

## Investigation of Components Forming the Spatial and Landscape Character of Amasya University Yeşilirmak Campus

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### Abstract

In this study, the study area was chosen as Amasya University Yeşilirmak Campus, located within the borders of Amasya province central county. The aim of the study was to investigate the components comprising the spatial character (buildings, roads and paths, parking areas, equipment elements, sports areas, social areas) and landscape character (topography, presence of plants) in terms of function, current status, environmental and aesthetic features. In line with this aim, the components comprising the spatial and landscape character of the campus were identified with field observations and the functions of the components were defined. An orthophoto for the campus was created using an unmanned aerial vehicle (UAV) and maps for the current spatial character, landscape character, social areas and parking areas were obtained. At the conclusion of the study, it is observed that, despite a significant portion of the campus surface being covered by wooded areas, the structures within the campus, such as buildings, parking areas, and vehicular and pedestrian pathways with hard surface materials, are more extensively utilized by the campus users, while the wooded areas remain largely unused. Findings revealed the current status of the campus, and recommendations were made to create a campus with distinctive identity that will be more livable and chosen more frequently by students.

**Keywords:** Campus identity, campus character, campus landscape, Amasya University Yeşilirmak Campus.

## Amasya Üniversitesi Yeşilirmak Yerleşkesinin Mekânsal ve Peyzaj Karakterini Oluşturan Bileşenlerin İrdelenmesi

### Öz

Çalışmada, Amasya ili Merkez ilçe sınırları içerisinde yer alan Amasya Üniversitesi Yeşilirmak Yerleşkesi çalışma alanı olarak seçilmiştir. Çalışmanın amacı, yerleşkenin mekânsal karakteri (yapılar, araç ve yaya yolları, otopark alanları, donatı elemanları, spor alanları, sosyal alanlar) ile peyzaj karakterini (topoğrafya, bitki varlığı) oluşturan bileşenleri işlevleri, mevcut durumu, çevresel ve estetik özellikleri açısından irdelemektir. Bu amaç doğrultusunda yerleşkenin mekânsal ve peyzaj karakterini oluşturan bileşenler arazi gözlemleriyle tespit edilerek bileşenlerin işlevleri tanımlanmıştır. İnsansız hava aracı (İHA) kullanılarak yerleşkenin ortofotosu üretilerek yerleşkenin güncel mekânsal karakteri, peyzaj karakteri, sosyal alanlar ile otopark alanları haritaları elde edilmiştir. Çalışmanın sonucunda, yerleşke yüzeyinin büyük bir bölümünü ormanlık alanı kaplamasına rağmen yerleşke kullanıcıları tarafından bu alanın kullanılmadığı yerleşke içerisindeki yapılar, otopark alanları, araç ve yaya yolları gibi sert zemin yüzeylerin daha fazla kullanıldığı görülmektedir. Bulgular dâhilinde yerleşkenin mevcut durumu ortaya konularak daha kimlikli, daha yaşanabilir ve öğrenciler tarafından daha tercih edilebilir bir yerleşke olmasına yönelik önerilerde bulunulmuştur.

**Anahtar kelimeler:** Yerleşke kimliği, yerleşke karakteri, yerleşke peyzajı, Amasya Üniversitesi Yeşilirmak Yerleşkesi.

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## **1. Introduction**

Universities are teaching institutions producing knowledge required by society, transferring the produced knowledge to future generations, and contributing to the continuous development of society. With the increase in demand for scientific research and professional educational activities, universities have become small towns meeting the need for social activities and housing, in addition to containing educational buildings.

The word university combines 'universitas magistrorum et scholarium' meaning union of students and teachers and 'universitas literarum' meaning union of sciences (Kortan, 1981). Universities are not just a system where knowledge is transferred to students to allow them to gain a profession, they are also a system contributing to shaping society by producing science and culture (Köroğlu, 1988). Universities, which are communities of researchers (Karakaş, 1999), have three basic functions of education-teaching, research-application and social services (Türeyen, 2002).

Though the concept of a university dates to very old times, the Middle Ages is accepted as the period of first institutionalization. Comprising a single independent building in the Middle Ages (Kortan, 1981), the first example of a university campus emerged with the founding of Princeton University in the USA in 1746. Universities were located within certain boundaries until the 20<sup>th</sup> century while the boundaries of universities have expanded since the 20<sup>th</sup> century, and they can be distributed in different locations within a city (Turner, 1995). Due to the inadequacy of land in cities, universities began to transform into university towns meeting all the needs required by students by being in large land areas outside of cities (Özer, 2008; Erçevik & Önal, 2011). However, as universities are in continuous interaction in socio-cultural and economic terms with the city and contribute to the economic, physical, and social development of the city, along with the development of society through scientific study, it is necessary to plan universities by considering the present status, features and needs of the city (Erkman, 1990; Özen, 2005).

