cutting during the period of rapid growth (in spring and early summer). However, after the emergence period, cut shoots are not (or hardly) replaced, and, with part of the growing season lost, the crop is reduced the following year.

Wetland characteristics depend particularly on the water régime, which is subject to seasonal variations. Water régime characteristics at the time of a spill can profoundly affect the distribution of oil within a wetland, with large areas at risk during times of flood. Conversely, at times when water is draining down through the substratum, relatively small areas may be affected but with enhanced penetration of the substratum. This in turn may lead to longer residence times and difficult clean-up problems.

**Agricultural land** – It is likely that the same problems would arise with cultivated species as have been recorded for natural plant communities. These are likely to include reduction of germination for oiled seeds, relatively high mortalities for annual species, and greater tolerance among deep-rooted perennial species. Bioremediation involving addition of fertiliser and ploughing (to stimulate bacterial breakdown of oil in the soil) is likely to be a particularly appropriate remediation technique.

#### 6.3.5.2 *Marine terminal oil spill risk assessment*

##### **Land-based spills**

An environmental risk assessment was conducted for the Ceyhan Marine Terminal. This assessment identified various scenarios relating to the accidental release of oil from the proposed terminal facilities and from tankers shipping the oil from the Ceyhan jetty (see below).

The main hazards associated with the Ceyhan Marine Terminal and its facilities were identified as:

- the storage area with seven crude oil floating roof tanks;
- two 42" gravity-fed ship-loading pipelines; and
- scraper receiving station and relief tank.

A detailed assessment of the likely frequency of release of crude oil from these facilities was then carried out. The following modes of release were considered:

- releases from crude storage tanks and scraper;
- receiving station; and
- releases from ship-loading pipelines.

The findings of an assessment of the likely size of spills resulting from these facilities and modes of release were combined with spill frequency data to determine the overall level of risk of a spill event.

By including a consideration of the key receptors of potential spill scenarios, the conventional assessment of the risk of a spill event (ie, size of spill versus frequency) has been extended to ascertain the risk to the environment. The result of this is a more complete understanding of the likelihood and consequences of spills (Table 6.14). It should be noted, however, that the risk data presented in Table 6.14 are preliminary and conservative, as ongoing design modifications based on these data will lead to further reductions in the residual risk. The preliminary risk data have also been used in the development of the OSRPs (see Section 6.3.5.3).

The impact of a release on land will depend on whether the release is within a bunded (ie, contained) area or not. The majority of releases from tanks will be contained within the bunds. However, in the event of a catastrophic failure, some liquid may overtop the bunds due to the momentum of the release. Such a phenomenon has occurred in the past, although this has generally been over low height earth dykes with sloping sides. Pipeline releases are all assumed to occur outside bunded areas, although there are small sections within the bunds.

### **Marine and coastal spills**

A risk assessment was also conducted to assess the frequency and consequences of an oil spill impacting the coastal and marine environment at Ceyhan (see DNV Report NO 2002-0386). The risk assessment comprised the following elements:

- Technical risk assessment (TRA) with quantification of the frequency of accidental oil spill to the marine environment. The TRA is limited to the tank farm, the transport pipelines from the tank farm to the jetty, the jetty, the loading arm and to accidental events with the transport vessels within the operational zone of the terminal. The TRA did not include accidental events in the ship lane;
- Oil drift modelling based on scenarios defined in the TRA;
- Description of environmental conditions relevant for the risk assessment and establishment of valuable ecosystem components (VECs), which were used as risk indicators;
- Assessment of consequences to the VECs, based on the results of the oil drift modelling and effects of oil on the actual VECs; and

- Assessment of risk as a combination of frequency of an oil spill and its consequences to the VECs.

Again, the data used in this assessment are based on historical performance and therefore statistical probabilities. They do not represent predicted (and therefore real) events.

