Ref. Ares(2023)6071821 - 07/09/2023

VOLUME 3

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

1. SUBJECT AND SCOPE OF THE PROJECT 4

1.1 Subject of the contract 4
1.2 Contract Management Structure 4
1.2.1 Contracting Authority (CA) *4*
1.2.2 End Recipient of Assistance (ERA) *4*
1.2.3 Delegation of the European Union to Türkiye (EUD) *4*
1.2.4 Supervisor *4*
1.3 Regulations and standards 4

2 SITE INFORMATION 5

2.1 Location 5
2.2 Project stages 6
2.3 Geo-technical investigation report 7

3 HEALTH AND SAFETY 8

4 QUALITY ASSURANCE 8

5 PROTECTION OF ENVIRONMENT 9

6 STRUCTURAL WORKS 10

6.1 Regulations and standards 10
6.2 Workmanship and productions 10
6.3 Mock-up and sampling 10
6.4 Preliminary works 10
6.5 Materials for bicycle roads and paved areas 11
6.5.1 Sub-base *11*
6.5.2 Bituminous surfacing construction *11*
6.5.3 Reinstatement of roads: bitumen surfacing *11*
6.5.4 Reinstatement of original ground surface *11*
6.5.5 Maintenance of reinstated surfaces *11*
6.6 Blasting 12
6.7 Surveying works 12
6.8 Earthworks and excavation 12
Crushed stone up to 32 mm *13*
Crushed stone up to 65 mm *13*
Filling with a quarry stone *13*
6.9 Keeping the site dry 13
6.10 Utility connections / clashes 14
6.11 Concrete works 14
6.12 Transportation and pouring 14
6.13 Compacting and vibration 15
6.14 Protection and curing 15
6.15 Formwork 15
6.16 Scaffolding 16

6.17 Insulation works 16
6.18 Prescribed mixes 16
6.19 Materials 16
*6.19.1 **Binding agent*** *16*
*6.19.2 **Aggregate*** *16*
*6.19.3 **Water*** *17*
*6.19.4 **Reinforcement*** *17*
*6.19.5 **Admixtures*** *17*
6.20 Curbstone works 17
*6.20.1 **Materials*** *17*
6.21 Stamped concrete 18
Formwork and printing application 18
6.22 Colored asphalt coating 19
6.23 Wooden bench with backrest 19
6.24 Rubbish bin 20
6.25 Galvanized metal separator 20
6.26 Metal drain 21
6.27 Drainage design and construction 21
6.28 Painting 22
6.29 Non-structural metal works 22

7 LANDSCAPE WORKS 24

8 SIGNING AND MARKING WORKS 27

9 ELECTRICAL AND LIGHTING WORKS 28

10 SUPERVISORS OFFICE 31

11 EC PUBLICITY & VISIBILITY REQUIREMENTS 31

11.1 EU Communication and Visibility Manual for EU External Actions 31
11.2 Signboards & commemorative plaques 32
*11.2.1 **Signboards during construction*** *32*
*11.2.2 **Permanent signboards*** *33*

List of Tables

Table 1: The summary of laboratory studies 7
Table 2: CBR test results 8
Table 3: Proportions of the concrete mixes 16
Table 4: Trees, grains, and shrubs 24

List of Figures

Figure 1: Location of Trabzon and Akçaabat in Türkiye 5
Figure 2: Aerial view of the project area (Section 1) 6
Figure 3: Aerial view of the project area (Section 2) 6
Figure 4: Locations of research pits 7

1. SUBJECT AND SCOPE OF THE PROJECT

1.1 Subject of the contract

The subject of the contract is a construction of a bicycle road in the coastal part of Akçaabat town making a part of Trabzon Metropolitan Municipality (TMM).

A total of 6,9 km of a bicycle road will be made. A pedestrian path shall be done along the bicycle road.

1.2 Contract Management Structure

1.2.1 Contracting Authority (CA)

The Ministry of Transport and Infrastructure, General Directorate of European Union Affairs and Foreign Relations, Department of European Union Investments (MoTI/GDEUAFR/EUID) will be the Contracting Authority (CA) of this operation and the Operating Structure (OS). The EUID is responsible for tendering, contracting, administration, accounting, and payments of the operation.

1.2.2 End Recipient of Assistance (ERA)

Trabzon Metropolitan Municipality (TMM) will be the End Recipient of Assistance (ERA) responsible for the management and performance of the operation. TMM shall appoint a high-level decision-making staff within the institution responsible for the management and performance of the Project and be the Senior Representative of End Recipient.

1.2.3 Delegation of the European Union to Türkiye (EUD)

EUD will exercise its ex-ante control on programming, procurement, monitoring and acting as an observer in the various meetings organized within the period of the implementation.

1.2.4 Supervisor

The supervisor shall act as adviser to CA/TMM in a role of the works supervisor and support the works contractor in implementation of works. The supervisor shall also support CA/TMM, in fulfilment of their obligations.

1.3 Regulations and standards

All works within this project shall be done in accordance with relevant Turkish and EU standards including:

- Bisiklet Yolları Yönetmeliği, Türkiye Cumhuriyeti Cumhurbaşkanlığı 12 Aralık 2019 sayı 30976 / Bicycle Roads Legislation, Presidency of Turkish Republic, 12 December 2019 numbered 30976;
- Bisiklet Yolları Kılavuzu, Çevre, Şehircilik İklim Değişikliği Bakanlığı / Bicycle Roads Manual, Ministry of Environment, Urbanization and Climate Change;
- Karayollari Genel Mudurlugu, Karayolu Tasarim El Kitabi / Highway Design Manual, General Directorate of Highways;
- Trafik İşaretleri El Kitabı, Trafik Güvenliği İşaretleme Şubesi Müdürlüğü, Trafik Güvenliği Dairesi Başkanlığı, Traffic Marking Standards, Traffic Safety Department - Traffic Safety Marking Branch;

- Other relevant documents from: Trabzon Metropolitan Municipality (Trabzon Büyükşehir Belediyesi-TMM), Ministry of National Defense (Milli Savunma Bakanlığı), Turkish Electricity Transmission Company (Türkiye Elektrik İletim A.Ş.-TEİAŞ), The General Directorate of State Hydraulic Works (Devlet Su İşleri Genel Müdürlüğü-DSI), Turk Telecom (Türk Telekom) and other relevant authorities.

2 SITE INFORMATION

2.1 Location

The location of the project is in Akçaabat, which is one of the central towns of the Trabzon Metropolitan Municipality in the Black Sea Region of Türkiye. Akçaabat is the largest town of Trabzon with an estimated population of 128.348 in 2021. Trabzon is the 27th most crowded city in Türkiye with estimated population of 818.023 in 2022 [1].

Akçaabat is located 13 km far from the center of Trabzon, east of Vakfıkebir and Çarşıbaşı, west of Düzköy and north of Maçka.

The town is situated between the Black Sea coast and the Eastern Black Sea mountains. It is surrounded by Eynesil district of Giresun from the west, Torul district of Bayburt and Gümüşhane from the south, and İkizdere and Kalkandere districts of Rize from the east.

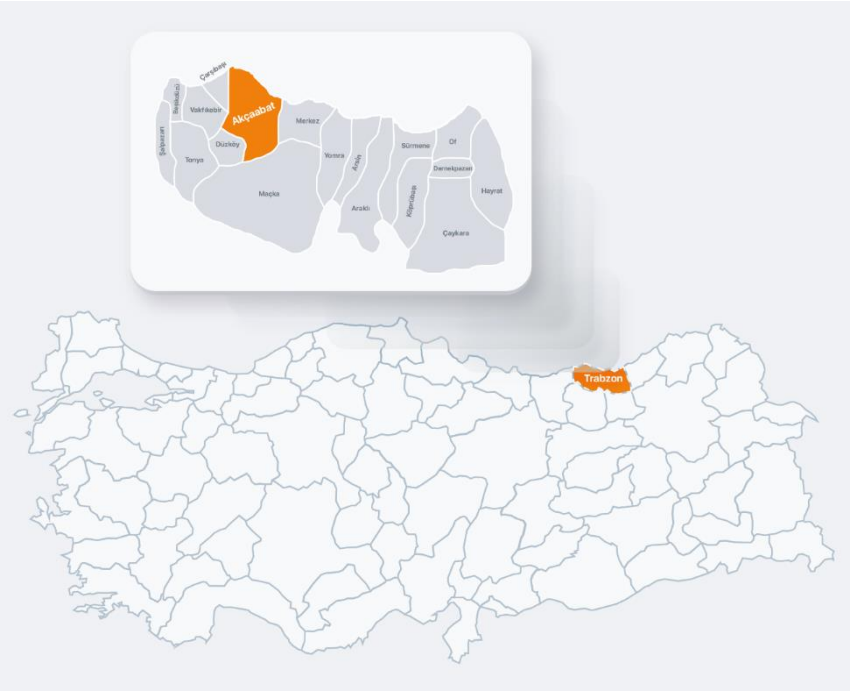

Figure 1: Location of Trabzon and Akçaabat in Türkiye

According to the "Trabzon Transport Master Plan for 2040 (TUAP)" prepared and completed by the end of 2022, the bicycle network shall have a crucial role in urban mobility of Trabzon.