With the distribution and development of universities over larger areas, the term campus began to be used. Campus is a multifunctional educational area including the educational buildings in the university, student dormitories, lodgings for teaching staff, social facilities and units connecting these like roads, paths, green areas, internal courtyards, and squares (Turner, 1995). University campuses fulfill education-teaching, research, housing, transport, application, health, relaxation, and recreational functions. The location, size, and open- green areas for common use in university campuses, accepted as a small-town model, direct the spatial development of the city, and affect the city identity (Erkman, 1990; Türeyen, 2002). Displaying development and transformation over time, university campuses gain a dynamic structure (Lidsky, 2002). Campuses are a part of the current ecosystem and are in large areas in natural or artificial environments (Tuna, 2006). According to Türeyen (2002), with the increase in academic functions and interdisciplinary relationships of universities, construction of campuses emerged due to the need for units comprising the campus to be located close to each other.

Universities are successful in terms of the quality of the environment they offer to their students as well as their academic and administrative staff. As a result, university campuses, fulfilling many functions with education-teaching, housing, research, social, commercial, and cultural purposes, should be founded and grow in line with certain planning and design principles (Anonymous, 2002; Gül et al., 2016). For selection of appropriate land for a university campus, the size of the land, opportunity for development, topographic features, geological features, geomorphological features, technical connections like electricity, water and sewage, available facilities and natural elements, climate features, visual character value like views and plants, and environmental effects like noise and odor should be noted (Erkman, 1990). Before beginning planning and design studies for university campuses, all natural data from the land should be investigated in detail and buildings should be associated with outdoor space use like sports areas, rest areas, squares, botanic gardens, and amphitheatres. The spatial sizes should be determined in line with the needs of the users and spaces should be built in easily accessible locations in the campus (Booth, 1990). Especially when selecting locations for campuses to be built within city centers, the qualities of the units to be

included in the campus should be considered and there is a need for planning and design studies from upper scale to lower scale (Türeyen, 2002).

The studies in the national and international literature about planning and design of university campuses are summarized as follows:

Tolon (2006), in a master's thesis entitled "Outdoor Space Design Principles for University Campuses and Landscape Design of Ankara University Gölbaşı Campus", identified the deficient points by assessing natural data through on-site observation from within the campus. They investigated the landscape design for an ideal university campus and created a landscape design for Ankara University Gölbaşı Campus.

A master's thesis study by Ayvaci (2009) was entitled "A Research on the Determination of the User Requirements in Open Spaces Design for University Campuses". They used observations of outdoor space use and survey studies to contribute to social and physical development to meet the needs of İstanbul Technical University Ayazağa Campus and Ege University Bornova Campus users.

A study by Ertekin & Çorbacı (2010) called "Landscape Planning at University Campuses (The Landscape Project Case Study of Karabük University)" made recommendations by proposing a landscape project to transform Karabük University Campus into a space that meets the academic, social, cultural, artistic, and sporting requirements of users. Within the scope of the study, the needs of campus users were listed, and a survey study and land use analysis were completed.

A master's thesis study by Koç (2011) entitled "University of Determination Iğdır Campus Landscape Planning and Design Principles" investigated examples of campuses from Türkiye and around the world and performed a survey study and land use analysis. A comparison was made between the location, settlement, and access in Iğdır University Campus according to design criteria with other university campuses and design recommendations were developed for the campus.

A study entitled "The Examination of The Spaces for Common Use in University Campus Settlements: Selcuk University Aleaddin Keykubat Campus" by Büyüksahin Sıramkaya & Çınar (2012) developed recommendations by assessing the campus according to planning criteria determined within the literature review and suggestions were developed.

Atabeyoğlu (2014) performed survey and status assessment studies for the Social Sciences Vocational College Campus located in the city center linked to Ordu University in a study entitled "Landscape Design and Application Study for the Campus of Vocational School of Social Sciences". The structural and plant materials in the area and the relationship between these materials and users were investigated and landscape design assessed.

A study called "Landscape Design of a Campus Outdoor Spaces: Süleyman Demirel University Faculty of Forestry Building" by Yılmaz (2015) determined the needs of academic and administrative personnel and students using the area around Süleyman Demirel University Faculty of Forestry and analyzed with on-site observation technique natural and cultural landscape data. Based on the obtained data, a landscape design for the surroundings of Süleyman Demirel University Faculty of Forestry was created by visualizing semantic, syntactic, and pragmatic aspects.