**Table 6.14: Environmental Sensitivities to Land-based Spills**

Source	Spill size (tonnes equivalent)	Frequency	Main receptor	Sensitivity	Comment
Storage Tanks					
50mm leak into bund	2300	6.8 E-4	Bund area	Not sensitive	Engineered bund designed to contain spills
Rupture in bund	126000	4.9 E-5	Bund area	Not sensitive	Large spill volume mostly contained in bund
Rupture overtops bund	12600	1.9 E-5	Land downhill from tank	Highly sensitive	Surrounding land may be used for agriculture as well as managed woodlands. Spill may enter ephemeral watercourses. No perceived threat to dwellings
Oil reception loading line, oil metering					
25mm leak	4-31	2.8 E-2	Land in vicinity of leak	Potentially sensitive	Small volume of release is thus unlikely to have an extensive impact
50mm leak	10-70	8.4 E-3	Land in vicinity of leak	Potentially sensitive	Moderate release volume. Potential to impact sensitive receptor if leak is in or near an agricultural area
100mm leak	24-18	2.8 E-3	Land in vicinity of leak	Potentially sensitive	Moderate release volume. Potential to impact sensitive receptor if leak is in or near an agricultural area or at western edge of site, where groundwater is at risk
Full bore rupture	350-2600	1.1 E-3	Wider area	Potentially sensitive	Exceptionally rare event. Potential to impact surrounding agricultural areas, unconfined aquifer and ephemeral watercourses

### **Accidental release scenarios**

The results of the first element of this assessment are summarised in Table 6.15 in terms of five oil release scenarios.

The consequences of several of the accidental release scenarios presented above are quite similar in terms of release rate and duration, and can be further summarised in terms of spill size (Table 6.16).

### **Fate and effects of oil spills**

The second phase in the assessment process involved simulations of the transport and fate of oil on the sea.

The results for the winter season show that the most likely fate of the oil is for rapid beaching close to the release position. Most of the oil would remain principally within Iskenderun Bay. The dominating north-east wind component together with the south-westward current direction at the west coast would make part of the oil leave the bay. The likelihood that oil will leave the bay is less than 3%. If a small spill were to occur, there is a 5-20% chance that 20% of the bay would be polluted. For the medium, large and very large spill scenarios, there is a 5-20% chance that 35%, 60% and 70% of the bay respectively would be polluted. During relatively strong offshore winds the oil will beach on the east and southern coasts of Iskenderun Bay.

In the summer season the most likely fate of the oil would be rapid beaching close to the release position. The dominating south/south-west wind component together with the clockwise current circulation would prevent the oil slick leaving Iskenderun Bay. The likelihood that oil would leave the bay is less than 1%. For the small spill scenario, the pollution probability is within 5-20% in about 25% of the bay's area. For the medium, large and very large spill the 5-20% probability figure would affect about 35%, 50% and 60% respectively.

A separate study was conducted to determine the conditions under which an oil spill release in the vicinity of the terminal could result in a transboundary impact. The results are summarised in Table 6.16. An additional investigation is being conducted to assess the environmental risks associated with the shipping lane.

### **Valued ecosystem components (VECs)**

The natural resources in and around Iskenderun Bay were assessed in terms of potential vulnerability to oil spills, and described in terms of VECs. A priority list of VECs was determined on the basis of ecological and economic importance, and vulnerability to oil pollution. The priority VECs were as follows:

- Fish and fisheries (various species);
- Salt marshes (Yumurtalik Lagoons);
- Waterfowl (white-headed duck in winter; Kentish plover in summer);
- Sea turtles (green turtle); and
- Sea mammals (Monk seal).

Each VEC was assessed using semi-quantitative techniques to determine the potential impact under five oil spill scenarios (from negligible to severe). Assessment parameters included recovery potential, ecological effect, conservation value, socio-economic impact and economic value.

