Chapter 10: Cultural Heritage

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10 Cultural Heritage

10.1 Introduction

This chapter presents an assessment of the predicted impacts associated with cultural heritage during the Construction and Pre-Commissioning, Operational, 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. 10.1). Cultural heritage is an important component of the cultural identity of communities, groups and individuals, and of social cohesion (Ref. 10.2). Cultural heritage includes (Ref. 10.1), including:

- 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 or seascapes, physical, biological or geological formations).

Cultural property (heritage) is defined in the Turkish Law on the Conservation of Cultural and Natural Property as "*movable and immovable property on the ground, under the ground or under the water pertaining to science, culture, religion and fine arts of before and after recorded history or that is of unique scientific and cultural value for social life before and after recorded history*" (Ref. 10.2, Article 3 (1)).

Within the Turkish Law, examples of immovable cultural property include, but are not limited to: archaeological sites, acropolis and necropolis, castles, fortresses, towers, walls, historic barracks, places of worship and tunnels (Ref. 10.2, Article 6 (d)). Movable cultural property includes "…*all kinds of cultural and natural property from geological periods, prehistory and recorded history, having documentary value in terms of geology, anthropology, prehistory, archaeology and art history reflecting the social, cultural, technical and scientific characteristics and level of the period they belong to*" (Ref. 10.2, Article 23 (a)). Some examples are: all kinds of animal and plant fossils, human skeletons, struck stone tools, volcanic glass (obsidian), all kinds of tools made of bones or metal, tiles, ceramics, similar pots and pans, statues, figurines, tablets, weapons to cut, for defence and assault, anchors, leather, cloth, papyrus, parchment or documents inscribed or described on metal and portable goods and their parts made of tiles, earth, glass, wood, and textiles (Ref. 10.2, Article 23 (a)).

The Turkish Law on the Conservation of Cultural and Natural Property does not specifically refer to shipwrecks. However, under the International Commission on Monuments and Sites (ICOMOS) 1996 Charter for the Protection and Management of the Underwater Archaeological Heritage (Sofia Charter ratified by Turkey 9 October 1996, Table 10.7), underwater cultural

heritage is understood to mean the archaeological heritage which is in, or has been removed from, an underwater environment. It includes submerged sites and structures, wreck-sites and wreckage and their archaeological and natural context.

Archaeology is the scientific study of the physical evidence of past human societies recovered through artefact collection and analysis, and excavation. Physical archaeological resources include portable antiquities, monuments, historic buildings, historic landscapes, cemeteries, and burial areas. Archaeological sites form an intrinsic part of Turkish national heritage.

Both immovable and moveable cultural property can be found on archaeological sites. Archaeological sites consist of "*an area where man-made cultural and natural property converges as the product of various prehistoric to present civilisations, that is adequately defined by topography and homogenous, at the time historically, archaeologically, artistically, scientifically, socially or technically valuable, and exhibits partial structures*" (Ref. 10.2, Article 3 (7)).

Cultural heritage is protected under national legislation, and by international agreements adhered to by the Republic of Turkey (Refs. 10.1 to 10.16) (Section 10.6.2). 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 (Ref. 10.3);
- Archaeology and cultural heritage are important to civilization and cultural life, therefore they are protected and potentially damaging activities are subject to regulation (Ref. 10.2); and
- Cultural heritage can be important to national and local identity and economic activities (tourism) (Ref. 10.4).

This chapter aims to identify any known or potential cultural heritage within the Project Area, 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 environmental and ESIA also considers natural and palaeontological intangible cultural heritage (Ref. 10.13, Ref. 10.14 and Ref. 10.15).

The Project aims 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.

[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. 10.10) 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. 10.11) and IfA Standard and Guidance for Archaeological Field Evaluation (field scanning) (Ref. 10.12).

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 Biological Environment, Chapter 9 Socio-Economics** and **Chapter 11 Ecosystem Services**.

10.2 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 (Ref. 10.17). 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 2012 (Section 10.4). 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 receptors;
- Cultural heritage receptors within the Project Area of Influence (refer to **Chapter 1 Introduction** for definition) were identified through a process of secondary data review and surveys undertaken for the Project (as described in Section 10.4) and professional expertise; and
- Review of relevant national and international legislative requirements and lender requirements to ensure legislative and policy compliance.

The Project Area (as described in Section 10.3) contains marine cultural heritage receptors and such features are therefore an important consideration in the ESIA process. 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**).

The Black Sea Region is rich in marine cultural heritage objects (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. There is little potential for the presence of human occupation and settlement, due to the fact that the Project Area has always been a submerged environment. 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 sediments. There is no potential for the presence of hominid and faunal remains as this area has always been a submerged environment. 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. 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. With reference to the IFC Performance Standards 2012, the Project is not assessed as having any impact on indigenous peoples (Ref. 10.13) (**Chapter 9 Socio-Economics**).

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.

10.3 Spatial and Temporal Boundaries

The **Project Area** is 470 km in length and 2 km in width, extending along an east west orientation across the north of the Turkish EEZ from the Russia and Turkey EEZ boundary to the Turkey and Bulgaria EEZ boundary. No excavation of or filling over the seabed is anticipated. There will be no landfall facilities within the Turkish Sector. The Project Area is defined in full in **Chapter 5 Project Description**.

The cultural heritage Study Areas were determined in accordance with the Law on the Conservation of Cultural and Natural Property (23 July 1983, Law No. 2863, last amended February 2008) 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. 10.13, para 6; Ref. 10.14, GN12) and was established based on the Project design and consideration of bathymetry (i.e. topography) and setting (Ref. 10.18, para 7; Ref. 10.14, GN3).

The cultural heritage Desk Based Study Area covered an extensive area including the Black Sea and the surrounding land areas. The Desk Based 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.

The Survey Area comprised a minimum 2 km wide area centred on the original proposed pipeline route centreline. This area was widened where engineering design decisions required it to be extended. The field surveys identified geophysical anomalies within this 2 km wide area. All geotechnical and environmental field surveys covered this area (see Figure 10.5 to Figure 10.12 in Section 10.5[2]).

The Zone of Potential Influence 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 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

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

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.

These areas are set out in Table 10.1 (see Figure 10.5 to Figure 10.12 in Section 10.5)[3].

Table 10.1 Summary of Spatial Boundaries

Study Area	Spatial Boundary
Desk Based Study Area	Documentary and inventory research.
	Turkish waters of the Black Sea.
Survey Area	Marine surveys for environmental, geotechnical and engineering purposes.
	Review of survey data for archaeological information.
	Minimum 2 km wide area centred on the original proposed pipeline route centreline.
Zone of Potential Influence	150 m either side of the proposed centreline of an individual pipeline.

10.4 Baseline Data

10.4.1 Methodology and Data

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

10.4.2 Secondary Data

10.4.2.1 Desk-Based Research

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

- Secondary data gathering included consultation of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage List (Ref. 10.19), Intangible Heritage Lists (Ref. 10.20) and Database of National Cultural Heritage Laws (Ref. 10.21) for cultural heritage. Analysis of the wider historical, cultural and archaeological context involved consultation of information in relevant digital databases, including: national and regional databases of the General Directorate for Cultural Heritage and Museums (Ref. 10.22); the Ministry of Culture and Tourism (Ref. 10.23); the TAY Project: Archaeological Settlements of

[3] Study areas are based on Pipeline route definition #300512 (dated 30 May 2012)

Turkey (Ref. 10.24), bathymetric and shipwreck data of the Turkish Office of Navigation, Hydrology and Oceanography (Ref. 10.25); and information from relevant archaeological institutions and museums;

- In order to complement the extensive research of Turkish-language sources, relevant international academic research papers were reviewed in a number of university libraries in Canada, the USA and the UK. 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. 10.26 to 10.37);
- Consultation of databases on the national and regional framework of Turkish archaeology and cultural heritage, including the European Heritage Network National Heritage Policies Database (Ref. 10.38);
- Analysis of the wider historical, cultural, archaeological and administrative context involved considering national and regional cultural policies and registers (Ref. 10.39), regional intangible cultural traditions (Ref. 10.40), and cultural festivals (Refs. 10.41 to 10.45);
- The history and location of 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. 10.46); and
- This study considered the academic context of past and on-going Black Sea archaeological research projects, including wider Black Sea research projects such as the Black Sea Trade Project (Ref. 10.47), various projects of the Danish National Research Foundation Centre for Black Sea Studies (Ref. 10.48) and the French Research Institute in Oceanography's ASSEMBLAGE Project (Ref. 10.49).

10.4.2.2 Reporting Methodology

The referencing of marine cultural heritage follows an arbitrary site identification system for cultural heritage objects, e.g. TK-MCH-001 (Turkey, Marine Cultural Heritage, site number 1). In addition, target naming systems established in earlier survey stages are also referenced. Distances reported in the text in this chapter are measured from the nearest edge of a cultural heritage object to the nearest pipeline centreline.

10.4.2.3 Stakeholder Engagement

Meetings have been held with a range of stakeholders including the Ministry of Environment and Urbanisation, regional government authorities, residents of Black Sea coastal communities and a number of non-governmental organisations (NGOs). Potential impacts upon marine cultural heritage were identified through the Projects stakeholder engagement activities as being of high importance to the Project (**Chapter 6 Stakeholder Engagement**).

Project Correspondence with Turkish authorities has set the range and conditions to be met in event of the discovery of objects of archaeological heritage along the pipeline route as well as requirements for informing the authorities of any CHO finds.

Engagement has occurred with the following authorities to further discuss cultural heritage issues:

- Ministry of Foreign Affairs, Republic of Turkey;
- Sinop Provincial Directorate of Culture and Tourism; and
- Ministry of Culture and Tourism: General Directorate of Cultural Heritage and Museums.

The meetings involved presentations of cultural heritage findings, confirmation of procedures of the transfer and sharing of information on cultural heritage finds and discussion of the proposed avoidance and mitigation strategies.

As a result of the close coordination with, and response to the concerns of, the Republic of Turkey, the Ministry of Culture and Tourism provided to South Stream Transport a letter dated 3 October 2013 stating its satisfaction with the proposed approach to avoiding impacts on CHOs outlined in the Environmental Impact Assessment Application File (Appendix 10.1: Stakeholder Correspondence). The letter stated that a distance of 100 m must be maintained between the pipelines and identified potential cultural heritage objects, which is within the Project standard of 150 m and will be met (refer to Section 10.6.4.1).

10.4.3 Data Gaps

Based upon the review of the data presented in Section 10.4.2 a gap analysis was undertaken between March and May 2012 in order to identify information 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. geotechnical studies, bathymetric and geophysical data in an integrated manner;
- 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; and
- Limited non-intrusive geophysical survey or Remotely Operated Vehicle (ROV) investigation had been carried out.

Actions arising from the gap analysis included: obtaining and reviewing the full suite of reports, including correspondence, raw marine survey data, relevant marine survey methods and subsea imagery prepared in 2011 and 2012 for offshore cultural heritage (Refs. 10.50 to 10.60); contacting relevant authorities to establish their requirements; and undertaking consultation.

After the gap analysis had been completed, a further survey to analyse geophysical anomalies using ROV was carried out in September and October of 2012 (Table 10.2). Following this further survey, the implementation of the gap analysis actions, and the application of the

Project design controls and mitigation measures (Section 10.7), it was confirmed that no further marine archaeological surveys were required.

10.4.4 Primary Data and Baseline Surveys

Surveys undertaken for the Project are detailed in Table 10.2. The location of archaeological and cultural heritage objects are marked on the constraints maps (see Figure 10.5 to Figure 10.12 in Section 10.5). Inventories of cultural heritage objects are contained in Appendix 10.2: Inventory of Marine Cultural Heritage Finds.

Table 10.2 Marine Surveys

Name of Survey	Month, Year	Surveyor	Location of Survey	Type of Survey
Offshore Geophysical Survey	May to Jul 2011	Peter Gaz	Turkish EEZ Waters	Multi-beam echosounder, sub-bottom profiler
Offshore Geophysical Survey	Jan to Mar 2012	Peter Gaz	Turkish EEZ Waters	Side-scan sonar, multi-beam echosounder, sub-bottom profiler
Offshore Geophysical Survey	Mar to Apr 2012	Peter Gaz	Turkish EEZ Waters	Side-scan sonar, multi-beam echosounder, sub-bottom profiler
Offshore Geophysical Survey	Sep to Oct 2012	Peter Gaz	Turkish EEZ Waters	ROV (e.g., visual) analysis of geophysical anomalies.

Geo-references constitute sensitive information which is omitted in order to protect CHOs from illegal looting. In order to protect shipwrecks from unauthorised access and potential looting, 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.

10.4.4.1 Marine Surveys and Analysis

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

- Geophysical and environmental marine surveys conducted to collect primary data;
- 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 contractors and Project cultural heritage professionals. A description of marine survey methods is set out in Appendix 10.3: 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 (Refs. 10.50 to 10.60). Those studies, which primarily focused on gathering information for geo-environmental, geotechnical, environmental and engineering purposes, are detailed in Table 10.2. The surveys utilised the following equipment to image and investigate the seafloor: side-scan sonar; multibeam echo sounder; and sub-bottom profiler. During investigations, objects that exhibited anthropogenic features were located and briefly analysed to determine if further investigations were required.

