



Estudos e Projectos de Arquitectura Paisagista, Lda

*Codificar os elementos naturais, interpretar a essência das formas,
na definição de uma maneira de fazer: metabólica, perceptiva,
funcional, natureza, artifício, paisagem.*

Albanian – American Development Foundation

Detailed Design

Waterscape Park Design

Drilon / Tushemisht – Albania

08

WATERFRONT

ARCHITECTURAL REPORT

ARCHITECTURAL REPORT

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1. INTRODUCTION

1.1 INTRODUCTION



Location

The main concept of the intervention for the Waterfront is the construction of a uniform, recognizable and continuous public domain in between the south shore of the lake and the urban and agricultural tissue that will be reorganized and requalified creating new opportunities for the development of the Tushemisht Village reinforcing his Identity.

For this purpose, it is important to invert the current situation of the waterfront where the traffic road creates a cut, a gap, in between the plots and the lake shore (beach) cutting the transversal continuity. For that is important to give priority to the pedestrian in a shared space where the cars must be aware of this new condition respecting the new vocation of the place.

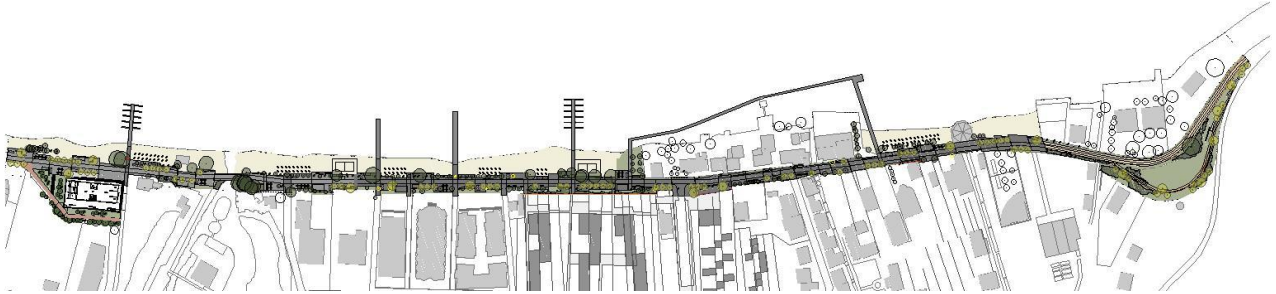
The Masterplan proposes the creation of an external road for regional connection and access to the Village from the south (from a set of parking plots where people can let the car and easily go to the Village and to the Waterfront). This new conception allows to have a Waterfront where the main users are pedestrians and bicycles and the vehicle traffic is for urban transports and local transit (local access to the residential areas and commercial units). This means that the existing road cannot be intended anymore as a traffic line and it will be integrated in the public domain (Waterfront design, signage, materiality) in order to give the intended priority to the pedestrians.

Also the Masterplan foresee that the Waterfront will have to important ends or gates: in the west side, from the arrival of Progradeç, is located Visitor center and in the east side it is located an informal event area that takes advantage of the existing hill consolidating a natural amphitheater.

The Waterfront has to be understood as a longitudinal space along the lake shore but mainly as a transversal mediation space between the hinterland (area with existing commercial units and future transformation) and the lake. The waterfront has to be robust to support this transformation.

2. PROPOSAL

2.1 INTERVENTION



General Plan

For the project it is important to counteract the current condition of the Waterfront defined by a road that cuts across continuity. For this purpose, the Waterfront is conceived as a sequence of large mismatched plaques of pavement that explore different forms of contact with the existing land (agricultural and urban) and the lake shore. These slabs have a uniform and homogeneous material and a surface texture that makes them more suitable for pedestrian use. By undoing the existing alignment, we increase the spatial depth and generate multiple forms of contact with the existing creating different programs and equipments. The lighting proposed for the Waterfront defines an alignment that guides vehicular traffic.

This sequence of plaques serves as a support for the implementation of various programmatic zones (informal beach resort areas, picnic areas, commercial units support areas, playgrounds, fitness areas...) with a series of small support units (kiosks, toilets, storage...) that are designed as recognizable and uniformizing elements of the Waterfront.

The project promotes surface drainage and infiltration through the pavement joints. The furniture (benches, paper bins, information...) is also uniformly designed to ensure the image of the whole.

The fundamental role of the proposed vegetation is on the one hand to create the conditions of shade and comfort along the Waterfront and on the other to define framing and transition areas between the Waterfront and the urban and agricultural plots that will be transformed into new urban plots, public or private. For the former, trees (riparian gallery) play the fundamental role, for the latter, clumps of herbaceous and shrubby vegetation provide the necessary framework and are a conscious solution to the temporary character of most of these areas.

2.2 MATERIALITY



HARDSCAPE

The proposal provides the waterfront space along the Waterfront path with slightly reinforced concrete decking with a ribbed surface finish. The platforms are separated by small green joints about 5cm apart to promote good drainage.



The concrete platforms are interrupted with wooden decking strips (pathways), connecting these pathways to the pontoons. All along the route, access to the beach is guaranteed with the minimum altimetric difference, always seeking a level finish, to guarantee accessibility for all.

On the east side, a transition of materials is proposed, where the well marked concrete path passes to a path in cobblestones pavement (10/11cm cubes). In the transition zone, an interior path is proposed, which aims to give access to the amphitheatre. This pedestrian path is paved with a cobblestone pavement (5/7cm cubes).

Along the Waterfront, in the programmatic areas for sports and recreational use, it is proposed to install sports fields on the beach and rubber cushioning flooring for the playgrounds.



SOFTSCAPE

The introduction of vegetation along the public space will be a very effective tool for the redevelopment of the Waterfront image and will contribute to the image and identity of the place. A tree reinforcement is proposed to ensure more areas of shade, meeting the comfort and environmentally effective heating that its absence could cause. The trees are planted along the route and next to the amphitheatre.

The space introduces a requalification of the existing green spaces, improving the landscape, enhancing the well being of those who walk along the Waterfront path. The vegetation is herbaceous and shrubby, appropriate to the region and the climate of a riverfront.

The plan of vegetation proposed is designed to achieve a result that corresponds to low levels of maintenance effort, using native species that are well adapted and used repeatedly in the region.

The following list is proposed:

TREES:



Acer platanoides



Alnus glutinosa





Betula pendula



Fraxinus angustifolia



Platanus orientalis



Populus alba



SHRUBS:



Berberis thunbergii



Buxus sempervirens





Cotoneaster lacteus



Euonimus japonicus



Juniperus horizontalis





Laurus nobilis



Nerium oleander



Pyracantha coccinea



Viburnum tinus

GRASS:

Sowing composed of the following mixture:

Agrotis tenuis
Festuca rubra
Commulata
Tricophyla
Poa pratensis

3. EQUIPMENTS

In terms of equipment and street furniture it is intended that there is a relationship with the landscape and the route, with the introduction of monolithic concrete benches that mark the transition between the space of the route and recreational / living and leisure areas.

Near the play and children's play areas, the areas will be complemented with drinking fountains.

Along the Waterfront, we propose the installation of bicycle parks, essential for the use of the space. After all, this is a cycle path.

Along the Waterfront, we propose areas with fitness equipment set, consisting of several equipments in order to promote sports. In the children's playground, we offer a wide choice of playground equipment adapted to the age group. In specific areas, we propose pergolas for shade, creating shadow areas. Complementing the proposal, we provide the spaces with equipment for use, such as toilets (wc), balneary, bar, storage and associations huts.

In the concession and terrace areas, we present our proposal of equipment for beach and esplanade areas.

4. GENERAL IRRIGATION PRINCIPLES

Through this criterion, water consumption is reduced to a minimum, and the types of irrigation used also contribute to this.

5. CONCLUSION

Considering the nature of the space and its characterization, we present a project with guidelines for uniformization and requalification of an entire public domain waterfront, with different spaces of use.

Lisbon, July, 2022

A handwritten signature in blue ink, appearing to read 'João Ferreira Nunes', is written over a horizontal line. The signature is stylized and cursive.

(João Ferreira Nunes)



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- Lisbon, July 2022 -

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WATERFRONT

TECHNICAL REPORT

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1. INTRODUCTION

1.1 INTRODUCTION

The Waterfront will be one of main engines of the development of this Park. In which you can develop any kind of program of public interest that will act as a decoy for the place. From restoration, playgrounds, skatepark, terraces, sports equipment, design of beach equipment (umbrellas and kiosks), rental of sports and nautical equipment, etc..

While the North Waterfront is directly attached to the Lake and it will be mainly a mineral support complementary to the lake banks and the Urban area, the South Waterfront will be directly related to the agricultural park and will have a more balanced relation between hardscape and softscape.

2. DESCRIPTION OF THE WORK

2.1 ABSTRACT

The following document presents an integral part of the RESPONSIBILITIES / TECHNICAL SPECIFICATIONS AND SPECIAL CONDITIONS for all supplies, works, and their manner of execution described in the price lists, schedules, and drawings with which the Contractor is obliged to comply.

The Contractor should become familiar with the site. With Management Direction, the volume and nature of the works should be understood to avoid any claims based on ignorance or lack of knowledge of the same.

It should be stated that faithful completion of the work and supplies will be executed, even if not explicitly described in the Specifications.

Transportation, loading and/or unloading, storage, and parking areas must avoid the mixing of different construction materials, as well as the conservation and all costs there within, will be borne by the Contractor.

The pages of this contract shall be executed in good faith, and in accordance with the best industry practices. Among the various construction industry practices that could be applied, the chosen process should be that which guarantees the best durability and finish.

The materials to be employed shall be of high quality, should meet the conditions required for the intended purposes, and may not be used without prior approval of the Management Direction. The materials for which there are already official Specifications should satisfy them fully to what is prescribed. The Contractor, when authorized by the Management Direction may employ different materials than were originally intended, if the strength, stability, duration, and appearance of the conservation work, are not adversely affected and without an increase in the contract price.

The Contractor is obliged to first submit for approval to the Management Direction samples of the materials to be employed accompanied by certificates of origin, or of the analysis or test results made in official laboratories, whenever the Management Direction deems it necessary, which when approved, will set the standard.

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Upon inspection, the Management Direction reserves the right to, during and after the execution of works, and whenever it sees fit, to carry out control tests to verify that the construction is in accordance with the stipulations in these Specifications, as well as taking new samples for analysis and testing in official laboratories of its choice. The resulting responsibilities shall be borne by the Contractor. The provisions of this condition do not diminish the responsibility that is fit to the Contractor in the execution of the work.