The results of this assessment indicated that the salt marshes in Yumurtalik Lagoon had the highest environmental risk due to operation of the BTC Ceyhan Marine Terminal. Yumurtalik Lagoon is also important for the waterfowl VEC and partly for the fish and

fishery VEC. This implies that the lagoon is very sensitive and vulnerable to an oil spill from the oil export terminal. A spill occurring in winter poses more risk to the lagoon than one occurring in summer due to prevailing currents, although both are low probability events.

#### 6.3.5.3 *Oil spill response planning*

While risk assessment indicates that the probability (frequency) of pipeline failure affecting any one site is very low, the occurrence of such an incident would potentially result in considerable impact on environmental and social receptors. The degree of impact is likely to be highly dependent on the mitigation and remedial actions undertaken. As such, any oil spill is likely to warrant substantial efforts aimed at containing and recovering the oil, protecting local receptors and remediating any residual contamination.

The project's approach to oil spill contingency planning is as follows:

- Construct the project in a manner that minimises risks of incidents;
- Design and maintain the pipeline system to ensure the risks of incidents during operation is minimised;
- Ensure that the pipeline system is operated in a manner that minimises the risk of incidents including monitoring and inspection;
- Recognise that incidents may still occur and understand the risks; and
- Ensure appropriate emergency response procedures and resources are in place to mitigate environmental effects.
- Ensure appropriate training is undertaken for emergency response.

**Table 6.15: Summary of Risk Results – Accidental Release Scenarios**

	Description	Main causes	Release rate	Release duration	Frequency (per year)
<b>1</b>	<b>Release from loading arms</b>				
1.1	Minor release from one loading arm	Mechanical defects; corrosion; wear and tear; operational error; etc	1 kg/s	4 hours	1.63 E-2
1.2	Large release from loading arms	Drift-off	17 tons - 200 tons within 15 - 120s	15 – 120 seconds	7.19 E-3
<b>2</b>	<b>Release from loading pipelines</b>				
2.1	Small/moderate size release from loading pipeline	Mechanical defects; corrosion; etc	10 kg/s	4 hours	1.20 E-3
2.2	Large release from loading pipelines	Ship impact; earthquake	6700 tons in 1 hour	1 hour	1.1 E-4
<b>3</b>	<b>Release from crude oil tankers</b>				
3.1	Overloading of cargo tank	Operational/technical error	2000 tons in 15 minutes	< 1 hour	4.2 E-4
3.2	Release from vessel piping system during loading	Mechanical defects; corrosion; wear and tear; operational error; etc	Spill will be contained on deck of the tanker.  Release to sea is thus not considered likely	-	0

**Table 6.15: Summary of Risk Results – Accidental Release Scenarios (continued)**

	Description	Main causes	Release rate	Release duration	Frequency (per year)
3.3	Minor release of cargo or fuel oil due to crack in tanker hull	Structural failure; impact from other ship; impact with jetty	1 kg/s	12 hours	4.5 E-4
3.4	Large release from vessel cargo tanks	Structural failure; impact from other ship	10000 tons within 12 hours	12 hours	2.5 E-4
3.5	Large release from vessel fuel oil tanks	Impact from other ship	2000 tons within 12 hours	12 hours	2.4 E-5
3.6	Large release from vessel cargo tanks	Fire/explosion. Impact with jetty	2000 tons within 1 hour	1 hour	4.7 E-4
3.7	Release from vessel fuel oil tanks due to impact with jetty	Impact with jetty	200 tons within 1 hour	1 hour	2.6 E-5
<b>4</b>	<b>Release from tanker fuelling operations</b>				
4.1	Release from fuelling operations	Operational/technical error	Not relevant, as such operations are not to take place in the terminal area	-	0
<b>5</b>	<b>Release from onshore tank farm</b>				
5.1	Release from rupture of onshore storage tank and bund	Major earthquake	63 000 tons within 24 hours	24 hours	9.0 E-6

