

Appendix

Table of contents:

I/ Methodology:

II/ Introduction:

III/ Analysis:

III-1/ Preview of the southern suburbs of Tunis

 III-1-1/ Location

 III-1-2/ History & Chronological growth

III-2/ Macro-scale: Characteristics of the area

 III-2-1/ Climate

 III-2-2/ Topography and water system

 III-2-3/ Urban network connections (Governorates/Cities)

 III-2-4/ Natural and Urban Landscape character

III-3/ Meso-scale: the selected site

 III-3-1/ Size and direct context

 III-3-2/ Accessibility

 III-3-3/ Topography

 III-3-4/ Structure of site and existing functions

III-3-5/ Green cover

III-3-6/ Legislative framework for prospective intervention

III-4/ Synthesis

III-4-1/ Problematics

III-4-1/ Potentials

IV/ Design phase

IV -1/ Strategy & Intervention Goals

IV -2/ Bubble Diagram

IV -3/ Initial sketches & Master Plan

IV -4/ Materials and plantation strategy:

IV -5/ Circulation Hierarchy

IV -6/ Focus sites (Sc 1:1000) – (Sc 1:250) - (Sc 1:50)

IV -7/ Technical Details

IV -8/ Visualizations

V/ Synthesis

VI/ Bibliography

VII/ Bibliography:

Arnberger, A., Eder, R., 2012. The influence of green space on community attachment of urban and suburban residents. *Urban Forestry and Urban Greening* 11, 41-49

Beckley, T., 1995. Community stability and the relationship between economic and social well-being in forest-dependent communities. *Society & Natural Resources* 8, 261-266.

Björk, J., Albin, M., Grahn, P., Jacobsson, H., Ardö, J., Wadbro, J., Östergren, P., Skärback, E., 2008. Recreational values of the natural environment in relation to neighborhood satisfaction, physical activity, obesity, and well-being. *Journal of epidemiology and community health*

Boucher, I.; Fontaine, N. *La Biodiversité et L'urbanisation, Guide de Bonnes Pratiques sur la Planification Territoriale et le Développement Durable ; MAMROT : Lac Saint Pierre, QC, Canada, 2010*

Coley, R.L.; Sullivan, W.C.; Kuo, F.E. Where does community grow? The social context created by nature in urban public housing. *Environ. Behav.* 1997

Dynamique des groupements végétaux dans une aire protégée de Tunisie méridionale
Cahiers Agricultures, 16 (2007), pp. 23-29

Ewing, R.; Handy, S. Measuring the unmeasurable: Urban design qualities related to walkability. *J. Urban Des.* 2009

Environmental protection and sustainable development in Tunisia: an overview
Sustainable Development, 7 (1999), pp. 191-203

Effect of protection on plant community dynamics in the Mediterranean arid zone of southern Tunisia: a case study from Bou Hedma National Park - Land Degradation and Development, 24 (2013), pp. 57-62

Floyd, D. *Race, Ethnicity and Use of the National Park System; U.S. Government Documents (Utah Regional Depository): Salt Lake City, UT, USA, 1999.*

Harrison, C.; Burgess, J.; Millward, A.; Dawe, G. Accessible natural greenspace in towns and cities: A review of appropriate size and distance criteria—guidance for the preparation of strategies for local sustainability. *Engl. Nat. Res. Rep.* 1995

Hung, K., Crompton, J., 2006. Benefits and constraints associated with the use of an urban park - Hong Kong. *Leisure Studies* 25, 291-311

Kuchelmeister, G. *Des arbres pour le millénaire urbain : Le point sur la foresterie urbaine.* Unasylva 2000.

Kuo, F.E.; Bacaicoa, M.; Sullivan, W.C. Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environ. Behav.* 1998

Matsuoka, R.H.; Kaplan, R. People needs in the urban landscape: Analysis of landscape and urban planning contributions. *Landsc. Urban Plan.* 2008

Mizouri M., Mtmet A. Pression urbaine sur les terres agricoles péri-urbaines du grand Tunis. In: Camarda D. (ed.), Grassini L. (ed.). Interdependency between agriculture and urbanization: Conflicts on sustainable use of soil and water. Bari : CIHEAM, 2001. p. 277-285 (Options Méditerranéennes : Série A. Séminaires Méditerranéens ; n. 44)

