Chapter 16: Cultural Heritage

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16 Cultural Heritage

16.1 Introduction

This chapter presents an assessment of the predicted impacts associated with cultural heritage during the Construction and Pre-commissioning, Operational (includes Commissioning and Full Operational Phases), and Decommissioning Phases of the Project.

Cultural heritage is defined as artefacts, monuments, buildings and sites that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, religious, scientific and social significance (Ref. 16.1). Cultural heritage is an important component of the cultural identity of communities, groups and individuals, and of social cohesion (Ref. 16.2). Cultural heritage includes:

- Tangible cultural heritage, including:
  - Movable cultural heritage (paintings, sculptures, coins, manuscripts);
  - Immovable cultural heritage (monuments, archaeological sites, etc.); and
  - Underwater cultural heritage (shipwrecks, submerged occupation remains, underwater ruins and settlements);
- Intangible cultural heritage (oral traditions, performing arts, religion etc.); and
- Natural heritage (natural sites with cultural aspects such as cultural landscapes, physical, biological or geological formations).

Cultural heritage thus includes both tangible forms of cultural heritage with archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values, unique features or objects that embody cultural values, and intangible forms of culture such as cultural knowledge and practices of communities embodying traditional lifestyles (Ref. 16.3). Cultural heritage also includes archaeology, which is the scientific study of the physical evidence of past human societies recovered through artefact collection and analysis, and excavation. Physical archaeology includes portable antiquities, monuments, historic buildings, historic landscapes, cemeteries and burial areas. Archaeological sites are a finite, irreplaceable and non-renewable cultural resource and form an intrinsic part of the cultural heritage of the people of the Russian Federation (Refs. 16.4 and 16.5). Throughout this chapter, the term cultural heritage is used to refer to all cultural heritage (tangible and intangible), including archaeology.

Cultural heritage is protected under regional and federal legislation, and by international agreements adhered to by the Russian Federation (Refs. 16.1 to 16.27, and 16.28) (Section 16.6.1). Cultural heritage (including archaeology) is regarded as important due to, but not limited to, the following factors:

- *"Archaeological heritage is a fragile and non-renewable cultural resource. Land use is therefore controlled in order to minimise the destruction of the archaeological heritage"* (Ref. 16.28);
- Archaeology and cultural heritage are important to civilization and cultural life, therefore they are protected and potentially damaging activities are subject to regulation (Refs. 16.4 and 16.5); and

- Cultural heritage can be important to national, regional and community identity and economic activities (e.g. tourism, crafts, and agricultural practices) (Ref. 16.29).

This chapter aims to identify any known or potential cultural heritage within the Project Area (terrestrial and marine), and to assess potential Project impacts upon this cultural heritage[1]. In accordance with International Finance Corporation (IFC) and Organisation for Economic Co-operation and Development (OECD) guidance, this ESIA also considers natural, palaeontological and intangible cultural heritage (Ref. 16.3; Ref. 16.30; Ref. 16.31).

The Project has been designed to avoid impacts on cultural heritage where feasible, while balancing cultural heritage considerations with other environmental and engineering requirements. Where significant cultural heritage impacts remain, this chapter also presents suitable mitigation measures which aim to minimise predicted impacts. A Grievance Mechanism and on-going stakeholder engagement will be implemented as part of mitigation and monitoring measures.

The data and interpretations presented in this chapter are linked to other chapters, including **Chapter 6 Stakeholder Engagement**; **Chapter 7 Physical and Geophysical Environment**; **Chapter 8 Soils, Groundwater and Surface Water**; **Chapter 13 Landscape and Visual**; **Chapter 14 Socio-Economics** and **Chapter 17 Ecosystem Services**.

16.2 Scoping

The scope of the cultural heritage impact assessment for the Project was defined through a scoping process which identified cultural heritage receptors and potentially significant impacts related to the Project. Baseline information which informed the scoping process largely drew on information gathered from studies undertaken for the South Stream Offshore Pipeline, including feasibility, engineering and environmental surveys carried out between 2009 and 2013 (see Section 16.4). Key steps in the scoping process for cultural heritage comprised the following:

- The Projects' Front End Engineering and Design (FEED) was reviewed to identify activities with the potential to significantly affect cultural heritage objects or receptors;
- Cultural heritage receptors within the Project Area (see **Chapter 1 Introduction** for definition) were identified through a process of secondary data review and surveys undertaken for the Project (as described in Section 16.4) and professional expertise; and
- A review of relevant national and international legislative requirements and lender requirements to ensure legislative and policy compliance.

[1] This chapter was prepared by qualified and registered cultural heritage professionals. The assessment has been undertaken according to the UK Institute for Archaeologists (IfA) Code of Conduct (Ref. 16.32) and adheres to the high professional standards required of Registered Archaeological Organisations of the IfA. Research, fieldwork and reporting has been undertaken following relevant and locally-applicable elements of the IfA Standard and Guidance for Historic Environment Desk-based Assessment (Ref. 16.33) and IfA Standard and Guidance for Archaeological Field Evaluation (field scanning) (Ref. 16.34).

The Project Area (as described in Section 16.3) contains a range of terrestrial and marine cultural heritage receptors and such features are therefore an important consideration in the ESIA process. Potential impacts upon marine and terrestrial cultural heritage were identified through the Project's stakeholder engagement activities as being of high importance to the Project (**Chapter 6 Stakeholder Engagement**).

Terrestrial cultural heritage receptors include archaeological sites from the Bronze Age, burial mounds (*kurgan*), areas of Antique/Hellenistic, early medieval/Byzantine, medieval and modern occupation, cemeteries, monuments and memorials. The Project Area also has the archaeological potential of other periods, such as early prehistoric tool scatters, hunting and occupation debris and evidence of settlement, farming, land divisions and burials, as well as the potential for historic landscape and woodland features, built heritage (including historic domestic, religious and agricultural buildings, and remains associated with 20th century conflict, including unmarked graves).

In terms of marine cultural heritage, the north-eastern Black Sea region is rich in marine cultural heritage objects or receptors (CHOs) which are fragile and irreplaceable resources and include submerged settlements, shipwrecks and associated nautical material, other anthropogenic structures of historical or archaeological significance, and remains associated with 19th and 20th century conflict. The underlying geological sedimentary deposits of the Project Area have the potential to contain Mesozoic, Miocene and Pliocene marine fossils. Above these fossiliferous deposits is a mantle of Quaternary deposits, soils and coastal marine sediments. There is little potential for the presence of Pliocene hominin and faunal remains, or Pleistocene fossils, due to the absence of refuges such as caves. Marine sediment sequences may provide evidence for past climatic and environmental conditions.

The Project Area does not contain any World Heritage Sites or known tangible or intangible archaeological or cultural heritage features of international significance (nearest World Heritage property is the Western Caucasus natural heritage site (WHS 900), located more than 50 km to the southeast). No intangible cultural heritage (such as specific notable or listed cultural traditions) related to the Project Area, and that could be exploited for commercial purposes, has been identified.

The cultural heritage receptors within the Project Area are identified in this chapter and discussed in terms of their importance and the potential impact that the Project may have on them. Cultural heritage experts met with Project engineers in April 2013 to discuss marine cultural heritage as well as proposed impact avoidance and mitigation strategies.

With reference to the IFC Performance Standards 2012, the Project is not assessed as having any impact on indigenous peoples (Ref. 16.35); further details on the relevance of indigenous people and the Project can be found in **Chapter 14 Socio-Economics**.

16.3 Spatial and Temporal Boundaries

The Project Area is defined in **Chapter 1 Introduction** and traverses three defined sections: landfall, nearshore and offshore:

- The landfall section is located in a rural landscape approximately 10 km south of the town of Anapa. The eastern part of the route is characterised by vineyards and overgrown former vineyards on hillsides; the western coastal corridor comprises dense mature woodland and vegetation. The coastal segment comprises a cliff edge and scree slope where pipelines will be installed inside microtunnels;
- The nearshore section begins at the exit point of the pipeline microtunnels south of Anapa, approximately 400 m from the coast at a depth of approximately 23 m below sea level, and extends outward to the southwest to a depth 30 m below sea level (Ref. 16.36); and
- The offshore section extends from the end of the nearshore section passing through approximately 225 km of Russian EEZ waters, of which 50 km lie within Russian territorial waters. Within the offshore section are three distinct oceanographic regions that are classified by water depth: the continental shelf (35 m to approximately 150 m), the continental slope (150 m to 1,900 m), and the abyssal plain (1,900 m to 2,200 m) (Ref. 16.37).

The terrestrial and marine cultural heritage Study Areas were determined in accordance with Russian Federation legislation of June 25, 2002 No. 73-FZ ('On Cultural Heritage Sites') and Design Documentation State Survey Areas as set out in Agreement No. 240/10 dated 10 January 2010 between Peter Gaz and JSC Giprospetsgaz. This constitutes internationally recognised practice in site survey (Ref. 16.3, para 6; Ref. 16.30, GN12) and was established based on the Project design and consideration of topography and setting (Ref. 16.30, GN3; Ref. 16.38, para 7).

16.3.1 Terrestrial Cultural Heritage Study and Survey Areas

Terrestrial Study and Survey Areas details are presented below:

- **Area of Potential Cultural Sensitivity:** Cultural heritage objects or receptors such as memorials and religious sites have been identified in a wider area, up to 5 km from the centreline of the originally proposed pipeline route, as these may experience traffic and setting[2] impacts during the Construction Phase;
- **General Study Area:** Extends approximately 1 km either side of the originally proposed pipeline route centreline (Ref. 16.39) and was determined in accordance with Russian Federation legislation of 25 June 2002 No. 73-FZ 'On Cultural Heritage Sites';
- **Survey Area:** Archaeological and cultural heritage field surveys have been undertaken on a corridor covering 1 km on either side of the originally proposed pipeline route centreline. This included a walkover survey across the Study Area (Ref. 16.40), followed by systematic fieldwalking (artefact collection) and sample test pit investigation of three sites at Varvarovka (ibid; RU-TCH-03; RU-TCH-04; RU-TCH-05); and

[2] Setting (cultural heritage) is defined in the Terms to Know and Glossary.

- **Zone of Potential Influence:** Defined as terrestrial areas within 2 km of the originally proposed pipeline route centreline, and ancillary terrestrial aspects including access roads, borrow and disposal areas, construction camps, and unplanned developments induced by the Project including areas impacted by increased traffic movement.

These areas are set out in Table 16.1 and are illustrated in Figure 16.1 Figure 16.2 and Figure 16.5.

16.3.2 Marine Cultural Heritage Study and Survey Areas

Marine Study and Survey Areas details are presented below:

- **Area of Potential Cultural Sensitivity:** Cultural heritage objects or receptors such as war graves have been identified up to 2 km from the pipeline route;
- **General Study Area:** This area covered an extensive area including the Black Sea and the surrounding land areas. The General Study Area provided information on the maritime cultures, shipping evolution, shipbuilding trends, and navigation patterns. This information facilitates the interpretation of survey data, which is collected from a narrower Survey Area, centred on the pipeline route;
- **Survey Area:** This area extends over a 2 km wide area centred on the centreline of the originally proposed pipeline route. This area was widened in the proximity of geohazards or other features that were not deemed to be optimal for pipe laying and required a broader corridor to be assessed. The whole survey area, including the sections where it was widened, was subject to geophysical investigations as well as detailed geotechnical and environmental field surveys (Figure 16.7 to Figure 16.9);
- **Zone of Potential Influence:** This zone was defined as the seabed within 150 m either side of the proposed centreline of an individual pipeline. This is based on the avoidance buffer distance chosen by the Project as a design control measure to ensure the avoidance of impacts to cultural heritage objects. The Zone is one of Potential Influence as it is not the case that the entire 150 m wide area could be impacted by Project activities – rather, this area is used to ensure the avoidance of impacts by routing the pipeline away from objects. This avoidance buffer distance was chosen after careful consideration of engineering and design constraints and after a review of commonly-used avoidance buffer intervals for similar marine construction projects. This area is the same for the Construction and Pre-Commissioning Phase, and for the Operational Phase. Specific investigations related to individual sonar anomalies were undertaken in this area; and
- **Anchoring Spread Area**: This area was defined based on the risk of adverse impacts to positively identified and potential CHOs as a result of Project activities involving anchored vessels in the nearshore section of the Project. This was not defined except by depth, and therefore there was no assessment of CHO, nor of impacts or effects.

These areas are described in Table 16.1 and are illustrated in Figure 16.1 and 16.2, where applicable.[3]

Table 16.1 Summary of Spatial Boundaries – Terrestrial and Marine

Area	Terrestrial	Marine
Area of Potential Cultural Sensitivity (sacred, spiritual and intangible heritage, including war graves)	Documentary research, site visit, consultation	
	Up to 5 km either side of the centreline of the proposed pipeline route	Up to 2 km either side of the centreline of the proposed pipeline route
General Study Area (prehistoric, historic, sacred, spiritual and intangible heritage, including war graves)	Documentary and inventory research	
	1 km either side of the centreline of the originally proposed pipeline route	Russian waters of the Black Sea
Survey Area	Field walkover survey	Marine surveys for geo-environmental, geotechnical & engineering purposes Marine surveys for archaeological purposes Review of survey data for archaeological information
	1 km either side of the centreline of the originally proposed pipeline route	Minimum 2 km wide area centred on the original proposed pipeline route centreline
Zone of Potential Influence	Zone within 2 km of the pipeline centre-line Area within 2 km of facilities including access roads, borrow and disposal areas and construction camps	Zone within 150 m either side of the proposed centreline of an individual pipeline

Continued…

[3] Some of the field surveys covered a broader area but still encompassed the Survey Area as defined in this Chapter.

Area	Terrestrial	Marine
Anchoring Spread Area (note areas not defined except by depth, and therefore there was no assessment of CHO, nor of impacts or effects)	n/a	Less than 350 to 380 m water depth

Complete.

16.4 Baseline Data

16.4.1 Methodology and Data

Cultural heritage objects or receptors of relevance to the impact assessment have been defined through a combination of secondary data sources and cultural heritage surveys carried out across the Study Areas.

16.4.2 Secondary Data

16.4.2.1 Desk-based Research

Secondary data sources as follows were consulted as part of this cultural heritage assessment:

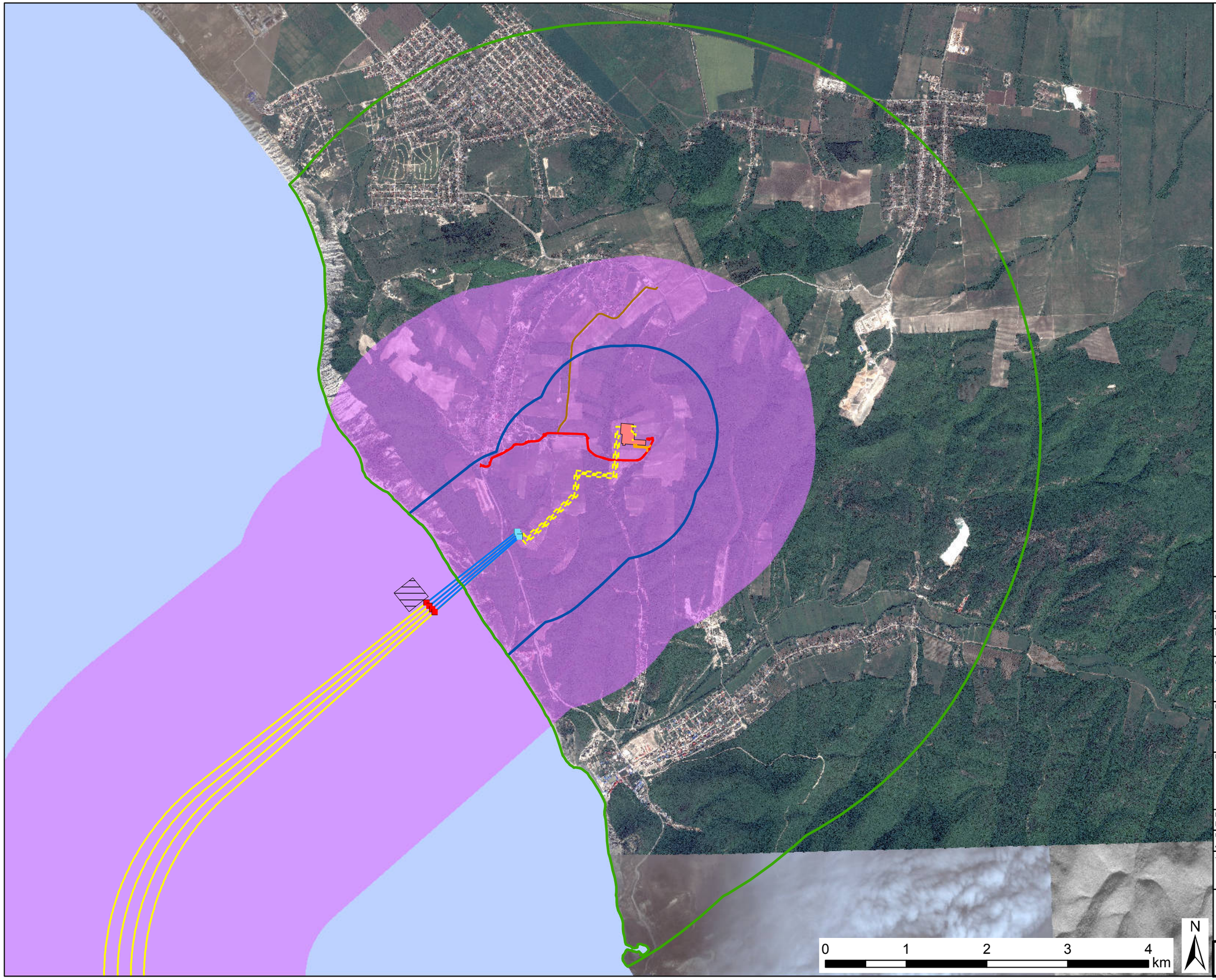
- Archaeological studies undertaken by Russian archaeological experts of the Support Foundation for Archaeological Monuments Protection, Moscow and JSC Kuban Heritage, Krasnodar in 2011. The desk-based assessment of primary and secondary archaeological data, including the results of previous archaeological surveys, involved searching source databases, and the study of documentary and archive sources including: the Archaeological Institute of the Russian Academy of Sciences (RAS, Moscow); the Krasnodar State Historic-Archaeological Museum named Felitsin (KSHAM, Anapa); the Department on the Protection, Restoration and Exploitation of Historical Cultural Values (Heritage) of Krasnodar Krai (Anapa); and the State List of Monuments and List of Defined Facilities of Historical Cultural Heritage located in the territory of the resort city of Anapa (Ref. 16.39; Ref. 16.40; Ref. 16.41);
- Secondary data gathering included consultation of the UNESCO World Heritage List (Ref. 16.42), Intangible Heritage Lists (Ref. 16.43) and Database of National Cultural Heritage Laws (Ref. 16.44) for both terrestrial and marine cultural heritage. Analysis of the wider historical, cultural and archaeological context involved consultation of information in relevant digital databases of the Ministry of Culture (Ref. 16.45) and the Office for the Protection, Restoration and Maintenance of Historical and Cultural Values (Heritage) of Krasnodar Region (Ref. 16.46); national and regional databases (Ref. 16.47), bathymetric and shipwreck data (Ref. 16.48); and information from relevant archaeological institutions and museums including KSHAM;
- In order to complement the extensive research of Russian-language secondary sources undertaken during desk-based assessment (Ref. 16.39), relevant international academic

research papers were reviewed in a number of university libraries in Canada, the USA and the UK for both terrestrial and marine archaeology. Journals included *Antiquity, World Archaeology, Europe-Asia Studies, Historic Environment, American Journal of Archaeology, European Journal of Archaeology, Journal of Indo-European Studies, Black Sea Studies, Hellenic Studies, Greek Roman and Byzantine Studies, Journal of Mediterranean Archaeology, Journal of Nationalism and Ethnicity, Paléorient, Journal of World Prehistory, Proceedings of the Prehistoric Society, Préhistoire Européenne, Journal of Field Archaeology, Journal of Archaeological Sciences, Science, Expedition, Archaeological Oceanography, Marine Geology, International Journal of Nautical Archaeology and the Journal of Maritime Archaeology* (Refs. 16.49 to 16.57);

- Consultation of databases on the national and regional framework of Russian archaeology and cultural heritage, including the Council of Europe Compendium of Cultural Policies and Trends in Europe (Ref. 16.58) and the European Heritage Network National Heritage Policies Database (Ref. 16.59);
- Analysis of the wider historical, cultural, archaeological and administrative context involved considering national and regional cultural policies and registers (Ref. 16.45; Ref. 16.46; Ref. 16.47), information on regional art and cultural policy (Ref. 16.60), regional material culture and crafts (Ref. 16.61; Ref. 16.62), and cultural festivals (Ref. 16.63; Ref. 16.64; Ref. 16.65);
- The history and location of land, naval and aerial combat sites in the vicinity of the pipeline corridor were assessed based on key local sources, memorials and international databases, including – Kriegsmarine Service Records (WASt), Lloyd's Register of Ships/Casualty Returns and Lloyd's List (Ref. 16.66);
- This study considered the academic context of past and on-going Black Sea archaeological research projects, including wider Black Sea research projects including the Black Sea Trade Project (Ref. 16.67), various projects of the Danish National Research Foundation Centre for Black Sea Studies (Ref. 16.68) and the French Research Institute in Oceanography's ASSEMBLAGE Project (Ref. 16.69); and
- National mapping was consulted to inform terrestrial field visits and understanding of the wider geographical and topographical context. Satellite imagery (Worldview-2/Ikonos Natural & False Colour Imagery, Oct/July 2011) was assessed for evidence of archaeological features and used in planning site visits. However, substantial portions of the route are under woodland cover or vineyard cultivation, which masks archaeological features from identification through satellite imagery.

16.4.2.2 Reporting Methodology

Arbitrary site identification numbers are used for terrestrial cultural heritage, e.g. RU-TCH-01 (Russia, Terrestrial Cultural Heritage, site no. 1). The referencing of marine cultural heritage follows an arbitrary numbering system for cultural heritage objects and also uses sequences of target naming systems established during earlier survey stages. Distances reported in the text in this chapter are measured from the nearest edge of a cultural heritage object to the nearest edge of a Project component or pipeline centreline (terrestrial) or from the nearest edge of a cultural heritage object to the nearest pipeline centreline (marine).



LEGEND

Russian Sector of South Stream Offshore Pipeline

- Proposed landfall section pipelines
- Landfall facilities
- Proposed microtunnels
- Proposed offshore pipelines
- Microtunnel entry shaft
- Microtunnel exit pit
- Permanent access road to be constructed by SSTTBV
- Varvarovka bypass road (used by Project during construction only)
- Potential storage area for dredged material
- General study area and survey area
- Area of potential cultural sensitivity
- Zone of potential influence

United Gas Supply System

- Permanent access road to be constructed by Gazprom Invest

Projection: Lambert Conformal Conic

Revision Details	By / Check	Check Date	Suffix

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Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: TERRESTRIAL CULTURAL HERITAGE STUDY AREAS

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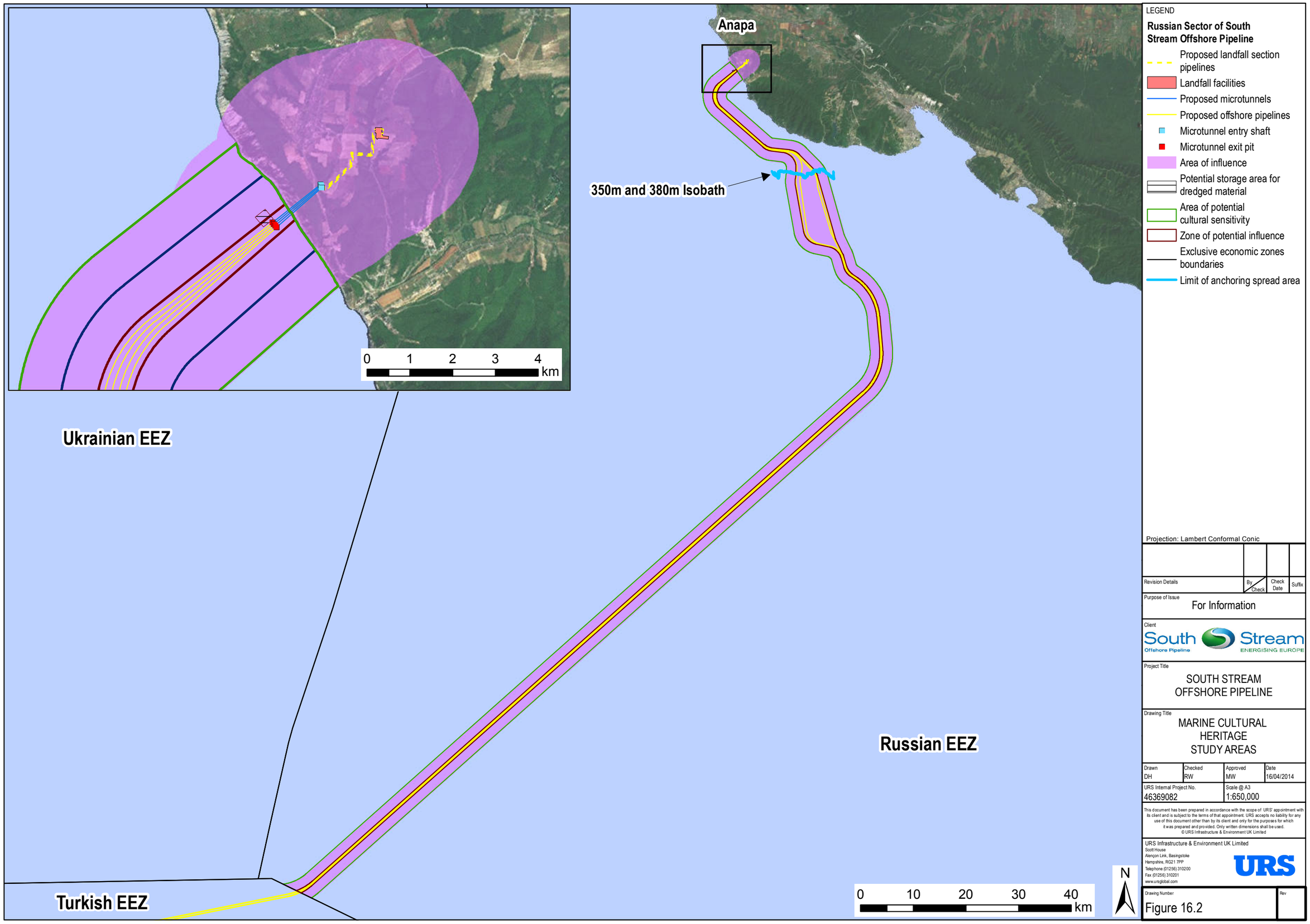

LEGEND

Russian Sector of South Stream Offshore Pipeline

- Proposed landfall section pipelines
- Landfall facilities
- Proposed microtunnels
- Proposed offshore pipelines
- Microtunnel entry shaft
- Microtunnel exit pit
- Area of influence
- Potential storage area for dredged material
- Area of potential cultural sensitivity
- Zone of potential influence
- Exclusive economic zones boundaries
- Limit of anchoring spread area

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16.4.2.3 Stakeholder Engagement

Meetings have been held with stakeholders including the Ministry of the Environment, regional, local and rural district administrations, government authorities, community service and infrastructure organisations, landowners, land users, residents of local communities (Gai Kodzor, Sukko, Supsekh, Varvarovka, Rassvet) and tourists, businesses and business associations, marine area users, inter-governmental organisations including the Black Sea Commission, a number of NGOs including international, national, local and community-based organisations (such as Ekurs, KD Group Political Consulting), academic and research organisations (Institute of Archaeology, Russian Academy of Sciences in Moscow).

These are further detailed in **Chapter 6 Stakeholder Engagement**. For cultural heritage, consultation was undertaken with the Department for Conservation, Restoration and Use of Historical and Cultural Treasures (Heritage) of the Krasnodar Region, the Institute of Archaeology of the Russian Academy of Sciences (IA-RAS) and the Krasnodar State Historic-Archaeological Museum named Felitsin (KSHAM).

The State Archaeological Expert Evaluation noted that the Commission of Experts considered it reasonable and possible to carry out works on the preservation of cultural heritage sites (terrestrial and marine) located in the area of the planned construction (positive conclusion) and recommended the research and design documentation for approval by the state agency for cultural heritage protection (Ref. 16.70; Appendix 16.8). The Project development has been approved by the Department for State Protection of the Cultural Heritage of Krasnodar Krai subject to the implementation of mitigation measures (Appendices 16.9 and 16.10).

Details of stakeholder engagement are set out below.

Terrestrial Cultural Heritage Stakeholder Engagement

Specific cultural heritage stakeholder engagement activities undertaken during the preparation of this assessment include the following:

- The Department for Conservation, Restoration and Use of Historical and Cultural Treasures (Heritage) of the Krasnodar Region was consulted by letter regarding terrestrial and marine cultural heritage in the Study Area (13.02.2011; Ref. 16.71; Appendix 16.3). Their initial response provided information on cultural heritage and zones of protection within the Study Area. It noted that test pit investigations should be carried out as part of a comprehensive baseline investigation of the terrestrial alignment. Depending on the results of investigations, in accordance with Article 36.3 of Federal Law No. 73-FZ (2002), it will be necessary to develop a Cultural Heritage CMP, monument protection measures, fieldwork plan and a mitigation works costing updating that in Proekt documentation (Ref. 16.72; Appendix 16.4);
- Archaeological test pit investigations undertaken in 2011 revealed unstratified archaeological material (ceramics, bone and building materials) at sites Varvarovka 1, Varvarovka 2 and Varvarovka 3. The Krasnodar Krai Heritage Department ('the Department') considered that these sites were not liable to mandatory preservation due to the absence of archaeological stratification and features, and were not eligible for inclusion

on the Unified State Register of the Objects of Cultural Heritage (Monuments of History and Culture) of the Peoples of the Russian Federation. The Department noted that due to the presence of cultural material in the topsoil, and the potential for buried archaeological deposits beneath the soil horizon disturbed by ploughing, Construction Phase groundworks should be subject to an archaeological watching brief in accordance with the current Handbook of Instructions of the Ministry of Culture (Ref. 16.73);

- Krasnodar Krai Heritage Department was consulted with regard to mitigation requirements at the kurgan site (RU-TCH-02) National Monument No 363 (Appendices 16.3 & 16.4). The Department has approved the Project development subject to the implementation of mitigation measures, including the archaeological supervision (watching brief) of excavation and construction work and informing monument protection authorities prior to the start of groundworks (Appendix 16.9);
- The Krasnodar State Historic-Archaeological Museum named Felitsin (KSHAM, Anapa) was consulted by letter regarding terrestrial and marine cultural heritage in the Study Area (13.02.2011; Ref. 16.74; Appendix 16.5);
- The Krasnodar Krai Heritage Department was consulted regarding archaeological surveys for the Varvarovka bypass road area resulting in a terrestrial walkover survey in June 2014 (see Table 16.2). Upon completion of the survey, the Department noted that due to the partial location of the site within the archaeological protection zone of the Varvorovka settlement (medieval, 6th to 13th centuries AD), excavation and construction work should be subject to archaeological supervision (watching brief) in accordance with the current Handbook of Instructions of the Ministry of Culture (Ref. 16.73) and informing monument protection authorities prior to the start of groundworks (Appendix 16.11); and
- During the community public hearing held at the Arin Berd Armenian cultural centre on 12 December 2012, a priest in Gai Kodzor was concerned that noise and vibration from the Russkaya Compressor Station (CS) would have an impact on his church and services. See Appendix 20.1 (Environmental Impacts of Associated Facilities: Russkaya CS) for further information. Further details regarding stakeholder consultation are contained in **Chapter 6 Stakeholder Engagement**.