The costs associated with the installation of on-site plumbing and electricity and its connection to the existing municipal networks and the payment of their consumption during construction are to be paid by the Contractor.

2.2 JOB SITE

The worksite, in accordance with the type of work to perform, should conform to the standards set in place, namely the National Laws and regulations on Building worksites from Albania.

The wear and tear inherent in the occupation of the worksite should be recovered by the Contractor and at his expense.

2.3 HEALTH AND SAFETY

The Contractor is required to meet the stipulations in all documents for the prevention of occupational risks pertaining to this contract, namely, in the Health and Safety Plan and / or Sheets of Safety Procedures, and applicable legislation on safety, hygiene and health at work.

The rules set forth in the legal documents and by the individuals mentioned above prevail, in terms of conditions of safety, hygiene and health in the work to establish during construction, over the Specifications that follow below.

The Owner shall prepare or request to have prepared, during the project phase, the health and safety plan to ensure the safety and health of all stakeholders in the yard, works on the subject and involving project work involving special risks referred to the Prior Notice of opening of the yard. If the project is planning to develop in stages and in successive periods, the Health and Safety Plan must be revamped to reflect changes in the project. The Health and Safety Plan will be further developed and specified by the entity performing to the stage of execution. In the case of works in which the plan is not mandatory safety and health, but which involve special risks, the entity must prepare performer Sheets of Safety Procedures for work involving such hazards and ensure that workers involved in labor have knowledge of them.

It is the responsibility of the Contractor and Subcontractors to maintain a technician responsible for Hygiene, Safety and Occupational Health accepted by the Owner, who may at any time be replaced in cases of acknowledged lack of competence, diligence and commitment and dedication function. It is also the responsibility of the technician to guarantee insurance of occupational accidents and others that should be required to face special risks, verifying the validity and form of coverage from the start of work. This should cover staff employed on site, including subcontractors and labourers. Copies of these insurance policies must include the process of the Health and Safety Plan.

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The executive entities, Contractor and subcontractors must:

- a) Assess the risks associated with carrying out the work and define the appropriate preventive measures and, if the health and safety plan is required, the Owner proposing the development and adaptations of the same;
- b) To publicize the health and safety plan for the execution of work and their changes with subcontractors and self employed, or at least the part that they need to know for reasons of prevention;
- c) Prepare records of safety procedures for work involving special hazards and ensure that the subcontractors and workers and workers' representatives for safety, hygiene and health at work working on site are aware of them;
- d) Ensure implementation of the health plan and safety data sheets and safety procedures by its employees, subcontractors and freelancers;
- e) Take measures to an appropriate organization and management of the site, including the organization of the emergency system;
- f) take measures necessary to ensure that access to the site is restricted to authorized persons;
- g) Organize a register of subcontractors and the self-employed Contractors with its own activity on site;
- h) ensuring the conditions for access, movement and travel necessary to the security in all jobs in the yard;
- i) Ensure the correct handling of materials and use of work equipment;
- j) Maintain and control facilities and equipment work before its entry into service and at regular intervals during the operation;
- k) identify and organize storage areas for materials, especially of substances, preparations and hazardous materials;
- l) to collect, in safety, hazardous materials used;
- m) store, disposal, recycling or evacuating waste and debris;

The General Contractor (Contractor / executing entity and subcontractors) should ensure that the system of first aid is constantly operating in a position to evacuate workers injured or suffering from sudden illness, so that they be given medical assistance. The number of first-aid facilities in every workplace is determined by the number of employees, type of activity and frequency of accidents. The first-aid facilities shall be provided with material and equipment needed for the fulfilment of their duties, allowing for stretchers to be properly marked in accordance with applicable law. Beyond these first-aid facilities, there should be first aid equipment (at least one box with: latex gloves, betadine, bandages, plasters, scissors, tweezers, tourniquets, splints and analgesics), marked and easily accessible in all places where working conditions require. The address and telephone number of the local emergency service must be posted and clearly visible, being necessary to the security of a system of emergency communications on the job site.

It is necessary to guarantee hygiene in the work, including the installation of toilets, provision of potable water in sufficient quantity, and the imposition of meals in the cafeteria, open fires not being allowed on the job site.

The Contractor shall place signage on roads, the area surrounding the work and at all points where that proves necessary, such as the fencing of the job site and demarcation of work areas, to avoid the generation of potential dangers.

The Contractor shall be responsible for any damages, caused on-site or to bystanders, by the lack of signage and implementation of the measures listed above, or its poor implementation.

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2.4 PREVENTIVE MEASURES

Included in these precautionary measures are insure correct signing and circulation, in order to avoid damage of the impermeabilization system, as well as protecting the drainage system already in place.

The existing tree will be preserved and should be protected from construction work and circulation areas on site. The identification and isolation of this area must be clear and the material used both durable and resistant.

2.5 DEMOLITION

Works will be performed in accordance with the laws and safety precautions to reduce risk of injury to passersby, skilled workers, neighbouring buildings, roads, vehicles, etc., and also includes:

- a. The assembly and disassembly of the support facilities (for execution of demolition), security and signalling the work;
- b. The loading of the goods in transport equipment
- c. Clearing the site, leaving the property free of demolished structures.

Floors, trim, walls and other existing built structures will be demolished. The demolition of the existing floors and trim, must meet the conservation of the largest possible number of blocks and cubes of stone, for reuse within the enterprise.

If during the execution of the work it is necessary to interfere with the surface and underground drainage systems, pipelines and similar existing buried structures, it will be the responsibility of the Contractor to take all measures necessary to maintain the functioning of those systems or structures, and the Contractor shall inform the Management Direction who will give the necessary instructions and if required, take the necessary steps.

The location of demolished buildings at the end of demolition work should present itself without any traces of pre-existence built. The land should be presented in its natural condition.

2.6 SITE LAYOUT

Before starting any work the Contractor shall, at its expense, demarcate and define the boundaries and heights of the works. Site staking and boundaries will be verified by the Management Direction, accepting them if they conform to the plans.

For the Contractor to execute the implementation of the work, the Management Direction shall specify the place or places where shall be put a transit level as necessary, well defined, and verified by the Management Direction in which it will support boundary definitions or stakeout.

The implementation of the various areas and volumes of the project will be done with the aid of correctly placed stakes to define the contours and dimensions of the project.

The Contractor shall deliver in writing to the Management Direction any anomalies found due to inaccuracies of the project.

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2.7 DRAINAGE

The implementation of the drainage network should be in accordance with the work and materials in accordance with plans provided by technical consultant. Elevations and surface pendants must be respected as defined in the Drainage Plan.

Proper coordination between project specialists and technical consultants involved in the project shall be respected, avoiding design changes without prior knowledge by the Management Direction and teams of Designers. Proposals from engineers assisting other consultants should be carefully verified.

Included in Contractor responsibilities are the execution of subsurface drainage layers, installation of gutters in paved areas, drainage in green areas, as defined in the drawings and in these Specifications.

2.8 TEST SAMPLES AND / OR PROTOTYPES

The Contractor should provide the Designer with samples and / or prototypes of all materials or work defined by the project, such as floor coverings, pavements and trim, in order to obtain its approval before the final finishes are applied.

The presentation of sample materials should take place as early as possible during the period of preparation and planning work and in any case, so that the measures of approval does not prejudice the completion of the work schedule.

Of the specified flooring materials, in particular stone slabs, will be carried out with samples 10m² (3.6 x 2.8m) of pavement and its trim, with the various dimensions of the stone, following all the indications of the Specifications, for 'Nature and Quality of Materials', and 'Method of Execution of the Works'. Samples will be taken one by one, incorporating the following suggestions from the Designer and Management Direction.

The approved sample will be standard for all the work and should only be dismantled or demolished only after the completion of the work involved. The existence of the standard will not waive, however, the approval of each batch of materials or building elements that enter the job site, as stipulated in these Specifications. If samples are presented off-site, they will be returned to the Contractor in time for them to be integrated into the work, if applicable.

2.9 FOUNDATIONS

Concrete foundations should implement the proposed levels in accordance with project design and Specifications.

2.10 LIGHTING

The lighting scheme should comply with the Urban Elements and Lighting Plan, in accordance with plans provided by the lighting consultant, respecting the typologies proposed.

Any adjustment to be made, with regard to the location of the elements may take place only after consultation with the Management Direction and Designer.

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2.11 URBAN FURNITURE AND SIGNAGE

The contractor should supply and place the elements in accordance with the Urban Elements and Lighting Plan.

Any adjustment to be made, regarding the location or replacement of these elements may take place only after consultation with the Management Direction and Designer.

2.12 IRRIGATION SYSTEM

2.12.1 GENERAL CONSIDERATIONS

Includes the execution of the system outlined in a diagram in the Irrigation Plan. The exact location of all driplines with integrated solenoid valves, tubes, etc. must be established by the Contractor during construction. System should be deployed using the bubblers, driplines with integrated solenoid valves, valves, tubes and accessories in the dimensions and types indicated in the Irrigation Plan. It will be built in accordance with the instructions from the Management Direction per the areas and locations in the Irrigation Plan.

The layout of the emitters (sprinkler and drip with integrated solenoid valves) is indicated in the Irrigation Plan and should not be changed.

Unless otherwise indicated, the construction of the irrigation system must include the supply, installation materials and labor to test all pipes, fittings, sprinklers, drippers, electrically-controlled valves and their respective junction boxes, electrical cables and other equipment, excavation and backfilling of trenches, and all labour necessary for the proper execution of work outlined in the plans and Specifications.

2.12.2 PRELIMINARY INDICATIONS

2.12.2.1 Substitutions

Any changes to sizing and strokes should be presented and justified proposal for approval of supervision. All pipes, materials and equipment for manufacturing defect or damage however should be removed from the site, and at the time of the inspection to detect such shortcomings.

2.12.2.2 Existing structures

The exact location of structures, infrastructure or other underground facilities, not indicated in the plans, shall be determined by the Contractor. All other indicated in plans should be confirmed by the contractor of the irrigation system and it must perform the work in order to avoid possible interruptions in operation of facilities, or any damage on them. If losses are incurred in these facilities, the Contractor will be responsible for them.

If minor adjustments are necessary to avoid obstructions fixed (resulting from any underground facilities), these adjustments must be submitted to the Designer for approval.