Düzenli et al. (2017), performed a study called "Determining the Usage Purposes of University Campus Open Spaces by Youth". They performed spatial analysis of Karadeniz Technical University Kanuni Campus and classified buildings and open spaces according to function. A survey study was completed to determine open space use by campus users and the common recreational areas most frequently used by young people on campus were identified.

Eminağaoğlu & Arslan Muhacir (2018) assessed Artvin Çoruh University Seyitler and City Campuses, with different morphological characteristics, in terms of planning and design principles determined within the literature review in a study entitled "Evaluation of Artvin Coruh University Campus Areas in the Scope of Planning and Design Principles".

A master's thesis entitled "Exterior Design Principles Campuses Terms Evaluation; the Example of Işık Ayazağa Campus" was completed by Şahin (2019). They identified on site and field analysis the status of structural and plant materials in Işık University Ayazağa Campus, located in Sarıyer county in İstanbul, to assess the landscape design.

A master's thesis by Ünal (2020) called "Landscape Planning at University Campuses the Landscape Project Case Study of Bandırma Onyedü Eylül University" considered the university campus and city as a whole. They redesigned the campus by investigations within the scope of urban planning and design principles determined within the literature review.

A study by Türker & Deneri (2021) called "Evaluation of Uşak University Campus in Terms of Planning and Design Principles" performed a literature scan, data collection and analysis studies. They assessed Uşak University 1 September Campus in line with planning and design principles. Solutions were proposed considering the obtained data.

Şahin Körmeçli (2022)'s study titled "Evaluating Transportation Network of University Campus by Using Space Syntax and GIS: Çankırı Karatekin University Uluyazı Campus Case Study" the university campus and the city were considered as a whole, and the transportation network of the campus was analyzed by the spatial syntax method. Design suggestions were proposed considering the obtained data.

The studies conducted within the scope of the examined national and international literature related to the planning and design of university campuses provide detailed discussions on the concepts of campus, campus identity, and campus landscape. Literature review, site analysis, and on-site observation techniques are identified as employed methods. In this context, the aim of the study is to scrutinize the spatial character and landscape components that constitute the character of the Green River Campus of Amasya University in terms of their functions, current state, and environmental and aesthetic features. In this context, the aim of the study was to investigate the components comprising the spatial character (buildings, roads and paths, parking areas, equipment, sports areas, social areas) and landscape character (topography, presence of plants) of Amasya University Yeşilirmak Campus in terms of function, status, environmental and aesthetic features. The spatial character of the campus is shaped by the structures, vehicular and pedestrian pathways, parking areas, equipment elements, sports areas, and social spaces within the campus. The landscape character of the campus is determined by the topography and plant presence. The reason for selecting these two components in the study is that, based on the studies conducted in the literature on the planning and design of university campuses, they are identified as fundamental elements constituting the campus landscape. In this study, the current state of the spatial character and landscape character of the campus is detailed through fieldwork, and an updatable infrastructure is established in the ArcGIS 10.5 program within a GIS environment. It is anticipated that this study will contribute to the literature by serving as an example for the planning and design process of other university campuses and the creation of an updatable infrastructure system in the GIS environment.

## **2. Material and Method**

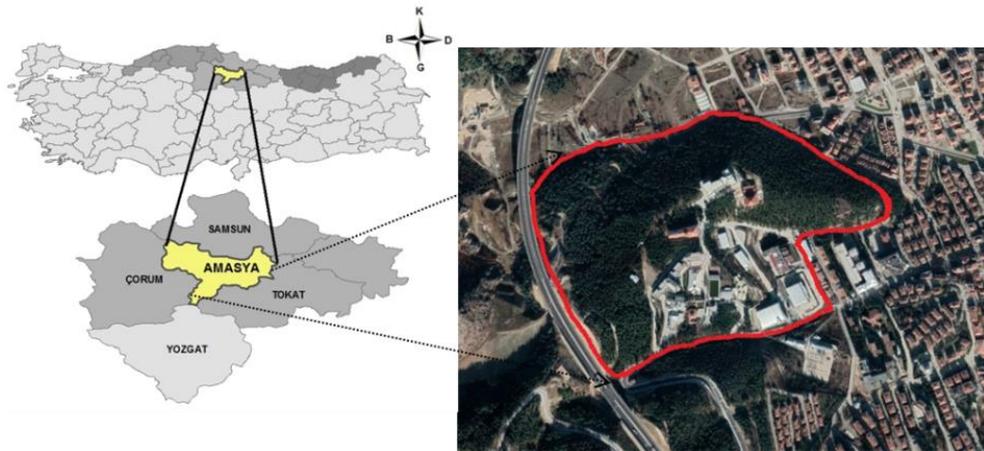
In the study, dealing with the campus concept considered to be a small-scale urban model, the study area was chosen as Amasya University Yeşilirmak Campus located within the central county of Amasya province, Türkiye.