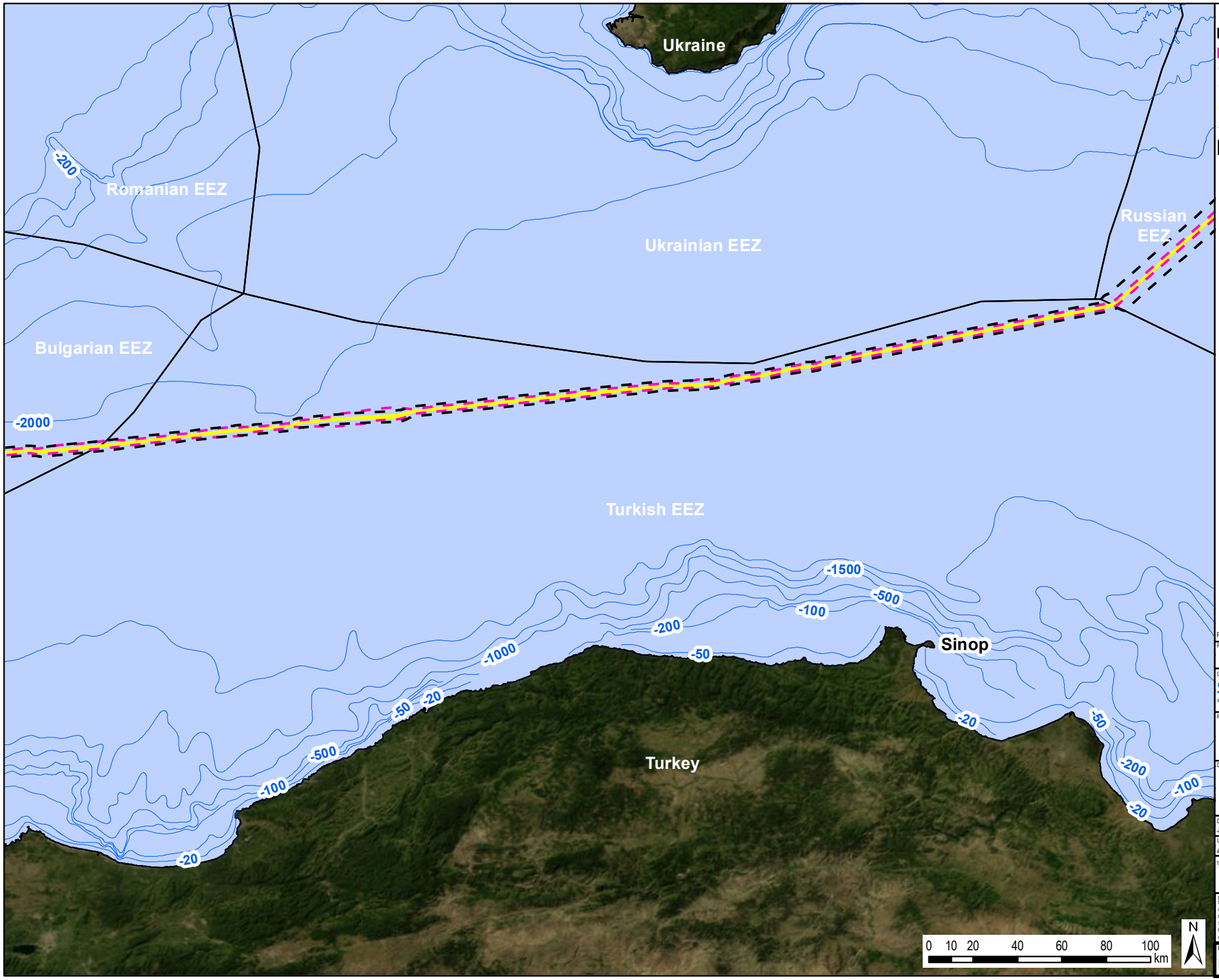
In addition, marine surveys in 2012 contributed information to this cultural heritage assessment. Fieldwork included a visual inspection of anomalies using an ROV equipped with an underwater video camera. These surveys are summarised in Table 10.2.

Desk-based analysis of marine geophysical survey data (ROV and video data) was undertaken by Peter Gaz. 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[4] (Figure 10.1). Table 10.3 provides details of the surveys carried out and methods used to achieve the required objectives.

Table 10.3 Marine Cultural Heritage Data Analysis

Survey Method	Survey Extent	Objective	Surveyor	Date
Desk-based analysis of marine geophysical data	Survey Area: approximately 2 km wide area centred on the original proposed pipeline route centreline	Desk-based analysis of marine geophysical survey data	Peter Gaz	Jan to Apr 2012
Desk-based analysis of marine geophysical survey data (ROV and video data)	Survey Area: approximately 2 km wide area centred on the original proposed pipeline route centreline	Verification of survey data. Visual survey for the presence of visible archaeological features Assessment of character and current condition of marine archaeology	URS	Aug – Nov 2012

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



LEGEND

- General study area
- Survey area

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- Isobaths
- Exclusive Economic Zones

Projection: Lambert Conformal Conic

Purpose of Issue: For Information

Client: South Stream Offshore Pipeline — Energising Europe

Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: MARINE CULTURAL HERITAGE STUDY AREAS

Drawn	Checked	Approved	Date
JM	VS	MW	03/06/2014

URS Internal Project No.	Scale @ A4
46369082	1:2,200,000

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Drawing Number: Figure 10.1

Rev:

Plot Date: 03 Jun 2014
File Name: I:\6004 - Information Systems\46369082_South_Stream\MXDs\Report Maps - Turkey\Turkey ESIA\Chapter 10\Figure 10.1 Marine Cultural Heritage Study Areas.mxd

10.4.5 Data Assumptions and Limitations

Potential cultural heritage objects occurring outside the defined Survey Area detailed herein have not been considered within this impact assessment. Similarly, it is recognised that although unlikely due to the very slow rate of sedimentation on the abyssal plain (see **Chapter 7 Physical and Geophysical Environment**) there is a low possibility that currently unknown cultural heritage objects may exist buried beneath the seabed within the Zone of Potential Influence that have not been identified through the ESIA investigations.

10.5 Baseline Characteristics

10.5.1 Overview

The Black Sea is rich in cultural heritage including the archaeological remains of shipwrecks and associated nautical material. Within the Project Area there is known and potential marine cultural heritage, including the remains of submerged vessels. This baseline section presents historical and cultural context followed by information on the marine known and potential cultural heritage objects identified within the Study Areas as defined in Section 10.3.

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 (10,000 to 2000 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 (3200 to 2000 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 southern Black Sea Region is presented in Table 10.4, 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 10.4 Timeline of the Southern Black Sea Region

Epoch	Period	Description
Pleistocene Era	Lower Palaeolithic circa (c.) 2,000,000 to 200,000 Before Present (BP)	Homo erectus / Homo ergaster (1.4 Million years ago (Ma) to 200,000 BP) European Neanderthal Homo sapiens (350,000 to 30,000 BP)
	Middle Palaeolithic c.200,000 to 43,000 BP	European Neanderthal Homo sapiens (350,000 to 30,000 BP)
	Upper Palaeolithic c.43,000 to 12,000 BP	European Neanderthal Homo sapiens (350,000 to 30,000 BP) European Early Modern Humans (43,000 BP+) Intermittent glaciations, hunting and gathering, cave art
Holocene Era	Mesolithic c.12,000 to 6,800 Before Christ (BC)	Hunting and gathering in extensive temperate forests and on coastlines
	Neolithic c.6,800 to 5,000 BC	Animal husbandry and agricultural cultivation, hunting wild animals, fishing and gathering wild foods
	Eneolithic / Chalcolithic c.5,000 to 3,200 BC	Development of gold and copper metalworking, development of increasingly complex societies and small towns
	Bronze Age c.3,300 to 1,200 BC	Early Bronze Age c. 3,200 – 2,500 BC Middle Bronze Age c. 2,500 – 1,600 BC, Hattian, Hurrian, and Hittite cultures Late Bronze Age c. 1,600 – 1,200 BC, Hittite and Assyrian cultures

Continued…

Epoch	Period		Description
Holocene Era	Iron Age c.900BC to Anno Domini (AD) 200		Assyrian and Phrygian cultures
	Antiquity c.800 BC to AD 395	Archaic c.800 to 480 BC	Persian Empire, 550 – 323 BC 6th century BC, Early Greek Pontic colonies
		Classical c.480 to 323 BC	Persian Empire, 550 – 323 BC
		Hellenistic 323 to 146 BC	Kingdom of Pergamon, 250 – 133 BC
		Roman 29 BC to AD 395	Entered Roman Republic
	Medieval AD 395 to 1475	AD 330 to 1453	Byzantine Empire
		1071	Battle of Manzikert
		1243	Mongolian invasion
		1288 to 1878	Ottoman Empire
		1371 to 1479	Serbian-Ottoman Wars
		1453	Conquest of Constantinople, renamed Istanbul
	Post-medieval 1475 to 1829	1568 to 1829	Russo-Turkish Wars
		1683	Austro-Ottoman War
	Modern 1829 to present	1853 to 1856	Crimean War

Continued…

Epoch	Period		Description
Holocene Era	Modern 1829 to present	1877 to 1878	Russo-Turkish War
		1914 to 1918	First World War
		1919 to 1922	Greco-Turkish War
		1923	Turkey becomes a republic, Atatürk declared president
		1939 to 1945	Second World War
		1946 to 1950	Institution of multi-party democracy

Complete.

10.5.2 Archaeological and Historical Context

The following archaeological and historical context sets out the background setting of the Project. Cultural heritage receptors identified within the Survey Area and Zone of Potential Influence are summarised in Table 10.5 (in Section 10.5.5) and an illustrated inventory is contained in Appendix 10.2.

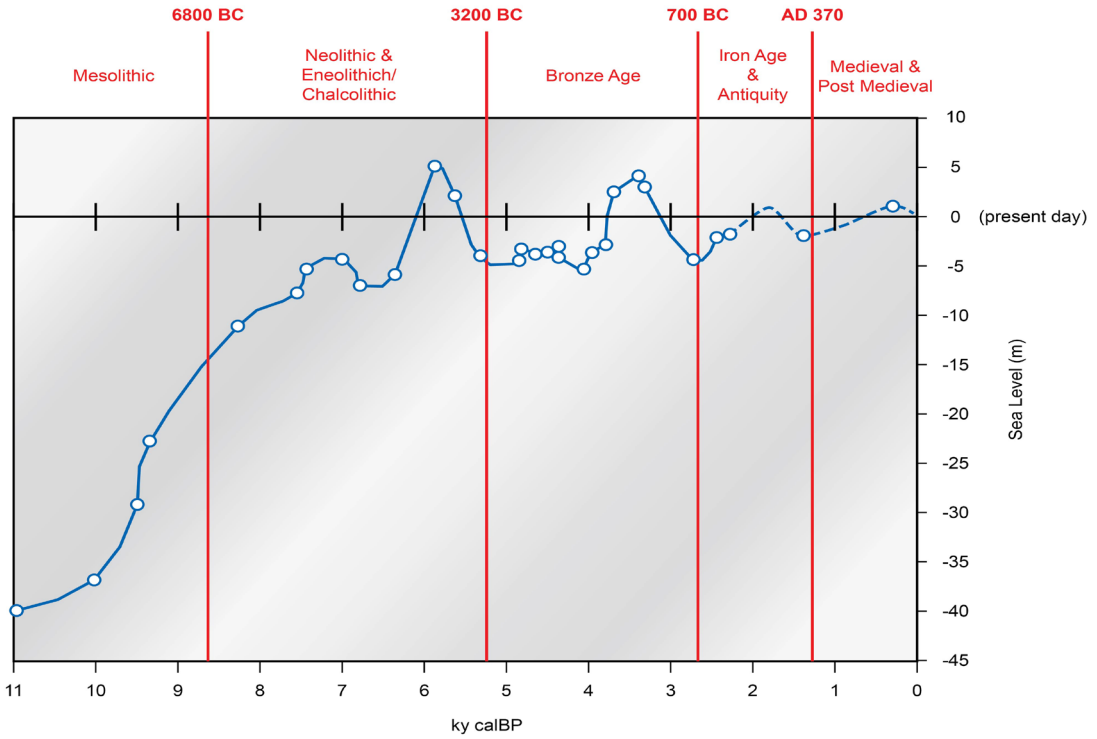
The Project Area has always been submerged and never exposed dry land, and as such there is no potential for submerged settlements (Figure 10.2).

10.5.2.1 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. Some of the earliest known sites in the region are at Kaletepe (Ref. 10.61) and Dursunlu (Ref. 10.62) in south-central Turkey and Yarımburgaz in the north-west (Ref. 10.63, Ref. 10.64). Along the Black Sea coast, Lower Palaeolithic sites have been investigated at Domuzdere and Ağaçlı, near the Bosphorus (Ref. 10.65 and Ref. 10.66).

Desk based literature review has not identified any Lower Palaeolithic sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Lower Palaeolithic sites are not considered further within this impact assessment.

Figure 10.2 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.

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

During much of Middle Palaeolithic, the region 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 southern shores of the Black Sea, but the colder climate was reflected in the animal species present.

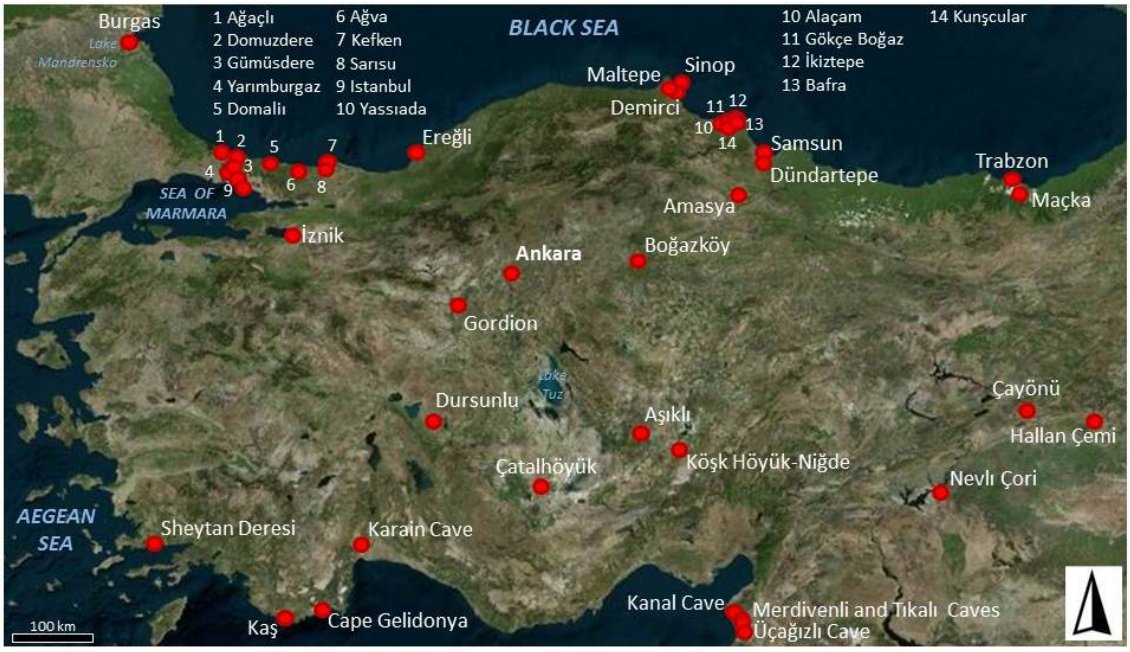
At this time, Neanderthals and early humans lived in caves, open-air settlements, and temporary hunting camps. Mousterian (120,000 to 30,000 BP) tools have been recovered from Karain Cave in southwest Turkey. Near the Black Sea coast, Middle Palaeolithic material has been discovered at Kefken, Ağva, Domalıı, Domuzdere, Gümüsdere, Ağaçlı (all located in the northwest close to the Bosphorus) (Figure 10.3), and in the Tekeköy valley (Samsun) (Ref. 10.64, Ref. 10.65 Ref. 10.67).