[1] https://data.tuik.gov.tr/

2.2 Project stages

Within the scope of the project, the bicycles road, pedestrian path and landscape areas will be implemented in two sections / stages (Figure 2 and Figure 3) and Annex 1 to this tender dossier.

- The first section of bicycle road will start before the Coast Park, continue in front of the Akçaabat Hackalı Baba State Hospital and cross the Söğütlü Stream via the bridge. Then, it will continue in front of Söğütlü Athletics Stadium, proceed along Söğütlü Beach, continue in front of the Directorate of TRT Trabzon, pass between other nearby residential areas, University of Trabzon and the sea and end before the cliff.
- The second section of bicycle road will start from the Medicalpark Trabzon Yıldızlı Hospital, cross the streamvia the new bridge, pass near the office of Regional Directorate of Highways and end in front of the Trabzon City Hospital.

The connection between the stage 1 and stage 2 of Trabzon works are not making part of this project and shall be designed and realised by TMM.

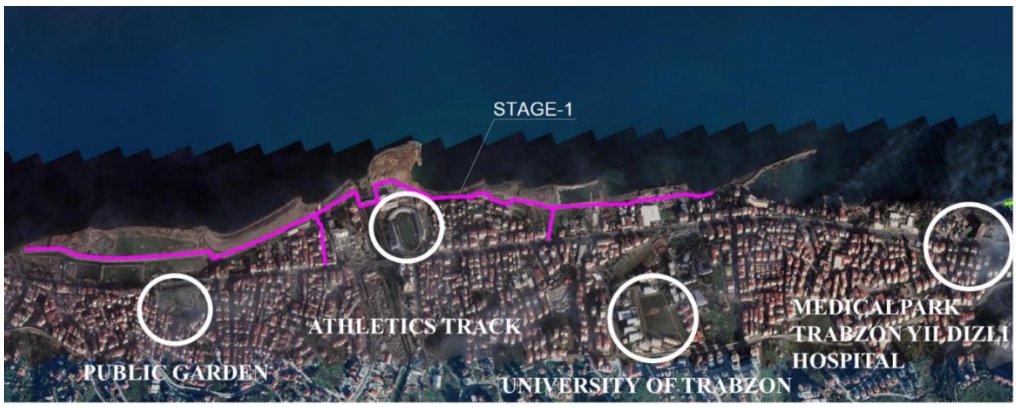

Figure 2: Aerial view of the project area (Section 1)



Figure 3: Aerial view of the project area (Section 2)

2.3 Geo-technical investigation report

To evaluate the ground profile of planned bicycle path, three research pits were opened on 03.01.2022 and samples taken were put in airtight sample bags without allowing lost of their ground properties. Samples were sent to Kaya Engineering Soil-Building Materials Laboratory for CBR testing. At the project site, 2 m deep coarse rock fill was made.



Figure 4: Locations of research pits

Sieve analysis, liquid and plastic limit, dry unit weight, water content and transport ratio tests were carried out on soil sample in the laboratory. CBR and other tests performed on wet sample were completed on 13.01.2022.

RESEARCH PIT NO	DEPTH(m)	SIEVE ANALYSIS ATTERBERG LIMITS (Physical Properties of Soil)								GROUND CLASS
		Optimum Water Content $W_{opt.}$ (%)	Max. Dry BHA γ_{dmax} (g/m^3)	Formation	+4 No	-200 No	Liquid Limit %	Plastic Limit %	Plasticity İndex %	
AÇ-1	1.00	10.50	2.043	Fill	30.9	6.7	29.4	20.1	9.3	GW-GM
AÇ-2	1.00	12.29	2.003	Fill	33.7	6.6	32.5	23.6	8.9	GP-GM
AÇ-3	1.00	13.25	1.771	Fill	35.4	6.0	36.3	27.2	9.1	GP-GM

Table 1: The summary of laboratory studies

Mechanical Properties of Soils				
RESEARCH PIT NO	DEPTH(m)	(%) CBR 2.5	(%) CBR 5.00	Swelling (%)
AÇ-1	1.00	20,7	28,9	0.18

AÇ-2	1.00	30,8	34,7	0.15
AÇ-3	1.00	38,3	39,4	0.21

Table 2: CBR test results

The laboratory test results for the soil sieve analysis in accordance with the standard TS EN ISO 17892-4 are provided in Annex 2 and Annex 3 to this tender dossier.

3 HEALTH AND SAFETY

It is the contractor's responsibility to take the necessary precautions to prevent health and safety problems which may cause injuries for people; damage for materials, equipment, and other facilities during the works.

Within 28 days after the works commencement date, the contractor shall provide and submit for an approval the **Health and Safety Plan (HSP)**.

HSP shall be prepared and developed by the contractor with the participation of CA/TMM and the supervisor.

In addition to technical documents for construction, HSP shall be the basis for assessing the risk of injuries and damage to health and safety, describing preventive actions at the workplace, and working environment.

During the construction period, HSP shall be revised and resubmitted for an approval, as necessary.

When preparing HSP, the contractor should take into account that all works shall be carried out in accordance with current European and Turkish Health and Safety Legislation; the Law numbered 6331, the Labor Law numbered 4857 and Social Insurance and General Health Insurance Law numbered 5510.

All measures to be taken at the site shall be detailed by the contractor in accordance with the applicable noise control regulation, fire regulation and energy performance regulation.

Particular attention shall be paid for electrical works and stray voltage protection to be carried out in wet surfaces.

During works, the contractor shall report details of any accident as soon as possible and right after its occurrence. The contractor shall maintain records and make reports concerning health, safety and welfare of people, and eventual damage to properties.

4 QUALITY ASSURANCE

All the works shall be carried out in accordance with the application and standards for construction, materials, equipment, and workmanship.

It is under the responsibility of the contractor to keep the quality of the works under control and recorded, to ensure its suitability to the given specifications/requirements, materials and to carry out the necessary tests.

Within 28 days after the commencement date, the contractor shall provide and submit the **Quality Assurance Plan (QAP)** for an approval.

QAP shall be prepared and developed by the contractor with the participation of CA/TMM and the Supervisor.

QAP shall be revised and resubmitted for an approval during the construction, as necessary.

The contractor shall assure that the QAP complies with the current European and Turkish standards/legislations and take a guidance from the following international standards:

- ISO 9000 Standards for the quality assurance - Guideline for selection and utilization;
- ISO 9001 Quality system - Model for the quality assurance in conception development, production, installation, and after-sales support;
- ISO 9002 Quality system - Model for the quality assurance in production and installation;
- ISO 9003 Quality system - Model for the quality assurance in controlling and final tests;
- ISO 9004 Quality control and element of the quality system – Guidelines;
- ISO 8402 Quality management and quality assurance – Vocabulary.

5 PROTECTION OF ENVIRONMENT

The contractor shall responsible for planning and executing the works with attention to minimize / avoid disturbance and harm to the environment.

Within 28 days after the commencement date, the contractor shall provide and submit the **Environment Management Plan (EMP)** for an approval to identify and mitigate damage to the environment caused by the scope of works.

EMP shall include monitoring checklist that specifies the schedule of environmental control activities, the responsible person, and the methods to measure their effectiveness.

Mitigation measures and environmental monitoring activities are obligatory for the contractor during the construction period.