Marine Cultural Heritage Stakeholder Engagement

Potential impacts upon marine cultural heritage were identified through the Project's stakeholder engagement activities as being of high importance to the Project (**Chapter 6 Stakeholder Engagement**) and meetings were undertaken with the Institute of Archaeology of the Russian Academy of Sciences (IA-RAS) and the Krasnodar State Historic-Archaeological Museum named Felitsin (KSHAM) to determine the scale and scope of the impact assessment, its parameters and the surveys undertaken. The Project held meetings with both organisations inJuly 2013 to:

- Provide information on the proposed mitigation strategy for marine cultural heritage (i.e. avoidance by a buffer of 150 m);
- Request comments and feedback on the proposed strategy, including any alternative suggestions; and

- For cultural heritage objects that fall within the 150 m buffer and the pipeline route cannot be optimized, discuss proposed mitigation plans (i.e. relocation and/or recovery).

Both IA-MAS and KSHAM agreed with 150 m as being an acceptable distance for avoidance. It was agreed that:

- The two aircraft wings (RU-MCH-001 [B5_S0006] & RU-MCH-002 [RS_651]) receive additional visual survey via remotely operated vehicle (ROV) to identify the type of aircraft and search for any additional remains, as these sites could represent military vessels and possibly war graves. The results of these surveys should then be checked against military records to potentially identify the aircraft and determine its crew and, if warranted, consult with the Russian Association of War Memorials (Ассоциация "Военные Мемориалы"). Recovery of wing RU-MCH-001[4] was not recommended due to logistical complications (e.g. who will raise the object and where will it be housed), but it could be relocated away from the pipeline construction corridor if it is considered to be at risk from pipe-lay operations;
- The amphora (RU-MCH-003) would be recovered under the supervision of a licensed Russian archaeologist, using a ROV; and
- The wooden shipwreck (RU-MCH-004), would be extremely difficult and costly to recover and conserve and it is best left in place; it was noted that sufficient precautions must be taken to avoid any possibility of anchor damage.

Krasnodar Krai Heritage Department has approved the Project development subject to the implementation of mitigation measures, including the recovery of the amphora (RU-MCH-003) (Appendix 16.10).

16.4.3 Data Gaps

Based upon the review of the data presented in Section 16.4.2 a gap analysis was undertaken between March and May 2012 in order to identify cultural heritage surveys needed to adequately define baseline conditions. The gap analysis noted that:

- The available reporting did not consider results of, or interfaces with, other environmental topics, e.g. soils, geotechnical studies, coastal erosion, bathymetric and geophysical data in an integrated manner;
- Existing data concentrated on known sites, rather than archaeological potential;
- Terrestrial data contained limited and unconfirmed information on current land use, and the reliability of data on the location, date, significance and character of archaeological and cultural heritage sites needed to be verified on the ground;

[4] Wing RU-MCH-002 lies in deep water on the continental slope at a depth of approximately 1578 m, is located over 162 m from the nearest pipeline.

- No terrestrial geophysical survey or intrusive archaeological investigation beyond test pit investigation had been carried out, due to the lack of a defined route and terrain constraints (woodland and active vineyards);
- The available reporting did not consider social topics, such as culture and tourism;
- The available reporting made no reference to intangible, natural or palaeontological heritage;
- Limited information on marine non-intrusive geophysical survey or ROV investigation was available at the time of the data gap analysis;
- A survey of the Anchor Corridor had not been undertaken as the area covered by this could not be calculated prior to the selection of the construction contractor and confirmation from the contractor of the area to be used by anchors for the pipe-laying vessel; and
- The reliability of marine survey data was not known. The gap analysis indicated that following the review of the geophysical methods applied and all available reports, further marine archaeological surveys may be required.

Actions arising from the gap analysis included obtaining and translating the full suite of reports prepared in 2011 (Refs. 16.39 to 16.41; Refs. 16.75 to 16.83) and 2012 (Ref. 16.84) for onshore and offshore cultural heritage, including correspondence, raw marine survey data, relevant marine survey methods and subsea imagery (Refs. 16.39 to 16.41; Refs. 16.75 to 16.83; Ref. 16.84); obtaining topographic mapping and information on military or restricted sites at appropriately detailed scales; contacting relevant authorities to establish their requirements; undertaking local consultation; and undertaking a site visit to establish archaeological potential and inform the scope of further survey, design and mitigation works.

After the gap analysis had been completed, further marine surveys using ROV were carried out between June and October of 2012 (see Table 16.3) and a terrestrial walk-over survey was carried out in August 2012. Following these further surveys, the implementation of the gap analysis actions, and the application of the Project design controls and mitigation measures (see Section 16.7), it was confirmed that no further terrestrial archaeological surveys were required. A further marine survey of the Anchor Corridor Area in the nearshore section of the Project would be required but would be undertaken prior to construction by the Project contractor once vessel type and anchor corridor area were known (see Sections 16.4.5 and 16.7).

16.4.4 Primary Data/Baseline Surveys

Surveys undertaken for the Project are detailed in Table 16.2 (terrestrial) and Table 16.3 and Table 16.4 (marine). The results of field surveys are summarised in Table 16.6 (terrestrial and marine) and Table 16.7 (marine). The location of archaeology and cultural heritage sites are marked on the constraints maps, Figure 16.5 (terrestrial) and Figure 16.7, Figure 16.8 and Figure 16.9 (marine). Inventories of cultural heritage sites are contained in Appendices 16.1 and 16.2 (Ref. 16.39; Ref. 16.40; Ref. 16.41).

Georeferencing is sensitive information which is omitted in order to protect sites from illegal looting. In order to protect terrestrial sites from looting, and shipwreck sites from unauthorised diving, the Project has adopted a policy of site confidentiality. This means that the general

locations of sites are mapped, but their exact locations (i.e. coordinates) are not publicly disclosed in this ESIA Report.

16.4.4.1 Terrestrial Surveys

A systematic visual walkover survey of the terrestrial portion of the construction corridor was undertaken up to approximately 1 km either side of the originally proposed pipeline centreline, with a linear separation of 20 to 30 m between archaeologists, noting areas of high topographic potential and observing areas of existing ground disturbance. Field survey was inevitably constrained in areas of dense woodland and steep hillsides. Systematic fieldwalking and artefact collection was undertaken in three vineyards southeast of Varvarovka where the walkover survey had identified artefact scatters (RU-TCH-03; RU-TCH-04; RU-TCH-05). Based on the results of the fieldwalking survey, nine test pits (2 m x 2 m) were excavated in areas of high potential in order to assess the character and integrity of deposits. This work was undertaken according to Russian Federation Permit N1149 for archaeological excavations and surveys (dated 10.11.2010) and Krasnodar region license N56 (dated 16.11.2010) (Ref. 16.40; Ref. 16.41).

A non-intrusive terrestrial walkover survey was undertaken in August 2012. This involved walking the proposed route of the construction corridor and assessing the potential for previously unrecorded archaeological sites or monuments on or adjacent to the Survey Area; visiting designated national monuments to assess their condition and vulnerability; and visiting cultural heritage sites located in within the terrestrial Area of Potential Cultural Sensitivity, noting churches, cemeteries and war memorials. An additional non-intrusive terrestrial walkover survey supplemented by the excavation of test pits was undertaken in June 2014 to fully cover the area of the Varvarovka bypass road.

Terrestrial cultural heritage field studies undertaken are detailed in Table 16.2.

Table 16.2 Terrestrial Cultural Heritage Studies

Name of Survey	Month, Year	Contractor	Limits of Study	Type of Study
Archaeological desk-based study	September – December 2011	Support Foundation for Archaeological Monuments Protection & JSC Kuban Heritage	Approximately 2.5 km either side of the originally proposed onshore pipeline route centreline.	Desk-based assessment of archives and cultural heritage databases (fund materials)
Terrestrial field survey	October – November 2011	Support Foundation for Archaeological Monuments Protection & JSC Kuban Heritage	Approximately 1 km either side of the originally proposed onshore pipeline route centreline.	Terrestrial archaeological field survey (visual walkover survey, systematic fieldwalking and test pit excavation)

Continued…

Name of Survey	Month, Year	Contractor	Limits of Study	Type of Study
Terrestrial archaeological site walkover survey (non-intrusive).	August 2012	On-Site Archaeology, UK	Approximately 1 km either side of the originally proposed onshore pipeline route centreline. Communities within the terrestrial Area of Potential Cultural Sensitivity.	Verification of survey data. Visual survey for the presence of visible archaeological features. Assessment of current condition of known archaeological sites and designated monuments. Identification of tangible, intangible and critical cultural heritage in accordance with IFC PS8 requirements.
Terrestrial archaeological site walkover survey (non-intrusive) supplemented by the excavation of test pits.	June 2014	JSC Kuban Heritage	Plotted route of the northern section of the Varvarovka bypass road	Investigation for the presence of visible archaeological features. Assessment of current condition of known archaeological sites and designated monuments.

Complete.

16.4.4.2 Marine Surveys and Analysis

Three steps were employed in the identification of marine cultural heritage:

- The geophysical and environmental marine surveys conducted to collect primary data;
- The geophysical and environmental marine survey data interpretation; and
- Geographic Information System (GIS) analysis integration.

The marine surveys were carried out by third-party contractors, while data post-processing and analysis were completed by both the third-party survey contractors and contracted cultural heritage professionals. A description of marine survey methods is set out in Appendix 16.7 (Marine Geophysical, Environmental and Archaeological Survey Methods).

Information on marine CHOs draws on data gathered from previous studies carried out for the Project, including extensive feasibility and engineering surveys performed since 2008. Those studies, which primarily focused on gathering information for geoenvironmental, geotechnical, environmental and engineering purposes, are detailed in Table 16.3. The surveys utilised the following equipment to image and investigate the seafloor: side-scan sonar; multibeam echo

sounder; sub-bottom profiler; and magnetometer (limited use in shallow waters only). During investigations, objects that exhibited anthropogenic features were located and briefly analysed to determine if further investigations were required.

In addition, marine cultural heritage surveys in 2012 contributed information to this cultural heritage assessment. Fieldwork included a visual inspection of potential CHO targets in the nearshore and offshore sections using a Remotely Operated Vehicle (ROV) equipped with an underwater video camera. These surveys are also noted in Table 16.3.

Table 16.3 Marine Surveys

Name of Survey	Month, Year	Surveyor	Location of Study	Type of Survey
Offshore Seismic Survey	December 2010	Peter Gaz	Russian Territorial and EEZ Waters	2D high resolution
Nearshore Geophysical Surveys	April 2011	Peter Gaz	Russian Territorial Waters	Multi-beam echosounder, sub-bottom profiler, side-scan sonar
Offshore Geophysical Survey	April – May 2011	Peter Gaz	Russian Territorial and EEZ Waters	Multi-beam echosounder, sub-bottom profiler, side-scan sonar, magnetometer
Offshore Geophysical Survey	May – July 2011	Peter Gaz	Russian Territorial and EEZ Waters	Multi-beam echosounder, sub-bottom profiler
Nearshore Geophysical Surveys	August 2011	Peter Gaz	Russian Territorial Waters (near Anapa, Krasnodar Krai)	Geomorphology surveys
Offshore Geophysical Survey	October 2011	Peter Gaz	Russian Territorial and EEZ Waters	Multi-beam echosounder, sub-bottom profiler, side-scan sonar
Offshore cultural heritage surveys	June 2012	Peter Gaz	Russian Territorial and EEZ Waters	ROV (e.g. visual) analysis of cultural heritage)
Offshore cultural heritage surveys	June 2012	Peter Gaz	Russian Territorial and EEZ Waters	ROV (e.g. visual) analysis of cultural heritage)

Continued…

Name of Survey	Month, Year	Surveyor	Location of Study	Type of Survey
Offshore cultural heritage surveys	September – October 2012	Peter Gaz (MV "Akademik Golitsyn")	Russian Territorial and EEZ Waters	ROV (e.g. visual) analysis of cultural heritage)

Complete.

Desk-based analysis of marine geophysical survey data (ROV and video data) was undertaken by the Support Foundation for Archaeological Monuments Protection and JSC Kuban Heritage in 2011. Further cultural heritage analysis was carried out in 2012 and 2013 to verify the survey data acquired for other purposes, analyse new survey data, and to assess the baseline conditions for marine archaeology CHOs within the Survey Area[5]. Table 16.4 provides details of the analysis carried out and methods used to achieve the required objectives.

Table 16.4 Marine Cultural Heritage Data Analysis

Survey method	Survey extent	Objective	Surveyor	Date
Desk-based analysis of marine geophysical data	Approximately 2 km centred on the original proposed pipeline route centreline	Desk-based analysis of marine geophysical survey data	Support Foundation for Archaeological Monuments Protection & JSC Kuban Heritage	Sep – Dec 2011
Desk-based analysis of marine geophysical survey data (ROV & video data)	Approximately 2 km centred on the original proposed pipeline route centreline	Verification of survey data Visual identification, interpretation and assessment of visible archaeological features Assessment of character and current condition of marine archaeology	URS	2012 and 2013

16.4.5 Data Assumptions and Limitations

Potential cultural heritage occurring outside the defined Study and Survey Areas detailed herein has not been considered within this impact assessment.

[5] The analysis of CHO was based on pipeline route definition #300512 (dated 30 May 2012).

Cultural heritage data only represents known sites. Additional, presently unknown buried terrestrial or marine archaeological sites may exist that have not been identified through the ESIA investigations.

During the terrestrial surveys, areas of exposed topsoil, subsoil and natural geology were examined for the presence of artefacts or traces of human occupation. These areas include the edges of vineyards, roadside ditches, the sides of dry gullies, eroding cliff faces, upcast spoil from animal burrows and storm-pulled tree root boles. Fields may have subsequently been ploughed, ditches and gullies may have been subject to natural scouring or deliberate clearing, further erosion may have occurred and further trees may have been uprooted. To obtain a fuller coverage, it would be necessary to monitor the Study Area over a number of years.

The woodland in the Study Area is extensive and heavily overgrown in places, which may obscure archaeological sites. Many of the sites that might exist here may only be discovered by chance (hence mitigation measures include archaeological watching brief and chance finds procedure, see Section 16.7).

No detailed analysis of primary medieval and post-medieval historical sources related to the Study Area has been undertaken although place-name evidence has been reviewed.

No research has been undertaken into oral sources, as it was considered that this would be unlikely to reveal any substantial amount of relevant data relating to the Study Area, which contains no settlements within it and has relatively recent vineyard cultivation. The route corridor population is seasonal and transient, mainly using the area for leisure or fishing.

Since the Scoping Report was issued, the community of Rassvet has been identified as a potentially affected Local Community due to confirmation that construction traffic will travel through Rassvet. Therefore, commitments to mitigate potential impacts on Rassvet's cultural heritage have been considered in this chapter.

In the nearshore section of the Project, low sedimentation rates and shallow bedrock offer little to no depositional protection from the existing high energy environment (see Section 16.5.4.2) so any buried remains are likely to be small and scattered. Due the very slow rate of sedimentation on the abyssal plain (see **Chapter 7 Physical and Geophysical Environment**) in the offshore section of the Project, it is unlikely that previously unknown objects would be identified in that area.

The Anchoring Spread Area in the nearshore section of the Project had not been surveyed at the time of writing and is therefore not included in the assessments and conclusions of this Chapter. An Anchor Corridor Survey will be undertaken by the construction contractor when the area to be used for anchoring vessels has been calculated and confirmed based on identified vessels and the pipelaying method (see **Chapter 5 Project Description**).

16.5 Baseline Characteristics

16.5.1 Overview

The Black Sea and the Krasnodar Krai are rich in both terrestrial and marine cultural heritage including the archaeological remains of prehistoric *kurgan* burial mounds, ancient towns and settlements, archaeological remains of shipwrecks and associated nautical material. Within the Project Area there is known terrestrial cultural heritage and known and potential marine cultural heritage, including the remains of submerged vessels.

The baseline section of this Chapter presents the historical and cultural context followed by information on the terrestrial and marine known and potential cultural heritage objects identified within the Study Areas as defined in Section 16.3.

The Black Sea has been navigated for thousands of years and served as a nexus for human activity and migration. The subject of scholarly research for the past 50 years, it is unknown when humans first traversed these waters, as archaeological examples of early watercraft have yet to be encountered. Early vessels developed during the Mesolithic to Early Bronze Age (c. 10,000 BC) were relatively simple by today's standards and possibly consisted of dugout canoes, skin boats, and/or rafts. These types of watercrafts are intended for use in localized coastal waters and were probably used to transport a limited number of people for exploration and resource procurement purposes. Remains of such dugout boats have been discovered along the Bulgarian coast that date to the Early Bronze Age (c. 3,200 BC) and represent some of the earliest watercraft to be discovered in the Black Sea.

It was during the Bronze Age that vessels began to increase in size and complexity. Simple canoes gave way to larger, plank-built vessels that were capable of carrying great quantities of goods and merchandise farther along the coast, as trade at this time likely existed between coastal settlements. A boom in maritime activities occurred with the arrival of Greek explorers during Antiquity (c. 700 BC to AD 395). Subsequent colonisation efforts allowed for major trade and production centres began to develop at settlements along every coast of the Black Sea. With the Greeks came their knowledge of seafaring and nautical traditions, which included sail-driven merchant ships and rowed military vessels, traditions eventually utilized by the Romans when they came into power. Maritime trade networks significantly expanded, especially during the medieval and post-medieval periods (395 to 1422), when Mediterranean and other European ships made their way into the Black Sea.

Shipbuilding underwent a profound change at this time; the concept of naval architecture was born and foreign construction conventions and ideas spread through the region. Speed, manoeuvrability, and carrying capacity were traits that shipwrights yearned to perfect, and gradually ships continued to grow in terms of size, grandeur, and intricacy. Seafaring soon became a global enterprise and the Black Sea became a highly attractive region both economically and militarily. Changes to shipbuilding continued, as steam-power and metal-hulled ships began to replace more traditional watercraft beginning in the 19th century. Large scale naval warfare during this time and through the 20th century also contributed to the development of ship design and construction.

A timeline of the north-eastern Black Sea Region is presented in Table 16.5, summarising the regional chronology in order to assist in understanding the area's historical and cultural context. It is important to note that there is a degree of overlap between some cultural periods, and that local chronological models continue to be developed through the application of scientific dating methods.

Table 16.5 Timeline of the North-eastern Black Sea Region

Epoch	Period	Description
Pleistocene Era	Lower Palaeolithic circa (c.) 2,000,000 – 200,000 Before Present (BP)	Homo erectus (1.9 Ma - 200,000 BP) European Neanderthal Homo sapiens (350,000 - 30,000 BP)
	Middle Palaeolithic c.200,000 – 43,000 BP	European Neanderthal Homo sapiens (350,000 - 30,000 BP)
	Upper Palaeolithic c.43,000 – 12,000 BP	European Neanderthal Homo sapiens (350,000 - 30,000 BP) European Early Modern Humans (43,000 BP+) Intermittent glaciations, hunting and gathering, portable and cave art, mammoth bone houses
Holocene Era	Mesolithic c.10,000 – 6,800 Before Christ (BC)	Hunting and gathering in extensive temperate forests and on coastlines
	Neolithic c.6,800 – 3,200 BC	Animal husbandry and agricultural cultivation, hunting wild animals, fishing and gathering wild foods. Horses domesticated
	Eneolithic/Chalcolithic c.5,000 – 3,200 BC	Development of copper metalworking alongside Neolithic developments
	Bronze Age c.3,300 – 700 BC	Early Bronze Age c. 3,700 – 2,500 BC, Maikop Culture Middle Bronze Age c. 3,300/2,900 – 1900 BC, Catacomb Culture Middle Bronze Age c. 3,000 – 1,700 BC, Kabardino-Pyatigorsk/North Caucasus Middle Bronze Age c. 2700 – 1,400 BC, Circassian Dolmen Culture Late Bronze Age c. 1,900 – 1,200 BC, Srubna/Timber Grave Culture

Continued…

Epoch	Period		Description
Holocene Era	Bronze Age c.3,300 – 700 BC		Late Bronze Age c. 1,300 – 700 BC, Scythian and Sarmatian nomads
	Iron Age c.900 BC – Anno Domini (AD) 200		Scytho-Meotian, Sindian and Sarmatian semi-nomads
	Antiquity c.800 BC – AD 370	Archaic c.800 – 480 BC	6th century BC, Early Greek Pontic colonies
		Classical c.480 – 323 BC	Kingdom of the Cimmerian Bosporus
		Hellenistic 323 – 146 BC	Hellenistic Kingdom of the Cimmerian Bosporus
		Roman 63 BC – AD 370	Roman Kingdom of the Cimmerian Bosporan
	Medieval AD 370 –1475	Barbarian invasions	Goths, European Huns, Turkic tribes, Bulgars
		Khazar AD 618– 1048	Khazar Khanate, Tmutarakan Principality
		Kievan Rus	10th and 11th centuries, Kievan Rus polity
		Byzantine	13th century
		Tatar-Mongolian invasions	13th century, invasions of Golden Horde khans
		Genoese	13th to 15th century, colony of Mapa (Anapa)
	Post-medieval	1475 – 1829	Ottoman Empire
	Modern	1829 – present	1829 Treaty of Adrianople, Anapa annexed to Russia 1853 to 1856 Crimean War 1917 Russian Revolution 1941 – 1945 Great Patriotic War & 1942 – 1943 Axis occupation

Complete.

16.5.2 Archaeological and Historical Context – Terrestrial and Marine

The following archaeological and historical context sets out the background setting of the Project, covering both terrestrial and marine areas. Cultural heritage receptors identified within the Study and Survey Areas are summarised in Table 16.6 and an illustrated inventory is contained in Appendices 16.1 (Inventory of Terrestrial Cultural Heritage Finds) and 16.2 (Inventory of Marine Cultural Heritage Finds).

16.5.2.1 Lower Palaeolithic (c.2,000,000 to 200,000 BP)

During the Lower Palaeolithic, pre-modern humans (Homo erectus) lived in small groups, hunting and gathering from a home base often near a river or cave. Remains include stone tools and fossil bone. Evidence for Lower Palaeolithic activity is very rare, but of great scientific importance. The earliest known hominin site in the region is at Dmanisi, Georgia (located c.680 km southeast of the Project shore crossing), where researchers have found faunal remains dating to the Pliocene (c.5.332 to 2.588 million years before present (Ma)) or earliest Pleistocene Era (c.2.588 to 0.781 Ma), fossilised Homo erectus hominin bones, and Oldowan (c.1.8 Ma) and Acheulean (c.1.4 Ma) stone tools (Ref. 16.85; Ref. 16.86).

Desk based literature review has not identified any terrestrial Lower Palaeolithic sites within the General Study Area. Lower Palaeolithic sites are thus not considered further within this impact assessment.

16.5.2.2 Middle Palaeolithic (c.200,000 to 43,000 BP)

During much of this period, Kuban was a peri-glacial environment, located south of the ice sheets and west of the glaciers of the Caucasus Mountains. The Ice Age glaciations did not reach the eastern shores of the Black Sea, but the colder climate was reflected in the animal species present.

Acheulian material (c.700,000 to 120,000 BP) frequently comprises flint, slate and sandstone tools recovered from river-rolled gravels and eroded river terraces that are not in their original location. Later Acheulian tools, such as scrapers, choppers and chisels have been recovered from inland sites in Krasnodar such as Belorechensk (Belaya River, approximately 200 km east of the Project shore crossing) and Labinsk (Bolshaya Laba River, 268 km to the east), the valley of the River Kuban (approximately 60 km to the northeast), and coastal sites such as Kadoshy Cape, near Tuapse (approximately 155 km to the southeast) (Ref. 16.87; Ref. 16.88).

During the Mousterian (120,000 to 30,000 BP), Neanderthals and early humans lived in caves, open-air settlements and temporary hunting camps, in structures built from the bones of mammoths and other large animals. Mousterian tools have been recovered from Ust'-Labinsk, approximately 190 km inland, east of the Project shore crossing in eastern Krasnodar Krai, and archaeological layers have been investigated at the cave sites of Barakaevskaya Monasheskaya and Gubskaya (265 km inland). Tools and the bones of hunted animals including bison, aurochs (extinct cattle), megaloceros (extinct elk), mammoth, wild horse, red deer, wolf and cave bear were recovered from the Ilskaya I and II caves (approximately 95 km east of the Project; Ref. 16.89).

Desk based literature review has not identified any terrestrial Middle Palaeolithic sites within the General Study Area. Middle Palaeolithic sites are thus not considered further within this impact assessment.

16.5.2.3 Upper Palaeolithic (c.43,000 to 12,000 BP)

During the Upper Palaeolithic, anatomically modern humans arrived in Europe and south-west Asia. Tools became increasingly complex and varied, with distinctive regional styles, perhaps indicating the emergence of territorial groups. During intermittent cold periods, the Kuban region lay south of the ice sheets. Mammoth bone was used extensively in constructing huts and tents, and caves and rock shelters were occupied. Large mammals such as reindeer, bison and woolly rhinoceros were hunted using spears.

The earliest evidence for human activity in the vicinity of the landfall section of the Project comprises Upper Palaeolithic stone tools found in the vicinity of the village of Supsekh (located approximately 5 km north of the landfall section of the Project) (Ref. 16.90). Given the distance between defined Upper Palaeolithic receptors and the Project, these are not considered further within this impact assessment.

16.5.2.4 Mesolithic (c.10,000 to 6800 BC)

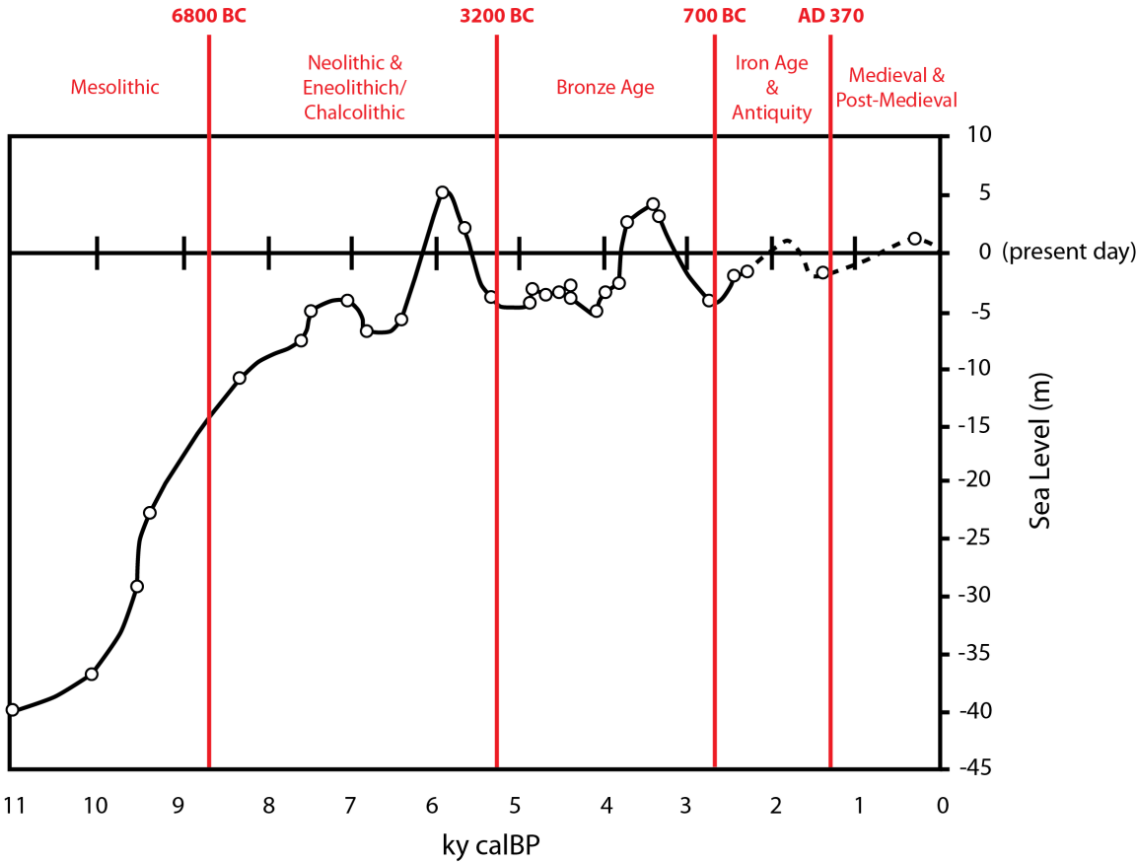
The retreat of the ice sheets of the Würm glaciation marked the end of the Pleistocene epoch and the start of the Holocene (Ref. 16.86). The climate became more temperate, resulting in the expansion of forest and steppe, and opening up a wider range of food and other natural resources. Mesolithic populations subsisted by semi-nomadic, seasonal hunting and gathering. Bows and arrows, slingshots and composite tools made from small microliths were developed. Grinding stones were used to process plants. Harpoons and net-sinkers have been found, indicating a greater role of fish in the diet than in previous periods.

Stratigraphic and palaeogeographic data indicates that the level of the Black Sea has undergone a range of significant rises and falls, resulting in a changing coastline and the submersion of Pleistocene and early Holocene landscapes (Ref. 16.91). Ancient coastlines have left permanent traces in the form of coastal terraces, relict seafloor features and offshore deposits. During this period the sea levels of the Black Sea were significantly lower than the sea levels of today. Analysis of submerged topography indicates that during the late Pleistocene, sea levels along the eastern and southern shorelines of the Black Sea were, at maximum, approximately 100 m to 155 m below present-day sea levels (Ref. 16.92). Lower sea levels meant greater exposure to the continental shelf for potential human activities, as there was likely to have been extensive exploitation of coastal receptors at this time. Sea levels at the end of the Mesolithic are estimated between 13 m and 15 m below present day levels (Figure 16.3; Ref. 16.93). The rise in sea level up to those of the present day may have slowed agricultural development, forced the migration of affected coastal populations, and extended the period of nomadic ephemeral land use. The drastic rise in sea level is primarily due to regional tectonic faulting and uplifts coupled with the relatively unstable climate oscillations from warm and moist to cold and dry. Archaeological sites from this period were inundated following an increase in sea level. Additionally, many terrestrial Mesolithic sites have been lost due to changes in river courses as a result of a rise in sea level. The potential for inundated Mesolithic sites to exist within the

shallow-water marine environment of the Project Area is classified as low due to high wave-based energy coupled with diminished sedimentation rates and shallow bedrock.

Desk based literature review has not identified any terrestrial Mesolithic sites within the General Study Area. Mesolithic sites are thus not considered further within this impact assessment. No marine Mesolithic sites have been identified within the marine Survey Area.

Figure 16.3 Sea Level Curve of the Black Sea



Note: Figure after Filipova-Marinova, M. 2007 "Archaeological and paleontological evidence of climate dynamics, sea-level change and coastline migration in the Bulgarian sector of the Circum-Pontic Region," figure 2, p. 460. In V. Yanko-Hombach, A.S. Gilbert, N. Panin & P.M. Doukhanov (eds) The Black Sea Flood Question: Changes in Coastline, Climate, and Human Settlement. Springer, Dordrecht, pp. 453-481.

16.5.2.5 Neolithic and Eneolithic/Chalcolithic (c. 6,800 to 3,200 BC)

During the early Neolithic period, there was a shift towards the domestication of animals and plants. Pottery, textiles and a range of new stone agricultural tools were developed. Neolithic houses, made of mud and wood, were built in small villages. These were often located in river valleys. During the Eneolithic/Chalcolithic period (c. 5,000 to 3,200 BC), copper and gold metalworking was developed.

