AYGM

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Environmental and Social Impact Assessment

70069878-ESIA
DECEMBER 2021

PUBLIC

10

LANDSCAPE AND VISUAL

10 LANDSCAPE AND VISUAL

10.1 INTRODUCTION

10.1.1. This chapter reports the findings of the assessment of the potential effects of the Project in relation to landscape character and visual amenity during both the construction and operational phases. For both phases, source and significance of potential effects are identified, and the measures that will be employed to minimise these described.

10.2 LEGISLATIVE FRAMEWORK, POLICY AND GUIDANCE

10.2.1. The landscape and visual assessment has taken account of the relevant legislative, policy and guidance framework internationally and nationally. The relevant legislation, policies and guidance are summarised below.

INTERNATIONAL LEGISLATION

European Landscape Convention

10.2.2. The European Landscape Convention (ELC) was adopted in Florence (Italy) on 20th October 2000, and aims to promote:

"…the protection, management and planning of European landscapes and organising European cooperation on landscape issues. It is the first international treaty to be exclusively concerned with all dimensions of European landscape. It applies to the entire territory of the Parties and relates to natural, urban and peri-urban areas, whether on land, water or sea. It therefore concerns not just remarkable landscapes but also ordinary everyday landscapes and blighted areas. The Convention represents an important contribution to the implementation of the objectives of the Council of Europe: these seek to protect Europeans' quality of life and well-being, taking into account landscape, cultural and natural values. The member states of the Council of Europe signatory to the European Landscape Convention declared their concern to achieve sustainable development based on a balanced and harmonious relationship between social needs, economic activity and the environment. The cultural dimension is also of fundamental importance."[143]

10.2.3. The Convention is not an EU Directive; rather countries that ratify the Convention make a commitment to upholding the principles it contains within the context of their own domestic legal and policy framework.

10.2.4. The Republic of Turkey ratified the Convention on the 13th October 2003, before coming into force in 2004 (Law No. 4881).

10.2.5. Within the Convention landscape is defined as: '*an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors.*' Furthermore, it recognises

[143] Maguelonne Déjeant-Pons Head of the Spatial Planning and Landscape Division (2006). The European Landscape Convention, Landscape Research, 31:4, 363-384.

that all landscapes are potentially important, irrespective of location or condition – signatories acknowledge:

"… that the landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas."[144]

NATIONAL LEGISLATION

10.2.6. The following national legislation is considered to be relevant to this assessment:

- Environment Law No. 2872 (1983), amended by Law No. 5491[145] (last amended in 2017);
- Law No. 2863 (1983) on the Preservation of the Cultural and Natural Assets[146];
- Law No. 2873 (1983) on National Parks, amended by Law No. 5400 (2005)[147];
- Forest Law No. 6831 (1956)[148] (last amended in 2004)[149]; and
- Law No. 4881 (2003) on the Approval of the European Landscape Convention[150].

NATIONAL POLICY

Regional Plans

10.2.7. The Project is located within both the region of Istanbul and province of Tekirdag (within the region of Thrace). The Thrace Regional Plan 2014 to 2023 sets out twenty-one initiatives for the Thrace region, which includes Tekirdag province, and two other provinces. The relevant initiative for this assessment is set out in **Table 10-1**.

Table 10-1 - Summary of Thrace Regional Plan: Relevant Initiatives

Initiative No.	Initiative
9	Experiencing a burst of industrialisation, the Region is obliged to be careful in terms of the use of natural resources. Pollution and limited use of surface waters has increased the pressure on underground sources, hence causing reserves to be

[144] European Landscape Convention, Florence 20 October 2000, Treaty Series No.36 (2012). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/236096/8413.pdf (Accessed 02/07/20).
[145] Turkish Government (2017). Available at: https://www.ecolex.org/details/legislation/law-no-5491-amending-the-environmental-law-no-2872-lex-faoc065097/ and http://www.fao.org/faolex/results/details/en/c/LEX-FAOC065097 (Accessed 15/07/20).
[146] Turkish Government (2005). Available at: https://www.ecolex.org/details/legislation/law-no5400-amending-the-law-on-national-parks-lex-faoc090592/?q=%EF%82%A1%09Law+No.+2873+National+Parks (Accessed 10/07/20).
[147] Turkish Government (1983). Available at: http://extwprlegs1.fao.org/docs/pdf/tur7683E.pdf (Accessed 15/07/20).
[148] Turkish Government (1956). Available at: https://www.ecolex.org/details/legislation/forest-law-no-6831-lex-faoc020346/?q=%EF%82%A1%09Law+No.+6831+on+forests&xdate_min=&xdate_max= (Accessed 15/07/20).
[149] Turkish Government (2003) and (2004). Available at: https://www.ecolex.org/result/?q=%EF%82%A1%09Law+No.+6831+on+forests&xdate_min=&xdate_max= (Accessed 15/07/20).
[150] Council of Europe (2012). Proceedings of the Council of Europe Celebration on the 10th Anniversary of the European Landscape Convention. Available at: https://rm.coe.int/16802f2999 (Accessed 05/10/20).

Initiative No.	Initiative
	rapidly used up. Pollution in the Ergene Basin has a hugely negative impact on the Regions ecosystem and agricultural production. Uniformed agricultural activities, excessive use of fertilizers and agricultural spraying also have negative impacts on soil productivity. To be able to combat such impacts, the plan introduces policies for the effective use of soil, forests, air, underground and surface waters.

10.2.8. The 2014-2023 Istanbul Regional Plan identifies policies for the development of Istanbul. The plan notes that it is "…in a sense a local development constitution for Istanbul, which requires the coherent, coordinated and dedicated efforts of all relevant stakeholders, and mobilization of resources accordingly"[151].

10.2.9. The Regional Plan is split into 3 Development Axes (as named in the Regional Plan), 23 Priority Areas, 57 Strategies and 476 Objectives.

10.2.10. Within the 3rd of the Development Axes (Joyful, Authentic Urban Spaces and Sustainable Environment), it notes that "…an inclusive and holistic planning approach based on cooperation and participation…" is required, and that, "In the process, protection of environmental and natural heritage and preservation of their sustainability as well as Istanbul memory and the historical and cultural heritage of the city, needs to be protected"[151].

10.2.11. The Regional Plan also requires protection of natural resources from the effects of development, stating that:

"Natural resources under pressure from construction, such as water basins, forest areas, and green areas and parks in urban areas, will be protected and their sustainable development will be ensured" [151].

"It is intended that by 2023, Istanbul will be a city where respect for the environment and life is felt in every area, environmental quality is enhanced, and not only the humans but all life is freely improved" [151].

10.2.12. The **Table 10-2** outlines the strategies and objectives included within the Regional Plan which are considered relevant to this Chapter.

Table 10-2 - Summary of Istanbul Regional Plan: Priority Areas, Strategies and Objectives

Strategies	Objectives
Priority Area: Urban Image and Effective Publicity	

[151] Istanbul Development Agency (2016). 2014-2023 Istanbul Regional Plan.

Strategies	Objectives
Strategy 3 – Preserving and using local resources and values to improve and publicise urban image, improving related infrastructure and services.	Objective 2 – Preserving the natural, historical, cultural heritage and other authentic values and using them effectively for publicity.
Priority Area: Sustainable urban Development and Participatory Planning	
Strategy 1 – Ensuring sustainable urban development and smart growth, efficient use of space in the distribution of urban functions.	Objective 1 – Easing pressure caused by urban development on natural and cultural assets by ensuring observance of urban thresholds (Conservation Areas, Protected Areas, disaster risk areas, etc) in spatial development, and taking developments in these fields under control.
	Objective 8 – Carrying out environmental, social and economic impact analyses of projects, particularly macro projects, with regard to compliance with historical texture, social structure and environmental and urban identify, conducting risk analysis for those projects and perverting their potential negative effects.
Priority Area: Quality and Sustainable Environment	
Strategy 1 – Ensuring the sustainable management of basins and water resources.	Objective 2 – Preventing urbanisation in the water basin protection area and increasing inspections.
Strategy 2 – Protection and development of forest and agricultural areas.	Objective 8 – Conserving and developing biodiversity, flora, fauna and endemic plant species.
	Objective 9 – Extending the number and total area of urban forests.

GUIDANCE

10.2.13. Turkish guidance includes requirements for EIA but does not contain specific requirements for Landscape and Visual Impact Assessments (LVIA). Further consideration of guidance is required in order to comply with European Bank for Reconstruction and Development (EBRD) Performance Requirement 6 (PR6), as follows:

- Environmental Impact Assessment Directive 2014 (2014/52/EU)[152];

[152] Official Journal of the European Union, Directive 2014/52/EU. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0052 (Accessed 14/06/20).

- EBRD – Environmental and Social Policy (2014)[153];
- EBRD – Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2014)[154]; and
- EBRD – Performance Requirement 8: Cultural Heritage (2014)[155].

10.2.14. As there is limited LVIA guidance in Turkey, this assessment has been undertaken in accordance with the principles of the following guidelines, which are the industry accepted best practice guidance in the UK, and are in accordance with EU requirements:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA) Third Edition (2013)[156]; and
- Natural England. An Approach to Landscape Character Assessment (2014)[157], sometimes referred to as the European Landscape Character Assessment methodology.

10.3 ASSESSMENT METHODOLOGY

10.3.1. This Chapter considers the likely effects of the Project upon the two separate (but linked) topics of landscape character and visual amenity:

- Landscapes: they are an important component of the distinctiveness of any local area; they take their character from a combination of elements, including landform, land use and pattern, land cover/vegetation, open space and cultural heritage influences; and
- Visual amenity: a view, its components and context can have a great effect on the quality of peoples' lives.

10.3.2. The key stages when carrying out assessments on the effects of landscape character and visual amenity are listed below:

- Assessment of the existing situation (baseline), analysing the existing landscape and visual amenity context of the receiving environment and human receptors, within the defined study area;
- A desk-based review of the relevant guidance and planning policy context (where possible);
- A review of local landscape character, including the existing site and features on the site;
- A review of surrounding potential visual receptors, located within study area, including identification of representative viewpoint locations;
- Identify potential impacts associated with the Project, relevant to landscape character and visual amenity during the construction and operational phases of the Project, to determine the potential for significant effect;
- Identify practicable mitigation measures, where the assessment identifies potentially significant effects; and

[153] EBRD (2014). Environmental and Social Policy. Available at:https://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html (Accessed 15/06/20).
[154] EBRD (2014). Guidance Note: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
[155] EBRD (2014). Performance Requirement 8: Cultural Heritage.
[156] Landscape Institute and Institute of Environmental Management & Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition).
[157] Natural England (2014). An Approach to Landscape Character Assessment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691184/landscape-character-assessment.pdf (Accessed 15/06/20).

- Describe residual effects i.e. those effects upon the receiving environment that cannot be offset by mitigation measures.

STUDY AREA

10.3.3. For the purpose of this ESIA, a study area of 1km has been identified on either side of the expropriation corridor, as shown in **Figure 10-1**.

10.3.4. It is considered that significant effects are unlikely to occur beyond this distance, due to the significance of effect decreasing as the distance from the Project increases. As such, it is considered that a 1km study area is sufficient in this instance to identity those receptors likely to be significantly affected by the Project, based on previous project experience, the National EIA for the Project (2017)[158], and professional judgement.

[158] Sweco Mühendislik Müşavirlik ve Tasarım Ltd. Şti.(2017). Halkali – Kapikule Railway Project EIA Report.

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Legend

- Buffer (1Km either side)
- Proposed Railway Route

Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 10-1 - Study Area

Scale at A4: 1:300,000

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METHOD OF BASELINE DATA COLLECTION

10.3.5. A desk-based review was undertaken in order to determine existing landscape features, landscape character, and potential visual receptors. The baseline data has been obtained through a combination of site visits, undertaken by the Project Team, and desk-based reviews of third party / consultation information.

10.3.6. The baseline data has been informed by the following resources:

- Aerial imagery[159];
- Desk-based review of existing publicly available information;
- Site visits and site photography (undertaken by environmental experts from the Project Team);
- The National EIA for the Project (2017)[160]; and
- The Environmental and Social Gap Analysis of the TCDD Halkali – Kapikule Railway Project[161].

10.3.7. A site visit was undertaken on the 7th July 2020 and 10th February 2021 by environmental experts from the Project Team. The representative photographs captured during the site visit are shown in **Figures 10-21 – 10-35** respectively as presented in **Appendix Q**.

10.3.8. Photographs were chosen as being representative of key visual receptors in the study area, as identified through desk top reviews. The photographs were taken from publicly accessible locations.

TEMPORAL SCOPE

10.3.9. The temporal scope for this Chapter is considered to be of medium-term duration for construction activities (i.e. a maximum duration of 5/6 years, as detailed in **Chapter 2: Description of the Project**) and long-term for operational effects of the Project (i.e. greater than 10 years duration).

SENSITIVITY OF RECEPTOR

10.3.10. For the purpose of this assessment, the definitions of sensitivity as outlined within **Chapter 5: Approach to ESIA**, have been revised to reflect the specific characteristics of landscape and visual receptors.

10.3.11. Upon review and receipt of baseline information, identified landscape and visual receptors were allocated an indicative value, based on the criteria outlined in **Table 10-3** (in accordance with principles of GLVIA, 3rd Edition[156]).

[159] As obtained via Google Earth Pro.
[160] Sweco Mühendislik Müşavirlik ve Tasarım Ltd. Şti.(2017). Halkali – Kapikule Railway Project EIA Report.
[161] EBRD (2020). Environmental and Social Gap Analysis of TCDD Halkali – Kapikule Railway Project.

Table 10-3 - Receptor Sensitivity

Sensitivity	Receptors	Context, Value, Quality	Susceptibility to Change
Very High	Visual amenity: Static views from major tourist attractions. Landscape: landscapes recognised at national and international levels.	High quality public open space; visitors / users of recreational, historical or cultural sites where landscape is an integral part of its enjoyment (such as users of National Parks, UNESCO World Heritage Sites). Typically, strong landscape with many features worthy of conservation; infrequent detracting features. Typically, of international recognition such as UNESCO World Heritage Sites.	Very high susceptibility to change.
High	Visual amenity: Many viewers including static viewpoint such as residential property. Landscape: Good quality, often designated landscape	Residential areas; public open space; visitors / users of recreational, historical or cultural sites where landscape is a significant factor in its enjoyment (such as users of long-distance trails). Good quality, high value and often designated landscape. High importance.	High susceptibility to change.
Medium	Visual amenity: Several viewers, longer transient views such as from public open space and recreational areas. Landscape: Pleasant but unremarkable landscapes.	Retail areas, offices, formal sports facilities where the landscape is secondary to enjoyment of the sport; outdoor workspaces; users of scenic roads, railways or waterways; users of tourist routes, schools and other institutional buildings and their outdoor areas. A reasonably attractive landscape with a mix of attractive features and intrusive elements. Pleasant but unremarkable. Moderate importance.	Moderate susceptibility to change.
Low	Visual amenity: Several viewers, longer transient views such as from public open space and recreational areas. Landscape: Landscapes of poor quality and low importance.	Indoor workers in medium quality landscape; passengers in public transport on main arterial routes; users of recreational facilities where the purpose of that recreation is not related to the view (e.g. sports facilities). Typically, poor quality landscape of low importance, with detracting features and intrusive features but with	Low susceptibility to change.