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2.12.3 SYSTEM VERIFICATION

2.12.3.1 System operations

The Contractor shall ensure the operability of the irrigation system. It will be the Contractor's responsibility to verify that the system distributes water in the area, satisfactorily watering the areas to irrigate. If discrepancies or flaws are found in the plan that the Contractor fails to note before installing, corrective action will be performed at the expense of the Contractor.

2.12.4 SUPPLIES AND EQUIPMENT

The Contractor shall provide equipment, tools, and labour necessary to ensure that the work of network installation is done in an acceptable manner and within the deadlines of the project schedule.

2.13 VEGETATION COVERING

2.13.1 PREPARATION OF TERRAIN

Before planting vegetation, the ground must be prepared which consists in carrying out various operations in the following order:

- manually spreading planting compost (as indicated in this Specification Book);
- settlement prior effected mechanically or manually;
- chemical fertilizers and organic materials as in the 'Materials and Resources' section of the Specifications;

2.13.2 PLANTINGS

In all plantings, the Contractor should strictly adhere to their plans, not being allowed any substitutions of species without prior approval of Management Direction. This treatment involves stakeout in accordance with the project, general holes, all supplies of plant material, hole digging, planting, staking, tying, watering and maintenance until project completion.

All plant material shall be designated by its botanical name according to the rules of botanical nomenclature, with the obligatory reference to the genus and species and variety or cultivar, if applicable.

All specimens from the nursery should be identified by indelible label, consisting of its botanical name. All specimens not identified individually or by batch will be excluded from site.

The relative positions of trees, shrubs and herbaceous patches must be respected, as the relationship with the points of the irrigation network assets.

2.13.3 SEEDS

As noted in the case of plantations, substitutions are not allowed any species without the written permission of the Management Direction and must be strictly adhered to the species and percentages of the project.

Whenever possible, the sowing should take place after all the plantings, to avoid trampling and allow a better finish work.

3. MATERIALS AND RESOURCES General Works

3.1 UNSPECIFIED MATERIALS

All materials not specified but used in the work must satisfy the technical and safety criteria imposed by the regulations concerning them, or have features that meet the standards of good construction.

The Management Direction may subject materials to special tests that verify, taking into account their place in construction, the intended purpose and nature of use required of them, in each case reserving the right to indicate the conditions that they must satisfy.

3.2 WATER

The water to be used in masonry and irrigation of ground cover will be soft, clean, free from acids, organic or dissolved substances, residues, or other impurities, especially chlorides, sulphides, and oils.

The water that would be used in the fabrication of mortar and concrete should not include substances in such proportions that may, by their nature, affect the normal setting and curing times of the same mortar and concrete mixes. In solution, the sulphates, sulphides, chlorides, and alkalis should be in such proportions that in all the remaining elements in the mortar and concrete mixes (additives and inert matter), the established values are not exceeded per standards set in EN 1008:2002 and NP 206:2000.

When the water does not come from potable sources, the water will be sampled and tested based on its characteristics and in accordance with EN ISO 5667:2006.

The water assessment (EN 1008:2002) will be made before the start of mortar and concrete fabrication and with the frequency that the Management Direction deems appropriate.

The costs associated with the installation of on-site plumbing and electricity and its connection to the existing municipal networks and the payment of their consumption during construction are to be paid by the Contractor.

The storage and transport of water should be cause for particular care in order to avoid contamination from deposits of dirt or any of the aforementioned materials. The water used in wetting the concrete during the curing stage should meet the requirements listed above.

3.3 HIDRAULIC CEMENT

The hydraulic cement of concrete and mortar shall be Ordinary Portland Cement (OPC), preferably from the region, recently manufactured and packaged so as to be protected against moisture. All the cement that does not satisfy the requirements of this Specification, purporting to be hardened with granules or which is poorly packaged will be immediately rejected and removed from the work site.

The cement bags shall be supplied in sealed bags in perfect condition that show the labels from the factory. Bags should be compact and without signs of tampering. When the supply is made in bulk, there should be proof of the trade name of the

manufacturer and the brand, with the date of manufacture. The storage of cement provided either in bags or delivered in bulk, must meet the specified guidelines set in the Standards of Concrete and Hydraulic Binders.

The cement bags shall be stored in a completely dry and ventilated site, either placed on wooden pallets on a warehouse floor or in properly sealed bins so that the material avoids deterioration. The bags will be arranged in batches according to the order of entry into the warehouse so as to allow easy inspection and differentiation of each stored lot. Cement stored for more than sixty days must be applied before using other more recent cement and should as a rule not be stored for more than ninety calendar days.

It is not permitted to use cement in which there has been water infiltration or that were stored in poorly conditioned or ventilated sites. If the Owner has doubts about the state of stored cement, either in batches on site or new deliveries to the site, the Owner may send samples out for testing.

The minimum requirements for strength, quality and supply shall comply with the requirements of the European Standard EN 206-1:2000 and EN 197:2000/A3:2007.

All cement at the time of application should be dry with no trace of moisture and be free of granules. Bags in which the latter occurs will be immediately removed from the work site.

It is forbidden to mix different cements, unless preliminary tests show that it does not degrade performance.

3.4 STONE FOR CONCRETE

Stone of siliceous nature, preferably crushed pebble or angled should be hard, sound, durable, and neither clayey nor frozen. Stone should be washed clean and free of substances that may impair the adherence to the cement or compromise the steel reinforcement. No elongated or flattened elements may be used, defined as stone whose largest dimension is 5 times its minimum.

The stones should be absolutely free of dust, clay, mica, coal, humus, salts, organic matter, etc.

Weight percentages of foreign substances in the stone for concrete must not exceed the following values:

Modified elements	2%
Agglomerated clay	0,25%
Loose material	1%

The stone must have variable dimensions, between 2 and 4 cm, and must abide by the provisions of the Standards of Concrete and Hydraulic Binders. The maximum size of crushed stone for concrete should always be adjusted to the distances between the reinforcement rods and the faces of the formwork; gravel with a maximum dimension of 4 cm will normally be used, with the thick and bulky stones no larger than 6 cm, with an even distribution of all sizes of stone.

When the gravel is intended for the use in unreinforced concrete, the maximum allowed dimensions shall be :

In works with less than 0,12 m of thickness	2 cm
In works with thicknesses between 0,12 and 0,18 m	3 cm
In work with thicknesses between 0,18 and 0,25 m	4 cm
In work with thicknesses greater than 0,25 m	5 cm
In foundations – with dimensions between	2 - 5 cm

The gravel must be of a granular size that, together with sand, gives the concrete the desired compactness.

The gravel should be deposited into separate lots and well defined according to their characteristics of particle size. The crushing of stone, where it has to be done on-site, should be performed in a separate location.

Resistant structures must follow the directions of Specifications provided by technical consultants.

3.5 STEEL AND REINFORCED CONCRETE

Either as individual bars or in groups, the steel profiles shall be of the dimensions defined in the detailed designs of the project drawings, in the manufacturer's installation details, or provided by the Management Direction.

The steel rebar shall be free of galvanization, paint, tar, oil, or loose rust and must not show surface defects, cracks, welds, or truncated sections. When this occurs, the rebar should be cleaned and scrubbed vigorously with a wire brush. The brush should be hard but not brittle, of homogeneous texture and fine bristles.

The rebar to be used in all reinforced concrete elements (footings, retaining walls, etc.) will comply with all rules and standards set forth in the Standards of Reinforced and Pre-Stressed Concrete Structures. In the case of omitted material, the Contractor shall use 400 NR type steel for ordinary reinforcement and S 235 JR for steel profiles, in each case submitting in advance request for approval to the Management Direction.

The rebar will be stored so as not to be exposed to oxidation. They will be placed off of the ground, separated by type, quality, diameter, origin, and properly protected so as not to be contaminated by oils, cement, or other products that may impair the adherence of the steel to the concrete.

The classification into classes and types of rebar shall be established in writing by official classification. The characteristics and conditions of use of rebar that may not be specified in the Standards of Reinforced and Pre-Stressed Concrete Structures shall be established in writing and officially approved.

Metal profiles will be applied with two coats of anti-corrosion protection.

3.6 SAND

The sand shall be of known origin and approved by the Management Direction, who may required additional tests in accordance with specific standards.

The sand shall be clean, hard, or silicon or quartz, clay-free and conform to the following grain conditions:

Sieve ASTM	Cumulative percentage of passed material
- N.º 4 (4,75mm)	100 %
- N.º 10 (2,00 mm)	85 %

3.6.1 SAND FOR MORTAR AND CONCRETE

The sand in the fabrication of mortar and concrete must satisfy the requirements of the Standards of Concrete and Hydraulic Binders (EN 12620:2002+A1:2008).

The sand must be hard, of silicon or quartz, of angular grain rough to the touch, clean or washed and free of soil, clay, and organic substances or other impurities and have a particle size distribution most appropriate for the nature of the work to be done. Sands should be composed of coarse grains, 2 - 5 mm, average 0,5 - 2 mm, and fine grains less than 0,5 mm, in order to provide maximum compactness and density.

The sand shall have granulometry adequate for each type of mortar. When intended for use in reinforced concrete, the sand must be, as much as possible, composed of two-thirds coarse and one-third fine grains, so that their particle size distribution is most appropriate for the compactness of the mortar.

The sand must also be free from substances likely to affect the holding power and curing time of the mortar and concrete mix or that may cause corrosion and efflorescence of the reinforcement, namely clay, silt, mica, shells, little resistant particles, soluble and organic substances. Use of sea sand or sand with salt is expressly prohibited.

The sand shall be stored in separate lots, depending on particle size, to avoid mixing between the various lots.

The sand shall be of known origin and be approved for use by the Management Direction, who may require additional tests according to specific standards, especially regarding the contents of salt and other extraneous matter. All sand shall be rejected that does not meet the listed Specifications.

3.7 CATALYSTS IN MORTAR AND CONCRETE

Catalysts may be used in mortar and concrete, such as plasticizers, air, or both, or retardants or accelerators that have been adopted by the Management Direction.

The catalysts use of for which there is no prior experience requires the Contractor to demonstrate the test results that prove the safety and performance of these catalysts, at its own expense.

When resorting to the use of catalysts, the Contractor agrees to comply with the manufacturer's instructions, with particular regard to dosage.

When mixed with other elements, catalysts should not contain harsh compounds - sulfates, sulfides and chlorides - in quantities that exceed the limits set in the Standards of Concrete and Hydraulic Binders.

It shall not be permitted to mix catalysts of different brands even if they have the same characteristics.

In the construction of stained or polished concrete floors, benches, and low walls that will be finished with necessary additives, the Contractor commits to submit samples for approval to the Management Direction and project team.