Mojiol, A.R. Public awareness on the importance of urban forest parks in Kota Kinabalu city, Sabah. *Borneo Sci.* 2018

Natural durability of four Tunisian *Eucalyptus* spp. and their respective compositions in extractives - De Gruyter September 7, 2019

Pataki, D.E., Carreiro, M.M., Cherrier, J., Grulke, N.E., Jennings, V., Pincetl, S., Pouyat, R.V., Whitlow, T.H., Zipperer, W.C. Coupling biogeochemical cycles in urban environments: ecosystem services, green solutions, and misconceptions. *Frontiers in Ecology and the Environment* 9

Peter, H. What Makes it Great and How to Get There - The Excellent City Park System - PUBLISHED BY The Trust for Public Land – 2003

Peters, K., 2010. Being together in urban parks: connecting public space, leisure, and diversity. *Leisure Sciences* 32, 418-433

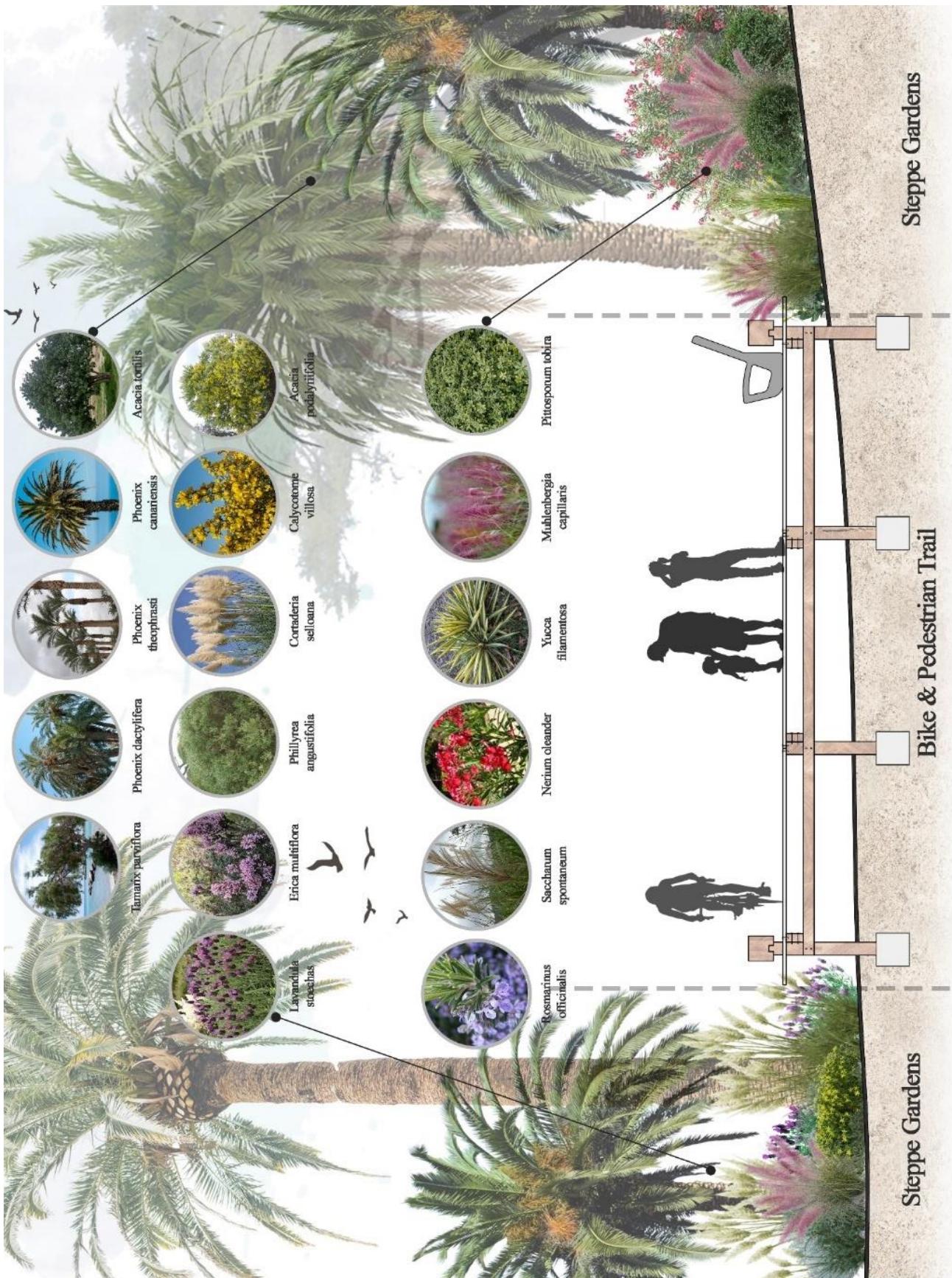
Plant diversity in different bioclimatic zones in Tunisia - Volume 9, Issue 1, 30 March 2016, Pages 56-62