An overall increase to sea level continued into the Neolithic and Eneolithic/Chalcolithic periods. According to some researchers, the level of the Black Sea rose suddenly around 5,600 BC, increasing from 80 m below sea level, at maximum, to present-day levels, resulting in a

catastrophic flood which submerged coastal sites, harbours, and river deltas (Ref. 16.94; Ref. 16.95). However, recent research suggests that if the flood occurred at all, water may have risen much less (Ref. 16.96), and that it was not a sudden event (Ref. 16.97). Analysis of sea level curves indicates that several transgression/regression episodes occurred during these periods. During the final Eneolithic through to the Early Bronze Age (c. 4,400 to 3,200 BC), several submerged marine beach facies and estuarine peat layers were found in the Kerch Strait region, connecting the Sea of Azov with the Black Sea (approximately 60 km northwest of Anapa), at depths that ranged from 6.5 m to 5 m below present day sea levels (Refs. 16.98 to 16.105). The Kerch Straits begin approximately 80 km northwest of the Project shore crossing. Sea level oscillations continued throughout this period resulting from global climate changes brought about by planetary orbital shifts, increased volcanism, and regional plate tectonics. Russian sea level curves place the most likely occupied areas during this time along a submerged shoreline between 6 m and 5 m below sea level. The potential for inundated Neolithic and Eneolithic/Chalcolithic sites to exist within the shallow-water marine environment of the Project Area is classified as low due to high wave-based energy coupled with diminished sedimentation rates and shallow bedrock.

Desk based literature review has not identified any terrestrial Neolithic and Eneolithic/Chalcolithic sites within the General Study Area. Neolithic and Eneolithic/Chalcolithic sites are thus not considered further within this impact assessment. No Eneolithic/Chalcolithic sites have been identified within the marine Survey Area.

16.5.2.6 Bronze Age (c. 3300 to 700 BC)

It is not until the late Chalcolithic to Early Bronze Age (c. 3,800 to 3,200 BC) that the sea levels stabilised across the Black Sea and large-scale re-settlement of earlier flooded landforms occurred. By this time sea levels had reached between 8 m to 5 m below present day sea levels at Anapa and the Kerch Strait region (Refs. 16.93, 16.100, 16.105). Sea levels rose up to 5 m above present day levels during the second millennium BC, a total increase of 10 m, before regressing back to approximately 4 m below present day levels c. 700 BC (Ref. 16.93). The potential for inundated Bronze Age sites to exist within the shallow-water marine environment of the Project Area is classified as low due to high wave-based energy coupled with diminished sedimentation rates and shallow bedrock.

During the Bronze Age, farming and technology continued to develop and societies became more complex as social hierarchies emerged. Bronze metalworking and land and sea trade developed. The Bronze Age in Kuban is characterised by the construction of a range of elaborate tombs or kurgan burial mounds.

A series of culture-historical terms have been ascribed to the sequence of Bronze Age activity in the region. These are named after geographical type sites or key characteristics, and include the Maikop Culture, the Catacomb Culture, the Kabardino-Pyatigorsk/North Caucasus Culture, the Circassian Dolmen Culture and the Srubna/Timber Grave Culture. However, the dating of these periods, continuity and change between 'cultures' and the development of characteristic monuments and material typologies is still unclear and subject to academic debate, as relatively few modern excavations or scientific dating programmes have been undertaken.

There are Early Bronze Age Maikop Culture settlements (c. 3,000 BC) in the vicinity of Anapskaya (approximately 8.4 km north of the Project construction corridor) and Supsekh (approximately 4.4 km northwest of the construction corridor), with pottery sherds, stone tools and quern stones. Maikop Culture burials with circular stone coverings were identified near Rassvet in 1962-1963, accompanied by grave goods of pottery, musical instruments and bronze weapons (Ref. 16.41, p17). A ritual offering stone from a Maikop sanctuary was found near Anapa (Ref. 16.90, p20-21). No Dolmen Culture settlements (c. 2,500 BC) have been identified in the Anapa area, although dolmens (megalithic monuments) were noted near Natukhaevskaya (approximately 20 km northeast of the Project shore crossing) and in the Sukko valley (approximately 3 km southeast of the Project construction corridor) in the late 19th century (Ref. 16.106). The Catacomb Culture (c. 2000 BC) is represented by a number of kurgan burial mounds in the Anapa area. The North Caucasus Culture is represented by several burials in the Anapa area and by Kabardino-Pyatigorsk type stone axes.

The Late Bronze Age (c. 1,400 to 700 BC) is represented by tools, jewellery and weapons found in the Anapa area, and material from the Sukko valley, Vestnik, Gostagaevskaya and Chekon. A Late Bronze Age settlement has been identified in the vicinity of Supsekh. A number of Late Bronze Age Koban Culture kurgan burial mounds have been investigated. Their construction methods and grave goods may indicate origins in, or contact with, the Central Caucasus.

Evidence of maritime activity begins to appear during the Bronze Age. Archaeological remains of at least five dugout canoes have been found in western Russia that date to this period (Ref. 16.107). These discoveries all come from nearby inland river systems and no dugouts have yet been found near Anapa. Detailed listings of associated artefacts are scarce, but include pottery fragments and stone tools such as grooved chisels and axes. These vessels are likely to have transported resources and trade goods from production centres to settlement sites. Remains of similar watercraft have been found along the western Black Sea coast of Bulgaria; making it possible that canoes were once used all around the Black Sea shores (Ref. 16.108, Ref. 16.109).

No shipwreck remains have yet been discovered in Russia of sea-going vessels of this period, but the Uluburun shipwreck, located off Kas in Turkey (Antalya), can serve as an appropriate comparative example, as it has the most complete hull remains of any Late Bronze Age shipwreck and dates between 1316 and 1305 BC (Ref. 16.110). Notable is the Uluburun's method of construction, which is known as shell-first, as the hull planks are joined together using pegged mortise-and-tenons. Mortise-and-tenon joinery was a common shipbuilding practice all throughout the Mediterranean from the Bronze Age through to the medieval period (Ref. 16.111).

No Early Bronze Age material has been found within the terrestrial General Study Area.

The remains of Bronze Age to medieval period settlements have been identified during archaeological fieldwalking and test pit investigations at Varvarovka-2 (RU-TCH-04; unstratified site; northern pipeline centreline lies 357 m east of the south-eastern receptor boundary and the core of the site lies 477 m west of the northern pipeline centreline) and Varvarovka-3 (RU-TCH-05; unstratified site; located 557 m northwest of the northern pipeline centreline; the core of the site lies 651 m northwest of the northern pipeline centreline) (Ref. 16.39; Ref. 16.40; Ref. 16.41; Ref. 16.112). There are dolmens located in the Sukko valley, approximately 3 km

south of the landfall section, and four Bronze Age kurgans or kurgan groups are located on high points between the villages of Varvarovka and Supsekh, located more than 4.5 km north of the landfall section.

No evidence of Bronze Age maritime activity has been found within the marine Survey Area.

16.5.2.7 Iron Age (c. 900 BC to AD 200)

The sea levels of the Black Sea experienced minimal change during the Iron Age. The sea level was approximately 4 m below present day levels at the beginning of this period and rose approximately 5 m before dipping again to 2 m below present day levels (Ref. 16.93). This oscillation is attributed to ocean-atmosphere reorganisation associated with the Phanagorian Regression. The potential for inundated Iron Age sites to exist within the shallow-water marine environment of the Project Area is classified as low due to high wave-based energy coupled with diminished sedimentation rates and shallow bedrock.

Agricultural improvements in the Iron Age may have resulted in a shift from nomadic to more sedentary herding, and regional trading groups began to emerge. The ancient historians Herodotus (Ref. 16.113) and Strabo (Ref. 16.114) wrote that the Anapa region was populated by semi-nomadic Scythian tribes known as Maeotians and Sindians, in the 7th to 6th century BC. The nomadic Sarmatians were also recorded in the area in the 6th century BC, and Scytho-Maeotians may have fortified their settlements in response to this threat. The Kuban region was a significant contact and trading zone for agricultural and nomadic peoples, and held an important position in trade between Greeks and Barbarians. The Scytho-Maeotian tribes were gradually Hellenised, importing wine from western Turkey, northern Greece and the northern Aegean islands.

Maritime activities continued to expand in the Iron Age as a result of exploration and trade. The Scythian tribes were primarily horse-breeders and herders and maintained a semi-nomadic way of life up through the 3rd century BC (Ref. 16.115). Little is known of their maritime endeavours or vernacular watercraft, but dugout canoes are likely to have been used for inland water-based travel. Fishing was a popular activity in the northern Black Sea region during the early Iron Age, as evidenced by decorative fish motifs and tools used in fish procurement (such as hooks, line/net weights) (Ref. 16.116). After the arrival of the Greeks in the 6th century BC, it is possible that the Scythians adopted Greek shipbuilding techniques and developed sea-going watercraft, as ancient authors noted the flow of cultural influences between the two groups (Ref. 16.117). The Greeks also brought with them an increased demand for fish, which resulted in a shift from domestic to commercial fishing between the 4th and 2nd centuries BC (Ref. 16.116).

The remains of Bronze Age to medieval period settlements, which may include Iron Age material, have been identified during archaeological fieldwalking and test pit investigations at Varvarovka-2 (RU-TCH-04; unstratified site; northern pipeline centreline lies 357 m east of the south-eastern receptor boundary) and Varvarovka-3 (RU-TCH-05; unstratified site; northern pipeline centreline lies 557 m southeast of the southern boundary of the receptor and 651 m south east of the core of the receptor) (Ref. 16.39; Ref. 16.40; Ref. 16.41; Ref. 16.112).

No other evidence for terrestrial Iron Age activity has been found within the General Study Area, and no evidence for Iron Age activity has been identified within the marine Survey Area.

16.5.2.8 Antiquity (c. 800 BC to AD 370)

The Black Sea in Antiquity follows the same sea level curve as seen in the Iron Age. The sea level was approximately 4 m below present day levels at the beginning of this period and rose approximately 5 m before dipping again to 2 m below present day levels (Ref. 16.93). The potential for inundated Antique period sites to exist within the shallow-water marine environment of the Project Area is classified as low due to high wave-based energy coupled with diminished sedimentation rates and shallow bedrock.

Greek colonists settled on the shores of the Bay of Anapa in the late 6th century BC (Ref. 16.89; Ref. 16.118; Ref. 16.119), developing a town on the earlier settlements of Sindos or Limenas Sindikos. Their most significant settlement grew into the polis or city-state of Gorgippia, located on the site of modern Anapa, on the coast approximately 10 km northwest of the Project.

During the Classical period (480 to 323 BC), the city of Gorgippia was located in a key strategic position within the southern limits of the Cimmeran Bosporan Kingdom (Figure 16.4).

Figure 16.4 Greek Cities of the Black Sea

This Ancient Greek kingdom was first settled by Milesians in the 6th century BC, and its capital was at Panticapaeum (now Kerch in Crimea, Ukraine). The port of Gorgippia exported grain, fish and slaves to Athens, the Aegean and the Mediterranean, and imported wine. Trading partners changed over the 4th century; initially, wine was imported principally from Thrace (Mende), then from the Mediterranean, and later from the Aegean island of Kos and Knidos in south-western Turkey. The fertile hinterland (chora) of Gorgippia was characterised by planned, small satellite villages and farmsteads. Some were fortified, such as the farm of Dzhemet, Rassvet which was excavated in the 1960s and 1970s (Ref. 16.41). The area seems to have been rather thinly populated in comparison with the other chora of the Taman peninsula. South of Gorgippia, villages developed at Supsekh and Sukko.

A number of Gorgippia's necropolises have been investigated. Grave goods in the more central cemeteries demonstrate extensive Greek and Mediterranean culture and imported goods. However, some graves in Gorgippia's central cemeteries also contain local Scythian weapons and Maeotian ceramics. Rural necropolises are different, with distinctive stone structures and grave goods similar to those of the earlier Kobanskaya Culture, and Maeotian pottery. These rural necropolises are found within a radius of 20 km of Anapa, and have been noted at Anapskaya (approximately 8.1 km north of the construction corridor), Rassvet (3.5 km to the north), Usatova Balka (7.5 km to the north), Voskresenskiy (16 km to the north northwest), between Krasnyi and Krasnaya Skala (18.2 km to the north) and also at Tuapse (158 km to the southeast). There are similarities between the moulded pottery and jewellery deposited in the Kobanskaya Culture kurgans in the 8th to 6th century BC and in Antique rural necropolises of the 6th to 4th century BC. This seems to indicate a degree of cultural continuity in inland areas beyond the Greek Pontic shores.

In 310/309 BC, united Sarmatian nomadic tribes conquered the steppes on the right bank of the Kuban. The Maeotians' fortifications were dismantled, and their tradition of kurgan burial mounds richly furnished with weaponry ceased. Burial customs changed, and grave goods in kurgans increasingly included amphorae; some are accompanied by opulent Graeco-Sarmatian gold work, imported pottery and textiles.

The Bosporan Kingdom of Pontus became a client kingdom of the Roman Empire in 63 BC, and was briefly incorporated into the Roman province of Moesia Inferior (AD 63 to 68). The Roman kingdom was threatened by local Scythian and Sarmatian tribes, particularly in the 3rd to 4th century AD, when they were displaced by the westward migration of Goths. The city of Gorgippia was destroyed by fire c. AD 238/240, perhaps at the hands of Gothic tribes from the east, or Alans from the west. The Goths and Sarmatian Borani seized Bosporan shipping in AD 255. Gorgippia declined, and was finally abandoned following the Hun invasions of the 370s.

Analysis of submerged beach terraces from this area of the Black Sea reveals that sea levels during this period were between 4.5 m and 2.5 m below present-day levels (Ref. 16.93, Ref. 16.100, Refs. 16.102 to 16.105). In the Kerch Strait submerged Antiquity period wells, amphora, and other structures have been recorded at these depths, indicating possible port settlements. Submerged settlement sites on the Russian Black Sea coast have been identified in nearshore areas off Patrey (Garkuscha, Taman Bay, 70 km north of the Project); Kepy (65 km north-northwest of Anapa), Phanagoria (61 km north), Hermonassa, Taman Peninsula (72 km north), Korokondama, Cape Tuzla (74 km northwest), and Anapa (10 km north) (Ref. 16.120, Ref. 16.121).

When the Greeks reached the Pontic shores, they brought with them an extensive knowledge of sea-based navigation and shipbuilding technology. The warship and merchant ship were the two main types of Greek vessels that existed during this period, but it is the latter that likely made it to the eastern Black Sea region. Merchant ships were deep, broad wooden vessels that used sails as the primary mode of propulsion (Ref. 16.122). This ship type is depicted in decorative motifs from the period and even exists in an archaeological example from the eastern Mediterranean, the Kyrenia shipwreck. Warships, by contrast, were long, narrow wooden vessels with raised platforms and curved posts at both ends (Ref. 16.122). Another primary difference is that warships utilised solely oars for propulsion or a combination of both oars and sails. While characteristically different, it is believed that warships and merchant ships were built in the same fashion; that is, they were built in the shell-first style using an elaborate system of mortise and tenons to secure planking strakes, followed by the insertion of transverse frames as a secondary means of hull strengthening. The Greeks built their vessels using this method throughout Antiquity, while eventually increasing the size of both ship types.

The Romans, by contrast, were not a seafaring people and probably relied on Greek nautical traditions to design and build their vessels. Whilst not much is known about their warships, extensive research has been conducted on the Roman merchant fleet. These vessels were double-ended wooden sailing ships usually with two masts with a cargo capacity ranging from 3,000 to 10,000 amphorae (Ref. 16.122). They were rigged with one large, square mainsail and a smaller, triangular topsail and were fitted with large quarter rudders (i.e. steering oars) at the stern. The same shell-first, mortise-and-tenon construction method used during the Hellenistic period was employed by the Romans.

Regarding trade destinations and goods, the Greeks were more far-reaching than the Romans in their nautical endeavours. From 600 to 323 BC, Greeks sailors made their way from the Sea of Marmara all around the coast of the Black Sea, even reaching the Crimean Peninsula and the Sea of Azov (Ref. 16.123). Hellenistic settlements and city-states developed at eastern sites such as Gorgippia (Anapa, Russia), Phasis (Poti, Georgia) and Dioscurias/Sebastopolis (Sukhumi, Russia) until they came under Roman rule in the 2nd century BC (Figure 16.4). The Romans largely ignored the eastern Black Sea coast, as they instead concentrated efforts to develop settlements on the southern and western coasts. Principal Black Sea exports during this period included grain, salt, fish, and metals, while imports from the Mediterranean included oil, wine, and finished products such as ceramics, metal goods and glassware (Ref. 16.124).

Maritime archaeological finds have been found along the Russian Black Sea coast that date to the Antiquity period. At the Yevpatoria sea port, Lake Donuzlav, Crimea, Ukraine (345 km to the west of the shore crossing and approximately 255 km north of the offshore section), the remains of a ship and its cargo of Heraclean amphora were discovered dating from the 4th to 3rd centuries BC (Ref. 16.120). Vessels from this period have also been found along the Turkish coast, thereby increasing the potential for archaeological finds in the region (Ref. 16.49).

A group of rural villas and farmsteads dating to the Antique period have been identified approximately 1.6 km northwest of Varvarovka (Ref. 16.39; Ref. 16.41). A burial dated to the 6th to 4th century BC is recorded between the villages of Varvarovka and Supsekh, located more than 4 km north of the landfall section of the Project (Ref. 16.39; Ref. 16.41).

There is a designated kurgan located approximately 50 m northwest of the pipeline microtunnel section (RU-TCH-02, National Monument No. 363) (Ref. 16.39; Ref. 16.40; Ref. 16.41). It is dated to the Antique to medieval period. The remains of three farming settlements have been identified located north of the proposed construction corridor during archaeological fieldwalking and test pit investigations. These comprise the sites of Varvarovka-1 (RU-TCH-03; unstratified site; receptor boundary lies 853 m east of the microtunnel exit and the core of the receptor lies 937 m west of the northern pipeline centreline), Varvarovka-2 (RU-TCH-04; unstratified site; northern pipeline centreline lies 357 m east of the south-eastern receptor boundary) and Varvarovka-3 (RU-TCH-05; unstratified site; edge of receptor area located 557 m northwest of the northern pipeline centreline; core of the receptor lies 651 m northwest of the northern pipeline centreline) (Ref. 16.39; Ref. 16.40; Ref. 16.41; Ref. 16.112).

No evidence of Antique period maritime activity has been identified within the marine Survey Area.

16.5.2.9 Medieval (AD 370 to 1475) and Post-medieval Periods (AD 1475 to 1829)

Very minor sea level fluctuations occurred in the Black Sea during the medieval and post-medieval periods. Sea levels were approximately 1 m above present day levels and regressed to modern levels by the 19th century. The potential for inundated medieval and post-medieval sites to exist within the shallow-water marine environment of the Project Area is classified as low due to elevated sea levels during this period, high wave-based energy, diminished sedimentation rates, and shallow bedrock.

During the early medieval period, the region formed part of the Khazar Khanate. It was a major commercial contact zone between northern Europe and Asia (Ref. 16.115). Genoese traders built the fortress of Mapa at Anapa in the 13th century. Raw metals, gold, pearls, amber, textiles and spices were imported, while agricultural products from the Adygei hinterland were exported. These include cereals, cheese, oil and honey, as well as furs and slaves.

Mapa was captured by the Ottoman Empire in 1475. Trade continued and the city was fortified, becoming a strategically important centre of Ottoman culture in the late 17th century. Russia attacked the city and the Ottoman fleet six times between 1788 and 1828 during the Russian-Turkish wars. Anapa was annexed by Russia following the Treaty of Adrianople in 1829.

Minor sea level oscillations continued to occur during these periods, with the last notable regression taking place during the 'Little Ice Age' (c. 1350 to 1850) (Ref. 16.93, Ref. 16.100, Refs. 16.102 to 16.105). Sea levels regressed to 3 m to 2 m below present-day sea levels. Peat layers located at these depths in the Sukhumi Bay region attest to the regression along the north-eastern margin of the Black Sea.

Maritime activity continued to increase along the north-eastern coast of the Black Sea given its strategic location between Europe and Asia. The Khazars maintained control from the Caspian Sea to the Crimean Peninsula to trade salt, wax, fur, leather, and slaves (Ref. 16.115, p74). While watercraft were probably used in river- and sea-based transport of these goods, details on the type or design are lacking. Anchors with stone, lead, and iron stocks dating from the 5th to 7th centuries have been found around the Straits of Kerch, but cultural affiliation has not yet

been determined (Ref. 16.120). Dugout canoes that plied the rivers and coastal areas continued to be used during this time up through the 18th century (Ref. 16.120). The 4th and 7th century shipwrecks discovered at Yassıada Island (Bodrum, Turkey) can provide possible parallels for the types of sea-going watercraft used in the Black Sea (Ref. 16.122). These vessels were Byzantine merchantmen and featured construction techniques that could be traced back to the Graeco-Roman tradition of shipbuilding: a shell-first, mortise-and-tenon joined hull. These wrecks also show a gradual departure from this type of construction to one that relied more heavily on the strength of the skeletal framework within the hull, which is known as frame-first construction.

During the late medieval and post-medieval periods, ships in the Black Sea continued to increase in size as interactions with nations outside of the region became more frequent. Recognising the commercial success and growing prosperity of the region, Scandinavian merchant-mercenaries redirected their trade through the Black Sea (Ref. 16.124). Archaeological evidence exists that shows Scandinavian shipbuilding techniques were incorporated into local western Russian vessels during this time, such as clinker joinery and bottom-based construction (Ref. 16.125). There was also extensive military activity throughout the region between the Byzantine, Arabic, and Rus' forces. The Rus' were a Varangian (Viking) group active between late 9th and mid-13th century; Khazar Tmutarakan came under Rus' control in the 10th and 11th centuries.

Italian ships carried Genoese and Venetian traders into the Black Sea starting in the 13th century. The Italians were known for their formidable naval fleet, which included long, rowed galleys, frigates, and smaller warships (Ref. 16.122). Rounder, sail-driven merchantmen with tall sides and bulging prows continued to carry oil, wine, and other goods into the region.

Shipwreck material from this period has been discovered along the Russian coast. A well-preserved Byzantine merchantman was found near the Russian Black Sea resort of Sochi (approximately 230 km southeast of the shore crossing) (Ref. 16.126). Maritime-related artefacts found in the region include anchors, anchor arms, navigation instruments, ship decorations, and ceramics (Ref. 16.120).

Terrestrial cultural heritage comprises two medieval cemeteries located in arable fields on north-facing hillsides east of Supsekh, located more than 4 km north of the landfall section of the Project (Ref. 16.39).

Marine cultural heritage comprises a single ceramic amphora that dates approximately to the medieval period (RU-MCH-003) and an undesignated wooden shipwreck that probably dates from the medieval to post-medieval periods (RU-MCH-004). Both are located within the marine Zone of Potential Influence.

16.5.2.10 Modern Period (1829 to Present)

During the 19th century, the hinterland of Anapa was populated by a cosmopolitan mix of Russians, Ukrainians, Greeks, Germans, Tatars and Armenians. The village of Varvarovka was one of a series of agricultural settlements established by Czech immigrants from Austria-Hungary in the 1870s, at the initiative of agronomist Franz Hejduk. The village of Supsekh was established in the late 19th century. A village called Galkina Shel was established in 1908, and

Armenian refugees from Trabzon settled here in 1915 to 1916. This village was renamed Gai Kodzor in 1925, meaning 'Armenian Gorge' (Ref. 16.127).

Anapa's modern vineyards were first established in the mid- to late 19th century. Following the construction of the railway to Novorossiysk in 1892, coastal resorts, sanatoria and summer tourism developed. After the 1917 revolution, the area became a focus for health treatments and children's holiday camps.

During the Great Patriotic War (1941 to 1945), the Kuban peninsula was occupied by German and Romanian Axis troops between August 1942 and September 1943.

With regard to the marine environment, shipbuilding changed drastically in the modern period. In the early to mid-19th century, metal started to be used more regularly for structural elements and eventually the hull; by the end of the century the majority of ships were being built completely out of iron and steel. Another revolutionary change came with the advent of marine steam engines, and later combustion engines, which had a decisive effect on how ships were built, manned, and operated.

Naval warfare was directly affected by these changes. As vessels became more robust and resilient as a result of their metal hulls, weaponry and ordnance were also redesigned to be more effective. Torpedoes, sea mines, and submarines were used quite extensively in naval combat starting at the end of the 19th century. In the 20th century, aircraft were introduced into military campaigns. During the Great Patriotic War, the nearshore area experienced active marine battles between German and Russian forces, and the Kuban was occupied by Axis troops between 1942 and 1943.

DS Kalinin, Hero of the Soviet Union and commander of the Second Reconnaissance Detachment Staff of the Black Sea Fleet (1910 to 1943), was killed in action with marines leading a seaborne assault south of the village of Supsekh in May 1943. This event is commemorated with a major memorial erected close to the Anapa-Sukko road, approximately 750 m southeast of the pipeline route centreline (RU-TCH-01, National Monument No. 383). War memorials in the village of Gai Kodzor commemorate Soviet soldiers killed during the Great Patriotic War, and villagers executed at Gai Kodzor in August and December 1942 (RU-TCH-11, National Monuments No. 390 & 391), approximately 5.1 km northeast of the nearest pipeline centreline and connection with the Russian gas network. At Varvarovka, there are monuments to the Soviet marines killed and villagers executed by the invaders in 1942 to 1943, and to countrymen who died in the Great Patriotic War (RU-TCH-09, National Monuments No. 381 & 382), approximately 1.2 km northwest of the northern pipeline centreline. Varvarovka village cemetery (Armenian and Russian cemetery) includes the common grave of Soviet soldiers and civilians killed in 1942 to 1943 (RU-TCH-06, National Monument No. 380), approximately 398 m northwest of the northern pipeline centreline. An MI-6 heavy transport helicopter crashed in 1992 in woodland northeast of Varvarovka, located more than 2.7 km north of the northern proposed pipeline centreline; the site is marked by two memorials (Ref. 16.128).

There are a number of cemeteries associated with the villages to the north of the Project. These comprise Varvarovka village cemetery, a mixed Armenian and Russian cemetery (RU-TCH-06), approximately 398 m north of the northern pipeline centreline and close to the Gazprom Invest Road (permanent access road) and 100 m west of the Project temporary access

road to the microtunnel site; Varvarovka Armenian cemetery (RU-TCH-07), approximately 2.1 km northwest of the nearest pipeline centreline; and Gai Kodzor Armenian cemetery and church (RU-TCH-10), approximately 5.6 km northeast of nearest pipeline centreline.

A new Russian Orthodox church is under construction at Varvarovka (RU-TCH-08), approximately 1.8 km northwest of the northern pipeline centre-line. The Armenian Apostolic Church of St. Sarkis (St. Sergius) at Gai Kodzor was built in 1997 (RU-TCH-12), approximately 4 km northeast of the nearest pipeline centreline, and a new Armenian church of St Gevorg (St. George) has been under construction on an adjacent plot since 2007/8. In the square adjacent to these in Gai Kodzor is a modern Armenian khachkar cross-stone (RU-TCH-13; see Section 16.4.3 Intangible Cultural Heritage for further details).

Two marine sites were identified within the marine Survey Area. These are:

- *An aircraft wing with integrated fuel reservoir that dates to the modern period (RU-MCH-001); and*
- *A metal component belonging to either a marine vessel or aircraft (possibly a wing) that also dates to the modern period (RU-MCH-002).*

Desk-based archival research undertaken by Peter Gaz in 2011 and 2012 identified three previously known shipwreck sites: sanitary vessel Dnepr, freight vessel Fabritsius, and the steam scow Gordipiya (Ref. 16.75). The Gordipya is used for recreational diving. In addition, three non-self-propelled bolinder barges, two chaser motor boats, and a number of auxiliary vessels were lost or destroyed in the Anapa region. These objects are located more than 150 m from the nearshore section of the Project.

16.5.2.11 Uncertain Date

Located on the coast west of Supsekh, approximately 3.3 km northwest of the shore crossing, at the base of a cliff, is a series of mortared sandstone walls of uncertain date and function called the 'Walls of the Sea'. There is speculation that it may be associated with submerged settlement remains (masonry structures) found by divers off the Anapa coast, although they are similar in fabric and construction method to elements of Anapa's fortifications associated with the Russo-Turkish wars of the late 18th and early 19th centuries (Ref. 16.129; RU-TCH-17).

Marine sites of uncertain date include nineteen potential CHOs originally within the marine Zone of Potential Influence, which will be avoided by 150 m via pipeline re-routing (see Section 16.7).

There is the potential for currently unknown or unregistered CHOs to exist in the nearshore and offshore sections of the Project that lack archaeological context (isolated/chance finds). These may include nautical items that were lost while sailing (e.g. anchors, trade goods), heavy objects jettisoned during inclement weather or conflict, disarticulated ship remains, remains of 19th and 20th century conflict, intentionally scuttled or abandoned material, and un-associated debris or garbage.

16.5.3 Intangible Cultural Heritage

Intangible cultural heritage refers to cultural resources, knowledge, innovations and/or practices of local communities embodying traditional lifestyles (Ref. 16.43). With reference to IFC PS8

paragraph 3 (iii) (Ref. 16.3), the Project does not propose to use any intangible forms of culture for commercial purposes.

The UNESCO Representative List of the Intangible Cultural Heritage of Humanity supports the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. There is no Russian listed intangible cultural heritage closer than 5,000 km to the Project. 2010 census data indicates that Krasnodar region's multi-ethnic indigenous population includes Russians (88.3%), Armenians (5.5%), Ukrainians (1.6%), Tatars (0.5%), Greeks (0.4%) and other nationalities including Yezidy [6] (3.7%) (Ref. 16.61). Krasnodar's national-cultural autonomy organisations reported in 2012 include German, Jewish, Kurdish, Korean, Tatar, Adyghe (Circassian), Assyrian, Russian Roma, Greek and Belarusian groups (Ref. 16.61). In additional to significant state-supported cultural institutions (Ref. 16.60), the area has a number of amateur associations and clubs such as folk dancing, choirs and orchestral groups, including Russian, Cossack, Greek and Armenian groups (Ref. 16.130). The villages of Varvarovka and Gai Kodzor both have cultural centres.

Traditional Kuban Cossack culture and local folk arts and crafts are being revived with State support, and include weaving, traditional embroidery, pottery, woodworking, basketry, leather manufacture, wool felting and blacksmithing (Ref. 16.62); masters of these arts are honoured with the title 'Master of arts and crafts of Kuban'. Other distinctive local cultural elements include traditional Cossack costume, which dates back to the late 19th century (Ref. 16.61). Gastronomic specialities include local wine (Gai Kodzor Vineyards), as well as Kuban produce including pickles, boiled pork, lard, blinis (pancakes) and pastries (Ref. 16.63).

Socially significant religious and secular events celebrated on the territory of Gai Kodzor, Sukko and Supsekh include national and international festivals, profession day, village days and commemorations of military and historical people and events that have made a significant contribution to the development of Russia and Kuban (Ref. 16.64; Ref. 16.65).

Non-working holidays in the Krasnodar region comprise New Year holidays (1 – 5 January), Christmas/Nativity (7 January), Defender of the Motherland Day (23 February), International Women's Day (8 March), Spring and Labour Day (1 May), Victory Day (9 May), Russia Day (12 June) and National Unity Day (4 November). Other festivals include Theophany/ Epiphany (19 January), Maslenitsa (Pancake Week prior to Great Lent), Easter, International Day for Protection of Children (1 June), Family Day (Saints Peter and Fevronia of Murom, 8 July), Day of Liberation from German-fascist Invaders (Anapa and Anapa region, 21 September), Kuban Family Day (third Sunday in September), the Day of Elderly People (1 October) and Mother's Day (last Sunday in November).

In addition to these holidays and festivals are civic and arts festivals, including 'From Masters of Arts to the Toilers of the Village' national heritage revival festival, the 'Address of Childhood is

[6] A Kurdish ethno-religious group with Indo-Iranian roots.

Kuban' festival of children's artistic creativity, and the 'For the Glory of Kuban - for the Benefit of Russia' festival of amateur artistic creativity.

On Victory Day (9 May) and Anapa and Anapa region Liberation Day (21 September) there are rallies, vigils, and wreath- and flower-laying ceremonies at monuments and war memorials. Intangible cultural heritage includes festivals and commemorations associated with war memorials (RU-TCH-06; RU-TCH-09; RU-TCH-11), cemeteries (RU-TCH-06; RU-TCH-07; RU-TCH-10) and churches (RU-TCH-08; RU-TCH-10; RU-TCH-12).