Sensitivity	Receptors	Context, Value, Quality	Susceptibility to Change
		occasional attractive features and elements.	
Negligible	Visual amenity: Very few viewers; fast, transient views such as from vehicles along a national road. Landscape: degraded or disturbed landscapes.	Industrial area, land awaiting development; indoor workers in poor quality landscape; users of large main roads (e.g. motorways and national roads). A degraded or disturbed landscape, typically awaiting development. Many unattractive and intrusive features, litter and dirt. Poor quality landscape. Very low importance.	Very low susceptibility to change.

MAGNITUDE OF CHANGE

10.3.12. The nature of the potential impacts was described within the context of the landscape and visual receptors identified, both in terms of temporal and spatial scope - considering the geographical extent of the area influenced, the duration of the impact and its reversibility.

10.3.13. For the purpose of this assessment, the definitions and criteria for assessing the magnitude of change are as defined within **Chapter 5: Approach to ESIA**.

SIGNIFICANCE OF EFFECTS

10.3.14. The objective of the assessment process is to identify and qualitatively define the likely significant effects arising from the Project. The effects of the Project upon the existing (baseline) landscape and visual environment have been identified and assessed at two points in time:

- Construction Phase; and
- Operational Phase.

10.3.15. Whilst there is a large degree of professional judgement involved in determining the significance of effects, they can broadly be determined by the interaction of the sensitivity of the receptor and magnitude of change. The matrix for assessing significance of effects is shown in **Table 5-3**.

10.3.16. The definitions of significance of effect are as defined within **Chapter 5: Approach to ESIA**, with the addition of 'negligible', those effects that are just perceptible within normal bounds of variation.

MITIGATION AND RESIDUAL EFFECTS ASSESSMENT METHODOLOGY

10.3.17. Where potentially significant effects are identified, mitigation measures are described that could potentially reduce those significant adverse effects identified. Additionally, general mitigation is included for the purposes of reducing insignificant effects.

10.3.18. Where effects remain following the provision of mitigation measures, these will be identified as residual effects. Only those residual effects with a value of 'Moderate' or above will be considered as significant in this instance. As photographs were taken in summer (with vegetation in leaf), and due

to the limitations and assumptions outlined below, the subsequent assessment has necessarily adopted a precautionary approach.

VISUAL REPRESENTATION

10.3.19. Visual representation presented to accompany the chapter and inform the findings of the assessment, were captured during the site visit on the 7th July 2020 and 10th February 2021. The representative views were taken using a Canon EOS-1D x Mark II, 50mm f/1.8 lens, suitable for the nature of the assessment.

ASSUMPTIONS AND LIMITATIONS

10.3.20. The following assumptions are applicable to this Chapter:

- Based on the tunnel design information, and as described in the **Chapter 2: Description of the Project**, where the Project is located in tunnel, it is assumed that there will be no visual effect on the receiving environment following construction, as the information indicates that all tunnel structures will be concealed below ground. However, at some locations, the topography surrounding the cut and cover tunnel will be altered and will be a noticeable change, albeit the structure itself will not be visible. Where this is the case, it is specifically mentioned in the assessment below;
- The resettlement information indicates that where properties are shown as being located directly within the footprint of the Project, they will be subject to physical resettlement and subsequent demolition due to the Project (as outlined in **Chapter 2: Description of the Project** and detailed in the **Resettlement Action Plan**), unless there are specific reasons for assuming they will be retained, as stated within this Chapter;
- It is assumed that the maximum height of the rolling stock will be 4.1m, based on the height of existing high speed trains in Turkey;
- The assessment has been based on the assumption that visual disturbance due to the usage of the line will be frequent, with an increase in usage of 80% in comparison to that at present (based on the projected train numbers);
- The assessment represents the worst-case scenario where information is unknown;
- For the assessment, where mitigation planting is proposed for the purpose of visual screening, it is anticipated that by Year 15 of operation (design year), the vegetation will have achieved its desired height (8m). Where planting is less successful, the outcome of the assessment may be more adverse than that reported in **Section 10.7**, but monitoring and replanting will be undertaken to ensure a higher level of success, although this may be achieved a later date than initially planned;
- The assessment assumes that the screening benefit provided by existing and proposed vegetation is reduced in winter months, as a result of the absence of foliage on broadleaved vegetation. Broadleaved vegetation has been proposed, even though it provides less screening in winter, because they are native species and reflect the character of the existing landscape;
- It is assumed that stockpiled mounds of material will be stored with a maximum height of 5m (with topsoil only mounds being a maximum of 2m), as this is specified in the **ESMP** that the Contractor will be required to implement; and
- Assumptions have been made as to the nature of the view (for example, short or long distance and enclosed or open) and associated receptor (for example, residential and workers) based on information gathered to date as part of the desk top study. Where the nature of the view is

transient, such as from a vehicle, the orientation of the viewer has been specified (for example, when looking in a westerly direction).

10.3.21. The following limitations are applicable to this Chapter:

- There are no publicly available landscape character areas assessments for the defined study area. As such the character of the landscape has been assessed from aerial photography, field survey photographs and publicly available data;
- Representative viewpoint locations have been identified from publicly accessible locations only. Therefore, when establishing the views from dwellings and / or buildings it has been based on information from a combination of desk-top studies and professional judgement; and
- Cultural Heritage assets are assessed only in terms of their potential as a point of interest and the visitor experience; effects on the assets themselves are addressed in **Chapter 9: Cultural Heritage**.

10.4 BASELINE CONDITIONS

OVERVIEW OF THE STUDY AREA

10.4.1. The Project is located in the north western of Turkey, and within the province of Tekirdag, in the region of Thrace, and the region of Istanbul. These regions are largely urbanised, containing the largest city in Turkey (Istanbul). There is an existing rail network in these regions which has a single-track layout throughout and connects Istanbul (Halkali station) to the Bulgarian border (Kapikule station).

10.4.2. The province of Tekirdag and the region of Istanbul are collectively located within the Marmara Region.

10.4.3. For the purpose of this assessment the study area has been defined as 1km on either side of the expropriation corridor for the Project.

LANDSCAPE DESIGNATIONS AND FEATURES

10.4.4. There are no areas of international importance directly related to landscape located within the study area, and there are no National Parks, Nature Parks or Wildlife Protection and Development Areas, as designated under the Law No. 2873 (1983) on National Parks, amended by Law No. 5400 (2005).

10.4.5. The closest National Park to the Project is the Igneada Longoz Forest National, located over 58km from the Project, designated in 2007. This National Park is located to the west of the Project along the Turkish coastline with the Black Sea. In addition to this, to the south, and separated from the Project by the Sea of Marmara, is the Manyas Bird Paradise National Park located over 107km from the Project, designated in 1959.

10.4.6. To the north of the Project, but located outside the study area, is the Samlar Natural Park (approximately 7km at its closest point), Cilingoz Wildlife Protection and Development Area (approximately 11km at its closest point) and Terkos Lake Wetland (approximately 16km at its closest point).

10.4.7. Turkey is a centre of genetic diversity for plants, with 8.1% of the total surface area of Turkey being protected[162]. Whilst the Project does not cross designated areas, there are areas within the study area which are designated, including forest areas within both Istanbul and Tekirdag provincial boundaries. In addition, there is an area approved for afforestation within the Tekirdag provincial border[163]. Ecological designations and features are detailed further within **Chapter 8: Ecology**.

10.4.8. The Project passes immediately north of Küçükçekmece Lake (at chainage 2+000 to 5+000). The Project will be in a deep tunnel at this location, where it will pass beneath the proposed Kanal Istanbul project that connects to Küçükçekmece Lake. Küçükçekmece Lake has a surface area of approximately 16km³. The watercourses of the Sazli Stream, Hadımköy Stream / Eşkinoz Creek and Nakkas Creek discharge to the Küçükçekmece Lake.

10.4.9. The Project passes approximately 1.4km to the north of Büyükçekmece Lake (at chainage 23+500 – 28+000). The lake has a surface area of approximately 28km³. Watercourses are detailed further within **Chapter 11: Surface Water Environment** and illustrated on **Figure 11-1: Surface Water Features**.

LANDSCAPE CHARACTER

10.4.10. As noted in the Handbook of Landscape Character Assessment[164]:

"Actions and interactions between humans and the environment delineate the characteristics of a landscape…As such landscape is far more than the natural and cultural features of an area, and its multi-layered complexity calls for sophisticated methods of characterisation, of which the most widely adopted is the 'Landscape Character Assessment' (LCA) approach developed in Britain, but now used in other parts of Europe"…and, "Landscape character is commonly defined as a distinct and recognisable pattern of elements that occur consistently in a particular type of landscape".

10.4.11. The Handbook provides an overview of the character of the Turkish landscape, noting that:

"…As a Mediterranean country the landscape characteristics of Turkey differ greatly from those regions of Europe in which LCA has most often been carried out with landscape diversity spread across three biogeographic zones, the Black Sea (Euro-Siberian) Anatolia (Irano-Turanian) and the Mediterranean, Turkey is characterised by heterogeneous landforms, vegetation types, climate zones and land uses"[165].

10.4.12. A basic classification of landscape areas was first established in Turkey in the 1960s. However, since signing the ELC in 2000, and its coming into effect in 2004, Turkish researchers have sought

[162] SOER (2015). The European environment state and outlook 2015 > Countries and regions > Turkey country briefing - The European environment state and outlook 2015.
[163] Sweco Mühendislik Müşavirlik ve Tasarım Ltd. Şti.(2017). Halkali – Kapikule Railway Project EIA Report.
[164] Routledge Handbook of Landscape Character Assessment (2018). Current Approaches to Characterisation and Assessment, Graham Fairclough, Ingrid Sarlov Herlin, Carys Swanwick – Chapter 5 New Approaches For New Regions Turkey.
[165] Routledge Handbook of Landscape Character Assessment (2018). Current Approaches to Characterisation and Assessment, Graham Fairclough, Ingrid Sarlov Herlin, Carys Swanwick – Chapter 5 New Approaches For New Regions Turkey.

to adopt the European Landscape Character Assessment methodology. Prior to the 1960s, landscape was generally defined by its natural beauty as idyllic scenery.

10.4.13. While landscape character areas studies are becoming more commonplace in Turkey, there are currently none relating to the study area. However, analysed geographically on the basis of biophysical features, Turkey can be divided into seven regions:

- Mediterranean Region – characterised by evergreen and drought tolerant plant species, karstic landforms and Mesozoic limestone and travertine deposits;
- Aegean Region – Similar to the Mediterranean Region but with sclerophyllous mixed forests;
- Black Sea Region – has rather temperate broadleaf and coniferous vegetation on a very mountainous landscape;
- Marmara Region – under the influence of its smaller inner sea, the Sea of Marmara, has temperate broadleaf and mixed forest on a changing coastline;
- Central Anatolia – characterised by its stepps, temperate grasslands and scrublands on relatively flat topography;
- East Anatolia – for its massive mountains and high plateaux; and
- Southeast Anatolia – characterised by its volcanic mountains, large plateaux and flat plains and river courses.

10.4.14. The Project and the study area is located within the Marmara Region.

Local Landscape Character Areas (LCAs)

10.4.15. For the purpose of this assessment, three landscape character areas (LCAs) have been identified, which are outlined below and shown in **Figure 10-2**. The Marmara Region character area has been considered at a regional level in the assessment, in addition, to provide a more local review, the character area has been subdivided into two smaller character areas, to consider the potential effects of the Project on more localised areas.

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Proposed Railway Route
- Provenance Boundaries
- Marmararegion

Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 10-2 - Landscape Character Areas

Scale at A4: 1:2,000,000

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Stage 1 check	Stage 2 check	Originated	Date
KM	JW	DG	22/02/2021

0 5 10 20 30 40 50 60
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Landscape Character Area (LCA) 1: Marmara Region

10.4.16. The study area in its entirety is located within LCA 1, and this character area encompasses landscape character areas 2 and 3. Marmara is a region in northwest Turkey, that encompasses the provinces of Edirne, Kirklareli, Tekirdag, Istanbul, Yalova, Kocaeli, Sakarya, Bilecik, Bursa, Balikesir and Canakkale.

10.4.17. To the north, the region is bound by the Black Sea, while to the south, the region is adjacent to the Aegean Sea. Located centrally within the region is the sea of Marmara. To the north, the sea of Marmara is connected to the Black Sea by the Bosphorus Strait, whereas to the south, the Sea of Marmara joins the Aegean Sea, via the Dardanelles Strait.

10.4.18. The Marmara climate reveals transition characteristics between that of the continental Black Sea and Mediterranean climates. Due to this, the natural plant cover is formed from Mediterranean origin plants within those provinces found in the south of the region and moist forests within the provinces in the north, where the Project is located.

10.4.19. Given the regions general low altitude and rolling valley landscape, the area is considered suitable for growing crops including apricots, grapes, peaches, vegetables, sunflowers and grain. Approximately 73% of Turkey's sunflowers, 71% of Turkey's rice and 30% of corn is produced within this region[166]. Further information on landuses, as informed by the household surveys is provided within the **Resettlement Action Plan**. Uludag is the most prominent mountain within the region at 2,543m Above Ordnance Datum (AOD).

10.4.20. The region has a number of landscape designations associated with it, recognised at both a national and international level, none of which fall directly within the expropriation corridor or the 1km study area. However, it should be noted that there are a number of heritage assets recognised at a national level located within the 1km study area, that contribute to sense of place. No elements of these are discernible above ground with all remnants being buried. These are discussed in greater detail within **Chapter 9: Cultural Heritage**.

10.4.21. Those designations of particular note located within the LCA, include 6 of the 44 National Parks located within Turkey, identified as Gala Lake National Park; Bird Paradise National Park, Igneada Longoz Forest National Park, Kazdagi National Park, Troya Historical National Park and Uludag National Park.

