

Istanbul New Airport ESIA

Environmental Baseline and Impact Assessment Forestry

Afforestation Plan

Prepared for:
IGA
Istanbul, Turkey

Prepared by:
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Bath, UK

Date:
March 2015

Project or Issue Number:
UK14-19216

ENVIRON

Contract No:	UK14-19216
Issue:	4
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Date:	26.03.2015

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Version Control Record				
Issue	**Description of Status**	**Date**	**Reviewer Initials**	**Author Initials**
1	First Draft	28 June 2014	KH/VV/NS	HC
2	Final Draft	17 December 2014	VV/DW	HC
3	Final	06 February 2015	VV/DW	HC
4	Updated Final	26 March 2015	VV/DW	HC

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LIST OF ABBREVIATIONS

APM	Air Passenger Movement
ATC	Air Traffic Control
CBD	Convention on Biological Diversity
CPF	Collaborative Partnership on Forests
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EC	European Community/Commission
EU	European Union
FSC	Forest Stewardship Council
IFC	International Finance Corporation
IGA	IGA Havalimanlari Isletmesi A.S.
INA	Istanbul New Airport
IUCN	International Union for Conservation of Nature
MA	Millennium Ecosystem Assessment
MoEU	Ministry of Environment and Urbanization
UN	United Nations
UNCCD	UN Convention to Combat Desertification
UNCED	UN Conference on Environment and Development
UNFCCC	UN Framework Convention on Climate Change
UNFF	UN Forum on Forests
VIP	Very Important Person
WWF	World Wildlife Fund

1. INTRODUCTION

IGA has been appointed by the Turkish Government to design, build and operate the Istanbul New Airport (INA). IGA Havalimanlari Isletmesi A.S. (IGA), a Consortium formed by five Turkish companies – CENGİZ, MAPA, LİMAK, KOLİN and KALYON (with 20% stake each), won the tender for 25 years operation of the new airport from completion of the first phase.

The Project is the design, build and operation of an international airport located on the Black Sea coast, 40 km north-west of the city of Istanbul and 35 km north-west of the existing international airport, Ataturk, located on the European side of Turkey. The Turkish Government has decided that there is a requirement to expand the airport capacity of the region. The airport will include six runways, passenger terminals and satellites (international and domestic); Air Traffic Control (ATC) Towers; Air Passenger Movement (APM) Station; a cargo terminal; maintenance; cargo apron; hangars; and ancillary buildings; general aviation; a VIP terminal; a fuel farm; fuel delivery jetty; fire services; a metro link; airport service roads and airport connector roads. The airport development is planned to be delivered in four phases. The airport will be designed to a full capacity of 150 mppa once all four phases of the development have been completed.

The topography of the area is uneven with a terrain elevation difference ranging from 0 to 160 meters approximately, from one portion of the site to another (typically between north and south). The site covers an area of approximately 7,650 ha that borders the Black Sea coastline and falls within the municipalities of Eyup and Arnavutkoy.

Of the 7,650 ha Project Area, 5,230 ha include forest assets. A total area of 610 ha has been identified as water bodies of different sizes (70 in total of them with different ranging in sizes ranging from 0.17 to 100 ha) resulting from previous quarry excavation (open pit mining) areas, which were then filled by precipitation. Forestry area contain a total of 2,280,308 trees/saplings, making up an asset of 171,125.81 m^3. Based on these figures, the area classified as forest is 68% of the total Project Area.

This Afforestation Plan has been prepared in relation to the national requirements to compensate the loss of forests due to the Project as well as summarising the process for compensation (replanting of trees at alternative sites). The Afforestation Plan also provides an insight into international requirements in terms of mitigating loss of forests and identifies the strategy for actions. Overall, it is prepared in order to determine the type and characteristics of the forest areas in the Project Area, potential loss of forests and the options (including estimates for the number of trees to be replanted and size of land needed for afforestation) for mitigation of the adverse impacts. The mitigation and compensation options will be in accordance with relevant Turkish legislation and international practices.

This report is mainly based on the following information and studies:

- The EIA report for the Project, which was prepared on behalf of the Ministry of Transport, Maritime Affairs and Communications, General Infrastructure Directorate and finalised in May 2013. The EIA has received a positive decision from the Turkish Ministry of Environment and Urbanization (MoEU).
- Forest management plans (official data of General Directorate of Forestry), management plan data and maps provided by IGA's forestry consultant working on forestry permits.
- Forest data serving as a basis for the forestry permit.
- The Project Master Plan.
- Information and data obtained from the visits to General Directorate of Forestry and Istanbul Regional Directorate of Forestry.
- Data collected during the ESIA field surveys on biodiversity/ecology especially vegetation cover, flora and habitats.

2. BASELINE CONDITIONS

2.1. General

According to the administrative classification, a large portion of the Project Area is comprised of Arnavutkoy North Forests, which are the westernmost section of the Belgrade Forests. A total of 52.32% of the forests in the Project Area consist of natural forests with thermophilous deciduous woodland habitats covering 52.01% of the Project Area. The remaining 47.68% of the forests are highly artificial coniferous plantations that were established through private plantation works.

In terms of related forestry authorities that have the responsibility for management of forests, the Project Area is located within the borders of Istanbul Regional Directorate of Forestry, Catalca Forestry Operation Directorate and Istanbul Forestry Operation Directorate. According to forest management process of the General Directorate of Forestry (under Ministry of Forests and Water Affairs), forests are divided into stands and sections. These stands and sections are defined according to partitioning of forest areas in terms of tree species, forest form, establishment type, operation type, age, mixture, canopy cover classification and potential for production (Ref. 1). In this context, Arnavutkoy Forest Sub-district Directorate with sections 1-3, 5-10, 13-19, 23-50, 52-68 and Kemerburgaz Forest Sub-district Directorate with sections 11, 25-47, 49-52, 78-81 are under Istanbul Forestry Operation Directorate. Durusu Forest Sub-district Directorate with sections 73, 76-89, 90-115 is under Catalca Forestry Operation Directorate. Areas included in the Project Area corresponding to above mentioned sections include 1,103.4 ha for Durusu, 1,981.8 ha for Kemerburgaz and 2,144.6 ha for Arnavutkoy, respectively. The boundaries of these departments are presented in Figure 1. The stand types and sections are provided in Figure 2 and further information regarding on stand types and sections are given in the following sections.