There is extensive tourist interest in Krasnodar's Bronze Age dolmens, some of which are subject to tourist pilgrimages and offerings (Ref. 16.131). No such activities have been observed to be associated with *kurgan* site (RU-TCH-02) or any archaeological remains located in the terrestrial Study Area.

There is a spring in northern Varvarovka, St. Barbara's Source (RU-TCH-14; Figure 16.5) where a resident had a vision of a girl in a red dress stretching out her hands to the spring, and held that this was a vision of the village's patron saint, Saint Barbara (feast day December 17). It is believed that the water from this spring has healing powers. Before the recent construction of Varvarovka Russian Orthodox church, believers met near the spring. An annual procession to the well takes place on the Feast of Theophany (Epiphany/Feast of Lights/Feast of the Manifestation, 19 January), and the water is blessed. Attendees include local parishioners and pilgrims from further afield (Ref. 16.132; Ref. 16.133). St. Barbara's Source is located approximately 1.9 km northwest of the northern pipeline centreline. There are springs in the villages of Raevskaya/Rajewski (15.4 km east of the shore crossing) and Semigorye (21 km to the northeast).

The village of Gai Kodzor has an annual festival in May at the modern khachkar cross-stone next to the Armenian Apostolic Church of St. Sarkis (St. Sergius) (RU-TCH-12) and the adjacent Armenian church of St. Gevorg (St. George) under construction since 2007/8 (Ref. 16.130, Ref. 16.134). The *khachkar* (RU-TCH-13) was carved by Armenian sculptor and stonemason Sergei Danilyan, brought from Armenia and erected in 1992. It depicts two phoenix birds, symbolizing the friendship between the Armenian and Russian peoples. A festival is held at the *khachkar* in the last week of every May, involving representatives from all communities in the Anapa area. *Khachkars* or Armenian cross-stones are carved outdoor stone stelae which act as a focal point for worship, as memorial stones and as relics facilitating communication between the secular and divine. *Khachkars* reach 1.5 m in height, and have an ornamentally carved cross in the middle, resting on the symbol of a sun or wheel of eternity, accompanied by vegetative-geometric motifs, carvings of saints and animals. They constitute a distinctive symbol of the identity of Armenian communities at home and abroad. The symbolism and craftsmanship of *khachkars* was inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2010 (Ref. 16.135).

There is a large modern concrete cross on a hill overlooking Supsekh, which was erected in 2005 to commemorate the 60th anniversary of the end of the Great Patriotic War. The area is used as a place of prayer, and the adjacent sign board indicates that it is the property of the Russian Orthodox Church (RU-TCH-15). The site is located approximately 4.5 km north of the Project construction corridor.

A sacred tree was noted west of the road between Sukko and Anapa, north of Varvarovka and distant from the Project (RU-TCH-16). Prayer ribbons and cloth rags are suspended from the branches of a blackthorn tree (*Prunus spinoza*). Sacred trees and groves occur in many cultures across the world (Ref. 16.136). In the Kuban region, the custom may date back to Circassian/Adyghe traditions, which in turn overlie earlier practices (Refs. 16.137 to 16.140).

16.5.4 Baseline Summary

The previous section has described the wider archaeological, historical and cultural context. This section focuses on receptors located within the Project Study and Survey Areas (Figure 16.1 and Figure 16.2). Table 16.6 presents an overall summary of terrestrial and marine cultural heritage receptors and the distances to the nearest Project component (terrestrial) or pipeline centreline (marine). Sites in bold italic type are those that are considered to be vulnerable to Project impacts and are carried forward to the impact assessment (Section 16.6.4.2).

Table 16.6 Terrestrial and Marine Cultural Heritage Receptors in the Project Area

Date	Terrestrial	Distance from nearest Project component	Marine	Distance from nearest pipeline centreline
Lower Palaeolithic	No sites identified within 5 km of the Project		No sites identified within the marine Survey Area	
Middle Palaeolithic	No sites identified within 5 km of the Project		No sites identified within the marine Survey Area	
Upper Palaeolithic	Upper Palaeolithic stone tools found near Supsekh	5 km	No sites identified within the marine Survey Area	
Mesolithic	No sites identified within 5 km of the Project		No sites identified within the marine Survey Area	
Eneolithic/ Neolithic	No sites identified within 5 km of the Project		No sites identified within the marine Survey Area	
Bronze Age	Varvarovka-2 (RU-TCH-04) unstratified site	357 m	No sites identified within the marine Survey Area	
	Varvarovka-3 (RU-TCH-05) unstratified site	557 m		
	Dolmens in the Sukko valley	3 km		

Continued…

Date	Terrestrial	Distance from nearest Project component	Marine	Distance from nearest pipeline centreline
Bronze Age	Bronze Age kurgans/kurgan groups between Varvarovka and Supsekh	4.5 km	No sites identified within the marine Survey Area	
Iron Age	Varvarovka-2 (RU-TCH-04)	357 m	No sites identified within the marine Survey Area	
	Varvarovka-3 (RU-TCH-05)	557 m		
Antiquity	***Kurgan (RU-TCH-02, National Monument No. 363)***	50 m	No sites identified within the marine Survey Area	
	Varvarovka-1 (RU-TCH-03) unstratified site	853 m		
	Varvarovka-2 (RU-TCH-04)	357 m		
	Varvarovka-3 (RU-TCH-05)	557 m		
	Antique rural villas and farmsteads, Varvarovka	1.6 km		
	Burial recorded between Varvarovka and Supsekh	4 km		
Medieval **Post-medieval**	Two medieval cemeteries east of Supsekh	4 km	***Single medieval ceramic amphora (RU-MCH-003)***	Within 150 m
			Wooden shipwreck (RU-MCH-004)	

Continued...

Date	Terrestrial	Distance from nearest Project component	Marine	Distance from nearest pipeline centreline
Medieval **Post-medieval**	Varvarovka medieval settlement (RU-TCH-018).	150m		
Modern period	DS Kalinin Memorial (RU-TCH-01, National Monument No. 383)	750 m	***Modern aircraft wing (RU-MCH-001)***	Within 150 m
Modern period	Gai Kodzor war memorials (RU-TCH-11, National Monuments No. 390 & 391)	5.1 km	*Modern metal component (RU-MCH-002)*	Over 150 m
	Varvarovka war memorials (RU-TCH-09, National Monuments No. 381 & 382)	1.2 km	Shipwreck of sanitary vessel *Dnepr*	Over 150 m
	Varvarovka village cemetery (Armenian and Russian): common grave of Soviet soldiers and civilians (RU-TCH-06, National Monument No. 380)	398 m	Freight vessel *Fabritsius* Steam scow *Gordipiya*	Over 150 m
	Varvarovka memorials to crashed military helicopter	2.7 km	Three bolinder barges	
	Varvarovka, village cemetery, Armenian and Russian cemetery (RU-TCH-06)	398 m	Two chaser motor boats	

Continued…

Date	Terrestrial	Distance from nearest Project component	Marine	Distance from nearest pipeline centreline
Modern period	Varvarovka Armenian cemetery (RU-TCH-07)	2.1 km	Auxiliary vessels	Over 150 m
	Gai Kodzor Armenian cemetery and church (RU-TCH-10)	5.6 km		
	New Russian Orthodox church, Varvarovka (RU-TCH-08)	1.8 km		
	Armenian Apostolic Church & khachkar, Gai Kodzor, (RU-TCH-12 & RU-TCH-13)	4 km		
Uncertain date	Supsekh, sea walls	3.3 km	Nineteen potential CHO	Over 150 m
Intangible cultural heritage	St. Barbara's Source (RU-TCH-14)	1.9 km	No marine receptors identified	
	Supsekh cross (RU-TCH-15)	4.5 km		
	Sacred tree (RU-TCH-16)	> 5 km		

Complete.

16.5.4.1 Baseline Conditions – Terrestrial

As can be seen from Table 16.6, the Project has a moderate to high potential to encounter buried terrestrial cultural heritage remains of settlement and burials dating to the Bronze Age, Iron Age, Antique and medieval periods. The southern part of the 125 m statutory protective perimeter of the kurgan burial mound (RU-TCH-02; National Monument No 363) is crossed by the microtunnels. This mound may be an outlier of a wider group of Bronze Age *kurgans* located to the north, on high ground between the villages of Varvarovka and Supsekh, which are not within the terrestrial Study Area or impacted by the Project.

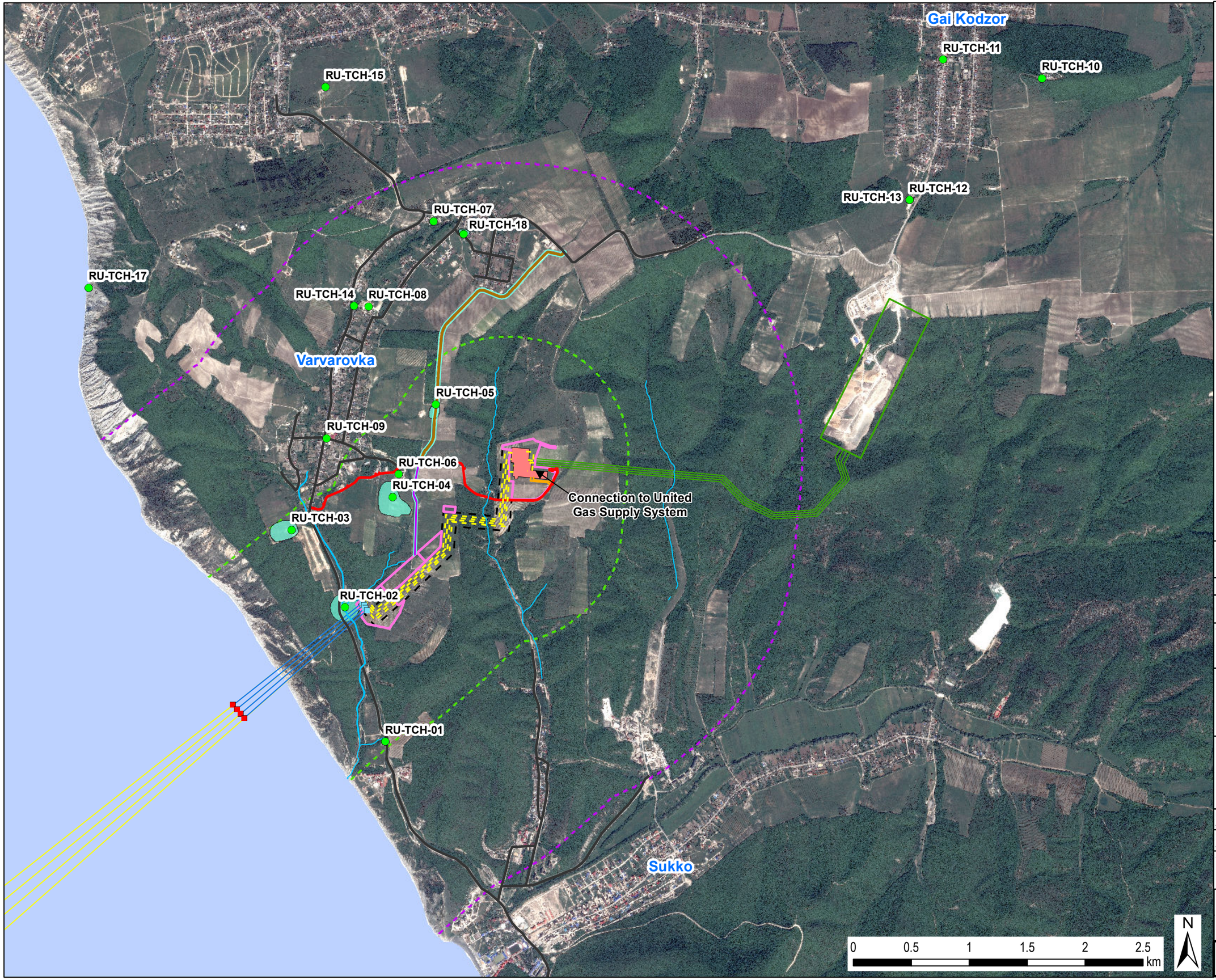
Fieldwalking and test pit investigation has identified the remains of three settlements of prehistoric, Antique and early medieval date, northwest of the Project (RU-TCH-03, RU-TCH-04, RU-TCH-05; unstratified sites) (Figure 16.5). The status of these sites has been reviewed by the Department of the Protection, Restoration and Operation of Historical and Cultural Values (Heritage) of Krasnodar Region. They were found not to warrant the classification of Cultural Heritage Object or National Monument due to their unstratified character (Ref. 16.112; Appendix 16.8.2). The Project is located beyond the mapped southern extent of these rural settlements, but may encounter peripheral remains. However, the Temporary Access Road runs immediately east of RU-TCH-04 and the Varvarovka bypass road (used by Project during construction only) runs through site RU-TCH-05 and through the protection zone of site RU-TCH-18. An archaeological watching brief will be maintained on all intrusive groundworks, including groundworks in these areas. These sites are not discussed further within this Chapter.

The preservation potential of archaeological remains in the Project landfall section is considered to be low to moderate. Any archaeological deposits along the top edge of the cliff will have undergone coastal erosion processes. Woodland cover east of the microtunnel area is liable to have caused moderate damage to any archaeological deposits due to root growth and root boles left after trees are felled or uprooted. Test pit investigations of the three settlements (RU-TCH-03, RU-TCH-04, RU-TCH-05) noted that occupation strata have been largely removed by vineyard ploughing, and survive only where cut into bedrock. The *kurgan* burial mound (RU-TCH-02) has been subject to robbing in the past, and it is likely that deposits in the uppermost, central part of the mound are no longer stratigraphically intact.

16.5.4.2 Baseline Conditions – Marine

As shown in Table 16.6, the marine environment has a high potential to feature the following cultural heritage remains: shipwrecks; maritime structures and objects; and remains associated with 19th and 20th century conflict. As a result of the anoxic conditions in the Black Sea, which inhibit corrosion and microbial degradation, the preservation potential for any CHO is greatly enhanced below a water depth of 120 m to 200 m.

Prehistoric and historic occupation areas – such as campsites, resource extraction sites, or settlements – that became submerged as a result of inundation by the Black Sea are not expected in the shallow-water marine environment in the nearshore section of the Project. The low potential for archaeological sites is due to high wave-based energy in these areas that can scatter and destroy submerged cultural material.



LEGEND

- Desk-based study area
- Archaeology and cultural heritage field surveys
- Terrestrial cultural heritage and archaeology
- Terrestrial cultural heritage and archaeology areas
- Rivers (mapped within a 1km radius of Project)
- Main roads

Russian Sector of South Stream Offshore Pipeline

- Proposed landfall section pipelines
- Landfall facilities
- Proposed microtunnels
- Proposed offshore pipelines
- Construction corridor
- Temporary construction area for road construction
- Construction sites
- Microtunnel entry shaft
- Microtunnel exit pit
- Permanent access road to be constructed by SSTTBV
- Temporary access road constructed by SSTTBV
- Varvarovka bypass road (used by Project during construction only)

United Gas Supply System

- Russkaya compressor station
- United Gas Supply System pipelines
- Permanent access road to be constructed by Gazprom Invest

Projection: Lambert Conformal Conic

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: For Information

Client: South Stream Transport AG — ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE PROJECT

Drawing Title: TERRESTRIAL CULTURAL HERITAGE RECEPTORS AND STUDY AREAS

Drawn	Checked	Approved	Date
AH	CP	AD	30/06/2014

URS Internal Project No.	Scale @ A3
46369084	1:30,000

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Drawing Number: Figure 16.5

Rev:

Plot Date: 30/06/2014
File Name: I:\5004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Russia\Russian ESIA v2\Chapter 16 Cultural Heritage\Figure 16.5 Terrestrial Cultural Heritage Receptors and Study Areas.mxd

Overview Map

A - Microtunnel construction site
B - Pipeline string preparation area
C - Landfall section pipelines construction site
D - Temporary storage area
E - Construction area for road crossing of Orekhovoya Gap
F - Construction site for landfall facilities and pre-commissioning and commissioning spread

Connection to United Gas Supply System

Vent stack

RU-TCH-02

Inset Map

Graphova Gap

0 20 40 60 m

0 200 400 600 800 m

N

LEGEND

- Terrestrial cultural heritage and archaeology areas
- Terrestrial cultural heritage and archaeology
- Marfovsky fault (indicative location)

Russian Sector of South Stream Offshore Pipeline

- Proposed landfall section pipelines
- Landfall facilities
- Anode bed for cathodic protection of landfall section pipelines
- Proposed microtunnels
- Proposed offshore pipelines
- Microtunnel entry shaft
- Construction corridor
- Cut and fill side slopes
- Temporary construction area for road construction
- Construction sites
- Permanent access road to be constructed by SSTTBV
- Temporary access road constructed by SSTTBV
- Varvarovka bypass road (used by Project during construction only)

United Gas Supply System

- United Gas Supply System pipelines
- Permanent access road to be constructed by Gazprom Invest

Projection: Lambert Conformal Conic

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: For Information

Client: South Stream Offshore Pipeline — ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: RELATIONSHIP BETWEEN KURGAN (RU-TCH-02), ITS 125M PROTECTIVE BUFFER, AND THE LOCATION OF MICROTUNNELS

Drawn	Checked	Approved	Date
DH	RW	MW	04/03/2014

URS Internal Project No.	Scale @ A3
46369082	1:7,500

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Drawing Number: Figure 16.6 — Rev:

Plot Date: 04 Mar 2014
File Name:I:\5004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Russia\Russian ESIA v2\Chapter 16 Cultural Heritage\Figure 16.6 Relationship between Kurgan (RU-TCH-02), its 125m Protective Buffer, and the Location of Microtunnels.mxd

37°4'0"E 37°8'0"E 37°12'0"E 37°16'0"E 37°20'0"E 37°24'0"E 37°28'0"E 37°32'0"E 37°36'0"E 37°40'0"E 37°44'0"E 37°48'0"E 37°52'0"E 37°56'0"E

44°48'0"N 44°44'0"N 44°40'0"N 44°36'0"N 44°32'0"N 44°28'0"N 44°24'0"N

MNS_24/MNS_12
Add1
MNS_36
Add2
MNS_40/MNS_37
B1_S0002
Gordipia
G-B1-0006
ROV Find_Amphora
B5_S0006
RS_942
RS_885
RS_943
RS_872
ROV Find_Wreck
RS_883
RS_77
RS_35
RS_394
RS_21
RS_651
RS_538
RS_190
Me-109
RS_993

RUSSIAN EEZ

0 1 2 4 6 8 10 km

N

LEGEND

Russian Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

- < 50m
- 50 - 100m
- 100 - 150m
- > 150m

Seabed Intervention

- Crossings
- Free spans (dynamic)
- Free spans (static)
- Rockfall protection
- Turbidity current
- Limit of anchoring spread area
- Temporary storage area for dredged material
- Zone of potential influence
- Survey area
- Exclusive Economic Zone boundary

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: For Information

Client: South Stream Offshore Pipeline — South Stream ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: MARINE TARGETS ON PROPOSED PIPELINE ROUTE (RUSSIA: NORTH-EASTERN SECTION)

Drawn	Checked	Approved	Date
DH/KJM	BS	MW	16/04/14

URS Internal Project No.: 15303191

Scale @ A3: 1:200,000

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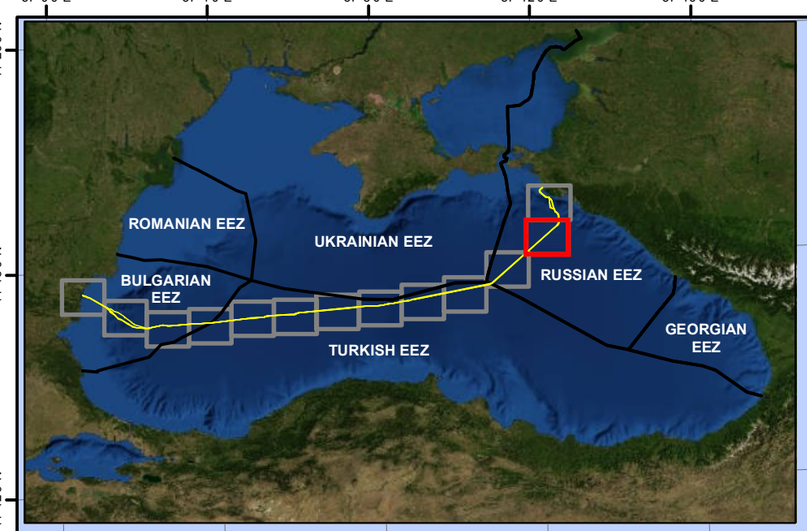
Drawing Number: Figure 16.7

Rev:

Plot Date: 16 Apr 2014
File Name:I:\5004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Russia\Russian ESIA v2\Chapter 16 Cultural Heritage\Figure 16.7 Marine Targets on Proposed Pipeline Route (Russia North-eastern Section).mxd



RUSSIAN EEZ

R-B5-0006

R-B5-0010

R-B5-0002

37°0'0"E 37°4'0"E 37°8'0"E 37°12'0"E 37°16'0"E 37°20'0"E 37°24'0"E 37°28'0"E 37°32'0"E 37°36'0"E 37°40'0"E 37°44'0"E 37°48'0"E 37°52'0"E

44°20'0"N 44°16'0"N 44°12'0"N 44°8'0"N 44°4'0"N 44°0'0"N 43°56'0"N 43°52'0"N

0 1 2 4 6 8 10 km

N

LEGEND

Russian Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

- < 50m
- 50 - 100m
- 100 - 150m
- > 150m

Seabed Intervention

- Crossings
- Free spans (dynamic)
- Free spans (static)
- Rockfall protection
- Turbidity current
- Limit of anchoring spread area
- Temporary storage area for dredged material
- Zone of potential influence
- Survey area
- Exclusive Economic Zone boundary

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: For Information

Client: South Stream Offshore Pipeline — ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: MARINE TARGETS ON PROPOSED PIPELINE ROUTE (RUSSIA: CENTRAL SECTION)

Drawn	Checked	Approved	Date
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URS Internal Project No.: 15303191

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Drawing Number: Figure 16.8

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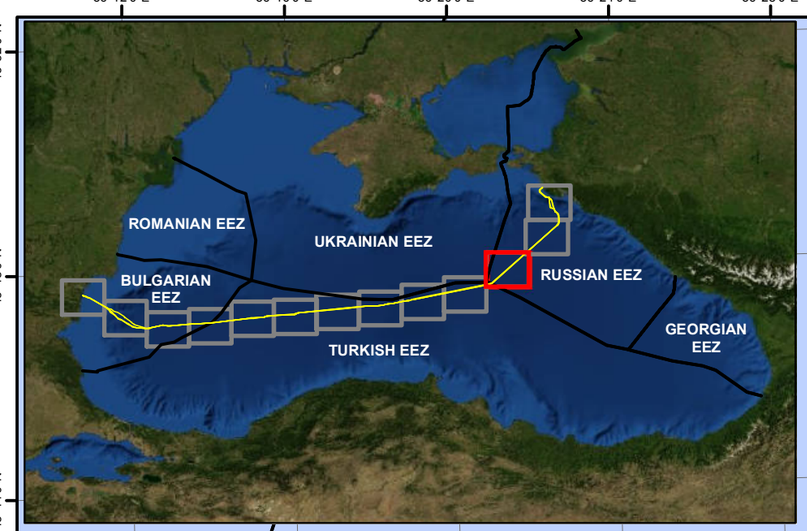
Plot Date: 16 Apr 2014
File Name:I:\5004 - Information Systems\46389082_South_Stream\MXDs\Report Maps - Russia\Russian ESIA v2\Chapter 16 Cultural Heritage\Figure 16.8 Marine Targets on Proposed Pipeline Route (Russia Central Section).mxd



36°12'0"E 36°16'0"E 36°20'0"E 36°24'0"E 36°28'0"E 36°32'0"E 36°36'0"E 36°40'0"E 36°44'0"E 36°48'0"E 36°52'0"E 36°56'0"E 37°0'0"E

43°52'0"N 43°48'0"N 43°44'0"N 43°40'0"N 43°36'0"N 43°32'0"N 43°28'0"N 43°24'0"N

R-B2-0007
R-B1-0042
R-B1-0011
R-B1-0010
R-B1-0008
R-B1-0029
Abs_289

RUSSIAN EEZ
TURKISH EEZ

0 1 2 4 6 8 10 km

N

Plot Date: 16 Apr 2014
File Name: I:\5004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Russia\Russian ESIA v2\Chapter 16 Cultural Heritage\Figure 16.9 Marine Targets on Proposed Pipeline Route (Russia South-western Section).mxd

LEGEND

Russian Sector of South Stream Offshore Pipeline
- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline
- < 50m
- 50 - 100m
- 100 - 150m
- > 150m

Seabed Intervention
- Crossings
- Free spans (dynamic)
- Free spans (static)
- Rockfall protection
- Turbidity current
- Limit of anchoring spread area
- Survey area
- Temporary storage area for dredged material
- Zone of potential influence
- Exclusive Economic Zone boundary

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: For Information

Client: South Stream Offshore Pipeline — ENERGISING EUROPE

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: MARINE TARGETS ON PROPOSED PIPELINE ROUTE (RUSSIA: SOUTH-WESTERN SECTION)

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Drawing Number: Figure 16.9

Rev:

Compounding this issue are low sedimentation rates and shallow bedrock, conditions that offer little to no depositional protection from these high energy environments. While there is a possibility for archaeological remains to exist, it is unlikely that intact, undisturbed archaeological deposits will be encountered during Project activities in the shallow-water marine environment.

Geophysical and cultural heritage field surveys conducted in 2011 and 2012 discovered a total of 26 CHOs and potential CHOs within the marine Survey Area of the offshore and nearshore sections in Russian territorial waters and EEZ (Table 16.4; Refs. 16.75 to 16.83), three of which were within the marine Zone of Potential Influence. Table 16.7 below and Figure 16.7, Figure 16.8 and Figure 16.9 show the geographical distribution of these targets. The locations of the continental shelf, continental slope and abyssal plain are discussed in **Chapter 7 Physical and Geophysical Environment**.

Table 16.7 Marine CHOs and Potential Marine CHOs within the Marine Survey Area

Oceanographic Region	Number of CHOs and Potential CHOs within the marine Survey Area	Number of CHOs and Potential CHOs within the marine Zone of Potential Influence*
Nearshore	0	0
Continental shelf	4	2
Continental slope	12	1
Abyssal plain	9	0
TOTAL	**25**	**3**

*This area is defined as within 150 m of the nearest pipeline centreline.

16.5.4.3 Objects within the Zone of Potential Influence - Marine

There are a total of three CHOs located within the marine Zone of Potential Influence i.e. within 150 m of the centreline of any of the four pipelines. These targets (RU-MCH-001 [original designation B5_S0006], RU-MCH-003 [ROV Find_Amphora], and RU-MCH-004 [ROV Find_Wreck]) are positively identified CHOs that range in date potentially from the medieval period to the modern period. The locations of these objects are shown on Figure 16.7 to Figure 16.9, whilst an illustrated inventory is presented in Appendix 16.2. These objects are discussed below.

Object RU-MCH-001 (recorded during original surveys as target B5_S0006) is an aircraft wing with an integrated fuel reservoir that lies at a depth of 78 m on the continental shelf. The object measures 6 m long by 2 m wide, and appears to be primarily constructed of metal. A determination on the identification of the exact aircraft type could not be made from the available data. This object is not an archaeological monument, but is a CHO in accordance with

Federal Law No.73-FZ of June 25, 2002. It is located approximately 56.7 m to the west of the originally proposed centreline of pipeline route # 3.

Object RU-MCH-003 (originally recorded as ROV Find_Amphora & RS_Cab Ph) is a single ceramic amphora that lies at a depth of 72 m on the continental shelf. This appears to be an isolated find, as there are no other associated objects or materials in the immediate vicinity of the amphora. A determination on the exact cultural affiliation could not be made from the available data, but preliminary analysis suggests it could potentially date to the medieval period. This object is not an archaeological monument, but is a CHO in accordance with Federal Law No.73-FZ dated 25 June 2012. It is located 23.9 m east of the originally proposed centreline of pipeline route #3.

Object RU-MCH-004 (recorded during original surveys as ROV Find_Wreck) is a wooden shipwreck that lies at a depth of 442.8 m on the continental slope. The wreck is mostly buried and only one end of the vessel protrudes from the seabed. A determination on the exact cultural affiliation or date could not be made from the available data. This object is not an archaeological monument, but is a CHO in accordance with Federal Law No.73-FZ dated 25 June 2012. It is located 69.7 m west of the originally proposed centreline of pipeline route #1.

The remaining nineteen potential CHO targets within the marine Survey Area. (targets R-B1-0029, R-B1-0042, R-B2-0007, R-B5-0006) are potential CHOs that will be avoided by pipeline re-routing (see Section 16.7).

In addition, seven anthropogenic targets that are not CHOs have been identified within 150 m of individual pipelines. Two acoustic targets (Add1 and Add2) in the nearshore section were determined to be modern-period metal structures, likely to be disarticulated marine cranes, in 12 m to 16 m of water. Three magnetic targets (MNS_24/MNS_12, MNS_36, and MNS_40/MNS_37) were identified in the nearshore section as metal anchors and anchor components in 10 m to 12 m of water that date to the modern period. Finally, two acoustic targets (RS_883 and RS_885) on the continental slope were identified as modern-period debris. Target RS_883 is an anchor chain at a depth of 762 m, and target RS_885 is a wooden rod at a depth of 712 m. Although these objects are not CHOs, they are noted so as not to impact Project activities.

16.5.4.4 Objects outside the Zone of Potential Influence but within the Survey Area – Marine

Twenty-two objects are located outside the Zone of Potential Influence and the Anchoring Spread Area, but within the marine Survey Area. Of these, two are aircraft wrecks/remains, one is a shipwreck, and 19 have been identified as potential CHO. This assessment is based on their size (greater than 5 m long), shape, height off the bottom, and acoustic reflectivity in the side-scan sonar images. These are detailed in Appendix 16.2 and illustrated on Figure 16.7 to Figure 16.9.

16.5.5 Critical Cultural Heritage

The Project has the potential to impact critical cultural heritage as defined in IFC PS8 (Ref. 16.3) given the presence of one formally designated site, a burial mound (*kurgan*) (RU-TCH-02, National Monument No. 363) located approximately 50 m northwest of the pipeline microtunnel section (Section 16.6.5.1).

The Project also has the potential to impact peripheral elements of Bronze Age, Antique and medieval occupation at Varvarovka-1 (RU-TCH-03), Varvarovka-2 (RU-TCH-04) and Varvarovka-3 (RU-TCH-05). As outlined in Section 16.5.4.1 the Department of the Protection, Restoration and Operation of Historical and Cultural Values (Heritage) of Krasnodar Region considers that these features do not warrant classification as Cultural Heritage Objects or National Monuments due to their unstratified character (Ref. 16.112; Appendix 16.4). These sites therefore do not constitute critical cultural heritage as defined in IFC PS8 (Cultural Heritage) (Ref. 16.3).

The nearest World Heritage property is the Western Caucasus natural heritage site (WHS 900), located more than 50 km to the southeast of the landfall section of the Project. The World Heritage Tentative List archaeological site of the Hellenistic city of Tanais (Ref. 5422) is located approximately 270 km to the northeast of the landfall section of the Project, in the Rostov on Don Region (Ref. 16.42).

16.5.6 Palaeontological Heritage

The underlying geology of the area comprises a system of ridges of the Black Sea Caucasus, folded Palaeozoic Era structures (c.541 to 252.2 Ma) and Jurassic (c.201 to 152 Ma) and Cretaceous (c.145 to 72 Ma) period strata (Ref. 16.141; periods defined by the International Commission on Stratigraphy v2013/01, Ref. 16.86). For further details on geology and soils, see **Chapter 7 Physical and Geophysical Environment**.