Desk based literature review has not identified any Middle Palaeolithic sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Middle Palaeolithic sites are not considered further within this impact assessment.

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

During the Upper Palaeolithic, anatomically modern humans arrived in Europe and southwest Asia. Tools became increasingly complex and varied, with distinctive regional styles, perhaps indicating the emergence of territorial groups. Notable Upper Palaeolithic sites are those of Kanal and Üçağızlı Cave in the Hatay region of Turkey (Ref. 10.63). Near the Black Sea coast, Upper Palaeolithic material has been discovered at Kefken, Sarısu, Domuzdere, and Ağaçlı, near the Bosphorus (Figure 10.3) (Ref. 10.65).

Figure 10.3 Select Archaeological Sites and Finds in Turkey



Desk based literature review has not identified any Upper Palaeolithic sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Upper Palaeolithic sites are not considered further within this impact assessment.

10.5.2.4 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. 10.68). The climate became more temperate, and ice-sheets retreated from the tops of Turkish mountains.

Mesolithic populations subsisted by semi-nomadic, seasonal hunting and gathering. Bows and arrows, slingshots, and composite tools made from small microliths were developed. Harpoons and net-sinkers have been found, indicating a greater role of fish in the diet than in previous periods. Mesolithic material has been discovered at sites such as Hallan Çemi Tepesi (Ref. 10.69) and Aşıklı Höyük (Ref. 10.70) in central Turkey, but few finds have been discovered along the Black Sea coast (Ref. 10.71). A site discovered 6 km off Sinop (Figure 10.3) on a

gentle slope and beach terrace landform (in approximately 95 m of water) that featured a structure consisting of one apparently worked beam, tree branches, and a series of rough stones was initially dated to the Mesolithic; this site, which was thought one of the earliest coastal habitations along the Black Sea coast that predates the relinking of the Mediterranean Sea with the Black Sea, was later determined to be geological rather than archaeological in nature (Ref. 10.31 and Refs. 10.72 to 10.82).

Desk based literature review has not identified any Mesolithic sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Mesolithic sites are not considered further within this impact assessment.

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

Analysis of sea level curves indicated that several transgression or regression episodes occurred during the Neolithic. Several submerged marine beach facies and estuarine peat layers have been found along the Black Sea coastline at depths that ranged from 8 m to 5 m below present-day sea levels (Ref. 10.31, Ref. 10.72, Ref. 10.73, Refs. 10.75 to 10.81). Sea level oscillations continued throughout this period resulting from global climate changes possibly brought about by a range of factors, such as periodic variations, planetary orbital shifts, increased volcanism, and regional plate tectonics (Figure 10.2).

One of the most notable Neolithic sites is that of Çatalhöyük in south-central Turkey, a multi-component settlement site that shows clear evidence of agriculture and animal domestication (Ref. 10.83). Very little material has been found along the Black Sea coast (Ref. 10.64 and Ref. 10.84).

A *höyük* (mound) site at Dündartepe (Öksürüktepe) (Samsun) along the Black Sea coast has been dated to the Eneolithic, as have sites at Demirci (Sinop), Kunşcular (Bafra), İkiztepe (Bafra), Gökçe Boğaz (Alaçam), and Maltepe (Sinop) based on analysis of painted pottery sherds (Figure 10.3) (Ref. 10.71, Ref. 10.85 and Refs. 10.86 to 10.88). Cultural development of the central Black Sea region before the Bronze Age has been studied by several researchers, who also mentioned several other cultural activity centres along the central coast of the Black Sea (Ref. 10.89). Ceramic remains from the Sinop area closely resemble finds discovered in Bulgaria along the western coast of the Black Sea, which has led to hypotheses regarding long-distance trade connections from the Eneolithic to the Bronze Age (Ref. 10.90); presently, it is unknown how this potential trade network was structured and if trade occurred by land, sea, or both.

Desk based literature review has not identified any Neolithic and Eneolithic / Chalcolithic sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Neolithic and Eneolithic / Chalcolithic sites are not considered further within this impact assessment.

10.5.3.1 Bronze Age (c. 3300 to 1200 BC)

It is not until the Late Chalcolithic to Early Bronze Age (c. 3800 to 3200 BC) that the sea levels stabilised across the Black Sea. By this time sea levels reached between 8 m and 5 m below present day sea levels.

During the Bronze Age, farming and technology continued to develop and societies became more complex as social hierarchies emerged. Bronze metalworking developed and land and sea trade expanded.

The Chalcolithic settlements along the Black Sea coast continued on into the Early and Middle Bronze Ages (c. 3300 to 1600 BC), notably Kunşcular and İkiztepe (Ref. 10.85). There is scarce archaeological information concerning the prehistoric ages of the Black Sea. The only site that provides information, the Early Bronze Age site İkiztepe, is located in Samsun Province near Bafra (Figure 10.3). Researchers who have studied in the Black Sea region have located several other Early Bronze Age sites such as Gökçeboğaz Tepe, Dede Tepe, Bağtepe, and Tekkeköy (all located between Sinop and Sansum) (Figure 10.3) (Ref. 10.89). This period also saw the rise of the Hittites and the Assyrians, both of which had knowledge of early iron working at this time (Ref. 10.91 and Ref. 10.92). The country of the Kaška tribes was limited to the coastline of Sinop and Bafra (Ref. 10.93). There is much less evidence for Late Bronze Age (c. 1600 to 1200 BC) activity in this region. The site of Troy in western Turkey, by contrast, saw more continuous occupation throughout the entire Bronze Age (Ref. 10.94).

Little is known of maritime activity along the Turkish Black Sea coast in the Bronze Age. There was extensive seafaring in the Aegean and eastern Mediterranean during this time, as evidenced by regional iconography and archaeological remains (Ref. 10.95). The Late Bronze Age *Uluburun* shipwreck, located off Kaş in the southwest of Turkey (Mediterranean Sea), 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. 10.96). Notable is the *Uluburun* shipwreck's method of construction, which is known as shell-based, 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 the medieval period (Ref. 10.97). In this method, adjacent hull planks, or strakes, were joined by pegs in holes on their narrow sides where they were in contact. Other Bronze Age shipwrecks in Turkish waters include those at Cape Gelidonya and Sheytan Deresi, also off the south-west coast in the Mediterranean (Ref. 10.98 and Ref. 10.99).

Desk based literature review has not identified any Bronze Age sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Bronze Age sites are not considered further within this impact assessment. Presently undated CHOs have been identified within the Survey Area (but located more than 150 m from the proposed centreline of any of the four pipelines); some of these may date to the Bronze Age.

10.5.3.2 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. 10.78). This oscillation is attributed to ocean-atmosphere reorganisation associated with the Phanagorian Regression.

The collapse of the Hittite kingdom (1200 to 1180 BC) saw the arrival of the Phrygians and other Indo-European migrants from the west and the expansion of the Urartian kingdom in the east (Ref. 10.100). Phrygian ceramics dating back to the 7th century BC have been discovered beneath a Hellenistic temple in Sinop (Ref. 10.101). During this period there is a general shift from Black Sea coastal settlement sites to those on the inland plateaus, even though significant iron deposits and iron-bearing sands existed along this coastline (Ref. 10.85, Ref. 10.102 and Ref. 10.103). Despite this shift, archaeological investigations have shown that İkiztepe and the Bafra plain (on the Black Sea coast) continued to be occupied through the Iron Age, as evidenced by a collection of Phrygian pottery sherds, a Hellenistic monumental tomb, and coinage (Ref. 10.104).

Archaeological evidence for Iron Age maritime activity along the Turkish Black Sea coast is scarce. No shipwrecks or associated nautical material have been discovered or published, but this should not discount the possibility that such material exists. In Bulgaria, for example, a dugout canoe was found in Mandrensko Lake near Burgas that dates to the 1st millennium BC (Ref. 10.105), and hundreds of stone anchors have been discovered along the western Black Sea coast (Refs. 10.106 to 10.109), indicating a strong maritime industry in the western Black Sea. After the Greeks arrived in the Black Sea during the 7th century BC, it is likely that local inhabitants adopted Greek shipbuilding techniques and expanded their sea-going endeavours.

Desk based literature review has not identified any Iron Age sites within the Project Area. As the Project Area has always been a submerged environment and there is extremely low potential for such material to exist, Iron Age sites are not considered further within this impact assessment. Presently undated CHOs have been identified within the Survey Area (but located more than 150 m from the proposed centreline of any of the four pipelines); some of these may date to the Iron Age.

10.5.3.3 Antiquity (c. 800 BC to AD 395)

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. 10.78).

Much is known historically and archaeologically of the Antiquity period, starting with Greek colonisation of the Black Sea beginning c. 7th century BC (Ref. 10.110 and Ref. 10.111). Mass colonisation began in the 6th century BC and continued until the late Archaic (c. 480 BC). During this period, both the Greeks and the western Anatolian cities established new cities along the Black Sea coast. The first Milesian colony, Sinope (Sinop), was likely founded in the late 7th century BC based on archaeological data. Other notably Greek colony cities include Heraclea Pontica (Ereğli), Amisos (Samsun), Cotyora (Ordu), Cerasus (Giresun), and Trapezus (Trabzon), some of which served as major production and trade centres for the entire Black Sea region (Figure 10.4). Colonists engaged in fishing, agriculture and craft production, while trade and shipping were secondary sources of income (Ref. 10.112). Principal Turkish exports during this period included fish and processed fish, timber and wooden items, metal goods, gems, olive

oil, and wine, while imports from the Mediterranean included oil, wine, and finished products (e.g. ceramics, metal goods, glassware) (Ref. 10.101, Ref. 10.113 and Ref. 10.114).

Figure 10.4 Greek Cities of the Black Sea

The geographical division of Pontus into coastal areas and inland areas reflects a sharp cultural division between Greeks and native Anatolians (Ref. 10.115). It is likely that the Greek cities of the coast, which looked regularly towards the sea, did not significantly influence the inland areas.

The Persians were another group who made their authority felt in the Black Sea. However, there is no detailed information about the Persian influence in the region. A valuable resource for the Classical period (5th century BC) is Xenophon; in his *Anabasis*, he writes about the native populations of Pontus (which stretched along the Black Sea coast from Sinop to Trabzon, Figure 10.4) like the Khalybs, Taokhs, Phasis, Skyths and Moskhos (Ref. 10.116). After this period, detailed knowledge on Pontus decreases.

The Greeks had a foothold in the region for approximately 700 years until the Greek city-states on the Black Sea coast came under Roman control starting in the 2nd century BC (Ref. 10.113). The Bosphoran Kingdom was taken as Roman influence and expansion policies in Asia Minor continued.

Regarding seafaring, the Greeks 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 the latter is the one 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. 10.95). 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. 10.95). 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 likely 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. 10.95). 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.

A number of Hellenistic and Roman settlements and production centres have been investigated in northern Turkey, including Sinop, and Ereğli on the Black Sea coast (Ref. 10.71). Underwater archaeological surveys off Ereğli in 2011 discovered a shipwreck that dates to the late 4th century BC, and another shipwreck off Sinop (Figure 10.3) has been dated to the 1st century AD (Ref. 10.117). Given the extensive maritime trade network that existed in the Black Sea and the Mediterranean during this period and the high preservation qualities of the anoxic waters, there is a high possibility that additional Antiquity-era shipwrecks exist in the Turkish waters of the Black Sea.

Desk based literature review has not identified any Antique period sites within the Project Area and there is a low potential for such material to exist, Antiquity Period sites are not considered further within this impact assessment. Presently undated CHOs have been identified within the Survey Area (but located more than 150 m from the proposed centreline of any of the four pipelines); some of these may date to the Antique period.

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

The Byzantine Empire began in 4th century AD after the Roman capital was moved to the city of Byzantium and renamed Constantinople (Ref. 10.113). Maritime activity continued to increase throughout the Black Sea given its strategic location between Europe and Asia. As the Byzantine Empire sought control over the eastern Mediterranean and Black Seas, many naval engagements resulted. There was much political unrest and naval warfare between the Byzantines, Germanic kingdoms, and Persians during this time (Ref. 10.95).

Regarding maritime trade, Sinop and Trabzon (Figure 10.3) continued to be major port centres, and the grain trade from Alexandria (Egypt) to Byzantine ports was most notable. Long-distance commerce peaked during the 14th century.

Small merchant vessels, sometimes referred to as *dorkon*, were used and were renowned for their agility and speed. The 4th and 7th century AD shipwrecks discovered at Yassıada, Turkey (on the Sea of Marmara) can provide possible parallels for the types of sea-going watercraft used in the Black Sea. 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. Naval ships were also built in this manner and were responsible for the protection and expansion of the Byzantine Empire. One- and two-decked warships, powered by oars and sails, were built to be exceptionally fast vessels and were often equipped with waterline rams at the ship's bow.

Underwater archaeological surveys off Sinop in 2000 and 2011 discovered six shipwrecks that date to the mid-5th century AD, and one shipwreck off Ereğli has been dated to the 6th century AD (Ref. 10.74, Ref. 10.82 and Refs. 10.117 to 10.119). All but one of these wrecks is located in the oxic/anoxic interface at a depth from 100 m to 115 m below surface. Cargos from these sites primarily consist of locally-made and imported amphorae (container of a characteristic shape and size, descending from at least as early as the Neolithic Period), and the wrecks themselves have been designated as Byzantine. Given the extensive maritime trade network that existed in the Black Sea and the Mediterranean during this period and the high preservation qualities of the anoxic waters, there is a high possibility that additional Medieval-era shipwrecks exist in the Turkish waters of the Black Sea.

In addition to shipwrecks, a portion of a Thracian wall has been recorded as eroding into the sea at the coastal site of Karacaköy (Ref. 10.83). Given rising sea levels during this period and changing coastlines, it is possible for other submerged settlements to exist long the Black Sea coastline. The fall of Constantinople in 1453 at the hands of the Ottomans resulted in increased naval activity in the region. The Ottoman fleet reached its height by the 17th century as their organisational structure and style of commend evolved out of Venetian and Genoese models (Ref. 10.120). Maritime trade was controlled by the Ottoman Empire. Foreign merchant vessels were mostly prohibited from entering the Bosphorus Straits, and all trade routes were redirected to Istanbul (formerly Constantinople) so that goods and resources could be taxed (Ref. 10.113). Merchantmen were built from primarily Italian design and were round, sail-driven vessels with tall sides and bulging prows (Ref. 10.95). These ships carried cotton, flax, hemp, wheat, millet, rice, olives, hazelnuts, walnuts, skins and hides, fish, salt, opium, beeswax, and silk throughout the region (Ref. 10.113).