10.4.22. Due to the area's vast expanse and designations the region is rich in tourist attractions, including the city of Istanbul located within the north-eastern corner of the LCA. Istanbul is described in greater detail in association with LCA 2.

10.4.23. This landscape character area is considered to have **Very High** sensitivity to change.

[166] All About Turkey (2020). Marmara: Region of Turkey. Available at: https://www.allaboutturkey.com/marmara.html (Accessed 01/07/20).

Landscape Character Area 2: Province of Istanbul

10.4.24. LCA 2 is located at the eastern end of LCA 1 and covers the majority of the Project and Study area (central and eastern sections), includes the province of Istanbul, and is located within two continents, Europe and Asia, separated from one another by the Bosphorus. The City of Istanbul itself is located to the south-east of the wider province, with predominantly open countryside making up the remainder of the landscape character area.

10.4.25. Istanbul is Turkey's largest and most developed city. For 1,500 years, Istanbul was the capital of Turkey during the Roman, Byzantine and Ottoman Empires, remaining the capital city until 1923. As such the city is steeped in history and architectural styles. In recognition of this in 1985, sections of the city were designated as a UNESCO World Heritage site. The most impressive cluster of monuments and buildings are located on the triangular piece of land to the west of the Bosphorus referred to as the historical peninsula. As one tourist travel website suggests, "…*Sultanahmet Square is the core of the historical peninsula and the most prominent examples of Byzantine and Ottoman architecture can be seen in close proximity here*"[167]. This includes Hagia Sophia, Blue Mosque, Topkapi Palace and the Suleymaniye Mosque complex.

10.4.26. Ataturk Airport - a general aviation and cargo airport, is located within the City of Istanbul. Ataturk Airport was previously the main international airport for Turkey; however, all passenger services were transferred to the new Istanbul Airport in 2019, which is located 40km from the city centre.

10.4.27. Within the wider region of Istanbul, the character of the landscape is more rural, with scattered settlements interspersed within large areas of open countryside. To the north the border of the province is defined by the Black Sea, while to the south, the Sea of Marmara, defines its boundary.

10.4.28. There are no large-scale rivers within in the borders of Istanbul province. The largest river of note is the Riva River, located to the northeast of Istanbul, on its Asian side. There are three main lakes within the province of Istanbul, referred to as Terkos (Also known as Durusu), Küçükçekmece and Büyükçekmece. The largest of which is Terkos located approximately 22km to the north of the Project.

10.4.29. The vegetative cover of the province is characteristic of the two contrasting climatic regions. To the north, the vegetation is characteristic of that of the Black Sea Region, while to the south the vegetation is more in keeping with that of the Marmara Region.

10.4.30. Cherries originated here, and are still grown in abundance, as are hazelnuts (filberts), of which Turkey supplies around 70%[168] of the world's requirements.

[167] Turley (2020). Istanbul: The Imperial Capital. Available at: https://www.goturkey.com/destinations/istanbul (Accessed 01/07/20).

[168] Turkey still dominates the world hazelnut industry, generally producing about 75%of the world's total. However, recent weather and disease issues affecting Turkey's crops have increased demand from the United States. (Food and Agriculture Organisation of the UN (2015). Available at: https://www.agmrc.org/commodities-products/nuts/hazelnuts and http://www.fao.org/3/x4484e/x4484e03.htm (Accessed 10/10/20)).

10.4.31. The province's landform is relatively of low altitude with gentle undulations. There are no mountain ranges of note associated within the province.

10.4.32. The province has a number of designations associated with it recognised at both a national and international level, including 25 nature parks, nationally important heritage assets; and part of the city of Istanbul itself being designated as a World Heritage Site. Nine of the nature parks are located upon its Anatolian Side, with the remaining 16 located within its European side.

10.4.33. These designations together contribute to local character and sense of place resulting in the area being a known tourist destination.

10.4.34. Within the study area itself there are a number of nationally recognised heritage assets. These are discussed in more detail within **Chapter 9: Cultural Heritage**. All remaining designations are located outside the study area and thus are not considered to be affected by the Project.

10.4.35. This landscape character is considered to have **High** sensitivity to change.

Landscape Character Area 3: Province of Tekirdag

10.4.36. This character area is located at the western side of Character Area 1 but contains only a small proportion of the Project and study area (from Chainage 73+500 to 76+800). The province of Tekirdag is famous for its sunflowers, meatballs (kofte) and alcoholic Raki[169].

10.4.37. The areas wide, open, flat, fertile soils dictate the areas dominant land use, with a large proportion of the countries sunflower and wheat production being produced within the province.

10.4.38. Tekirdag province lacks any natural lakes due to its topography, and the flat and rugged nature of the area, but Tekirdag does have a big commercial port on the Marmara Sea. The main rivers in Tekirdag province are: Ergene River, Corlu Stream, Hayrabolu Stream, Beşiktepe Stream and Muzalı Stream. The Project does not directly interact with any rivers located within the province of Tekirdag.

10.4.39. The character area includes a number of designations that contribute to sense of place including the Kartaltepe Nature Park, however no designations fall directly within the 1km study area, and they are therefore is not considered to be affected by the Project. This landscape character is considered to have **Moderate** sensitivity to change.

VISUAL AMENITY

10.4.40. For the purpose of this assessment, the study area for visual amenity has been defined as 1km on either side of the expropriation corridor. Whilst the Project may be discernible from areas outside the defined study area, significance of effects generally decreases with distance. As such in order to focus the assessment on those impacts likely to result in significant effects the study area for visual amenity has been set at 1km.

[169] All About Turkey (2020). Tekirdag: Region of Turkey. Available at: https://www.allaboutturkey.com/tekirdag.html (Accessed 01/07/20).

10.4.41. The following main visual receptor types have been identified within the study area:

- Static views observed by occupants of residential properties, encompassing individual and groups of properties;
- Static views from adjoining public open spaces, such as the Bahcesehir Golet Park;
- Static view from commercial / industrial properties; and
- Transient views along the existing transport network, including both road and rail users.

10.4.42. Due to the scale of the Project, an assessment of all visual receptors potentially affected by the Project is not considered proportionate or practical. As such, a sample of visual receptors from each of the visual receptor groups identified above are assessed as part of the Project in the form of representative viewpoints. A list of the representative viewpoints identified are described below.

VIEWPOINT LOCATIONS

10.4.43. The following 15 viewpoint locations have been identified along the length of the Project, representing both long- and short-range views and a range of different visual receptor groups.

10.4.44. The location of the viewpoint locations and direction of view are shown on **Figures 10-3** to **10-20**, as presented in **Appendix Q**.

Table 10-4 - Viewpoint Locations

No.	Viewpoint Name and approximate chainage	Sensitivity of Receptor	Description
1	View looking north-west from Canary Cemetery, at eastern end of Project towards Halkali Station. Approximate nearest chainage: 0+000	Visitors to the cemetery (Medium).	Illustrative view taken from within the terraced, tree lined cemetery. Filtered views of the surrounding densely populated residential development is perceivable through gaps in the tree line. Due to the elevated position of the receptor, the view of those neighbouring properties within the background of the view is predominantly of the terracotta rooftiles. Within the immediate foreground of the view are the graves, and their associated gravestones.
2	View looking in a south-westerly direction from Karaca Sokak (Sk), along the urban fringe of Yarimburgaz. Approximate nearest chainage: 3+000	Road users (Low). Nearby residential properties (High).	Representative of static views from nearby residential properties and transient views along Altinsehir Istanbul Caddesi (Cd) / Karaca Sokak (Sk) when looking in a westerly direction. The nature of the existing view is predominantly of the open water body referred to as Küçükçekmece Golu. Within the midground of the view, periodic views of those trains using the existing railway line are discernible. Within the background of the view, residential and commercial properties located on the western shore and hill side are discernible, including multiple multi-storey high-rise premises, providing a contrast to the open foreground of the view. From here long-distance views up to 16km away are discernible.
3	View looking in a north-westerly direction from the southern end of Sumbul Sokak (Sk) within the Firuzkoy Neighbourhood. Approximate nearest chainage: 5+000	Nearby residential properties (High).	The nature of the existing view is predominantly urban, with high rise residential properties dominating the view. There are a number of detracting features discernible within the view including pylons and overhead power lines, with limited vegetative cover. Short range views only are attainable from this location due to the frequency of intervening features.
4	View looking in a south-westerly direction from unnamed gravel road towards the offline section of the Project (where the Project deviates from the route of the existing railway). Approximate nearest chainage: 6+000	Representative of nearby residential properties (High).	The nature of the existing view is one of an enclosed landscape with built form dominating the view on either side of a linear belt of open rough ground. To the right of the view, high rise multi-storey premises dominate the skyline, while to the left, premises densely populate the inclining land (hillside). Within the midground of the view, the existing infrastructure of the existing railway is discernible.
5	View looking east from Bahcesehir Golet Park. Approximate nearest chainage: 9+500	Users of the public open space (Medium).	An enclosed view from within the area of public open space. The viewpoint is representative of an illustrative view from within the public open space looking in the direction of the existing railway, that runs along its eastern perimeter. Subject to the distance of separation between the receptor and the railway, the nature of the existing view is predominantly going to be of the park itself. When viewed from areas within the park, along the eastern edge, filtered views of the railway are likely to be perceivable, with its visual influence becoming more pronounced during the winter months when the trees are not in leaf.
6	View looking in a north-westerly direction from pedestrian footpath to the east of Vali Recep Yazicioglu Cd. Approximate nearest chainage: 9+300	Representative of adjacent residential properties (High). Road users (Low). Pedestrian footpath users (High).	The nature of the existing view is representative of those transient views encountered when looking in a westerly direction. Within the immediate foreground of the view is the Vali Recep Yazicioglu Cd. The existing railway is located within the midground of the view, partially screened from view by those trees located within the grass verge on either side of the carriageway. Within the background of the view the tree canopies of trees located within Bahcesehir Gölet Park area are prominent, partially screening views of the development beyond. In this instance due to the prominence of vehicular movement within the foreground of the view, it is considered that the visual influence of trains along the existing railway will be less discernible then elsewhere along the Project.
7	View looking west from Hürmet Sokak (Sk) representative of residential properties at Deliklikaya. Approximate nearest chainage: 15+500	Representative of nearby residential properties (High).	The nature of the existing view is of an undulating undeveloped landscape of predominantly pastural fields with scattered blocks of woodland on the opposing hillside. Due to the areas topography it is not anticipated that views of the existing railway are discernible from this location. To the far right of the view, distant views of the built form of Omerli is discernible. Similarly, to the left of the view distant views of development associated with Kirackoy, is discernible.
8	View looking north-east from unnamed road towards offline section of the Project. Approximate nearest chainage: 20+500	Road users (Low). Nearby residential properties (High).	Viewpoint representative of transient easterly views from unnamed road. The nature of the existing view is predominantly of the open undulating pastural landscape, with mid to long distance views of the settlement of Yeşilbayir, discernible along the crest of the hillside (horizon). Views of the existing railway are not discernible from this location. Detracting features within the immediate foreground of the view include telegraph poles on either side of the road.

No.	Viewpoint Name and approximate chainage	Sensitivity of Receptor	Description
9	View looking north-west from unnamed road towards section of the Project. Approximate nearest chainage: 20+500	Road users (Low). Nearby residential properties (High).	Viewpoint representative of transient westerly views from unnamed road. The nature of the existing view is similar to that of Viewpoint 8, however it is considered to be less developed. Along the horizon line a wind farm is discernible, although views of the existing railway are not discernible from this location. Detracting features within the immediate foreground of the view include telegraph poles on either side of the road.
10	View looking south-west from Suleyman Bingol Cd towards the Project. Approximate nearest chainage: 31+000	Representative of nearby residential properties (High).	Viewpoint representative of that from nearby residential properties. The nature of the existing view is of a predominately low lying, undeveloped, flat landscape. Within the view, the land use is a mix of both pastural and arable farming. Within the far distance of the view, the surrounding undulating landscape to the south is prominent. The existing railway is discernible within the mid ground of the view.
11	View looking south to south-east between Berfin Street and Büyükkarıştıran Creek. Approximate nearest chainage: 42+200	Road users (Low). Nearby residential properties (High).	Viewpoint representative of transient views along the existing Berfin Street and adjacent residential properties (approximately 15 single-storey detached properties). The nature of the existing view is predominantly of scrub and tree cover, with clear views across the existing Büyükkarıştıran Creek railway crossing along the less-vegetated stream corridor. Pylons and the existing railway in the middle distance traverse through the landscape, albeit screened to the south-west and south-east by scrub vegetation. Busy traffic along the Akören-İnceğiz Road was clearly audible, detracting from the character of the view.
12	View looking south-east from Akincik Sk, along the eastern edge of Bekirli. Approximate nearest chainage: 50+000	Representative of adjacent residential properties (High).	Viewpoint representative of views from nearby residential properties. From here far reaching views to the east and south are discernible, looking across rolling hills. Development within the view is scattered with the dominant land use being a combination of both pastural and arable farming scattered with settlements, isolated farmsteads, access tracks and small copses of trees. Within the midground of the view, a wind farm is clearly discernible on the skyline. Overall the character of the view is tranquil, birdsong was the predominant noise at time of survey accompanying the panoramic view down the valley.
13	View looking west from Okul Cd along the western edge of Sinekli. Approximate nearest chainage: 61+000	Representative of nearby residential properties (High). Road users (low).	Viewpoint representative of transient views along nearby roads, and nearby residential properties. Views of the existing railway are partially screened from view by an intervening narrow belt of vegetation. Views of the railway will be more pronounced during the winter months when the trees are not in leaf. The nature of the view is restricted to short range only due to intervening vegetation and topography.
14	View looking north from Çayırdere Road. Approximate nearest chainage: 68+100	Road users (Low).	Viewpoint representative of transient views along nearby roads. The nature of the existing view is dominated by the existing railway, unvegetated earthworks, highway and a derelict station building to the left of the view. The highway/existing railway level crossing is visible to the right of the view. Woodland planting crosses the landscape in the middle distance, largely screening all longer distance views of the wider countryside beyond.
15	View looking north-east from Beyciler yolu towards the western end of the Project. Approximate nearest chainage: 71+500	Road users (Low).	The nature of the existing view is of undeveloped open, rough grassland. It is a predominantly flat landscape with little to no variation on landform. There is little to no discernible built form beyond that of the existing road within the view. Detracting features within the immediate foreground include telegraph poles on either side of the road at this location.