Plant species as indicators of the extent of desertification in four sandy rangelands African Journal Ecology, 45 (2006), pp. 94-102

Plant salt tolerance: adaptations in halophytes *Annals of Botany*, 115 (2015), pp. 327-331

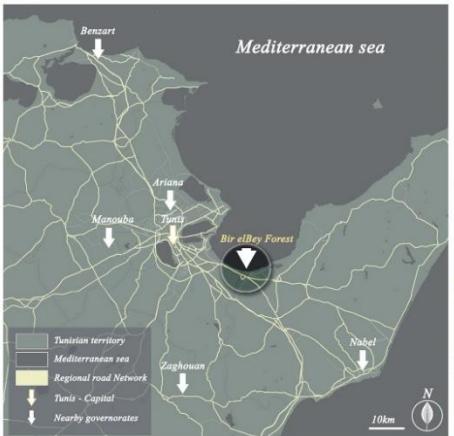
Restoration and rehabilitation of arid and semiarid Mediterranean ecosystems in North Africa and West Asia: a review of Arid Soil Research and Rehabilitation, 14 (2000), pp. 3-14

Sonti, N.F.; Campbell, L.K.; Svendsen, E.S.; Johnson, M.L.; Auyeung, D.N. Fear, and fascination: Use and perceptions of New York City's forests, wetlands, and landscaped park areas. *Urban For. Urban Green.* 2020



Macroscale Analysis: Characteristics of the area

Location, History and Topography and water system



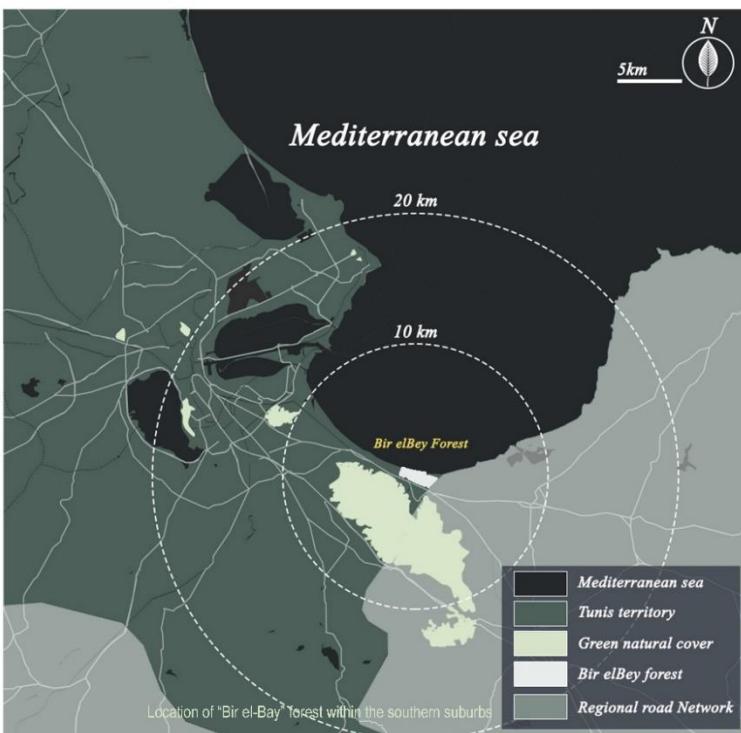
The southern suburbs of Tunis, within the governorate of Ben Arous, lie approximately 10 kilometers from the capital. Covering an area of 761 km², it is bordered by Zaghouan, Manouba, and Nabeul. Urban expansion since the 20th century has transformed agricultural areas into residential and industrial zones. Ben Arous features flat terrain, with mountain ranges in the southeast, playing a role in water channeling. Bougamine Mountain, with heights reaching 750 meters, supplies rainwater to nearby cities. This hydrological network includes creeks flowing through the region's topography, influencing its environmental dynamics.