Russian forces began to challenge the Ottomans starting in the 16th century. The following centuries saw a series of Russo-Turkish Wars and treaties that resulted from major engagements gave more maritime rights to Russia (Ref. 10.113). By 1774, Russian merchant vessels could freely navigate the Black Sea and in the following decades foreign merchantmen were allowed to do so as well, thereby re-establishing a pan-European maritime commercial network.

The Black Sea experienced 20th century naval warfare during World War I. Turkey and Bulgaria joined with the Central Powers between 1914 and 1915, while Russia and Romania sided with the Allied forces. In response to bombing attacks by the Ottomans, Russia placed a series of sea-mines along the Anatolian coast and disrupted the transportation of coal, thereby crippling the Ottoman fleet (Ref. 10.113).

Archaeological remains from the post-medieval period can be found throughout Anatolia, especially at the site of Zeytinlik (Sinop) on the Black Sea coast and İznik on the Sea of Marmara, which consist primarily of Ottoman ceramic assemblages (Ref. 10.27 and Ref. 10.83). Maritime archaeology finds have also has been discovered. Underwater archaeological surveys off Sinop and Ereğli (Figure 10.3) in 2011 and 2012 located at least six shipwrecks that date from the 17th to the 19th century (Ref. 10.117, Ref. 10.119). Cargoes could not be identified on the majority of these sites, but in one case, cut timber was clearly determined to be cargo material. Archaeological examples of Ottoman-period shipwrecks have been found in southwest Turkey at Yassıada (Sea of Marmara), which exhibit skeleton-based (i.e. frame-based) construction methods (Ref. 10.120 and Ref. 10.121). Given the extensive maritime trade network that existed in and around the Black Sea during this period and the high preservation qualities of its anoxic waters, there is a high possibility that additional post-medieval-era shipwrecks exist in the Turkish waters of the Black Sea.

Two shipwrecks were discovered during the Project's marine surveys that originally lay (prior to pipeline re-routing) within the Zone of Potential Influence that potentially date to the post-medieval or modern period:

- *Wooden shipwreck (TK-MCH-001); and*
- *Wooden shipwreck (TK-MCH-002).*

Potential CHOs that are within the Survey Area but located further than 150 m from the proposed centreline of any of the four pipelines could also date to this period.

10.5.3.5 Modern Period (1922 to Present)

During the early 20th century, the political climate of Turkey changed with the creation of the Republic of Turkey in 1923. Turkey stayed largely neutral during World War II, but did join the Allied forces towards the end of the war. The refugee ship MV *Struma* was sunk by a Soviet submarine north of the Bosphorus Straits, over 100 km distant from the Project Area (Ref. 10.113).

Shipbuilding changed radically 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 resounding 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 ordinance 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 in

military campaigns. During both World War I and World War II, the nearshore area of Turkey experienced significant naval activity from Russian forces (e.g. establishing minefields).

Two shipwreck sites were identified that originally lay (prior to pipeline re-routing) within the Zone of Potential Influence that potentially date to the post-medieval or modern period, noted in Section 10.5.3.4 above. For the purposes of this chapter they have been included in the post-medieval period. Potential CHOs that are within the Survey Area but located further than 150 m from the proposed centreline of any of the four pipelines could also date to this period.

10.5.3.6 Uncertain Date

Within the Survey Area, but outside the Zone of Potential Influence, 30 objects were identified as CHOs in the form of shipwrecks and 38 objects have been identified as potential CHOs. This assessment is based on the size (greater than 5 m long), shape, height off the bottom, and acoustic reflectivity of the objects in the side-scan sonar images. Specific temporal classifications cannot be made at this time based solely on the sonar images, but it is believed the ages of these objects span from the Antique period to the Modern era.

There is the potential for currently unknown or unregistered CHOs to exist in the offshore section that lack archaeological context (isolated or 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.

10.5.4 Intangible Cultural Heritage

Intangible cultural heritage refers to cultural resources, knowledge, innovations and/or practices of local communities embodying traditional lifestyles (Ref. 10.20). With reference to IFC PS8 paragraph 3 (iii) (Ref. 10.13), 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 are no marine or nautical-related nationally, regionally or locally registered elements of intangible cultural heritage or Turkish Living Human Treasures in the vicinity of the Project (Ref. 10.20 and Ref. 10.22).

Some Turkish festivals are related to rituals and beliefs associated with the Black Sea. The Black Sea is thought to have healing powers, and these powers are sought during the Alaturbi Festival, celebrated from late May to early July in the communities of Akçaabat and Beşikdüzü, west of Trabzon (Ref. 10.123). While the festival celebrates and honours the sea, the restorative powers of the sea are sought by those suffering aches, pains, and epilepsy. Healing is sought through three methods. Those physically able to, and who can do so safely, jump into the water fully immersing themselves and swimming. Less physically able pilgrims may take a bath in seawater. Others, with presumably less onerous ailments, seek the healing powers of the Black Sea from the deck of a boat traversing the waters. The Black Sea is enmeshed in well-known legends and cross-cultural epics. The Black Sea was the setting for the voyage of Jason and his fellow crew on the *Argo*. The fictional voyage to Colchis, in present day Georgia, in search of the Golden Fleece, would have taken the Argonauts along the northern coast of Turkey, certainly in sight of land. The legendary crew would have used northern Turkey to replenish

supplies and drinking water. The Black Sea of the Neolithic is hypothesised to have figured in an event that was passed down to eventually be recorded in early written works. A catastrophic inflow of water from the Mediterranean Sea into the Black Sea approximately 7,000 years ago may be the source of the Great Flood narrative told in several cultures, including several versions of the Mesopotamian Flood myth and the story of Noah's flood (Ref. 10.124).

The Project is unlikely to impact any intangible cultural heritage given the distance from the coast and, as such, this is not considered further in the impact assessment.

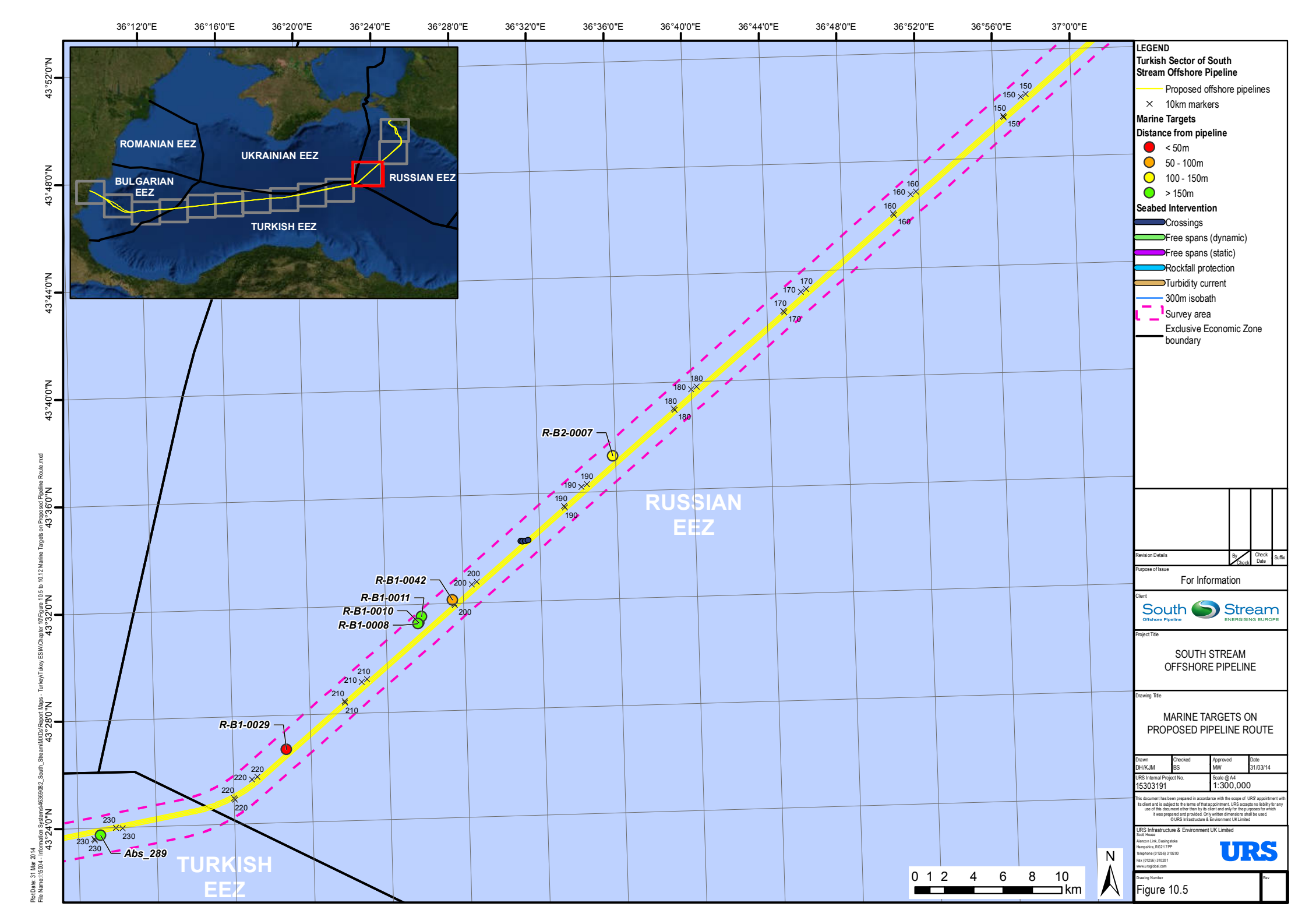
10.5.5 Baseline Summary

The previous section has described the wider archaeological, historical and cultural context. This section focuses on receptors located within the Study Area (Figure 10.5 to Figure 10.12 in Section 10.5). Table 10.5 presents an overall summary of marine cultural heritage receptors and the distances to the nearest pipeline. Sites in ***bold italic*** type are those that were considered to be vulnerable to Project impacts and are discussed further in this chapter (Section 10.6).

Table 10.5 Cultural Heritage Receptors in the Project Area

Date	Marine	Distance from Nearest Pipeline Centreline
Lower Palaeolithic to Antiquity	No dated sites identified within the Project Area	
Medieval and Post-medieval	***Wooden shipwreck (TK-MCH-001)*** in the Zone of Potential Influence	Within 150 m (prior to re-routing of the pipelines)
	Wooden shipwreck (TK-MCH-002) in the Zone of Potential Influence	
Modern	No dated sites identified within the Survey Area	
Uncertain date	30 submerged CHOs in the Survey Area	Over 150 m but within the Survey Area (approximately 2 km wide area centred on the original proposed Pipeline route centreline)
	38 submerged potential CHOs in the Survey Area*	
Intangible cultural heritage	No receptor identified within the Project Area	