Amasya province is in the Middle Black Sea section of the Black Sea region between 35°00' and 36°30' longitude and 40°15' and 41°03' latitude north, covering 5,690 km<sup>2</sup> area. It is surrounded by Tokat and Yozgat provinces to the east, Samsun to the north, Çorum to the west and Tokat to the south. The province generally has elevation 1,150 m above sea level, with the provincial center located at 412 m above sea level (Anonymous, 2010; Kurt, 2013).

Amasya University is a state university founded in Amasya on 17 March 2006. Amasya University includes 3 institutes (Sciences Institute, Health Sciences Institute, Social Sciences Institute), 8 faculties (Medicine Faculty, Education Faculty, Theology Faculty, Architecture Faculty, Science-

Literature Faculty, Health Sciences Faculty, Engineering Faculty and Merzifon Economics and Administrative Sciences), 1 college of foreign languages and 8 vocational colleges (Design VC, Suluova VC, Merzifon VC, Social Sciences VC, Technical Sciences VC, Taşova Yüksel Akın VC, Gümüşhacıköy Hasan Duman VC and Sabuncuoğlu Şerefeddin Health Services VC). Due to the topography and transportation in Amasya province, Amasya University is generally distributed in sections in the province in general, instead of in a single campus. Amasya University has 8 campuses of Hâkimiyet Campus, Ipekköy Campus, Yeşilirmak Campus, and the Faculty of Medicine Campus in the central county, Gümüşhacıköy Hasan Duman VC Campus in Gümüşhacıköy county, Merzifon Campus in Merzifon county, Suluova VC Campus in Suluova county and Taşova Yüksel Akın VC Campus in Taşova county (Amasya University, 2021a-2021c). Since the day of its founding, the university has contributed to Amasya in social, cultural, and economic terms. Due to the topography of Amasya, campuses are generally distributed throughout the province, rather than in a single campus.

The Yeşilirmak Campus, chosen as the study area, is located on Kemal Nehrozoğlu Avenue. The campus comprises the Faculty of Architecture-Design VC, Faculty of Engineering A-B-C blocks, Faculty of Theology, Technical Science VC, Social Sciences VC, College of Foreign Languages-Distance Education Application and Research Center, Machinery-Automotive Laboratory, Central Workshop, central canteen, semi-Olympic indoor swimming pool, indoor sports center and sports fields. The Yeşilirmak Campus is surrounded by 201,781.49 m<sup>2</sup> forestry area and covers a total of 332,850.26 m<sup>2</sup> (Fig. 1). It is located 4 km from the center of Amasya city. The city center can be reached by motor vehicles in about 10 minutes on Kemal Nehrozoğlu Avenue, which is within walking distance of the campus.



**Figure 1.** Study area boundaries

The reason for choosing Yeşilirmak Campus in this study is the larger areal size compared to other campuses, the difference in elevation between buildings/areas within the campus, and the excess diversity of users due to the combination of different units together in the campus allowing for different uses. When this study is successfully completed, it will represent an example for other campuses within the university.

In the study, answers to the following questions were sought:

Research Question 1: What are the components and functions comprising the spatial and landscaping characters of Amasya University Yeşilirmak Campus?