The Black Sea region was submerged beneath an ocean during the Mesozoic Era (c.252 to 66 Ma), and it is rich in marine fossils of the Miocene (c.23 to 5 Ma) and Pliocene (c.5 to 2.5 Ma) series, including molluscs, gastropods and bivalves; the fossilised bones of sea turtles and cetaceans have also been found. These deposits are frequently revealed in cliff faces and eroded river and stream channels. Above these fossiliferous deposits is a mantle of Quaternary Period (c.2.6 Ma to present) deposits comprising soils and coastal marine sediments. Sediments may contain climatic and environmental indicators such as diatoms, ostracods and formanifera (Ref. 16.142). Other fossil bearing deposits are as follows:

- The Palaeozoic basement may contain remains of Carboniferous (c.358 to 323 Ma) marine fossils (conodonts, brachiopods, corals, echinoderms, mollusca, benthonic formanifera; plant microflora, branches, leaves) and Permian (c.300 to 252 Ma) plant microflora;
- Jurassic strata (c.208 to 146 Ma) may contain fossils of ichthyosaurs and plesiosaurs, fish, bivalves, belemnites, brachiopods, echinoids, starfish, sponges and ammonites; and
- Cretaceous strata (c.146 to 65 Ma) may contain fossil remains of sharks, rays, fish, ichthyosaurs, plesiosaurs, mosasaurs, baculites, marine diatoms (Ref. 16.143; Ref. 16.144).

The Cenozoic Era (c.65 Ma to present) saw the development of mammals, birds, protozoa and flowering plants. Cenozoic fossils from limestone areas include marine fauna such as shells, sea urchins, sharks, marine reptiles, whilst terrestrial fauna included reptiles, birds and mammals.

Pliocene fossil remains of hominin and faunal remains have been found at Dmanisi, Georgia (Section 16.5.2.1). During the Quaternary Period (2.6 Ma to present), a series of repeated glaciations during the Pleistocene Epoch (1.8 Ma to 11,700 BP) saw the extinction of large mammals. The remains of bison, mammoth, megaloceros, aurochs and cave bears have been recovered from the inland Ilskaya I and II caves (Ref. 16.89). During the Upper Palaeolithic cold periods, mammoth bone was used to construct huts and reindeer, bison and woolly rhinoceros were hunted.

The Project Area does not contain any refuges such as caves, so has little potential for harbouring fossils of Quaternary Period megafauna. However, Quaternary sediments, in particular marine sediment sequences, have the potential to contain evidence for past climatic and environmental conditions, including evidence of sea level changes. Such sediments are present across the entire Black Sea marine region, and are subject to on-going targeted research programmes; deposits in the vicinity of the proposed pipeline route do not present any specific interests or research targets.

16.6 Impact Assessment

16.6.1 Impact Assessment Methodology

The impact assessment methodology specific to cultural heritage, presented in this section, builds upon the general assessment methodology summarised in **Chapter 3 Impact Assessment Methodology**. The methodology is then developed specifically in relation cultural heritage receptors in relation to impacts arising from the construction, operation and decommissioning of the Project, as is further outlined below.

16.6.1.1 Federal and Regional Legislation

As detailed in **Chapter 2 Policy, Regulatory and Administrative Framework**, this cultural heritage assessment has taken into consideration national legislation, including the Constitution of the Russian Federation (Ref. 16.4), the Civil Code of the Russian Federation (Ref. 16.7), Foundations of Russian Federation Legislation on Culture No. 3612-1 (Ref. 16.5) and Federal Law of June 25, 2002 No. 73-FZ "On Objects of Cultural Heritage (Historical and Cultural Monuments) of the Russian Federation" (Ref. 16.8).

The Constitution of the Russian Federation establishes the right of every person to have access to cultural values (Clause 44, P. 3) and the responsibility of every person to preserve historical and cultural heritage, to protect monuments of history and culture (Clause 44, P. 3), and to preserve nature and environment, treating natural receptors with care (Clause 58). Federal law states that the cultural heritage (monuments of history and culture) of the Russian Federation is a unique value for the multinational people of the Russian Federation and forms an integral part of the world cultural heritage, and notes that State protection of cultural heritage (monuments

of history and culture) is one of the priorities of the authorities of the Russian Federation, the state authorities of the Russian Federation and local self-government (Ref. 16.4).

Penalties for damage to heritage are set out in the Civil Code of the Russian Federation (Ref. 16.7). The objectives of the Foundations of Russian Federation Legislation on Culture No. 3612-1 (Ref. 16.5) are the maintenance and protection of the constitutional rights of citizens of the Russian Federation for cultural activities, the establishment of legal guarantees for free cultural activities of associations of citizens, peoples and other ethnic communities of the Russian Federation, the definition of the principles and rules of law related to subjects cultural activity and the definition of the principles of state cultural policy, legal rules for state support for culture and guarantees of non-interference in the creative process.

According to Federal Law No. 73-FZ (Ref. 16.8), all cultural receptors and objects of cultural heritage are considered to be the exclusive property of the State, and are protected by the State. Archaeological sites, both formally registered and newly identified, are considered to be objects of cultural heritage of a federal value. According to Article 46 of the Law, individuals and legal entities engaged in business and other activities in the territory of the CHOs are obliged to observe the procedure of use of this territory as established in the Federal Law and Land Laws of the Russian Federation. The broad objective of these regulations is to avoid harm to cultural objects. Article 61 sets out criminal, administrative and other legal liability in the event of violation of the Law.

Other applicable cultural heritage legislation includes:

- Land Code of the Russian Federation (Articles 3, 27, 56, 99) (Ref. 16.9);
- Law of the Russian Federation "On the Subsurface Resources" (Ref. 16.10);
- Urban Planning Code of the Russian Federation (Ref. 16.11);
- Criminal Code of the Russian Federation (Ref. 16.12, Article 164, Article 243);
- Federal Law of 14 January 1993 No. 4292-1 "On the Perpetuation of the Memory of those who Died in Defence of the Fatherland" (Ref. 16.13);
- Federal Law of 12 January 1996 No. 8-FZ "On Burial and Funeral" (Ref. 16.14); and
- Other normative legal acts of the Russian Federation on the protection and use of cultural heritage.

This cultural heritage assessment takes account of Krasnodar regional legislation, including Krasnodar Regional Laws:

- "On Culture" (No. 325, 2000) (Ref. 16.15);
- "On the Objective Composition of Local Immovable Historical and Cultural Monuments Located in the Territory of the Krasnodar Region" (2000) (Ref. 16.16);
- "On Cultural Heritage (historical and cultural) of the Russian Federation located in the Krasnodar Territory" (and subsequent amendments, No. 558-KZ, 06.02.2003) (Ref. 16.17);
- "On Immovable Monuments of History and Culture of Regional Importance", Situated in Krasnodar Krai (2009) (Ref. 16.18);

- "On the Designated Areas and Protection Zones of Immovable Cultural Heritage (Historical And Cultural Monuments) of Regional and Local Value Located in the Krasnodar Region" (No. 2316-KZ, 19.07.2011) (Ref. 16.19);
- "On Burial and Funeral Business in the Krasnodar Territory" (No. 666-KZ, 04.02.2004) (Ref. 16.20); and
- The Krasnodar Governor's Resolution "On Amendments to the decree of the Head of Administration of Krasnodar Region of 09.09.2011 No. 975. On the control of the protection, restoration, use and cultural values (Heritage) of the Krasnodar region" (No. 455, 2007) (Ref. 16.21).

16.6.1.2 International Agreements

The Russian Federation has ratified a number of international conventions regarding cultural heritage including various conventions of the Council of Europe (CoE), International Commission on Monuments and Sites (ICOMOS) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), which are set out in Table 16.8.

Table 16.8 Summary of Relevant International Agreements

Agreement and Objective	Objective	Date of Ratification
UNESCO 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (Convention on Cultural Property)	Prohibits and prevents the illicit import, export and transfer of ownership of cultural property and aims to discourage the pillage of archaeological sites and cultural heritage by controlling international trade in looted antiquities through import controls and other measures.	28 April 1988
UNESCO 1972 Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)	To ensure that effective and active measures are taken for the protection, conservation and presentation of the "cultural and natural heritage" on its territories.	12 October 1988
UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage	The Convention sets out basic principles for the protection of underwater cultural heritage; provides a detailed State cooperation system; and provides widely recognised practical rules for the treatment and research of underwater cultural heritage.	Not ratified by Russian Federation, but is internationally accepted as Good International Industry Practice (GIIP) and is cited in IFC GN8 (Ref. 16.30)

Continued…

Agreement and Objective	Objective	Date of Ratification
UNESCO 2003 Convention for the Safeguarding of the Intangible Cultural Heritage	To safeguard and ensure respect for the world's Intangible Cultural Heritage, including raising awareness of the importance of intangible heritage and encouraging international cooperation and assistance.	Ratification process not yet completed
UNESCO 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions	Recognises the rights of states to protect and promote the diversity of cultural expressions, encompassing cultural and natural heritage, movable cultural property, intangible cultural heritage and contemporary creativity.	Ratification process not yet completed
CoE 1954 European Cultural Convention	To develop mutual understanding among the peoples of Europe and reciprocal appreciation of their cultural diversity, to safeguard European culture, to promote national contributions to Europe's common cultural heritage respecting the same fundamental values.	21 February 1991
CoE 1995 European Convention on the Protection of the Archaeological Heritage (revised) (Valetta Convention)	Notes that cultural heritage comprises "all remains and objects and any other traces of mankind from past epochs… The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water". Makes the conservation and enhancement of the archaeological heritage one of the goals of urban and regional planning policies. Sets guidelines for the funding of excavation and research work and publication of research findings.	12 October 2011
CoE 1985 Convention for the Protection of the Architectural Heritage of Europe (Granada Convention)	Reinforces and promotes policies for conserving and enhancing Europe's heritage. Affirms the need for European solidarity with regard to heritage conservation and fosters practical co-operation among the Parties.	13 November 1990

Continued…

Agreement and Objective	Objective	Date of Ratification
UNCLOS 1982 United Nations Convention on the Law of the Sea	Comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources. Article 303 notes that "States have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose". This article also gives coastal states limited rights to protect cultural heritage within the contiguous zone. Article 149 states that "all objects of an archaeological and historical nature found [on the seabed underneath the high seas] shall be preserved or disposed of for the benefit of mankind as a whole, particular regard being paid to the preferential rights of the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin".	12 March 1997
UNESCO 1956 Recommendation on International Principles Applicable to Archaeological Excavations (New Delhi)	To ensure the protection of its archaeological heritage, the provision of archaeological services, the control over accidental discoveries and the upkeep of excavation sites and monuments, the establishment of museums and public education, and the repression of clandestine excavations and of the illicit export of archaeological finds.	5 December 1956
ICOMOS 1990 Charter for the Protection and Management of the Archaeological Heritage (Lausanne Charter)	Notes that archaeological heritage is a fragile and non-renewable cultural resource, and that policies for the protection of the archaeological heritage should be integrated into land use, development, planning, cultural, environmental and educational policies. Sets out principles of survey, investigation, maintenance, protection, presentation, information, reconstruction, training, international cooperation.	11 October 1990

Complete.

16.6.1.3 Standards and Guidelines for Financing

IFC Performance Standard and Guidance on Cultural Heritage (Ref. 16.3 and Ref. 16.30) aims to protect cultural heritage from the adverse impacts of Project activities and supports its preservation, in accordance with the World Heritage Convention (Ref. 16.1). Its scope includes:

- Tangible cultural heritage with archaeological, palaeontological, historical, cultural, artistic, and religious values;
- Unique natural features or tangible objects that embody cultural values, such as sacred groves, sacred trees, rocks, lakes, and waterfalls;
- Intangible forms of culture proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles; and
- Critical Cultural Heritage - internationally recognised or legally protected cultural heritage areas, including proposed World Heritage Sites. Heritage of communities who use, or have used within living memory, the cultural heritage for long-standing cultural purposes.

In addition, this cultural heritage assessment has been developed with reference to the OECD Common Approaches (Ref. 16.31).

Where further detailed guidance was needed and was not covered by the IFC PS or OECD Common Approaches, the Project has referred to UNESCO and ICOMOS guidance as appropriate.

16.6.2 Impact Assessment Criteria

The criteria used to assess the potential impacts upon cultural heritage sites follow the current international standard for cultural heritage impact assessment, issued by the International Council on Monuments and Sites (Ref. 16.145). It is acknowledged that this current international standard contains much reference to World Heritage, but the assessment tools contained within its appendices are applicable to all cultural heritage. It has been adapted for Russia by applying tiered national standards based on the designation level of known monuments. Cultural monuments are classified according to national standards by type and their significance to Russian culture and history.

16.6.2.1 Receptor Sensitivity

Identified cultural heritage features have been evaluated for their sensitivity in accordance with Table 16.9 which presents a description of receptor sensitivity, (using the categories High, Moderate, Low and Negligible) and highlights relevant applicable legal standards. The terms High, Moderate, Low and Negligible are terms which correlate to the impact assessment matrix which applies to the whole ESIA (**Chapter 3 Impact Assessment Methodology**)[7]. Legal standards are detailed in **Chapter 2 Policy, Regulatory and Administrative Framework** and in Section 16.6.2 Applicable Standards.

[7] This is comparable to the categorisations adopted by national standards; the terms High and Major are deemed equivalent. The overall matrix for this ESIA has no 'Very High' category, and for this reason the 'High' category conflates sites of national and international sensitivity. No World Heritage Sites or proposed World Heritage Sites will be impacted by the Project.

The sensitivity of terrestrial and marine cultural heritage receptors also reflects how vulnerable or robust a site, monument, artefact, assemblage or complex is to damage or destruction by a number of factors, including:

- Natural conditions, such as erosion, flooding, wave movement and chemical deterioration;
- Environmental conditions, such as faunal and floral impacts;
- Human conditions, such as vandalism or interference, recreational use, e.g. vehicle damage, anchor strike; and
- Project-related conditions, including construction and operational impacts.

Table 16.9 Cultural Heritage Receptor Sensitivity

Sensitivity and Value	Description, based on ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)	Applicable Legal Standards*
High (D)	Sites of acknowledged international importance inscribed as World Heritage Sites. Individual attributes that convey Outstanding Universal Value. Nationally-designated archaeological monuments, sites, buildings or historic landscapes protected by national laws. Undesignated sites, structures or historic landscapes of demonstrable national value. Assets that can contribute significantly to acknowledged national or international research objectives, whether designated or not. Well or extremely well preserved historic landscapes or seascapes with considerable or exceptional coherence, time-depth, or other critical factors. Intangible Cultural Heritage inscribed on national registers, or associated with movements or individuals of national or global significance.	International: UNESCO World Heritage Sites UNESCO Representative List of the Intangible Cultural Heritage of Humanity IUCN Marine Protected Areas (Category III Natural monuments or features, including shipwrecks & and cultural sites) UNESCO Geoparks (with cultural heritage and/or palaeontology linkage) UNESCO MAB Biosphere Reserves (with cultural heritage linkage) Ramsar Convention on Wetlands of International Importance sites (with cultural heritage linkage) Russia: National Cultural Heritage Register of Russia & State Code of Particularly Valuable Objects of Cultural Heritage of the Peoples of the Russian Federation

Continued...

Sensitivity and Value	Description, based on ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)	Applicable Legal Standards*
Moderate (C)	Designated or undesignated sites, landscapes or seascapes that can contribute significantly to regional research objectives. Designated or historic (unlisted) buildings that have exceptional qualities or historical associations, with important historic integrity and contributing significantly to historic character. Designated or undesignated historic landscapes or seascapes of regional value, which would warrant designation. Intangible cultural heritage areas in local registers, or associated with movements or individuals of local importance.	Russia: National Cultural Heritage Register of Russia & State Code of Particularly Valuable Objects of Cultural Heritage of the Peoples of the Russian Federation
Low (B)	Designated or undesignated assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations, or with little or no surviving archaeological interest. Assets with potential to contribute to local research objectives. Historic (unlisted) buildings of modest quality in their fabric or historical associations, or buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character. Undesignated historic landscapes or seascapes with importance to local interest groups, whose value is limited by poor preservation and/or poor survival of contextual associations. Landscapes or seascapes of little or no significant historical interest. Intangible cultural heritage activities of local significance, or associated with individuals of local importance. Poor survival of physical areas in which activities occur or are associated. Areas with few intangible cultural heritage associations or vestiges surviving.	Russia: National Cultural Heritage Register of Russia & State Code of Particularly Valuable Objects of Cultural Heritage of the Peoples of the Russian Federation

Continued...

Sensitivity and Value	Description, based on ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)	Applicable Legal Standards*
Negligible (A)	Assets with little or no surviving archaeological interest. Buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character. Areas with few intangible cultural heritage associations or vestiges surviving.	-
Unknown	The importance of the resource cannot be ascertained.	-

*These standards are theoretically applicable to impact assessment; however, there are no instances of World Heritage Sites, Representative Intangible Heritage, Category III Marine Protected Areas, Geoparks, MAB Biosphere Reserves or Ramsar sites with cultural heritage linkage within the Project Area of Influence.

Complete.

Taking into account the criteria presented in Table 16.9, Table 16.10 and Table 16.11 define terrestrial and marine cultural heritage receptor sensitivity, respectively (also refer to Appendix 16.1 and 16.2 for the cultural heritage inventories, and Figure 16.5, Figure 16.7 to Figure 16.9 for details of receptor location).

Table 16.10 Terrestrial Cultural Heritage Receptor Sensitivities

Terrestrial Cultural Heritage Receptor	Condition	Receptor Sensitivity
RU-TCH-01 – Grave of DS Kalinin, Hero of the Soviet Union (1910 – 1943)	The grave of DS Kalinin is a National Monument (local protection category). This public monument is in good condition, set back from the coastal highway.	High
RU-TCH-02 – Burial mound (kurgan)	The kurgan is a National Monument (local protection category). The perimeter of the 2.97 m high monument protection extends 125 m from the edge of the monument. The centre of the burial mound has been robbed in the past and the site is overgrown with trees and vegetation.	High
RU-TCH-03– Varvarovka-1 settlement, Antiquity	Occupation strata destroyed by vineyard ploughing, surviving only where cut into bedrock. Undesignated, area of unstratified (redeposited) cultural layers.	Low

Continued…

Terrestrial Cultural Heritage Receptor	Condition	Receptor Sensitivity
RU-TCH-04 – Varvarovka-2 settlement, Bronze Age to early Middle Ages	Occupation strata destroyed by vineyard ploughing, surviving only where cut into bedrock, including a possible oven or kiln. Undesignated, area of unstratified (redeposited) cultural layers.	Low
RU-TCH-05 – Varvarovka-3 settlement, Bronze Age to early Middle Ages	Occupation strata destroyed by vineyard ploughing, surviving only where cut into bedrock. Undesignated area of unstratified (redeposited) cultural layers.	Low
RU-TCH-06 – Varvarovka, village cemetery (within Site RU-ARCH-04), Armenian and Russian cemetery	Cemetery includes a National Monument, the common grave of Soviet soldiers and civilians killed or executed in 1942 – 1943. In good condition, well-maintained. The cemetery is an undesignated asset of local importance and the site of intangible cultural heritage activities of local significance. The sensitivity of the site is raised due to the presence of a National Monument.	High
RU-TCH-07 – Varvarovka, Armenian cemetery	20th century cemetery. In good condition, well-maintained. Undesignated asset of local importance and the site of intangible cultural heritage activities of local significance.	Low
RU-TCH-08 – Varvarovka, Russian Orthodox church under construction	Modern church under construction. Undesignated asset of local importance and the site of intangible cultural heritage activities of local significance.	Low
RU-TCH-09 – Varvarovka, monument and memorial to local people killed during the Great Patriotic War	Two war memorials which are National Monuments. In good condition. Both public monuments are located adjacent to main roads through the village.	High
RU-TCH-10 – Gai Kodzor Armenian Church and Cemetery	20th century church, cemetery and memorial chapel. In good condition. Undesignated asset of local importance and the site of intangible cultural heritage activities of local significance.	Low

Continued…

Terrestrial Cultural Heritage Receptor	Condition	Receptor Sensitivity
RU-TCH-11 – Gai Kodzor war memorials commemorating residents killed during the Great Patriotic War	Two war memorials which are National Monuments, a mass grave of fallen soldiers and executed villagers, and an obelisk to Soviet soldiers. In good condition. Both public monuments are located adjacent to the main road through the village, Str. Shaumyan.	High
RU-TCH-12 – Gai Kodzor Armenian Apostolic Church (Church of St Sarkis (St. Sergius))	Modern church built in 1997. Single red brick cell with a khachkar cross stone (RU-TCH-13). Non-replicable tangible cultural heritage of local importance and the site of intangible cultural heritage activities of local significance.	Low
RU-TCH-13 – Gai Kodzor Armenian khachkar	Cross stone brought from Armenia and erected in 1992. In good condition. The symbolism and craftsmanship of khachkars is inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity, so this monument reflects Intangible Cultural Heritage associated with a movement of national or global significance.	High
RU-TCH-14 – St. Barbara's Source, Varvarovka	Natural spring reputed to have healing powers. Undesignated asset of local importance and the site of intangible cultural heritage activities of local or regional significance, as visited by non-local pilgrims.	Moderate
RU-TCH-15 – Cross, Supsekh	Large concrete cross erected in 2005 commemorating the 60th anniversary of the end of the Great Patriotic War. Used as a place of prayer. Undesignated asset of local importance and the site of intangible cultural heritage activities of local significance. Landmark.	Low
RU-TCH-16 – Sacred tree, Sukko/ Anapa road	Tree located west of the road between Sukko and Anapa. Prayer ribbons and cloth rags are suspended from its branches. Undesignated asset of local importance and the site of intangible cultural heritage activities of local significance.	Low
RU-TCH-17 – 'Walls of the Sea', west of Supsekh	A series of mortared sandstone walls of uncertain date and function at the base of a cliff. Undesignated. Subject to natural erosion.	Unknown

Continued…

Terrestrial Cultural Heritage Receptor	Condition	Receptor Sensitivity
RU-TCH-18 Varvarovka settlement	Varvarovka medieval settlement. Area 2ha (200x100 m). Located within vineyards. Designated, area of stratified cultural layers.	Low

Complete.

Table 16.11 Marine Cultural Heritage Receptor Sensitivities

Marine Cultural Heritage Receptor	Condition	Receptor Sensitivity
RU-MCH-001 Undesignated aircraft wing Continental shelf Modern period	A 20th century metal aircraft wing with integrated fuel reservoir. No other associated material appears to be in the immediate vicinity of this object. This undesignated modern site has limited complexity or contextual associations, and low potential for contributing to the understanding of aviation or aircraft construction techniques.	Low
RU-MCH-002 Metal component from either a marine vessel or an aircraft (possibly a wing) Continental slope Modern period	A 20th century metal object that is a component of either a marine vessel or aircraft (possibly a wing, the object is in a state of disrepair). No other associate material appears to be in the immediate vicinity of this object. This undesignated modern site has limited complexity or contextual associations, and low potential for contributing to the understanding of ship/aircraft construction techniques.	Low
RU-MCH-003 Single ceramic amphora Continental shelf c. Medieval period	A single intact ceramic amphora that may date to the medieval period. This isolated find has limited complexity or contextual associations, and moderate potential for contributing to the understanding of maritime trade interactions and cargoes.	Moderate
RU-MCH-004 Undesignated wooden shipwreck Continental slope Probably medieval to post-medieval periods	This undesignated site has potential to contribute to the understanding of Black Sea ship construction techniques and maritime trade. Mostly protected by covering silts on the sea floor. There is no evidence that the wreck has been disturbed after it sank.	High

Continued…

Marine Cultural Heritage Receptor	Condition	Receptor Sensitivity
19 potential CHOs	These potential CHOs had not been investigated at the time of developing the EIA and it has been conservatively assumed that they are CHOs for the purpose of the assessment.	High

Complete.

16.6.2.2 Impact Magnitude Criteria

Table 16.12 presents a description of the magnitude of change to cultural heritage receptors that can be caused by a project, using the classifications High, Moderate, Low and Negligible, based on the current ICOMOS standard (Ref. 16.145).

Table 16.12 Cultural Heritage Impact Magnitude Criteria

Magnitude	Description, taken from ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)
High	Changes to most or all key archaeological sites such that the resource is totally altered. Changes to key architectural and artistic building elements such that the resource is totally altered. Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit. Comprehensive changes to setting (refer to the Glossary for definition). Major changes to an area affecting intangible cultural heritage activities, associations, visual links and cultural appreciation.
Moderate	Changes to many key materials of archaeological sites, such that the resource is clearly modified. Changes to setting that affect the character of the asset. Changes to many key historic building elements, or to the setting of an historic building, such that the resource is significantly modified. Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character. Considerable changes to an area affecting intangible cultural heritage activities, associations, visual links and cultural appreciation.

Continued...

Magnitude	Description, taken from ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)
Low	Minor changes to key archaeological sites, such that the resource is slightly altered or clearly modified. Slight changes to setting, or changes to setting that affect the character of the asset. Slight changes to the setting of key historic building structures. Changes to many key historic building structures, or to the setting of an historic building, such that the resource is slightly different and noticeably changed. Change to many key historic landscape elements, parcels or components; slight or minor visual change to many key aspects of the historic landscape; limited but noticeable differences in noise or sound quality; changes to use or access; resulting in limited to minor changes to historic landscape character. Minor changes to area that affect intangible cultural heritage activities, associations, visual links and cultural appreciation.
Negligible	Very minor or no changes to archaeological asset, historic building fabric or setting. Very minor or no changes to elements, parcels or components of landscapes or seascapes; no visual or audible changes. Very minor or no changes in amenity or community factors.
No change	No change.
Uncertain	The extent of data on the site or feature, or the nature of construction activities does not enable a determination of likely effects to be made at this stage.

Complete.

16.6.2.3 Impact Significance

Chapter 3 Impact Assessment Methodology details how impact significance (High, Moderate, Low, Not Significant) can be defined through the consideration of impact magnitude and receptor sensitivity criteria. The impact significance matrix presented in Table 16.13 has been applied in order to assign levels of significance to defined cultural heritage impacts.

Table 16.13 Impact Significance Matrix

		Receptor Sensitivity (Vulnerability and Value)			
		Negligible	*Low*	*Moderate*	*High*
Impact Magnitude (Extent, Frequency, Reversibility, Duration)	*Negligible*	Not significant	Not significant	Not significant	Not significant/Low*
	Low	Not significant	*Low*	Low/Moderate†	Moderate
	Moderate	Not significant	Low/Moderate	Moderate	High
	High	Low	Moderate	High	High

* Allows technical discipline author to decide if impact significance is Not Significant or Low.
† Allows technical discipline author to decide if impact significance is Low or Moderate.

16.6.3 Assessment of Potential Impacts: All Phases

16.6.3.1 Impact Sources

The cultural heritage baseline conditions as described in Section 16.5 have the potential to be impacted by various Project activities (as described in **Chapter 5 Project Description**). This section identifies the activities that are likely to take place during the Construction and Pre-Commissioning and Operational Phases of the Project that have an ability to generate an impact on cultural heritage receptors. The Project activities that have a potential to impact on cultural heritage within the terrestrial and marine Study Areas are discussed in below and summarised in Table 16.14.

The majority of the activities occur during the Construction and Pre-Commissioning Phase of the Project. Operational Phase activities have little potential to impact on terrestrial and marine cultural heritage receptors, as routine operational activities are infrequent, minimally invasive and will take place in areas that will have already undergone ground disturbance during the Construction and Pre-Commissioning Phase of the Project and have had any appropriate design control or mitigation measures implemented. Decommissioning Phase activities are not discussed further in this assessment (see Section 16.9).

Terrestrial Cultural Heritage Impact Sources

Table 16.14 outlined the Project activities that have the potential to impact upon cultural heritage receptors (both known and un-known) during the various Project phases – such activities have the potential to damage or destroy upstanding remains, surface scatters or buried, sub-surface remains.

Table 16.14 Project Activities that Could Potentially Impact Terrestrial and Marine Cultural Heritage

Phase	Activity	Onshore	Nearshore	Offshore
Construction & Pre-Commissioning (Terrestrial)	Preparation of access roads/ upgrades to junctions of existing roads	✓	x	x
	Open trench pipe-laying activities - from microtunnel entry pit to ESD valve stations by open trench method	✓	x	x
	Construction of landfall facilities	✓	x	x
	Establishment of microtunnel construction site	✓	x	x
	Increased site population	✓	x	x
	Increased construction related traffic	✓	x	x
Construction & Pre-Commissioning (Marine)	Pre-construction route surveys (ROV, side-scan sonar etc.) and as-built survey. Removal of any obstacles (e.g. wrecks, munitions, boulders). Construction of crossings of third party infrastructure with concrete mattressing or rock placement etc. Placement of grout bags, concrete mattresses etc. on the seabed to correct free-span pipeline sections	x	✓	✓
	Dredging the microtunnel exit pits and the pipeline trenches in the nearshore area	x	✓	
	Laying pipe on seabed by S-Lay method (30 -600 m water depth) Laying pipe on seabed by J-Lay method (>600 m water depth)	x	✓	✓
	Abandonment and recovery operations relating to ROV (if necessary due to weather or emergency conditions (e.g. anchor strike))	x	✓	✓
Operational	ROV and ROTV sonar and visual surveys along nearshore pipeline (initial ROV subsea leak inspection survey, surveys of critical sections, initially annually and subsequently more or less frequently, depending on actual findings). Maintenance/ repair to pipelines (e.g. span correction, corrosion or leakage repair). Abandonment and recovery operations (if necessary due to weather or emergency conditions (e.g. anchor strike))	x	✓	✓

The Construction Phase activities in the landfall section of the Project that have the potential to impact terrestrial cultural heritage are those involving ground clearance or excavation. In particular these may impact upon buried archaeological layers - such activities include:

- Vegetation and land clearance, grading and topsoil stripping;
- Open trench pipe-laying activities;
- Construction of shore crossing microtunnel facilities and foundations for shore pull winches and sheaves;
- Construction of landfall facilities;
- Excavation of foundations, underground chambers and areas for hardstanding formation, building foundations and piling; and
- Ancillary works, including:
    - The preparation of access roads and junction upgrades;
    - The preparation of temporary and permanent drainage channels, soakaways, diversions etc.; and
    - The establishment and use of temporary construction areas, topsoil storage areas, rubble and waste dumping.

It is considered that microtunnelling, which will occur at a depth of approximately 18 m below ground level in the vicinity of kurgan site RU-TCH-02, does not have the potential to physically impact upon archaeological deposits beyond the entry tunnels. This is because archaeological deposits and finds are generally located within the topsoil and subsoil, or cut into the uppermost surface of the underlying superficial geological deposits. In rural locations such as that of kurgan site RU-TCH-02, buried archaeological remains such as inhumations and structures associated with ritual activity are generally found at between 1.5 m and 0.1 m below ground level.

Use of construction vehicles may impact upon cultural heritage receptors through rutting or collision damage, whilst there are risks regarding the unauthorised removal of artefacts or vandalism as a result of increased human access to previously inaccessible areas (such impacts could also occur during pre-construction route surveys).

Some cultural heritage receptors, such as cemeteries, roadside war memorials (e.g. Varvarovka and Rassvet) which are located close to access routes may also be potentially impacted by noise and visual intrusion from Project traffic (which could occur during all Project phases). Visual aspects of setting are addressed in **Chapter 13 Landscape and Visual**.

As detailed in Section 16.6.3 operational activities have little potential to impact on cultural heritage receptors, as such activities will take place in areas that will have already undergone ground disturbance during the Construction and Pre-Commissioning Phase of the Project and may have had mitigation measures implemented. However, there would remain the potential for the illicit removal of archaeological remains or interference with sites as a result of limited increased movement of people undertaking routine operational tasks (**Chapter 5 Project Description**).