* The original total was 44 potential CHO in the Survey Area, 6 of which were in the zone of potential influence. Subsequently these 6 were found not to be CHOs and so have not been included in this table. See Section 10.5.5.1 for further details.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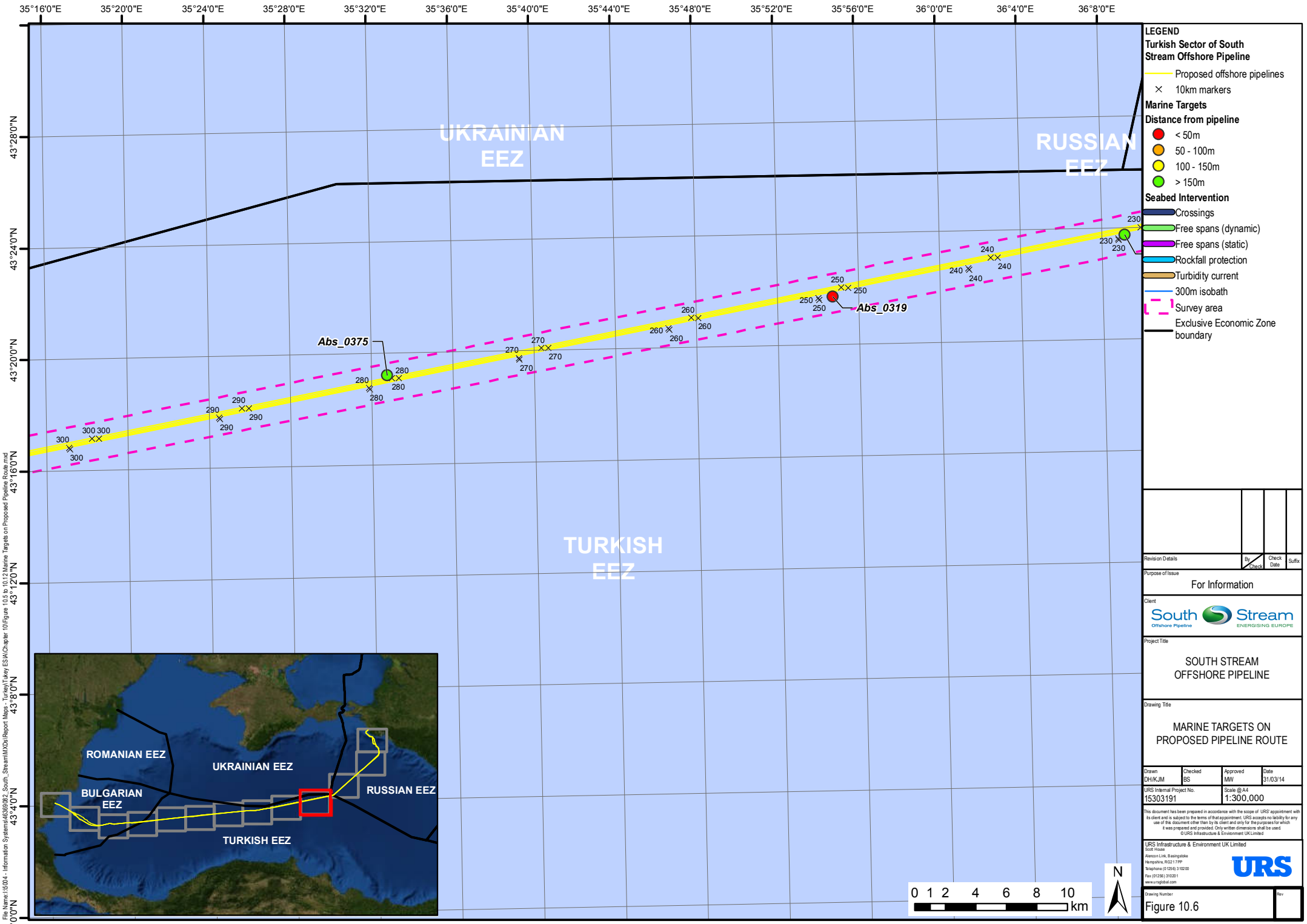
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43°16'0"N
43°12'0"N
43°8'0"N
43°4'0"N
43°0'0"N
UKRAINIAN EEZ
RUSSIAN EEZ
TURKISH EEZ
Abs_0375
Abs_0319
ROMANIAN EEZ
UKRAINIAN EEZ
BULGARIAN EEZ
RUSSIAN EEZ
TURKISH EEZ
0 1 2 4 6 8 10
km
N
LEGEND
Turkish Sector of South Stream Offshore Pipeline
Proposed 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
300m isobath
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
Drawn DH/KJM
Checked BS
Approved MW
Date 31/03/14
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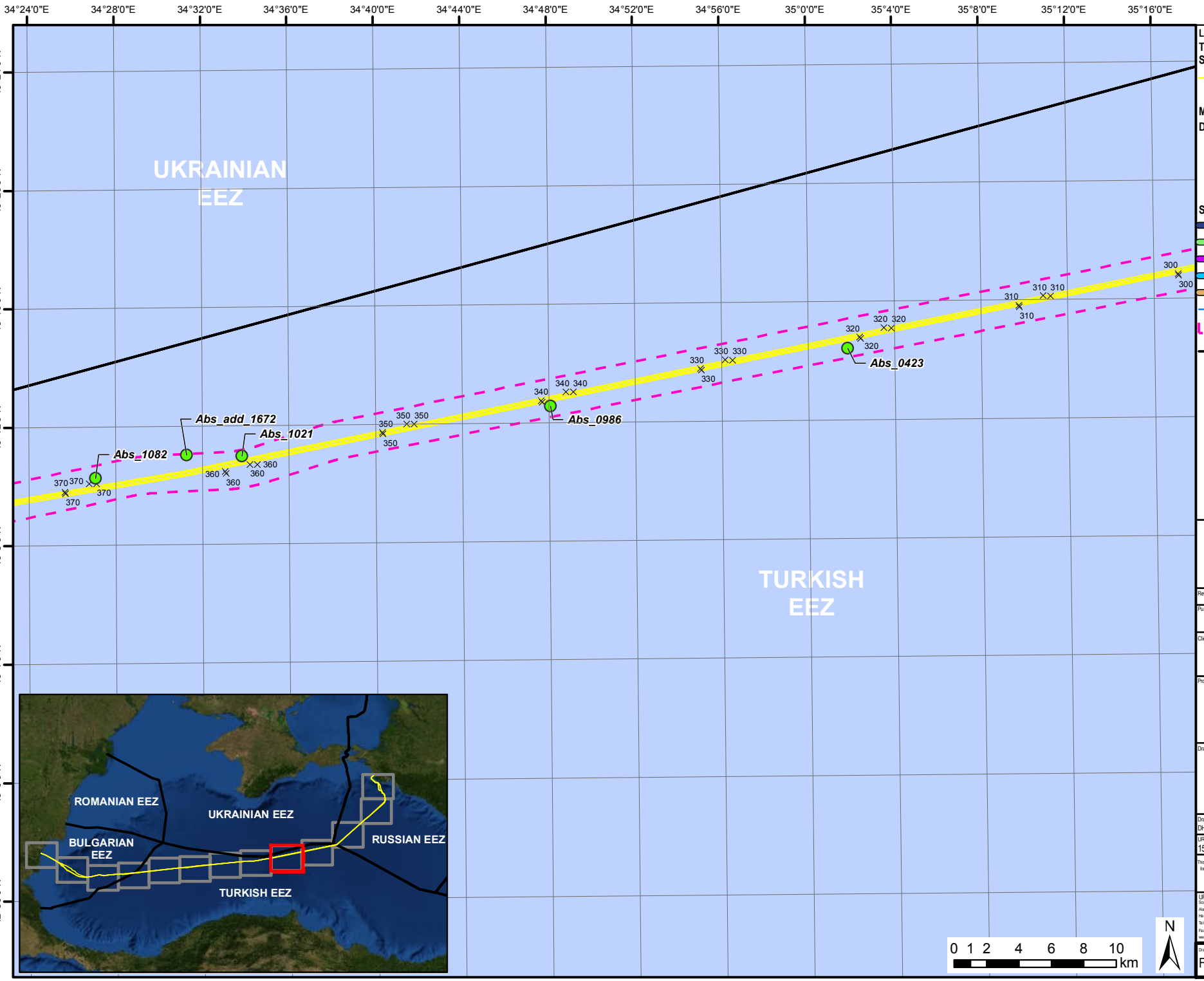

LEGEND

Turkish 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
- 300m isobath
- Survey area
- Exclusive Economic Zone boundary

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Project Title: SOUTH STREAM OFFSHORE PIPELINE

Drawing Title: MARINE TARGETS ON PROPOSED PIPELINE ROUTE

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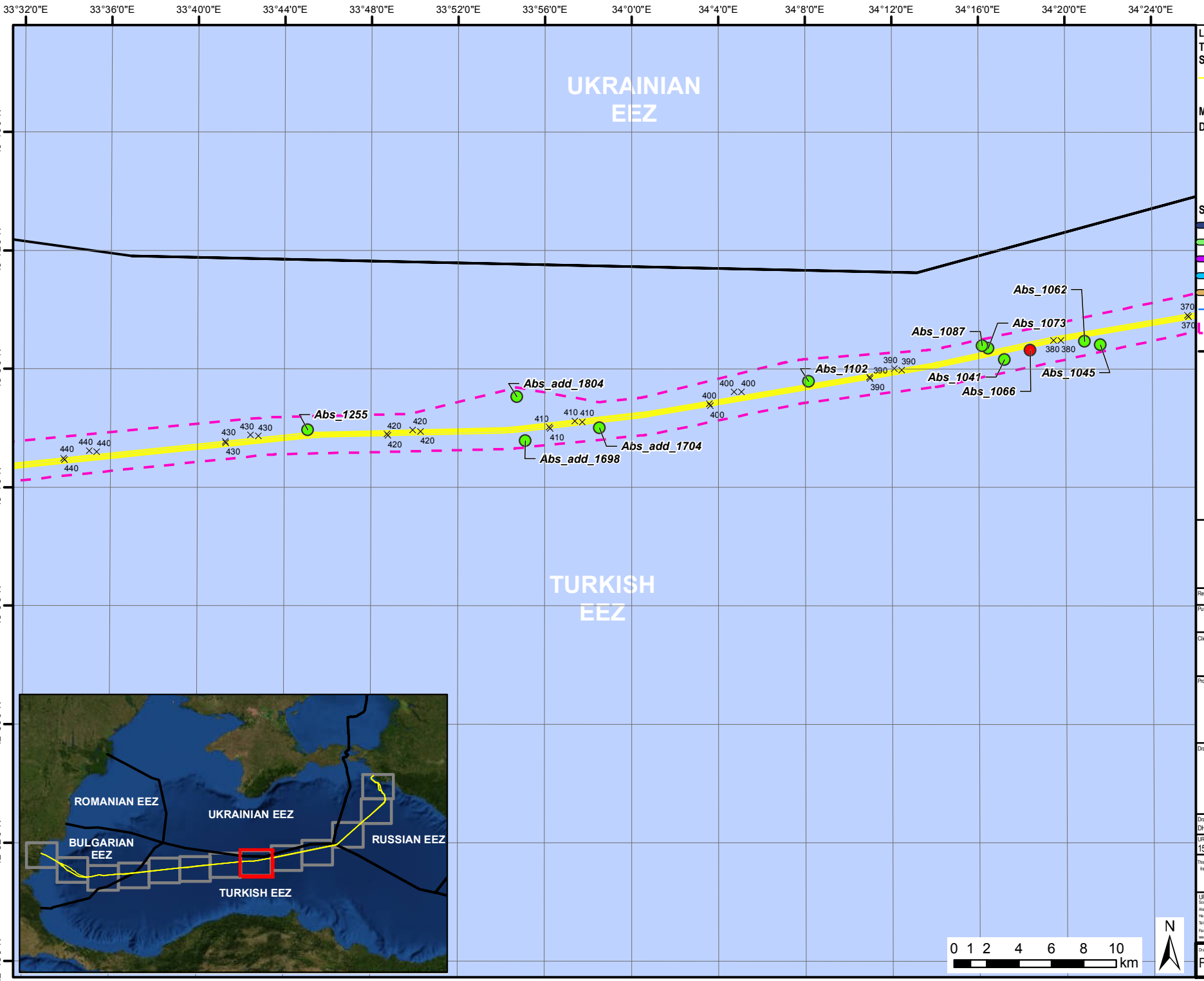

LEGEND

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

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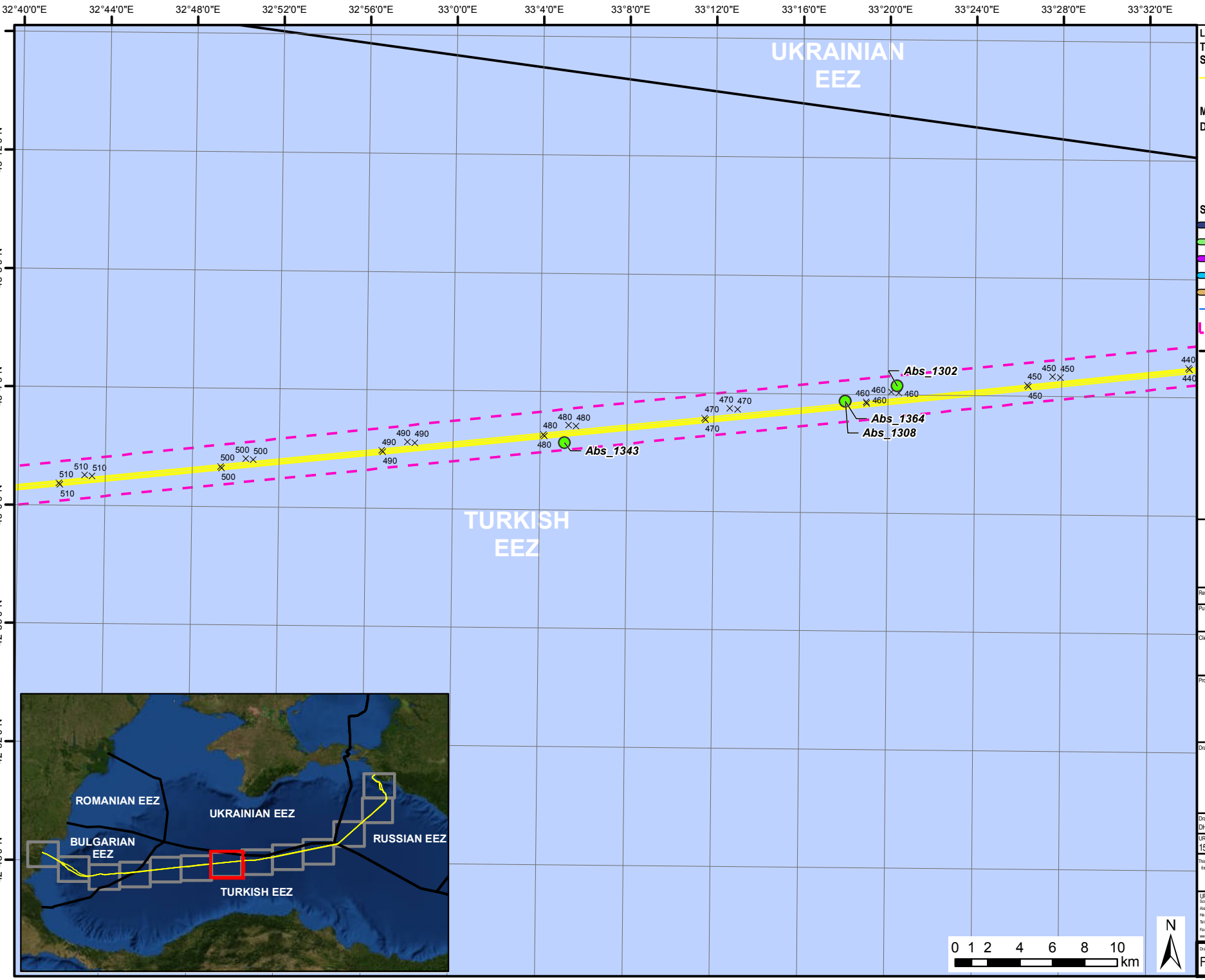

LEGEND

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

- < 50m
- 50 - 100m
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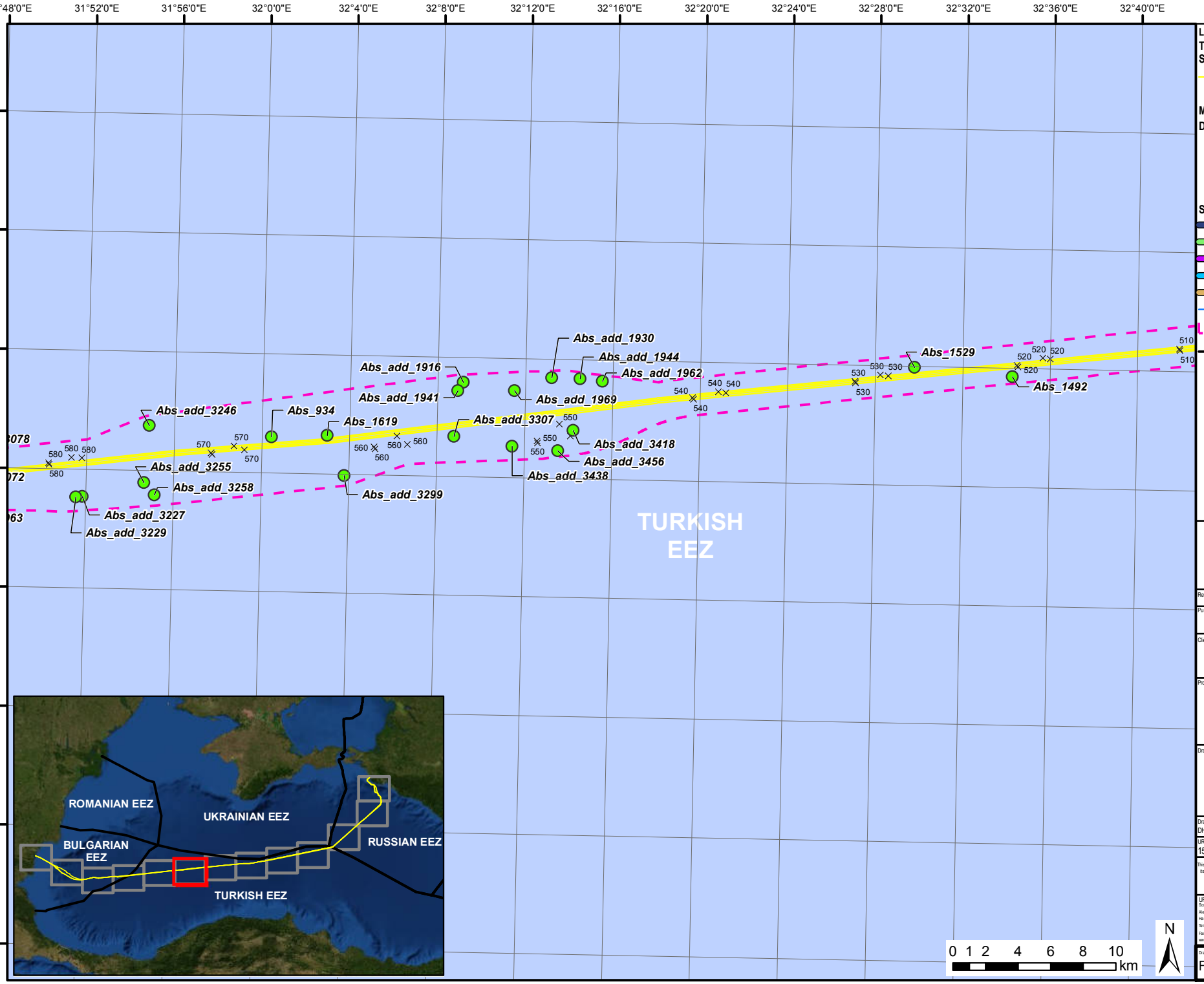