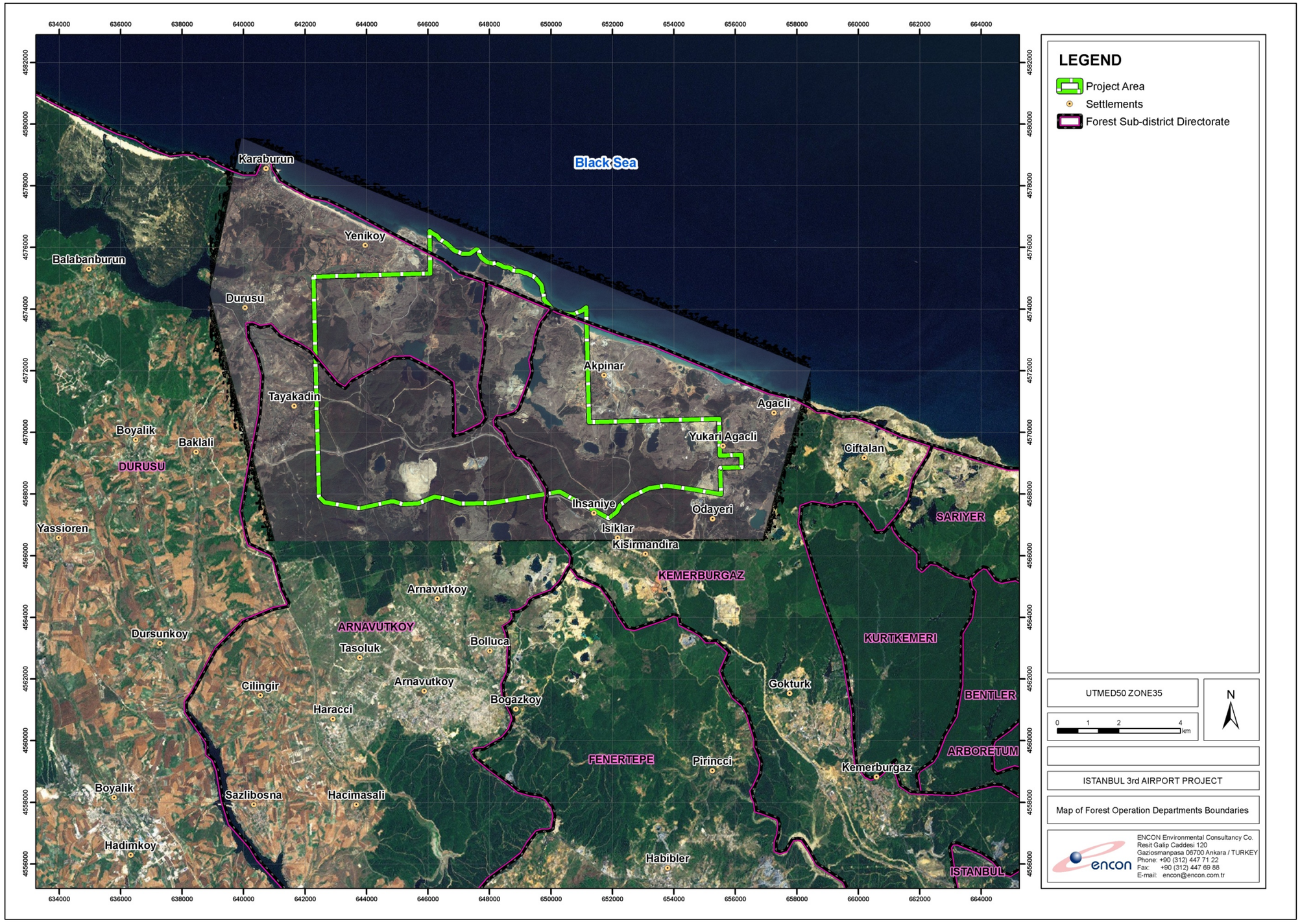

Figure 1 Forest Sub-district Directorate Boundaries

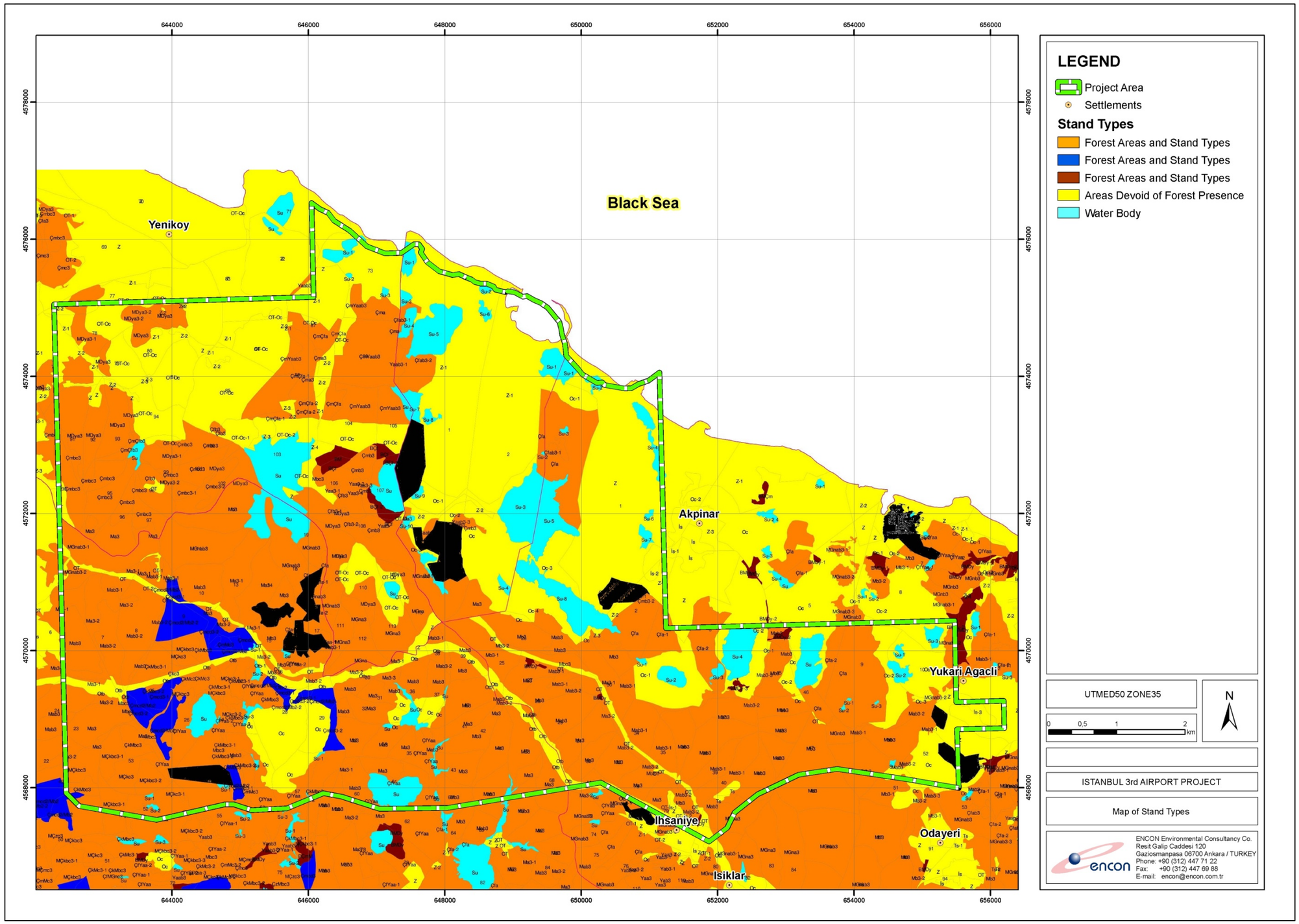

Figure 2 Stand Types within the Project Area

2.2. Existing Land Use and Areas of Conservation

According to the EIA Report prepared for the Turkish Ministry of Environment and Urbanization, approved in May 2013, , 5,230 ha of the land within the Project Area has forest status and will be developed as the new airport, which means topsoil will be stripped. This corresponds to the land take area for the facilities.. For the areas with forest status no expropriation is required. A permitting process would be conducted in accordance with Article 17 of the Forest Law (No: 6831).

The total forest area identified in the forestry survey, in accordance with UNFCCC's forest definition, is 4,352 ha. According to this definition, forest is "a minimum area of land of 0.05-1.0 ha with tree crown cover (or equivalent stocking level) of more than 10-30% with trees with the potential to reach a minimum height of 2-5 m at maturity *in situ*". The 5,230 ha area provided by the General Directorate of forestry includes areas with forest status but does not fit the description of UNFCCC, since they do not comply the crown cover rate of the definition The difference between the area concluded by the survey and the area the Directorate provided comes from the areas that have forest status but have no or very little trees on them and therefore are not considered forest by UNFCCC definition.

There are no statutory designated protected sites within the Project Area such as national parks, nature parks, nature conservation sites, wildlife development areas, special environment protection areas, and tourism areas.

2.3. Forest Types and Tree Species

The forests in the Project Area mainly comprise of deciduous natural forests and coniferous plantations. The species with extensive distribution and large numbers in the Project Area with specific stand types are as follows.

- Ash (*Fraxinus angustifolia*)
- Black locust (*Robinia pseudoacacia*)
- Castanea (*Castane sp.*)
- European/common hornbeam (*Carpinus betulus*)
- Oak (*Quercus frainetto, Quercus petraea subsp. Iberica, Quercus cerris, Quercus frainetto, Quercus cerris*)
- Black pine (*Pinus nigra*)
- Maritime pine (*Pinus pinaster Aiton*)
- Red Pine (*Pinus brutia Ten.*)
- Stone pine (*Pinus pinea L.*)

Other tree species abundant in the Project Area are given below. It should be noted that these species do not constitute an aggregation of trees (at least 1 ha) with sufficiently uniform specie composition, size, age and arrangement, therefore they do not have stand types specific to them.

- Chequer tree (*Sorbus torminalis*)
- Field elm (*Ulmus minor*)
- Linden (*Tillia Argentea*)
- Maple species (*Acer campestre, Acer campestre subsp. campestre)*

In order to identify the forest assets in the Project Area, Durusu, Kemerburgaz and Arnavutkoy Series Forest Management Plans of the Istanbul Regional Directorate of Forestry were used. Stand types in the Project Area are presented in Tables 1 to 3 and explanations for abbreviations used in these tables are given in Tables 4 to 6. A stand type map of the Project Area in relation to the Project Master Plan is given in Figure 2. A complete list of stand types, total tree numbers, total assets and total increases for each section are given in Appendix 1 in tabular form.

Table 1 Forest Assets of Durusu Sections

Section Numbers	Stand Types
72, 73, 76, 77, 78, 80, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 101, 106, 107, 108, 109, 110, 111, 113, 114, 115	Mab3, Mb3, Mbc3, MGnab3, MKsa3, MGnb3, Ma3, Cfa, Cfab3, Cfb3, CfYab3, CfYaa, Cmb3, Yaab3, Yaa3, Dsa

Table 2 Forest Assets of Kemerburgaz Sections

Section Numbers	Stand Types
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 45, 46, 47, 49, 50, 52, 78, 79, 81	Mab3, Mb3, Mbc3, MGnab3, MKsa3, MGnb3, Ma3, Cfa, Cfab3, Cfb3, CfYab3, CfYaa, Cmb3, Yaab3, Yaa3

Table 3 Forest Assets of Arnavutkoy Sections

Section Numbers	Stand Types
1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 45, 49, 50, 52, 53, 54, 56, 57, 60, 61, 63, 66, 67	Cfa, Cfab3, CfYaa, Cmc3, Cmcd2/Mb2, Cmcd3, CmMc3, MCmc3, CkMbc3, CkMc3, Mab3, Mbc3, MCzc3, MCkab3, MCkbc3, MCkc3, MGnab3, CfYaa, Yaa

Table 4 Stand Types and Symbols for Stand Types

Symbol	Stand Type	Symbol	Stand Type
Ck	Black pine	Gn	Hornbeam
Cf	Stone pine	Ya	Black locust
Cz	Red pine	Ds	Ash
Cm	Maritime pine	Dy	Other leafy
M	Oak	Ks	Chestnut

Table 5 Stand Ages, Symbols and Diameter Range for Stand Ages

Age	Symbol	Trunk Diameter (cm)
Seedling and Stocked	a	0 – 7.9
Sapling and Pole timber	b	8 – 19.9
Thin Saw timber	c	20 – 35,9
Medium Saw timber	d	36 - 51,9
Thick Saw timber	e	52 >

Table 6 Canopy Cover Classification, Related Symbols and Rates of Coverage

Canopy Cover Classification	Symbol	Rate of Canopy Cover (%)
Absent to sparse	-	<10
Sparse	1	11 - 40
Moderately closed	2	41 - 70
Closed to fully closed	3	71 - 100

While all of the stand types in the Project Area have a and b age stands. Oak, maritime pine, black pine and red pine have also c age stands but only in some sections of Arnavutkoy Series.Maritime pine is the only stand type that has d age stands. Therefore, there are both young and mature forests in the Project Area. Canopy cover rates of 0-10%, 10-40%, 40-70%, 70-100% are all present in the area in different sections. The details of these classifications are provided in Annex 1 of this document.

3. POTENTIAL IMPACTS ASSOCIATED WITH THE PROJECT

3.1. Loss of Trees

In the worst case scenario, where all of the trees in the entire permitted Project Area are removed, a total of approximately 2,280,308 trees, making up a total asset of 171,125.76 m^3, will be lost according to the forest management plans of the General Directorate of Forestry. However, the area of the land take for the facilities to be constructed is smaller than the area designated as the Project Area (7,650 ha). Trees/forest in the areas which are not needed for the construction and operation of the facilities will not be completely cut. Thus, the total number of trees that will be lost due to the Project will be less than the total number of trees determined in the whole Project Area.

Total number of trees, total assets and total annual increase in assets (as volume) are given in Table 8 in accordance with the sections they belong. These figures are the official figures provided by Istanbul Regional Directorate of Forestry.

Table 7 Total Number of Trees, Total Assets and Total Annual increase in Assets in the Project Area*

Series	Total Nr. of trees	Total Asset (m^3)	Total Annual Increase (m^3)
Durusu	306,913	12,487.4	1,128.0
Kemerburgaz	875,682	67,268.8	2,825.6
Arnavutkoy	1,097,713	91,369.5	4,577.6

**Based on data obtained from Istanbul Regional Directorate of Forestry, Durusu, Kemerburgaz and Arnavutkoy Series Forest Management Plans.*

3.2. Loss of Carbon Capture Capacity

According to the estimates and statements of Istanbul Regional Directorate of Forestry, carbon capture capacity and oxygen generation amount of the forests under their authority (in the region of this directorate) is 85,500 million tonnes per year and 2.4 million tonnes per year, respectively. Therefore, based on the fact that the Project Area is located in this area managed by Istanbul Regional Directorate of Forestry, a correlation can be made between the Project Area and the whole area managed by the Directorate. This correlation is based on the size of the forest area in the Project Area and in the area under the authority of the Istanbul Directorate.