Marine Cultural Heritage Impact Sources

A number of Pre-construction and Construction Phase activities may impact upon the seabed or sedimentation regimes, resulting in potential disturbance of marine archaeological receptors (both known and unknown). The activities include the following and are summarised in Table 16.14:

- Use of underwater survey equipment (via ROV and any towed sensor arrays) during the pre-construction and construction pipeline route surveys (pre-lay, UXO, as-built), and during real time touch down monitoring of pipe-laying activity that may result in seabed contact by ROV strikes and thruster washing;
- Direct disturbance of the CHO as a result of pipe-laying;
- Direct disturbance of CHO as a result of anchoring activities associated with pipelaying. For the majority of offshore pipe-laying work the pipe-lay vessel will be manoeuvred along the pipe-lay route using DP. Anchored vessels can potentially be used in water depths of up to 600 m, although for the Project it is anticipated that anchoring will only be undertaken up to a water depth of approximately 350 – 380 m; and
- Seafloor intervention (which may cause disturbance and changes to erosion and sedimentation regimes) resulting from:
    - Removal of obstacles such as munitions, boulders etc.;
    - Drilling;
    - Dredging;
    - Placement of materials including concrete mattressing, rocks and grout bags; and
    - Pipe-laying and anchoring.

Operational Phase activities which may impact upon marine cultural heritage receptors include:

- Use of underwater survey equipment (via ROV and any towed sensor arrays) during the regular pipeline inspection activities that may result in seabed contact by ROV strikes and thruster washing(ROV sonar and visual surveys along pipeline e.g. initial ROV subsea leak inspection survey, surveys of critical sections, initially annually and subsequently more or less frequently, depending on actual findings); and
- Maintenance and repair to pipelines, which may result in seafloor intervention.

16.6.3.2 Project Design Controls

The engineering and design of the Project has incorporated a number of project control measures to ensure impact avoidance and minimisation; these measures are detailed in **Chapter 5 Project Description**. Design controls for cultural heritage include the following:

- Optimisation of the marine pipeline route to avoid known and potential CHOs by a 150 m buffer. This avoidance buffer distance was chosen after careful consideration of engineering and design constraints and after a review of commonly-used avoidance buffer intervals for similar marine construction projects;
- Microtunnelling for terrestrial cultural heritage;

- Selection of terrestrial transportation routes to avoid sensitive cultural heritage objects or sites; and
- Construction of road by-passes to avoid routing heavy traffic through the communities of Gai Kodzor and Varvarovka. The route of the Project temporary access road was moved further to the east during the detailed design phase of the route, placing a buffer of a gully and vegetation between the road and cemetery RU-TCH-06.

These design controls reduce the risk of any adverse impacts to many receptors, both terrestrial and marine, that have been identified in the previous sections.

Table 16.15 below lists the terrestrial cultural heritage receptors that have been excluded, or scoped out, of the Impact Assessment as a result of the Project design controls.

Table 16.15 Terrestrial Scoped-out Receptors

Terrestrial Cultural Heritage Receptor	Reasons for scoping out
RU-TCH-01 – Grave of DS Kalinin, Hero of the Soviet Union (1910 – 1943) (20th century)	Traffic routes do not pass in the vicinity of the site
RU-TCH-07 – Varvarovka, Armenian cemetery (modern)	Varvarovka bypass
RU-TCH-08 – Varvarovka, Russian Orthodox church under construction (modern)	Varvarovka bypass
RU-TCH-09 – Varvarovka, monument and a memorial to local people killed during the Great Patriotic War (modern)	Varvarovka bypass
RU-TCH-10 – Gai Kodzor Armenian Church and Cemetery (modern)	Gai Kodzor bypass
RU-TCH-11 – Gai Kodzor war memorials commemorating residents killed in during the Great Patriotic War (modern)	Gai Kodzor bypass
RU-TCH-12 – Gai Kodzor Armenian Apostolic Church (Church of St Sarkis (St. Sergius)) (modern)	Gai Kodzor bypass
RU-TCH-13 – Gai Kodzor Armenian khachkar cross stone (modern)	Gai Kodzor bypass

Continued…

Terrestrial Cultural Heritage Receptor	Reasons for scoping out
RU-TCH-14 – St. Barbara's Source, Varvarovka (uncertain date)	Varvarovka bypass
RU-TCH-15 – Cross, Supsekh (modern)	Heavy traffic will be not be routed through Supsekh
RU-TCH-16 – Sacred tree, Sukko/Anapa road (modern)	Traffic routes do not pass in the vicinity of the site
RU-TCH-17 – 'Walls of the Sea', west of Supsekh (uncertain date)	Traffic routes do not pass in the vicinity of the site

Complete.

For marine cultural heritage only CHOs or potential CHOs that fall within 150 m of the centreline of the route of any of the four pipelines have been included in the Impact Assessment. Table 16.16 lists the marine cultural heritage receptors that have been scoped out of the assessment.

Table 16.16 Marine Scoped-Out Receptors

Marine Cultural Heritage Receptor	Reasons for scoping out
RU-MCH-002 Metal component from either a marine vessel or an aircraft (possibly a wing) Continental slope Modern period	Pipelines have been rerouted to avoid potential objects by a minimum of 150 m.
19 potential CHOs	Pipelines have been rerouted to avoid potential objects by a minimum of 150 m.

16.6.3.3 Assessment of Potential Impacts (Pre-mitigation)

Taking account of the potential Project impact sources as detailed in Section 16.6.3.1, it is possible to define levels of impact magnitude on each of the identified cultural heritage receptors as detailed in Table 16.10 and Table 16.11. Using the impact significance matrix as set out in **Chapter 3 Impact Assessment Methodology**, it is then possible to define the significance of potential impacts on terrestrial and marine cultural heritage prior to mitigation. Table 16.17 below defines both levels of impact magnitude on terrestrial and marine cultural heritage receptors, as well as defining impact significance.

Where different activities and Project phases are assessed to have different levels of potential impact on a given receptor, the highest level of potential impact has been assigned in Table 16.17.

Table 16.17 Summary of Predicted Impacts on Terrestrial and Marine Cultural Heritage (Without Mitigation)

Cultural Heritage Receptor	Phase	Impact	Receptor Sensitivity	Magnitude of Impact	Impact Significance Without Mitigation
RU-TCH-02 – Burial mound (kurgan) (Antiquity to medieval)	Pre-construction Construction Operation	Damage or destruction of archaeological deposits and layers	High	Low, since preserved in place	Low adverse
RU-TCH-06 – Varvarovka, village cemetery, Armenian and Russian cemetery	Construction: traffic	Changes to setting - increased noise and vibration	High	Low	Moderate adverse
RU-TCH-18 – Varvarovka, medieval village	Pre-construction Construction	Damage or destruction of archaeological deposits and layers	Low	Low	Low adverse
RU-MCH-001 – Aircraft wing	Pre-Construction, Construction, Operational, (Decommissioning)	Destruction of submerged cultural resources	Low	Moderate	Moderate adverse
RU-MCH-003 – Single ceramic amphora (medieval)	Pre-Construction, Construction, Operational, (Decommissioning)	Destruction of submerged cultural resources	Moderate	High	High adverse
RU-MCH-004 – Wooden shipwreck (probably medieval to post-medieval)	Pre-Construction, Construction, Operational, (Decommissioning)	Destruction of submerged cultural resources	High	Moderate	High adverse

Table 16.17 indicates that a number of cultural heritage receptors are potentially impacted – the sections below consider these receptors in terms of their sensitivity, impact magnitude during the various Project Phases, and the significance of potential impacts (without mitigation).

16.6.3.4 RU-TCH-02 – Burial Mound (kurgan) (Antiquity to Medieval)

- **Description:** National Monument (No. 363). Circular burial mound, 29 m in diameter and 2.97 m high. The centre has been robbed. Surrounded by a 125 m National Monument (No. 363) protection buffer zone;
- **IFC Classification:** Non-replicable tangible cultural heritage (archaeology);
- **Proximity to Project Works:** The microtunnels pipeline cross the 125 m National Monument (No. 363) protection buffer zone at a depth of approximately 18 m below ground level. The monument itself is located approximately 50 m north of the most northerly microtunnel (Figure 16.6); and
- **Sensitivity:** High (National Monument local protection category). The monument is assessed as being of regional value as it can contribute to regional research objectives. It has been subject to an unknown degree of tomb-robbing at some point in the past, the extent of which cannot be determined without intrusive investigation. It is assumed that its integrity is slightly compromised.
- **Magnitude of Impact:**
    - **Pre-construction works** may impact upon the burial mound. It is not considered that vehicle tracking (i.e. wheel damage from vehicles) or collision damage is likely to occur, as the monument is protected by dense vegetation. The site may be impacted by the unauthorised removal of artefacts or vandalism. The magnitude of this potential impact is low;
    - **Construction works** including vegetation clearance along the corridor, works associated with microtunnel insertion c.250 m to the northeast, traffic movements etc. may put the monument at risk of damage. The designated monument protection perimeter defines the extent of the registered monument which would experience changes to setting due to vegetation clearance. The magnitude of this potential impact is assessed as low; and
    - **Operational activities** will give rise to a small increase in the working population accessing the general area, increasing the risk of unauthorised removal of artefacts or vandalism. The magnitude of this impact is assessed as low.
- **Significance of impact:** A potential low magnitude impact during the Construction Phase on this high sensitivity receptor would result in an impact of low adverse significance; and
- **Overall impact:** Overall impact may be local (within the boundaries of the archaeological site), direct (directly affecting the archaeological receptor), permanent and of **low adverse** significance (see summary in Table 16.18).

Table 16.18 Impact on Receptor RU-TCH-02

Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Potential Impact (Without Mitigation)
Adverse	Archaeological site	High	Low	Low adverse

16.6.3.5 RU-TCH-06 – Varvarovka, village cemetery, Armenian and Russian cemetery

- **Description:** This cemetery lies to the east of Varvarovka village, close to vineyards. The cemetery is extensive and divided into family plots. Includes the common grave of Soviet soldiers and civilians killed in the fighting and executed by the fascist invaders in 1942 and 1943 (National Monument No. 380);
- **IFC Classification:** Non-replicable tangible cultural heritage (historical, cultural, artistic and religious values);
- **Proximity to Project Works:** Cemetery located 398 m northwest of the north-western-most pipeline. Located approximately 10 m south of Gazprom Invest Road and approximately 100 m west of South Stream Transport temporary microtunnel access road. The alignment of the South Stream Transport temporary access road was designed to avoid running close to the cemetery;
- **Sensitivity:** High, as the site contains a National Monument;
- **Magnitude of Impact:** During the Construction Phase, the cemetery and cemetery visitors may be impacted by increased construction traffic movements (noise, visual intrusion and change to setting). Impact magnitude assessed as low. No impacts are anticipated during other Project phases;
- **Significance of impact:** A potential low magnitude impact during the Construction Phase on this high sensitive receptor would result in an impact of **moderate** adverse significance. Impacts limited to changes to setting, but noticeable differences in noise or sound quality and minor changes to area can affect intangible cultural heritage activities, associations, visual links and cultural appreciation; and
- **Overall impact:** Overall impact will be local (within the boundaries of the cemetery), indirect (affecting cemetery visitors), temporary and reversible (Construction Phase South Stream Transport temporary microtunnel access road) and permanent (Gazprom Invest Road permanent access road) and of **moderate adverse** significance (see summary in Table 16.19).

Table 16.19 Impact on Receptor RU-TCH-06

Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Potential Impact (Without Mitigation)
Adverse	Cultural heritage site	High	Low	Moderate adverse

16.6.3.6 RU-MCH-001 – An Aircraft Wing on the Continental Shelf (78 m Water Depth) (Modern)

- **Description:** The site measures approximately 7.4 m long by 3.9 m wide, and is primarily constructed of metal. Located in the marine environment in less than 350 to 380 m of

water. It dates to the modern period (20th century). The site does not appear to have any post-depositional anthropogenic disturbance;

- **IFC Classification:** Marine cultural heritage object with historical significance, assessed as being less than 100 years old by experts of the Russian Academy of Sciences;
- **Proximity to Project Works:** This undesignated aircraft wing lies 56.7 m west of pipeline #3;
- **Sensitivity:** The receptor's sensitivity is assessed as low due to its limited complexity and contextual associations, and low potential for contributing to the understanding of aviation or aircraft construction techniques;
- **Magnitude of Impact:**
  - **Pre-construction element of Construction Phase.** Pre-construction route surveys may impact upon the aircraft wing. There is a potential for underwater vehicle (e.g. ROV and AUV) damage resulting from collision, improper tether management fouling the object, or damage from thruster/propeller washing. Magnitude of impact is assessed as moderate, as the site is just over 50 m from the construction corridor;
  - **Construction Phase.** It is not anticipated that Construction Phase activities will have a direct impact upon the site. However, the increased activity near to the site increases the risk of potential ROV strikes. As this site is located in less than 350 to 380 m of water, it also has the potential to be impacted by vessel anchoring. Magnitude of impact is assessed as moderate; and
  - **Operational Phase.** Operational activities will give rise to a small increase in ROVs accessing the general area, increasing the risk of potential ROV strikes. Magnitude of impact assessed as moderate.
- **Significance of Impact:** A potential moderate magnitude impact on this low sensitive receptor would result in an impact of **moderate** adverse significance (**not significant** during the Decommissioning Phase); and
- **Overall Impact:** The overall impact will be local (within the boundaries of the receptor), direct (affecting the receptor), irreversible and of **moderate adverse** significance (see summary in Table 16.20).

Table 16.20 Impact on Receptor RU-MCH-001

Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Potential Impact (Without Mitigation)
Adverse	Marine CHO	Low	Moderate	Moderate adverse

16.6.3.7 RU-MCH-003 – A Single Ceramic Amphora on the Continental Shelf (72 m Water Depth) (Medieval Period)

- **Description:** A single ceramic amphora that appears to be an isolated find, as there are no other associated objects or materials in the immediate vicinity. A determination on the exact cultural affiliation could not be made from the available data, but an examination of the object's shape suggests it could approximately date to the medieval period (4th to 15th centuries AD);
- **IFC Classification:** Movable marine cultural heritage object with archaeological significance;
- **Proximity to Project Works:** Amphora lying 23.9 m east of pipeline #3;
- **Sensitivity**: The receptor's sensitivity is assessed as moderate due to the potential for contributing to the understanding of maritime trade interactions and cargoes;
- **Magnitude of Impact:**
    - **Pre-construction element of Construction Phase**. Pre-construction route surveys may impact upon the amphora. There is a potential for underwater vehicle (e.g. ROVs and AUVs) damage resulting from collision, improper tether management fouling the object, or damage from thruster/propeller washing. Magnitude of impact is assessed as high, as the site is less than 50 m from the construction corridor and may require additional geophysical surveys;
    - **Construction Phase.** There is some potential that Construction Phase activities will have a direct impact upon the object. The increased activity near to the site increases the risk of potential ROV damage or unauthorised removal of the amphora. As this site is located in less than 350 to 380 m of water, it also has the potential to be impacted by vessel anchoring. Magnitude of impact is assessed as moderate; and
    - **Operational Phase.** Operational activities will give rise to an increase in ROVs accessing the general area, increasing the risk of potential ROV strikes or unauthorised removal of the object. Magnitude of impact is assessed as low.
- **Significance of Impact:** A potential high magnitude impact on this moderate sensitive receptor (during the Pre-construction Phase) would result in an impact of **High** adverse significance. Impact significance would be **Moderate** during the Construction Phase, **Moderate** during the Operational Phase and **Not Significant** during the Decommissioning Phase); and
- **Overall Impact:** Overall impact will be local (within the boundaries of the receptor), direct (affecting the receptor), irreversible and of **High** adverse significance (see summary in Table 16.21).

Table 16.21 Impact on Receptor RU-MCH-003

Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Potential Impact (Without Mitigation)
Adverse	Marine CHO	Moderate	High	High adverse

16.6.3.8 RU-MCH-004 – A Wooden Shipwreck on the Continental Slope (442.8 m Water Depth) (Probably Medieval to Post-medieval)

- **Description:** An undesignated wooden shipwreck that is mostly buried beneath the seafloor, but has one end protruding up from the seafloor. A determination on the exact cultural affiliation or age could not be made from the available data. An assessment of visible construction features suggests this shipwreck could potentially date from the medieval to post-medieval periods (13th to 19th century);
- **IFC Classification:** Marine cultural heritage object with archaeological significance;
- **Proximity to Project Works:** Shipwreck located 69.7 m west of pipeline #1;
- **Sensitivity:** The receptor's sensitivity is assessed as high due to its potential for significant contributions to the understanding of early boat construction techniques and maritime trade on the Black Sea. It does not appear to have any post-depositional anthropogenic disturbance;
- **Magnitude of Impact:**
    - **Pre-construction element of Construction Phase.** Pre-construction route surveys may impact upon the shipwreck site. There is an increased potential for underwater vehicle (e.g. ROVs and AUVs) damage resulting from collision, improper tether management fouling the shipwreck, or damage from thruster/propeller washing. The site may be impacted by the unauthorised removal of artefacts during ROV examination of the site as a result of increased human access to previously unknown sites. Magnitude of impact is assessed as moderate, as the site is over 60 m distant from the construction corridor and will likely be exposed to additional geophysical surveys;
    - **Construction Phase.** There is potential that Construction Phase activities will have a direct impact upon the site. Given that this site is located in water depths greater than 350 to 380 m there are no impacts expected as a result of vessel anchoring. The increased activity near to the site increases the risk of potential ROV strikes, thruster washing, or unauthorised removal of artefacts. Magnitude of impact is assessed as moderate; and
    - **Operational Phase.** Operational activities will give rise to an increase in ROVs accessing the general area, increasing the risk of ROV strikes or unauthorised removal of artefacts. Magnitude of impact is assessed as low.
- **Significance of Impact:** A potential moderate magnitude impact on this high sensitive receptor (during the Pre-construction and Construction Phases) would result in an impact of high adverse significance. Impact significance would be **Moderate** during the Operational Phase and **Not Significant** during the Decommissioning Phase); and
- **Overall Impact:** Overall impact will be local (within the boundaries of the receptor), direct (affecting the receptor), irreversible and of **High** adverse significance (see summary in Table 16.22).

Table 16.22 Impact on Receptor RU-MCH-004

Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Potential Impact (Without Mitigation)
Adverse	Marine CHO	High	Moderate	High adverse

16.7 Mitigation and Monitoring

Where the Project involves potential adverse impacts on cultural heritage, that have not been avoided through the application of Design controls (see Section 16.6.3.1), appropriate mitigation measures to avoid, minimise, mitigate and offset these impacts will be applied. The cultural heritage mitigation measures presented in this chapter are based on the policy, regulatory and administrative frameworks as outlined in **Chapter 2 Policy, Regulatory and Administrative Framework**, as well as national laws and regulations, international conventions ratified by the Russian Federation (Section 16.6.2) and Good International Industry Practice (GIIP).

An Environmental and Social Management Plan (ESMP) will be prepared for the Project before any on-site works begin (see **Chapter 22 Environmental and Social Management**). The ESMP will set out mitigation and monitoring measures, including those for cultural heritage mitigation and monitoring, as described in the sections below.

Mitigation and monitoring measures will include on-going engagement with the relevant authorities, as needed.

Mitigation measures will be designed and executed following national guidance as set out in **Chapter 2 Policy, Regulatory and Administrative Framework**:

- Guidelines for the design of archaeological work in areas of national economic construction (Ref. 16.26) and the Handbook of Instructions (HOI) on the Recommendations for Scientific Research, Survey, Design and Production Works, aimed at the preservation of the objects of the cultural heritage (monuments of history and culture) of the people of the Russian Federation (Ref. 16.73);
- Regulations on the Execution of Archaeological Fieldwork (archaeological excavations and surveys) and Compiling Scientific Report Documentation (Ref. 16.27);
- Order of the Federal Service for the Monitoring of Compliance with Legislation in the Area of the Protection of Cultural Heritage 'Regulation on procedure for issuance of authorizations (permits) for the right of works execution on determination and study of the archaeological heritage objects' (No. 15, 2011) (Ref. 16.146); and
- Archaeological survey and mitigation works will take account of SNiPs (Russian National Standards - Construction Norms and Rules) related to Engineering Surveys for Construction (SNiP 11-02-96; Ref. 16.22), Engineering and Environmental Investigations for Construction (SNiP 11-102-97; Ref. 16.23) and Pipelines (SNiP 2.05.05-85; Ref. 16.24), as well as

'Specifications for Project Documentation for Construction, Modernization and Reconstruction' (RD-91-010.ZO KTN-170; Ref. 16.25).

The overarching mitigation measure to prevent any adverse impacts on CHOs, which will be applied throughout the Project life cycle, consists of the adoption by South Stream Transport of a cultural heritage stewardship programme. The objective of such programme is to ensure that all parties involved in the construction, operation and decommissioning of the Pipeline are at all times aware of the importance of cultural heritage and that compliance with national legislation and international conventions is achieved during any activity associated with the Project.

Systematic stewardship of cultural heritage can be ensured throughout the Project life-cycle by developing and implementing a Cultural Heritage Construction Management Plan (CMP) during the Construction and Pre-Commissioning Phase of the Project (see Section 16.7.1) and Operational Management Plans (OMPs) during the Operational Phase (see Section 16.7.2). The Cultural Heritage CMP will be developed and implemented in consultation with the Department on the Protection, Restoration and Exploitation of Historical Cultural Values (Heritage) of Krasnodar Krai. Any archaeological survey and mitigation works will be performed in consultation with the Department on the Protection, Restoration and Exploitation of Historical Cultural Values (Heritage) of Krasnodar Krai.

Appropriate staff training in cultural heritage awareness will be undertaken by staff and subcontractors during all Phases of the Project to assist in the prevention of interference or accidental damage to cultural heritage. The approach to this training will be included within the Cultural Heritage CMP.

A Grievance Mechanism and on-going stakeholder engagement will be implemented as part of mitigation and monitoring measures.

A review of already-collected marine data suggests that chance finds of CHOs are highly unlikely to occur during Project construction and operation activities. A UXO survey will be carried out in advance of pipe-lay activities (see Section 16.7.1.1) to further reduce the possibility that a previously unidentified cultural heritage object, such as a small object that may not have been detected by geophysical surveys, will be encountered during pipe-laying activities. In addition, real time touch down monitoring of pipe-laying activity, using ROV, will be undertaken to confirm the absence of CHO along the pipeline route and to enable a prompt response in case of chance finds.

Should chance finds of cultural heritage objects occur during Project construction activities (including during UXO and pre-lay surveys and site mobilisation activities undertaken prior to construction), the Chance Finds Procedure will be implemented to allow the monitoring archaeologist to record and assess the find, and carry out an appropriate avoidance or mitigation response. The Cultural Heritage CMP will be discussed with the relevant Russian authorities. The relevant authorities will be informed of all chance finds. A Chance Find Procedure appropriate to the Operational Phase of the Project will be developed in advance of the commencement of this Phase. The Chance Find Procedure for all Phases of the Project will be developed in consultation with the Department on the Protection, Restoration and Exploitation of Historical Cultural Values (Heritage) of Krasnodar Krai.

Reducing the risk of looting, vandalism and damage to cultural heritage objects during the Construction and Pre-Commissioning and Operational Phases of the Project will be achieved through implementation of the Cultural Heritage CMP including staff cultural heritage awareness training.

In addition to the implementing the Cultural Heritage CMP the Project will implement specific mitigation measures during the various Project phases. Table 16.23 provides a summary of the cultural heritage mitigation measures – as the principal impacts on cultural heritage will be associated with the Construction Phase, the majority of proposed mitigation measures relate to this phase of the Project. These mitigation measures are explained in more detail in the sections that follow the table.

Table 16.23 Summary of Cultural Heritage Mitigation Measures by Project Phase

Phase	Terrestrial	Marine
Construction & Pre-Commissioning, including Pre-Construction Surveys	Protective flagging/fencing Provide security if required by authorities	UXO survey Real time monitoring of the pipe-laying activity Careful piloting of ROVs during surveying and during installation monitoring (such as avoiding ROV strikes, minimising propeller or thruster washing, tether management, use of ultra-short baselines and acoustic tracking) Establish baseline to permit monitoring and evaluation of sediment load where technically feasible
	Archaeological watching brief on groundworks	Archaeological watching briefs on pipe-lay vessels & nearshore approaches Identification of nature of RU-MCH-001 (aircraft wing) and, if warranted, observation, lifting to surface or relocation with the recording and statutory reporting of new coordinates of the object. Recovery of RU-MCH-003 (amphora)
	Traffic Management component of the Russian Landfall CMP	Anchor Management Plan Monitoring and evaluation of sediment loading where technically feasible
	Chance Find Procedures	
	Staff cultural heritage awareness training	
	Plotting of location of CHOs on Project mapping and GIS	

Continued…

Phase	Terrestrial Marine
Construction & Pre-Commissioning, including Pre-Construction Surveys	A Grievance Mechanism and on-going stakeholder engagement will be implemented as part of mitigation and monitoring measures
Operational	Application of Chance Find Procedures Plotting of location of CHOs on Project mapping and GIS Careful piloting of ROVs during surveying and maintenance activities
	A Grievance Mechanism and on-going stakeholder engagement will be implemented as part of mitigation and monitoring measures
Decommissioning	The need for additional survey and further impact assessment will be revisited once plans for the Decommissioning Phase have been finalised.

Complete.

16.7.1 Mitigation Measures – Construction and Pre-Commissioning Phase

A Cultural Heritage CMP will be developed by South Stream Transport and it will include a Chance Find Procedure. If chance finds are identified during construction, different procedures will be applied depending on the sensitivity of the receptor. The Cultural Heritage CMP will include a tiered approach that will assign responsibility for dealing with the chance find to the appointed watching brief archaeologist, institutional counterpart or national cultural agencies, depending on the significance of the find.

All terrestrial and marine archaeological fieldwork will be approved, permitted and supervised by the authorities. Archaeological works will be undertaken according to the stipulations of the eventual Russian Federation permit for archaeological excavations and surveys and Krasnodar region license (Department on the Protection, Restoration and Exploitation of Historical Cultural Values (Heritage) of Krasnodar Krai).

In addition, the Cultural Heritage CMP will include procedures to ensure the following:

- All known terrestrial and marine cultural heritage receptors will be delineated on digital and paper Project maps and in the Project GIS database, which will be available to the design team and construction contractors;
- Project mapping and GIS will be updated, as necessary, should any chance finds of cultural heritage objects occur.;
- Terrestrial receptors will be flagged and protective fencing established, if considered necessary, during ground clearance and during the Construction Phase (Ref. 16.3);

- Archaeological Excavations. Any excavations that may be required as a result of chance finds will be implemented in accordance with applicable laws;
- Conservation. Any post-excavation conservation and analysis, publication, dissemination or finds curation will be undertaken in accordance with Russian legislation and standard national practice (Ref. 16.26; Ref. 16.73);
- A UXO survey will be conducted to strengthen and enhance marine cultural heritage baseline data and further decrease the possibility of encountering a chance find during marine pipe-laying activities. This survey will be conducted in advance of the commencement of pipe-laying works;
- Real-time monitoring of the marine pipe-laying process to ensure that the pipeline is installed at the stipulated distance from any marine CHOs; and
- A Grievance Mechanism and on-going stakeholder engagement will be implemented.

Potential impacts from the use of ROVs for marine monitoring and surveying activities will be minimised by limiting propeller or thruster washing, proper tether management and avoiding ROV strikes by careful piloting. During surveying and pipe-laying works, archaeological watching briefs will be undertaken to monitor surveying and construction activities.

- At sea, South Stream Transport will ensure that an archaeological watching brief is conducted by a qualified archaeologist to monitor surveying and pipe-laying activities to determine the presence or absence of potential cultural heritage objects and to ensure that known cultural heritage sites are not impacted by surveying and pipe-laying activities, including in all nearshore areas; and
- On land, South Stream Transport will ensure that an archaeological watching brief is conducted by a qualified archaeologist on all areas of terrestrial ground disturbance, including clearance activities, groundworks and excavation works associated with the construction of the terrestrial pipeline route; and all associated temporary and permanent construction areas, access routes and areas of ancillary works, including the Temporary Access Road and Varvarovka bypass road. This constitutes GIIP and IFC PS8 requirements, and was advised in discussions between Peter Gaz and Krasnodar Krai Department for the Protection, Restoration and Exportation of Cultural Heritage Objects of Value and Peter Gaz in 2012-2013 (Appendices 16.3, 16.4, 16.5, 16.9 and 16.11) and by the State Historical-Cultural Expert Evaluation (Ref. 16.70; Appendix 16.8).

Terrestrial and marine archaeological watching briefs will be undertaken by appropriately qualified and experienced cultural heritage professionals approved and permitted by the competent authorities. Specifically, the watching briefs will be undertaken in order to ensure that:

- The avoidance distance of 150 m for known marine CHOs is adhered to during marine pipe-laying;
- The agreed mitigation measures are appropriately implemented to ensure the prevention of damage to presently known marine CHOs from the use of ROVs or other surveying and construction activities; and

- The procedure for chance finds, as outlined in the Cultural Heritage CMP, and detailed in the Contractor's CMP, is appropriately implemented.

Specific mitigation measures that will be applied to identified terrestrial receptors include the following:

- Terrestrial site RU-TCH-02 (Kurgan burial mound) will be protected by flagging and/or fencing and security provided, if required.

Specific mitigation measures that will be applied to identified marine receptors include the following:

- Aircraft wing RU-MCH-001 lies within 150 m of the centreline of one of the pipelines and cannot be avoided by the 150 m avoidance distance. The wing will be subject to further identification and, if warranted, observation, lifting to surface or relocation with the recording of new coordinates of the object. If the object remains in place, use of avoidance buffering of approximately 60 m (due to geotechnical constraints);
- Amphora RU-MCH-003 lies within 150 m of the centreline of one of the pipelines and cannot be avoided by the 150 m avoidance distance. It will be recovered by lifting it to the surface prior to the start of construction;
- Wooden shipwreck RU-MCH-004 lies within 150 m of the centreline of one of the pipelines and cannot be avoided by the 150 m avoidance distance. The wreck will be further investigated via ROV as part of the pre-construction UXO survey and details recorded. Avoidance buffering of approximately 70 m (due to geotechnical constraints) will be implemented; and
- Relocation and recovery measures will be established in consultation with the Russian Ministry of Culture and implemented using the best available techniques. The areas adjacent to these objects (i.e., a radius of 150 m to 200 m) will also receive high-resolution survey and documentation prior to recovery activities to ensure that no additional cultural material is present. Nationally and internationally recognised practices for the protection, field-based study and documentation of the cultural heritage will be implemented.

Where anchoring vessels are used for Project activities, there is a potential to impact marine cultural heritage sites. The survey data that has been used to identify the CHOs described in this study covers an approximately 2 km wide corridor. In water depths in excess of approximately 100 m the anchors could be laid outside the currently surveyed area, potentially impacting currently unknown objects.

- An Anchor Management Plan will be developed to enable marine works to proceed in a manner that safely avoids marine archaeological sites in water depths where anchoring will take place by placing the anchors at a distance of no less than 150 m from currently known receptors and any that are identified as a result of the anchor corridor survey. The Anchor Management Plan will be developed by the chosen contractor; and
- A survey of the Anchoring Spread Area will be conducted by the pipeline construction contractor using high resolution side scan sonar. The survey will record data at high enough resolutions to discern CHOs, including those observed during prior geophysical surveys of the pipeline corridor. Side scan sonar will overlap and provide 100% coverage of the sea

floor. Based on the CHO/potential CHO that are identified anchor avoidance buffers of 150 m will be established to ensure no associated anchoring impacts (drags, sweeps or drops) will occur.

16.7.2 Mitigation Measures – Commissioning and Operational Phase

As no significant intrusive work will be carried out on the pipelines during their operation no significant impacts are expected. However, in the nearshore and offshore sections of the Project, inspection and maintenance activities that may involve the use of ROVs may be required. In such cases, the mitigation measures will be as per the Construction Phase and will include the limitation of ROV propeller or thruster washing, proper tether management and avoidance of ROV strikes by careful piloting. On land, similar measures as per the Construction Phase will be implemented to address any potential impacts from inspection and maintenance activities. As during construction, Project mapping and GIS will be updated, as necessary, should any chance finds of cultural heritage objects occur. A Grievance Mechanism and on-going stakeholder engagement will be implemented as part of mitigation and monitoring measures.