**Table 6.16 Accidental Release Scenarios**

Category	Total spill (tons)	Rate (tons/hour)	Duration	Frequency
Small spill	4 – 200	4 - 200	1 - 4 hours	2.40 E-2
Medium spill	200 – 2000	170 - 2000	1 - 12 hours	4.70 E-4
Large spill	2000 - 10 000	850 - 7000	1 - 12 hours	2.46 E-4
Very large spill	10 000	2600	24 hours	9.00 E-6

**Table 6.17: Potential Consequences of a Transboundary Event**

<b>Spill scenario (tonnes equivalent)</b>	<b>Wind conditions</b>	<b>Impact</b>	<b>Time to beaching (days)</b>	<b>Amount (approx)</b>	<b>Specific sensitivities</b>
500 winter	Northerly	Lebanon	9 – 10	150 m3	Tourism
500 winter	North-easterly	North and East Cyprus	4 – 5	300 m3	Monk seal, green turtle, tourism
500 summer	Northerly > Force 4	Syria	2.5-6	240 – 112 m3	None known
10,000 winter	Northerly Force 8	North Cyprus	3 – 4	8,000 – 20,000 m3	Monk seal, green turtle, tourism
10,000 winter	Northerly Force 8	North Syria	3 – 4	8,000 – 20,000 m3	None known
10,000 winter	Northerly Force 8	North Egypt	12-13	1,500 m3	Lake Burullus (Ramsar site)
10,000 summer	Northerly > Force 4	North Syria	2.5-6	8,000 – 20,000 m3	None known

An Oil Spill Response Plan Framework has been developed by BP and is reproduced in the draft ESIA documents. Country-specific OSRPs have been prepared by BTC Co within the context of this Framework. The aims and objectives of the OSRPs are to provide the means to:

- Control any release that may arise from a fault in the operation of pipeline, terminals or ships;
- Minimise the volume of all such releases if they do occur by securing the source in the most appropriate way;
- Minimise the movement from the source of released oil by timely containment;
- Minimise the environmental impact of primary releases by timely containment and recovery response;
- Maximise the effectiveness of such response through appropriate equipment and technique selection based on full knowledge of the relevant properties of the oil; and
- and the changes in its properties arising from the ambient conditions into which it is released and the sea and land conditions and morphologies onto which it is released.

The OSRPs have been developed taking into consideration BP’s existing regional emergency and spill response system and resources, and are being integrated within BP’s existing Crisis and Emergency Management System. The integration will include existing plans for ongoing operations (eg, WREP, NREP, Shah Deniz, and ACG). While the oil spill plans for these facilities are an integrated part of the BP Azerbaijan Business Unit’s Incident Management Plan, they are ‘standalone’ plans in accordance with the PSAs and HGAs.

BP recognises the need to have a high degree of self-sufficiency in terms of oil spill response. This position reflects its own corporate philosophy and its obligations under the HGAs. The company also recognises that there is a remote possibility that an oil spill could affect a neighbouring country (Table 6.17) and hence result in a transboundary pollution incident, with attendant legal implications (Section 6.1.3). In addition, the company recognises the importance of the government role in oil spill response and the fact that

some administrations are under-resourced. For this reason, BP has and continues to provide financial and technical support to a range of organisations and activities aimed at enhancing the regional capacity to respond to oil spills. A selection of these support activities is as follows:

- **Regional organisations:** financial and technical support of Caspian Environmental Programme (CEP); member of Mediterranean Oil Industry Group
- **Industry initiatives:** member of steering group established as part of an industry-led initiative to enhance marine oil spill response in the Caspian/Black Sea region
- **Technical initiatives:** development of a dispersant testing and approval programme
- **Government support:** assisting the Azerbaijani Government in the preparation of a National Contingency Plan; creation of a government liaison position within BP's Incident Management Team to promote co-operation and co-ordination.

Further details are provided in the National and Regional Review.