LEGEND

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

- < 50m
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Seabed Intervention

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Drawing Title: MARINE TARGETS ON PROPOSED PIPELINE ROUTE

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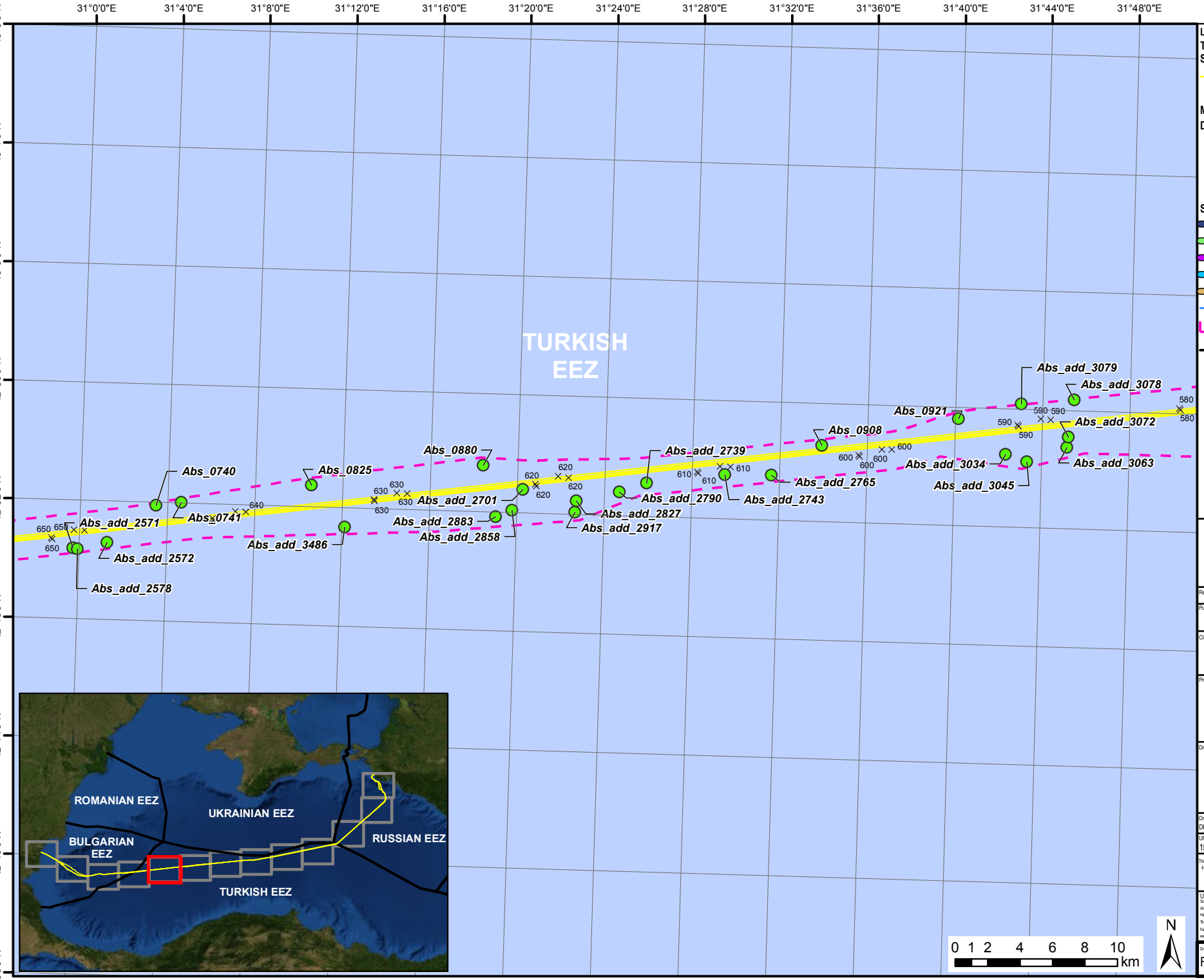

LEGEND

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

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Project Title: SOUTH STREAM OFFSHORE PIPELINE

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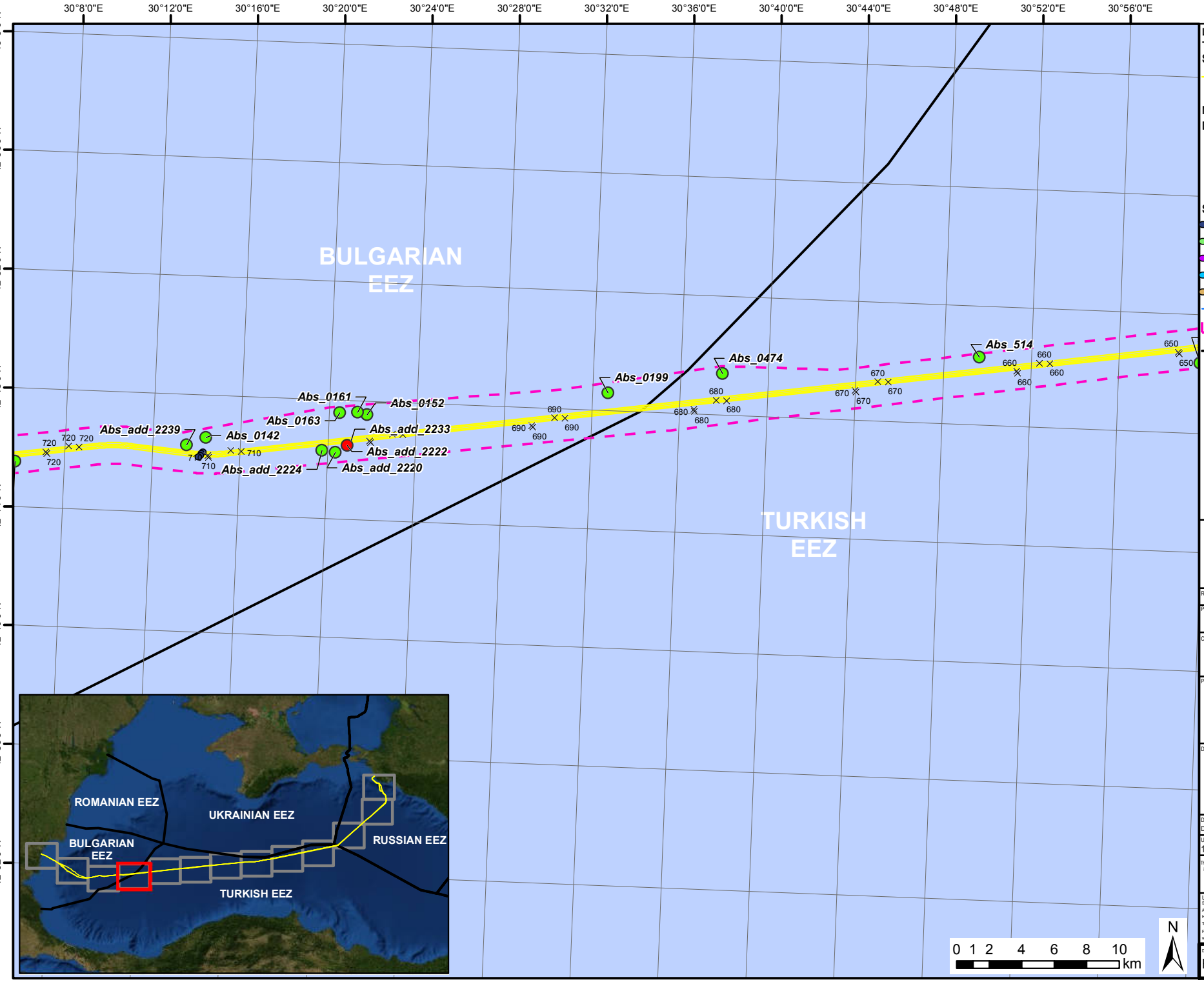

LEGEND

Turkish Sector of South Stream Offshore Pipeline

- Proposed offshore pipelines
- 10km markers

Marine Targets

Distance from pipeline

- < 50m
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10.5.5.1 Baseline Conditions

As shown in Table 10.6, the marine environment has a high potential to feature the following cultural heritage: 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.

Geophysical field surveys conducted in 2011 and 2012 discovered a total of 76 potential CHOs within the Survey Area i.e. within a minimum 2 km wide area centred on the original proposed pipeline route centreline in the Turkish EEZ, eight of which were within the Zone of Potential Influence i.e. within 150 m of the proposed centreline of the nearest pipeline (Table 10.6; Refs. 10.50 to 10.60). Figure 10.5 to Figure 10.12 in Section 10.5 show the geographical distribution of these targets.

Table 10.6 Marine CHOs and Potential CHOs within the Survey Area

Oceanographic Region	Number of CHOs and Potential CHOs within Survey Area (2 km wide area centred on the original proposed Pipeline route centreline)	Number of CHOs and Potential CHOs within Zone of Potential Influence (150 m of the nearest pipeline centreline)
Abyssal plain	76 (following further investigation this number was reduced to 70, see Section 10.5.5.2)	8 (following further investigation this number was reduced to 2, see Section 10.5.5.2)

10.5.5.2 Objects within the Zone of Potential Influence (150 m of the Centreline of Any of the Four Proposed Pipeline Routes)

There were a total of eight potential CHOs within the Zone of Potential Influence i.e. within 150 m of the centreline of any of the four proposed pipeline routes. All of these targets received inspection via ROV in order to determine their identity and potential cultural heritage significance. Six of these potential CHOs (targets Abs_0362, Abs_0364, Abs_1014, Abs_add_2675, Abs_add_2727, and Abs_add_3289) proved to be logs, trees, and modern objects of no cultural heritage significance thereby reducing the total number of CHOs and potential CHOs within the Survey Area from 76 to 70 (Table 10.6). Two of these targets (TK-MCH-001 and TK-MCH-002) were subsequently positively identified as CHOs that range in date potentially from the post-medieval period to the modern period. The locations of these objects are shown on Figure 10.5 to Figure 10.12 in Section 10.5, whilst an illustrated inventory is presented in Appendix 10.2. These two objects are discussed in the following paragraphs.

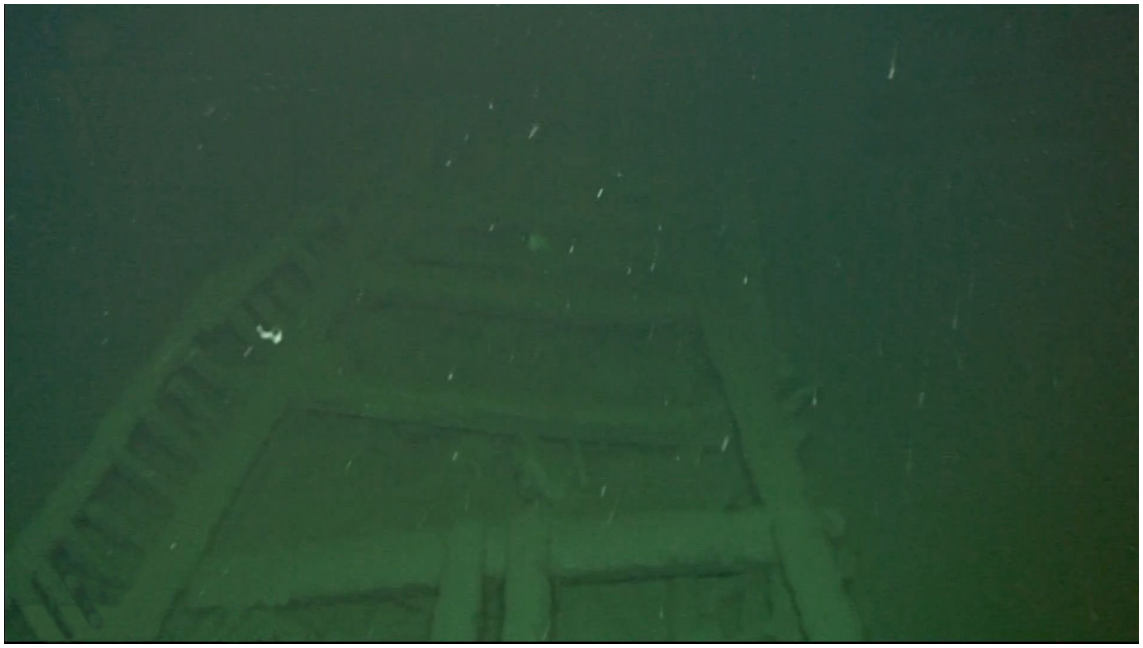
Object TK-MCH-001 (recorded during original surveys as target Abs_0319) is a wooden shipwreck that lies at a depth of approximately 2,170 m on the abyssal plain (Figure 10.13). The wreck is partially buried beneath the seafloor, but has a good amount of exposed hull material. The tops of the frames, the stern post, and the stem are all visible. The transom is flat and composed of large, horizontal transom timbers, while four thwart timbers span the entire width of the vessel. Planking has come loose from the upper portion of the frames, and the bow

consists of mostly disarticulated timbers. There is no clear evidence of cargo, but there are objects within the hull that are covered by a layer of sediment. The wreck site measures approximately 7.8 m long by 4.3 m wide, and likely dates to the Post-Medieval to Modern period (18th to 19th century). Prior to re-routing of the Pipeline it was located approximately 30 m north of the centreline of the proposed route of Pipeline 4. It now lies approximately 310 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.