Istanbul Regional Directorate of Forestry is managing a forest area of 762,458 ha within an overall regional area of 2,420,837 ha. The correlation for estimation of the loss of carbon capture and oxygen generation capacity had been made considering the forest area of 762,458 ha in the region and the forest area of 5,230 ha that would be potentially lost in the Project Area. As a result, it was estimated that the forests in the Project Area have a carbon capture capacity of 586.5 tonnes per year and oxygen generation capacity of 0.016 tonnes per year. These correspond to less than 1% (0.68%) of the carbon capture and oxygen generation capacities of the forests in the region.

4. LEGAL STATUS AND COMPENSATORY REQUIREMENTS

4.1. Relevant Turkish Legislation and Procedures for Projects on Forest Land

The legislation related to forest areas, their protection and utilisation for public benefit is composed of laws and regulations that are based on the Constitution of Turkey. The central administrative authority is the Ministry of Forestry and Water Affairs (MFWA). The relevant agency within MFWA is the General Directorate of Forestry, which itself has Regional Directorates (including Istanbul Regional Directorate) in the country and Operational Directorates and Sections in those regions. These Directorates are responsible for protecting forestry and forestry resources against negative impacts, and developing and managing forestry and forestry resources in a sustainable way.

Laws and regulations for realisation of various types of projects located on state owned forest land and regulation of afforestation and other related measures on these areas can be summarised as follows:

- Forest Law (Law No. 6831, Official Gazette date 8.9.1956, No. 9402)
- Implementing Regulation of 16th Article of the Forest Law (Official Gazette dated 18.04.2014, No. 28976)
- Implementing Regulation of 17th/3 and 18th Articles of the Forest Law (Official Gazette dated 18.04.2014, No. 28976)
- Regulation on Permits to be Granted in Areas Considered as Forest
- Regulation on Afforestation (Official Gazette dated 23.08.2012, No. 28390)

The INA Project is planned to be implemented by the Republic of Turkey Ministry of Transportation, Maritime Affairs and Communications, the General Directorate of Infrastructure Investments. The Project Area contains forest areas under the authority of the Ministry of Forestry and Water Affairs, General Directorate of Forestry. Article 4 of "Implementing Regulation of 17th/3 and 18th Articles of the Forest Law," and Section 10 of "Regulation on Permits to be Granted in Areas Considered as Forest" state that a permit application must be made for airports (amongst other construction types listed in this article) that are to be built in forest land. Therefore, it will be necessary for project protocols to be established between the two relevant ministries. An application by Ministry of Transportation, Maritime Affairs and Communications must be made to the Ministry of Water Affairs and Forestry in order to proceed with the project construction.

The following documents are required for this application (note that these documents are required for infrastructure projects and this list excludes additional documents needed for mine projects):

a. Operation licence
b. Map or sketch (1/25000 scale)
c. Stand map
d. Layout plan (1/1,000 or appropriate scale)
e. Coordinate lists
f. Forest cadastral map
g. Tree plan showing the existing state of the forest (1/1,000 or appropriate scale)
h. Local zoning plan (1/1,000 scale)
i. EIA permit licence
j. Bill of quantities of the facilities that will be built in the requested area and summary of estimates prepared according to proforma invoices or current year unit prices which

will be determined by the Ministry of Environment and Urbanization and the relevant state authorities or public institutions and organisations.

The Ministry of Transportation, Maritime Affairs and Communications is required commission an authorised company to prepare the aforementioned documents. Where the application paperwork is complete and accurate, a delegation from the Regional Directorate will inspect the land and prepare a preliminary, or final, permit report. This report includes consideration of whether the Project is in the public interest. In the event the final permit report is given, permission for up to 49 years (extendable up to 100 years) is given. Within one month following the permit issuance, relevant fees and assurance are taken from the Ministry of Transportation, Maritime Affairs and Communications by the General Directorate of Forestry.

The General Directorate of Forestry and its Regional Directorate will perform all the works (including tree marking, felling, logging, chipping and removal) on the area during the period between permit issuance and delivery of the land to the Ministry of Transportation, Maritime Affairs and Communications.

The above documentation is required for final permitting and by preparing the documents mentioned in items (a), (b), (c), (d), (e) and (f), an application for pre-approval may be made to the regional directorate. A pre-approval application generally serves as a permit to prepare the documents and information needed to apply for the final permit. During this period, preparatory studies can be undertaken for permitting in this period (which is generally 24 months), but construction is not allowed until the final permit is granted.

Fees required to be paid for the application are; afforestation fee, land permit fee, forest-village relations fee (Orkoy fee) and erosion fee. However, state institutions and organisations are not required to pay these fees for pre-approval application. Therefore, the General Directorate of Infrastructure Investments is relieved from payment of any such fee in connection with the INA Project.

A raw material production permit is required for activities concerning the production of construction raw materials, by state institutions and organisations, in forest areas. Based on this permit, allowance of all operations and constructions for this purpose is regulated by Implementing Regulation of 16th Article of the Forest Law.

The permitting documents are being prepared by IGA through a consultant authorised (by the Ministry of Forestry and Water Affairs) to prepare those documents. The data used in this Afforestation Plan are also mainly based on the data of the authorised forestry consultant. Based on the applications, to date, forestry permits for two construction camp sites have been issued.

4.2. Further Compensatory Actions with regard to International Requirements

Starting with the United Nations (UN) Conference on Environment and Development (UNCED), international conferences like the UN Convention on Biological Diversity, the UN Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC) are some of the many conventions which have given forests an increasingly important role in the context of sustainable development and environmental conservation. UN Forum on Forests (UNFF) and its supporting institution Collaborative Partnership on Forests (CPF) are currently responsible for international arrangements on forests. Although these conventions and institutions did not manage a consensus for a single legally binding document, they each contributed to the terms and conditions regarding sustainable forestry, reforestation and afforestation (Ref 2; Ref 3; Ref 4; Ref 5).

Since international finance is widely used for large scale projects, standards and guidelines regarding environmental and social issues associated with the projects that are supported by such finance, have been developed by international financing institutions. Among these institutions, the World Bank Group has a specifically important role, having established multiple documents covering almost every environmental and social aspect related to various project types. International Finance Corporation (IFC), which serves the private sector in the World Bank Group, has established its Performance Standards on Environmental and Social Sustainability and relevant guidelines covering environmental and social issues, including forestry and biodiversity.

IFC lists key initiatives and practices for forestry sector in its web based “Guide to Biodiversity for the Private Sector” (IFC, 2006). Among these key initiatives the following two, which have comparatively more importance, are defined as follows:

- The World Bank/WWF Forest Alliance: The Alliance works with governments, the private sector and civil society to create new protected areas of forest, improve the management of existing protected areas and promote independent certification of the world's production forests.

- The Forest Stewardship Council (FSC): The FSC is a global multi-stakeholder standard setter for sustainable forest management certification, promoting “environmentally appropriate, socially beneficial, and economically viable management of the world's forests.”

As stated in Section 4.1, the General Directorate of Forestry and its Regional Directorate are responsible for establishing and maintaining new forest areas, as compensation for the losses caused by the relevant project. The project sponsor is only responsible for paying an amount required for compensation. No international requirements regarding compensation in form of afforestation are given in this section, since only the Directorate is responsible for such forest works.

IFC has various social and environmental criteria for the projects it finances and these include criteria specifically set for biodiversity, since biodiversity based goods and services (products, ecosystem services, non-material benefits, and future options as mentioned in IFC’s A Guide to Biodiversity for the Private Sector) are affected by human activity. The main international agreement on biodiversity, Convention on Biological Diversity (CBD), highlights the importance of the private sector in meeting the convention's three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, through multi-stakeholder partnerships and industry-driven initiatives. In this regard, IFC Performance Standard 6 (PS6) Biodiversity Conservation and Sustainable Management of Living Natural Resources, categorises habitats as modified, natural and critical, where critical habitats are a subset of modified or natural habitats and provides general requirements (Ref 8).

In the scope of the INA Project, these international requirements and guidance have been and will be taken into account during planning (including ESIA and design), construction and operation activities. Relevant measures are developed during the planning phase in the context of the ESIA, especially in the scope of the assessment made on ecology, and master plan/design studies for mitigating and, where necessary, compensating the adverse impacts on forests and forest habitats. These mitigation and compensation measures are explained in detail in the following sections.

5. AFFORESTATION PLANNING AS MITIGATION AND SITES TO BE PROTECTED

5.1. General Provisions

According to relevant regulations, the General Directorate of Forestry is the authority that manages the forests in Turkey. In this regard, this Directorate is responsible for plantation works and maintenance of trees, cutting and/or translocation of trees, identification of species and locations for afforestation. Project owners are only required to pay the fees that are determined by this Directorate.

In order to compensate for the loss of forest assets in the Project Area, IGA committed to invest/pay for planting of twice the number of trees to be removed from the Project Area. The afforestation will be done by the General Directorate of Forestry and Istanbul Regional Directorate of Forestry in accordance with Turkish legislation. Since afforestation area to compensate the losses would be rather large as estimated below, the time needed for afforestation is expected to take many years and details are provided below.

All processes regarding the forest areas would be conducted in line with relevant Turkish legislation on forests.

5.2. Replacing the Forests/Afforestation at Alternative Sites and On Site, and Translocation Potential

Afforestation at Alternative Sites (Off Site)

For permit applications regarding projects on forest areas, no fee is required for state property forests (i.e. forests that are not established by third parties through private plantation work) if the applicant is a government body. In case private forests or plantation areas are present, as it is in the INA Project Area, the project owner pays the necessary fees regardless of it being a governmental organisation, for this type of forests. Therefore, Ministry of Transport, Maritime Affairs and Communications acquired the necessary preliminary permit by only paying the fees needed for plantation areas.

According to Turkish Legislation, afforestation for compensation is not required by the law, when the project owner is a government body. For privately owned projects, total area of afforestation is determined by General Directorate of Forestry and this area is always equal to the total forest area loss caused by the related private sector project. For INA, the government is responsible for taking clearance for the whole Project Area and later on, will handover the land to IGA as the appointed project sponsor/developer/owner to build and operate the Project. Therefore, for the Project, there is no legal requirement of compensation afforestation. However, IGA voluntarily committed to compensate for the loss of all forest assets by afforestation. This commitment involves the number of trees for new plantations to be 2 times the loss caused by the Project.