10.5 POTENTIAL IMPACTS AND EFFECTS

10.5.1. The section outlines potential impacts in relation to landscape character and visual amenity, during the construction and operational phases of the Project, in the absence of any proposed mitigation. A full description of the Project can be found within **Chapter 2: Description of the Project**.

10.5.2. Construction impacts are expected to last for a maximum duration of 5 years with works commencing in 2021 and the Project becoming operational in 2026. A detailed construction programme will be prepared by the appointed Contractor.

IMPACTS ON LANDSCAPE CHARACTER

Construction Phase

10.5.3. The following impacts are anticipated during construction:

- Loss of existing vegetation to facilitate the construction of both the online and offline section of the Project– for the purpose of this assessment the main areas of vegetation loss (woodland / scrub) have been identified at the following chainages:
  - 21+350 – 21+650 (woodland / tree loss);
  - 23+850 – 24+000 (woodland / tree loss);
  - 24+700 – 25+050 (woodland / tree loss);
  - 26+800 – 27+350 (woodland / tree loss);
  - 28+850 – 29+100 (scrub / tree loss);
  - 31+700 – 32+000 (scrub / tree loss);
  - 36+150 – 37+150 (woodland / tree loss);
  - 38+400 – 38+600 (woodland / tree loss);
  - 39+400 – 42+300 (woodland / tree loss);
  - 42+700 – 43+200 (woodland / tree loss);
  - 44+300 – 45+300 (scattered tree lines / tree loss);
  - 46+400 – 48+100 (woodland /scattered tree lines / tree loss);
  - 51+600 – 69+650 (scrub / tree loss);
  - 74+650 – 75+200 (scrub / tree loss).
- Temporary change to the local topography as a result of the stockpiling (maximum height of stockpiles 5m);
- Demolition of properties along the Project– for the purposes of this assessment it is assumed that all properties within the expropriation corridor will be demolished, in order to represent a worst-case scenario. The expropriation corridor includes both the 50m railway corridor for the Project and the wider areas of permanent land required (such as embankments and cuttings) for the Project. The expropriation corridor excludes any land required for construction compounds or construction access roads and such assumptions have been made regarding these in **Chapter 2: Description of the Project**;
- Temporary change to the land use in order to accommodate the three proposed construction compounds, provisionally located near Kabakca, Halkali and Cerkezkoy respectively. The construction compounds are anticipated to cover an area of between 5,000 – 9000m² at each location; and

- Alterations to 3 existing stations along the Project identified as Halkali Station, Ispartakule Station, and Catalca Station. The works will predominantly be limited to the provision of footbridges, platforms and additional tracks, with no work proposed to the buildings themselves[170].

Operational Phase

10.5.4. The following impacts are anticipated during operation:

- Permanent change to the nature of the landscape directly within the footprint of the Project. The railway corridor itself will form a 50m wide corridor (25m either side of the centreline) which will accommodate infrastructure associated with the electrification of the track;
- Permanent modifications to existing landform (cuttings and embankments). The most notable of these are the substantial embankments identified at the following chainages:
  - Chainage 36+199 – 37+095 (maximum height 16.5m above existing);
  - Chainage 39+553 – 40+889 (maximum height 12.5m above existing);
  - Chainage 46+175 – 47+440 (maximum height 17.5m above existing);
  - Chainage 47+700 – 48+645 (maximum height 10m above existing);
  - Chainage 49+270 – 50+086 (maximum height 16m above existing);
  - Chainage 51+469 – 53+275 (maximum height 23.4m above existing);
  - Chainage 54+110 – 55+400 (maximum height 10m above existing); and
  - Chainage 70+800 – 72+200 (maximum height 16.5m above existing).
- Where cutting slopes are indicated, they appear shallower (i.e. smaller landform alteration) than that of the embankments, with the average height being 2.5m or less. The exception to this are cutting slopes at the following four locations:
  - Chainage 38+400 with a maximum height of 5m;
  - Chainage 48+927 with a maximum height of 5m;
  - Chainage 56+200 with a maximum height of 12.5m; and
  - Chainage 56+420 with a maximum height of 5.8m.
- Addition of a number of permanent built structures within the landscape, including: 2 viaducts, 9 bridges, 17 overpasses and 26 underpasses.

IMPACTS ON VISUAL AMENITY

Construction Phase

10.5.5. The following impacts are anticipated during operation:

- Temporary visual awareness of the 3 construction compounds, provisionally located near Kabakca, Halkali and Cerkezkoy, including the temporary stockpiling of material to a maximum height of 5m;

[170] The buildings are considered to be historic assets, therefore ensuring their preservation retains local character and sense of place.

- Opening up of views, following vegetation clearance in order to facilitate the construction of the Project;
- Temporary visual awareness of the construction activities associated with the construction of the Project, but in particular the construction of the two viaducts, nine bridges, seventeen overpasses and 26 underpasses will be particularly noticeable, including the visual awareness of large machinery, usually with flashing lights; and
- Temporary visual awareness of construction activities associated with the tunnel construction. The following methods of construction are currently proposed in relation to the construction of the eight tunnels, as described in **Chapter 2** and **Figure 2-10**:

  - Tunnel Boring Machine (twin bore tunnel under the Kanal Istanbul) – used to excavate tunnels with a circular cross section through a variety of soil and rock strata. They have a rotating cutting wheel, which breaks the soil and rock. The material is then transferred to the rear of the machine for removal. The tunnel is lined with precast concrete segments and a launching shaft and retrieval shaft must be excavated either end of the tunnel;
  - Cut and cover tunnels – the approach involves digging a trench, the construction of a tunnel, and then returning the surface to its original state. It is an economical construction technique that is typically reserved for relatively shallow tunnels (those with a depth of approximately 20m or less); and
  - The New Austrian Tunneling Method (NATM) Tunnels – the approach involves the excavation of sections of material, followed by the application of a sprayed concrete lining for the excavated section. The section is then reinforced with steel grids before having a further application of sprayed concrete.

10.5.6. The NATM, also known as the sequential excavation method (SEM) or sprayed concrete lining method (SCL),

10.5.7. The greatest visual impacts are likely to be associated with the cut and cover tunnel approach due to greatest alteration to above-ground features. Example tunnel drawings are provided in **Chapter 2: Description of the Project**.

Operational Phase

- Permanent alternation to the nature of the existing view through the inclusion of prominent structures including:

  - 2 viaducts (with maximum heights of 28.9m and 39.97m);
  - 9 bridges;
  - 17 overpasses;
  - 26 underpasses;
  - Fencing, that is between 1.5 and 2m in height, will be provided in the expropriation corridor, along the length of the Project as described in **Chapter 2: Description of the Project**. Additional poles with coloured ribbon/tape will be installed in areas where there is a high potential for bird collisions, as described in **Chapter 8: Ecology**;
  - 1-3m high acoustic barriers along sections of the Project (primarily 1m height barriers with 3 short sections at 2m or 3m) as follows:

    - Kaleici (south of the track Ch 33+800 – 34+000) – Height 3m;
    - Kaleici (south of the track Ch 34+600 – 34+900) – Height 3m;

- Kaleici (south of the track Ch 34+900 – 35+450) – Height 1m;
- Kaleici (north of the track Ch 34+680 – 34+900) – Height 2m;
- Gökçeali (north of the track Ch 37+970 – 38+250) – Height 1m; and
- Istasyon (north of the track Ch 75+750 – 76+600) – Height 1m.

- The linear corridor of the railway itself;

- Where tunnels are proposed, only the access and egress points will be visually discernible at operation - all below ground structures will be screened, resulting in no perceivable change to the nature of the view for much of the tunnel length;
- Permanent visual awareness of above ground structure along the length of the Project associated with the electrification of the track, height of vertical structures (Catenary posts) assessed as 6m;
- Works at 3 existing stations along the Project identified as Halkali Station, Ispartakule Station, and Catalca Station. The works will predominantly be limited to the provision of footbridges, platforms and additional tracks, there will be no work to the station buildings themselves[171].
- Increased visual awareness of disturbance from passenger and freight train movements within the view, following an approximately 80% increase in line usage. It is estimated that the maximum number of trains utilising the line by 2041 (15 years after the opening year) will be 18 passenger and 5 freight trains between Halkali – Catalca and 18 passenger and 12 freight trains between Catalca – Cerkezkoy; and
- Perceivable change to the landform, at the following locations following the permanent presence of terraced landforms (embankments):

  - Chainage 36+199 – 37+095 (maximum height 16.5m, above existing);
  - Chainage 39+553 – 40+889 (maximum height 12.5m, above existing);
  - Chainage 46+175 – 47+440 (maximum height 17.5m, above existing);
  - Chainage 47+700 – 48+645 (maximum height 10m, above existing);
  - Chainage 49+270 – 50+086 (maximum height 16m, above existing);
  - Chainage 51+469 – 53+275 (maximum height 23.4m, above existing);
  - Chainage 54+110 – 55+400 (maximum height 10m, above existing); and
  - Chainage 70+800 – 72+200 (maximum height 16.5m, above existing).

EFFECTS ON LANDSCAPE CHARACTER

10.5.8. The Project will result in direct impacts to all three local landscape character areas. The Project will result in a permanent change to the character of the landscape through the addition of a new, permanent liner feature.

10.5.9. The Project, for the most part, closely follows the alignment of the existing railway. This reduces the magnitude of change and impact on surrounding receptors as the new railway would be seen in the context of the existing railway and its infrastructure (rather than as new, detracting features). In these locations, the Project is not anticipated to be at odds with the existing landscape character.

[171] The buildings are considered to be historic assets, therefore ensuring their preservation retains local character and sense of place.

10.5.10. Where sections are offline (at a distance from the existing railway), the Project passes in close proximity to other built forms, including settlements, industrial buildings and other linear features, such as roads. This has reduced the potential for the severance of otherwise large, unbroken expanses of open countryside. Furthermore, the inclusion of tunnels in the design has reduced the magnitude of change to the landscape character, by reducing the amount of above ground structures and visually discernible sections of railway.

10.5.11. The Project will however result in the loss of large sections of established vegetation, particularly at the western end of the Project, resulting in habitat loss and noticeable changes to the local landscape character.

10.5.12. At a Local Landscape Character level, the Project will result in a measurable alteration to one or more features and elements associated with Landscape Character Areas 1 and 2, which will result in a permanent change to the nature of the landscape. While the Project is perceived to be similar in nature to other features in the Landscape Character Areas, it will result in perceivable changes to topography at several locations. Furthermore, the Project will result in the erosion of the green fields and rural character along a linear corridor, due to the movement of trains and introduction of above ground structures in the form of catenary posts, bridges, viaducts, underpasses and overpasses. The magnitude of change will be at its greatest / most noticeable during the construction phase of the works and prior to any landscape planting becoming established on the reprofiled earthworks.

10.5.13. The magnitude of change associated with Landscape Character Area 3 is not considered to result in a detrimental alteration to the character of the landscape, due to its relatively short length (only 3km) and its location within a predominantly built up area that has already undergone a high-level of change and disturbance.

10.5.14. Overall the Project is perceived to have a moderate magnitude of change on Landscape Character Area 2 and a slight magnitude of change on Landscape Character Areas 1 and 3, during both phases of the works, resulting in the following effects:

- Landscape Character Area 1: Marmara – There would be a Slight magnitude of impact on a receptor of Very High sensitivity, resulting in the potential for **Minor Adverse (not significant)** effects;
- Landscape Character Area 2: Province of Istanbul – There would be a Moderate magnitude of impact on a receptor of High sensitivity, resulting in the potential for **Moderate / Large Adverse (significant)** effects; and
- Landscape Character Area 3: Province of Tekirday – There would be a Slight magnitude of impact on a receptor of Medium sensitivity, resulting in the potential for **Negligible (not significant)** effects.

EFFECTS ON VISUAL AMENITY

10.5.15. At the eastern end of the Project, where the Project closely follows the alignment of the existing railway, the effects are considered to be reduced in comparison to those sections of the Project that are offline.

10.5.16. Where the Project is located within tunnels, only those tunnels constructed using the cut and cover approach are considered to result in a visual awareness of the construction activities themselves (although movement of plant to / from all tunnelling sites will be discernible). Following construction,

it is assumed that there will be no visual effects upon the receiving environment, with all structures being concealed below ground.

10.5.17. It is anticipated that the greatest visual effects will occur where the Project passes in close proximity to residential areas, and therefore the separation distance between the sensitive receptor and the impact are reduced. Those settlements and residential properties most significantly affected will include Omerli (properties on the southern side); Yesibayir (all properties); Kabakca (properties on the southern side); Akoren (properties along the northern edge and scattered farmsteads); and at Bekirli (all properties). The locations of these settlements are shown on Figures 10-3 to 10-20, as presented in **Appendix Q**.

10.5.18. Where the Project is offline, the most significant effects are attributed to the inclusion of permanent above ground structures including: nine bridges, and two viaducts and substantial areas of ground reprofiling (cutting and embankments).

10.5.19. The construction phase will result in the demolition of a number of residential properties and other above ground structures, and the earthworks (as detailed in **RAP**) will result in a significant perceptual change to the landform within the affected area, and in some instances obstruct views of the wider countryside beyond.

10.5.20. Where the Project is in a cutting, visual awareness of passing passenger and freight trains will still be discernible from nearby visual receptors, due to the height of the cuttings being less than the height of the trains themselves, but the overall magnitude of impact will be reduced compared to the visual intrusion of trains located at ground level, or on an embankment. The cuttings will provide limited screening potential of the associated railway infrastructure itself, including the visual prominence of the catenary posts and the track. There are some locations where the cuttings provide screening of the full height of the trains, namely at chainages 38+400; 48+927; 56+200 and 56+420, where the height of the cutting slope is: 5m, 5m, 12.6m and 5.8m respectively.

10.5.21. In all instances, the visual effects are considered to be at their greatest during the construction phase of the Project. Following construction, the Project will largely be perceived as an alteration to an existing feature within the view (where the Project is closely follows the existing railway) reducing the significance of effect. Elsewhere, the Project will be perceived as a new and generally detracting feature within the view.

10.5.22. The effects of the Project on the receptor groups identified are summarised through the assessment of the 15 viewpoints below.

Viewpoints

Viewpoint 1 (view looking north-west from Canary Cemetery, at eastern end of Project towards Halkali Station, approximate nearest chainage 0+000)

10.5.23. There will be no perceivable change to the nature of the view from this location as a result of the Project during either the construction or operational phases. The Project is screened from view by the topography and intervening features including built form, and the heavily wooded nature of the cemetery itself. Visitors to the cemetery will therefore not be greatly impacted by the Project, as summarised in **Table 10-5**.