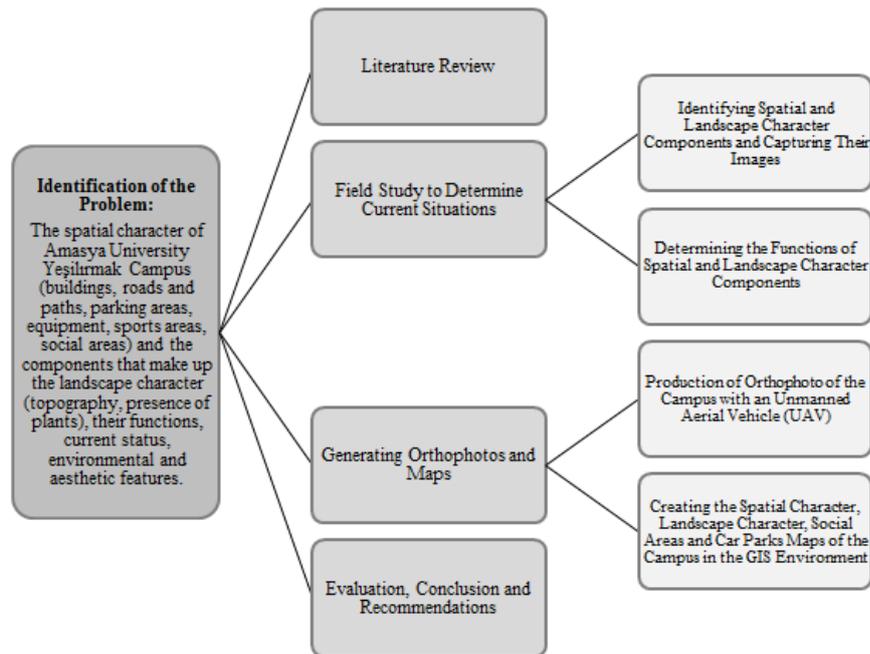
Research Question 2: What are the environmental, functional, and aesthetic features of components comprising the spatial and landscape characters of Amasya University Yeşilirmak Campus?

In line with the research questions and purpose, the steps followed in the study are summarized as follows:

- First step: General information about the planning and design concepts for the university, campus and campuses comprising the basic foundation of the study was acquired.

- Second step: Field studies were completed to determine the status of Amasya University Yeşilirmak Campus. The functions of buildings comprising the spatial character of the campus, area covered by buildings and social areas, width of roads and paths, capacity of parking areas, relationship of buildings to the surrounding environment, disabled accessibility of buildings, social use areas in buildings (type and number of equipment elements) and functions of open-green areas comprising the landscape character of the campus and surrounding the buildings and topography were identified on site and photographed from different angles. Photographs were taken using a Canon 600 D digital camera.
- Third step: As there was no digital substrate in Amasya University for the study area, an Anafi Parrot unmanned aerial vehicle (UAV) was used to take overlapping photographs during field studies which were combined using Photoscan Agisoft Professional software to produce an orthophoto of Amasya University Yeşilirmak Campus. A total of 20 control points were used in the study area with the UTM coordinates of these points identified with a GNSS receiver. Flights were completed at 80 m height with 75% transverse and 75% longitudinal overlap rates used. This digital substrate was uploaded to the GIS environment and the ArcGIS 10.5 program was used to create maps of the spatial character, landscape character (green areas), social areas and parking areas in the campus.
- Fourth step: Results obtained from the previous steps were discussed and the status of the campus was revealed in detail. Recommendations were developed about landscape planning and design for the campus.

The process followed in the study is summarized in Figure 2.



**Figure 2.** Work-flow chart of the study

### 3. Research Findings

The Faculty of Theology, Faculty of Theology Mosque, Technical Sciences VC, Faculty of Engineering, College of Foreign Languages-Distance Education Center, Social Sciences VC, library and academic café, canteen, workshops, Faculty of Architecture-Design VC, indoor sports center, indoor swimming pool buildings and car parks, sports grounds, roads, and paths around the buildings comprise the spatial character of Amasya University Yeşilirmak Campus. The buildings comprise the spatial character of the campus and green areas remaining outside these areas comprise the landscape character of the campus (Fig. 3). The functions of the buildings comprising the spatial character of the campus are given in detail in Table 1.



Figure 3. Map showing spatial and landscape character of Amasya University Yeşilirmak Campus