6 STRUCTURAL WORKS

6.1 Regulations and standards

All structural works shall be done in accordance with these technical specifications, regulations stated in chapter 1.3. and comply with applicable EU and Turkish standards issued by:

- Karayolları Genel Müdürlüğü (KGM) / General Directorate of Highways;
- Çevre, Şehircilik İklim Değişikliği Bakanlığı / Ministry of Environment, Urbanization and Climate Change.

6.2 Workmanship and productions

It is the contractor responsibility to prepare land for a construction (grading following demolishing all existing structures on the land, removing construction residuals from the site areas and other).

The contractor workmanship shall be of the first class and of the highest quality.

6.3 Mock-up and sampling

Mock-up section must be provided at the beginning of each production, and successive productions should be continued following an approval of the supervisor and TMM.

6.4 Preliminary works

Existing roads and the nearest areas shall be cleaned from loose debris and/or inorganic waste. Waste material shall be disposed into containers and carted away to approved dumping zone.

Contractor is responsible to make safe or divert all services and liaise with the relevant service authority, when necessary.

All existing electricity poles and lighting poles within the project boundaries shall be removed. Before starting construction, all existing plants shall be moved to place(s) determined by CA/TMM with appropriate transportation.

Before starting construction, existing tree locations shall be checked and protected, the root area and tree body shall be wrapped with wooden strips and burlap. Up to 3m depth can be excavated in the root area.

At all stages of the project, the contractor shall be responsible for the existing infrastructure as well as the infrastructure to be established and connected under the contract.

Exact routes, elevations and locations of existing water supply pipes and wastewater channels to be connected to the works under the contract shall be determined by the contractor. In cases where information about the existing water supply and wastewater system is not shown in the drawings, the contractor shall carry out the necessary investigations to obtain the exact location, route, and elevations.

The contractor is responsible for determining the lines such as natural gas, electricity, telephone, cable TV to be connected to the new work lines to be built under the contract. In cases where information about the existing natural gas, electricity, telephone, cable TV system is not shown in the drawings, the contractor shall carry out the necessary investigation to obtain the exact location, route, and elevations.

The contractor shall take the necessary measures to prevent dusting caused by on-site traffic and during the operation.

The water to be used at every stage of production shall be supplied by the contractor. Mobile water tankers required for this work (the water tanker shall have sufficient flow capacity) shall be delivered on the site as needed.

6.5 Materials for bicycle roads and paved areas

6.5.1 Sub-base

The contractor shall use sub-base materials according to General Directorate of Highways "Flexible Superstructures Design Guide."

The same guideline shall apply for trenches cross or run along surfaced roads and paved areas where surfaces are planned to be reinstated.

6.5.2 Bituminous surfacing construction

The contractor shall use bituminous surfacing materials according to General Directorate of Highways "Flexible Superstructures Design Guide."

For a bitumen-surfaced road, the contractor shall, after completion of back-filling to sub-grade level, reinstate the sub-base and base, using material of quality at least equal to that of the material used in the construction of the road. The depth of each course in the reinstated portion shall be at least equal to the thickness of the existing sub-base or base, as applicable, or at least 100 mm, whichever is greater. Each course shall be compacted to a density at least equal to that of the adjacent existing materials except that where there is no existing sub-base, the thickness of the base that is placed directly on sub-grade shall be at least 150 mm. The base shall be finished slightly above the road surface to allow for initial settlement, but shall not be left so far protruding off the adjacent road surface as to cause excessive jolting of any vehicle proceeding at normal speed. The contractor shall maintain the gravel surface to a standard suitable for normal traffic until the bitumen surfacing has been reinstated.

6.5.3 Reinstatement of roads: bitumen surfacing

The base material shall be graded to a level sufficiently below the final road surface to allow the bitumen surfacing to be accommodated, and the edges of the existing bitumen wearing course shall be cut back vertically to a straight line. Before the bituminous construction is commenced, all loose materials and dust shall be removed with brooms or similar.

The vertical faces of manholes, kerbs and similar shall be cleaned and painted with thin uniform coating of hot bitumen before the asphalt is laid.

6.5.4 Reinstatement of original ground surface

Where applicable, in fields and undeveloped areas the surface shall be reinstated with topsoil to the thickness originally removed, plus an allowance for settlement which shall initially be not more than 150 mm above the original ground surface level. Any subsequent settlement below original ground surface level that occurs still before or during the construction period, should be replaced by the contractor with material of the same quality as the original top soil.

6.5.5 Maintenance of reinstated surfaces

The contractor shall maintain new roads and reinstated surfaces of roads and make good any damage from subsidence, pothole, or other unevenness immediately it occurs during the construction. The responsibility for maintaining such road surfaces shall rest with the contractor during entire contract duration.

The contractor shall carry out regular inspections of all backfilled excavations in order to locate any subsidence. Without delay, the contractor shall make good any such subsidence.

Additional inspections agreed by the contractor and supervisor shall take place immediately after rainfalls and during maintenance period.

The contractor shall reinstate and maintain the surfaces of all roadways through which trenches have been made. Should any subsidence occur at the site of such trench or other excavation, the contractor shall immediately restore the road surface to its correct level. Where immediate restoration is impracticable, the contractor shall provide barricading, lighting and other safeguards until restoration is complete.

6.6 Blasting

Blasting will not be allowed.

6.7 Surveying works

The contractor shall make sure that any dimensions, setting out and site levels (whether it is spot elevation or contour) shown on drawings are correct, before commencing/starting any kind of excavation.

All elevations, measurements and coordinates in the projects shall not start without checking on site, if there is observed mismatch, the supervisor shall be notified, and the production shall start after the necessary corrections.

All levels shall be according to specific reference points established by TMM.

The contractor shall carry out an application of works elements according to shop drawings to be approved by the supervisor. The contractor shall determine the application dimensions of all structures according to the existing situation and drawings making part of this tender dossier.

The contractor shall employ experienced and qualified personnel in execution and application of surveying works. The land survey measuring instruments to be used by the contractor shall be in good condition.

Unless otherwise stated, all elevation shall be given in meters according to sea level. Data on all elevations shall be based on the data points approved by CA/TMM. All elevations in the project represent finished surface elevations.

The contractor shall identify the additional reference points that shall be required during construction, and erect reference point marks on these points. The contractor is responsible for providing the elevation that are not shown in the detailed design during the construction works according to the reference points signs.

6.8 Earthworks and excavation

Ref: BoQ Structural Works Item no 10, 11, 12, 15, 16 and 31, 32, 33, 36

Fillings in constructions shall be made in accordance with these specifications and approved projects. All compressions shall be made with techniques suitable for the type of filling.

The contractor shall execute fillings in such a way that the fillings near the structures do not cause damage and do not endanger the structures during the construction process. When laying the material, the drainage shall be completed, and water accumulation shall be prevented. When filling around concrete structures, attention shall be paid to ensure that the structure is completed and has reached its strength.

Measurements of all excavations and subsequent disposal are required before the start of excavations to any depth.

Excavations for foundations and other substructure (if any) shall be in accordance with the drawings and requirements for the bearing pressure capacity of the ground/soil.

Bottom elevations of excavations shall be leveled, properly compacted, and consolidated.

The contractor shall provide notice to the supervisor when levelling works are completed for inspection and no works shall continue until related excavations have been approved.

In a case of the contractor's excavation below the levels or beyond the widths shown or directed without written instructions, the contractor shall fill the excavation to the proper level specified, with concrete of the equivalent quality.

Crushed stone up to 32 mm

Works include all kinds of labor, material, and losses, loading at the workplace, horizontal and vertical transportation, unloading of crushed stone up to 32 mm, pouring it on the field, laying it with a motor grader, watering it, compacting it layer by layer with a vibratory roller.

Crushed stone up to 65 mm

Works include all kinds of labor, material, and losses, loading at the workplace, horizontal and vertical transportation, unloading of crushed stone up to 65 mm, pouring it on the field, laying it with a motor grader, watering it, compacting layer by layer with a vibratory roller.

Filling with a quarry stone

Works include laying the quarry stone on the desired slopes and dimensions after the arrangement of the base to be applied, in accordance with the detail of the material to be agreed with supervisor.

6.9 Keeping the site dry

The contractor shall take all necessary measures for keeping the site free of any ground or rain water and assure following for the purpose:

- Form drainage channels, whether temporary or permanent, all positions are to be agreed with the supervisor.
- Provide, maintain, and run sufficient pumps on site, together with all related equipment, to remove all water from the site and to discharge into the public sewer, or into other location as may be indicated by the supervisor, and to remove any silt or debris left by the work.
- Obtain any approval necessary in respect of pumping of water, and give all notices required.