In addition, BP continues to work with the host governments on subjects such as the use of dispersants, border control issues associated with the movement of people and equipment across national boundaries in the event of a Tier 2 incident, and continued planning to ensure integration and effective use of contracted Tier 3 resources<sup>1</sup>.

## **6.3.6 Environmental and Social Management**

### *6.3.6.1 Overview*

The ESIA's produced for each country (of whose Overview this document is an update) are supplemented by a range of additional documents. Among them are the Response to Comments (from the ESIA disclosure phase, also known as the ESIA Addendum); the Resettlement Action Plans (RAPs); the Regional Review, the Supplementary Lenders' Information Packs and the Environmental and Social Action Plan (ESAP).

Of these, the information most pertinent for the lenders to the environmental and social management of the project is the ESAP. It has been developed for the BTC Project, as required by the Common Terms Agreement. The ESAP package is composed of a main document which outlines the Project Environmental and Social Management System (ESMS) and three annexes; Annex A: Outline of Annual Report, Annex B: Country Specific Commitments Registers and Annex C: Contractor Control Plans (CCP).

The Commitments Registers itemise all the commitments made in the ESIA's. Upon completion of these, the several thousand commitments were grouped into 34 topics (Waste, Community Safety etc) and a CCP produced for each, so that every one of the ESIA commitments became the specific responsibility of a contractor, whose fulfilment of that commitment would be monitored and verified through a rigorous set of checking and confirmation procedures (see below). The full list of CCPs is provided in Table 6.19.

The ESAP provides an exhaustive description of the environmental and social action plans and policies of the Baku-Tbilisi-Ceyhan Pipeline Company (BTC Co.). The ESAP has been developed with the aim of detailing the project's construction and operations phase Environmental and Social Management Systems (together, the "ESMS" and, individually, the "Construction ESMS" and the "Operations ESMS"). The ESAP, as described above,

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<sup>1</sup> A Tier 1 spill is 'small' and typically occurs during loading and discharge operations at a terminal, or a leak from an onshore facility. A Tier 2 spill is typically of 'medium' size, usually occurs in the vicinity of an organisation's facilities but may be at a remote location. A Tier 3 spill is large, usually occurs at sea and is of a scale that exceeds the capabilities of a Tier 2 response. The incident may be at a terminal, in a port or harbour, or in a remote area.

documents illustrate how the BTC Project will implement, manage and monitor the environmental and social commitments set out in each host country's Environmental (and Social) Impact Assessment. The ESAP also documents the environmental and social standards applicable to the construction, operation and management of the BTC Project and demonstrates the ongoing commitment of BTC Co. to environmental and social issues and the establishment and maintenance of the Construction ESMS, Operations ESMS and other relevant plans or programmes connected with these issues.

**Box 6.14: Issues Addressed by the ESAP**

Status of Impact Assessments and other documents Environmental and Social Standards (including IFI Policies and Guidelines) Mitigation Measures Environmental and Social Monitoring Programme Capacity Development and Training Environmental and Social Awareness Programme Audit Programme and Annual Report Consultation
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**6.3.6.2 Contractor Control Plans**

In the construction phase, the translation of the elements of the management system defined in the ESAP is achieved via Contractor Control Plans (CCPs).

The Contractor Control Plans (CCPs) are **management control** documents that fulfil the following purpose:

- They serve as an important part of the process to translate project commitments originally developed during the environmental and social impact assessment (ESIA) and contracting processes into Contractor actions (in this regard the construction contract is an integral part of these processes);
- They serve as a key tool by which BTC Co can check the Contractor Implementation Plans and Procedures (CIPPs). This includes the procedures and method statements that specify how the activities described in their contract will be carried out to ensure compliance with project commitments; and
- They provide transparency and assurance to the Lenders that commitments made through the ESIA process are being translated through to the construction Contractor who is responsible for implementation.

Box 6.15 provides a summary of the Environmental and Social Management Plans requiring implementation by construction contractors.