Ministry of Forestry and Water Affairs Department of Permission and Easements states that for individual afforestation applications, as it is the case with IGA, afforestation can be done in any region of Turkey. However, IGA plans to compensate for the forest habitat losses specific to Marmara region, so the new plantation areas would be in this region. For each region, specific tree species for plantations are determined by the related regional forestry directorate, depending on the forest habitats and economic requirements of that region. These requirements are determined yearly and are specified on that year's afforestation plans of the Regional Directorate.

In this context, the area to be afforested for compensating the loss due to the Project would be determined in coordination and cooperation of IGA with this Directorate. In worst case scenario, where all of the trees in the entire permit area of the Project are removed, a total of 2,280,308 trees would be lost. For compensation afforestation planning, Istanbul Regional Directorate of Forestry will determine the total area for planned plantations depending on the total forest assets that will be lost and the total annual increase this asset creates. Currently, there is no specific area designated for afforestation in Istanbul. General Directorate of Forestry stated that a 1,000 ha (500 ha + 500 ha) area in Trace region is available and in addition to this, areas in Canakkale, Bursa and Kocaeli provinces (all in Marmara Region) will be eligible.

Considering the number of trees that will be lost is 2,280,300, the number of trees for compensation will be around 4,560,600. Plantations will be made elsewhere in the region and based on the availability of land outside the Project Area. IGA will sign a protocol with relevant Regional Forestry Directorates. The number of saplings for plantation will be determined based on the area and tree species/types. Stated numbers of saplings that can be planted per hectare, by the Istanbul Regional Forestry Directorate, for different tree types, are as follows: 1,600 maritime pine saplings; 500 stone pine; 1,100 deciduous trees and 3,000 oak saplings. Some of these species are selected for economic reasons and some are selected to create the natural habitat conditions of Marmara Region. Therefore it is accurate to say an unknown percentage of the newly established forests will be used for economic purposes however natural habitat conditions will also be provided where harvest will not occur.

Under Turkish law, there is no legal requirement for payment of any fees for compensation as discussed above, due to the nature of the Project (designed as a build and operate project). However, IGA will implement afforestation activities to replace the lost forest assets at relevant locations to be showed by the Forestry Directorates. In this regard, costs associated with the afforestation activities will be paid by IGA.

The time required for exact compensation for the loss of forest assets depends on various interacting factors regarding forest conditions of the Project Area and conditions of afforestation. Some of these factors are as follows:

- Factors regarding species that will be lost and that will be planted such as growth rate
- Proportion of different age stands of different species that will be lost
- Proportion of different species that will be planted
- Proportion of trees that will be planted each year
- Site specific conditions like average precipitation and soil productivity of the selected afforestation areas

Planting as well as growing of the forests to maturation will take a rather long time and this will be an unavoidable consequence of the Project. Thus, compensating the impacts on forests would be achieved in medium to long term (including maturation of the forests to be planted).

Translocation Potential

In the Project Area, some species such as maritime pine (*Pinus pinaster Aiton)* that have rapid growth rates and low landscape and economic value, cutting and selling of all-age stands of these species is acceptable by the General Directorate of Forestry and that all timber cutting and selling would be conducted by the General Directorate of Forestry C-age (20 35.9 cm in diameter) larch and red pine stands are likely to be cut and a market assessment provided by the General Directorate of Forestry since they have a greater commercial value. Translocation

of a-age seedling stands of oaks (*Quercus sp*.) and hornbeams (*Carpinus betulus*) like MDya, Ma and Ma3's is not economicaly feasible due to low rate of translocation success, and also because their landscape value is low, these stands' translocation is considered infeasible. It is not possible to translocate c-age (20-35.9 cm in diameter) and d-age (36-51.9 cm in diameter) tree species, however, they have economic value and therefore it is appropriate that the Administration cut the c-age trees and provide them to market.

A-age genus and species, such as *Pinus pinea* (Stone pine), *Robinia* (Black locust), *Pinus nigra* (Black pine), *Cedrus* (Cedar), *Tilia* (Linden), *Acer* (Maple) and *Fraxinus* (Ash) have landscape and economic importance and c-age (8-19.9 cm in diameter) *Pinus brutia* (Red pine), *Pinus nigra* (Black pine), *Pinus pinea* (Stone pine), *Tilia* (Linden), *Acer* (Maple), *Robinia* (Black locust), *Cedrus* (Cedar) , *Fraxinus* (Ash) have landscape value. Of these genera, only stone pine and black locust are present in the Project Area, with age groups suitable for translocation, however translocation of these species is not considered a viable option since both are plantation trees and not representative of the natural habitats of the area.

Afforestation On Site

In addition, there would be planting of trees on site (in the Project Area) as well, where project facilities allow in line with the industry standards for airports. This will be implemented and coordinated by IGA and tree types will be selected such that they would be the native and suitable species for the area.

5.3. Sites to be Protected

IGA intends to keep and protect forest areas where possible, and in this regard, a decision has been made to protect the forest area specified as significantly important habitat, which covers and area of 50 ha in the north-western section of the Project Area. The studies revealed that this site is an important habitat for various wildlife species. Protection of this area in its natural state as much as possible is a priority and a large proportion of this area remains outside the current locations/footprint of airport facilities. In order protect to this habitat to the extent possible, utmost care would be given during the construction phase of the Project. It should be noted here that planning studies for the Project is ongoing and the master plan of the Project might further modified. Thus, protection of this habitat would be considered as an important factor for any future modifications to the master plan. The location of the natural forest habitat that will be protected is given in Figure 3.

The species that need protection as well as measures for mitigation of any impacts on these species are described in ESIA Chapter 7.8 Ecology. During pre-construction and construction activities forest removal will be done by Istanbul Regional Directorate of Forestry and will be monitored by both this Directorate and IGA to keep the removal areas at a minimum based on the project needs.

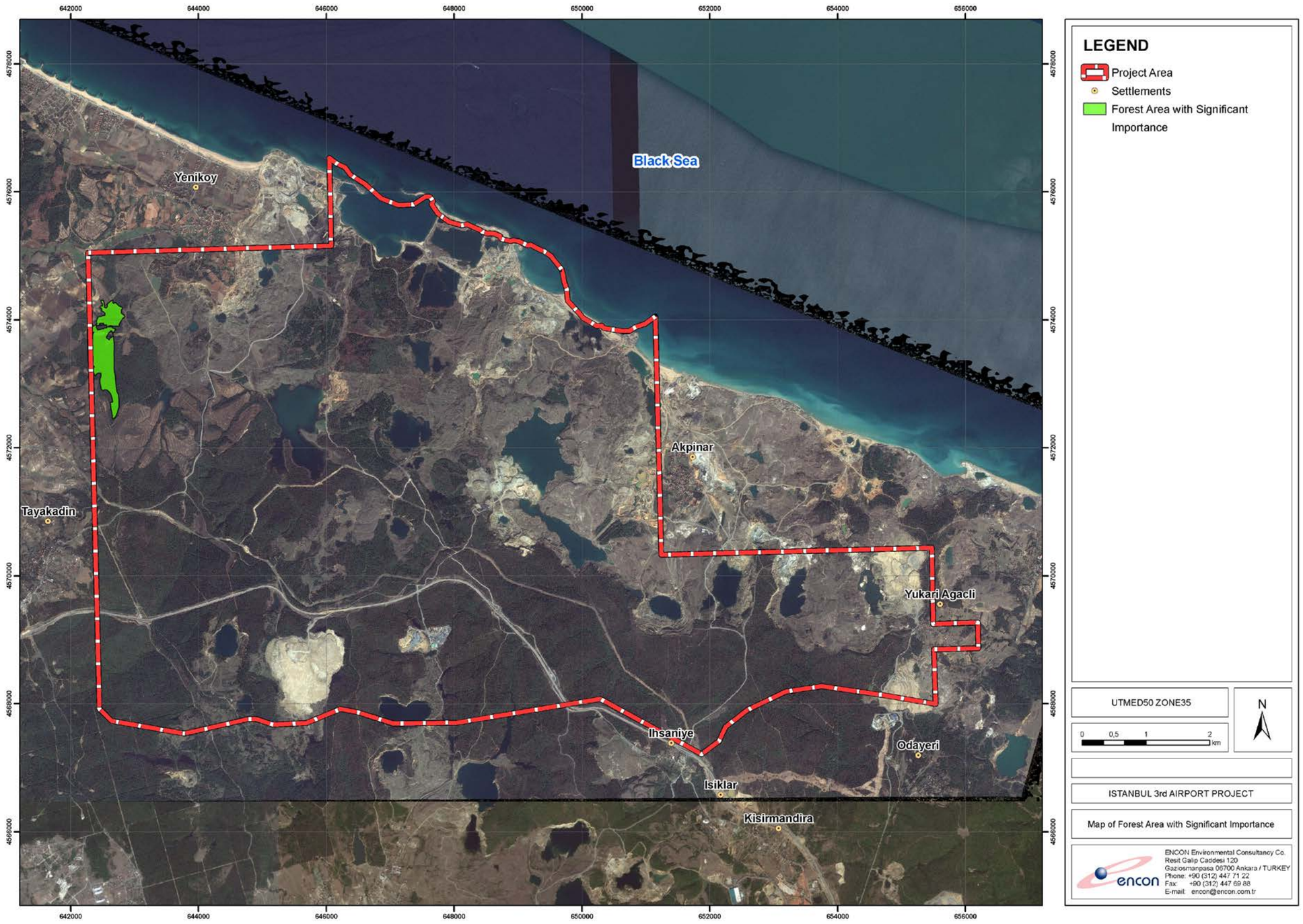

Figure 3 Natural Woodland Habitat with Significant Importance in the Project Area

REFERENCES

Reference 1 General Directorate of Forestry, Forest Management and Planning Department, 2011, Technical Prospectus for Field and Desk Studies on Functional Management Planning.

Reference 2 Eurostat, 2001, Forestry in the EU and the World, a Statistical Portrait.

Reference 3 European Communities (EC), 2003, Sustainable Forestry and the European Union, Initiatives of the European Commission.

Reference 4 UNCCD, 2012, The Rio Conventions: Action on Forests, Convention on Biological Diversity, United Nations Convention to Combat Desertification, United Nations Framework Convention on Climate Change.

Reference 5 UNCED, 1992, Rio Declaration on Environment and Development.

Reference 6 International Finance Corporation (IFC), 2006, A Guide to Biodiversity for the Private Sector (a web based guide).

Reference 7 Forest Stewardship Council, 2013, Forest Management Referential for Turkey.