- The contractor must not, without written permission from the supervisor, use any method of keeping the excavation free from water, which involves continuous pumping to withdraw water from the foundations of adjoining sites.

6.10 Utility connections / clashes

If any part of the project clash with infrastructure services such as natural gas, water, wastewater, electricity, telephone, cable TV, drainage and other., the contractor shall immediately stop working and notify CA/TMM.

The CA/TMM shall not be responsible for the damage to existing infrastructure facilities as a result of the work of the contractor.

6.11 Concrete works

Ref: BoQ Structural Works Item No 13, 14 and 34, 35

The contractor shall comply with the requirements of EN 206-1:2000: Concrete - Part 1: Specification, performance, production, and conformity.

The constituent materials, manufacture, and transport of all concrete for the Works shall comply with the requirements of the stated standards and approval of the supervisor.

The class and quality of the concrete used shall be as specified in approved projects (C20 concrete for stamped concrete parts, C25 for foundations of street furniture). The contractor shall take separate care for the continuity, strength, and levelling of the concrete.

The contents of all concrete used shall be strictly checked and protected for required standards.

The contractor shall make all necessary arrangements in accordance with the relevant international and Turkish standards for sampling and testing of fresh and hardened concrete.

In order to determine the concrete strength of the concrete used, samples shall be taken and tested in accordance with TS 500 and test reports shall be obtained. The tests to determine the consistency of the concrete shall be carried out in accordance with TS 500 and carried out with samples taken from the poured concrete. In order to determine the compressive strength of the concrete for 7 and 28 days, enough concrete cube samples shall be taken before each casting.

6.12 Transportation and pouring

The method used in the transportation and pouring of concrete shall be in a way that prevents the decomposition of materials in concrete subject to approval of the supervisor and TMM, obtained before the concrete casting process begins. Pouring and compacting of concrete shall be carried out under the control of the supervisor.

Concrete shall be poured directly into place as soon as possible and carried out at once. There shall be no interruptions and no breaks during concrete pouring. If it is necessary to make cuts during the pouring of concrete, measures shall be taken to ensure that the next mixture of concrete is fully joined into the pre-poured concrete. Skilled work force shall be employed at the site until the concrete pouring is finished to adjust the equipment that can be dislodged during the concrete pouring and to perform it correctly.

6.13 Compacting and vibration

The contractor shall consider the work of compacting the concrete as a task of fundamental importance. Waterproof concrete shall be produced with maximum density and strength. The concrete shall be fully compacted during the casting process, and the reinforcement and clamping elements shall be thoroughly filled around and in the formwork corners. Approved amount of concrete, shall be compressed by vibration process.

Mechanical vibrators shall be with a frequency of at least 6000 vibrations per minute. The vibration time shall be limited to a time that does not allow separation but ensure satisfactory compression. Vibration shall not be continued after water or excess grout appears on the surface. Concrete should not be deteriorated after being compacted and in final state.

The contractor shall pay attention to prevent the cracking of the concrete or concrete surface in hot weather. The contractor shall make necessary arrangements and work schedule for the early morning or late evening pouring of concrete in hot weather.

The formwork shall be protected from the direct sunlight before the pouring of concrete and during the settlement. The contractor shall take appropriate measures to ensure that the reinforcement in the poured section that is maintained at the lowest possible temperature.

6.14 Protection and curing

Concrete shall be protected against damage caused by dehydration or mechanical damage during the curing due to climatic conditions (direct sunlight, rain, snow, and frost). All methods used for curing and preserving newly poured concrete shall be subject to approval of the supervisor.

All open surfaces that have been made flat shall be covered with a wet membrane. The canvas cover shall always be kept moist and checked periodically. Concrete on open surfaces shall be kept moist for at least ten days / curing compound shall be used. The contractor shall keep full and precise records showing the time and date of work when pouring concrete on the site.

6.15 Formwork

Ref: BoQ Structural Works Item No 16 and 37

The contractor is obliged to ensure the formation of the formwork surface in his shop drawings to be approved by supervisor and projects for concrete and reinforced concrete construction works, in accordance with the technical specifications. in a way that shall not leak the concrete water to be poured into formwork made from timber or artificial wood or sheet boards or plywood.

The contractor shall ensure that the surface is lubricated after the formation of the formwork surface, to withstand the vibrational influence of the high-speed vibrator, and that form working is made in a way that prevents deflection and cambering.

The formwork shall be protected from the direct sunlight before the pouring of concrete and during the settlement. The contractor shall take measures to ensure that the reinforcement in the section that will be poured is maintained at the lowest possible temperature.

6.16 Scaffolding

The construction and use of scaffolding shall comply with HSP requirements to the satisfaction of the supervisor ensuring safety for workers.

The scaffolding should be protected with translucent canvasses or protecting nets as mitigation against dust propagation and rain cap during works.

6.17 Insulation works

Heat and water insulation works shall be carried out with the appropriate materials specified in the project.

For water insulation, the necessary overlapping portions shall be provided, sealing tests shall be carried out, and the next process shall continue after the sealing is approved by the supervisor. When subsequent production is carried out, necessary measures shall be taken to prevent damage to existing water insulation.

For heat insulation, milling type materials shall be used to block heat bridges. The overlapping of insulation shall be used when mounting to avoid any gaps in place.

6.18 Prescribed mixes

Table shows mixes / proportions of the mixes prescribed. N – values stated in the mix / grade references indicate the characteristic 28-day compressive strength as defined in BS EN 12390-3:2019 (Testing hardened concrete compressive strength of test specimens) and BS EN 12390-8:2019 (Testing hardened concrete depth of penetration of water under pressure).

Mix Reference	Equivalent BS 5328 Grade	Total dry aggregate Weight for use With 100kg of cement	Max size Aggregate Mm	Slump Range mm
20N / 20mm	C20P	600	20	25-75
25N / 20mm	C25	810	20	25-75

Table 3: Proportions of the concrete mixes

6.19 Materials

6.19.1 Binding agent

- Cement: unless otherwise stated, ordinary Portland cement as per EN 206-1:2000: Part1
- White Portland cement: as per EN 206-1:2000: Part1
- Hydraulic lime: used in conservation works as instructed by supervisor;
- All cements: Only one type of cement to be used in any mix.

6.19.2 Aggregate

- Coarse aggregate: Single sized natural gravel, crushed gravel, or crushed stone as per TS 706 EN 12620:2002
- Fine aggregate: Well graded natural gravel, crushed gravel, or crushed stone as per TS706 EN 12620:2002

- All aggregates: Obtain each size from one source capable of maintaining adequate supplies of constantly graded material for the duration of concrete works.

6.19.3 Water

Clean and free from harmful matter in proper quantities that would not adversely affect the properties of the concrete. De-ionized water to be used in protection works.

Water to be used at every stage of production shall be supplied by the contractor.

The contractor shall take necessary measures to prevent dusting caused by on-site traffic and weather conditions during the operation. Mobile water tankers required for the work with sufficient flow capacity shall be operated on the site.

6.19.4 Reinforcement

Ref: BoQ Structural Works Item No 17 and 38

Before concrete pouring, the reinforcements of the load bearing system shall be made in accordance with the project and reported to the supervisor.

Unless otherwise specified, steel reinforcement for reinforced concrete shall consist of ST III deformed rebars. In all reinforced concrete manufacturing, the plastic spacer of appropriate size shall be used.

The reinforcement shall be cut and cold bent by experienced workers from the new bars. Rods with curves, twists, rusty or other damage cannot be used. A bent reinforcement shall never bend again from the point that was bent previously.

The contractor shall provide precast concrete blocks or similar supports to place the cut and bent reinforcements in the places shown in the project, connect and clean them from impurities (dirt, harmful rust, paint, and oil), provide the distance between the irons according to project.

Cold worked steel deformed bars shall be as per EN 206-1:2000 TS4559, TS 500.

6.19.5 Admixtures

Usage of admixtures or additives shall be approved by supervisor.

The contractor shall pour concrete using necessary concrete settlement accelerators or frost-resistant additives into the concrete to be poured in cold weather (where the air temperature drops below 2 C, or the average daily temperatures measured in the following 3 or more days decrease below 5 C).

Under no circumstances frozen, ice, snow-covered equipment and concrete shall be poured on the formwork.