3.8 MORTAR AND CONCRETE

3.8.1 MORTAR

For works not otherwise specified, the composition of cement mortar will be 1 part cement to 4 parts fine sand.

3.8.2 CONCRETE

Unreinforced and reinforced concrete for use shall be indicated in the detail design of the project drawings.

All Specifications will be in accordance with the Standards of Reinforced and Pre-Stressed Concrete EN 206:2000.

In case of omission, concrete type C25/30 EC2 (B30.1) shall be used in the manufacture of reinforced concrete and C16/20 (formerly B20) for unreinforced concrete, in each case submitting in advance request for approval to the Management Direction.

3.8.2.1 Concrete levelling

Concrete levelling shall be composed of 200 kg of cement, 400 litres of sand and 800 litres of gravel 1/1,5 cm, with the thicknesses indicated in the project.

At a minimum, the Contractor must wait one day before placing the next series of steel reinforcement.

3.9 METALWORK

3.9.1 GENERAL CONDITIONS

a) The Contractor is responsible for the execution of all metalwork, including the supply and installation of hardware and all other materials inherent to the completion of the job, according to the drawings and Specifications.

b) The execution of metalwork must consider EN 1991 :2003. ; EN ISO 8501:2001 ; EN 15614:2006 ; EN ISO 15609 :2009.

3.9.2 DETAIL DESIGN

When there are no sufficient details or when the Contractor deems it necessary to propose change orders, the Contractor should submit for approval to the Designers and Management Direction one month before the start of work: a study of all metalwork made to include drawings representing the construction elements, assembly and fastening systems of all the constituent parts of the proposed metal structures, showing their dimensions when they differ from the project, or when the original design drawings leave dimensions undefined.

3.9.3 WORKMANSHIP

a) The Contractor shall complete all metalwork as indicated in the project, in accordance with the detail design drawings.

- b) The Contractor must carry out a survey of the measurements that are necessary for the fabrication of all metalwork, when the implementation of primary design elements does not ensure compliance with the elevations of the project. When the requirements of manufacture do not permit to wait for a survey of the aforementioned measurements, the Contractor must ensure that the design and fabrication of metalwork fits the allowable tolerances for the execution of subsequent and dependent design components.
- c) Until the acceptance of the work, it is incumbent upon the Contractor to perform all work required for the final finish of all metal design components. If the work is found to be incomplete and if the Management Direction deems it necessary, the Contractor shall bear the costs of reinstalling new hardware and repainting surfaces as needed per the repairs.
- d) The storage of metalwork must be done to avoid damage to the protective finish, metal plating or paint.
- e) The metalwork shall be staged to ensure that no infiltration or water penetration from rain or other moisture damages the work already performed.
- f) Metalwork should result in well-aligned and level structures that are in strict accordance with the dimensions and layout approved for implementation.
- g) Welding is generally not permitted, unless indicated in the project drawings. However, the Management Direction may allow welds in extenuating circumstances.
- h) Holes, cracks, and other imperfections must be repaired with welds.
- i) Direct contact between steel and plaster and other corrosive building materials must be avoided.

3.9.4 STRIPPING STEEL SURFACES

- a) All metalwork that will be painted or lacquered must be previously stripped and galvanized with, at minimum, 250 microns, after the cutting and welding of profiles.
- B) Metal may be sandblasted or stripped with chemicals. The types and methods of stripping must comply with EN ISO 8501:2001. Metal will be stripped to its base metal in cases of extreme exposure.
- c) Metal must be cold-bonded with, at a minimum, 100 microns weld depths.

3.9.5 FINISH THICKNESSES

The minimum thicknesses of various films that make up the final finish of metalwork and aluminium, when not otherwise specified in the drawings, will be as follows:

- paint and varnish: 60 a 80 microns;
- lacquer: 80 microns;
- anodization: 25 microns;

3.9.6 HARDWARE

Metal hardware and fasteners shall be of the type referred to in project drawings, having been approved before use by the Management Direction.

All hardware and accessories shall be well-built with a uniform surface.

3.10 PAVEMENT BASE

The thickness of the base layer for the floor forms shall be indicated in the design drawings, after compaction, according to the design detail drawings.

The gravel should be composed of rigid jagged-edged fragments and free of clay, organic matter or any other harmful substances. The stones should not be flat nor show signs of change due to weather.

All base material that has more than 15% of elongated elements (defined if the ratio between the highest and lowest dimensions is equal to or greater than 2) shall be rejected.

The gravel must comply with the following granulometry:

Sieve ASTM	Cumulative percentage of passed material
3" (75 mm)	100 %
2 1/2" (63 mm)	90 – 100%
1 1/2" (37,50 mm)	25 - 60%
3/4" (19,00 mm)	0 – 10%

The maximum percentage of friction of the Los Angeles machine at 500 rpm is 50%.

3.11 SUB-BASE AND FILLER MATERIALS

The thickness of the pavement sub-base layer in crushed gravel of different sizes (tout-venant) shall be indicated in design detail drawings. The surface must be smooth, uniform, and free from cracked, wavy, or loose material. Void areas may not be more than 15%. The scattering must be regular, avoid material separation, and not allow pockets of only fine or coarse material to form.

3.11.1 AGGREGATE

The aggregate must consist of crushed material in homogeneous form and be free of clay, organic matter or other harmful substances.

The particle composition, obtained from at least three different batches, will be recomposed during construction to comply with the following granulometry parameters:

Sieve ASTM	Cumulative percentage of passed material
1" (25 mm)	100 %
3/4" (19,0 mm)	80 – 100 %
3/8" (9,5 mm)	50 – 80 %
N.º 4 (4,75 mm)	30 – 60 %
N.º 10 (2,00 mm)	22 – 45 %
N.º 40 (0,425 mm)	8 – 24 %
N.º 200 (0,075 mm)	2 – 8 %

Within specified limits, the granulometric curve will be of regular form.

The composition will also exhibit the characteristics below:

The maximum percentage of attrition of the Los Angeles machine (Granulometry F)	30 % (a)
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Liquid limit	N.P.
Index of maximum plasticity	N.P.
Minimum sand content	50% (b)

(a) In the special case of granite, the percentage of attrition of the Los Angeles machine can be 35% (Gran. F)

(b) Sand content may be as high as 40% provided that the coefficient of blue methylene is less than 1 and the Management Direction endorses the procedure.

3.11.2 FILL MATERIAL

The material should only be applied to fill and stabilize the surface, consisting only of crushed products in accordance with the following particle size characteristics:

Sieve ASTM	Cumulative percentage of passed material
3/8 " (9,5 mm)	100 %
N.º 4 (4,75 mm)	85 – 100 %
N.º 200 (0,075 mm)	5 – 12 %

3.12 GRAVEL FOR FILL

Gravel used to cover the surfaces of vases and planters must be washed, without variations larger than 10% in dimension (10 a 20 mm) or larger than 85% in the quantity used.

Gravel used will be of limestone on the tree pit surface and granite on under the topsoil inside the tree pit.

Gravel used will be clean, washed, composed of rigid jagged-edged fragments, free from clay, organic material or any other harmful substances. The stones should not be flat nor show signs of change due to weather.

No admission of gravel with marine origin, pozzolans, or others with elevated levels of porosity.

They should be previously presented as sample materials selected for approval by the Designer and Management Direction.

3.13 HYDRAULIC LIME

Hydraulic lime must satisfy the following conditions:

- (a) Be of superior quality and free of hard fragments and foreign bodies, be well cooked and extinguished;
- (b) The hydraulicity index shall not be less than 0.30 or greater than 0.50;
- (c) The lime variety, not placed, should never be less than 700Kg / m³. Cubes of normal mortar (one lime for three sand) made with fresh water, and immersed in it, should have minimum compressive strengths of 25Kgf / cm², at 28 days.

3.14 CLAY

Where possible, clays from the region will be used for pavement composition. They must be less than 2 µm in size.

Clays must obey the characteristics indicated for civil construction, free from foreign matter.

3.15 PROPYLENE FILTER

The geotextile fabric should be free from fine soil, retaining small particles carried by water. It must avoid the mixture of materials with different physical or chemical properties to increase surface stability, distribute loads and improve compression.

It must possess sufficient physical and mechanical properties to resist stresses and handling, without producing tears during installation. It will be placed to ensure a minimum overlap between two membranes of 0.20m, in both the longitudinal and transversal directions, or in the end of each roll and done by the manufacturer's recommendations.

The geotextile, of type 'Fibertex', or equivalent, will be fabricated with virgin fibers of polypropylene. It should present a minimum surface mass of 120g/m², minimum thickness of 1.15mm over 2kPa, with sufficient and adequate permeability, for approval by the Management Direction.

The execution must consider EN 13252:2000.

3.16 GEODRAIN

Corrugate tube will be installed in perforated PVC (diameter 10cm) of the type 'Tecipipe by Sotecnisol', or equivalent to integrate in a gravel box wrapped in geotextile, for sub-surface drainage of green areas.

3.17 WOODS

The woods to be used obey the following conditions:

3.17.1 GENERAL CHARACTERISTICS

All wood must be healthy, not allowing rot, dark bands, ring or zigzag cracks, perforations, any trace of insect attack, or other harmful defects or anomalies, in accordance with NP 180: 1962. the standards EN 350: 1994, EN 1313: 2010 and EN 1316: 1997.

3.17.2 FORM

All the woods to be used have the dimensions indicated in the project, which are intended for the final finish. All frameworks and other parts to be used on the floors, must have a sharp edge, otherwise indicated.

3.17.3 MOISTURE

All wood to be used must have a humidity level of less than 18%.

3.17.4 FIBERS

The woods to be used have straight fibers parallel to the longitudinal edge of the piece, allowing a tolerance up to a great inclination of 1/10 in relation to that edge, when for pieces with resistance function and 1/5 in the remaining cases. The number of rings per square centimeter should not be less than 4.

3.17.5 WEIGHT

The minimum weight of pine wood for resistant parts will be 550kg / m³.

3.17.6 KNOTS

Pieces with no vicious or loose knots are allowed, and the wood for visible coating must be free from any knots. In the remaining pieces, healthy knots with a diameter of up to 1/5 wide, without exceeding 5 cm, in the case of pieces with a resistance function and up to 1/2 without exceeding 8 cm in the remaining pieces, are allowed.

3.17.7 CURVATURE

Arrows larger than 5mm measured over a length of 2m will not be admitted. In the case of long pieces, the maximum allowed arrow will be 1/400 of its length.