Natural and Urban Landscape character



Urban network connections (Governorates/Cities):



MESO-SCALE: THE SELECTED SITE

Size, Accessibility & Direct Context



Structure of the site and existing functions



Green Cover Analysis



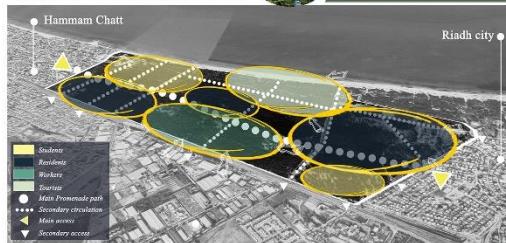
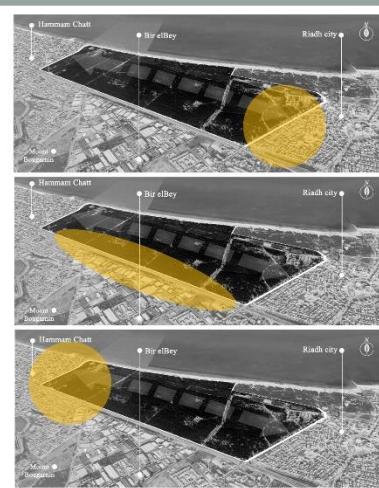
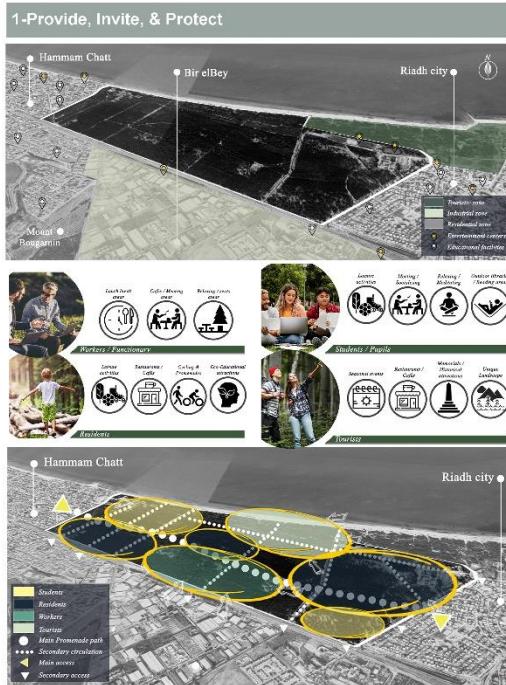
Synthesis

Challenges	Potentials
Limited public access: Besides the existing functions dedicated to limited users, the forest doesn't contain any appealing set of functions for public use.	Ease of access: The location of the forest regarding the urban fabric is a very important factor in the success of the future project.
Urban obstacle: The forest is presenting, in most parts, an urban obstacle for the surrounding cities due to inadequate connectivity to its instant context.	Varied landscapes: The different landscape characters within the forest can be promising for various ambiances and atmospheres.
Green space degradation: The green open space shows increasing degradation rates due to abundance, lack of maintenance, and inappropriate use.	Transport access: The forest is already connected to the transportation network.
Disconnected green network: The forest is no longer connected to the green network.	Diverse user types: The functions surrounding the forest regroup numerous categories: hotels, industrial areas, universities, schools, and residences, therefore, a variety of targeted users can be expected.