6.20 Curbstone works

Ref: BoQ Structural Works Item No 18 and 39

Only best quality concrete curb or approved equivalent shall be used, from approved sources and free from all defects. Any stone showing defects on the exposed face or with chipped edges / corners shall be rejected. If any such stones be used, the supervisor shall request removal and replacement of such work.

6.20.1 Materials

Mortar for laying shall be composed of first quality slaked lime portion and two portions of crushed/soft stone (dust) prepared in bulk with fresh water, well mixed and kept till fully formed before use. It shall be further mixed with water in small batches. Cement shall be added with the ratio 1:10 (cement/crushed soft stone fines).

The masonry blocks used to form the curb for the road sides, shall be cut to best fit the existing rock profile and laid with cement mortar. Concrete foundations can be used where necessary as directed by the supervisor.

Normal cemented steam cured concrete curbs or approved equivalent with dimensions of 50x20x10 cm in accordance with the project and technique, closing the junction places between the two curbs with 400 dose cement mortar.

Each block shall be bedded in mortar composed of cement lime and fine aggregate in the proportion of: one portion cement, one portion lime and not more than 5 to 6 portions of fine aggregate.

6.21 Stamped concrete

Ref: Structural Works Item No 2 and 24

Works include use of granulometric sand within the proportions and weight basis to provide the desired strength according to laboratory tests and granulometric analyses, transport of gravel or crushed stone, water and cement in the concrete facility with concrete production, decomposition transport vehicles, transported to every depth and height by concrete pump or serial elevator, put in, compressed with vibrator, watered when necessary, protection from cold, heat and other external conditions, obtaining samples for a sufficient number of tests to determine whether the manufactured concrete has BS 18 (B.225), BS.25 (B.300) in required strength, printing with special formworks for BS 18 (B.225), BS.25 (B.300) concrete and surface texture, surface hardening and coloring in the 1 m^3 anchored, non-ferrous concrete plant.

Formwork and printing application

On flattened and troweled concrete, the colored surface hardener is spread by sprinkling the surface with an average of 4-5 kg/m^2. It is perched to the surface with special steel trowel. After the coloring process is completed, it is expected to draw the concrete water until plastic consistency. After the formwork separator (100gr/m2) is spread, polyurethane-based decorative concrete printing formworks are placed on the concrete surface so that there are no gaps one after the other and the patterns on the formwork surface are removed to the concrete surface by hitting with the tool. By transferring the formworks from the back to the front, the same processes are performed, and the preparation of the entire surface is completed.

After waiting 1-2 days according to climatic conditions for the concrete settle, the formwork separator on the surface is swept first, then the floor is cleaned using a machine that sprays pressurized. Decorative effect is obtained by leaving part of the formwork separator between the tissues and joints on the surface.

After the washed surface is dry, the process is completed by applying 2 layers through a special spray gun or roll to the surface in the form of water/solvent based acrylic protective polish 0.150-0.300 lt/m2.

Joint cutting shall be made from the appropriate points, elevations and leveling should be arranged to get a proper slope for water flow, material shall be provided in the desired color and pattern. Salt should never be used in icing on the surface.

Color codes shall be: RAL 7043, RAL 7047 (Light Gray Printing Concrete/Dark Gray Printing Concrete).

6.22 Colored asphalt coating

Ref: Structural Works Item No 3 and 25

Colored asphalt coating of bicycle paths in accordance with the project. A mixture of 95% 0-5 mm or 0-7 mm stone dust, 5% filler, 6% bitumen shall be prepared on the filled and compacted area.

If the ground is suitable, the asphalt will be leveled with a finisher, if not, by using 40x60 steel profile gauges and smoothed with a hand-roller. The asphalt shall be smoothed and compacted with a roller, replacing the damaged parts during the pavement, polishing the surface. Asphalt thickness will be 5 cm.

Preparation of the surface shall start after completion of environmental lighting, automatic irrigation, rainwater channels and curb laying works. All mortar and concrete residues and other residues on the application surface shall be cleaned.

Asphalt coating application

The contractor shall produce shop-drawings according to measurements taken on site, prepare samples before moving to manufacturing, and start manufacturing after shop-drawing and sample approval.

The asphalt to be prepared and layered on the floor by the contractor according to the project.

Cleaning and protection

After the coating process, the surface and edges will be cleaned. Hydrochloric acid or similar acid or alkalic products shall not be used.

After the application area has been cleaned and tested, the perimeter of the coating shall be limited by the warning strip until the site is handed over.

6.23 Wooden bench with backrest

Ref: Structural Works Item No 4

Back bench made of 1. Class Impregnated Wood from Yellow Pine Tree in accordance with the project.

1st Class Yellow pine tree shall be smooth and pruning shall not exceed Ø12-18 mm. Wood shall be impregnated for outdoor use. Before impregnation, the wood dampness shall be 22% or reduced to this level. Impregnated vacuum pressure system shall be filled cell method. Impregnation substance shall not contain chromium and arsenic. Impregnation agent TS EN 335-1 Durability of Wood and Wood Based Materials - The risk of decay determined in the Hazard Classes standard of The Degree of Biological Destruction shall be in accordance with the classes 3 and 4.

The effectiveness of impregnation substance used shall be in accordance with TS EN TS 599-1 - and EN 252 Land Testing standard.

The impregnation substance shall be used in accordance with the conditions of penetration and penetration specified in TS EN 351-1. Impregnation substance shall not be harmful to the environment and human health. Agent shall not contain corrosion-causing chemicals.

Construction

1900 mm length backrest bench, a pair of 2/30x50 mm box profile and 5 mm thick sheet metal in the middle, support made by welding combinations, 3 sheet metals bent and detailed with 10 mm thickness on the backrest, 1st class consists of impregnated wood (Yellow Pine Tree) and connection components.

The seating part will be connected by inserting 7 pieces of 1st Class Impregnated Wood (Yellow Pine Tree) (7x10x170 cm) into the 2/70x100 mm box profile, and will be secured with screws from the bottom of the box profile.

The backrest part shall be fixed to the 1. Class Impregnated Wood (Yellow pine) (7x10x170 cm) in the seating part of the steel plates bent according to the detail of 10mm thick and shall be fixed with a rear screw connection and 1. Class Impregnated Wood (Yellow pine) (2x5x180 cm) shall be fixed to steel sheets with screws.

6.24 Rubbish bin

Ref: BoQ Structural Works Item No 5 and 26

Rubbish Bins shall be made of light steel sheet (1.5 mm thick), coated with electrostatic powder paint. Width: 450 mm, overall height: 900 mm.

6.25 Galvanized metal separator

Ref: BoQ Structural Works Item No 6 and 27

In accordance with the project, galvanized metal separators shall be placed in previously excavated area, elevations shall be adjusted, connections made, and the finishes shall be completed.

Preparation of the surface shall start after environmental lighting, automatic irrigation, rainwater channels and curb laying works. All mortar and concrete residues and other residues on the application surface shall be cleaned.

Galvanized metal separator plate application

The contractor shall produce shop-drawings according to measurements taken on site, prepare the samples before moving to manufacturing, and start manufacturing after approval of shop-drawings and samples.

To separate the garden/vegetal soil with other productions such as gravels and concrete, galvanized metal products with a height of 15cm and a thickness of 3mm should be used in the form of "L". The sheet should not be mechanically fixed on the ground but released to carry itself with the weight of the soil. Profiles should be added to each other with the help of a telescopic spacer.

To properly create the designed boundary lines and curves, the boundary lines must be formed with rope, lime, or other materials. Excavations should be carried out at the required height at specified boundary lines, and the separator should be placed on edge lines by adding the plates together from the edges with proper curves.

Cleaning and protection

Defective or improper galvanized metal separators with size and color difference shall not be used. After the treatment, the surface and edges shall be cleaned. For cleaning works, hydrochloric acid, similar acids, or alkali chemicals shall not be used. After the application area is cleaned and tested, the coating area shall be protected with a warning strip until the place is handed over.