The Contractors' implementation procedures are assured through a systematic monitoring and verification programme. The **principal objectives** of the monitoring and verification programme are to provide confirmation that:

- The construction Contractor and its subcontractors are adhering to the requirements of the ESIA-Draft for Disclosure, contracts, legislation, method statements, Lender institution requirements, BTC Co environmental and social objectives, and BP's corporate requirements; and
- The Contractor is in compliance with its approved CIPP

The monitoring and verification programme will generate tangible evidence to demonstrate whether all relevant project commitments are being discharged effectively

and that the desired intent of the commitments – that of avoiding and minimising environmental and social impacts – is, or has been, achieved.

The **specific objectives** of the programme can be summarised as follows:

- Monitor the timely completion of Contractor method statements, where relevant, and CIPPs (the definition of timely completion is to be determined by the Contractor in agreement with BTC Co);
- Verify the performance of the Contractor in implementing appropriate avoidance and mitigation measures in accordance with the commitments register and the appropriate method statements;
- Measure the success of the mitigation measures in minimising environmental and social impacts;
- Monitor the need for, and implementation of, corrective action in the event that the prescribed avoidance measure does not work, or that the mitigation measure does not, or appears unlikely to, meet the nominated level of performance; and
- Provide a mechanism for implementing new impact avoidance and impact mitigation measures, or altering existing practices, based on performance data, thus facilitating continual improvement

The Contractor is contractually bound to implement the commitments contained in the various source documents. Many of these are impact avoidance measures whose successful implementation will be assessed by BTC Co through informal site inspections, audits against the commitments register, and spot check monitoring where results appear questionable.

In addition, environmental and social performance will be compared against a set of Key Performance Indicators (KPIs). Finally, an Action Tracking System will be introduced to facilitate the execution of the above actions.

A formal internal audit programme is in place in each country to evaluate compliance with the CCPs and CIPPs. The audit programme will involve regular auditing by BTC Co of Contractor field operations, as well as its reporting and documentation.

BTC Co's audit programme will provide assurance that the construction Contractor is complying with the requirements set down in this CCP. In addition the Contractor is responsible for developing and implementing audit programmes consistent with the BTC Co requirements to gain assurance that their activities comply with the environmental and social requirements in the ESIA-Draft for Disclosure, RAP and CCPs.

The auditing results will be used to indicate areas of non-compliance and to allow for corrective measures to be implemented.

BTC Co has developed a series of environmental and social KPIs and related targets that address the mitigation of impacts or additionality programmes. BTC Co is responsible for ensuring that these KPIs are measured and reported by their Contractors. Performance against the indicators will be measured on a monthly basis. The KPIs are similar across the project although there may be slight variations that enable country specific issues to be captured.

Each construction Contractor is required to monitor environmental and social performance against KPIs and report performance to BTC Co's in-country management on a monthly

basis. The Contractor is also required to ensure that these KPIs are communicated to all relevant parties prior to the start of construction.

BTC Co will monitor KPIs as part of its overall assessment of the Contractor's performance.

There is a contractual mechanism in place that enables BTC Co to withhold up to 5% of an invoice if HSE performance is unsatisfactory. The KPIs will be used as part of this performance assessment.

An Action Tracking System has been established by BTC Co for the project to provide a formal record of all significant project risks, health, safety and environmental related actions derived from design through to construction and commissioning. This system is described in detail in the ESMS. The construction Contractor is responsible for managing and tracking its own actions.

The Contractor is required to report to in-country BTC teams on environmental and social issues on a regular basis (see Table 6.18).

**Table 6.18: Reporting**

<b>Reporting Parameter</b>	<b>Frequency</b>
KPIs and Measures	Monthly
Environmental and Social Incidents	Monthly (immediately if severe)
Monitoring Results	Monthly
Audit Findings	Annual

Details of the reporting requirements between BTC Co and its Contractor(s) are outlined in the in-country ESMS Manual.