3.17.8 TREATMENT

All wood must be previously treated in an autoclave, with water-soluble salts, including as cutting surfaces, and should be carried out, whenever possible, after drilling and cutting.

Before applying the treatments, the dishes must be clean, dry, free of dust and oil. Oily wood must be degreased with a cellulose thinner.

The parts must be considered an autoclave treatment under pressure, with a product consisting of a mixture of oxides of copper, chromium and arsenic, with fungicidal and insecticidal action, in a dosage appropriate for manufactured products covered by risk classes A1, the Portuguese standard NP -2080/1985, that is, 24 kg / m³. In order to prevent the wood from acquiring a greenish tone resulting from the application of the salts, a brown dye must be incorporated in the autoclave impregnation phase.

It should also be applied to the wood a treatment with a water-repellent product of the protective impregnating stain type (colorless, water-soluble, with great penetration capacity), to prevent its rotting by the action of water.

They must be received from the material to be used and be subject to the assessment of the Inspection and Designers.

3.17.9 STORAGE

The wood will be stored by nature, categories, dimensions and by lot of each supply. The storage will be carried out in sheds or closed warehouses that shelter the rain woods and ensure the adequate to facilitate their natural drying. For this, between each two pieces, slats with a minimum thickness of 1 cm should always be interposed, spaced at most 60 cm apart.

3.17.10 ASSEMBLY AND FINISHES

As connections and sambling will be perfectly executed, according to the best rules of the art. The frames will be perfect and the clearances reduced to a minimum, in order to ensure a rigorous adjustment of the parts and to guarantee the defense against the penetration of atmospheric agents.

All made will be well-equipped, and no amendments or filling in defects to bitumen or putty are allowed to impair the behavior

of future finishes.

The exposed wood surfaces will be laid protected with a suitable primer and, before the final finish, they will be thoroughly cleaned of mortar incrustations and sanded.

3.17.11 WOOD DECK

The wooden deck, will be built in ipe wooden rulers properly treated with a striated finish, with a section 95x21mm, hidden with AISI 316 section stainless steel clips in U. The deck rests on IPE wood stringer structure, section 0.04x0.05m.

3.17.12 DECK WALKWAY

Supply and execution of Deck walkway to access the pontoons according the details, in wooden structure.

3.18 GRAVEL

The gravel of limestone origin to be used in coatings must be washed gravel, with no variation greater than 10% in dimensions 6 to 10mm, in more than 85% of the quantities used.

Samples of the materials selected for approval by the designer and the Inspection must be previously presented.

3.19 PAVING IN REINFORCED CONCRETE 'IN SITU'

Supply and execution of pedestrian, cycling and vehicle circulation pavement on the waterfront promenade. Pavement in reinforced concrete 'in situ', tck. 0,15m over layer of tout venant of 0,20m.

3.20 SECURITY SYNTHETIC - RUBBER

For the playground area, it should be performed in situ of the type 'kraiburg of Playplanet', or equivalent, composed of a 100mm thick SBR impact-dampening lower layer and a 10mm EPDM finish layer, in beige.

The SBR layer consists of a mixture of 90% black granules with 2.5-4.0 mm clean of impurities and 10% Conipur 4020 binder, component, solvent-free prepolymeric polyurethane with a density of 1.07gr / cm³ and viscosity 3800 mPas up to 23°C. Recommended temperature for application between 15-25°C. Application only recommended with temperatures between 15 and 40°C, and relative humidity between 40 and 90%. This pavement base will be executed in situ with 30mm and 100mm thickness, according to the fall zone indicated in the plan.

The upper layer consists of a 10mm thick EPDM synthetic rubber floor, executed in place (in situ), in beige color, consisting of a mixture of 80% 1.4mm colored EPDM granules, with a density of 1.6gr / m³, tensile strength greater than 6MPa and elongation at break greater than 700%, with color stability between 5-4 in gray scale, and 20% Conipur binder 4020, one component, free prepolymeric polyurethane of solvents with a density of 1.07gr / cm³ and a viscosity of 3800 mPas up to 23°C. Recommended temperature for application between 15-25°C. Application only recommended with temperatures between 15 and 40°C, and relative humidity between 40 and 90%.

3.21 COBBLESTONE

The mechanical resistance to compression of the stone should be between 1300 and 1700kg / cm². The maximum acceptable porosity will be 1.5% and will have an apparent density of 2600kg / m³. The stone must be hard, homogeneous grain, unassailable by air or water, free of cavities, lesins or foreign matter.

Samples of the materials selected for approval by the designer and the Inspection must be previously presented.

Blocks with the following dimensions and broken finish will be used:

-0.05X0.05X0.05m

-0.11x0.11x0.11m

3.22 METALLIC CURB

To finish the floors, a curb will be applied in galvanized steel plate (thickness 4mm), arranged with a cleaver, with a width defined in the project details.

3.23 IRRIGATION

The speciality project should be consulted.

3.24 VEGETATION

All plants must be specimens, nursery-grown, phyto-pathologically healthy, well-shaped, without dead or damaged roots, and must have compatible development with the species to which they belong.

3.24.1 TREES

Trees will have robust foliage, vigorous deflection and a canopy in good condition. They must have a well-developed and abundant branch system. The root system must be healthy with extended and uncoiled roots.

Regarding the quality of the trunk, it should be upright and show uniformity and be straight from its base, with the presence of a single main trunk and no dominant branches or significant pruning wounds.

The proposed trees must be of the dendritic class as specified by the girth and height, per the Planting Plan (see drawings).

The perimeter of the trunk must be measured one meter from the stem of the tree and shall be recorded in centimetres. The height must be measured from the stem to the highest deflection, in its normal configuration, and shall be recorded in centimetres.

All specimen trees must show similar growth and development patterns.

3.24.2 SHRUBS

The shrubs should be plants with good growth, well formed and full, with branches well separated in order to allow a good balance and with good quality shoots. They must be alive, free from pests or diseases, without signs of nutritional deficiencies and without any damage.

The bushes must be potted, well rooted, without dry parts and in good phytosanitary condition. Its branch must be very dense from the base Your root system must be alive and healthy and must have a balanced size in relation to the aerial part of the plant. They must have a balanced aerial structure, with a minimum of 3 to 5 stems from the root system (unless otherwise

indicated), covered with branches from the neck.

The shrubs and vines will be of the following species, to be planted according to the spots defined in the Plantation Plan (see drawings).

3.25 SEEDS

The seeds must have the degree of purity and the germination power required by law, regarding the species included in the law. The rest of the seeds will come from the harvest, the date of which has not elapsed more than ten months, and must also have all the characteristics considered essential for the proper execution of the work. If the Inspection so requires, they will be provided separately.

Lawn / meadow sowing should be in the grammage and percentage established in the respective drawn parts (Seed Plan) and work map, as well as their composition.

The contractor is obliged to deliver to the Inspection a sample of the batch of seeds to be used or the species that constitute it. The following sowing mixtures will be applied:

Lawn according to the spots defined in the Plantation Plan (see drawings).

3.26 DEFINITION OF PRODUCTION CONDITIONS

The plants must be produced in authorized nurseries. Plants produced in containers must remain there long enough for root growth to substantially fill the container, without however being limited by it. The size of the container must be proportional to the size of the plant, the development of the plant being accompanied by successive changes in the size of the container, the number of changes being recorded.

3.27 PROJECT SUPPLY, TRANSPORT AND DELIVERY

The trees must be supplied in containers or clods, and in the latter case, they must be sufficiently consistent so as not to fall apart easily, and be protected with litter, paper, plaster or other organic fabrics, ensuring the union between the earth and the roots and avoiding dehydration of these, and preferably in spring, when the development of your root system begins.

The root ball must be well shaped, with size proportional to the development of the tree (it is estimated that the diameter corresponds, at least, to three times the perimeter of the tree trunk) and with the centered trunk. If supplied with root ball, they must be removed from the soil before the beginning of the period of vegetative activity. The clods will be firm and intact, and plants that have lost large amounts of root material in proportion to the aerial part should be rejected. It must be checked that the sectioned roots, that is to say, those that extended out of the root ball and that, for this reason, were cut, do not have diameters greater than 2 cm.

In the case of trees grown in containers, the container must be similar in size to that of the root ball specified for the same tree. It must be checked that the roots are not curled, which hinders their future development.

Arboreal specimens of protected clod or container, should only be handled by the clod or container and never by the aerial part. The sub-shrubs and shrubs to be supplied must be bagged or packaged and should only be handled by the bag or the vase and never by the aerial part.

In specific cases, deciduous plants may be supplied in bare roots, in winter during the dormancy period. In this case, an abundance of hair (young and superficial roots, responsible for absorption), a well-developed root system and the absence of necrosis or rot should be required.

During transport, the plant material must be protected against extreme temperatures, excessive sunlight, wind and other adverse weather conditions. If transport is done in a closed vehicle, the plant material must have adequate ventilation conditions to avoid excessive sweating. All transportation of plant material must be accompanied by a transportation guide, which can be verified by the Inspection. The transportation of national or international plant material must be carried out in accordance with legal requirements, confirmed through the respective documents.

After unloading at the construction site, the plant material must be inspected by the Inspection, to verify compliance with these specifications. In addition to other qualitative parameters, the Inspection may check the state of root development of plants with protected clods, or in containers. Plants from different suppliers will be considered as different batches for the purpose of batch inspection. If, after inspection, the Inspection considers that root development has been restricted or deformed in the container or clod protection, all plants of this species and the same supply lot, must be rejected and removed from the construction site. The contractor's representative must be present at all inspections of plant material.

The designer will evaluate (in the nursery or at the time of unloading) and approve or not, the specimens, which, if not considered to correspond to the characteristics expressed in this document, will be rejected.

3.28 SOIL

The soil supplied shall be natural and cultivated from the surface layer of forest land or the topsoil of agricultural land with high agricultural capacity, or from land stripped and stored as a result of other on-site grading operations.

The soil shall be free of stones and foreign waste materials. It must be of uniform composition without subsoil.

It must also demonstrate the following characteristics:

- PH: between 5,0 e 7,0;
- electrical conductivity: less than 1500 micromhs per cm per soil extract: water 1:2;
- nitrogen (N): not less than 0,2%;
- available phosphorus (P): not less than 70 ppm when extracted with 4,2% of NaHCO₃ at PH 8,5;
- available potassium (K): not less than 300 ppm when extracted with 8% of ammonium nitrate; mesh sieve of 1,3 cm;

The Contractor will submit analytic proof for each batch of soil attained from the same source and will be responsible for carrying out further tests at the request of the Management Direction. Any soil samples that do not meet these Specifications will be rejected.