Table 1. Functionality of buildings in Yeşilirmak Campus

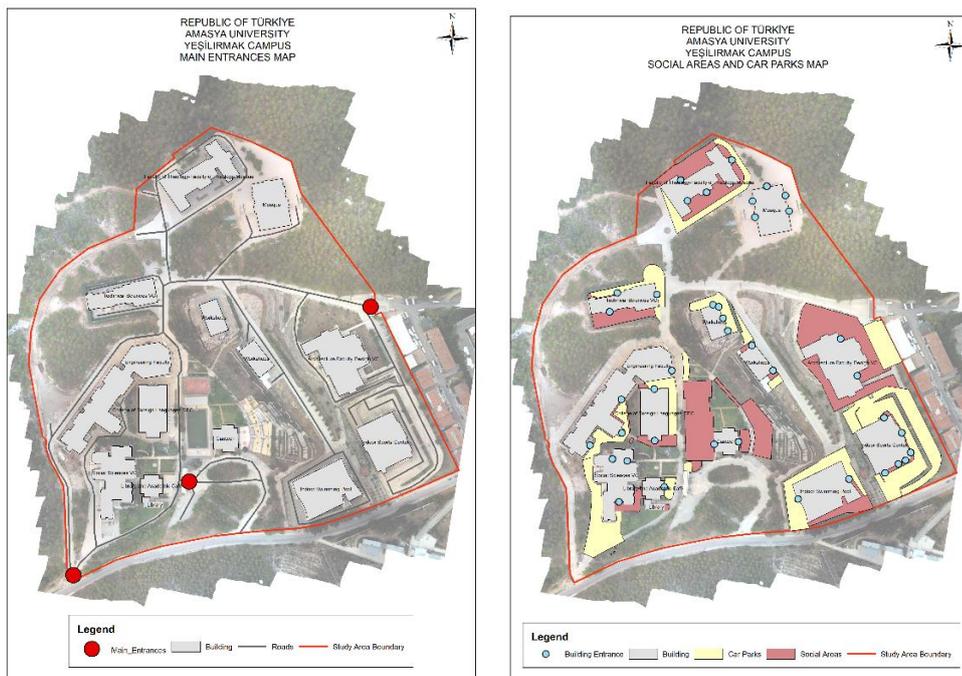
Buildings in the campus	Functionality of buildings
Faculty of Theology-Faculty of Theology Mosque	Education and Worship
Technical Sciences VC	Education
Engineering Faculty	Education
College of Foreign Languages-Distance Education Center	Education
Social Sciences VC	Education
Library and Academic Café	Socialization
Architecture Faculty-Design VC	Education
Sports Grounds	Socialization
Workshops	Socialization
Indoor Sports Center	Socialization
Indoor Swimming Pool	Socialization
Canteen	Socialization
Viewing Terraces	Socialization

With size of 332,850.26 m<sup>2</sup>, Yeşilirmak Campus comprises 201,781.49 m<sup>2</sup> forested area, 23,823.61 m<sup>2</sup> green areas, 23,318.22 m<sup>2</sup> buildings, 1,435.82 m<sup>2</sup> sports grounds, and 82,491.12 m<sup>2</sup> hard surfaces in open areas (roads and paths, parking areas, social areas, etc.) (Table 2) (Fig. 4).

**Table 2.** Area covered by buildings and social areas in Yeşilirmak Campus

Buildings in the Campus	Area covered by buildings and social areas	
Faculty of Theology-Faculty of Theology Mosque	2.023,97 m <sup>2</sup> + 1.797,37 m <sup>2</sup>	467 m <sup>2</sup> + 860 m <sup>2</sup>
Technical Sciences VC	1.509,08 m <sup>2</sup>	350 m <sup>2</sup> + 140 m <sup>2</sup>
Engineering Faculty	4.135,28 m <sup>2</sup>	150 m <sup>2</sup>
College of Foreign Languages-Distance Education Center	1.584,72 m <sup>2</sup>	190 m <sup>2</sup> + 30 m <sup>2</sup>
Social Sciences VC	2.701,43 m <sup>2</sup>	150 m <sup>2</sup>
Library and Academic Café	691,23 m <sup>2</sup>	15 m <sup>2</sup>
Architecture Faculty-Design VC	2.666,96 m <sup>2</sup>	650 m <sup>2</sup> + 1700 m <sup>2</sup> + 750 m <sup>2</sup>
Sports Grounds	942,22 m <sup>2</sup>	2.600 m <sup>2</sup>
Workshops	735,91 m <sup>2</sup> + 712,07 m <sup>2</sup>	50 m <sup>2</sup> + 50 m <sup>2</sup>
Indoor Sports Center	1.850,05 m <sup>2</sup>	100 m <sup>2</sup>
Indoor Swimming Pool	2.490,08 m <sup>2</sup>	400 m <sup>2</sup>
Canteen	500 m <sup>2</sup>	250 m <sup>2</sup>
Viewing Terraces	1.300 m <sup>2</sup>	1.300 m <sup>2</sup>

Access is provided for both pedestrians and vehicles from 3 main entrances to Amasya University Yeşilirmak Campus located on Kemal Nehrozoğlu Avenue (Fig. 4). The spine of the campus is shaped by the main axis providing access between the main entrances to buildings/spaces within the campus shaped around this main axis. Linked to needs of the campus and increase in student numbers in recent years, the campus has grown with development toward the north with the construction of new units. The main road used within the campus has a slope and does not have pavements on both sides.