**Table 6.19: Contractor Control Plans**

<b>(a)</b>	<b>Azerbaijan</b>	<ul style="list-style-type: none"><li>• Construction Camps</li><li>• Infrastructure and Services</li><li>• Pollution Prevention</li><li>• Reinstatement</li><li>• Community Liaison</li><li>• Community Safety</li><li>• Transport</li><li>• Employment and Training</li><li>• Procurement and Supply</li><li>• Waste Management</li><li>• Landscape</li></ul>
<b>(b)</b>	<b>Georgia</b>	<ul style="list-style-type: none"><li>• Construction Camps</li><li>• Infrastructure and Services</li><li>• Pollution Prevention</li><li>• Reinstatement</li><li>• Community Liaison</li><li>• Community Safety</li><li>• Transport</li><li>• Employment and Training</li><li>• Procurement and Supply</li><li>• Waste Management</li><li>• Landscape</li></ul>
<b>(c)</b>	<b>Turkey</b>	<ul style="list-style-type: none"><li>• Environmental Management Plan</li><li>• Ecological Management Plan</li><li>• Construction Impacts</li><li>• Pollution Prevention</li><li>• Reinstatement</li><li>• Community Liaison</li><li>• Community Safety</li><li>• Traffic</li><li>• Employment and Training</li><li>• Procurement and Supply</li><li>• Waste Management</li><li>• Aggregates</li></ul>

## Box 6.15: Summary of Environmental and Social Management Plans

**Community Safety Management Plan:** outlines specific actions regarding safety of communities along the route

**Community Relations Plans:** 1. Community Liaison Management Plan. 2. Worker camp Management Plan

**Infrastructure and Services Management Plan:** Sets out specific actions to reduce the disruption and negative impact associated with infrastructure, natural resources, households and community assets

**Employment and training Management Plan:** 1. Sets out specific actions to increase opportunities for local employment and fair distribution of jobs 2. manages skills development and training processes

**Procurement and Supply Management Plan:** Sets out specific actions to increase opportunities for sourcing goods and services from local and national businesses

**Transport Management Plan:** Sets out specific actions properly to manage traffic and its potential impacts, including safety and accidents

**Resettlement Action Plan:** Sets out principles, processes and specific actions related to land acquisition and compensation

**Cultural Heritage Management Plan:** Outlines strategy and action to avoid and/or reduce project impacts to archaeological and historic monument sites

**Summary Reinstatement Plan:** Outlines action to be taken to implement reinstatement specification and achieve the reinstatement targets for erosion control and biorestorement

**Landscape Management Plan:** Sets out specific action to be taken to reduce and mitigate visual landscape impacts

**Pollution Prevention Management Plan:** Sets out specific actions to reduce and mitigate polluting emissions and disturbances

**Waste Management Plan:** Outlines specific actions regarding implementation of waste management procedures

**Emergency Response Plan:** Sets out specific actions to ensure that incidents, including fire and those involving the spillage of chemicals or oil, are properly managed during construction and operation

**Oil Spill Response Plans:** Developed for each country, setting out specific mitigation and response measures (see Section 6.3.5.2)

**Community Investment Programme:** Sets out principles, processes and specific actions undertaken to promote sustainable benefits for communities along the right of way, over and above direct mitigation

**Environmental Investment Programme:** Sets out principles, processes and specific actions undertaken to promote sustainable environmental benefits along the right of way, over and above direct mitigation

### Further information

More details on the performance in managing the environmental, land, community and social issues associated with the project can be found in:

- *The separate project ESIA's produced for Azerbaijan, Georgia and Turkey, including the Addenda (Response to Comments from Disclosure Phase)*
- *The separate Supplementary Lenders' Information Packs produced for Azerbaijan, Georgia and Turkey*
- *The National and Regional Review – economic, social and environmental overview of the Southern Caspian oil and gas projects*
- *The Resettlement Action Plan*