A Chance Find Procedure appropriate to the Operational Phase of the Project will be developed in advance of the commencement of operation of the pipelines and will be included in the Operational Management Plans. The Operational Management Plans will describe environmental and social mitigation, management and monitoring requirements and actions in relation to normal operating conditions and planned maintenance, minor repairs and minor incidents.

16.7.3 Monitoring Requirements

As set out in **Chapter 22 Environmental and Social Management**, a Cultural Heritage CMP would be implemented throughout the Project Construction and Pre-Commissioning Phase with OMPs implemented during the Operational Phase, as appropriate. Monitoring requirements will form part of the Cultural Heritage CMP and any Operational Phase Plans, including Chance Finds Procedures and staff cultural heritage awareness training.

Monitoring requirements identified during the Construction and Pre-Commissioning Phase comprise:

- Archaeological watching briefs on terrestrial groundworks;
- Archaeological watching briefs on marine works, including the pipe-lay vessel and nearshore approaches;
- Monitoring of the seafloor/CHO condition will be undertaken as part of the real time touch down monitoring of the material placement, pipe-laying activity and during the as-built pipeline route survey. This monitoring will include specific monitoring of cultural heritage objects RU-MCH-001 and RU-MCH-004, all of which lie within the marine Zone of Potential Influence, in order to confirm that the objects have been avoided during the pipe-laying process. The monitoring will also confirm that all other CHOs have been avoided by the specified 150 m buffer zone; and

- Where technically feasible, the sediment load baseline will be established via multi-beam echo sounder and side-scan sonar survey, as well as visual observation of the sea surface, and sampling to establish the suspended matter content and particle size distribution of matter within marine horizons (surface, thermocline, benthic and seabed), as part of the sea water monitoring programme and in accordance with Russian regulations (Refs. 16.147 to 16.150).

Monitoring requirements have been identified for the Operational Phase and comprise:

- Where a CHO is located within 150 m of the centreline of any one of the four pipelines (i.e. a currently unknown CHO discovered during the construction activities that could not be avoided by re-routing of the pipeline), monitoring of the CHO condition and seafloor between the CHO and the pipeline by ROV in the course of sonar and visual inspection and maintenance surveys during the Operational Phase. The purpose will be to monitor the condition of cultural heritage sites and their preservation contexts in case the Project gives rise to any unanticipated physical, chemical or environmental changes, and if so, to allow for the early identification of these changes and for corrective measures to be implemented.

16.8 Residual Impact Assessment – All Phases

Table 16.24 (terrestrial) and Table 16.25 (marine) present a summary of the potential residual impacts on cultural heritage receptors during the Construction and Pre-commissioning Phase and the Operational Phase respectively, following the implementation of the mitigation measures detailed in Section 16.7.

16.8.1 Terrestrial Cultural Heritage

Table 16.16 presented details of potential cultural heritage impacts without mitigation. Table 16.24 provides details of mitigation measures to be undertaken for those receptors that are potentially impacted by the Project, and post-mitigation levels of residual impact significance following the application of mitigation measures. For each of the receptors identified, the post-mitigation impact significances in Table 16.24 were determined.

Table 16.24 Construction and Pre-Commissioning Phase Residual Impacts (Terrestrial Cultural Heritage)

Receptor	Impact Significance Pre-mitigation	Mitigation Measure	Residual Impact Significance
Burial mound (kurgan) (RU-TCH-02)	High adverse	Site protection (flagging/fencing), provide security if required, archaeological watching brief, application of Chance Find Procedure and staff training via the Cultural Heritage CMP	Not Significant

Continued…

Receptor	Impact Significance Pre-mitigation	Mitigation Measure	Residual Impact Significance
Varvarovka village cemetery -Armenian and Russian cemetery (modern) (RU-TCH-06)	Moderate adverse	Detailed design routes the microtunnel temporary access road further to the east from the cemetery providing buffer.	Low
Varvarovka medieval settlement site (RU-TCH-18)	Low adverse	Site protection (flagging/fencing), provide security if required, archaeological watching brief, application of Chance Find Procedure and staff training via the Cultural Heritage CMP	Not significant

Complete.

During the Construction and Pre-Commissioning Phase:

- Potential adverse impacts:
    - Without mitigation, low adverse impacts are predicted for the burial mound (kurgan) (RU-TCH-02). The site will not be directly impacted by construction works as it will be preserved in place by microtunnelling. The proposed microtunnels will pass approximately 18 m below the receptor, but within the 125 m buffer area that surrounds it. The insertion of the microtunnels will avoid disturbance of non-geological deposits, and will not impact the topsoil, subsoil, and surface of natural horizons, which are the only strata liable to contain archaeological features or finds. In consultation between Peter Gaz and the Krasnodar Krai Department for the Protection, Restoration and Exportation of Cultural Heritage Objects of Value, the Department indicated that it would be best to avoid impacts on the monument and to protect and preserve the monument in situ. Mitigation will include Cultural Heritage Awareness Training, the implementation of site protection measures such as demarcation with suitable materials following the site warning colour codes, chance finds procedures and traffic control measures, including an appropriate fixed track policy, via the Cultural Heritage CMP. Following mitigation the residual impact is assessed as **Not Significant**.

The mound will be protected prior to any groundworks to prevent accidental damage. Flagging or fencing and signage (to be determined by the permitting authorities) will be subject to regular inspections and maintenance.

- Without mitigation, Varvarovka village cemetery, Armenian and Russian cemetery (RU-TCH-06) may experience moderate adverse impacts. The route of the South Stream Transport temporary microtunnel access road has been designed to minimise impacts by implementing a road layout which moves construction traffic away from the cemetery area and its immediate surroundings. However, the Gazprom Invest permanent road will run immediately north of the cemetery, following the course of an existing road.

Mitigation will involve the preparation and implementation of the Traffic Management component of the Russian Landfall CMP, which will contain measures to manage traffic in proximity to the cemetery, and the Cultural Heritage CMP. Following mitigation, the residual impact is assessed as **Low**.

There is potential for unknown and unregistered buried archaeological remains and stray finds to be present within the construction corridor of the Project. The potential Project impact on such features may range between moderate and high adverse, depending on the character and sensitivity of the remains and their location. In accordance with legislation and to mitigate for the disturbance of potential sites, an archaeological watching brief will be conducted on all areas of ground disturbance. Mitigation will also involve the development and application of a Cultural Heritage CMP including Chance Finds Procedures (CFP) and appropriate staff training in cultural heritage awareness.

- Potential beneficial impacts:
  - The information gathered during the watching brief and any further investigations undertaken by Russian archaeologists may enhance the current archaeological knowledge and understanding of the region.

No impacts on terrestrial cultural heritage are expected during the Operational Phase.

In conclusion, after mitigation the residual impact on terrestrial cultural heritage is assessed as **Not Significant**.

16.8.2 Marine Cultural Heritage

For those marine receptors that are indicated to be potentially impacted by the Project in Table 16.17, applicable mitigation measures will be applied. Table 16.25 provides details of mitigation measures to be undertaken, and post-mitigation levels of residual impact significance.

Table 16.25 Construction and Pre-Commissioning Phase Residual Impact (Marine Cultural Heritage)

Site	Significance of Impact Pre-mitigation	Mitigation Measure	Residual Impact Significance
RU-MCH-001 aircraft wing	Moderate adverse	Additional visual survey via ROV, check military records Relocation, if warranted Anchor Management Plan Sediment load monitoring where technically feasible	Low Adverse
RU-MCH-003 amphora	High adverse	Additional visual survey via ROV Recovery (ROV)	Moderate Adverse

Continued…

Site	Significance of Impact Pre-mitigation	Mitigation Measure	Residual Impact Significance
RU-MCH-004 wooden shipwreck	High adverse	Pipeline optimisation Sediment load monitoring where technically feasible	Moderate Adverse

Complete.

Table 16.25 indicates the following:

During the Construction and Pre-Commissioning Phase:

Potential adverse impacts:

- Without mitigation, impacts of moderate significance are predicted for the aircraft wing (RU-MCH-001). This site can be impacted by pre-construction activities and Construction Phase works based on proximity to the nearest pipeline centreline. The proposed pipeline route cannot be optimised to accommodate an avoidance buffer of 150 m in this area due to geotechnical constraints. Following mitigation through further survey investigation and, if warranted, relocation or avoiding the site by a buffer of approximately 60 m (due to geotechnical constraints, the significance of the residual impact is assessed as being **Low Adverse**;
- Without mitigation, impacts of high adverse significance are predicted for the ceramic amphora (RU-MCH-003). This site can be impacted by pre-construction activities and Construction Phase works based on proximity to the nearest pipeline centreline. The proposed pipeline route cannot be optimised to accommodate an avoidance buffer of 150 m in this area due to geotechnical constraints, and therefore mitigation through archaeological recovery will be undertaken. Following mitigation through recovery, the significance of the residual impact is assessed as being **Moderate** adverse due to the removal of the object from its context;
- Without mitigation, impacts of high adverse significance predicted for marine site RU-MCH-004 (wooden shipwreck). This site may be impacted during the pre-construction activities and Construction Phase works based on proximity to the nearest pipeline centreline, and therefore mitigation through avoidance will be undertaken. The proposed pipeline route cannot be optimised to accommodate an avoidance buffer of 150 m in this area due to geotechnical constraints, but the site will be avoided by a distance of approximately 70 m. Following mitigation through avoidance controls (such as avoiding ROV strikes, minimising propeller or thruster washing, tether management, use of ultra-short baselines and acoustic tracking), the application of an Anchor Management Plan, sediment monitoring, ROV-based monitoring, CFP and staff training, the significance of the residual impact is assessed as being **Moderate** adverse; and
- Without mitigation, during the Construction and Pre-Commissioning Phase there is the potential for currently unknown cultural heritage to be impacted by the Project resulting in potential Low to High adverse impacts, depending on the importance of the find. Should

any currently unknown CHO be identified, the mitigation measures outlined in Section 16.7.1 will be applied and any residual impacts are anticipated to be **Low**.

Potential beneficial impacts:

- Information gathered from the watching brief and any further investigations, which will be supervised by Russian archaeologists, may enhance the current knowledge of maritime archaeology in the Russian Sector of the Black Sea.

Operational Phase impacts are summarised in Table 16.28.

Potential adverse impacts:

- Without mitigation, during the Operational Phase there is the potential for as yet unknown cultural heritage to be impacted by the Project resulting in potential Low to High adverse impacts, depending on the character and sensitivity of the find and its location. Should any currently unknown CHO be identified, mitigation measures outlined in Section 16.7 will be implemented where possible and any residual impacts are anticipated to be **Low**.

Potential beneficial impacts:

- Where a CHO is located within 150 m of the centreline of any one of the four pipelines, periodical monitoring of the CHO condition and seafloor between the CHO and the pipeline by ROV in the course of sonar and visual inspection and maintenance surveys will provide longitudinal data on the condition of CHOs.

In conclusion, after mitigation, the residual impact on marine cultural heritage is assessed as **Low**.

16.8.3 Summary of Cultural Heritage Residual Impact

Tables 16.26 (terrestrial) and Table 16.27 (marine) provide a summary of potential residual impacts upon cultural heritage receptors arising from the Project during the Construction and Pre-Commissioning Phase following the implementation of mitigation measures detailed in Section 16.7.1. Table 16.28 provides a summary of the potential residual impacts upon cultural heritage receptors arising from the Project during the Operational Phase following the implementation of mitigation measures defined in Section 16.7.2.

Table 16.26 Cultural Heritage: Construction and Pre-Commissioning Residual Impacts (Terrestrial)

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre -Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Open trench pipe-laying activities Construction of landfall facilities Establishment of microtunnel construction site Increased construction related traffic Increased site population	Direct damage to or destruction of archaeological site from: • Ground excavation and terracing work; • Drilling, blasting and boring work; • Vehicle and plant tracking and collision damage; and • Potential illicit removal of archaeological remains or interference with sites, due to increased site population.	Burial mound (kurgan) (RU-TCH-02)	High	Low	Low as preserved in place	Subject to consultation with the authorities, mitigation measures will include: Site protection Preparation and implementation of a Cultural Heritage CMP, Chance Finds Procedures, traffic management and appropriate staff training in cultural heritage awareness. Grievance Mechanism and on-going stakeholder engagement	Not significant (preservation in place due to microtunnelling)

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre -Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Increased construction related traffic	Disturbance of tranquillity and local users from: • Increase in noise and visual intrusion.	Varvarovka, village cemetery, Armenian and Russian cemetery (modern) (RU-TCH-06) Rassvet cemetery /memorials	High	Low	Moderate adverse	Detailed design to route the Microtunnel temporary access road further to the east from the cemetery. Preparation and implementation of Traffic Management component of the Russian Landfall CMP and Cultural Heritage CMP Grievance Mechanism and on-going stakeholder engagement	Low

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre -Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Preparation of access roads / upgrades to junctions of existing roads Open trench pipe-laying activities - Onshore excavation of pipeline trench and storage of excavated materials Construction of landfall facilities Establishment of microtunnel construction site Increased construction related traffic Increased site population	Potential damage / loss of archaeological receptors Tracking damage caused by vehicles from: • Ground excavation and terracing work; • Construction and realignment of roads and temporary road diversions; • Ground preparation activities, including building foundations and piling; • Diversion of utilities and drainage; • Drilling, blasting and boring work; • Vehicle and plant tracking and collision damage; and Potential illicit removal of archaeological remains or interference with sites, due to increased site population.	RU-TCH-18	Low	Low	Low adverse	Archaeological watching brief. Preparation and implementation of the Cultural Heritage CMP, Chance Finds Procedures and appropriate staff training in cultural heritage awareness. Grievance Mechanism and on-going stakeholder engagement	Not significant

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre -Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Preparation of access roads / upgrades to junctions of existing roads Open trench pipe-laying activities - Onshore excavation of pipeline trench and storage of excavated materials Construction of landfall facilities Establishment of microtunnel construction site Increased construction related traffic Increased site population	Potential damage / loss of archaeological receptors Tracking damage caused by vehicles from: • Ground excavation and terracing work; • Construction and realignment of roads and temporary road diversions; • Ground preparation activities, including building foundations and piling; • Diversion of utilities and drainage; • Drilling, blasting and boring work; • Vehicle and plant tracking and collision damage; and • Potential illicit removal of archaeological remains or interference with sites, due to increased site population.	Currently unknown items and sites of heritage significance	Unknown (anticipated to be Low to High)	Moderate	Unknown (estimated to be moderate adverse to high adverse)	Archaeological watching brief. Preparation and implementation of the Cultural Heritage CMP, Chance Finds Procedures and appropriate staff training in cultural heritage awareness. Grievance Mechanism and on-going stakeholder engagement.	Unknown (estimated to be Low adverse to Moderate adverse)

Complete.

Table 16.27 Cultural Heritage: Construction and Pre-Commissioning Residual Impacts (Marine)

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore and nearshore pre-construction Route Surveys & as-built survey ROV and ROTV sonar and visual surveys along nearshore pipeline Removal of any offshore and nearshore obstacles Placement of grout bags, rocks, concrete mattressing etc. on seabed Offshore pipe-laying on seabed by S-Lay method (30 - 600 m water depth)	Damage or loss of archaeological receptors from: • Seabed disturbance; • Anchor or ROV strikes; and • Changes to erosion and sedimentation regimes.	Aircraft wing (RU-MCH-001)	Low	Moderate	Moderate Adverse	Use of avoidance buffering of approximately 60 m (due to geotechnical constraints) Further investigation followed by relocation, if deemed necessary. Sediment load monitoring where technically feasible.	Low adverse

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore and nearshore pre-construction route surveys & as-built survey ROV and ROTV sonar and visual surveys along nearshore pipeline Removal of any offshore and nearshore obstacles Placement of grout bags, rocks, concrete mattressing etc. on seabed Offshore pipe-laying on seabed by S-Lay method (30-600 m water depth)	Damage or loss of archaeological receptors from: • Seabed; • Disturbance; • Anchor or ROV strikes; and • Changes to erosion and sedimentation regimes.	Single ceramic amphora (RU-MCH-003)	Moderate	High	High Adverse	Archaeological recovery of object	Moderate adverse (due to removal from context)

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore and nearshore pre-construction route surveys & as-built survey ROV and ROTV sonar and visual surveys along nearshore pipeline Removal of any offshore and nearshore obstacles Placement of grout bags, rocks, concrete mattressing etc. on seabed Offshore pipe-laying on seabed by S-Lay method (30-600 m water depth)	Damage or loss of archaeological receptors from: • Seabed disturbance; • Changes to erosion and sedimentation regimes; and • Anchor or ROV strikes.	Wooden shipwreck (RU-MCH-004)	High	Moderate	High Adverse	Minimise propeller or thruster washing Proper tether management Avoid ROV strikes by careful piloting Use of avoidance buffering of approximately 70 m (due to geotechnical constraints) ROV monitoring of material placement Anchor Management Plan Archaeological watching brief Use of Ultra-Short Baselines (USB) acoustic tracking system on pipe and ROVs Chance Finds Procedures and appropriate staff cultural heritage awareness training Sediment load monitoring where technically feasible Grievance Mechanism and on-going stakeholder engagement.	Moderate adverse

Continued…

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore and nearshore pre-construction Route Surveys & as-built survey	Seabed disturbance Changes to erosion and sedimentation regimes Anchor or ROV strikes	Currently unknown marine archaeology	Low to High	Moderate	Low to High Adverse	Minimise propeller or thruster washing Proper tether management	Not Significant to Moderate adverse
ROV and ROTV sonar and visual surveys along nearshore pipeline Removal of any offshore and nearshore obstacles Placement of grout bags, rocks, concrete mattressing etc. on seabed Offshore pipe-laying on seabed by S-Lay method (30-600 m water depth)						Avoid ROV strikes by careful piloting Use of avoidance buffering to protect known sites ROV monitoring of material placement Anchor Management Plan Archaeological watching brief	

Continued...

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore pipe-laying on seabed J-Lay method (>600 m water depth)						Use of Ultra-Short Baseline (USB) acoustic tracking systems on pipe and ROVs Chance Finds Procedures and appropriate staff cultural heritage awareness training Sediment load monitoring where technically feasible Grievance Mechanism and on-going stakeholder engagement.	

Complete.

Table 16.28 Cultural Heritage: Operational Phase Residual Impacts (Marine)

Activity	Potential Impact	Receptor (s)	Receptor Sensitivity	Impact Magnitude/ Likelihood	Pre-Mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
Offshore and nearshore as-built surveys ROV and ROTV sonar and visual surveys along nearshore pipeline Maintenance/ repair to pipelines	Damage or loss of archaeological receptors from: • Seabed disturbance; and • Anchor or ROV strikes.	Known and as yet unknown marine archaeology	Low to high	Moderate	Moderate Adverse	Abate at source Minimise propeller or thruster washing Proper tether management Avoid ROV strikes by careful piloting CFP and appropriate staff cultural heritage awareness training Grievance Mechanism and on-going stakeholder engagement.	Not Significant

16.9 Unplanned Events

An unplanned event, such as the controlled detonation of a UXO, an ROV strike, the sudden abandonment of the pipeline, during construction, as a result of emergency situations, or a major pipeline breach and pressure loss during operation, may result in damage to or destruction of submerged archaeological material. The magnitude of this impact is assessed as high, and the significance is assessed as moderate to high adverse, depending on the sensitivity of the receptor. However, the likelihood of this event occurring is very low and therefore, for the purposes of this assessment, such potential impact has been discounted.

It should also be noted that during the Construction and Operational Phases, changes in the seafloor due to environmental conditions could have the potential to impact known and as yet unknown cultural heritage, resulting in potential Low to High adverse impacts, depending on the significance of the cultural heritage object.

Appropriate unplanned event contingency planning will be undertaken that minimises the likelihood of low probability events occurring, as well as minimising event consequences (**Chapter 19 Unplanned Events**).

16.10 Cumulative Impacts

The cumulative impact assessment considers the Project within the context of other development projects in the local Study Area and the wider regional area. The assessment is presented in **Chapter 20 Cumulative Impacts**.

16.11 Conclusions

The Project will generate beneficial impacts during all phases of the Project:

- Further survey work will be undertaken of the following marine sites: the wooden shipwreck (RU-MCH-004) and the aircraft wing (RU-MCH-001) as part of the pre-construction activities;
- A ceramic amphora (RU-MCH-003) will be recovered and if warranted, the aircraft wing (RU-MCH-001) will be relocated; and
- The conditions of any positively identified marine CHOs (including any chance finds) in close proximity of any pipeline will be monitored throughout the life cycle of the Project during routine inspection and maintenance works.

Information gathered from further investigations and on-going monitoring may enhance the current knowledge of terrestrial and maritime archaeology in the Russian Sector of the Black Sea.

With regard to potentially adverse effects the Construction and Pre-Commissioning Phase of the Project has the greatest potential to impact terrestrial and marine cultural heritage receptors.

- Potential impacts to terrestrial cultural heritage designated *kurgan* burial mound RU-TCH-02 are avoided as the result of the design control of microtunnelling which places the pipelines approximately 20 m below the receptor;
- Potential impacts on terrestrial cultural heritage will also be mitigated by archaeological watching briefs (monitoring), application of Cultural Heritage CMP, Chance Find Procedures and Cultural Heritage Awareness Training and, if warranted, archaeological excavation and the implementation of the Traffic Management component of the Russian Landfall CMP, including a fixed track policy. These mitigation measures will reduce operational impacts to cultural heritage receptors to **Not Significant**;
- Potential impacts to known marine cultural heritage receptors are avoided as a result of the design control of re-routing the pipelines to ensure a minimum separation distance of 150 m from these known and potential CHOs. Sites include potential CHO (B1_S0002; G-B1-0006; RS_21; RS_35; RS_394, RS_538; RS_942; RS_943, RS_993; R-B5-0010; R-B1-0010; R-B1-0011), potential shipwrecks (RS_77; RS_871; R-B1-0008), a shipwreck (RS_872) and a German Messerschmitt Bf 109 (Me 109) Aircraft (CHO) (RS_190);
- Potential impacts to known and potential marine CHOs in the anchor spread area will be mitigated via the Anchor Corridor Survey and Anchor Management Plan;
- Potential impacts on marine cultural heritage will also be avoided by real time touch down monitoring during pipe-lay and the as-built survey along with careful management and piloting of ROVs; and
- Potential impacts on known and as yet unknown terrestrial and marine CHOs will be mitigated by archaeological watching briefs (monitoring), Chance Find Procedures and Cultural Heritage Awareness training. These measures will reduce any potential impacts to **Low** significance.

These measures will reduce any potential adverse impacts during the Construction and Pre-commissioning Phase to **Low** significance.

Operational impacts on terrestrial cultural heritage are not expected.

Operational impacts on unknown marine CHOs are largely mitigated through careful ROV piloting. These mitigation measures will reduce operational impacts to cultural heritage receptors to **Not Significant**.

Throughout the Project life-cycle, impacts on cultural heritage will be systematically controlled and monitored by the application of a Cultural Heritage CMP and OMPs both of which will include Chance Find Procedures and provisions for Cultural Heritage Awareness Training.

References

Number	Reference
Ref. 16.1	UNESCO 1972 Convention concerning the Protection of the World Cultural and Natural Heritage. United Nations Educational, Scientific and Cultural Organization, Paris, 16 November 1972. Accessed at: http://whc.unesco.org/en/conventiontext [Accessed on 20 November 2012]
Ref. 16.2	UNESCO 2003 Declaration concerning the Intentional Destruction of Cultural Heritage. United Nations Educational, Scientific and Cultural Organization, Paris, 17 October 2003. Accessed at: http://www.unesco.org/ [Accessed on 20 November 2012]
Ref. 16.3	IFC 2012 Performance Standard 8: Cultural Heritage. International Finance Corporation, Washington DC. Accessed at: http://www1.ifc.org/wps/wcm/connect/dd8d3d0049a791a6b855faa8c6a8312a/PS8_English_2012.pdf?MOD=AJPERES [Accessed on 20 November 2012]
Ref. 16.4	Constitution of the Russian Federation, dated 25 December 1993. Preamble; Article 44; Article 58; Article 71; Article 72; Article 114. Accessed at: http://www.constitution.ru/en/10003000-01.htm [Accessed on 20 February 2013]
Ref. 16.5	Foundations of Russian Federation Legislation on Culture No. 3612-1, approved by the Supreme Soviet of the Russian Federation on 09.10.1992 (As amended on 08.05.2010). Accessed at: http://zakonprost.ru/content/base/174232/ [Accessed on 20 February 2013]
Ref. 16.6	UNESCO 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Cultural Property. United Nations Educational, Scientific and Cultural Organization, Paris, 14 November 1970. Accessed at: http://www.unesco.org [Accessed on 20 November 2012]
Ref. 16.7	Civil Code of the Russian Federation (and subsequent Additions and Amendments). Passed by the State Duma on November 24, 2006. Approved by the Federation Council on December 8, 2006. Article 1.3; Article 233; Article 240; Article 272. Accessed at: http://www.russian-civil-code.com/ [Accessed on 20 February 2013]
Ref. 16.8	On Objects of the Cultural Heritage (Historical and Cultural Monuments) of the Peoples of the Russian Federation. Federal Law No. 73-FZ, dated June 25, 2002 (as amended last on November 16, 2011. Accessed at: http://www.rg.ru/2011/11/21/nasledie-dok.html [Accessed on 20 February 2013]
Ref. 16.9	The Land Code of the Russian Federation No. 136-FZ of October 25, 2001 (As amended 7 December 2011). Adopted by the State Duma September 28, 2001. Approved by the Federation Council October 10, 2001. [Земельный кодекс Российской Федерации от 25 октября 2001 г. № 136-ФЗ]. Accessed at: http://www.rg.ru/2001/10/30/zemkodeks.html [Accessed on 20 February 2013]

Number	Reference
Ref. 16.10	Law of the Russian Federation 'On the Subsurface Resources' No. 2395-1, February 21, 1992 ((as amended by Federal Law of March 3, 1995 N 27-FZ) as amended December 12, 2011). Accessed at: http://www.rg.ru/2011/12/07/nedra-dok [Accessed on 20 February 2013]
Ref. 16.11	Urban Planning Code of the Russian Federation dated 29 December, 2004, No. 190-FZ. Adopted by the State Duma on 22.12.2004. Accessed at: http://www.consultant.ru/popular/gskrf/ [Accessed on 20 February 2013]
Ref. 16.12	The Criminal Code Of The Russian Federation Federal Law No. 64-FZ. Adopted by the State Duma on May 24, 1996 (and subsequent amendments). Adopted by the Federation Council on June 5, 1996. Accessed at: http://www.legislationline.org/documents/section/criminal-codes/country/7 [Accessed on 20 February 2013]
Ref. 16.13	Federal Law of 14 January 1993 No. 4292-1 'On the Perpetuation of the Memory of those who Died in Defence of the Fatherland' (with amendments). Accessed at: http://base.garant.ru/1583840/ [Accessed on 20 February 2013]
Ref. 16.14	Federal Law of 12 January 1996 No. 8-FZ "On the Burial and Funeral" (with amendments). Accessed at: http://base.garant.ru/105870/ [Accessed on 20 February 2013]
Ref. 16.15	Law of Krasnodar Region November 3, 2000 No. 325-KZ "О культуре" "On Culture" (As amended on December 28, 2004 and July 15, 2005) Passed by the Legislative Assembly of Krasnodar Region October 2000. Accessed at: http://kultura.kubangov.ru/html/nato-6kea6l.html [Accessed on 20 February 2013]
Ref. 16.16	'On the Objective Composition of Local Immovable Historical and Cultural Monuments Located in the Territory of the Krasnodar Region' (25 December 2000)
Ref. 16.17	Law of Krasnodar Region of February 6, 2003 No. 558-KZ "On Cultural Heritage (historical and cultural) of the Russian Federation located in the Krasnodar Territory (as amended on December 28, 2004, December 14, 2006, April 4 and July 21, 2008, December 29, 2010, May 10, July 19, 2011). Accessed at: http://kultura.kubangov.ru/html/nato-6ke9ka.html [Accessed on 20 February 2013]
Ref. 16.18	Resolution of the Legislative Assembly of Krasnodar Region No. 1633-P "On the Law of Krasnodar Territory" On Amendments to the Law of Krasnodar Region "On each object consisting of immovable monuments of history and culture of regional importance, situated in Krasnodar Krai", 18 November 2009. Accessed at: http://www.kubzsk.ru/resolutions/ib.jsp?id=81970A3E17B188D5E040A8C007010554 [Accessed on 20 February 2013]
Ref. 16.19	Law of Krasnodar Region July 19, 2011 No. 2316-KZ "On the lands of immovable cultural heritage (monuments of history and culture), regional and local, situated in Krasnodar Krai, and their protection zones. Accessed at: http://kultura.kubangov.ru/html/nato-6ke9p8.html [Accessed on 20 February 2013]

Number	Reference
Ref. 16.20	Law of Krasnodar Region February 4, 2004 No. 666-KZ 'On Burial and Funeral Business in the Krasnodar Territory', Passed by the Legislative Assembly of Krasnodar Region January 23, 2004. Accessed at: http://www.kubzsk.ru/kodeksdb/noframe/law?d&nd=921017770&prevDoc=921038455 [Accessed on 21 February 2013]
Ref. 16.21	Krasnodar Governor's Resolution 'On Amendments to the decree of the Head of Administration of Krasnodar Region of 09.09.2011 No. 975 'On the control of the protection, restoration, use and cultural values (Heritage) of the Krasnodar region' (No. 455, 2007)
Ref. 16.22	Russian National Standards: Engineering Surveys For Construction. Basic Principles (SNiP 11-02-96)
Ref. 16.23	Russian National Standards: Engineering and Environmental Investigations for Construction (SNiP 11-102-97)
Ref. 16.24	Russian National Standards: Pipelines (SNiP 2.05.05-85)
Ref. 16.25	Russian National Standards: Specifications for Project Documentation for Construction, Modernization and Reconstruction (RD-91-010.ZO KTN-170)
Ref. 16.26	Smirnov, AS 1990 Guidelines for the design of archaeological work in areas of national economic construction. Institute of Archaeology of the USSR, Moscow
Ref. 16.27	Regulations on the Execution of Archaeological Fieldwork (archaeological excavations and surveys) and Compiling Scientific Report Documentation. Confirmed by the Academic Council of Archaeology Institute of the Russian Academy of Science, 30 March 2007. Accessed at: http://www.krasnodar.ru/photo/Zakon/Ohrana/Arheologia.zip [Accessed 20 February 2013]
Ref. 16.28	ICOMOS. 1990. Charter for the Protection and Management of the Archaeological Heritage (Lausanne Charter). International Council on Monuments and Sites. Lausanne. Available from: www.international.icomos.org/charters/arch_e.pdf. Accessed on 11 March 2013.
Ref. 16.29	UNESCO. 2010. The Power of Culture for Development. United Nations Educational, Scientific and Cultural Organization. Paris. Available from: http://unesdoc.unesco.org/images/0018/001893/189382e.pdf?bcsi_scan_AB11CAA0E2721250=0&bcsi_scan_filename=189382e.pdf. Accessed on 11 March 2013.
Ref. 16.30	IFC 2012 Guidance Note 8: Cultural Heritage. International Finance Corporation, Washington DC. Accessed at: www1.ifc.org/wps/wcm/connect/39e39000498007fda1fff3336b93d75f/Updated_GN8-2012.pdf?MOD=AJPERES [Accessed on 20 November 2012]