Strategy & intervention goals



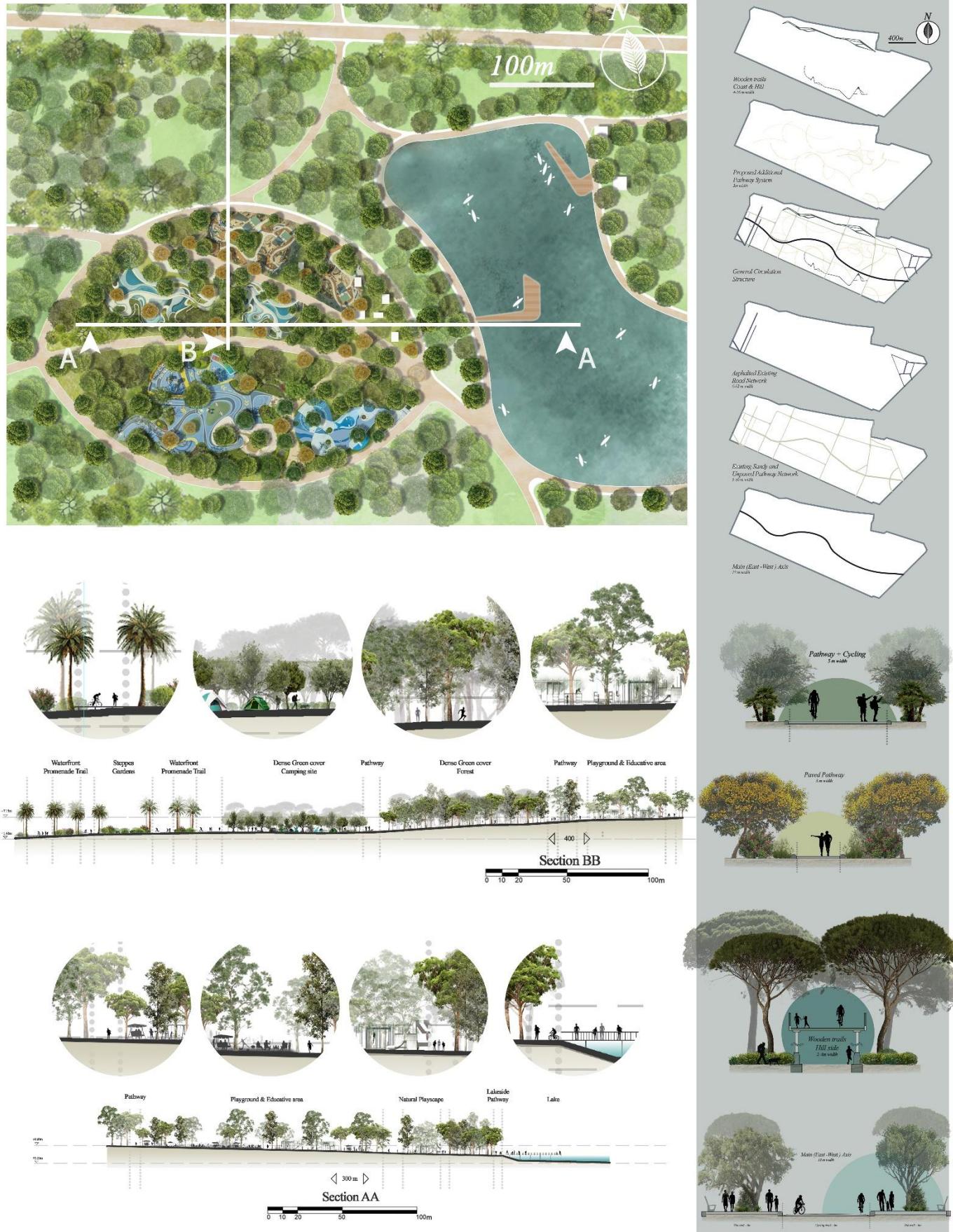
DESIGN STRATEGIES



MASTER PLAN



2D LAYOUT , SECTIONS & PATHWAYS TYPOLOGIES



2D PLAN LAYOUT & DETAILS



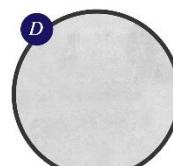
Steel Lawn Edging



Red Colored Rubber



Concrete Expansion Joint



Concrete Slabs



Natural rock



Deck wooden Panels



Quercus suber



Pinus Pinea



Eucalyptus gomphocephala



Pinus Halepinus



Genista aspalathoides



Copsosma repens



Cenchrus ciliaris



Peganum harmala



Echinodorus cordifolius



Scirpus maritimus



Phragmites australis



Canna glauca



Cyperus papyrus



Teucrium fruticans



Cladium spp.



Agave asperima Jacobi



Erica multiflora



Ammophila arenaria ssp. arundinacea

SECTION & VISUALIZATIONS



DECLARATION

on authenticity and public assessment of final essay/thesis/master's thesis/portfolio¹

Student's name: Firas Ben Youssef
Student's Neptun ID: N5HREH
Title of the document: Bir el-Bey Forest - Urban Park Development
Year of publication: 2024
Department: Landscape Architecture, Urban Planning, and Garden Art

I declare that the submitted final essay/thesis/master's thesis/portfolio² is my own, original individual creation. Any parts taken from another author's work are marked, and listed in the table of contents.