**Figure 4.** Map showing social areas and car parks along with main entrances for Amasya University Yeşilirmak Campus

Comprising the spatial character of the campus and ensuring circulation within the campus, paths are 2 m wide, while roads are 10 m wide. The total length of road is 1640 m, with all made of cast concrete, apart from the road close to the Faculty of Architecture-Design VC building. The area around the Faculty of Architecture-Design VC is covered with interlocking paving stones.

The total number of parking spaces close to the educational buildings in the campus is 230. When the car parking capacity for buildings within Yeşilirmak Campus is investigated, there is space for 100 cars near the indoor sports center, 60 cars near the Faculty of Theology-Faculty of Theology Mosque, 50 cars near the Social Science VC, 40 cars near the workshops, 40 cars near the Faculty of Architecture-Design VC, 30 cars near the Technical Sciences VC, 21 cars near the College of Foreign Languages-Distance Education Center, 20 cars near the Indoor Swimming Pool, 20 cars near the Faculty of Engineering, and 9 cars near the library and academic café. There is no parking near the viewing terraces, canteen, and sports grounds. There is a hard surface area in front of the indoor sports center and indoor swimming pool that could be converted to a car park if desired.

As there is 5 m elevation difference between the College of Foreign Languages-Distance Education center building and the Faculty of Engineering building in the campus, there is a path dominated by steps. There is 3 m elevation difference between the Faculty of Architecture-Design VC building and the indoor swimming pool. Due to the elevation differences in the campus in general, ramps are used on roads and steps are used on paths. This situation causes difficulty for pedestrian accessibility within the campus for students, especially for disabled individuals.

The entrances to buildings comprising the spatial character of the campus and relationship to their surroundings are given in Table 3.

**Table 3.** Relationship between buildings and close surroundings in Yeşilirmak Campus

Buildings in the Campus	Relationship of buildings to surroundings
Faculty of Theology-Faculty of Theology Mosque	Faculty of Theology building has 4 entrances, Faculty of Theology Mosque has 5 entrances, with surroundings and social areas near the buildings comprising hard ground.
Technical Sciences VC	Technical Sciences VC building has 3 entrances, with surroundings and social areas near the building comprising hard ground.
Engineering Faculty	Faculty of Engineering building has 4 entrances, with surroundings and social areas near the buildings comprising hard ground.
College of Foreign Languages-Distance Education Center	College of Foreign Languages-Distance Education Center building has 2 entrances, with surroundings and social areas near the buildings comprising hard ground.
Social Sciences VC	Sosyal Sciences VC building has 3 entrances, with surroundings and social areas near the building comprising hard ground.
Library and Academic Café	Library and Academic Café building has 1 entrance, with surroundings and social areas near the building comprising hard ground.
Architecture Faculty-Design VC	Architecture Faculty-Design VC building has 2 entrances, part of the front garden and back garden of the building consists of hard ground, part of the front garden and side garden of the building consists of green area.
Sports Grounds	There are football and basketball fields and floor chess, and the immediate surroundings and social areas of the sports fields consist of hard ground.
Workshops	Each workshop building has 1 entrance, with surroundings and social areas near the building comprising hard ground.
Indoor Sports Center	Indoor Sports Center has 5 entrances, with surroundings and social areas near the building comprising hard ground.

Indoor Swimming Pool	Indoor Swimming Pool building has 2 entrances, with surroundings and social areas near the building comprising hard ground.
Canteen	Canteen building has 2 entrances, with surroundings and social areas near the building comprising hard ground.
Viewing Terraces	The social areas of the viewing terraces are composed of hard ground.

The disabled access to buildings comprising the spatial character of the campus, was assessed as presented in Table 4. The appearance of some ramps near the buildings is shown in Figure 5.