Steel sheet parts used in steel sheet production shall be hot rolled steel in accordance with TS 3736 EN 10051. Flat steel components used in flat steel construction shall be a hot rolled flat steel suitable for TS EN 10058. Hot dip galvanized coating shall be made in accordance with TS 914 EN ISO 1461 with an average coating thickness of at least 85μm. The welding electrode used in construction shall comply with TS 2716 and EN 1600. Bolt used in construction shall be galvanized steel complying with TS EN 10266-1

6.26 Metal drain

Ref: Structural Works Item No 7 and 28

Metal drains should be produced with the dimensions 12x60 mm flat iron consists of 7 Corner-bent (3/30x30 mm L:7cm) feet placed according to the detail, The corner-bent (3/30x30 mm) profile and surface painted 5 mm sheet metal (Ral Code 9006) should be placed.

The under-tree grid shall be applied to the bottom of the tree in 2 pieces. The variety edge bracket (3/20x30 mm) shall be positioned and fixed by welding at the specified intervals. All joints shall be welded and anchored to the floor concrete using a proper steel dowel.

After the welding process completed, the burrs shall be stoned and the joints shall be taken care to appear monolithic. All iron shall be painted with electrostatic powder paint and shall be submitted for approval by the supervisor before installation.

Against rusting, when placing at the bottom of the tree, the soil level at the bottom of the tree shall be positioned to leave minimum 2cm gap and it should be placed in such a way that it shall never be in contact with the sub-tree drain.

6.27 Drainage design and construction

Ref: Structural Works Item No 8, 9 and 29, 30

Bicycle road is designed in a way that the super-elevation and the longitudinal slope help the drainage of excess water towards the sea, which can be accumulating from rainfall on the cycle path, pedestrian walking area and landscaping.

Rain water accumulating on the borders due to the slope of the road of urban bicycle roads should be properly drained. For the purpose, surface rain water will be collected by vertical or lateral gratings to be built on the pavement edges and drained by conveying to the discharge point with conduits.

The design and works shall be in accordance with General Directorate of Highways' "Highway Design Manual Section 7 Drainage Design".

Flood recurrence intervals (return period) of drainage elements shall be taken as 2-10 years. Related tables from the "Highway Design Manual" shall be the basis for the design parameters. Precipitation depths should be calculated by taking the precipitation intensity recordings, according to the duration of the rainfall, from the precipitation curve prepared by the General Directorate of State Hydraulic works (DSI).

To prevent surface rain waters damaging the road, drainage structures shall be designed by the contractor:

- Drain trenches or lateral/longitudinal gratings shall be used to prevent disturbances on the path;
- Culverts or conduit pipes (to provide horizontal crossings for water of any possible intersection with the cycle path);
- Curb and chutes;
- Small type of collectors (if necessary).

The contractor should take into consideration that all drainage elements need to be in a harmony with other road elements such as kerbs, pavements, urban furniture, and painted areas. The direction of gratings should be located horizontally to prevent bicycle tire problems on the path.

6.28 Painting

Ref: Structural Works Item No 1 and 23

Bicycle road paintings and horizontal markings on the road surface shall comply with the "Highway Traffic Marking Standards" by Traffic Safety Department of Traffic Safety Marking Branch Directorate.

The sizes of the cycle symbol and RAL codes for the colored asphalt coating shall be consistent with above standard and the design drawings.

6.29 Non-structural metal works

Works shall include and fix of galvanized steel mesh used in the cycle track and comply with EN 10210-2:1997 and with relevant EN standards in respect of fabrication and metalwork finishing.

All materials shall be free from defects, obtained from approved manufacturers.

All steel-works shall be forged clean, all screwed works shall be filled from internal and external threads.

Joints shall be neatly made, filled smooth and left clean and adequate means shall be employed for temporarily fastening the parts to be welded together until the joints are welded properly.

Except where otherwise indicated, all metal works shall be hot dip galvanized and painted with three coats of an approved oil-based paint.

The contractor shall produce shop drawings showing supports with unit dimensions and sections, type and location of welds and bolted fasteners. These drawings shall be approved by the supervisor prior to manufacturing.

In case that existing steel structures need to be restored all rust and scale and loose paint shall be entirely removed. All oil, dirt and other, must also be removed and a perfectly clean surface need to be obtained. All iron and steel-work to be properly prepared and treated with approved pacifying solution and primed with selected primer or a primer specified in EN ISO 12944–5 and 7:1998 as appropriate. Preparation and priming should be followed up promptly by the completion of the required paint system, approved by the supervisor.

All stainless-steel manufacturing shall use AISI 304 or equivalent quality stainless steel. The thickness used in stainless steel bending manufacturing shall be minimal as 2 mm and the dimensions as defined in the project.

7 LANDSCAPE WORKS

All landscape works shall be done in accordance with these technical specifications, regulations stated in chapter 1.3. and comply with applicable EU and Turkish standards issued by:

- Karayolları Genel Müdürlüğü (KGM) / General Directorate of Highways;
- Çevre, Şehircilik İklim Değişikliği Bakanlığı / Ministry of Environment, Urbanization and Climate Change.

The contractor should carry out all landscaping works including provision of soil and planting. The contractor shall prepare a maintenance plan for the protection of the soft landscaping including watering systems.

Table 4 provides a list of the trees, grains, and shrubs, with respective sizes, which shall be used landscape works.

Plant Species		**Size and other properties**					
	Botanical Name	**Corolla Diameter (cm)**	**Corolla Height (cm)**	**Height (cm)**	**Pot Volume (lt)**	**Properties**	**Amount (Pcs)**
LEEFY TREES	Chamaerops excelsa	125-150	125-150	200-250	CLT-180-230	Under branched / local	215
	Ligustrum japonica 'Tige'	150-200	250-275	250-300	CLT-180-230	Over branched / local	111

Plant Species		Size and Other Properties			
	Botanical Name	Height (cm)	Pot Volume (lt)	Properties	Amount (Pcs)
SHRUBS AND GRAINS	Lonicera nitida	50-60	CLT-10	6-8 Branch / local	7589
	Photinia serrulata 'Red Robin'	40-50	CLT-10	6-8 Branch / local	331

Table 4: Trees, grains, and shrubs

The grass area shall be composed as following:

- %20 Lolium arundinacea - Bize M
- %40 Festuca arundinacea - Golden gate
- %20 Festuca arundinacea - Terrano
- %10 Poa pratensis - Prafin
- % 10 Festuca Arundinacea - Rinovo

The soil for the landscaping project shall be as following:

- 40% Screened soil
- 25% Sand
- 15% Fertilizer (burnt sheep manure)
- 10% Peat
- 10% Pumice

All plants to be used are listed below:

- Photinia serrulata 'Red Robin' Flame Bush (Landscape Works Item No 1)
- Ligustrum japonica 'Tige' Japanese Pride (Landscape Works Item No 2)
- Chamaerops excelsa Stranded Palm (Landscape Works Item No 3)
- Lonicera nitida Dwarf Honeysuckle (Landscape Works Item No 4)

All plants will be placed to the locations specified in the landscaping design drawings.

The landscape works include:

- Manual raking of the rough leveled soil in turf field to make it ready for grass planting - 20-25 cm deep burial of hard soil to prepare grass pitches in the median of roads, removal of grass and coarse stones. Hard soil; 20 - 25 cm deep logging, cleaning, growing grass and coarse stones.
  Ref: BoQ Landscape Works Item No 5, 6 and 16, 17

- Rough leveling of the roads by hoeing the soil on the cut and filling slopes as well as median and manual grading of the surfaces, hoeing the land for the purpose of forming a grass field or planting saplings, rough leveling of the land, correcting the cavities and depressions formed on the surface, transporting the stones, roots, and foreign materials from the hoeing, and straightening out of the field, stacking them.
  Ref: BoQ Landscape Works Item No 7 and 18

- Manually digging a 40 cm diameter, 50 cm deep sapling pit in hard and gravelly soil in the median and fill slopes, opening the seedling pits in the form of a cylinder to the seedling planting places as foreseen in the project and respecting the leveled soil surface and/or the lower point of the slope, separating the suitable soils.
  Ref: BoQ Landscape Works Item No 8

- Manually digging 60 cm diameter, 80 cm deep sapling pit in hard and gravelly soil for planting seedlings, opening the seedling pits in the form of a cylinder to the seedling planting respecting the leveling of the pit height and/or the lower point of the slope, separation of the suitable soils.
  Ref: BoQ Landscape Works Item No 9 and 19