Reference 8 Performance Standards IFC, 2012, Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

Appendix 1: Forest Characteristics for Sections of each Forest Sub-district Directorate Identified in the Project Area

Details of Forest Characteristics for Sections of each Forest Operation Department identified in the Project Area

ARNAVUTKOY SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
1	Cfab3-1	4.5	457	37.457	1.900	2,057	168.56	8.550
	Cfab3-2	28.3	457	37.457	1.900	12,933	1,060.03	53.770
	Cmb3	1.3	1,634	98.034	9.734	2,124	127.44	12.654
	Ma3	1.6						
	MGnab3	40.1	755	38.735	1.920	30,276	1,553.27	76.992
	Yaab3-1	6.3	867	54.967	2.200	5,462	346.29	13.860
	Yaab3-2	3.6						
	Yaab3-3	1.0						
2	Cfa	12.6						
	Cmb3	3.9	1,634	98.034	9.734	6,373	382.33	37.963
	Ma3	19.6						
3	MGnab3-1	46.6	755	38.735	1.920	35,183	1,805.05	89.472
	MGnab3 -2	26.6	755	38.735	1.920	20,083	1,030.35	51.072
6	Ma3-1	24.7						
	Ma3 -2	12.1						
	Ma3 -3	39.8	759	40.491	1.983	30,208	1,611.54	78.923
7	Ma3-1	2.3						
	Ma3 -2	26.3						
	Mab3-1	9.0	759	40.491	1.983	6,831	364.42	17.847
	Mab3 -2	30.7	759	40.491	1.983	23,301	1,243.07	60.878
	Mbc3	0.9	720	137.165	4.700		123.45	4.230
8	Ma3-1	4.8						
	Ma3 -2	2.3						

ARNAVUTKOY SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
	Mab3-1	8.0	759	40.491	1.983	6,072	323.93	15.864
	Mab3 -2	58.7	759	40.491	1.983	44,553	2,376.82	116.402
9	CkMbc3	5.9	1,083	112.738	7.237	6,390	665.15	42.698
	Cmcd2/Mb2-1	2.1						
	Cmcd2/Mb2-2	28.3						
	Cmcd3-1	3.6						
	Cmcd3-2	6.8						
	Mab3-1	3.5	759	40.491	1.983	2,657	141.72	6.941
	Mab3-2	2.6	759	40.491	1.983	1,973	105.28	5.156
	MCkbc3	10.0	1,027	126.453	6.201	10,270	1,264.53	62.010
10	Ma3	1.7						
	Mab3	35.2	759	40.491	1.983	26,717	1,425.28	69.802
11	MGnab3	60.1	755	38.735	1.920	45,376	2,327.97	115.392
12	Mb3	50.1						
14	Ma3	40.9						
	Mb3	11.0						
15	Ma3-1	2.3						
	Ma3-2	0.6						
	Mb3	16.5						
16	CfYaa	1.3						
	Mb3-1	5.5						
	Mb3-2	4.4						
17	Cfa-1	0.9						
	Cfa-2	2.0						
	CfYaa-1	2.3						
	CfYaa-2	2.0						

ARNAVUTKOY SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
	Mab3-1	18.1	759	40.491	1.983	13,738	732.89	35.892
	Mab3-2	3.0	759	40.491	1.983	2,277	121.47	5.949
	MGnab3	2.6	755	38.735	1.920	1,963	100.71	4.992
18	Cfa-1	2.3						
	Cfa-2	1.2						
	MGnab3	41.2	755	38.735	1.920	31,106	1,595.88	79.104
19	Cfa	2.3						
	MGnab3	17.2	755	38.735	1.920	12,986	666.24	33.024
22	Ma3-1	2.4						
	Ma3-2	10.0						
	Mab3	25.4	759	40.491	1.983	19,279	1,028.47	50.368
23	Ma3	37.7						
	Mab3	20.6	759	40.491	1.983	15,635	834.11	40.850
24	Ma3-1	2.4						
	Ma3-2	4.4						
	Mab3	36.3	759	40.491	1.983	27,552	1,469.82	71.983
25	Ckc3	3.6						
	CkMbc3-1	19.2	1,083	112.738	7.237	20,794	2,164.57	138.950
	CkMbc3-2	2.0	1,083	112.738	7.237	2,166	225.48	14.474
	CkMc3	2.2	893	152.898	8.274	1,965	336.38	18.203
	Cmcd2/Mb2	7.7						
	Cmcd3-1	11.5						
	Cmcd3-2	8.5						
	Mab3	3.4	759	40.491	1.983	2,581	137.67	6.742
	Mbc3	4.2	720	137.165	4.700	3,024	576.09	19.740
	MCkc3	8.9	961	185.327	7.878	8,553	1,649.41	70.114

ARNAVUTKOY SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
26	CkMc3	3.3	893	152.898	8.274	2,947	504.56	27.304
	CfYaa	29.9						
	Cmcd2/Mb2	17.6						
	Mbc3	1.3	720	137.165	4.700	936	178.31	6.110
	MCkbc3	9.9	1,027	126.453	6.201	10,167	1,251.88	61.390
27	CkMbc3-1	15.4	1,083	112.738	7.237	16,678	1,736.17	111.450
	CkMbc3-2	3.6	1,083	112.738	7.237	3,899	405.86	26.053
	CfYaa-1	8.1						
	CfYaa-2	1.9						
	CfYaa-3	4.7						
	Cmcd2/Mb2	10.2						
	Cmcd3	10.6						
	CmMc3 1	3.1	870	199.395	12.330	2,697	618.12	38.223
	MCkc3-1	4.3	961	185.327	7.878	4,132	796.91	33.875
	MCkc3-2	6.3	961	185.327	7.878	6,054	1,167.56	49.631
28	CkMbc3	9.2	1,083	112.738	7.237	9,964	1,037.19	66.580
	CfYaa	4.7						
	Cmcd2/Mb2-1	1.5						
	Cmcd2/Mb2-2	1.9						
	Cmcd3-1	4.4						
	Cmcd3-2	1.6						
29	Cmcd2/Mb2	8.0						
	Cmcd3-1	1.8						
	Cmcd3-2	8.9						
30	Ma3-1	2.4						
	Ma3-2	5.5						

ARNAVUTKOY SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
	Ma3-3	4.3						
	Mab3	8.6	759	40.491	1.983	6,527	348.22	17.054
31	Ma3	13.6					0.00	0.000
	Mab3	3.6	759	40.491	1.983	2,732	145.77	7.139
32	Ma3	21.5					0.00	0.000
	Mab3	5.7	759	40.491	1.983	4,326	230.80	11.303
33	Ma3	25.0						
34	Ma3	19.9						
35	CfYaa	12.8						
	Ma3	10.3						
36	Mab3	21.2	759	40.491	1.983	16,091	858.41	42.040
37	Mab3	14.2	759	40.491	1.983	10,778	574.97	28.159
38	Mab3-1	4.5	759	40.491	1.983	3,416	182.21	8.924
	Mab3-2	6.1	759	40.491	1.983	4,630	247.00	12.096
39	Mab3	9.9	759	40.491	1.983	7,514	400.86	19.632
	Mb3	13.0	1,251	94.059	4.175	16,263	1,222.77	54.275
40	Mb3	35.5	1,251	94.059	4.175	44,411	3,339.09	148.213
42	Ma3	2.1						
	Mab3	0.8	759	40.491	1.983	607	32.39	1.586
	Mb3	25.3	1,251	94.059	4.175	31,650	2,379.69	105.628
43	CfYaa	1.5						
	Mb3	24.9	1,251	94.059	4.175	31,150	2,342.07	103.958
45	Ma3	9.1					0.00	0.000
	Mab3	1.7	759	40.491	1.983	1,290	68.83	3.371
	Mb3	31.3	1,251	94.059	4.175	39,156	2,944.05	130.678
49	CkMbc3	9.4	1,083	112.738	7.237	10,180	1,059.74	68.028

ARNAVUTKOY SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	Cmcd2/Mb2	18.6						
	Ma3	1.2						
	Mab3	31.7	759	40.491	1.983	24,060	1,283.56	62.861
50	Cmcd2/Mb2	10.5						
	MCzc3	16.7	815	149.366	6.659	13,611	2,494.41	111.205
	MCkbc3	34.1	1,027	126.453	6.201	35,021	4,312.05	211.454
	MCmc3	3.9	709	197.323	8.027	2,765	769.56	31.305
52	CkMbc3	3.0	1,083	112.738	7.237	3,249	338.21	21.711
	CfYaa	49.0						
	MCkbc3-1	24.6	1,027	126.453	6.201	25,264	3,110.74	152.545
	MCkbc3-2	7.9	1,027	126.453	6.201	8,113	998.98	48.988
	MCkc3-1	3.8	961	185.327	7.878	3,652	704.24	29.936
	MCkc3-2	10.8	961	185.327	7.878	10,379	2,001.53	85.082
	MCk							
53	CkMbc3	3.0	1,083	112.738	7.237	3,249	338.21	21.711
	CfYaa	3.8						
	Ma3	4.7						
	MCkbc3-1	19.3	1,027	126.453	6.201	19,821	2,440.54	119.679
	MCkbc3-2	16.5	1,027	126.453	6.201	16,946	2,086.47	102.317
	MCkc3	24.0	961	185.327	7.878	23,064	4,447.85	189.072
54	CkMbc3-1	4.8	1,083	112.738	7.237	5,198	541.14	34.738
	CkMbc3-2	4.0	1,083	112.738	7.237	4,332	450.95	28.948
	CfYaa	26.9						
	Mbc3	1.6	1,083	137.165	4.700	1,733	219.46	7.520
	MCkbc3	2.4	1,027	126.453	6.201	2,465	303.49	14.882
56	CkMbc3-1	1.2	1,083	112.738	7.237	1,300	135.29	8.684

ARNAVUTKOY SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	CkMbc3-2	5.0	1,083	112.738	7.237	5,415	563.69	36.185
	CfYaa	50.0						
	Cmc3	2.6	453	189.076	14.168	1,178	491.60	36.837
	CmMc3	7.7	870	199.395	12.330	6,699	1,535.34	94.941
	Mab3	3.2	759	40.491	1.983	2,429	129.57	6.346
	MCkbc3	0.7	1,027	126.453	6.201	719	88.52	4.341
	MCmc3	1.9	709	197.323	8.027	1,347	374.91	15.251
	Yaab3	3.8	867	54.967	2.200	3,295	208.87	8.360
57	CkMbc3	25.7	1,083	112.738	7.237	27,833	2,897.37	185.991
	CkYaa	25.1						
59	Mab3	21.2	759	40.491	1.983	16,091	858.41	42.040
60	CfYaa	0.7						
	Ma3-1	3.9						
	Ma3-2	5.3						
	Mab3	21.8	759	40.491	1.983	16,546	882.70	43.229
61	CfYaa	12.9						
	Ma3	13.0						
63	CfYaa	7.3						
	Ma3	21.0						
66	Mab3	28.1	759	40.491	1.983	21,328	1,137.80	55.722
67	Mab3	26.3	759	40.491	1.983	19,962	1,064.91	52.153
TOTAL		**2,144.6**				**109,7713**	**91,369.54**	**4,577.594**