Number	Reference
Ref. 16.31	OECD 2012 Working Party on Export Credits and Credit Guarantees Recommendation of the Council On Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (the "Common Approaches") TAD/ECG(2012)5 Accessed at: http://search.oecd.org/officialdocuments/displaydocumentpdf/?cote=tad/ecg(2012)5&doclanguage=en [Accessed on 10 April 2012]
Ref. 16.32	IfA 2010 Code of Conduct (April 2010). Institute for Archaeologists, Reading. Accessed at: www.archaeologists.net/sites/default/files/node-files/code_conduct.pdf [Accessed on 20 November 2012]
Ref. 16.33	IfA 2012 Standard and Guidance for historic environment desk-based assessment (April 2012). Institute for Archaeologists, Reading. Accessed at: www.archaeologists.net/sites/default/files/node-files/DBA2010working%20draft_0.pdf [Accessed on 20 November 2012]
Ref. 16.34	IfA 2009 Standard and Guidance for Archaeological Field Evaluation (April 2009). Institute for Archaeologists, Reading. Accessed at: www.archaeologists.net/sites/default/files/node-files/ifa_standards_field_eval.pdf [Accessed on 20 November 2012]
Ref. 16.35	IFC 2012. Performance Standard 7: Indigenous Peoples. International Finance Corporation, Washington DC. Accessed at: www1.ifc.org/wps/wcm/connect/1ee7038049a79139b845faa8c6a8312a/PS7_English_2012.pdf?MOD=AJPERES. Accessed on 20 November 2012.
Ref. 16.36	South Stream Transport B.V. 2012. South Stream Offshore Pipeline – Russian Sector: Scoping Report – Non-Technical Summary. December 2012. Accessed at: http://www.south-stream-offshore.com/media/documents/pdf/en/2012/11/ssttbv_russian-sector-scoping-report_33_en_20121116_2.pdf. Accessed 19 July 2013.
Ref. 16.37	South Stream Transport B.V. 2012. South Stream Offshore Pipeline – Russian Sector. Scoping Report. 46369085_Doc020_REP_Rev03. December 2012. Accessed at: http://www.south-stream-offshore.com. Accessed 19 July 2013.
Ref. 16.38	IFC 2012 Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts. International Finance Corporation, Washington DC. Accessed at: www.ifc.org [Accessed on 20 November 2012]
Ref. 16.39	Peter Gaz 2011 'Complex Engineering Surveys at the Phase 'Design Documentation' within the Framework of the South Stream Gas Pipeline Marine Sector Project Implementation. Volume 5 Environmental Survey and Archaeological Studies. Part 5 Archaeological Studies. Book 1 Information report on archaeological surveys. Collection and analysis of library data on cultural heritage objects. Location along the gas transmission pipeline route, 'LLC PGAZ', 2011 (Ref. No. 6976.101.004.21.14.05.05.01-01)

Number	Reference
Ref. 16.40	Peter Gaz 2011 'Complex Engineering Surveys at the Phase 'Design Documentation' within the Framework of the South Stream Gas Pipeline Marine Sector Project Implementation. Volume 5 Environmental Survey and Archaeological Studies. Part 5 Archaeological Studies. Book 2 Determination of objects with cultural heritage features along the route. Development and coordination of the found objects survey programme. Visual examination of cultural heritage objects information and report' (Ref. No. 6976.101.004.21.14.05.05.02 Vol 5.5.2)
Ref. 16.41	Peter Gaz 2011 'Complex Engineering Surveys at the Phase 'Design Documentation' within the Framework of the South Stream Gas Pipeline Marine Sector Project Implementation. Volume 5 Environmental Survey and Archaeological Studies. Part 5 Archaeological Studies. Book 3 Measures for the Conservation of Cultural Heritage' (Ref. No. 6976.101.004.21.14.05.05.03).
Ref. 16.42	UNESCO 2012 World Heritage Centre World Heritage List. United Nations. Accessed at: http://whc.unesco.org/en/list [Accessed on 20 November 2012]
Ref. 16.43	UNESCO 2012 Intangible Heritage Lists. United Nations. Accessed at: www.unesco.org/culture/ich/index.php?pg=00011 [Accessed on 20 November 2012]
Ref. 16.44	UNESCO 2012 Database of National Cultural Heritage Laws. United Nations. Accessed at: http://portal.unesco.org/culture/en/ev.php-URL_ID=33928&URL_DO=DO_TOPIC&URL_SECTION=201.html [Accessed on 20 November 2012]
Ref. 16.45	Ministry of Culture 2012 Digital State Register of Cultural Heritage (Ministry of Culture of the Russian Federation). Accessed at: http://kulturnoe-nasledie.ru/ [Accessed on 16 November 2012]
Ref. 16.46	Office for the protection, restoration and maintenance of historical and cultural values (heritage) of Krasnodar Region 2012, Law of Krasnodar region from August 17, 2000 N 313-KZ "On each object consisting of immovable monuments of history and culture of regional importance, situated in Krasnodar Krai" (as amended on December 17, 2001, February 4, 2002, November 2003 and May 31, 2005). Accessed at: www.krasnodar.ru/content/507/show/7619/ [Accessed on 16 November 2012]

Number	Reference
Ref. 16.47	National and regional databases include: Ministry of Culture of the Russian Federation (Minkultury Rossii) www.mkrf.ru [Accessed on 16 November 2012] Federal Service for Supervision of Legislation in Mass Communications and Protection of Cultural Heritage/Ministry of Culture Rosokhrankultura www.rosohrancult.ru [Accessed on 16 November 2012] United State Inventory of the Cultural Heritage Sites of the Russian Federation List of cultural heritage sites (archaeology, architecture, history, monumental art), Main Information and Computing Centre of the Culture Ministry. Accessed at: www.kulturnoe-nasledie.ru [Accessed on 16 November 2012] *Culture of Russian Regions project (natural and cultural heritage, history, ethnography and traditional culture). Accessed at: http://www.culturemap.ru [Accessed on 16 November 2012]*
Ref. 16.48	Head Department of Navigation and Oceanography of Ministry of Defence of the Russian Federation. Accessed at: www.chartpilot.ru/products/collections/russian [Accessed on 16 November 2012] Federal Service of State Registration Cadastre and Mapping of Russia (Rosreestr), Federal Cadastral Center, Zamlya/ESRI CIS. Accessed at: www.maps.rosreestr.ru/portal [Accessed on 16 November 2012]
Ref. 16.49	Ballard, RD, Hiebert, FT, Coleman, DF, Ward, C, Smith, JS, Willis, K, Foley, B, Croff, K, Major, C & Torres, F 2001 Deepwater archaeology of the Black Sea: the 2000 Season at Sinop, Turkey. American Journal of Archaeology 105/4, 607 – 623
Ref. 16.50	Ballard, RD 2008 Searching for ancient shipwrecks in the deep sea. Archaeological Oceanography, 131 – 147
Ref. 16.51	Bekker-Nielsen, T (ed) 2005 Ancient Fishing and Fish Processing the Black Sea Region. Black Sea Studies 2, Århus University Press
Ref. 16.52	Coleman, DF 2008 Archaeological and geological oceanography of inundated coastal landscapes. Archaeological Oceanography, 177 – 199
Ref. 16.53	Hiebert, FT 2001 Black Sea coastal cultures: trade and interaction. Expedition 43/1,11 – 20
Ref. 16.54	Horlings, R 2005 Deepwater Survey, Archaeological Investigation and Historical Context of Three Late Antique Black Sea Shipwrecks. Unpublished MA Thesis, Florida State University
Ref. 16.55	Kacharava, DD 1983 Archaeological Investigations on the Eastern Black Sea Littoral, 1970-80. Archaeological Reports 30, 98 – 101

Number	Reference
Ref. 16.56	Treister, MJ & Vinogradov, YG 1993 Archaeology on the northern coast of the Black Sea. American Journal of Archaeology 97/3, 521 – 563
Ref. 16.57	Ward, C & Horlings, R 2008 The remote exploration and archaeological survey of four Byzantine ships in the Black Sea. Archaeological Oceanography, 148 – 173
Ref. 16.58	Council of Europe/ERICarts Compendium of Cultural Policies and Trends in Europe, 13th edition. 2012. Accessed at: www.culturalpolicies.net/web/russia.php. Accessed on 28 May 2013.
Ref. 16.59	Council of Europe/European Heritage Network. Permanent information system bringing together governmental services in charge of heritage protection within the Council of Europe. Accessed at: http://european-heritage2.coe.int/sdx/herein/national_heritage/voir.xsp?id=intro_RU_en. Accessed on 28 May 2013.
Ref. 16.60	Portal of the State's executives of the Krasnodar Region. Art and Culture of Krasnodar Region. Accessed at: http://www.krasnodar.ru/en/content/573/show/15589/. Accessed on 12 April 2013.
Ref. 16.61	Southern Federal District 2012 Material Cultural Life - Krasnodar Region (Паспорт Культурной Жизни - Краснодарского Края). Accessed at: http://kultura.kubangov.ru/www/kultura.nsf/info/kula-84hbqj.html. Accessed on 12 April 2013.
Ref. 16.62	Southern Federal District 2012 Material Cultural Life - Krasnodar Region Arts and crafts. Accessed at: http://kultura.kubangov.ru/html/nato-6jmn7q.html. Accessed on 12 April 2013.
Ref. 16.63	Department of External Economic Activity of the Krasnodar region 2012 Kuban Cuisine Festival, XI International Investment Forum Sochi 2012 Accessed at: http://www.forumkuban.com/programme/cultural_programme/festivals. Accessed on 12 April 2013.
Ref. 16.64	Executive of Krasnodar Territory Portal 2013. Calendar of holidays, anniversaries and other significant events of the Krasnodar Territory in 2013. Calendar published annually in accordance with the law of the Krasnodar Territory of December 14, 2006 № 1145-CH "On establishment of holidays and anniversaries in the Krasnodar region."
Ref. 16.65	Especially revered holidays and anniversaries traditional religions in 2013. [Особо чтимые праздники и памятные даты традиционных религиозных конфессий на 2013 год] Accessed at: http://www.krasnodar.ru/photo/Kalendar_2013/2013-Religiya.pdf. Accessed on 19 April 2013.

Number	Reference
Ref. 16.66	Wrecks Office Information Service, UK Hydrographic Office, Taunton, Somerset, UK. Kriegsmarine Service Records (WASt), Deutsche Dienststelle (WASt), Berlin, Germany. Lloyd's Register of Ships/Casualty Returns, Lloyd's Register Information Centre, London, UK. Lloyd's List, Lloyd's Marine Collection, Guildhall Library, London, UK.
Ref. 16.67	Black Sea Trade Project, University of Pennsylvania. Accessed at: www.sas.upenn.edu/aamw/resources/fieldwork/. Accessed on 28 May 2013.
Ref. 16.68	Danish National Research Foundation Centre for Black Sea Studies, Aarhus. Accessed at: www.pontos.dk/ Accessed on 28 May 2013.
Ref. 16.69	French Research Institute in Oceanography ASSEMBLAGE Project. Accessed at: www.ifremer.fr/assemblage/. Accessed on 28 May 2013.
Ref. 16.70	Vlaskin, M.B., Malovsky, A.N. & Fomichev, N.M. 2013. State Historical-Cultural Expert Evaluation of the Research and Design Documentation, Demonstrating the Feasibility for the Performance of Works for the Conservation of the Objects of Cultural Heritage: Section: Protection of the Objects of Cultural Heritage within the Framework of the South Stream Project for the Construction of the Offshore Section of the Gas Pipeline (Russian Sector). Rostov-on-Don, July-August 2013.
Ref. 16.71	Letter no. 107/2 dated 13 February 2011. L.A. Gavrilova of Archaeological Heritage Fund (Kuban Heritage JSC) to N. Vladimirovna, head of Department for Conservation, Restoration and Use of Historical and Cultural Treasures (Heritage) of the Krasnodar Region. Reproduced in Appendix 16.3
Ref. 16.72	Letter no. 03R dated 14 March 2011, from G.G Davidenko & N.V. Volkodav of the Department for Conservation, Restoration and Use of Historical and Cultural Treasures (Heritage) of the Krasnodar Regionto L.A. Gavrilova, Vice President of the Archaeological Heritage Fund. Reproduced in Appendix 16.4
Ref. 16.73	Handbook of Instructions (HOI) on the Recommendations for Scientific Research, Survey, Design and Production Works, aimed at the preservation of the objects of the cultural heritage (monuments of history and culture) of the people of the Russian Federation (HOI – 2007), Version 4.
Ref. 16.74	Letter no. 107/1, dated 13 February 2011. L.A. Gavrilova, Vice President of the Archaeological Heritage Fund to A. Grigorievitch, Krasnodar Krai Museum and Preserve. Reproduced in Appendix 16.5
Ref. 16.75	Peter Gaz 2011. 'Complex Engineering Surveys at the Phase 'Design Documentation' within the Framework of the South Stream Gas Pipeline Marine Sector Project Implementation. Volume 5 Environmental Survey and Archaeological Studies. Part 5 Archaeological Studies. Book 6 Measures for protection of cultural heritage objects. The Russian sector of the Black Sea. Offshore area. Final technical report' (Ref. No. 6976.101.004.21.14.05.05.06).

Number	Reference
Ref. 16.76	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 4: Engineering-Hydrographic Works and Engineering-Geophysical Research at the Shelf Areas of Anapa. Book 2: Field Report (Ref. No. 6976.101.004.21.14.08.04.02-1).
Ref. 16.77	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 4: Engineering-Hydrographic Works and Engineering-Geophysical Research at the Shelf Areas of Anapa. Book 3: Text Appendices (Ref. No. 6976.101.004.21.14.08.04.03-1).
Ref. 16.78	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 4: Engineering-Hydrographic Works and Engineering-Geophysical Research at the Shelf Areas of Anapa. Book 5: Final Report, Explanatory Note (Ref. No. 6976.101.004.21.14.08.04.05-1).
Ref. 16.79	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 4: Engineering-Hydrographic Works and Engineering-Geophysical Research at the Shelf Areas of Anapa. Book 6: Final Report, Text Appendices (Ref. No. 6976.101.004.21.14.08.04.06-1).
Ref. 16.80	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 7: Engineering-Hydrographic Works and Engineering-Geophysical Research at the Shallow Areas of Anapa. Book 6: Text Appendices (Ref. No. 6976.101.004.21.14.08.07.06).
Ref. 16.81	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 8: Hydrographic Work and Engineering-Geophysical Studies Using an Autonomous Underwater Vehicle. Book 5: Final Report, Explanatory Note (Ref. No. 6976.101.004.21.14.08.08.05-1).
Ref. 16.82	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 8: Hydrographic Work and Engineering-Geophysical Studies Using an Autonomous Underwater Vehicle. Book 6: Final Report, Text Appendices (Ref. No. 6976.101.004.21.14.08.08.06(1)-1 and 6976.101.004.21.14.08.08.06(2)-1).
Ref. 16.83	Peter Gaz 2011. 'Complex Engineering Surveys at Design Documentation Phase as Part of South Stream Gas Pipeline Marine Section. Volume 8: Engineering Survey, First Phase. Part 8: Hydrographical Works and Geophysical Survey Using AUV Along Abyssal Area. Book 6: Final Report, Text Appendices (Ref. No. 6976.101.004.21.14.08.08.06(2)-1).

Number	Reference
Ref. 16.84	Peter Gaz 2012. 'Complex Engineering Surveys at Design Documentation Phase As Part Of South Stream Gas Pipeline Marine Section, Volume 18: Integrated Report On First Phase, Part 2: Integrated Report, Book 1' (Ref. No. 6976.101.004.21.14.18.02.01).
Ref. 16.85	Ferringa, R, Omsb, O, Agustíc, J, Bernad, F, Nioradzee, M, Sheliae, T, Tappenf, M, Vekuae, A, Zhvaniae, D & Lordkipanidzee, D 2011 Earliest human occupations at Dmanisi (Georgian Caucasus) dated to 1.85–1.78 Ma. Proceedings of the National Academy of Sciences 108/26, 10432 – 10436
Ref. 16.86	ICS 2013. International Chronostratigraphic Chart v2013/01. International Commission on Stratigraphy/ International Union of Geological Sciences. Accessed at: http://www.stratigraphy.org/index.php/ics-chart-timescale. Accessed on 12 April 2013.
Ref. 16.87	Abramov A, Anikovich M, Bader N, Boriskovsky P, Lubin V, Praslin N & Rogachev A 1984 Archaeology of the USSR. Nauka, Moscow
Ref. 16.88	Golovanova, LV & Doronichev VB 2003 The Middle Paleolithic of the Caucasus. Journal of World Prehistory 17/1, 71 – 140
Ref. 16.89	Hoffecker, J, Baryshnikov, G & Potapova, O 1991 Vertebrate remains from the Mousterian Site of Ilskaya 1 (Northern Caucasus, USSR). New analysis and interpretation. Journal of Archaeological Sciences 18, 113 – 147
Ref. 16.90	Novichikhin, AM 2000 Древнейшее прошлое Анапского района (эпоха камня и бронзы). Очерки по истории Анапы. [Anapa district (Stone Age and Bronze Age). Essays on the history of Anapa Essays on Anapa history]. Anapa, 13 – 24
Ref. 16.91	Sorokin, VM 2011 Correlation of upper quaternary deposits and paleogeography of the Black and Caspian seas. Stratigraphy and Geological Correlation Journal 19/5, 563 – 578
Ref. 16.92	Ryan, WBF., 2007. Status of the Black Sea flood hypothesis. In: Yanko-Hombach V., Gilbert, A.S., Panin, N. and Dolukhanov, P.M. (eds) The Black Sea Flood Question: Changes in Coastline, Climate and Human Settlement, pp. 63 – 88. Springer: Dordrecht
Ref. 16.93	Filipova-Marinova, M. 2007. Archaeological and paleontological evidence of climate dynamics, sea-level change and coastline migration in the Bulgarian sector of the Circum-Pontic Region. In V Yanko-Hombach, AS Gilbert, N Panin & PM Doukhanov (eds) The Black Sea Flood Question: Changes in coastline, climate, and human settlement. Springer, Dordrecht, 453 – 481.
Ref. 16.94	Ryan WBF, Pitman, W, Major CO, Shimkus K, Moskalenko V, Jones GA, Dimitrov P, Görür N, Sakınç M & Yüce H 1997 An abrupt drowning of the Black Sea shelf. Marine Geology 138, 119 – 126
Ref. 16.95	Ryan WBF & Pitman W 1998 Noah's Flood: the new scientific discoveries about events that changed history. Simon and Schuster Press, New York

Number	Reference
Ref. 16.96	Giosan L, Filip, F & Constantinescu, S 2009 Was the Black Sea catastrophically flooded in the early Holocene? Quaternary Science Reviews 28, 1-6
Ref. 16.97	Hiscott, RN, Aksu AE, Mudie PJ, Marret F, Abrajano T, Kaminski MA, Evans J, Çakıroğlu AI & Yaşar D 2007 A gradual drowning of the southwestern Black Sea shelf: evidence for a progressive rather than abrupt Holocene reconnection with the eastern Mediterranean Sea through the Marmara Sea Gateway. Quaternary International 167/8, 19 – 34
Ref. 16.98	Boyadziev, YD 1995 Chronology of Prehistoric cultures in Bulgaria. Monographs in World Archaeology 22, Prehistoric Press, Wisconsin, 149 – 192
Ref. 16.99	Anthony, DW 2007 Pontic-Caspian Mesolithic and Early Neolithic societies at the time of the Black Sea flood: a small audience and small effects. In V Yanko-Hombach, AS Gilbert, N Panin & PM Doukhanov (eds) The Black Sea Flood Question: Changes in coastline, climate, and human settlement. Springer, Dordrecht, 345 – 370
Ref. 16.100	Balabanov, IP 2007 Holocene sea-level changes of the Black Sea. In V Yanko-Hombach, AS Gilbert, N Panin & PM Doukhanov (eds) The Black Sea Flood Question: Changes in coastline, climate, and human settlement. Springer, Dordrecht, 603 – 631
Ref. 16.101	Dergachev, VA & Dolukhanov, PM 2007 'The neolithization of the north Pontic area and Balkans in the context of the Black Sea Flood'. In V Yanko-Hombach, AS Gilbert, N Panin & PM Doukhanov (eds) The Black Sea Flood Question: Changes in coastline, climate, and human settlement. Springer, Dordrecht, 489 – 514
Ref. 16.102	Draganov, V 1995 Submerged coastal settlements from the Final Eneolithic and the Early Bronze Age in the sea around Sozopol and Urdoviza Bay near Kitten. Prehistoric Bulgaria, Monographs in World Archaeology 22, Prehistoric Press, Wisconsin, 225 – 275
Ref. 16.103	Filipova-Marinova, M & Christova, R 2004 Sea level fluctuation in the Black Sea during the Holocene. Environmental Micropaleontology, Microbiology and Meiobenthology 1, 122 – 135
Ref. 16.104	Porotov, A 2007 Relative sea-level changes and submersion of archaeological sites along the northern shoreline of the Black Sea. Méditerranée 108, 29-36. Accessed at: http://mediterranee.revues.org/160 [Accessed 22 August 2012]
Ref. 16.105	Wright, HE Jr., Ammann, B, Stefanova, I, Atanassova, J, Margalitadze, N, Wick, L & Blyakharchuk, T 2003 Late-Glacial and Early Holocene dry climates from the Balkan Peninsula to Southern Siberia. Aspects of Palynology and Paleoecology. Pensoft, Sofia/Moscow, 127 – 136
Ref. 16.106	Markovin, VI 1997 Дольменные памятники Прикубанья и Причерноморья (Dolmen sites of Prikubanie and Prichernomoriya). Russian Academy of Sciences, Moscow, 11
Ref. 16.107	Okorokov, AV 1995 Archaeological finds of ancient dugouts in Russia and the Ukraine. International Journal of Nautical Archaeology 24(1), 33 – 45

Number	Reference
Ref. 16.108	Stanimirov, S 2003 The Western Black Sea boats in the Eneolithic and Bronze Ages. Athena Review 3(4). www.athenapub.com/12blksea.htm. Accessed July 2012.
Ref. 16.109	NBC News 2008 Explorers Find Ancient Boat in Black Sea. www.msnbc.msn.com/id/27968305/ns/technology_and_science-science/t/explorers-find-ancient-boat-black-sea/ Accessed 18 September 2012.
Ref. 16.110	Pulak,c. 202002. The Uluburun hull remains. Tzalas, H (ed) Tropis VII: Proceedings from the 7th International Symposium on Ship Construction in Antiquity. Hellenic Institute for the Preservation of Nautical Tradition, Athens, 615 – 636.
Ref. 16.111	Steffy, JR. 1994. Wooden Ship Building and the Interpretation of Shipwrecks. Texas A&M University Press, College Station.
Ref. 16.112	Letter from the Department for Conservation, Restoration and Use of Historical and Cultural Treasures (Heritage) of the Krasnodar Region, Department Manager N.V Volkodov to the General Director of OJSC "Naslediye Kubany" (Kuban Heritage), N.N. Tkachevaya. Reference No.78/3865/120119, dated 10 July 2012. Reproduced in Appendix 16.6
Ref. 16.113	Herodotus 1987 edition. The History, translated by D Grene. Herodotus, History. Book Four (Melpomene). Tenth logos: country and customs of the Scythians. University of Chicago Press
Ref. 16.114	Strabo 1932 edition. The Geography of Strabo, translated by HL Jones. Loeb Classical Library VII, Harvard University Press. The shore of the Black Sea from the Maeotian Lake to Colchis, 11.2.10.
Ref. 16.115	King, C. 2005. The Black Sea: a history. Oxford University Press, Oxford, 33-36
Ref. 16.116	Gavriljuk, NA. 2005. 'Fishery in the life of the nomadic population of the Northern Black Sea Area in the Early Iron Age.' In T Bekker-Nielsen (ed) Ancient Fishing and Fish Processing in the Black Sea Region, 105 – 113.
Ref. 16.117	Treister, MJ. & Vinogradov, YG. 1993. Archaeology on the northern coast of the Black Sea. American Journal of Archaeology 97/3, 521 – 63.
Ref. 16.118	Alekseeva, EM. 1991. The Greek Colonization of the North-western Caucasus. Moscow
Ref. 16.119	Alekseeva, EM. 1994. Gorgippia: a Bosporan polis in ancient Sindike. Expedition 36/2-3, 47 – 55.
Ref. 16.120	Okorokov, AV. 1993. Development of underwater archaeological investigations in Russia and the Former Soviet Union. International Journal of Nautical Archaeology 22(3), 267 – 273.

Number	Reference
Ref. 16.121	Divakov, IV. & Demidenko, NA. 1998. History of the underwater archaeology in the Kimmerian Bosphorus on the Black Sea. In JT. Tanacredi & J. Loret (eds) Ocean Pulse: A Critical Diagnosis. Result of First International Oceans Conference, Istanbul, Turkey. Plenum Publishing Corporation, New York, 185 – 189
Ref. 16.122	Bass, G. 1972. A History of Seafaring Based on Underwater Archaeology. Thames & Hudson, London.
Ref. 16.123	National Geographic Society 1982. The Historic Mediterranean 800 BC to AD 1500 [Map]. National Geographic Society, Washington, DC.
Ref. 16.124	Zelenko, S. 1997. Underwater Archaeology of the Black Sea: Crimean Coastal Survey 1997. Available from: http://nautarch.tamu.edu/PROJECTS/crimea/final.html. Accessed June 2012.
Ref. 16.125	Sorokin, P. 1994. Some results of the study of medieval boatbuilding traditions in North-west Russia. International Journal of Nautical Archaeology 23(2), 129 – 139.
Ref. 16.126	Archaeology News Network 2012 Byzantine shipwreck found off Russia's Black Sea coast. Available from: http://archaeologynewsnetwork.blogspot.de/2012/08/byzantine-shipwreck-found-off-russias.html. Accessed November 2012.
Ref. 16.127	Anapa On-line 2013. The names of settlements in the Anapa District [Названия населенных пунктов Анапского района] Accessed at: http://www.anapaweb.ru/anapa/nazvan.php. Accessed on 17 April 2013.
Ref. 16.128	Crashed helicopter MI-6, November 5, 1992 [Место авиакатастрофы вертолета МИ-6, 5 ноября 1992 года] Accessed at: http://www.panoramio.com/photo/57952368 [Accessed on 12 April 2013] [N44.85119 E37.40342]
Ref. 16.129	The walls of the sea (the remains of unknown structure). [Стены у моря (остатки неизвестного строения)]. Accessed at: http://www.anapafuture.ru/yamap/pages/steni-u-morya.htm; http://anapa-pro.com/category/16/article/218 & http://anapa-pro.com/category/9/article/219. Accessed on 12 April 2013.
Ref. 16.130	Anapa News Board 2011 Khachkar [Хачкар]. Accessed at: http://st-a.ru/2011-10-09-18-37-44/176/751.html. Accessed on 12 April 2013.
Ref. 16.131	Markovin, VI. 2002. Western Caucasian dolmens. Mysticism, scientific opinions, and perspectives on further study. Anthropology & Archeology of Eurasia 41/4, 68 – 88.
Ref. 16.132	Map of attractions Black Sea (Novorossiysk, Anapa Temryuk). Description and unique photographs of more than 100 monuments of nature, history and archaeology of the Azov-Black Sea Russia http://www.anapafuture.ru/yamap/anapafuture-map.htm [Accessed on 12 April 2013]; Wikimapia, Spring St. Barbara (Varvarovka), Supsekh, Krasnodar. Accessed at: http://wikimapia.org/23300312/ru/. Accessed on 12 April 2013.

Number	Reference
Ref. 16.133	Komsomolskaya Pravda (Krasnodar Branch) 2013 'Where the Kuban dip in the Jordan. Sacred springs edge' 15 January 2013. Accessed at: http://kuban.kp.ru/daily/26014/2937656/. Accessed on 12 April 2013.
Ref. 16.134	Armenian interlocutor [Собеседник Армении] nd Armenians Anapa [Армяне Анапы] Accessed at: http://sobesednikarmenii.ru/index.php/diaspora/67694-armyane-anapy Accessed on 12 April 2013.
Ref. 16.135	UNESCO 2010. Intangible Heritage Lists and Register: Inscribed elements. Armenian cross-stones art. Symbolism and craftsmanship of Khachkars. Accessed at: www.unesco.org/culture/ich/index.php?lg=en&pg=00011&RL=00434. Accessed on 10 April 2013.
Ref. 16.136	Eliade, M. 1959. (1987) The Sacred and the Profane: The Nature of Religion. Houghton Mifflin Harcourt: Orlando
Ref. 16.137	Hathi, AA. 2011. Cognitive and Linguistic-cultural Aspects of Flora Names (in Russian and Circassian languages) Accessed at: http://m.adygnet.ru/sites/default/files/monograf_hathe.pdf. Accessed on 15 April 2013.
Ref. 16.138	Musukaeva, AI. 2001. World Tree in Circassian Culture [Мир дерева в культуре адыгов]. Caucasian Literary and Historical Olympus Volume 6, El Fa Publishing Centre
Ref. 16.139	Karataban, M. nd Circassian Sacred Groves and Trees [Черкесские священные рощи и деревья] Accessed at: http://circassian.narod.ru/rus/circass/hist/santtree.htm. Accessed on 15 April 2013.
Ref. 16.140	Lyaushevoy, SA. 2002. Sacred to the religious consciousness of the Circassians [Священное в религиозном сознании адыгов] in RA Khanakhu (ed) The Culture World of Adyghes. Ministry of Education and Science of the Republic of Adygea / Adyghe Republican Institute of Humanities Research / GURIPP "Adygea", Maikop Accessed at: http://arigi.adygnet.ru/socio/mir_kult_all.pdf?bcsi_scan_AB11CAA0E2721250=0&bcsi_scan_filename=mir_kult_all.pdf. Accessed on 15 April 2013.
Ref. 16.141	Shimkus, K.M., Malovitsky,Ya.P. & Shumenko, S. I. 1978 The bedrocks from the Black Sea bottom and some features of the deep-sea basin structure. Init. Rept. Deep Sea Drilling Program 42(2): 469-482 www.deepseadrilling.org/42_2/volume/dsdp42pt2_11.pdf
Ref. 16.142	Schrader, H.J. 1978. Quaternary through Neogene history of the Black Sea, deduced from the paleoecology of diatoms, silicoflagellates, ebridians and Chrysomonads. Init. Rept. Deep Sea Drilling Program 42(2): 789-801 http://www.deepseadrilling.org/42_2/volume/dsdp42pt2_41.pdf

Number	Reference
Ref. 16.143	Yanev, S. & Adamia, S. General correlation of the Late Palaeozoic sequences in the Balkans and the Caucasus [Balkanlarda ve Kafkaslardaki Üst Paleozoyik istiflerinin genel Karşılaştırması]. Yerbilimleri: Journal of the Earth Sciences Application and Research Centre of Hacettepe University, 31 (1). pp. 1–22. Available from: http://www.yerbilimleri.hacettepe.edu.tr/no311/31101.pdf?bcsi_scan_E956BCBE8ADBC89F=0&bcsi_scan_filename=31101.pdf. Accessed on 12 July 2013.
Ref. 16.144	Russian Palaeontology Portal. Available at http://www.ammonit.ru/site.htm. Accessed 09 August 2013.
Ref. 16.145	ICOMOS 2011. Guidance on Heritage Impact Assessments for Cultural World Heritage properties. Appendix 3A, Example Guide for Assessing Value of Heritage Assets. January 2011. International Council on Monuments and Sites, Paris. Accessed at: http://openarchive.icomos.org/266/. Accessed on 20 November 2012.
Ref. 16.146	Order of the Federal Service for the Monitoring of Compliance with Legislation in the Area of the Protection of Cultural Heritage 'Regulation on procedure for issuance of authorizations (permits) for the right of works execution on determination and study of the archaeological heritage objects' (No. 15, 2011)
Ref. 16.147	GOST 17.1.5.05-85 Environmental Protection. Hydrosphere. General Requirements for Sampling of Surface and Marine Waters, Ice and Precipitation
Ref. 16.148	GOST 17.1.3.08-82 Environmental Protection. Hydrosphere. Procedures for Quality Control of Sea Water
Ref. 16.149	GOST 17.1.5.04-81 Environmental Protection. Hydrosphere. Instruments and Apparatus for Sampling, Primary Processing and Storage of Natural Water Samples
Ref. 16.150	RD 52.24.609-99 Procedural Guidelines. Organisation and Monitoring of the Pollutants' Content in the Bottom Sediments