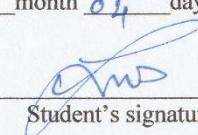
If the statements above are not true, I acknowledge that the Final examination board excludes me from participation in the final exam, and I am only allowed to take the final exam if I submit another final essay/thesis/master's thesis/portfolio.

Viewing and printing my submitted work in a PDF format is permitted. However, the modification of my submitted work shall not be permitted.

I acknowledge that the rules on Intellectual Property Management of the Hungarian University of Agriculture and Life Sciences shall apply to my work as an intellectual property.

I acknowledge that the electric version of my work is uploaded to the repository system of the Hungarian University of Agriculture and Life Sciences.

Place and date: Budapest year 2024 month 04 day 17


Student's signature

¹Please select the one that applies, and delete the other types.

²Please select the one that applies, and delete the other types.

STATEMENT ON CONSULTATION PRACTICES

As a supervisor of *Firas Ben Youssef* (Student's name) *N5HREH* (Student's NEPTUN ID), I here declare that the final ~~essay/thesis/master's thesis/portfolio~~¹ has been reviewed by me, the student was informed about the requirements of literary sources management and its legal and ethical rules.

I recommend/don't recommend² the final essay/thesis/master's thesis/portfolio to be defended in a final exam.

The document contains state secrets or professional secrets: –yes– no*³

Place and date: Budapest - year 2024 – month 04 – day 19



Internal supervisor

¹ Please select applicable and delete non-applicable.

² Please underline applicable.

³ Please underline applicable.

Illustrations table

Figure 1 : Plane view on the southern suburbs of “Greater Tunis” – “Bir elBey” forest, “Bougarnine” mountain.....	Erreurs ! Signet non défini.
Figure 1 : Plane view on the southern suburbs of “Greater Tunis” – “Bir elBey” forest, “Bougarnine” mountain.....	Erreurs ! Signet non défini.
Figure 2: Geographical satellite map of the Northern part of Tunisia.....	Erreurs ! Signet non défini.
Figure 3: “Ben Arous” Demographic data according to the 2019 Census survey....	Erreurs ! Signet non défini.
Figure 4: Photo of the former agricultural “Elysée” domain at “Bougarnine” Mountain foot – “Bir elBey” – Colonial era	Erreurs ! Signet non défini.
Figure 5: Average monthly temperature and rainfall of Tunisia for 1991–2019 - climateknowledgeportal.worldbank.org/	Erreurs ! Signet non défini.
Figure 6: 3D Simulation of the general topography of the southern suburbs of “Tunis”	Erreurs ! Signet non défini.
Figure 7: Photo of the main water Canal running through the northern bank of “Boukarnin” Mountain	Erreurs ! Signet non défini.
Figure 8: Map of rainwaters network in the eastern banks of “Bougarnin” Mountain and “Bir el-Bey” Forest.....	Erreurs ! Signet non défini.
Figure 9: Photo of the A1-R34 Mountain-Road.....	Erreurs ! Signet non défini.
Figure 10: Photo of the RN1 Road	Erreurs ! Signet non défini.
Figure 11: Map of the main surrounding governorates – By author	Erreurs ! Signet non défini.
Figure 12: Location of “Bir el-Bay” forest within the southern suburbs	Erreurs ! Signet non défini.
Figure 13: Photo of the general landscape took from “Bougarnine” Mount.	Erreurs ! Signet non défini.
Figure 14: Photo of the National Road RN1, the railways line and “Bir el-Bey” Forest	Erreurs ! Signet non défini.
Figure 15: Train station of “Borj Cedria”	Erreurs ! Signet non défini.
Figure 16: Bridge Connection above the RN1 Road.....	Erreurs ! Signet non défini.
Figure 17: Location of “Bir el-Bey” Forest compared to the green areas within the southern part of the Capital	Erreurs ! Signet non défini.
Figure 18: View from “Bir el-Bey” Forest.....	Erreurs ! Signet non défini.
Figure 19: View of Bougarnine Mountain from “Bir el-Bey” side	Erreurs ! Signet non défini.
Figure 20: Dimensions of “Bir elBey” forest	Erreurs ! Signet non défini.
Figure 21: Institute of Animation’s Southern Gate	Erreurs ! Signet non défini.
Figure 22: View from the Northern side of the forest	Erreurs ! Signet non défini.
Figure 23: Western wall of the forest.....	Erreurs ! Signet non défini.
Figure 24: Site accessibility Map	Erreurs ! Signet non défini.
Figure 25: “Bir el-Bey” forest topography	Erreurs ! Signet non défini.
Figure 26: “Bir el-Bey” forest Circulation Structure & Functions Map	Erreurs ! Signet non défini.
Figure 27: Photos of the Institute of Animation, the Scout center gathering point and the Football Academy.....	Erreurs ! Signet non défini.
Figure 28: Photo of a narrow asphalt pathway	Erreurs ! Signet non défini.
Figure 29: Photo of a Sandy pathway.....	Erreurs ! Signet non défini.
Figure 30: Photo of a narrow asphalt pathway	Erreurs ! Signet non défini.