Figure 10.13 ROV Image of Object TK-MCH-001

Object TK-MCH-002 (recorded during original surveys as target Abs_1066) is a wooden shipwreck that lies at a depth of approximately 2,190 m on the abyssal plain Figure 10.14. The wreck is partially buried beneath the seafloor, but has a good amount of exposed hull material. Frames and gunwales are visible on both sides, which are mostly intact. At least six thwarts span the entire width of the vessel, and two short, longitudinal timbers rest upon the two centre-most thwarts, possibly a mast step. There is no clear evidence of cargo, but there are objects within the hull that are covered by a layer of sediment; these include stacked timbers at the stern of the vessel and a pile of debris near amidships. The wreck site measures approximately 11.8 m long by 5.6 m wide, and likely dates to the Post-Medieval to Modern period (18th to 19th century). Prior to re-routing of the pipeline it was located approximately 5 m north of the centreline of the proposed route of Pipeline 4. It now lies approximately 185 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.

Figure 10.14 ROV Image of Object TK-MCH-002



10.5.5.3 Objects outside the Zone of Potential Influence but within the Survey Area

Thirty (30) of the 68 objects located outside the Zone of Potential Influence but within the Survey Area have been identified as shipwrecks, and 38 objects have been identified as being potential CHOs on the basis of their size (greater than 5 m long), shape, height off the bottom, and acoustic reflectivity in the side-scan sonar images (Appendix 10.2).

10.5.6 Critical Cultural Heritage

The Project does not have the potential to impact any critical cultural heritage, as defined in IFC PS8 (Ref. 10.13), or proposed national monuments. The nearest Turkish World Heritage property is the city of Safranbolu (WHS614), located on the northern Turkish coastline approximately 260 km from the Project Area.

10.5.7 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. 10.125; periods defined by the International Commission on Stratigraphy v2013/01, Ref. 10.68). 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 foraminifera (Ref. 10.126). 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 foraminifera; 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. 10.127 and Ref. 10.128).

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.

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. Faunal and botanical remains and a collection of lithic artefacts have been recovered from Lower Palaeolithic sites of Domuzdere and Ağaçlı along the Black Sea coast (Ref. 10.65, Ref. 10.66).

The Project Area has always been a submerged environment, thereby eliminating the potential for Quaternary Period megafauna or prehistoric habitation. 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 extensive ongoing targeted research programmes; deposits in the vicinity of the proposed pipeline route do not present any specific interests or research targets.

10.5.8 Baseline Summary

The Project Area contains two CHOs within the Zone of Potential Influence (within 150 m of the centreline of any of the four pipelines prior to re-routing) and 68 objects (30 CHOs and 38 potential CHOs) further than 150 m from the pipeline centrelines but within the Survey Area. The Project Area does not contain any World Heritage sites or known tangible or intangible archaeological or cultural heritage features of international significance. 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.

10.6 Impact Assessment

This section discusses the potential cultural heritage impacts associated with the Project and the requirement for mitigation. Impacts to marine cultural heritage receptors may arise during

the Construction and Pre-Commissioning, Operational and Decommissioning Phases of the Project.

10.6.1 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 to cultural heritage receptors in relation to impacts arising from the construction, operation and decommissioning of the Project, as is further outlined below.

10.6.2 Applicable Standards

10.6.2.1 National Legislation

As detailed in **Chapter 2 Policy, Regulatory and Administrative Framework**, this cultural heritage assessment has taken into consideration national legislation, including the Turkish Law on the Conservation of Cultural and Natural Property (1983, Law No. 2863, last amended February 2008), Environmental Act, Law No. 2872 (1983), and EIA Regulation No. 21498 (1993). Cultural heritage protection measures are legally regulated by national laws, regulations and ordinances, and by international conventions ratified by Turkey.

There is no distinction made between general terrestrial cultural heritage and underwater cultural heritage in the relevant legislation. The Turkish Law on the Conservation of Cultural and Natural Property (Ref. 10.2) covers both. All zones in need of protection and a subsequent prohibition for unauthorised diving have been declared in Article 35 of the law (the zoning information was published in 1989 and subsequently amended). The law states that a permit is required for archaeological diving anywhere in Turkish waters. Only licenced archaeologists (academics and qualified researchers) can obtain a permit for this type of work in Turkey. Turkey has a centralised administration where the Ministry of Culture and Tourism has jurisdiction over underwater cultural heritage and the Turkish Coast Guard is responsible for the enforcement of the prohibitions at the registered archaeological sites within the territorial waters.

Key national standards include:

- Law on the Conservation of Cultural and Natural Property (23 July 1983, Law No. 2863, last amended February 2008) (Ref. 10.2);
- Regulation on the Collection and Control of Movable Cultural and Natural Property to be Protected (17 January 1984) (Ref. 10.5);
- Regulation on Treasure Hunting (1984) (Ref. 10.6);
- Regulation on Survey, Sounding and Excavation to be Performed in Relation to Cultural and Natural Property (10 August 1984) (Ref. 10.7);
- Regulation on the Identification and Registration of Immovable Cultural and Natural Property to be Protected (10 December 1987) (Ref. 10.8); and

- Regulation on the Classification, Registration and Admission to the Museum of the Movable Cultural and Natural Assets Requiring Preservation (20 April 2009) (Ref. 10.9).

Turkey is party to a number of European cultural heritage instruments, including:

- European Cultural Convention (1954) (entered into force: 10 October 1957) (Ref. 10.129);
- European Convention on Offences relating to Cultural Property (1985) (signature: 26 September 1985) (Ref. 10.130);
- European Convention for the Protection of the Architectural Heritage of Europe (Granada Convention, 1985) (entered into force: 1 February 1990) (Ref. 10.131); and
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention, revised, 1992) (entered into force: 30 May 2000) (Ref. 10.132).

10.6.2.2 International Agreements

The Republic of Turkey has ratified a number of international conventions regarding cultural heritage including various conventions of the Council of Europe (CoE), ICOMOS and the UNESCO, which are set out in Table 10.7 (Ref. 10.1, Ref. 10.40 and Refs. 10.129 to 10.138).

Table 10.7 Summary of Relevant International Agreements

Agreement and Objective	Objective	Date of Ratification
UNESCO 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict with Regulations for the Execution of the Convention (The Hague Convention)	To ensure that cultural property and goods are protected during times of war and/or armed conflict through the adoption and use of protective signage.	Accession 15 Dec 1965
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.	21 Apr 1981
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.	16 Mar 1983

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.	27 Mar 2006
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.	10 Oct 1957
CoE 1985 European Convention on Offences relating to Cultural Property	Promotes the safeguard and protection of Europe's heritage from pillage, theft, destruction, illegal transfer, and any other unlawful activity.	26 Sep 1985
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.	11 Oct 1989 (entered into force 1 Feb 1990)
CoE 1992 European Convention on the Protection of the Archaeological Heritage (Valetta Convention)	Promotes the protection of archaeological sites, remains, objects, and areas of interest; to prohibit and restrain illicit excavations; to take the necessary measures to ensure that excavations are authorised and entrusted only to qualified persons; and to control and protect the results obtained.	Entered into force 30 May 2000
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 Oct 1990

Continued…

Agreement and Objective	Objective	Date of Ratification
ICOMOS 1996 Charter for the Protection and Management of the Underwater Archaeological Heritage (Sofia Charter)	This Charter, intended as a supplement to the ICOMOS Charter for the Protection and Management of Archaeological Heritage, is intended to encourage the protection and management of underwater cultural heritage in inland and inshore waters, in shallow seas and in the deep oceans. Defines fundamental principles, project design, funding, time-table, research objectives, methodology, techniques, and qualifications.	9 Oct 1996

Complete.

10.6.2.3 Standards and Guidelines for Financing

IFC Performance Standard and Guidance on Cultural Heritage (Ref. 10.13 and Ref. 10.14) aims to protect cultural heritage from the adverse impacts of Project activities and supports its preservation, in accordance with the World Heritage Convention (Ref. 10.1). Its scope includes:

- Tangible cultural heritage with archaeological, palaeontological, historical, cultural, artistic, and religious values. These are present in the Project Area;
- Unique natural features or tangible objects that embody cultural values, such as sacred groves, sacred trees, rocks, lakes, and waterfalls. These are not present in the Project Area;
- Intangible forms of culture proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles. These are not present in the Project Area; 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. These are not present in the Project Area.

In addition, this cultural heritage assessment has been developed with reference to the OECD Common Approaches (Ref. 10.15).

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.

10.6.3 Impact Assessment Criteria

The criteria used to assess the potential impacts upon cultural heritage receptors follow the current international standard for cultural heritage impact assessment, issued by the International Council on Monuments and Sites (Ref. 10.139). 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 Turkey 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 Turkish culture and history.

10.6.3.1 Receptor Sensitivity Criteria

Identified cultural heritage receptors have been evaluated for their sensitivity in accordance with Table 10.8 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 Report (**Chapter 3 Impact Assessment Methodology**[5]). Legal standards are detailed in **Chapter 2 Policy, Regulatory and Administrative Framework** and in Section 10.6.2.1.

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

- Natural conditions, such as erosion, 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.

[5] This is comparable to the categorisations adopted by national standards; the terms High and Major are deemed equivalent. The overall matrix for this ESIA Report 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.

Table 10.8 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	Sites of acknowledged international importance inscribed as World Heritage Sites. Individual attributes that convey Outstanding Universal Value. Nationally-designated archaeological sites, protected by national laws. Undesignated sites 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 seascapes with considerable or exceptional coherence, time-depth, or other critical factors.	*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) *Turkey:* Law on the Conservation of Cultural and Natural Property (1983) National and regional databases of underwater cultural heritage Bathymetric and shipwreck data of the Turkish Office of Navigation, Hydrography and Oceanography Turkish Living Human Treasures database
Moderate	Designated or undesignated sites, or seascapes that can contribute significantly to regional research objectives. Designated or undesignated historic seascapes of regional value, which would warrant designation.	*Turkey:* Law on the Conservation of Cultural and Natural Property (1983) National and regional databases of underwater cultural heritage Bathymetric and shipwreck data of the Turkish Office of Navigation, Hydrography and Oceanography Turkish Living Human Treasures database

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*
Low	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. Undesignated historic 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.	*Turkey:* Law on the Conservation of Cultural and Natural Property (1983) National and regional databases of underwater cultural heritage Bathymetric and shipwreck data of the Turkish Office of Navigation, Hydrography and Oceanography
Negligible (Not used in this cultural heritage assessment)	Assets with little or no surviving archaeological interest. 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.

Complete.

Taking into account the criteria as presented in Table 10.8 the known receptors within 150 m of the nearest original proposed pipeline route centreline had the potential to be impacted by Project activities. The sensitivity of these known receptors is discussed below and summarised in Table 10.9. As these receptors have been avoided by 150 m as a result of pipeline re-routing (Section 10.5.5.2) they are not considered further in this impact assessment.

In addition to known receptors, South Stream Transport acknowledges that, although highly unlikely, there is a low possibility of encountering yet undiscovered objects, which are therefore considered in this assessment.

10.6.3.2 TK-MCH-001 – Wooden Shipwreck (Post-Medieval to Modern)

- *Description*: The shipwreck site measures approximately 7.8 m long by 4.3 m wide, and is primarily constructed of wood. Located in the marine environment in greater than 2,000 m

of water. It dates to the post-medieval to modern period (18th to 19th century). The shipwreck site does not appear to have any post-depositional anthropogenic disturbance.

- *IFC Classification*: Marine cultural heritage object with archaeological significance, not registered with the Ministry of Culture and Tourism.
- *Proximity to Project Work*: This wooden shipwreck lay approximately 30 m north of the centreline of the original proposed route of Pipeline 4. It now lies approximately 310 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.
- *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.

10.6.3.3 TK-MCH-002 – Wooden Shipwreck (Post-Medieval to Modern)

- *Description*: The wreck measures approximately 11.8 m long by 5.6 m wide, and is primarily constructed of wood. Located in the marine environment in greater than 2,000 m of water. It dates to the post-medieval to modern period (18th to 19th century). It does not appear to have any post-depositional anthropogenic disturbance.
- *IFC Classification*: Marine cultural heritage object with archaeological significance, not registered with the Ministry of Culture and Tourism.
- *Proximity to Project Works*: This wooden shipwreck lay approximately 5 m north of the centreline of the original proposed route of Pipeline 4. It now lies approximately 185 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.
- *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.

Table 10.9 Marine Cultural Heritage Receptor Sensitivities

Marine Cultural Heritage Receptor	Condition	Receptor Sensitivity
TK-MCH-001 Wooden shipwreck Abyssal plain Post-medieval to modern period	This undesignated site has potential to contribute to the understanding of early ship construction techniques and international networks of maritime trade on the Black Sea (i.e. can contribute significantly to international or national research objectives). Partially protected by covering silts on the sea floor, and there is no evidence that the wreck has been disturbed after it sank.	High

Continued…

Marine Cultural Heritage Receptor	Condition	Receptor Sensitivity
TK-MCH-002 Wooden shipwreck Abyssal plain	This undesignated site has potential to contribute to the understanding of Black Sea ship construction techniques and maritime trade (i.e. can contribute significantly to international or national research objectives).	High
Post-medieval to modern period	Partially protected by covering silts on the sea floor, and there is no evidence that the wreck has been disturbed after it sank.	

Complete.

10.6.3.4 Impact Magnitude Criteria

Table 10.10 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. 10.139).

Table 10.10 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 marine structures elements such that the resource is totally altered. Change to most or all key maritime landscape elements or components; extreme visual effects; fundamental changes to use or access; resulting in total change to maritime landscape character unit. Comprehensive changes to setting (refer to the glossary for definition).
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 marine structures or elements, or to the setting such that the resource is significantly modified. Change to many key maritime landscape elements or components; visual change to many key aspects of the maritime landscape; considerable changes to use or access; resulting in moderate changes to maritime landscape character.
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.

Continued…

Magnitude	Description, Taken from ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (appendices 3A and 3B)
Low	Slight changes to the setting of key maritime structures. Changes to many key maritime structures, or to the setting of a maritime structure, such that the resource is slightly different and noticeably changed. Change to many key historic maritime elements or components; slight or minor visual change to many key aspects of the maritime landscape; changes to use or access; resulting in limited to minor changes to maritime landscape character.
Negligible	Very minor or no changes to archaeological asset or setting. Very minor or no changes to elements components of maritime landscapes; no visual 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.

10.6.3.5 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 10.11 has been applied in order to assign levels of significance to defined cultural heritage impacts.