3.29 PEAT MOSS

Peat moss used in compost shall be Sphagnum, unfertilized.

3.30 FERTILIZERS AND ADDITIVES

The following substances shall be applied as indicated in the Specifications chapter 'Implementation Method' for Fertilization:

Macronutrient fertilizer with a minimum NPK analysis of 12-12-17, in addition to 2% Mg and 6% Ca, and other micronutrients of the type Blaukorn from Hoechst;

Ammonium nitrate fertilizer at 20,5%, for regular maintenance fertilization;

Organic additives with about 50 % of stabilized organic material.

3.31 TUTORS AND TIES

The training system for trees shall be formed by three stakes of pine or eucalyptus, treated by immersion in a 5% copper sulphate solution for at least 2 hours, and will be cut to the scale appropriate to guide and protect the tree while being trained. The stakes will be sharp enough to be inserted into the ground, have a greater diameter than the trunk and a minimum height of 2/3 the tree specimen. Trees that will grow to be higher than 3 m will be trained with a system of at least 4 m.

The guy-ropes shall be of raffia, twine, sisal or other materials such as rubber, with sufficient strength and elasticity for the required function, without damaging the specimen.

3.32 FURNITURE AND EQUIPMENT

Subject to the provisions for each item, all equipment listed should always follow the manufacturer's instructions with regard to transport and assembly. The layout and installation will be observed per the Urban Elements and Lighting Plan and should only be performed by qualified personnel.

3.33 LIGHTING EQUIPMENT

The material used must be the one indicated in the Lighting Location Plan, and any replacement must be authorized in writing by the Inspection. Their handling and transport must comply with the manufacturer's instructions. Specifications and dimensioning of the electrical network, including models of outdoor lighting equipment, are included in the specialty project.

3.34 LIGHT STRUCTURES

Without prejudice to the provision for each item, all equipment referred to must always follow the details and instructions of the manufacturers with regard to transportation and assembly. The relative positions defined in the design drawings and the indications specified in the design details will be respected. Installation should only be carried out by qualified personnel.

The structures shall be installed and defined as detail.

[AADF]

[Shetitorja "DRILON-TUSHEMISHT]

Raport mbi Punimet Topografike



KORRIK, 2022

CONSULENTI:

BUJAR KARANXHA PF

Klienti:	[AADF]
Konsulenti:	Bujar Karanxha
Titulli I Projektit:	[Shetitorja "DRILON-TUSHEMISHT]
Emri I dokumentit:	Raport mbi Punimet Topografike
Faza e Projektit:	Projektim I detajuar
Kodi I Dokumentit:	BK-2782022R0 (BK-data/muaji/viti-rishikimi i dokumentit)

Rev.	Qellimi I leshimit	Pershkrimi	Date
00	Per Aprovim	Dikumenti I pare	27.07.2022

	Konsulenti			AUTORITETI KONTRAKYOR	
	Pergatirur:	Kontrolluar / Aprovuar:	Firma:	Kontrolluar:	Aprovuar:
Emri / Firma:	Bujar KARANXHA				
Date:	27.07.2022	dd.mm.vvvv	dd.mm.vvvv		
Statusi I Dokumentit:	Projektim i detajuar	Kontrolluar	Aprovuar	Kontrolluar	Aprovuar

Tirana 2022

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1 HYRJE

1.1 Pershkrimi mbi Projektin

Qëllimi I ketij rievimi eshte te paraqitet gjendja ekzistuese e rrugeve, objekteve dhe elementeve te tjere te situacionit per qellim Studim projektim "Shetirtorja e Drilonit"

U moren ne kosiderate qe produkti perfundimtar I ketij rievimi te paraqese nje situatë reale dhe me sa me shume detaje te gjendjes faktike te sheshit ku pretendohet te realizohet projekti. Nuk eshte neglizhuar asgje nga situacioni faktik ne terren duke paraqitur cdo rruge, puset, mure rrethuese, rrethime, objekte ekzistuese, linja/shtylla elektrike dhe telefonie si dhe cdo gje tjeter brenda fashes se rievimit .

1.2 Detyrimet Kontraktuale

Qëllimi i këtij projekti është përgatitja e projektit të zbatimit për zhvillimin e kesaj zone ne kuader te permirsimit te infrastruktures rrugore dhe shetirores se aksit Drilon-Tushemisht, si pjese perberese te ketij projekti jane dhe punimet topogjeodezike.

Kryerja e matjeve fushore, me saktësi te shkalles 1:100 dhe 1:200 dhe 1:500 me qellim realizimin e projektit:



Fig.01 Pamje Grafike e zones ku do zhvillohet Projekti

1.3 Grupet e punes

Per kryerjen e kesaj detyre jane angazhuar 3 grupe pune, Keto grupe pune jane te angazhuara per te realizuar matjet fushore me paisje marres satelitor GNSS, gjithashtu dhe me paisje total station duke patur parasys qe ne shume zona te ketij projekti matjet me GPS jane te kufizuara per shkak te objekteve dhe bimesise ne zone. Keto ekipe jane mbeshtetur nga ekipi I perpunimit te materialeve dhe te dhenave te marra ne terren me dy metoda, matjet tokesore dhe fotografimin ajror te realizuar me paisje special te projektuara per te arritur saktesine e te dhenave te perpunuara Brenda vlerave te lejuara te projektit.

Fillimisht jane caktuar zonat qe kane prioritet nga ekipi i projektimit, ka filluar rilevimi duke vendosur pika bazamentit mbeshtetes, me parametrat e pershkruar me poshte ne kete raport, me pas duke u mbeshtetur ne keto pika te matura me gps ka filluar puna duke rilevuar cdo gje brenda fashes se kerkuar te rilevimit.

Veshitresite dhe sfide gjate kryerjes se procesit te rilevimit kane qene te lidhura me kohen e kryerjes se ketyre punimeve, zona e ngarkuar me qytetare ne sezonin e pushimeve dhe mjete transporti te shumta qe pushojne ne zona te ndryshme pergjate fashes ku kryhet rilevimi. Ne disa raste ka qene e nevojshme te rikthehemi serish te njeztes zone per rilevim per te realizuar plotesime te mundshme qe ne heren e pare mund te jene lene per shkaqe te ndryshme.

Duke qene se terreni ishte shume i ngarkuar me detaje per tu arritur te gjitha pikat e interesit parashtruar nga projektuesi jane perdorur duke i kombinuar te gjitha llojet e pajisjeve qe ndodhen ne treg, GNSS, Total Station dhe UAV (fotogrametri ajrore).

2 PERSHKTIM I PERGJITHSHEM I PUNIMEVE TOPOGRAFIKE

Me poshte paraqitet I gjithe procesi I punes per realizimin e ketij rilevimi:

1. Matjet GNSS
2. Rilevimi fotogrametrik, UAV
3. Matjet tokesore me Stacion Total

2.1 Matjete GNSS

2.1.1 Sistemi I referimit, Rrejtji Mbeshtetes

Per realizimin e ketij rilevimi u ndertuan 5 pika poligonometrie te emeruara nga BM1 deri ne BM5 me system rrites nga 1.

Pikat u sinjalizuan ne terren me vida metalike dhe gozhde te ngulura mire ne beton dhe pika qe ekipe te tjera kane ndertuar ne zone duke qene se jane ne gjendje te mire fizike ne terren, ne menyre qe paisjet qe peroren per te realizuar rilevimin topografik apo dhe ato qe do te perdoren ne fazen e ndertimit te rrugeve apo dhe veprave te tjera inxhinierike, te qendrojne kollaj dhe gjithmone ne te njejtin pozicion. Jane zgjedhur ne zona me shikueshmeri te mire dhe ne pozicione qe nuk preken nga nderhyrjet per rindertimin e zones.

Pika hyrese eshte perdorur pika BM1, koordinatat e te ciles u perftuan duke u mbeshtetur ne bazat permanente ALBCORS elipsoidi WGS84 Projeksioni UTM 34N

Sistemi i Lartesive eshte perdorur sistemi gjeoidi global EGM2008,

Tabela 2A.

KOORDINATAT E STACIONEVE "T-V" KRGJSH				
NR	Nord	Eeast	H	D
1	475734.545	4527877.418	694.254	BM1
2	475853.876	4527884.320	695.028	BM2
3	476236.648	4527960.464	694.389	BM3
4	476606.431	4528060.131	694.934	BM4
5	476682.604	4527847.268	724.991	BM5



Fig.02 Pamje grafike e zones ku jane vendosur pikat e bazamentit

Ne tabelen e mesiperme jepen koordinatat e pikave te rrejtit kryesor mbeshtetes.

Keto pika nuk jane zhvilluar brenda dites, por pergjate gjithë kohes qe eshte nevojitur per te realizuar matjete ne terren gjithashtu gjate punes eshte dashur qe te zhvillohen shume me shume pika mbeshtetese se keto ne liste por nuk jane paraqitur ne kete table,

2.1.2 GPS RTK (Real Time Kinematics)

Metoda rtk eshte perdorur nga ekipi I punimeve fushore per te realizuar rilevimin, ku jane marre te gjithë elementet e situacionit. Gjithashtu kjo metode eshte perdorur per te matur koordinatat e pikave te orientimit te fototgrafive GCP (Ground Control Points) gjithashtu dhe te pikat e rrejtit mbeshtetes duke patur parasyshe qe shtrirja e zones nuk eshte e madhe.