- Planting coniferous and leafy seedlings with soil in pits 40 cm in diameter and 50 cm in depth in the cut and fill slopes of roads and in the median, loading saplings into vehicles without deteriorating their packaging, transporting to the workplace, lowering to the seedling pit or burial channel, burying, transporting to the planting places, unpacking, planting, providing about 1 shovel full of fertilizer and compacting after filling the planting pit, works required for the construction of irrigation bowls and giving at least 5 liters of water, the work of making saplings stakes when deemed necessary by the supervisor.
  Ref: BoQ Landscape Works Item No 10

- Planting coniferous and leafy seedlings in pits 60 cm in diameter and 80 cm in depth, loading the saplings containers into vehicles without spoiling, transporting, lowering them into the sapling planting pit, opening the seedlings containers, transporting, planting them in place, giving approximately 1.5 shovels of fertilizer and compacting the planting pit after filling it, making irrigation bowls and giving at least 8 liters of water, making sapling stakes when deemed necessary by the supervisor.
  Ref: BoQ Landscape Works Item No 11 and 20

- Construction of grass fields on the cutting and filling slopes of roads and in the medians, raking the soil by hand for grass field formation, provision of grass seed, loading, transporting, preparing the grass seed mixture, sowing the seed at least 50 kg per 1 decare, sifting the cover material, preparing it by mixing fertilizer into it, transporting, emptying, laying and consolidating 1-1.5 cm thick, supplying water at work, supply of water to a depth of at least 15 cm from the top.
  Ref: BoQ Landscape Works Item No 12 and 21

- Planting soil to be used for 10 cm thickness to provide environment for planting.
  Ref: BoQ Landscape Works Item No 13 and 22

8 SIGNING AND MARKING WORKS

All signing and marking works shall be done in accordance with these technical specifications, regulations stated in chapter 1.3. and comply with applicable EU and Turkish standards issued by:

- Karayolları Genel Müdürlüğü (KGM) / General Directorate of Highways;
- Çevre, Şehircilik İklim Değişikliği Bakanlığı / Ministry of Environment, Urbanization and Climate Change.

Provision and placement of traffic signs shall comply with the "Highway Traffic Marking Standards" issued by Traffic Safety Department of Traffic Safety Marking Branch Directorate.

Signing and marking works include production of the 60 cm circular plate and 90 cm size triangular plates, the galvanized sheet poles. Work also includes placing of the posts, mounting of the plates (with hazard warning, traffic regulation, information, stop and parking signs) on the post and placing the sign (writing symbols, borders, and texts on traffic signs such as standard and information traffic sign boards) on the board itself and the foundation construction and signpost erection for traffic information signs.

Sign boards shall be showing the starting and ending points of the bicycle road and shall warn that the road parts that can be used by both cyclists and pedestrians. These signboards shall also include warning signs.

Signing and marking works include a combination of several work items. The main working items for the plates include, preparation of black sheet for the required diameter; cost, cutting, shaping, drilling the holes, cleaning the burrs, cleaning the oil and rust of all materials with a chemical bath and hot-dip galvanizing in accordance with the standard, cleaning the galvanized residues from the materials, in accordance with the Traffic Signs Handbook:

- Making a 60 cm diameter round plate from 2 mm thick galvanized sheet;
- 5 mm thick, 170 mm opening traffic signpost pole, galvanized;
- Replacing the pole in place for danger warning, traffic regulation, information, stop and parking signs;
- Putting standard traffic signs in place;
- Making symbols, borders and writing texts on the traffic signboards (standard and information traffic signboards);
- Construction of foundations for the information signs and the installation of the signpost.
  Ref: BoQ Signing and Marking Works Item No 2 and 3

- Making an equilateral triangle plate with 90 cm sides from 2 mm thick galvanized sheet.
  Ref: BoQ Signing and Marking Works Item No 1

9 ELECTRICAL AND LIGHTING WORKS

All electrical and lightning works shall be done in accordance with these technical specifications, regulations stated in chapter 1.3. and comply with applicable EU and Turkish standards issued by:

- Karayolları Genel Müdürlüğü (KGM) / General Directorate of Highways;
- Çevre, Şehircilik İklim Değişikliği Bakanlığı / Ministry of Environment, Urbanization and Climate Change.

All grounding and other electrical works shall be done in accordance with the relevant grounding regulation (published in the Official Gazette dated 21 August 2001 and numbered 24500), Electricity High Current Facilities Regulation (published in the Official Gazette dated 30 November 2000 and numbered 24246) and General Technical Specification for Electricity Distribution Facilities.

Pipe system consisting of non-metallic cable casing pipe and fittings for energy cables, lighting panel, switched automatic fuse, aluminum hazard board, galvanized earth electrode and fuse-box, copper conductor and embeddings shall be done in accordance with these technical specifications.

Electrostatic paint shall be applied on the galvanized panels.

The Electrical and Lightning Works include:

- 8-meter double console (8-8) 100-100W LED Luminaire - lighting pole including; cost, cutting, shaping, drilling the holes, cleaning the burrs, cleaning the oil and rust of all materials with a chemical bath and hot-dip galvanizing in accordance with the standard, cleaning the galvanized residues from materials.
  Ref: Electrification and Lightning Works Item No 1

- 50 mm Cable Protecting Pipe 2500 N (non-metallic, underground)
  Ref: Electrification and Lightning Works Item No 2
  a) Material: Pipe system shall consist of non-metallic cable casing pipe and fittings for energy cables buried underground in TYPE 250 and TYPE 450 type. Material of all additional parts shall be included in the cable casing pipe works.
  b) Assembly: The non-metallic cable casing shall be laid in the cable ducts to form a system with the fittings in accordance with the Electricity High Current Facilities Regulation (published in the Official Gazette dated 30 November 2003 and numbered 24246), the General Technical Specification (TEDAŞ) for Electricity Distribution Facilities and the Energy Cables Assembly (application) Procedures and Principles. (TEDAŞ)
  The installation of all additional parts shall be included in works of the cable protection pipe.

- Lighting panel
  Ref: Electrification and Lightning Works Item No 3
  a) Material: A ready-to-use complete panel boards made of at least 2mm DKP sheet in accordance with the General Technical Specification for Electricity Distribution Facilities (TEDAŞ) and the Principles of the High Current Regulation (published in the Official Gazette dated 30 November 2003 and numbered 24246), dimensions of 80x90x35cm, with a double door from the front, closed at the back, designed that all electrical connections to be made from the front, including the connection between the devices and the bus-bar, the exterior painted to withstand external conditions, heat insulation, dust and water tight, the

roof part inclined in four directions so that it protrudes 50 mm, front doors locked, open bottom to be placed on a concrete base; It will contain an input and six outputs as specified in the electrical characteristics according to the single line diagrams. Bus-bar, internal connection cable, internal lighting, 1kV bus-bar support insulator, grounding socket, internal grounding connection, bolt, nut, washer, and others shall be included. If the panel is manufactured as galvanized, the sheet will be at least 3 mm.
Electrostatic paint can be applied on galvanized panel.

- 220 V, 10 A Switched automatic fuse
  Ref: Electrification and Lightning Works Item No 4
  a) Material: Panel materials (relays, signal blocks, control and wiping butane, alarm horn, other) manufactured in accordance with its specifications and standards. Three phase over-current, three phase over-current + earth, two phase over-current + earth relays and DC leakage relay shall have the supply voltage levels of 24 VDC to 110 VDC and may have the characteristics of fixed, normal, normal inverse, inverse and, very inverse time. Settings of the over-current and ground relays will be individually adjustable. Tank protection relay shall be 0.2-2 A will be instantaneous (As an alternative, fixed time earth protection relays can be used in these facilities).
  b) Assembly: Installation works shall be done according to principles specified in the General Technical Specification for Electricity Distribution Facilities (TEDAŞ) and their location in the panel. Including; the mounting material and assembly required by the device, NYA cables with a cross section of 2.5 or 4 mm^2 that will allow these devices to be connected with each other, terminals (row terminals) necessary for this connection, spirals, cable clamps, cable label, cable lugs, bolts, nuts, other included. Material and assembly of the cables used between the panel and other devices outside the panel included.

- Aluminum danger board & danger sign earthing
  Ref: Electrification and Lightning Works Item No 5
  - Material: Danger sign shall be enamel or aluminum with the specifications defined in the Technical Specification for TEDAŞ Electricity Distribution Network Numbering Works regarding "Electrical Hazard" specified in the Safety and Health Signs Regulation published in the Official Gazette dated 23 December 2003 and numbered 2532.
  - Assembly: Assembly works shall be done in accordance with the principles specified in the Technical Specification for TEDAŞ Electricity Distribution Network Numbering Works. Including all material and assembly of clamps, flat blades, nails, bolts, and nuts required for assembly are also included in the assembly scope. The mounting of the danger sign to be done using rust and corrosion resistant steel clips.