DURUSU SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
76	MDyab3	27.7	686	23.144	2.371	19,002	641.09	65.677
	Yaa-1	1.5						
	Yaa-2	1.0						
	Yaa-3	0.4						
77	Cfa	10.5						
	MDya3-1	4.3						
	MDya3-2	5.9						
	MDya3-3	1.9						
78	Cfa	19.5						
	MDya3	19.2						
79	Cfa	31.0						
	MDya3	5.2						
80	Cfa	58.0						
	MDya	2.0						
	MDya3	3.7						
81	Cfa	1.4						
	MDya	20.7						
82	Cfa	22.8						
	MDya	4.6						
83	Cfa-1	0.3						
	Cfa-2	1.4						
	MDya-1	1.5						
	MDya-2	2.0						
84	Cfa-1	0.3						
	Cfa-2	67.2						

DURUSU SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
	MDya	0.5						
85	Cfa	32.9						
	MDya3	1.4						
86	Cfa-1	7.5						
	Cfa-2	19.2						
	Cfb3	1.7	661	57.018	4.047	1,124	96.93	6.880
	CmCfa	5.1						
	CmCfbc3	10.2	951	208.526	10.192	9,700	2,126.97	103.958
	Dsa	5.8						
	Yaab3	6.7	2,904	19.666	19.706	19,457	131.76	132.030
87	Cfa	14.0						
	CfCma3	2.7						
	CmCfbc3	2.2						
	Yaab3	1.1	1,292	19.666	5.467	1,421	21.63	6.014
89	Cmbc3	1.9						
	MDya3-1	0.2						
	MDya3-2	0.6						
	MDyab3	5.0	686	19.215	2.271	3,430	96.08	11.355
90	Cfa	2.0						
	Cm0a	42.2						
	MDya3	3.9						
	MDyab3	8.7	686	23.144	2.371	5,968	201.35	20.628
91	Cfa	1.3						
	Cm0a-1	0.8						
	Cm0a-2	5.4						
	MDyab3	43.3	686	23.144	2.371	29,703	1,002.14	102.664

DURUSU SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
92	Cfa	0.6						
	Cm0a	4.6						
	MDyab3	24.6	686	23.144	2.371	16,875	569.34	58.327
93	Cfb3	2.2	661	57.018	4.047	1,454	125.44	8.903
	Cm0a	14.5						
	Cmbc3	2.9	884	126.259	7.651	2,564	366.15	22.188
	MDyab3	35.9						
94	Cfa	39.0						
	Cmbc3	0.9	884	126.259	7.651	796	113.63	6.886
	MDyab3	2.0	686	23.144	2.371	1,372	46.29	4.742
95	Cma	31.9						
	Ma3	6.5						
96	Cm0a	10.3						
	Mab3	24.3	479	14.092	1.200	11,640	342.44	29.160
	MDyab3	2.3	686	23.144	2.371	1,578	53.23	5.453
97	Cma-1	5.1						
	Cma-2	10.5						
	Ma3	0.8						
	MDyab3	3.4	686	23.144	2.371	2,332	78.69	8.061
98	Cfbc3	6.6						
	Cm0a-1	0.8						
	Cm0a-2	13.8						
	CmCfa	4.0						
	MDyab3-1	1.0	686	23.144	2.371	686	23.14	2.371
	MDyab3-2	2.2	686	23.144	2.371	1,509	50.92	5.216
	MDyab3-3	1.0	686	23.144	2.371	686	23.14	2.371

DURUSU SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
99	Cma-1	6.9						
	Cma-2	14.8						
	MDyab3-1	2.5	686	23.144	2.371	1,715	57.86	5.928
	MDyab3-2	3.7	686	23.144	2.371	2,538	85.63	8.773
101	Cm0a	17.8						
	MDyab3	7.1	686	23.144	2.371	4,870	164.32	16.834
102	Cma-1	5.9						
	Cma-2	14.8						
	MDyab3	25.0	686	23.144	2.371	17,150	578.60	59.275
106	Mc3	4.3	592	130.783	4.017	2,545	562.37	17.273
	MGnab3	10.3						
	BMDy-1	1.8						
	BMDy-2	0.7						
107	MGnab3	13.8	721	38.293	3.992	9,950	528.44	55.090
108	Cfa	5.3						
	MGnab3	11.6	1,191	38.293	3.150	13,816	444.20	36.540
109	Cfa	8.6						
	MGnab3	17.5	1,191	38.293	3.150	20,843	670.13	55.125
110	MGna3	8.8						
	MGnab3	9.2	1,191	38.293	3.150	10,957	352.30	28.980
111	MGnab3-1	1.2	1,191	38.293	3.150	1,429	45.95	3.780
	MGnab3-2	21.6	1,191	38.293	3.150	25,726	827.13	68.040
112	MGna3	11.3						
	MGnab3	17.4	1,191	38.293	3.150	20,723	666.30	54.810
113	Cfa	1.4						
	MGna3	5.2						

DURUSU SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	MGnab3	12.7	1,191	38.293	3.150	15,126	486.32	40.005
114	MGna	10.3						
	MGna3	8.1						
	MGna3	8.1						
115	MGnab3	23.7	1,191	38.293	3.150	28,227	907.54	74.655
TOTAL		**1,103.4**				**306,913**	**12,487.45**	**1,127.992**

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
1	Cfa	87.0						
	Cfab3-1	5.8	430	44.685	2.365	2,494	259.17	13.717
	Cfab3-2	3.6	430	44.685	2.365	1,548	160.87	8.514
	Cmb3	10.3	1,006	73.538	19.088	10,362	757.44	196.606
	Mab3	13.7	656	46.204	1.777	8,987	632.99	24.345
2	Cfa	41.5						
	Cmb3-1	6.3	1,006	73.538	7.119	6,338	463.29	44.850
	Cmb3-2	1.5	1,006	73.538	7.119	1,509	110.31	10.679
	Mb3	17.8	1,119	91.227	3.311	19,918	1,623.84	58.936
3	Cfa-1	24.5						
	Cfa-2	44.4						
	Mab3-1	6.6	656	46.204	1.777	4,330	304.95	11.728
	Mab3-2	11.3	656	46.204	1.777	7,413	522.11	20.080
	Mab3-3	1.9	656	46.204	1.777	1,246	87.79	3.376
	BMDy-1	1.6						
	BMDy-2	1.1						
	BMDy-3	2.5						
4	Cfa	25.8						
	BMCm	3.2						
	BMDy	2.9						
5	Cfa-1	8.1						
	Cfa-1	19.4						
	Mab3	3.8						
	MGnab3-1	5.6	680	44.985	1.760	3,808	251.92	9.856
	MGnab3-2	8.9	680	44.985	1.760	6,052	400.37	15.664

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	MGnab3-3	4.6	680	44.985	1.760	3,128	206.93	8.096
	BMDy-1	0.9		-				
	BMDy-2	3.0		-				
6	Cfab3	4.1	680	44.985	1.760	2,788	184.44	7.216
	CfYaa	5.7		-				
	Cmb3	8.8						
	Yaab3-1	1.6	680	44.985	1.760	1,088	71.98	2.816
	Yaab3-2	2.7	680	44.985	1.760	1,836	121.46	4.752
	Yaab3-3	0.8	680	44.985	1.760	544	35.99	1.408
7	CfYaa-1	1.2		-				
	CfYaa-1	21.2		-				
	Mb3	4.3	1,119	91.227	3.311	4,812	392.28	14.237
	MGnb3	13.7	1,136	92.584	3.354	15,563	1,268.40	45.950
	BMDy	0.8						
8	Mb3-1	7.1	1,119	91.227	3.311	7,945	647.71	23.508
	Mb3-2	12.6	1,119	91.227	3.311	14,099	1,149.46	41.719
	MGnab3-1	8.1	680	44.985	1.760	5,508	364.38	14.256
	MGnab3-2	5.5	680	44.985	1.760	3,740	247.42	9.680
	MGnb3	5.5	1,136	92.584	3.354	6,248	509.21	18.447
	BMDy-1	5.5						
	BMDy-2	3.2						
9	Cfa	102.5						
	Mab3-1	2.3	656	46.204	1.777	1,509	106.27	4.087
	Mab3-2	11.4	656	46.204	1.777	7,478	526.73	20.258
	MGnab3	2.5	680	44.985	1.760	1,700	112.46	4.400

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
10	MGnab3-1	9.1	680	44.985	1.760	6,188	409.36	16.016
	MGnab3-2	2.1	680	44.985	1.760	1,428	94.47	3.696
11	Cfa-1	29.2						
	Cfa-2	35.5						
	Ma3	0.5						
	Mab3-1	18.4	656	46.204	1.777	12,070	850.15	32.697
	Mab3-2	15.6	656	46.204	1.777	10,234	720.78	27.721
	BMDy	16.3						
12	CfYaa	6.4						
	MGnb3	7.3	1,136	92.584	3.354	8,293	675.86	24.484
	BMDy	3.4						
13	CfYaa	12.7						
	MGnb3	6.7	1,136	92.584	3.354	7,611	620.31	22.472
	BMDy-1	1.6						
	BMDy-2	2.7						
	BMDy-3	9.8						
14	Cfa	82.5						
	CfYaa	9.0						
	Cma-1	1.9						
	Cma-2	3.3						
	Cma-3	1.9						
	Cmb3-1	1.2	1,006	73.538	7.119	1,207	88.25	8.543
	Cmb3-2	3.2	1,006	73.538	7.119	3,219	235.32	22.781
	Cmb3-3	7.8	1,006	73.538	7.119	7,847	573.60	55.528
	Yaab3-1	2.3	680	44.985	1.760	1,564	103.47	4.048