Table 10-5 - Viewpoint 1 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	Medium (visitors to the cemetery)	No Change	Neutral (not significant)
Operation	Medium (visitors to the cemetery)	No Change	Neutral (not significant)

10.5.24. **Appendix Q**, **Figure 10-21** and **Figure 10-36** provide the supporting photography for this viewpoint.

Viewpoint 2 (view looking in a south - westerly direction from Karaca Sk, along the urban fringe of Yarimburgaz, approximate nearest chainage 3+000)

10.5.25. The view is representative of static views from nearby properties within the urban fringe of Yarimburgaz, and transient views from the nearby road network. From here, there will be visual awareness of the construction phase of the works.

10.5.26. During the construction phase, residential properties on either side of the Project are likely to be aware of the construction works due to the visual presence of machinery and the proposed location of the construction compound near Halkali. It is anticipated that the machinery will be concentrated within a localised area at the entrance to the tunnel, thus reducing the magnitude of the impact, and number of visual receptors affected. Those residential properties considered to be most affected by the Project are those located along Rifat Ilgaz Cd.

10.5.27. Following construction, it is not anticipated that the nature of the view will be affected due to the Project and associated infrastructure being screened from view, below ground (tunnel). Where the Project is above ground immediately to the north of Halkali Station, the railway and associated infrastructure will be located to the west of the existing railway. It will therefore be perceived as an extension to an existing feature, reducing the magnitude of change. The assessment is summarised in **Table 10-6**.

Table 10-6 - Viewpoint 2 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (Residential properties) and Low (road users)	Slight (residential receptors and road users)	**Minor Adverse (not significant)** (Residential properties) and **Negligible Adverse (not significant)** (road users)
Operation	High (Residential properties) and Low (road users)	No Change (residential receptors and road users)	**Neutral (not significant)** (residential receptors and road users)

10.5.28. **Appendix Q**, **Figure 10-22** and **Figure 10-36** provide the supporting photography for this viewpoint.

Viewpoint 3 (view looking in a north-westerly direction from the southern end of Sumbul Sokak (Sk) within the Firuzkoy Neighbourhood, approximate nearest chainage 5+000)

10.5.29. The view at this location is representative of views from nearby residential properties. Along this section the Project is concealed below ground within a tunnel. Due to the method of construction it is not considered that there will be any perceivable visual awareness of either the construction or operational phase of the works from this location. The assessment is summarised in **Table 10-7**.

Table 10-7 - Viewpoint 3 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties)	No Change	**Neutral (not significant)**
Operation	High (residential properties)	No Change	**Neutral (not significant)**

10.5.30. **Appendix Q**, **Figure 10-23** and **Figure 10-37** provide the supporting photography for this viewpoint.

Viewpoint 4 (view looking in a south-westerly direction from unnamed gravel road towards the offline section of the Project, approximate nearest chainage 6+000)

10.5.31. The nature of this view is representative of views from nearby residential properties. There will be a visual awareness of the construction phase, as the Project emerges above ground. Due to the open nature of the view, the construction phase will be prominent, although temporary in nature. The proposed method of construction for the tunnel between chainage 6+678 - 7+041, to the left of the view, will be via the cut and cover methodology resulting in a significant visual disturbance within the view during the construction phase.

10.5.32. Following construction, the northern end of the tunnel will be discernible in the view, where the Project continues above ground. At this location the Project is offline, to the west of the existing railway. The magnitude of change in this location will be reduced due to the presence of the existing railway within the view but it will increase the visual presence of detracting features within it, in addition to the frequency of visual disturbance from the trains themselves. The assessment is summarised in **Table 10-8**.

Table 10-8 - Viewpoint 4 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties)	Moderate	**Moderate Adverse (significant)**
Operation	High (residential properties)	Slight	**Minor Adverse (not significant)**

10.5.33. **Appendix Q**, **Figure 10-24** and **10-37** provide the supporting photography for this viewpoint.

Viewpoint 5 (view looking east from Bahcesehir Golet Park, approximate nearest chainage 9+500)

10.5.34. The nature of this view is representative of views from within the public open space. To the east of the main waterbody, filtered views of the existing railway are discernible through the heavily wooded parkland environment.

10.5.35. Along this section of the Project the alignment follows the existing railway, and as such the construction phase of the works will increase the visual influence of the existing railway within view. It will emphasise its visual presence through the inclusion of temporary construction machinery, and the clearance of screen planting along the western edge of the existing railway in order to facilitate the construction works.

10.5.36. Following construction, the online widening associated with the Project will be perceived as an alteration to the existing railway, thus reducing the magnitude of change.

10.5.37. The visual influence of both the existing and Project increases as the distance of separation between the receptor and the railway decreases. Furthermore, during the winter months, the visibility of the Project will be temporarily increased when the trees within the park itself are not in leaf. The assessment is summarised in **Table 10-9.**

Table 10-9 - Viewpoint 5 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	Medium (users of the public open space)	Slight	**Minor Adverse (not significant)**
Operation	Medium (users of the public open space)	Slight	**Negligible (not significant)**

10.5.38. **Appendix Q**, **Figure 10-25** and **Figure 10-38** provide the supporting photography for this viewpoint.

Viewpoint 6 (view looking in a north-westerly direction from pedestrian footpath to the east of Vali Recap Yazicioglu Cd, approximate nearest chainage 9+300)

10.5.39. This view is representative of nearby residential properties and users of the public highway and associated footpaths. This section of the Project is online and to the west of the existing railway. It will therefore be set further back from the visual receptors than the existing railway, partially screened from view.

10.5.40. During the construction phase of the works visual awareness of the construction activities will be clearly discernible in the view. Following construction, the Project will be perceived as an alteration to the existing railway and thus the magnitude of change will be decreased. However, temporary visual disturbance by trains utilising the route will be increased as a result of the Project. The assessment is summarised in **Table 10-10**.

Table 10-10 - Viewpoint 6 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties and footpath users) and Low (road users)	Slight (residential properties, footpath users and road users)	**Minor Adverse (not significant)** (all receptors)
Operation	High (residential properties and footpath users) and Low (road users)	Slight (residential properties, footpath users and road users)	**Negligible Adverse (not significant)** (all receptors)

10.5.41. **Appendix Q**, **Figures 10-26** and **Figure 10-38** provide the supporting photography for this viewpoint.

Viewpoint 7 (view looking west from Hurmet Sokak (Sk) representative of residential properties at Deliklikaya, approximate nearest chainage 15+500)

10.5.42. This view is representative of nearby residential properties to the east and long-distance views from those high-rise residential / commercial properties to the west. The Project is offline along this section; however, it closely follows the alignment of the existing railway to its east. Due to the topography, visual awareness of the construction phase of the works will be minimal from this location. It is not considered that the construction machinery will be significantly more visually prominent within the view than the existing vehicle movement along the existing public highway.

10.5.43. Following construction, visual awareness of the above ground catenary posts will be discernible in the view, similar in nature to that of the lighting columns along the existing highway. As such the magnitude of the impact will be reduced, as detracting features are already present within the view. **Appendix Q**, **Figure 10-44** provides an illustrative representation of the change to the nature of the view post construction. At this location, the visual disturbance from the increase in rail usage during operation will not have an impact on the view, due to the frequency of vehicular movement already discernible along the existing public highway. The assessment is summarised in **Table 10-11**.

Table 10-11 - Viewpoint 7 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties)	Slight	**Minor Adverse (not significant)**
Operation	High (residential properties)	Slight	**Negligible Adverse (not significant)**

10.5.44. **Appendix Q**, **Figures 10-27** and **Figure 10-39** provide the supporting photography for this viewpoint.

Viewpoint 8 (view looking north-east from unnamed road towards offline section of the Project, approximate nearest chainage 20+500)

10.5.45. This view is representative of views from nearby residential properties to the north, associated with the settlement of Yesibayir, and scattered isolated farmsteads to the south. The Project is offline along this section, traversing through open undulating countryside. As such visual awareness of the construction phase will be far reaching. Construction activities will be more intensive and more visually intrusive than elsewhere, with substantial reprofiling of the existing topography taking place.

10.5.46. Following construction, the nature of the view will permanently change, with a prominent linear feature being present within the view. It will dissect formally wide-open arable fields, where the railway emerges from underground, on embankment. The change of topography will emphasise the visual presence of the feature within the view, including the punctuation of the skyline with the catenary posts. The magnitude of change will be reduced however from those residential properties to the south, due to the visual presence of detracting features within the background of the existing view from this location. From Yesibayir itself, the Project will alter the horizon line, when looking in a south-westerly direction.

10.5.47. The Project will introduce additional visual distance to the nature of the view not previously experienced, through the periodic usage of the railway by trains, throughout the day and the presence of infrastructure. Those residential receptors most significantly affected by both phases of the works include properties located along the southern edge of Yesibayir whose property boundaries are immediately adjacent to the extent of the Project.

10.5.48. **Appendix Q**, **Figure 10-45** provides an illustrative representation of the change to the nature of the view from this location, when viewed from the road or nearby properties. The assessment is summarised in **Table 10-12**.

Table 10-12 - Viewpoint 8 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties) and Low (road users)	Large (residential properties) and Moderate (road users	**Large Adverse (significant)** (residential properties) and **Minor Adverse (not significant)** (road users)
Operation	High (residential properties) and Low (road users)	Large (residential properties) and Moderate (road users	**Large Adverse (significant)** (residential properties) and **Minor Adverse (not significant)** (road users)

10.5.49. **Appendix Q**, **Figure 10-28** and **Figure 10-39** provide the supporting photography for this viewpoint.

Viewpoint 9 (view looking north-west from unnamed road towards offline section of the Project, approximate nearest chainage 20+500)

10.5.50. The view is representative of the same visual receptors as Viewpoint 8 but looking in a different direction towards the Project. From here the visual awareness of the construction phase of the work from residential properties in Yesilbayir will be slightly reduced in comparison to that of Viewpoint 8. This is due to the increased separation distance, with the Project transecting an area of established woodland, partially screening views of the Project, increasing the separation distance between the source of the impact and the receptors. However, from the south, the visual awareness of the Project will remain unchanged due to the residential properties being located on a localised highpoint, directly overlooking this section of the Project.

10.5.51. While substantial vegetation clearance works will be carried out within the area in order to facilitate the construction of the Project, it is anticipated that large sections of existing woodland will be retained. As such views of the construction phase of the works will be screened from view from those nearby residential properties to the north and east.

10.5.52. Along this section of the Project, the main construction impact will be associated with the visual awareness of the construction of the tunnel. The method of tunnel construction here will be a combination of cut and cover and NATM, between chainages 21+080 – 21+440 and 21+440 – 21+905 respectively. The method of construction will result in an enhanced visual awareness of construction activities taking place at a local level.

10.5.53. Following construction, visual awareness of the railway itself will be screened from view below ground, with only those structures above ground discernible within the view. This includes the tunnel entrance and exit, associated infrastructure where the Project transects existing road corridors, and proposed earthworks. The Project will result in a permanent change to the nature of the topography within the affected area, with the addition of notable terraces. The assessment is summarised in **Table 10-13**.

Table 10-13 - Viewpoint 9 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties) and Low (road users)	Moderate (residential properties and road users)	**Moderate Adverse (significant)** (residential properties) **and Minor Adverse (not significant)** (road users)
Operation	High (residential properties) and Low (road users)	Moderate (residential properties and road users)	**Moderate Adverse (significant)** (residential properties) **and Minor Adverse (not significant)** (road users)

10.5.54. **Appendix Q**, **Figure 10-29** and **Figure 10-40** provide the supporting photography for this viewpoint.

Viewpoint 10 (view looking south-west from Suleyman Bingol Cd towards the Project, approximate nearest chainage 31+000)

10.5.55. This view is representative of nearby residential properties. Visual awareness of the construction phase of works is likely from this location, due to the lack of intervening features between the Project and the visual receptors, beyond that of the existing railway. While detracting features are noted within the background of the existing view as well as the existing railway, the construction phase of the works will temporarily add to the detracting nature of the view and increase the visual awareness of disturbance within the mid ground of the view.

10.5.56. During operation, the Project will be perceived from this distance as an extension to an existing feature within the view, reducing the magnitude of change. The assessment is summarised in **Table 10-14**.

Table 10-14 - Viewpoint 10 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties)	Slight	**Minor Adverse (not significant)**
Operation	High (residential properties)	Slight	**Negligible (not significant)**

10.5.57. **Appendix Q**, **Figure 10-30** and **Figure 10-40** provide the supporting photography for this viewpoint.

Viewpoint 11 (view looking south to south-east between Berfin Street and Büyükkarıştıran Creek, approximate nearest chainage 42+200)

10.5.58. The view from this location is representative of views from the road and nearby residential properties (elevated greater than 6m above the existing railway). During construction, visual awareness of the construction activities associated with the construction of the offline section of railway and bridge (between chainage 42+100 and 42+246) will be discernible from all receptors, although at a largely oblique angle of view. The construction of the bridge itself, as well as the railway at this location will require localised vegetation clearance and earthworks, opening up some views to the south-east. Construction of the off-line section of the Project and highway diversions will also be visible in views south and result in vegetation clearance, although the main belt of vegetation separating the construction activities from the residential properties will largely remain.

10.5.59. During operation, the bridge will have permanently changed the nature of the view from nearby residential receptors, due to it being a maximum of 11.17m in height. While some screen planting along the curtilage of the nearby residential properties will be retained, providing limited screening from the railway as it travels at ground level, the height of the bridge will still be discernible above the canopy of the trees. Movement of trains are also likely to be discernible in winter through existing vegetation on the approaches (on an embankment) to the bridge.

10.5.60. Where sections in this location are in shallow cutting (where it passes to the south of the existing railway), the visual influence of the Project will be slightly reduced when viewed from the road or at

ground level. Visual awareness of passing trains will still be discernible however due to the depth of the cutting slopes being less than the height of the trains. Railway infrastructure will also remain visible. The assessment is summarised in **Table 10-15**.

Table 10-15 - Viewpoint 11 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties) and Low (road users)	Moderate (residential properties and road users)	**Moderate Adverse (significant)** (residential properties) and **Minor Adverse (not significant)** (road users)
Operation	High (residential properties) and Low (road users)	Moderate (residential properties and road users)	**Moderate Adverse (significant)** (residential properties) and **Negligible Adverse (not significant)** (road users)

10.5.61. **Appendix Q**, **Figure 10-31** and **Figure 10-41** provide the supporting photography for this viewpoint.