- 35 mm^2 (319.26 kg/km) Copper conductor and embedding. Installation of each extra meter of strip to the ground, duct, wall, or pole, if necessary, using extra galvanized grounding strip.
  Ref: Electrification and Lightning Works Item No 6

- 2m Length Galvanized 65x65x7 Earthing Electrode. All grounding will be done in accordance with the Grounding Regulation (published in the Official Gazette dated 21 August 2001 and numbered 24500), Electricity High Current Facilities Regulation (published in the Official

Gazette dated 30 November 2003 and numbered 24246), General Technical Specification for Electricity Distribution Facilities (TEDAŞ) and Typical Projects. NYY cable with copper conductor at least 50mm2 cross section as grounding conductor and equivalent 70mnr galvanized braided steel rope or 3mm thick hot-dip galvanized strip with at least 100mm2 cross-section and hot-dip galvanized at least 0.5 m2 (50x100 cm) 3mm thick strip as grounding electrode grounding plate or equivalent 65x65x7mm angle iron, 2m long galvanized grounding stake or equivalent galvanized pipe will be used. Valid for LV - MV networks, transformer buildings, direct transformer posts, protection and operation grounding of power plant buildings and surge arrester grounding,

a) Material: Grounding plate and 5m long grounding strip.

   All grounding will be made in accordance with the Grounding Regulation, Electricity High Current Facilities Regulation, General Technical Specification for Electricity Distribution Facilities and Typical Projects. NYY cable with copper conductor at least 50 mm2 cross section and equivalent 70 mm2 galvanized braided steel rope or at least 100 mm2 as grounding conductor.

   3 mm thick hot-dip galvanized strip and a 3mm thick, at least 0.5 m2 size (50x100cm) hot-dip galvanized grounding plate or equivalent 65x65x7mm angle iron 2m long galvanized grounding plate or equivalent galvanized pipe will be used as grounding electrode.

   It is valid for LV - MV networks, transformer buildings, direct transformer posts, protection and operation grounding of power plant buildings and surge arrester grounding

b) Installation: Transportation of galvanized sheet and strip, fastening of the strip to the plate with at least three bolts, passing the strip through the channel at a depth of 70 cm and excavating ground to bury the plate at a depth of 2 meters, burying the strip and plate, closing the pit and canal, dumping the remaining soil and stone to the place indicated by the administration. Material and assembly of all kinds of materials required for fixing the strip to the grounding points included.
   Ref: Electrification and Lightning Works Item No 7

- Cable works for different kind of YAVV (NAYY) and NYM cables as listed:
  - 5 x 1.5 mm^2 NYM Cable Aluminum cables NAYY Cables (installing underground)
  - 4×16 mm^2, 0.6/1 kV Aluminum D cable YAVV (NAYY) (installing underground)
  - 4×25 mm^2, 0.6/1 kV Aluminum D cable YAVV (NAYY) (installing underground)

a) Material: Single or multi-wire single core used in dry places inside the building, in fixed pipes, under plaster and on plaster distribution tables.

b) Mounting: 0.6 / 1 kV cables will be XLPE or EPR insulated instead of PVC insulator. For all voltage levels; when a single cable with 1 or more cores is laid in a standard cable channel of 0.40 - 0.60 - 0.80 mt size, 12 bricks in 1 row included.
   Ref: Electrification and Lightning Works Item No 8, 9 and 10

10 SUPERVISORS OFFICE

Office accommodation of a reasonable standard and approximately 10 square meters for each supervisor's expert working on the contract shall be provided by the contractor at a location in Trabzon to be agreed.

Minimum furniture of the office (for 1 supervision staff) is defined as follows:

Office equipment	**Quantity**
• Meeting table	1
• Director chair	1
• Guest chairs	2
• Design table	1
• Cupboard (4 rows of shelves)	1
• Telephone	1

The contractor will maintain, light, heat and clean the offices for the duration of the contract.

Office washroom shall be provided with a washbasin, hot and cold water supplies and a flush operated WC connected to the existing sewer.

The contractor shall arrange for the provision of international telephone line for the sole use of supervisor's staff. In addition, an internet connection must be provided. The supervisor will pay the cost of calls.

The contractor shall be responsible for the security of the supervisor's office and all equipment until the office is finally closed.

The contractor shall ensure the office and its content are provided against fire, burglary and other risks normally insured for the duration of the contract.

The office shall be provided for the total construction period.

11 EC PUBLICITY & VISIBILITY REQUIREMENTS

11.1 EU Communication and Visibility Manual for EU External Actions

The contractor shall take all necessary measures to publicize the fact that the European Union has financed the Program.

In addition, the contractor shall take the necessary measures to ensure the visibility of the European Union financing or co financing. These measures must comply with the rules laid down and published by the Commission on the visibility of external operations: https://ec.europa.eu/international-partnerships/comm-visibility-requirements_en.

All projects /contract implemented under this programme shall comply with the Visibility Guidelines for European Commission Projects in Türkiye published by the EU Delegation to Türkiye, at https://www.avrupa.info.tr/tr/avrupa-birligi-gorunurluk-ilkelerini-ogrenin-16.

All communication and visibility activities should be carried out in close co-operation with the Employer. The Employer is the main authority in charge of reviewing and approving visibility-

related materials and activities. Before initiating any information, communication or visibility material and activity, contractors and implementing partners should seek the written approval of the Employer. Also, EUD's prior consent will be obtained for visibility & publicity actions/materials/plans, etc. Therefore, the Employer will submit those materials in advance to allow enough time and flexibility to address comments from the EU Delegation.

The EU-Türkiye cooperation logo should be accompanied by the following text:

"This project is co-financed by the European Union and the Republic of Türkiye."

Whether used in the form of the EU-Türkiye cooperation logo for information materials or separately at events, the EU and Turkish flag have to be provided at least double prominence each, both in terms of size and placement in relation to other displayed logos and should appear on all materials and at all events as per the Communication and Visibility Manual for European Union External Actions. At visibility events, the Turkish and the EU flag have to be displayed prominently and separately from any logos.

Logos of the end-user institution and the Employer should be clearly separated from the EU-Türkiye partnership logo and be maximum half the size of each flag. The logos will not be accompanied by any text. The Employer and end-user logo will be on the lower left-hand corner and lower right-hand corner respectively. The contractor logo with the same size will be in the middle of the Employer and end-user logo. If the contractor is a consortium, only the logo of the consortium leader will be displayed.

11.2 Signboards & commemorative plaques

11.2.1 Signboards during construction

The contractor shall provide, erect and maintain a signboard on site, as soon as possible, but no later than 45 days after the commencement date, in accordance with the Communication and Visibility Manual for EU External Actions bearing:

- The EU's name and logo,
- The Contracting Authority name,
- The End User's name,
- The Contractor's name,
- The Project name,
- Start and finish dates of the contract,
- Other information to be inserted upon, according to the EU visibility guidelines.

The signboards shall be not less than 2.5 m x 4 m, written in Turkish and English language. The design of the signboard and information given shall be approved by the Supervisor prior to manufacture and implementation. Further information regarding the standardized size and colour of flags and logos can be found in the publication "Visibility Guidelines" for contractors and other Implementing Partners operating in Türkiye issued by The European Commission on https://www.avrupa.info.tr/tr/avrupa-birligi-gorunurluk-ilkelerini-ogrenin-16.

The locations for the signboards shall be decided by the Supervisor. The contractor shall remove the signboards from the site on completion of the Works.

11.2.2 Permanent signboards

Ref: Signing and Marking Works: 3

Upon completion of works, the contractor shall erect a permanent signboard on site (5 signboards for the Phase 1 and 3 signboards for the Phase 2) in accordance with the Communication and Visibility Manual for EU External Actions to be agreed with CA/TMM. The signboards shall bear:

- The EU's name and logo,
- The Contracting Authority name,
- The End User's name,
- The Project name,
- Value of works,
- Other information to be inserted upon, according to the EU visibility guidelines.

The locations for the signboards shall be decided by CA/TMM and instructed by the supervisor.

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