2.1.3 Paisjet

Paisjet GNSS te perdoruara per realizimin e ketij rilevimi jane te specifikuara me poshte:

Table 2-1: A

Quantity	CHCNAV	Base Accuracy vector prescribed by the manufacturer		Frequencies	Channels
		Hz:	V:		
3	CHC NAV i90	8mm ± 0.5 ppm	10mm ± 0.5 ppm	See below	220
				See below	

GNSS Characteristics

- 220 channels with all in view simultaneously tracked satellite signals
- GPS: L1C/A, L2C, L2E, L5
- GLONASS: L1C/A, L1P, L2C/A, L2P, L3
- Galileo: E1, E5A, E5B

- BDS: B1, B2
- SBAS: L1C/A, L5 (QZSS, WAAS, EGNOS, GAGAN)

GNSS Accuracies

- Network RTK:
 - Horizontal: 8 mm + 0.5 ppm RMS
 - Vertical: 15 mm + 0.5 ppm RMS
 - Initialization Time: < 10 s
 - Initialization Reliability: > 99.9%
- Real Time Kinematic (RTK):
 - Horizontal: 8 mm + 1 ppm RMS
 - Vertical: 15 mm + 1 ppm RMS
 - Initialization Time: < 5 s
 - Initialization Reliability: > 99.9%
- Post-processed Kinematic (PPK):
 - Horizontal: 8 mm + 1 ppm RMS
 - Vertical: 15 mm + 1 ppm RMS
- High-precision Static:
 - Horizontal: 2.5 mm + 0.1 ppm RMS
 - Vertical: 3.5 mm + 0.5 ppm RMS
- SBAS: 0.5 m RMS

Kjo paisje GNSS eshte e pajisur dhe me kompensator pjerresie, gje qe ben te mundur matjen e pikave qe me pare ishte e pa mundur te merren. Kempensatori lejon qe me nje perrtesi deri ne 60° te merret pika detaje duke mos kaluar skatesine e permendur me siper. Ne saje te teknologjive te reja qe kane bere te mundur rritjen e eficiencies ne terren, eshte realizuar dhe rilevimi i ketij projekti.

2.2 Punimet Fotogrametrike (UAV Survey)

Puna e pare e ketij procesi ishte te shenonim pikat e kontrollit ne toke, pika te cilat rilevohen dhe me paisjet gnss, keto pika evidentohen ne sejcilen fotografi respektive ku jane shfaqur gjuje i caktuar pozicionin ne qender te shenjes.

Misioni i krijuar eshte mision fotografik LINEAR ku te gjitha objektet mbas pepunimit ne software te posacem ku me pas mund te ventorizohen te gjitha elementet me interes per projektin.

2.2.1 Paisja

PHANTOM 4 RTK

Kjo paisje ka revolucionizuar procesin e fotografimit ajror duke qene se eshte e paisur me marres satelitor gnss duke siguruar nje saktesi centimetrike te qendres se fotografive, me kete paisje numri i pikave te kontrollit ne toke eshte me i ulet.



Figure 2-1: Saktësia e PHANTOM 4 RTK

Phantom 4 RTK, siguron saktësin absolute në real time. P4RTK ruan të dhënat e observimeve satelitore që mund të perdoren dhe me pas per procesim të mëvonshëm nëse gjatë kohës së fluturimit nuk ka sinjal RTK. P4RTK operon me software specifike per procesimin e të dhënave të koordinatave të qendres së fotografive (Cloud PPK Service).

Sinjali RTK per këte paisje mund të sigurohet duke përdorur bazen që është projektuar per këte qëllim D-RTK 2 ose duke përdorur N-Trip

Detajet teknike sipas pasaportes së paisjes P4RTK janë listuar më poshtë:

- **GNSS**

Multi-Frequency Multi-System High-Precision RTK GNSS

Frequency Used:

GPS: L1/L2;

GLONASS: L1/L2;

BeiDou: B1/B2;

Galileo: E1/E5a

First-Fixed Time: < 50 s

Positioning Accuracy:

Vertical 1.5 cm + 1 ppm (RMS);

Horizontal 1 cm + 1 ppm (RMS)

1 ppm means the error has a 1mm increase for every 1 km of movement from the aircraft.

- **Kamera**

Sistem imazherie preciz

Të dhënat më të mira të fotove mund të kapen me një sensor 1-inç, 20 megapixel CMOS. Shkrepja mekanik bën që misionet e per krijimin e hartës ose kapja e rregullt e të imazheve të jenë në një qetësi dhe pa deformim pasi Phantom 4 RTK mund të lëvizë ndërsa bën fotografi pa rrezikun e turbullimit të hapjes së kamerës. Për shkak të rezolucionit të lartë, Phantom 4 RTK mund të arrijë një (GSD) prej 2.29 cm në 90 metra lartësi fluturimi. Për të siguruar që çdo Phantom 4 RTK ofron saktësi të pashembullt, çdo lente e kamerës së vet kalon përmes një procesi rigoroz të kalibrimit, me parametrat e ruajtur në metadat e secilës imazh, duke lejuar që programi pas përpunimit të përshtatet në mënyrë unike për çdo përdorues.

Sensor	1" CMOS; Effective pixels: 20 M
Lentja	FOV 84°; 8.8 mm / 24 mm (35 mm format equivalent:24 mm) f/2.8 - f/11, auto focus at 1 m - ∞
ISO Range	Video: 100 - 3200 (Auto) 100 - 6400 (Manual)

Photo: 100-3200(Auto) 100 - 12800(Manual)

Shpejteisa e shkrepjes mekanike 8 - 1/2000 s

Shpejteisa e shkrepjes elektronike 8 - 1/8000 s

Madhesia maksimale e imazhit 4864 × 3648 (4:3), 5472 × 3648 (3:2)

Video Recording Modes H.264, 4K: 3840 × 2160 30p

Photo Format JPEG

Video Format MOV

Me një program të integruar të planifikimit të fluturimit (GS RTK) dhe një metodë të lehtë për të mbledhur të dhëna RTK (Rrjeti RTK ntrip ose Stacioni Mobile D-RTK 2), Ekipi i punest ka një zgjidhje të plotë për çdo rrjedhë pune të rilevimit, hartografimit ose inspektimit.

Quality Report



Generated with Pix4Denterprise version 4.5.6

! **Important:** Click on the different icons for:

? Help to analyze the results in the QualityReport

i Additional information about the sections

💡 Click [here](#) for additional tips to analyze the QualityReport

Summary i

Project	Rruga
Processed	2022-07-24 20:16:26
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	2.02 cm / 0.80 in
Area Covered	0.313 km ² / 31.2867 ha / 0.12 sq. mi. / 77.3511 acres
Time for Initial Processing (without report)	29m:08s

Quality Check i

? Images	median of 62793 keypoints per image	✓
? Dataset	470 out of 470 images calibrated (100%), all images enabled	✓
? Camera Optimization	0.77% relative difference between initial and optimized internal camera parameters	✓
? Matching	median of 10398.7 matches per calibrated image	✓
? Georeferencing	yes, no 3D GCP	⚠

? Preview i

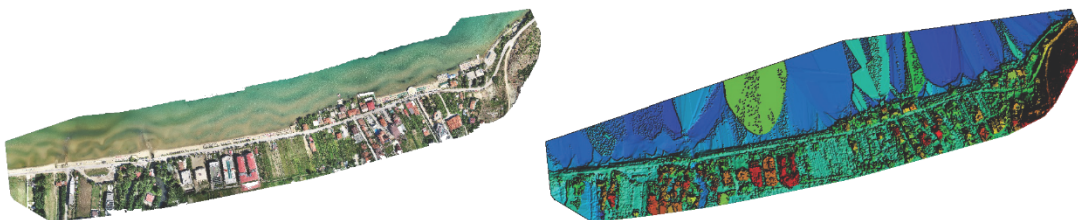


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details i

Number of Calibrated Images	470 out of 470
Number of Geolocated Images	470 out of 470

? Initial Image Positions i



Report

Mbi kushtet Gjeologo-Inxhinjrik te Zones ku do te ndertohet “ Waterscape Park Design” for the Sustainable Tourism Development of Tushemisht and Drilon area in the Municipality of Pogradec



Punuan:

Ing. Defrim SHKUPI

Ing. Aranit KACDEDJA



Porositesit:

PROAP STUDIO

TIRANË, SHTATOR 2019

NORD COMAT

HEAD OFFICE - TIRANE; TEL:044525511 ,NIPT: L 08501501 Q

Tirane,Dajt,Rruga"Muhamet Deliu" Pallat I Firmes "DODAJ",Kati I,afër Restorant Fresku;Mob:+355 69 21 34 888;E-mail:nordcomat@yahoo.com

1-HYRJE

Ky raport paraqet dhe jep vlerësimin e rezultateve të studimit gjeologo-inxhinierik që është kryer nga “Nord Comat”, sh.p.k në përputhje me marrëveshjen ndërmjet firmës projektuese “PROAP STUDIO” ku parashikohen që të ndertohen dhe rehabilitohen infrastrukurat publike ekzistuese (si p.sh. Rugët, rrugë kalime), ndërtimin e faciliteteve të reja (si p.sh. qendër vizitorësh, museum uji), ndërtimin e strukturave të reja (si p.sh. ura, pergolas), etj.

Qëllimi i këtij studimi është njohja e ndërtimit gjeologo-litologjik e zonës së propozuar për ndërtimin e objekteve në fjalë, si vlersimi i vetive fiziko-mekanike të dherave, të ndara në shtresa, vrojtimi i fenomeneve negative fiziko-gjeologjike brenda territorit të shesheve të ndertimit dhe për rreth tij si dhe të dhënat mbi ujrat nëntokësore. Për realizimin e këtij studimi janë marrë parasysh të gjitha studimet gjeologo-inxhinierike të realizuar nga autorët e tjerë të kësaj fushe për qëllime ndërtimi. Krahas të dhënave të mësipërme, është shfrytëzuar hartat gjeologjike të Shqipërisë në shkallën 1:200000 të cilat janë të mjaftueshme për të përcaktuar kushtet gjeologo-inxhinierike të shesheve të ndërtimit. Për të përftuar të dhënat e nevojshme për përpilimin e studimit u realizuan nëntë shpime me autosond me thellësi 15m dhe gjashtë tespiste me thellësi 3m. Gjatë shpimeve u morën kampione me strukturë të prishur për tu analizuar në laboratorin “NORD COMAT” sh.p.k. sipas standarteve përkatëse për çdo provë (AASHTO dhe ASTM). Mbështetur në punimet e kryera është bërë i mundur realizimi dhe vlerësimi mbi kushtet gjeologo-inxhinierike për fazën e projekt- zbatimit të zonës ku shtrihen sheshet e ndërtimit. Pamjet e përgjithëshme të shesheve të ndërtimit jepen nëpermjet orthofotos në fig.1.



Figura 1: Tushemisht, Pogradec

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2. VENDODHJA E TUSHEMISHTIT

Tushemishti është një vendbanim në Qarkun e Korçës në Shqipërinë juglindore me Njësi Administrative në Bashkinë Pogradec, që ndodhet në brigjet e Liqenit të Ohrit. Fshati është shumë afër kufirit me Republikën e Maqedonisë së Veriut. Ai ulet në një lartësi prej 841m.