Viewpoint 12 (view looking south-east from Akincik Sk, along the eastern edge of Bekirli, approximate nearest chainage 50+000)

10.5.62. This view is representative of residential receptors at Bekirli. Due to the settlements elevated location, long distance views to the south are discernible from this location. This includes views of the wide-open valley bottom and the Project.

10.5.63. Given the height and potential visual intrusion of the three significant structures in this locality (2 viaducts and a cut and cover tunnel), a series of initial 'viewsheds' were generated using Google Earth software to provide an indication of the visibility of the three structures in the vicinity of this viewpoint. The three resulting viewsheds show that all three structures are likely to be visible in the surrounding landscape, although contained to relatively nearby topographical high points.

10.5.64. The following three viewshed images indicate the potential area of visibility (the 'visual envelope') of each of the three main constructed structures in the locality of the viewpoint. The areas of lime green indicate where the structure is likely to be visible from (not taking into consideration any vegetation). In the case of the cut and cover tunnel, although trains will be hidden during operation, extensive changes to topography will be noticeable.

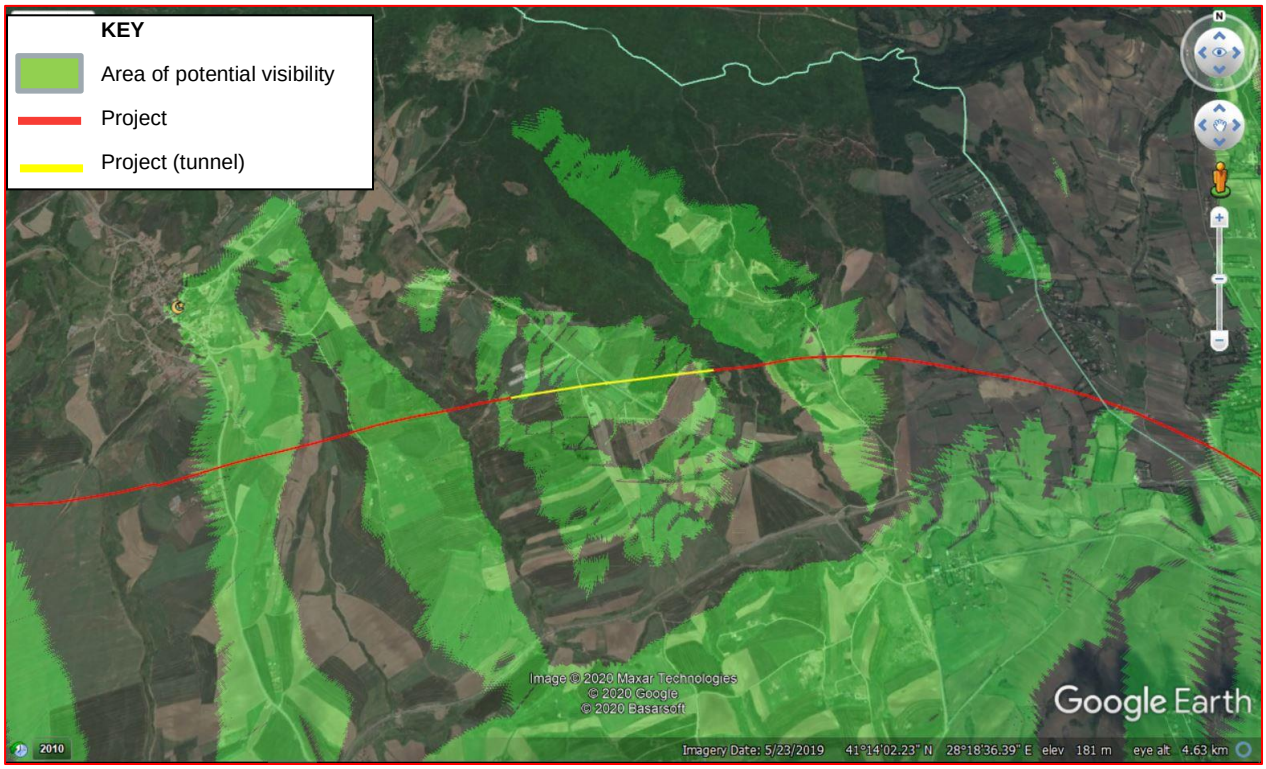

Plate 10-1 – Viewshed of Cut and Cover Tunnel Change in Earthworks at Operation (Chainage 47+700 – 48+650)

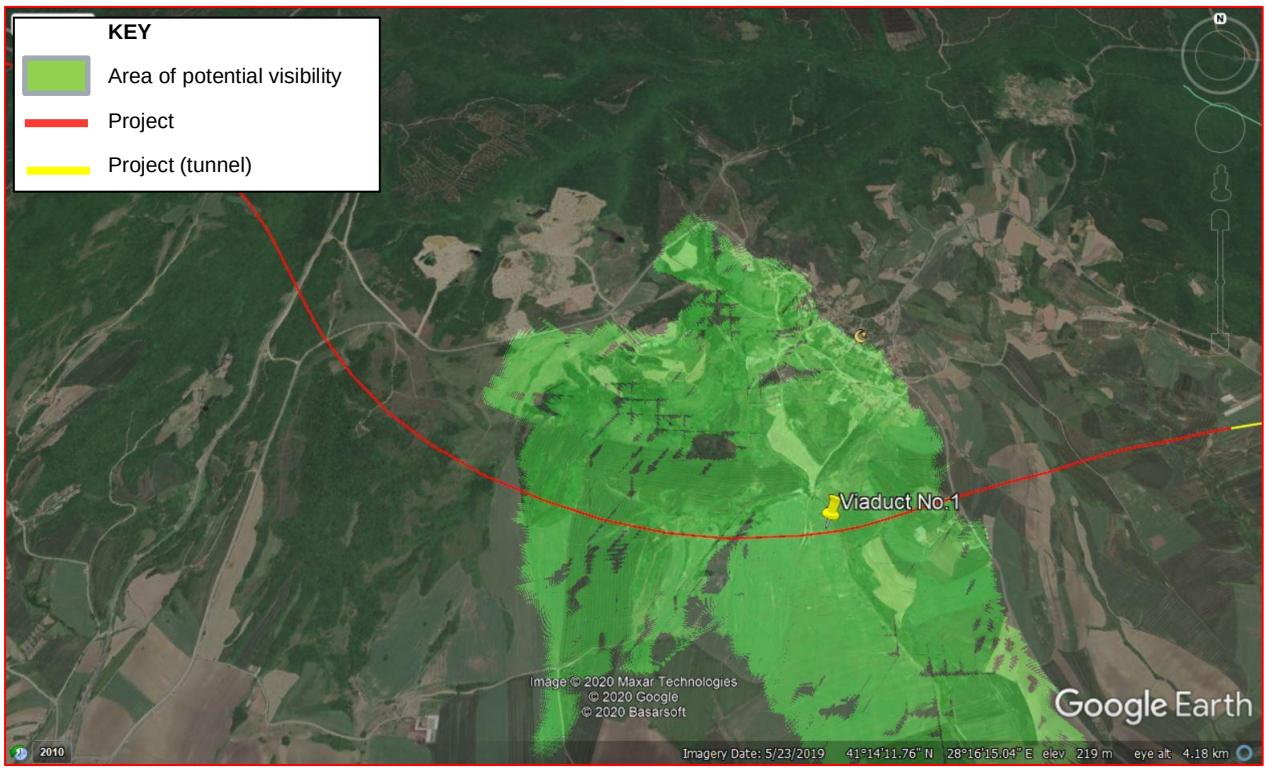

Plate 10-2 – Viewshed of Viaduct at Operation (Chainage 50+304 – 50+727, maximum height 28.9m)

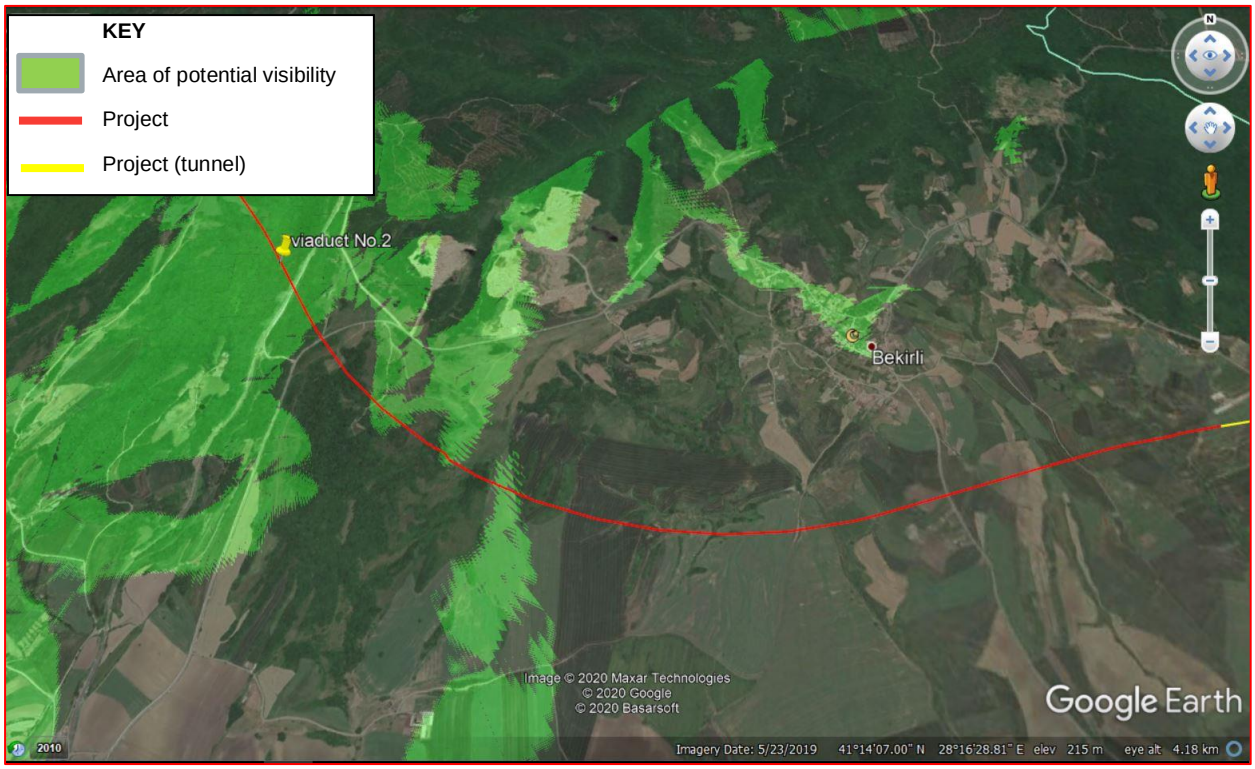

Plate 10-3 – Viewshed of Viaduct at Operation (Chainage 53+585 – 54+041, maximum height 39.97m)

10.5.65. During construction visual awareness of the construction of the offline section of the Project will be clearly discernible, principally associated with the construction of the three main structures. In addition to this, due to the local topography of the area, significant earth reprofiling works will be required, increasing the visual disturbance associated with the Project within the view.

10.5.66. Following construction, the nature of the existing view will be permanently changed, due to the visual prominence of the two viaducts. The elevated height of the Project at this location as it travels over the viaducts will increase the visual awareness of the passenger and freight trains themselves and the static catenary posts that will punctuate the skyline. Following construction, the visual prominence of the tunnel will be less prominent within the view, due to the railway being concealed below ground. The assessment is summarised in **Table 10-16**.

Table 10-16 - Viewpoint 12 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties at Bekirli)	Moderate	**Moderate Adverse (significant)**
Operation	High (residential properties at Bekirli)	Moderate	**Moderate Adverse (significant)**

10.5.67. **Appendix Q**, **Figure 10-42** and **Figure 10-41** provide the supporting photography for this viewpoint. In addition, **Appendix Q**, **Figure 10-46** provides an illustrative representation of the potential visual change to the view. Key settlements are also shown in **Figure 2-1: Project Location**.

Viewpoint 13 (view looking west from Okul Cd along the western edge of Sinekli) (Approximate nearest chainage 61+000)

10.5.68. This view is representative of views from nearby residential properties and users of the public highway.

10.5.69. During construction, visual awareness of the construction phase of the works will be partially screened from view from all properties located to the south of the existing railway by the intervening screen planting, immediately to the north of the existing railway. As such the magnitude of change will be reduced, with only partial or glimpsed views discernible at any given time. Visual awareness may slightly increase during the winter months when the trees are not in leaf.

10.5.70. From here the construction phase of the works will be clearly visible within view, although the magnitude of change will be slightly reduced due to the dominance of the existing railway within their views to the south.

10.5.71. Following construction, visual awareness of the Project will be reduced further with the Project being at grade along this section. The existing intervening planting will screen views of the above ground structures, and any visual disturbance in the form of passing trains. Due to the visual dominance of the existing railway within the foreground of all views, the Project, where glimpsed, will be perceived as an alteration to an existing feature within the view, reducing the impact further.

10.5.72. Only those properties to the north of the existing railway are considered to be highly impacted by the Project, due to them being bound by railway on either side. The assessment is summarised in **Table 10-17**.

Table 10-17 - Viewpoint 13 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	High (residential properties) and Low (road users)	Slight (residential properties to the south of the existing railway and users of the public highway) and Moderate (from residential properties to the north)	**Minor Adverse (not significant)** (residential properties to the south), **Negligible (not significant)** (road users) and **Moderate Adverse (significant)** (residential properties to the north)
Operation	High (residential properties) and Low (road users)	Slight (residential properties and road users)	**Negligible (not significant)** (residential properties to the south), **Negligible (not significant)** (road users) and **Minor Adverse (not significant)** (residential properties to the north)

10.5.73. **Appendix Q**, **Figure 10-33** and **Figure 10-42** provide the supporting photography for this viewpoint.

Viewpoint 14 (view looking north from Çayırdere Road, approximate nearest chainage 68+000)

10.5.74. The view at this location is representative of views from users of the local road. The Project is located to the north of the existing railway at this location, within an area of heavily wooded vegetation.

10.5.75. There may be some awareness, particularly in winter, of construction activities as well as passing trains during operation, with glimpsed views through the vegetation, but the noise of road vehicles and vehicle movement are already detracting features of the view. Overall, visual awareness of the construction and operational phases of the Project will be limited due to the retention of the wide belt of intervening established vegetation, screening all views to the north. The assessment is summarised in **Table 10-18**.