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	Yaab3-2	1.2	680	44.985	1.760	816	53.98	2.112
	Yaab3-3	4.0	680	44.985	1.760	2,720	179.94	7.040
	Yaab3-4	1.4	680	44.985	1.760	952	62.98	2.464
15	Mab3	23.0	656	46.204	1.777	15,088	1,062.69	40.871
16	Mab3	29.5	656	46.204	1.777	19,352	1,363.02	52.422
17	Mab3	18.3	656	46.204	1.777	12,005	845.53	32.519
	MKsa3	4.9						
18	Cfa	0.5						
	Ma3	10.8						
	Mab3	5.8	656	46.204	1.777	3,805	267.98	10.307
	BMDy	2.8						
22	Cfa	26.6						
23	Cmb3-1	1.0	1,006	73.538	7.119	1,006	73.54	7.119
	Cmb3-2	1.6	1,006	73.538	7.119	1,610	117.66	11.390
	Cmb3-3	14.4	1,006	73.538	7.119	14,486	1,058.95	102.514
	Yaab3-1	1.1	680	44.985	1.760	748	49.48	1.936
	Yaab3-2	4.8	680	44.985	1.760	3,264	215.93	8.448
	Yaab3-3	2.2	680	44.985	1.760	1,496	98.97	3.872
	Yaab3-4	2.5	680	44.985	1.760	1,700	112.46	4.400
24	Cfa	12.5						
25	Mab3	1.5	656	46.204	1.777	984	69.31	2.666
	Mb3-1	37.1	1,119	91.227	3.311	41,515	3,384.52	122.838
	Mb3-2	1.5	1,119	91.227	3.311	1,679	136.84	4.967
26	Mab3	6.7	656	46.204	1.777	4,395	309.57	11.906
	Mb3	34.4	1,119	91.227	3.311	38,494	3,138.21	113.898

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
27	Mab3-1	3.9	656	46.204	1.777	2,558	180.20	6.930
	Mab3-2	0.7	656	46.204	1.777	459	32.34	1.244
	Mb3	20.2	1,119	91.227	3.311	22,604	1,842.79	66.882
	Mbc3	11.0	950	152.741	4.350	10,450	1,680.15	47.850
	BMDy	2.1						
28	Mab3-1	4.3	656	46.204	1.777	2,821	198.68	7.641
	Mab3-2	2.6	656	46.204	1.777	1,706	120.13	4.620
	Mb3	27.0	1,119	91.227	3.311	30,213	2,463.13	89.397
	BMDy	0.6						
29	Mab3	39.9	656	46.204	1.777	26,174	1,843.54	70.902
30	Ma3-1	32.9						
	Ma3-2	2.9						
31	Ma3	35.5						
32	Ma3	19.9						
33	Ma3	27.2						
34	Mab3-1	29.5	656	46.204	1.777	19,352	1,363.02	52.422
	Mab3-2	3.1	656	46.204	1.777	2,034	143.23	5.509
35	Mab3-1	21.1	656	46.204	1.777	13,842	974.90	37.495
	Mab3-2	0.8	656	46.204	1.777	525	36.96	1.422
36	Mab3	24.8	656	46.204	1.777	16,269	1,145.86	44.070
37	Mab3	28.8	656	46.204	1.777	18,893	1,330.68	51.178
38	Mab3	43.7	656	46.204	1.777	28,667	2,019.11	77.655
	Mab3-1	22.0	656	46.204	1.777	14,432	1,016.49	39.094
	Mab3-2	2.5	656	46.204	1.777	1,640	115.51	4.443
40	Mab3-1	30.1	656	46.204	1.777	19,746	1,390.74	53.488

KEMERBURGAZ SERIES								
Section Nr.	Stand Type	Area (Ha)	Per Ha			Total		
			Number	Asset (m^3)	Increase (m^3)	Number	Asset (m^3)	Increase (m^3)
	Mab3-2	3.6	656	46.204	1.777	2,362	166.33	6.397
	BMDy	0.8						0.000
41	Mab3	21.4	656	46.204	1.777	14,038	988.77	38.028
42	Mab3	16.5	656	46.204	1.777	10,824	762.37	29.321
43	Mab3	21.9	656	46.204	1.777	14,366	1,011.87	38.916
44	Mab3	19.9	656	46.204	1.777	13,054	919.46	35.362
45	Mab3	22.7	656	46.204	1.777	14,891	1,048.83	40.338
46	Cfa	13.1						
	Mab3	4.1	656	46.204	1.777	2,690	189.44	7.286
	MGnb3	13.0	1,136	92.584	3.354	14,768	1,203.59	43.602
47	Mb3	41.0	1,119	91.227	3.311	45,879	3,740.31	135.751
48	Mab3	58.5	656	46.204	1.777	38,376	2,702.93	103.955
49	MGnb3	44.7	1,136	92.584	3.354	50,779	4,138.50	149.924
50	Mab3	36.3	656	46.204	1.777	23,813	1,677.21	64.505
52	Mab3-1	2.9	656	46.204	1.777	1,902	133.99	5.153
	Mab3-2	1.7	656	46.204	1.777	1,115	78.55	3.021
	Mab3--3	0.6	656	46.204	1.777	394	27.72	1.066
	Mc3	5.3	603	202.257	4.202	3,196	1,071.96	22.271
	BMDy	1.4						
78	Ma3	19.8						
	Mb3	2.4	1,119	91.227	3.311	2,686	218.94	7.946
79	Ma3	12.4						
	Mb3	5.3	1,119	91.227	3.311	5,931	483.50	17.548
	MGnab3	0.3	680	44.985	1.760	204	13.50	0.528
81	Mab3	6.5	656	46.204	1.777	4,264	300.33	11.551

KEMERBURGAZ SERIES								
Section Nr.	**Stand Type**	**Area (Ha)**	**Per Ha**			**Total**		
			Number	**Asset (m^3)**	**Increase (m^3)**	**Number**	**Asset (m^3)**	**Increase (m^3)**
	MGna3	29.4						
TOTAL		**1,981.8**				**875,682**	**67,268.82**	**2,825.562**

Appendix 2: Approach to Afforestation Plan



Istanbul New Airport ESIA

Environmental Baseline and Impact Assessment Forestry

Approach for Afforestation Plan

Prepared for:
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Istanbul, Turkey

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Date:
February 2015

Project or Issue Number:
UK14-19216

ENVIRON

Contract No:	UK14-19216
Issue:	3
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Date:	06.02.2015

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Version Control Record				
Issue	**Description of Status**	**Date**	**Reviewer Initials**	**Author Initials**
1	First Draft	28 June 2014	KH/VV/NS	HC
2	Final Draft	17 December 2014	VV/DW	HC
3	Final	06 February 2015	VV/DW	HC

APPROACH FOR AFFORESTATION PLAN

1. Project Description and Background

The Consortium of Limak, Cengiz, Kolin, MAPA and Kalyon (IGA) is planning to build a new international airport to service Istanbul, Turkey. It is intended that the Istanbul New Airport (INA) will be constructed and operated by IGA on behalf of the Turkish Government over a 25 year operational concession period from completion of the first phase. The project is split into four phases and it is expected that phase four will facilitate a 150 million passengers per annum throughput.

The proposed airport site is located 35 km north-west of the existing Ataturk Airport and 40 km north-west from the centre of the city of Istanbul. The Project Area is located on the Black Sea coastline and falls within the municipalities of Eyup and Arnavutkoy with an area of 76,500,000 m^2 in total. The area is located 2.5 km to the east from Terkos Lake which is one of the major water resources supplying the city of Istanbul.

Portions of land within the Project Area are mined for sand, gravel and lignite. Sixteen companies are listed as licensed mines, of which six are currently operational in an area of 1,180 ha. An area of 298 ha is listed as being used for agricultural and stockbreeding purposes (236 ha of pasture land, 60 ha of dry farming, two ha of scrub) as being used for agricultural and stockbreeding purposes. There are three landfill sites within the boundary of the Project Area, of which two are operational and these are licensed by the Government to receive construction waste materials.

According to the official forest management plans of the General Directorate of Forestry, 5,230 ha of the 7,650 ha Project Area includes forest assets. An area of 610 ha has been identified as different sized water bodies (70 in total of them with different ranging in sizes ranging from 0.17 to 100 ha) resulting from previous quarry excavation (open pit mining) areas, which were then filled by precipitation. Forestry area contain a total of 2,280,308 trees/saplings, making up an asset of 171,125.81 m^3. Based on these figures, the area classified as forest is 68% of the total Project Area.

2. Turkish Legislation and Procedures

Legislation

For the INA Project, a permit application is required according to Article 17 of Forest Law (No: 6831) and its implementing regulation. As specified in the implementing regulations of the relevant laws, the state administration and public institutions and organisations are required to make a formal application for transfer of authority regarding these lands.