Table 10.11 Impacts 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**

10.6.4 Assessment of Potential Impacts

10.6.4.1 Impact Sources

The cultural heritage baseline conditions as described in Section 10.5 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. Table 10.12 outlines the Project activities that could potentially impact cultural heritage within the Study Area.

Table 10.12 Project Activities that Could Potentially Impact Cultural Heritage

Phase	Activity
Construction and Pre-Commissioning	Use of underwater survey equipment (e.g. ROV, side-scan sonar, etc.) during the pre-construction and construction pipeline route surveys (pre-lay, unexploded ordinance (UXO), and as-built), and during real time touch down monitoring of pipe-laying activity. Removal of any obstacles (e.g. munitions, boulders). Laying the pipe on seabed.
Operational	Visual inspection via underwater vehicle (e.g. ROV) and maintenance of pipelines, which may result in seafloor intervention.

The majority of the activities which have the potential to affect cultural heritage receptors occur during the Construction Phase of the Project. Operational Phase activities have little potential to impact on cultural heritage receptors, as routine operational activities are infrequent, minimally invasive and will take place in areas that will have already undergone disturbance during construction activities and have had any appropriate design control or mitigation measures implemented. Decommissioning Phase activities are not discussed further in this assessment (see Section 10.9).

A number of pre-construction and Construction Phase activities may impact upon the seabed, resulting in potential disturbance of marine cultural heritage receptors (both known and unknown). The activities are summarised in Table 10.12.

The engineering and design of the Project has incorporated a number of Project design control measures to ensure impact avoidance and minimisation; these measures are detailed in **Chapter 5 Project Description**.

The design control measure for cultural heritage consists of the optimisation of the 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.

The two presently known marine cultural heritage objects, TK-MCH-001 and TK-MCH-002 (shipwrecks) listed in Table 10.13, have been avoided by a distance of no less than 150 m by micro re-routing of the pipeline in February 2014 and have therefore been scoped out of further assessment.

Table 10.13 Cultural Heritage Receptors Scoped Out of Further Assessment

Marine Cultural Heritage Receptor	Reasons for Scoping Out
TK-MCH-001 Wooden shipwreck Abyssal plain Post-medieval to modern period	Pipelines have been rerouted to avoid known objects by a minimum of 150 m. This object now lies approximately 310 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.
TK-MCH-002 Wooden shipwreck Abyssal plain Post-medieval to modern period	Pipelines have been rerouted to avoid known objects by a minimum of 150 m. This object now lies approximately 185 m north of the centreline of the route of Pipeline 4 following re-routing undertaken in February 2014.

The only additional receptors that could be impacted by Project Activities are unknown CHOs that have not yet been detected during the surveys that have been carried out for the Project to date. Although review of already-collected marine data suggests that chance finds of CHOs are highly unlikely to occur during Project construction and operation activities (see Section 10.7.1), there is the potential for pre-construction, Construction Phase and operational activities to impact upon currently unknown CHOs that could be located in proximity to any of the four pipelines. The following sections will therefore focus on potential impacts to such unknown receptors and on the mitigation measures that will be implemented to minimise such impacts.

10.6.4.2 Assessment of Potential Impacts (Pre-mitigation) – Construction and Pre-Commissioning Phase

This section provides an assessment of potential impacts to any unknown cultural heritage receptors using the impact magnitude and receptor sensitivity matrix discussed in **Chapter 3 Impact Assessment Methodology**.

Construction and Pre-Commissioning Phase activities which may impact upon the seabed, resulting in potential disturbance of presently unknown marine cultural heritage receptors include:

- Use of underwater survey equipment (via ROV and any towed sensor arrays) during the pre-construction and construction pipeline route surveys (pre-lay, unexploded ordinance (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;

- Seafloor intervention (e.g. removal of obstacles such as munitions, boulders etc.); and
- Direct disturbance of the CHO as a result of pipe-laying.

Potential impacts and their significance without mitigation are summarised in Table 10.14. A summary of the impacts identified and their pre- and post-mitigation significance ranking is provided in Table 10.17 in Section 10.6.4.3.

Table 10.14 Summary of Predicted Impacts on Marine Cultural Heritage (Without Mitigation), Construction and Pre-Commissioning Phase

Cultural Heritage Receptor	Phase	Impact	Receptor Sensitivity	Magnitude of Impact	Impact Significance Without Mitigation
Currently unknown cultural heritage receptors	Construction and Pre-Commissioning	Damage to submerged cultural heritage	Low to High (depending on value of receptor and sensitivity / vulnerability to damage)	Moderate	**Low** to **High** Adverse

10.6.4.3 Assessment of Potential Impacts (Pre-Mitigation) – Operational Phase

Operational activities that may impact upon the seabed, resulting in potential disturbance of presently unknown marine cultural heritage receptors are the visual inspection via underwater vehicle (e.g., ROV) and maintenance of pipelines, which may result in seafloor intervention. Potential impacts and their significance without mitigation are summarised in Table 10.15. A summary of the impacts identified and their pre- and post-mitigation significance ranking is provided in Table 10.17.

Table 10.15 Summary of Predicted Impacts on Marine Cultural Heritage (Without Mitigation), Operational Phase

Cultural Heritage Receptor	Phase	Impact	Receptor Sensitivity	Magnitude of Impact	Impact Significance Without Mitigation
Currently unknown cultural heritage receptors	Operational	Damage to submerged cultural heritage	Low to High (depending on value of receptor and sensitivity / vulnerability to damage)	Moderate	**Low** to **High** Adverse

10.7 Mitigation and Monitoring

Where the Project involves potential adverse impacts on cultural heritage that have not been avoided through the application of Design Controls (Section 10.6.4.1) 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 Republic of Turkey (Section 10.6.2) 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 (**Chapter 16 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 stakeholder engagement with the Ministry of Foreign Affairs, the Ministry of Culture and Tourism: General Directorate of Cultural Heritage and Museums and the Sinop Provincial Directorate of Culture and Tourism.

Mitigation measures will be designed and executed following national guidance as set out in Section 10.6.2:

- Law on the Conservation of Cultural and Natural Property (23 July 1983, Law No. 2863, last amended February 2008) (Ref. 10.2);
- Regulation on the Collection and Control of Movable Cultural and Natural Property to be Protected (17 January 1984) (Ref. 10.5);
- Regulation on Survey, Sounding and Excavation to be Performed in Relation to Cultural and Natural Property (10 August 1984) (Ref. 10.7); and
- Regulation on the Identification and Registration of Immovable Cultural and Natural Property to be Protected (10 December 1987) (Ref. 10.8).

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 10.7.1) and Operational Management Plans (OMPs) during the Operational Phase (see Section 10.7.3).

Appropriate staff training in Cultural Heritage Awareness Training 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 Project Cultural Heritage CMP.

All known marine cultural heritage receptors will be plotted on digital and paper Project maps and in the Project GIS database, which will be available to the design team and construction contractors.

A review of already-collected marine data suggests that chance finds of CHOs are highly unlikely to occur during Project construction and operation activities. Real time touch down monitoring of pipe-laying activity, using ROV, will be undertaken to confirm the absence of CHOs 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 pre-lay surveys 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. Relevant Turkish authorities will be informed of all chance finds.

In addition to implementing the cultural heritage stewardship programme the Project will implement specific mitigation measures during the various Project phases. Table 10.16 provides a summary of the cultural heritage mitigation measures – as the principal impacts on cultural heritage will be associated with the Construction and Pre-Commissioning 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 10.16 Summary of Cultural Heritage Mitigation Measures by Project Phase

Phase	Marine
Construction and Pre-Commissioning, including Pre-Construction Surveys	Cultural Heritage CMP and Chance Find Procedures
	Careful piloting of ROVs during surveying and during installation monitoring
	Real time monitoring of pipe-laying activity
	Archaeological watching briefs on pipe-lay vessel
	Staff Cultural Heritage Awareness Training
	Plotting of location of CHOs on Project mapping and GIS
Operational	Application of Cultural Heritage CMP and Chance Find Procedures Plotting of location of CHOs on Project mapping and GIS Careful piloting of ROVs during surveying and maintenance activities
Decommissioning	The need and scope of the assessment will be confirmed once plans for the Decommissioning Phase have been finalised

10.7.1 Mitigation Measures

10.7.1.1 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.

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

- Potential impacts on currently unknown CHOs from the use of ROVs for monitoring and surveying will be minimised by limiting propeller or thruster washing, proper tether management and avoiding ROV strikes by careful piloting; and
- During surveying and pipe-laying works, archaeological watching briefs will be undertaken to monitor surveying and construction activities. A qualified archaeologist will monitor during the pre-lay surveys and pipe-laying activities to determine the presence or absence of potential cultural heritage objects and to ensure that known cultural heritage objects are not impacted by surveying and pipe-laying activities. Archaeological watching briefs will be undertaken by appropriately qualified and experienced cultural heritage professionals. Specifically the watching briefs will be undertaken to ensure that:
    - The avoidance distance of 150 m for known CHOs is adhered to during pipe-laying; and
    - The procedure for chance finds, as outlined in the Project Cultural Heritage CMP and detailed in the Contractor's CMP, is appropriately implemented (**Chapter 16 Environmental and Social Management**).

10.7.1.2 Mitigation Measures – Commissioning and Operational Phase

As during construction, Project mapping and GIS will be updated, as necessary, should any chance finds of cultural heritage objects occur.

As no significant intrusive work will be carried out on the pipelines during their operation, no significant impacts are expected. However, 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.

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.

10.7.2 Monitoring Requirements

As set out in **Chapter 16 Environmental and Social Management**, a Cultural Heritage CMP will 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 marine works, including the pipe-lay vessel; and
- Monitoring of the seafloor and CHO condition will be undertaken as part of the real time touch down monitoring of pipe-laying activity and during the as-built pipeline route survey.

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 including sonar and visual inspection will be undertaken during the Operational Phase.

10.8 Residual Impact Assessment

Table 10.17 and Table 10.18 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 defined mitigation measures during various Project activities.

During the Construction and Pre-Commissioning Phase, without mitigation, 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 10.6.4.3 will be applied and any residual impacts are anticipated to be **Low**.

During the Operational Phase, without mitigation, 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 significance of the find. Should any currently unknown CHO be identified, mitigation measures outlined in Section 10.7 will be enforced where possible and any residual impacts are anticipated to be **Not Significant**.

Table 10.17 Cultural Heritage: Construction and Pre-Commissioning Phase

Activity	Potential Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Summary of Mitigation Measures	Residual Impact Significance
Pre-construction route surveys, as-built survey and real time touch down monitoring Offshore pipe-laying on seabed	Seabed disturbance Object removal Damage to cultural heritage receptor	Currently unknown cultural heritage receptors	Low to High	Low to High	**Low** to **High** Adverse	Real time monitoring of the pipe-laying process Careful piloting of ROVs during surveying and during installation monitoring. Minimise propeller or thruster washing. Proper tether management. Archaeological watching briefs on pipe-lay vessels. Cultural Heritage Management Plan and Chance Find Procedures. Staff Cultural Heritage Awareness Training.	**Low** adverse

Table 10.18 Cultural Heritage: Operational Phase

Activity	Potential Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Pre - Mitigation Impact Significance	Summary of Mitigation Measures	Residual Impact Significance
Inspection and maintenance of pipelines	Seabed disturbance	Currently unknown cultural heritage receptors	Low to High	Low to High	**Low** to **High** Adverse	Careful piloting of ROVs during surveying and maintenance activities. Minimise propeller or thruster washing. Proper tether management. Operations Management Plan and Chance Find Procedures. Staff Cultural Heritage Awareness Training.	**Not Significant**

10.9 Decommissioning Phase

Decommissioning of the South Stream Offshore Pipeline will be carried out according to prevailing international and national legislation and regulations and best practices regarding environmental and other potential impacts. It is envisaged that the process of developing detailed decommissioning management plans may be staged, initially outlining potential options and studies required for discussion with the regulatory authorities, and finally leading to agreed plans prior to the commencement of decommissioning.

Two options are available; namely in situ decommissioning or pipe removal:

- In situ decommissioning involves cleaning the Pipeline and filling it with seawater. The receptors and degree of impact are thus the same as those for the Operational Phase; or
- Removal of the Pipeline is a similar operation to pipe-laying, but in reverse. The receptors and degree of impact will thus be similar to those identified for the Construction and Pre-Commissioning Phase.

Impacts that may be associated with decommissioning will be assessed as part of the process of developing decommissioning management plans and are not assessed in this ESIA Report.

10.10 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.

Appropriate unplanned event contingency planning will be undertaken that minimises further the likelihood of low probability events occurring, as well as minimising event consequences (**Chapter 13 Unplanned Events**).

10.11 Cumulative Impacts

The cumulative impact assessment considers the Project within the context of other Projects in the Project Area and greater regional context (**Chapter 14 Cumulative Impact Assessment**).

None of the identified potential developments will impact upon the marine cultural heritage resources that will be affected by the Project, and thus there is no risk that the Project will contribute to cumulative impacts upon marine cultural heritage features.

10.12 Conclusions

The Construction and Pre-Commissioning Phase of the Project has the greatest potential to lead to potentially adverse effects to marine cultural heritage receptors.

- Impacts to known cultural heritage receptors, TK-MCH-001 and TK-MCH-002, have been 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 CHOs.
- Potential impacts on as yet unknown CHOs will be mitigated by archaeological watching briefs (monitoring), Chance Find Procedures and Cultural Heritage Awareness Training along with the careful piloting and management of ROVs. These measures will reduce any potential impacts to **Low** significance.

Operational impacts on unknown 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

Ref. No.	Reference
Ref. 10.1	UNESCO 1972 Convention concerning the Protection of the World Cultural and Natural Heritage. United Nations Educational, Scientific and Cultural Organisation, Paris, 16 November 1972. Available from: http://whc.unesco.org/en/conventiontext [Accessed on 20 November 2012]
Ref. 10.2	Law on the Conservation of Cultural and Natural Property 1983 (Kültür ve Tabiat Varlıklarını Koruma Kanunu), Law Number 2863, last amended June 2009. Published in the Official Gazette on 23 July 1983, No. 18113. Available from: http://www.unesco.org/culture/natlaws/media/pdf/turkey/turkey_lawconservationculturalnaturalproperty_1_entof [Accessed 26 March 2013]
Ref. 10.3	ICOMOS 1990 Charter for the Protection and Management of the Archaeological Heritage (Lausanne Charter). International Council on Monuments and Sites, Lausanne, 1990. Available from: http://www.international.icomos.org/charters/arch_e.pdf [Accessed on 11 March 2013]
Ref. 10.4	UNESCO 2010 The Power of Culture for Development. United Nations Educational, Scientific and Cultural Organisation, 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]
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