Table 10-18 - Viewpoint 14 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	Low (road users)	Slight (road users)	**Negligible (not significant)**
Operation	Low (road users)	Slight (road users)	**Negligible (not significant)**

10.5.76. **Appendix Q**, **Figure 10-34** and **Figure 10-42** provide the supporting photography for this viewpoint.

Viewpoint 15 (view looking north-west from Beyciler yolu towards the western end of the Project, approximate nearest chainage 71+500)

10.5.77. The view at this location is representative of views from the local road. The Project is located to the north of the existing railway, set back from the highway itself. The Project is partially located within an area of dense vegetation providing a degree of screening during both the construction and operational phases. However, glimpsed views of the construction phase will be discernible in the distance due to the Project being on substantial embankment at this location.

10.5.78. During operation, it is anticipated that the railway and its associated infrastructure will be discernible above the canopy of the intervening vegetation; however, due to the distance in separation between the receptor and the Project the significance of effect will be reduced. The assessment is summarised in **Table 10-19**.

Table 10-19 - Viewpoint 15 Assessment

Phase	Receptor Sensitivity	Magnitude of Change	Significance of Effect
Construction	Low (road users)	Moderate	**Minor Adverse (not significant)**
Operation	Low (road users)	Moderate	**Minor Adverse (not significant)**

10.5.79. **Appendix Q**, **Figure 10-35** and **Figure 10-43** provide the supporting photography for this viewpoint.

Residential Properties

10.5.80. The following residential properties (refer to **Figure 2-1** and **15-1** for settlement and community locations) have been identified as being significantly adversely affected by the Project (due to the effects outlined below), in addition to the significantly adversely affected key receptors represented by the viewpoint photographs above.

Risalet Sokagi within the Main Settlement of Omerli

10.5.81. Construction:

- Demolition of properties directly within the footprint of the Project.
- Visual awareness of construction activities associated with the construction of the tunnel and offline section of the Project.

10.5.82. Operational:

- Permanent change to a number of residential property boundaries.
- Permanent change to the topography earth form directly to the east of the settlement where the Project is concealed below ground within a tunnel – associated above ground earthworks.

10.5.83. During the construction phase the effects are considered to be **Large Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

Isolated Farmstead (chainage 24+800)

10.5.84. Construction:

- Visual awareness of construction activities associated with the construction of the tunnel and offline section of the Project.
- Vegetation clearance - opening up of views along the Project.

10.5.85. Operational:

- Permanent change to the landform directly to the south of property.
- Visual awareness of the Project screened from view below ground within the tunnel.

10.5.86. During the construction phase the effects are considered to be **Moderate Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

Properties to the West of the D569 (chainage 36+499)

10.5.87. Construction:

- Demolition of residential properties and other above ground structures.
- Visual awareness of construction activities.

10.5.88. Operational:

- Permanent change to the landform.
- Permanent change to a number of residential property boundaries.

10.5.89. During the construction phase the effects are considered to be **Large Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

Properties near Akoren-Incegiz Yolu (chainage 42+150 – 42+246)

10.5.90. Construction:

- Permanent change to the nature of the view – principally through the addition of an 11m high bridge between chainage 42+150 – 42+246.
- Localised vegetation clearance opening up of views – visibility of Project and existing railway.

10.5.91. Operational:

- Permanent change to the nature of the view – principally through the addition of an 11m high bridge between chainage 42+150 – 42+246.
- Increase in awareness of visual disturbance from trains.

10.5.92. During the construction phase the effects are considered to be **Moderate Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Moderate Adverse (significant)** prior to mitigation.

Properties at Kabakca off Akoren Yolu (chainage 44+600)

10.5.93. Construction:

- Demolition of residential properties and other above ground structures.
- Visual awareness of construction activities including tunnel to the west.

10.5.94. Operational:

- Permanent change to the landform.
- Permanent change to a number of residential property boundaries.

10.5.95. The extent of the visual awareness of the construction and operational phase of the works from these nearby residential properties is illustrated upon Figures 10-47 to 10-49 associated with Viewpoint 12 noted above.

10.5.96. During the construction phase the effects are considered to be **Large Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

Residential Properties to the North of Akoren and along Bekirli Yolu

10.5.97. Construction:

- Visual awareness of construction activities associated with the construction of the tunnel and offline section of the Project between chainage 47+700 and 48+650.

10.5.98. Operational:

- Permanent change to the landform to the north.
- Visual awareness of the track and trains themselves screened from view below ground within the tunnel.

10.5.99. The extent of the visual awareness of the construction and operational phase of the works from these nearby residential properties is illustrated upon **Figures 10.47 – 10.49** associated with Viewpoint 12 noted above.

10.5.100. During the construction phase the effects are considered to be **Large Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

Residential Properties between Chainage 76+000 – 76+700, at the Western End of the Project

10.5.101. Construction:

- Demolition of properties directly below the footprint of the Project.
- Visual awareness of construction activities associated with the construction of the offline section of the Project.

10.5.102. Operational:

- Permanent change to a number of residential property boundaries.

10.5.103. During the construction phase the effects are considered to be **Large Adverse (significant)** prior to mitigation, and during the operational phase the effects are considered to be **Minor Adverse (not significant)** prior to mitigation.

10.6 MITIGATION AND ENHANCEMENT MEASURES

10.6.1. There are currently no industry standards or best practice guidance relating to landscape mitigation and management directly relating to Turkish railways. As such the proposed mitigation measures associated with the Project have been derived from professional judgement.

10.6.2. As set out in the **ESMP**, a **CESMP** will be prepared by the Contractor, which will outline how the construction phase of the Project will be managed to minimise the effects on the surrounding environment. The **CESMP** will include the requirement for a **Landscape Management Plan.**

10.6.3. No planting of tall shrubs or trees is proposed within the 50m railway corridor for the project (25m either side of the centreline of the Project). This is to avoid disruption from potential vegetative contact with the power supply and catenary posts. However, shrubs below 1m mature height or grasses/ground cover are to be planted or seeded on all exposed earthworks within the railway corridor up to within 1m of the track to help reduce soil erosion and runoff. Planting should be as close as possible to any areas of loss (refer to **paragraph 10.5.3**) to provide maximum screening benefit, to the extent that health and safety requirements allow and within the limits of the expropriation corridor only.

10.6.4. All planting should be in accordance with the **Landscape Management Plan and Landscape Planting Plans**, which will outline species, density and locations, as agreed with the Ecological Clerk of Works, Environmental Engineer, and Environmental Supervisor. Planting should be of local provenance, native and typical of the area.

10.6.5. It is considered that appropriate mitigation measures would reduce identified adverse effects on the identified landscape and visual receptors, and these are outlined further below.

10.6.6. In some locations screen planting has not been proposed in order to retain the existing character of the receiving landscape. Where screen planting has not been proposed, this is because it would be at odds with the existing open character of the receiving landscape.

LANDSCAPE CHARACTER

10.6.7. The following mitigation measures are proposed to reduce adverse effects identified on landscape character receptors:

- Upon completion, areas used as construction compounds will be returned to their original use and state;
- Replacement tree planting / woodland planting will be carried out within those areas noted as being subject to significant loss (as noted in **paragraph 10.5.3**). This replacement planting should be located as close to the area of loss as is practicable. This includes biodiversity requirement locations, such as replanting of oak/hornbeam woodland within current areas of plantation forest – indicative areas are illustrated on **Figure 8-11** of **Chapter 8: Ecology** and outlined in the **BMP**);
- All planting will be of local provenance and in keeping with the local character; and
- Where topsoil is to be stripped and stored on site temporarily for reuse, the stockpile mounds will be stored at a maximum height of 2m, in order to preserve the structural integrity of the soil[172].

10.6.8. In some instances, the potential for mitigation planting may be restricted due to the method of construction. Where tunnels have been constructed using the cut and cover method, this shallower method of construction may limit the amount of planting on/adjacent to it. If during the design process, it is identified that there is too great a risk that the roots of the proposed planting will compromise the structural integrity of the tunnels, in such instances, the proposed planting will be restricted within these areas.

VISUAL AMENITY

10.6.9. The following mitigation measures are proposed to reduce adverse effects identified on visual receptors:

- Mitigation screen vegetation planting, subject to land take, and availability of suitable land area. In some instances where the Project is located within built up areas, the availability of land for mitigation planting will be restricted. No planting of tall shrubs or trees is proposed within the railway corridor (25m on either side of the centreline of the Project). This is to avoid disruption from potential vegetative contact with the power supply and catenary posts. However, shrubs below 1m mature height or grasses/ground cover are to be planted or seeded on all exposed earthworks up to within 1m of the track to help reduce soil erosion and runoff; Planting should be as close as possible to any areas of loss (refer to **paragraph 10.5.3**) to provide maximum screening benefit, to the extent that health and safety requirements allow and within the limits of the expropriation corridor only..
- Implementation of a 5-year **Landscape Management Plan** to ensure successful plant establishment and growth, replacement of plant failures and appropriate protection and care of planted areas. Planted areas should be kept weed and litter free throughout the maintenance period;
- All planting should be in accordance with the **Landscape Management Plan**, which will outline species, density and locations, as agreed with the Ecological Clerk of Works, Environmental

[172] A 5m maximum height remains for other materials.

Engineer, and Environmental Supervisor. Planting should be of local provenance, native and typical of the area;

- Contractors' aftercare and maintenance period (for the duration of the contract warranty period) to be included as part of the deliverable with annual replacement planting being carried out within those areas where plant failure has been recorded, on a like for like basis. Aftercare period to include activities to ensure the successful establishment of those areas of proposed mitigation planting;
- During the construction phase of the works, restricted hours of working will be proposed within built up areas, where the construction phase of the works is considered to impact on residential properties, avoiding the of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view, further details are provided within **Chapter 7: Noise and Vibration**; and
- Stockpiles to have a maximum height of 5m, in order to reduce visual awareness within views. However, where topsoil is to be stripped and stored on site temporarily for reuse, the stockpile mounds will be stored at a maximum height of 2m, in order to preserve the structural integrity of the soil[173]. Where topsoil is to be stored for a prolonged period of time (such as for 6 months or more) it is proposed that the mounds be temporarily seeded with an appropriate grass seed mix in order to reduce the visual prominence of the temporary soil mounds further within view.

10.7 RESIDUAL EFFECTS

10.7.1. Residual effects are the effects remaining following the implementation of the mitigation measures outlined above. However, mitigation planting will take a while to mature and provide screening or visual replacement for vegetation lost. In these instances, the change in effect over time (from year 1 of opening to year 15 of operation) is given, to show the effects of the mitigation planting over time.

10.7.2. Where effects remain following mitigation (including 15 years for the growth of planting), this is as a result of a proposed permanent change to the localised area that cannot be fully mitigated, resulting in residual effects.

LANDSCAPE CHARACTER

10.7.3. The Project will result in a residual effect on all three landscape character areas, ranging from Moderate Adverse to Negligible.

Landscape Character Area 1 and Landscape Character Area 2

10.7.4. The Project will result in a measurable alteration to one or more features and elements associated with Landscape Character Areas 1 and 2, which will result in a permanent change to the nature of the landscape. While the Project is perceived to be similar in nature to other features already present in the Character Area, the Project will result in perceivable changes to the topography at a local level. Furthermore, the Project will result in the continued urbanisation (loss of agricultural land)

[173]A 5m maximum height remains for other materials.

along a linear corridor, including above ground structures in the form of catenary posts, bridges, viaducts, underpasses and overpasses.

10.7.5. While replacement planting is proposed in order to mitigate against the loss of existing areas of woodland / scrub vegetation (within the limits of the expropriation corridor only), not all impacts will be mitigated. The magnitude of change will be highest during the construction phase of the works prior to the establishment of proposed mitigation planting and the revegetation of reprofiled earthworks.

10.7.6. The residual effects of the Project on Landscape Character Area 1 are therefore considered to be **Minor Adverse (not significant)** during the construction phase and **Minor Adverse (not significant)** during the operational phase.

10.7.7. The residual effects of the Project on Landscape Character Area 2 are therefore considered to be **Moderate/Large Adverse (significant)** during the construction phase and **Moderate Adverse (significant)** during the operational phase.

Character Area 3

10.7.8. Only a relatively short (3km) stretch of Project is directly located within the Landscape Character Area, with the Project being located within a predominantly built up area that has already undergone great change and disturbance. The magnitude of change associated with Landscape Character Area 3 is therefore not considered to result in a detrimental alteration to the character of the landscape.

10.7.9. The residual effects of the Project on Landscape Character Area 3 are therefore considered to be **Negligible (not significant)** at both the construction and operational phases.

VISUAL AMENITY

Viewpoints

10.7.10. The residual construction and operation effects for the 15 viewpoints are set out in **Table 10-20**.

Residential Properties

Construction Phase

10.7.11. The residential properties where residual effects as a result of the Project are anticipated to remain following mitigation are listed below:

- Risalet Sokagi Within the Main Settlement of Ömerli – **Large Adverse (significant)**;
- Isolated Farmstead (chainage 24+800) – **Moderate Adverse (significant)**;
- Properties to the West of the D569 (chainage 36+499) – **Large Adverse (significant)**;
- Properties at Kabakca off Akoren Yolu (chainage 44+600) – **Large Adverse (significant)**;
- Residential Properties to the North of Akoren and along Bekirli Yolu – **Moderate Adverse (significant)**; and
- Residential Properties between Chainage 76+000 – 76+700, at the Western End of the Project – **Large Adverse (significant)**.

Operational Phase

10.7.12. The residential properties where residual effects as a result of the Project are anticipated to remain following mitigation (Year 15) are listed below:

- Risalet Sokagi Within the Main Settlement of Ömerli – **Negligible (not significant)**;
- Isolated Farmstead (chainage 24+800) – **Negligible (not significant)**;
- Properties to the West of the D569 (chainage 36+499) – **Minor Adverse (not significant)**;
- Residential properties near Akoren-Incegiz Yolu (between chainage 42+150 – 42+246) – **Moderate Adverse (significant)**;
- Properties at Kabakca off Akoren Yolu (chainage 44+600) – **Minor Adverse (not significant)**;
- Residential Properties to the North of Akoren and along Bekirli Yolu – **Negligible (not significant)**; and
- Residential Properties between Chainage 76+000 – 76+700, at the Western End of the Project – **Minor Adverse (not significant)**.