Figure 31: A selection of the existing plant species **Erreurs ! Signet non défini.**
Figure 32: Distribution of green cover types along “Bir el-Bey” forest..... **Erreurs ! Signet non défini.**
Figure 33: Dense green cover crossed by a sandy pathway **Erreurs ! Signet non défini.**

Figure 34: Glades – poorly vegetated area **Erreurs ! Signet non défini.**
Figure 35: Shoreline green cover **Erreurs ! Signet non défini.**
Figure 36: Legislative extracts from the : « stratégies de développement et de gestion durables des forêts et des parcours » document **Erreurs ! Signet non défini.**
Figure 37: Intervention Strategy Map **Erreurs ! Signet non défini.**
Figure 38: « Bir el-Bey city » reconnection Map..... **Erreurs ! Signet non défini.**
Figure 39: « Erriadh city » reconnection Map..... **Erreurs ! Signet non défini.**
Figure 40: « Hamma Chatt » reconnection Map **Erreurs ! Signet non défini.**
Figure 41: Map of vocations repartition (existing) around the forest..... **Erreurs ! Signet non défini.**
Figure 42: Proposed functions per user category **Erreurs ! Signet non défini.**
Figure 43: Map of the initial proposed functions within the site according to the users’ categories **Erreurs ! Signet non défini.**
Figure 44: Location of the various aspects and atmospheres of the landscape within “Bir el-Bey” forest..... **Erreurs ! Signet non défini.**
Figure 45: Photos of an open meadow and a sandy pathway spotted in the forest .. **Erreurs ! Signet non défini.**
Figure 46: Functional bubble diagram **Erreurs ! Signet non défini.**
Figure 47: Initial Plans and drawings..... **Erreurs ! Signet non défini.**
Figure 48: Master Plan – Last Version..... **Erreurs ! Signet non défini.**
Figure 49: Main used materials along the park **Erreurs ! Signet non défini.**
Figure 50: Decortication of the pathways network **Erreurs ! Signet non défini.**
Figure 51: Sections of the different pathways **Erreurs ! Signet non défini.**
Figure 52: Focus Plan– Scale 1:1000 level – Play area, Lake promenade, Camping site and Steppe Gardens..... **Erreurs ! Signet non défini.**
Figure 53: Section AA..... **Erreurs ! Signet non défini.**
Figure 54: Section BB **Erreurs ! Signet non défini.**
Figure 55: Focus Plan– Scale 1:250 level – Play area & Lake promenade.. **Erreurs ! Signet non défini.**
Figure 56: Detailed section and selected plant species – Lake promenade.. **Erreurs ! Signet non défini.**
Figure 57: Focus Plan– Scale 1:50 level –Lake promenade..... **Erreurs ! Signet non défini.**
Figure 58: Plants characteristics table **Erreurs ! Signet non défini.**
Figure 59: Park Bench Detail **Erreurs ! Signet non défini.**
Figure 60: Open meadow and Picnic area..... **Erreurs ! Signet non défini.**
Figure 61: Kids Playground and Educative area **Erreurs ! Signet non défini.**
Figure 62: Dense Forest pathway circuit..... **Erreurs ! Signet non défini.**
Figure 63: Camping Area **Erreurs ! Signet non défini.**
Figure 64: Theatre Area **Erreurs ! Signet non défini.**
Figure 65: Detailed section and selected plant species – Steppe Gardens ... **Erreurs ! Signet non défini.**