3- NDËRTIMI GJEOLOGJIK I RAJONIT

Në ndërtimin gjeologjik të rajonit marrin pjesë depozitimet karbonatike të Senomanian; depozitimet flishore të Pg₃ dhe depozitime kuaternare. Në figurën 2 është paraqitur harta gjeologjike e rajonit.

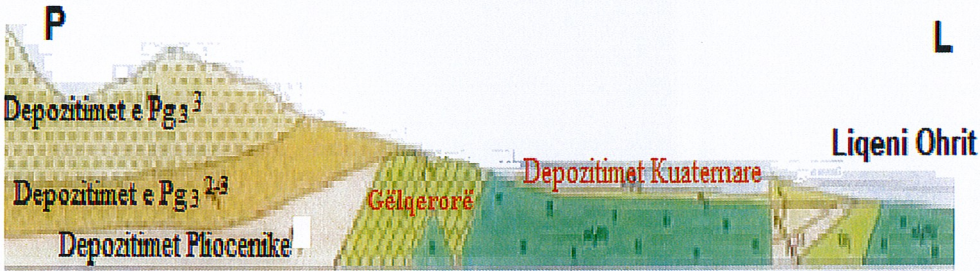


Figura 2: Prerja skematike gjeologjike Linje-Perëndim nga Liqeni i Pogradecit - Gështenjas- maja e Dardushes (+1438,0m).

Depozitimet karbonatike të Senomanian

Këto depozitime dalin në trajtë pullash dhe pllake lineare me përmasa të ndryshme në anën veriore dhe lindore në afërsi të fshatrave Vërdova, Rëmenji e deri në Gështenjas. Depozitimet e Senomanianit përfaqësohen nga gëlqerorë biomikritike dhe turbiditike shtresëmesëm deri masive dhe i përkasin facies neritike.

Depozitimet e Triasikut të Sipërm-Jurasikut të Poshtëm.

Këto depozitime përfaqësohen nga gëlqerorë të cekët neritike dhe përbëjnë periferinë karbonatike lindore të ofioliteve të zonës së Mirditës. Gëlqerorët e Triasikut të Sipërm-Jurasikut të Poshtëm, përbëhen nga gëlqerorë biomikritike me megalodonte e korale, që ndërthuren me gëlqerorë stromatolitike algore dhe dolomite. Ato janë shtresëmesëm dhe shtresështrashë. Kreun e prerjes së depozitimeve të T3-J1 në mjaft raste e ndërtojnë gëlqerorët biomikritike me ngjyrë të kuqerremtë, të pasur me radiolarie e bivalvore pelagjike dhe amonite. Trashësia e këtyre depozitimeve luhet nga disa qindra metra deri në 1200m.

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Depozitimet e Oligocenit i Mesëm - i Sipërm (Pg_3^{2-3})

Këto depozitime janë shumë të përhapura në zonën e studimit dhe bëjnë pjesë në krahun lindor të sinklinalit të Mokrës. Ato kanë shtrirje të përgjithshme JL-VP dhe rënie JP me kënd nga $10-32^0$. Përfaqësohen nga gëlqerorë koralorë, mergele e alevrolite. Mbi to vendosen normalisht depozitimet e Pg_3^3 . Këtu ato përfaqësojnë një ndërthurje ritëm trashë 30-50m të ranorëve, alevroliteve, argjiliteve, mergeleve, e më pak të konglomerateve. Ata kanë rënie VL me kënd $30-40^0$.

Depozitimet e Oligoceni i Sipërm (Pg_3^3)

Depozitimet flishoret të Pg_3^3 kanë përhapje në perëndim të atyre të Oligocenit i Mesëm - i Sipërm duke ndërtuar gjithashtu krahun L të sinklinalit të Mokrës. Kanë rënie në JP me kënd rënie $12-30^0$. Litologjikisht këto depozitime kryesisht nga ranorë masivë që ndërthuren në intervale me alevrolite e argjilite me shumë shtresa qymyresh brune. Në krahun L të ultësirës këto depozitime janë trashamane në veçanti në zonat qymyrbajtëse si: Pretushë, Leshnicë, Stropckë, Jamë-Homezh me përjashtim të sektorit Vërdovë e Pogradec ku prejra paraqitet kryesisht me ranorë, konglomeratë e më rrallë argjila. Krahu P në rajonin Velçan i Gorës-Qafë Panjë, përfaqësohen nga ndërthurje ranorësh masivë me paketa argjilash e alevrolitesh dhe shtresa qymyresh brune e shiste qymyrore me shumicë. Trashësia e përgjithëshme e varion nga 350-500 m.

Në figurën 2 është dhënë një prerje skematike gjeologjike sipas drejtimit nga lindja në perëndim, në të cilën janë paraqitur depozitimet që dalin në hartën gjeologjike të rajonit të studimit. Siç shihet rënia e shtresave flishore dhe molasike është drejt perëndimit me kënde të buta, ndërkohë që gëlqerorët kanë rënie të fortë.

Depozitimet Pliocenike (N_2^P)

Këto depozitime kanë përhapje nga ana perëndimore e Grabovicës deri në Gështenjës. Në rajonin nga Gështenjasi, Gurasi e deri në Tushemisht ato mbulohen nga depozitimet Kuaternare të përziara aluvialo-proluviale e liqenoro-kënetore të fushës së Buçimasit. Këto depozitime takohen në trajten e "pullave" të veçuara në Rëmenj, Vërdovë, Pogradec e kodra e Kalasë dhe ndërtojnë bazamentin e depozitimeve më të reja të fushëgropës së Pogradecit. Përfaqësohen nga shtresa konglomeratësh, ranorësh, alevrolitesh e argjilash.

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Kuaternari (Q)

Depozitimet e Kuaternarit kanë përhapje kryesisht në lindje të rajonit të studimit. Ato takohen në gropën ndërmallore të Pogradecit, në fushat, në luginat lumore dhe shpatet e rrafshinat malore, duke përfaqësuar pothuaj të gjitha tipet gjenetike kontinentale (eluvione, deluvione, proluvione, aluvione, koluvione, akullnajore, kënetore, liqenore). Në shumë raste takohen edhe tipe të perziera gjenetike si: aluvialo-proluviale, proluvialo-liqenore, liqenoro-kënetore, proluvialo-koluviale, etj. Depozitimet Q në teritorin e bashkisë i kemi ndarë në: Plioceni i sipërm-Pleistoceni (N_2-Q^p), Pleistocen-Holocen($Qp-h$), Holoceni (Q_4h).

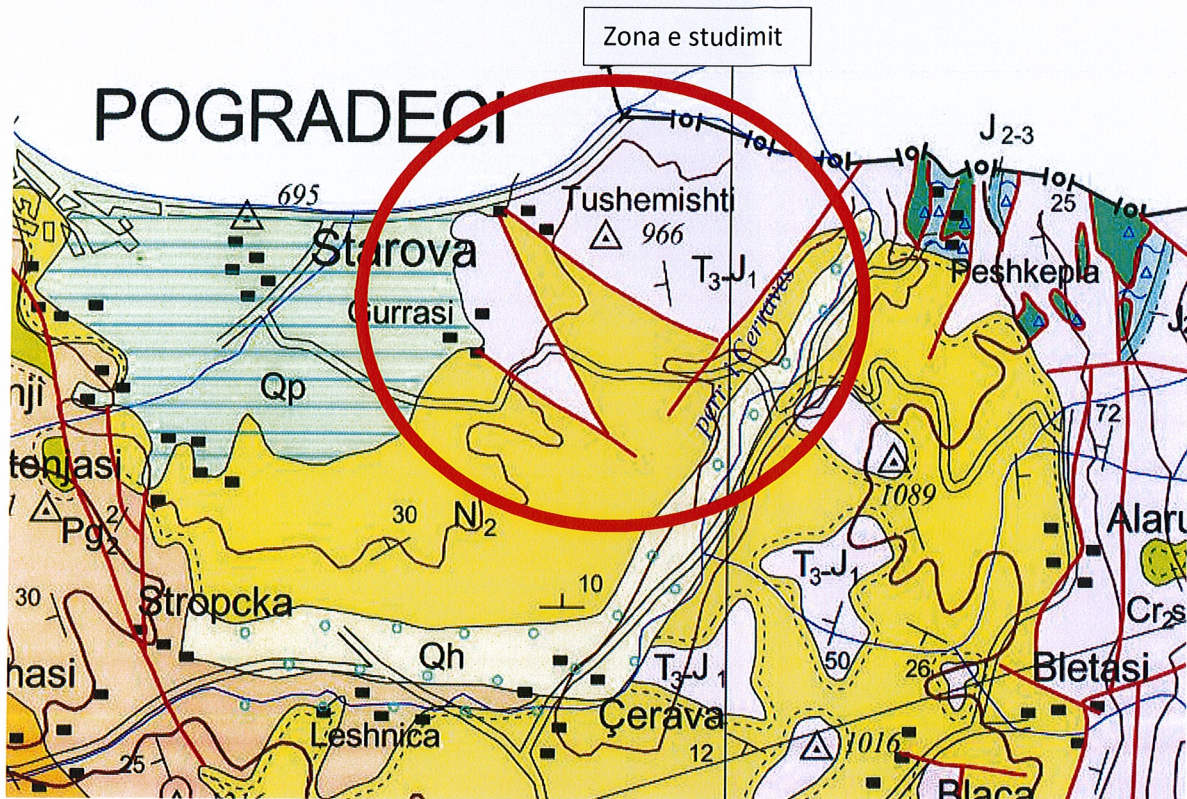
Në rajonin e studimit takohen depozitimet aluvialo-proluviale në pjesën e sipërme të përrrenjve të Rëmenjt, Vërdovës dhe të Kishës.

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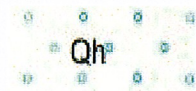
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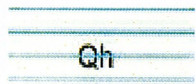
4. Harta gjeologjike e zones me shkalle 1:200000



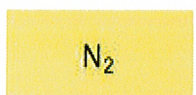
Legjenda:



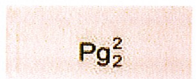
Holocen. Depozitime aluviale: alevrite, rëra dhe zhavore.



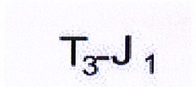
Holocen. Depozitime lagunore: argjila, alevrite, rëra dhe mbetje organike.



Pliocen. Argjila, ranorë, gravelite, konglomerate dhe qymyre.



Eocen I Mesëm: Flish argjil-alevrolitor me ranore, ranorë-argjilor.



Triasik I siperm-Jurasik I Poshtëm: Gëlqerore me megalodonte, stromatolitikë.

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