CONCLUSION

10.7.13. There will remain the potential for significant adverse effects on visual receptors during the construction and operational phase, even with mitigation. During construction, the effects will be temporary only, but during operation, the effects will be permanent and long term. This is due to the presence of structures (such as viaducts and bridges), changes in landform, the presence of trains and the associated infrastructure (such as overhead cables and signalling) that will remain visible and disrupt the quality of existing visual amenity.

10.8 SUMMARY

Table 10-20 - Summary of Potential Impacts, Effects and Mitigation (Landscape and Visual)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
Landscape Character Areas						
Landscape Character Area 1: Marmara	Very High Sensitivity	Construction and Operational	Permanent change to the land use along the Project. Permanent alteration of the topography Loss / severance of substantial areas of established woodland / scrub. Permanent addition of 9No. bridges, 2No. viaducts, 17No. overpasses and 26No. underpasses	Minor Adverse (not significant)	Reinstatement of woodland / scrub vegetation lost to the Project – principally between chainages 21+350 – 21+650, 47+180 – 48+200; and 52+000 – 67+500.	Minor Adverse (significant)
Landscape Character Area 2: Province of Istanbul	High Sensitivity		Permanent change to the nature of the landscape directly within the expropriation corridor of the Project (73km) in this character area, of which 9km is considered to be online, with a further 64km offline. Permanent alteration to the topography Loss / severance of substantial areas of established woodland / scrub Permanent addition of 6No. bridges, 2No. viaducts, 17No. overpasses and 25No. underpasses	Moderate /Large Adverse (significant)	Reinstatement of woodland / scrub vegetation lost to the Project – principally between chainages 21+350 – 21+650, 47+180 – 48+200; and 52+000 – 67+500.	Moderate Adverse (not significant)
Landscape Character Area 3: Province of Tekirday	Medium Sensitivity		Permanent change to the land use along the Project (3km). Permanent inclusion of detracting features and the additional of permanent features.	Negligible (not significant)	-	Negligible (not significant)
Viewpoints						
Viewpoint 1	Medium Sensitivity	Construction and Operational	No change to the nature of the view.	Neutral (not significant)	-	Neutral (not significant)
Viewpoint 2	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities, including construction compound.	Minor Adverse (not significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Minor Adverse (not significant)
	Road Users (Low Sensitivity)	Construction	Glimpsed views of construction activities including visual awareness of construction activities.	Negligible (not significant)	-	Negligible (not significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
	Residential Properties (High) Road Users (Low)	Operational	Main Project is concealed below ground (tunnel). Where a short section of the Project is above ground, it is located to the west of the existing railway thus is visually perceived as an alteration to an existing feature within the nature of the view.	Neutral (not significant)	-	Neutral (not significant)
Viewpoint 3	Residential Properties (High Sensitivity)	Construction and Operational	No change to the nature of the view.	Neutral (not significant)	-	Neutral (not significant)
Viewpoint 4	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities.	Moderate Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential for visual disturbance within the view.	Moderate Adverse (significant)
		Operational	Magnitude of change is reduced due to the proximity of the Project to the existing railway. The Project will be perceived as an alteration of an existing feature within the view. Frequency of trains within view will increase by 80%	Minor Adverse (not significant)	Visual screening in this instance would change the character of the environment - no screen mitigation planting has been proposed in this instance.	Minor Adverse (not significant)
Viewpoint 5	Users of the Public Open Space (Medium Sensitivity)	Construction	Visual awareness of construction activities. Opening up of view following vegetation clearance along the western edge of the existing railway.	Minor Adverse (not significant)	None additional identified	Minor Adverse (not significant)
		Operational	Visual awareness of trains using the Project.	Minor Adverse (not significant)	Where space allows, reinstate screen planting along the western edge of the Project (within the limits of the expropriation corridor only).	Negligible (not significant)
Viewpoint 6	Residential Properties (High Sensitivity) Users of Footpath (High Sensitivity)	Construction	Visual awareness of construction activities.	Minor Adverse (not significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within the view.	Minor Adverse (not significant)
	Road Users (Low Sensitivity)	Construction	Visual awareness of construction activities.	Minor Adverse (not significant)	-	Minor Adverse (not significant)
	Residential Properties (High Sensitivity) Users of The Public Footpath (High Sensitivity)	Operational	Visual awareness of trains using the Project.	Negligible (not significant)	Limited opportunity to provide screen planting (especially to the east of the railway) or for adjacent residents living at 2 storeys or above who look down on the Project.	Negligible (not significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
	Road Users (Low Sensitivity)	Operational		Negligible (not significant)		Negligible (not significant)
Viewpoint 7	Residential Properties (High Sensitivity)	Construction	Slight visual awareness of construction activities.	Minor Adverse (not significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Minor Adverse (not significant)
		Operational	Visual awareness of trains using the Project – offset by the frequency of vehicle movement along the public highway.	Negligible (not significant)	Visibility of the Project predominantly screened from view by intervening topography – no specific mitigation measures proposed.	Negligible (not significant)
Viewpoint 8	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities. In some instances, the works are adjacent to residential property boundaries.	Large Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Large Adverse (significant)
	Road Users (Low Sensitivity)	Construction	Visual awareness of construction activities.	Minor Adverse (not significant)	-	Minor Adverse (not significant)
	Residential Properties (High Sensitivity)	Operational	Visual awareness of a prominent new linear feature within view. Project raised on embankment. Tunnel entrance discernible within view. Increase in detracting features within view, in the form of catenary posts. Frequent introduction of visual disturbance within view of trains.	Large Adverse (significant)	Elements of screen planting on either side of the Project should be considered, along the bottom section of the embankments and where not at odds with the character of the landscape and where outside the railway corridor. Gradient of embankments proposed at a gradient of 1:6 in order to provide a more gradual change to local topography. All planting to be located within the limits of the expropriation corridor only.	Moderate Adverse (significant)
	Road Users (low sensitivity)	Operational		Minor Adverse (not significant)		Minor Adverse (not significant)
Viewpoint 9	Residential Properties (High Sensitivity)	Construction	Mass vegetation clearance in order to facilitate the construction of the Project, opening up views Visual awareness of the construction of the tunnel – most significant impact associated with the construction of the section of cut and cover tunnel	Moderate Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Moderate Adverse (significant)
	Road Users (Low Sensitivity)	Construction		Minor Adverse (significant)	-	Minor Adverse (not significant)
	Residential Properties (High Sensitivity)	Operational	Visual awareness of reprofiled earthworks.	Moderate Adverse (significant)	Reinstatement of woodland upon reprofiled earthworks, where the method of construction allows (restrictions may result due to the method of tunnel construction).	Moderate Adverse (significant)
	Road Users (Low Sensitivity)	Operational	Visual awareness of reprofiled earthworks.	Minor Adverse (significant)	-	Minor Adverse (not significant)
Viewpoint 10	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities.	Minor Adverse (not significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Minor Adverse (not significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
		Operational	Project perceived as an alteration to existing features within the view.	Negligible (not significant)	Given the open nature of the landscape, screen planting would not be appropriate and would be at odds with the character of the landscape.	Negligible (not significant)
Viewpoint 11	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities – principally the construction of the bridge between chainage 42+150 – 42+246.	Moderate Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Moderate Adverse (significant)
	Road Users (Low Sensitivity)	Construction	Localised vegetation clearance opening up of views – visibility of Project and existing railway.	Minor Adverse (not significant)		Minor Adverse (not significant)
	Residential Properties (High Sensitivity)	Operational	Permanent change to the nature of the view – principally through the addition of an 11m high bridge between chainage 42+150 – 42+246.	Moderate Adverse (significant)	Where available space allows, proposed replacement screen planting (outside the railway corridor but within the limits of the expropriation corridor only).	Moderate Adverse (significant)
	Road Users (Low Sensitivity)	Operational	Increase in awareness of visual disturbance from trains.	Negligible (not significant)		Negligible (not significant)
Viewpoint 12	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities – principally the construction of the cut and covered tunnel between chainage 47+700 – 48+650 and the 2 viaducts. Significant earth reprofiling associated with the construction of the offline section of the Project.	Moderate Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Moderate Adverse (significant)
		Operational	Permanent change to the nature of the view, due to proposed earth works and the presence of 2 viaducts. Frequent visual disturbance within the view from the passing of trains not previously experienced within the area.	Moderate Adverse (significant)	-	Moderate Adverse (significant)
Viewpoint 13	Residential Properties to the south (High Sensitivity)	Construction	Visual awareness of construction activities from those properties to the north of the existing railway.	Minor Adverse (not significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing potential visual disturbance within the view.	Minor Adverse (not significant)
	Residential Properties to the north (High Sensitivity)	Construction		Moderate Adverse (significant)	-	Moderate Adverse (significant)
	Road Users (Low Sensitivity)	Construction	Visual awareness of construction activities.	Negligible (not significant)	-	Negligible (not significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
	Residential Properties to the south (High Sensitivity)	Operational	Project dominant within views looking in a northerly direction - change to the nature of the view in this direction formally uninterrupted views of the open countryside. Reduced magnitude of change due to the Project being at grade along this section of the Project. Frequent visual disturbance of trains using the Project.	Minor Adverse (not significant)	Proposed screen planting along the southern edge of the Project (where outside the railway corridor but within the limits of the expropriation corridor only) – screening views of catenary posts and passing trains.	Negligible (not significant)
	Residential Properties to the north (High Sensitivity)	Operational		Minor Adverse (not significant)	-	Minor Adverse (not significant)
	Road Users (Low Sensitivity)	Operational		Negligible (not significant)	-	Negligible (not significant)
Viewpoint 14	Road Users (Low Sensitivity)	Construction	Some awareness, particularly in winter, of construction activity, with glimpsed views through the vegetation, but the noise of road vehicles and the vehicle movement are already detracting features of the view. Visual awareness will be limited due to the retention of the wide belt of intervening established vegetation, which will screen all views to the north.	Negligible (not significant)	-	Negligible (not significant)
		Operational	Some awareness, particularly in winter, of passing trains with glimpsed views through the vegetation, but the noise of road vehicles and the vehicle movement are already detracting features of the view. Visual awareness will be limited due to the retention of the wide belt of intervening established vegetation, which will screen all views to the north.	Negligible (not significant)	-	Negligible (not significant)
Viewpoint 15	Road Users (Low Sensitivity)	Construction	Visual awareness of some but not all construction activities within the distance. Extensive vegetation clearance works are required, in order to facilitate the construction of the Project , which will result in the opening up of views.	Minor Adverse (not significant)	-	Minor Adverse (not significant)
		Operational	Visual awareness of the Project above the canopies of the trees, where it is raised on embankment.	Minor Adverse (not significant)	Proposed replacement planting of woodland vegetation upon embankment slopes, where the method of construction allows and where outside the railway corridor but within the limits of the expropriation corridor.	Negligible (not significant)
Visual Amenity						
		Construction	Demolition of properties within the expropriation corridor the Project.	Large Adverse (significant)	-	Large Adverse (significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
Risalet Sokagi (within the main settlement of Omerli)	Residential Properties (High Sensitivity)		Visual awareness of construction activities associated with the construction of the tunnel and offline section of the Project.			
		Operational	Permanent change to a number of residential property boundaries. Permanent change to the topography earth form directly to the east of the settlement where the Project is concealed below ground within a tunnel – associated above ground earth works.	Minor Adverse (not significant)	Proposed screen planting along the foot of the embankment (where outside the railway corridor but within the limits of the expropriation corridor).	Negligible (not significant)
Isolated Farmstead (chainage 24+800)	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities associated with the construction of the tunnel and offline section of the Project. Vegetation clearance - opening up of views along the Project.	Moderate Adverse (significant)	Replacement planting to be carried out (outside the railway corridor but within the limits of the expropriation corridor).	Moderate Adverse (significant)
		Operational	Permanent change to the landform directly to the south of property. Visual awareness of the Project screened from view below ground within the tunnel.	Minor Adverse (not significant)	Replacement woodland planting to be carried out on earth embankments (where outside the railway corridor but within the limits of the expropriation corridor).	Negligible (not significant)
Residential Properties (to the west of the D569, at chainage 36+499)	Residential Properties (High Sensitivity)	Construction	Demolition of residential properties and other above ground structures. Visual awareness of construction activities.	Large Adverse (significant)	-	Large Adverse (significant)
		Operational	Permanent change to the landform. Permanent change to a number of residential property boundaries.	Minor Adverse (not significant)	-	Minor Adverse (not significant)
Residential Properties (near Akoren-Incegiz Yolu, between chainage 42+150 – 42+246)	Residential Properties (High Sensitivity)	Construction	Permanent change to the nature of the view – principally through the addition of an 11m high bridge between chainage 42+150 – 42+246. Localised vegetation clearance opening up of views – visibility of Project and existing railway.	Moderate Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Moderate Adverse (significant)
		Operational	Permanent change to the nature of the view – principally through the addition of an 11m high bridge between chainage 42+150 – 42+246. Increase in awareness of visual disturbance from trains.	Moderate Adverse (significant)	Where available space allows, and where outside the railway corridor, proposed replacement screen planting (within the limits of the expropriation corridor).	Moderate Adverse (significant)
Residential Properties (at Kabakca, off Akoren		Construction	Demolition of residential properties and other above ground structures.	Large Adverse (significant)	-	Large Adverse (significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation Year 15)
Yolu, at chainage 44+600)	Residential Properties (High Sensitivity)		Visual awareness of construction activities including tunnel to the west.			
		Operational	Permanent change to the landform. Permanent change to a number of residential property boundaries.	Minor Adverse (not significant)	-	Minor Adverse (not significant)
Residential Properties (to the north of Akoren and along Bekirli Yolu)	Residential Properties (High Sensitivity)	Construction	Visual awareness of construction activities associated with the construction of the tunnel and offline section of the railway between chainage 47+700 – 48+650.	Large Adverse (significant)	Restricted hours of working – avoidance of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.	Large Adverse (significant)
		Operational	Permanent change to the landform to the north. Visual awareness of the Project screened from view below ground within the tunnel	Minor Adverse (not significant)	Replacement woodland planting to be carried out on earth embankments (where outside the railway corridor and within the limits of the expropriation corridor).	Negligible (not significant)
Residential Properties (at chainage 76+000 – 76+700)	Residential properties (High Sensitivity)	Construction	Demolition of properties directly below the footprint of the Project. Visual awareness of construction activities associated with the construction of the offline section of the Project.	Large Adverse (significant)	-	Large Adverse (significant)
		Operational	Permanent change to a number of residential property boundaries.	Minor Adverse (not significant)	-	Minor Adverse (not significant)