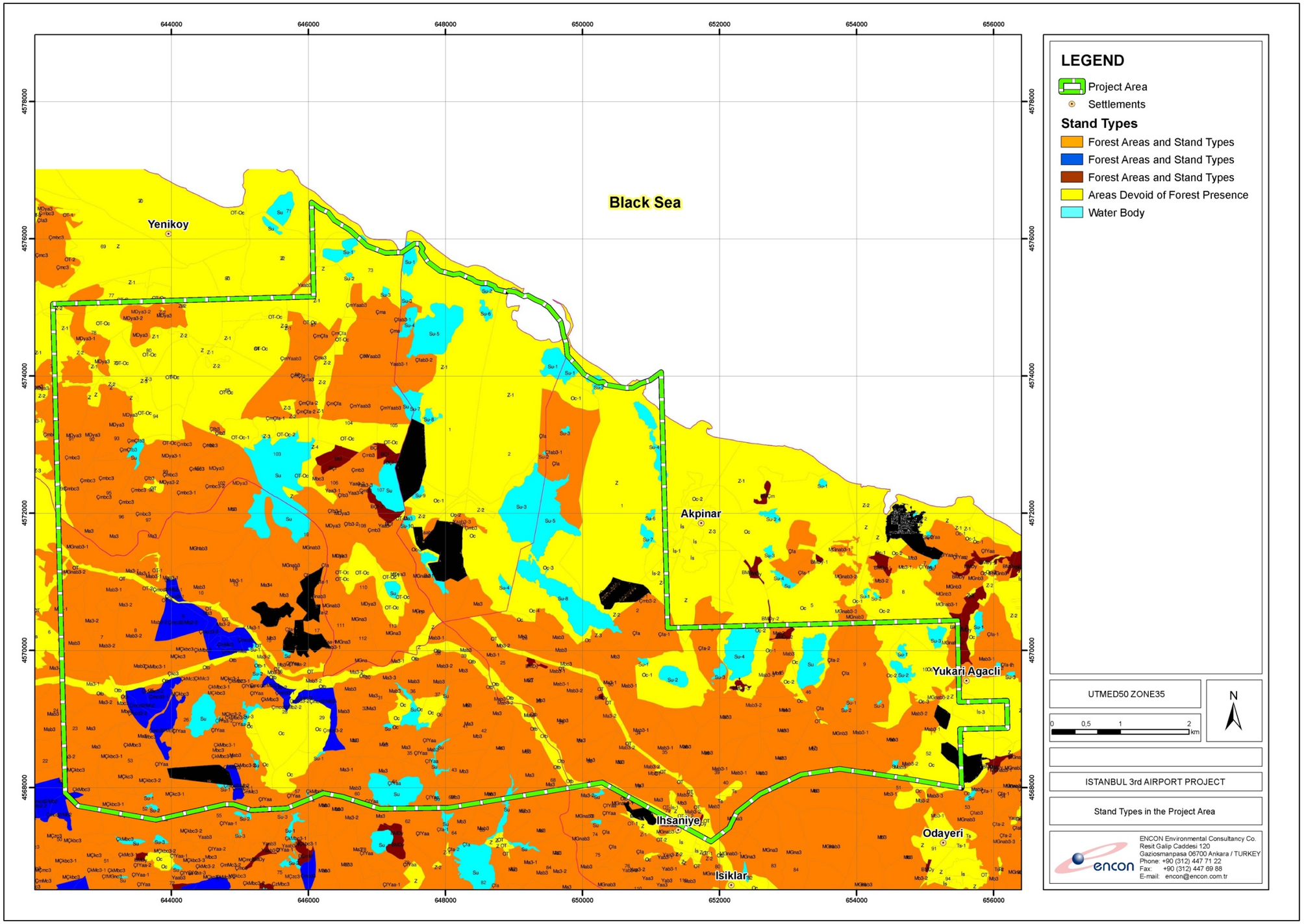

Figure 1. Stand Types within the Project Area

Protocols and Process

The INA Project is planned to be implemented by the Republic of Turkey Ministry of Transportation, Maritime Affairs and Communications, the General Directorate of Infrastructure Investments. The Project Area contains forest areas under the authority of the Ministry of Water Affairs and Forestry, General Directorate of Forestry. Therefore, it will be necessary for project protocols to be established between the two relevant ministries.

Initially, the Ministry of Transportation, Maritime Affairs and Communications makes an application to the Department of Water Affairs and Forestry for permission to implement (construct, operate) the Project in this area. For this application, the following documents are required to be included in this application (note that these documents are required for infrastructure projects and this list excludes additional documents required for mine projects):

a) Operation licence
b) Map or sketch (1/25000 scale)
c) Stand map
d) Layout plan (1/1,000 or appropriate scale)
e) Coordinate lists
f) Forest cadastral map
g) Tree plan showing the existing state of the forest (1/1,000 or appropriate scale)Local zoning plan (1/1,000 scale)
h) Environmental Impact Assessment (EIA) permit licence Bill of quantities of the facilities that will be built in the requested area and summary of estimates prepared according to proforma invoices or current year unit prices which will be determined by the Ministry of Environment and Urbanization and the relevant state authorities or public institutions and organisations.

The above documentation is required for final permitting and by preparing the documents mentioned in items (a), (b), (c), (d) and (e) above, an application for pre-approval may be made to the regional directorate. A pre-approval application generally serves as a permit to prepare the documents and information needed to apply for the final approval (permit). Thus, preparatory studies could be done for permitting in this period (which is generally 24 months), but construction is not allowed.

The Ministry of Transportation, Maritime Affairs and Communications should commission an authorised company to prepare the aforementioned documents. Where the application paperwork is complete and accurate, a delegation from the Regional Directorate explores the land and prepares a preliminary or final permit report. This report includes consideration of whether the project is in the public interest. In the event the final permit report is given, permission for up to 49 years (extendable up to 100 years) is given. Within one month following the permit issuance, relevant fees and assurance are taken from the Ministry of Transportation, Maritime Affairs and Communications by the General Directorate of Forestry.

The General Directorate of Forestry and its Regional Directorate perform all the works on the area during the period between permit issuance and delivery of the land to the Ministry of Transportation, Maritime Affairs and Communications.

It should be noted that all documents required for the forest permit shall be provided by IGA to be used in the ESIA study. Neither field nor desktop study shall be performed for the documents/studies required within the scope of forest permit application.

3. EIA Findings

The following was concluded by the Turkish EIA:

Most of the Project Area consists of planting areas where *Pinus maritima* (maritime pine), *Pinus pinea* (stone pine), *Quercus* (oak) and *Robinia* (black locust) could be observed. In this regard, *Pinus maritima* (Maritime pine, *Pinus pinea* (Stone pine, *Pinus brutia* (Red pine), *Pinus nigra* (Black pine), Oak, *Carpinus* (Hornbeam) and *Fraxinus* (Ash) genus and species are common in the Project Area.

Identified stands of trees are located in the borders of Catalca Forestry Operation Directorate and Istanbul Forestry Operation Directorate of Istanbul Regional Directorate of Forestry under General Directorate of Forestry. Associated forest sub-district directorates are Arnavutkoy, Kemerburgaz and Durusu Forest Sub-district Directorates. Durusu Forest Sub-district Directorate is under the Catalca Forestry Operation Directorate while Arnavutkoy and Kemerburgaz Forest Sub-district Directorates are under the Istanbul Forestry Operation Directorate. These three operational Directorates determined that there was a total of 2,513,341 trees in the Project Area, and most of them would be removed due to project realisation. According to the formal letter of the Istanbul Regional Directorate of Forestry attached to the EIA, the number of trees to be removed would vary based on the fieldwork results to be conducted by regional directorate after permit application. Exact numbers will be determined by the regional directorate after examination of current management plans and field markings.

The EIA Report states that species such as: maritime pine, beach-maritime pine, and *Pinus radiata* (radiata pine) have rapid growth rates so it is difficult to assess the forest assets in the Area of Influence. In addition, the EIA Report assesses that this vegetation has low landscape value. Therefore, the EIA Report concludes that cutting and selling of all-age stands is acceptable by the General Directorate of Forestry and that all timber cutting and selling would be conducted by the General Directorate of Forestry C-age (20 35.9 cm in diameter) larch and red pine stands are likely to be cut and a market assessment provided by the General Directorate of Forestry since they have a greater commercial value.

The EIA Report concludes that:

- A-age genus and species, such as stone pine, black locust, black pine, cedar, linden, maple and ash have landscape and economic value. Therefore, translocation of these trees for use in landscaping works by local municipalities can be considered.
- B-age (8 19.9 cm in diameter) red pine, black pine, stone pine, linden, maple, black locust, cedar, ash genus and species have landscape value. Utilization of these tree species in landscaping works by municipalities would be appropriate.
- It is not possible to translocate C-age (20 35.9 cm in diameter) and D-age (36 51.9 cm in diameter) tree species and stands; however, they have economic value, and, therefore, it is appropriate that the General Directorate of Forestry cut the C-age trees and provide them to the commercial market.

The EIA Report reports that the General Directorate of Forestry is the authority that would undertake felling and/or relocation of the trees. All processes regarding the forest areas would be conducted in line with relevant Turkish legislation on forests. Where the General Directorate of Forestry and Istanbul Regional Directorate of Forestry finds it appropriate, the needs of Arnavutkoy and Eyup Municipalities would be taken into consideration and some of the trees could be translocated (costs to be met from the Project budget) to areas designated by the municipalities for plantation.

4. Approach and Methodology

The aim of the Afforestation Plan is to determine the quality of the forest areas, to determine the impacts of the Project on forest areas and to determine the options for reduction of adverse impacts. The stepwise approach for conducting the studies for the Afforestation Plan can be summarised as follows.

Definition of the Study Area

The overall Study Area covers the Project Area (including the overall expropriation area) indicated in the 2013 Master Plan. The areas that would be available for plantation/ afforestation were provided to IGA's forestry consultant in preparation of the forestry permit application(s), but such areas could not be specified at this time by the relevant governmental authorities: Istanbul Regional Directorate of Forestry and General Directorate of Forestry. Figure 1 shows the Project Area and its close vicinity including the Project Area borders defined within the Master Plan also including the classification of forests as provided in the official forest management plans of Istanbul Regional Directorate of Forestry.

Obtaining maps and satellite images (as available) for the Study Area

The available 1/25,000 scale topographical maps of the Project Area with relevant available satellite images have been obtained and used together with the maps provided by IGA.

Collection of further background data and information

A documentation review was conducted on the available reports and maps to evaluate the existing information relevant to the Project. This review covered the following:

- Existing reports (EIA report, feasibility and design reports, etc.) for the INA Project.
- Existing permits and any records regarding previous environmental related activities.
- The report and forest management plans provided by IGA's forestry consultant.
- The documents obtained from Istanbul Regional Directorate of Forestry and General Directorate of Forestry upon meeting with relevant departments.

Background information and data include:

- Present data (from the EIA report and IGA's forestry consultant) with regard to the Study Area relevant to the scope of this study,
- Forestry maps of the Project Area established by the authorities,
- Maps presenting information on land use, and
- Information gathered from IGA's meetings with Istanbul Regional Directorate of Forestry and site surveys.

Some of the above mentioned information is already in hand and official data and interpretation of this data were provided by IGA (through the forestry consultant working on the forestry permit application).

Preparation of maps

The maps of the Study Area were produced using GIS tools, to facilitate for effective presentation of the findings in geographical context (see Figure 1).

Establishing inventory and the ESIA chapter

As a result of these studies, the ESIA chapter on forestry was prepared and the findings were used for the baseline description and the assessment of impacts. In this regard, a forestry map showing various types of trees in the Project Area (as classified in the official management plans of General Directorate of Forestry) is presented and associated management approaches are reported. For potential adverse impacts relevant management measures are described in the ESIA.

5. Database and Reporting

In the context of the above mentioned studies, collected data and information were analysed, interpreted and reported in the establishment of the baseline conditions within the Study Area and for preparation of the ESIA Forestry Chapter and the Afforestation Plan. The content of the Afforestation Plan is provided below.

AFFORESTATION PLAN OUTLINE

1. INTRODUCTION

2. BASELINE CONDITIONS

   2.1 General
   2.2 Existing Land use and Areas of Conservation
   2.3 Forest Types and Tree Species

3. POTENTIAL IMPACTS DUE TO THE PROJECT

   3.1 Loss of Trees
   3.2 Loss of Carbon Capture Capacity

4. LEGAL STATUS AND COMPENSATORY REQUIREMENTS

   4.1 Relevant Turkish Legislation and Procedures for Projects on Forest Land
   4.2 Further Compensatory Actions with regard to International Requirements

5. AFFORESTATION PLANNING AS MITIGATION AND SITES TO BE PROTECTED

   5.1 General Provisions
   5.2 Replacing the Forests/Afforestation at Alternative Sites and On Site and Translocation Potential
   5.3 Sites to be Protected

REFERENCES

APPENDIX 1 DETAILS OF FOREST CHARACTERISTICS FOR SECTIONS OF EACH FOREST OPERATION DEPARTMENT IDENTIFIED IN THE PROJECT AREA