**Table 4.** Disabled access to buildings in Yeşilirmak Campus

<b>Buildings in the Campus</b>	<b>Disabled access to buildings</b>
Faculty of Theology-Faculty of Theology Mosque	Access with 5% slope ramp at front entrance of Faculty of Theology, access with 6% slope ramp at first entrance, access with 5% slope ramp at third entrance and access with 6% slope ramp at fifth entrance to Faculty of Theology Mosque, entrance at back of building is at same level as the road.
Technical Sciences VC	Access with 7% slope ramp at front entrance of Technical Sciences VC, access with 19% slope ramp at east entrance of building, building entrance at back of building at the same level as the road.
<b>Buildings in the Campus</b>	<b>Disabled access to buildings</b>
Engineering Faculty	Access with 11% slope ramp at dining hall entrance to the Faculty of Engineering, access to all other building entrances with steps with no ramp for use by disabled persons.
College of Foreign Languages-Distance Education Center	Access with 5% slope ramp at front entrance of College of Foreign Languages-Distance Education Center.
Social Sciences VC	Access with 8% slope ramp at front entrance of Social Sciences VC, access with 9% slope ramp at east entrance of building, building entrance at back of building at the same level as the road.
Library and Academic Café	Access with 12% slope ramp at front entrance of Library and Academic Café.
Architecture Faculty-Design VC	Access with 9% slope ramp at front entrance of Architecture Faculty-Design VC, building student's entrance at the same level as the road.
Sports Grounds	Some entrances of the sports grounds are accessed by stairs, the level of some entrances and the road level are at the same level and there is no ramp for the use of disabled.
Workshops	Workshops' building entrance at the same level as the road.
Indoor Sports Center	Access to the Indoor Sports Center building is provided only by stairs and there is no ramp for the use of the disabled.
Indoor Swimming Pool	Access with 5% slope ramp at front entrance of Indoor Swimming Pool building.
Canteen	Access with 12% slope ramp at back entrance of canteen building, building entrance at front of building at the same level as the road.
Viewing Terraces	Access to the viewing terraces is provided only by stairs and there is no ramp for the use of the disabled.



**Figure 5.** Some ramps near buildings in Yeşilirmak Campus

The social use near buildings comprising the spatial character of the campus was assessed and shown in Table 5. It appears the number of social areas in the campus is inadequate for the number of campus users.

**Table 5.** Social use areas in buildings in Yeşilirmak Campus

Buildings in the Campus	Social use areas				
	Seating unit	Pergola	Picnic table	Under tree seating unit	Sitting step
Faculty of Theology-Faculty of Theology Mosque	15	2	-	-	-
Technical Sciences VC	20	2	2	-	-
Engineering Faculty	13	-	-	-	-
College of Foreign Languages-Distance Education Center	6	1	1	-	-
Social Sciences VC	9	1	1	6	-
Library and Academic Café	7	1	1	-	-
Architecture Faculty-Design VC	18	5	-	-	1
Sports Grounds	3	-	-	-	-
Workshops	5	-	-	-	-
Indoor Sports Center	-	-	-	-	-
Indoor Swimming Pool	2	1	-	-	-
Canteen	-	-	-	-	-
Viewing Terraces	4	-	-	-	-

The 201,781.49 m<sup>2</sup> forested area comprising the landscape character of the campus provides ecological contributions, while the 23,823.61 m<sup>2</sup> green areas provides aesthetic/visual effect. The open-green areas close to buildings in the campus and forming the landscape character of the campus was assessed in terms of design principles like creating spaces in open-green areas, ecological contribution, camouflage, creating a focal point, and providing aesthetic/visual effect. Results are given in Table 6.

**Table 6.** Assessment of open-green areas near buildings in Yeşilirmak Campus

<b>Buildings in the Campus</b>	<b>Assessment of open-green areas located near buildings</b>
Faculty of Theology-Faculty of Theology Mosque	The garden in front of the Faculty of Theology building has no green area, while the green area at the back provides aesthetic/visual effect.
Technical Sciences VC	Green areas in the front and back of the Technical Sciences VC building camouflage the walls at the end of the garden and provide aesthetic/visual effect.
Engineering Faculty	The green area in front of the Faculty of Engineering provides aesthetic/visual effect.
College of Foreign Languages-Distance Education Center	The green area in front of the College of Foreign Languages-Distance Education Center provides aesthetic/visual effect and there is no green area in the backyard of the building.
Social Sciences VC	The green area in front and side garden of the Social Sciences VC provides aesthetic/visual effect.
<b>Buildings in the Campus</b>	<b>Assessment of open-green areas located near buildings</b>
Library and Academic Café	The green area in front and side garden of the Library and Academic Café provides aesthetic/visual effect.
Architecture Faculty-Design VC	The green area in front and side garden of the Architecture Faculty-Design VC provides aesthetic/visual effect.
Sports Grounds	The green area in the immediate vicinity of the sports grounds provides an aesthetic/visual effect.
Workshops	The green areas in the immediate vicinity of the workshop buildings provide an aesthetic/visual effect and hide the level difference.
Indoor Sports Center	There is no green area in the immediate vicinity of the Indoor Sports Center building.
Indoor Swimming Pool	The green areas in the side garden of the Indoor Swimming Pool Building provide border effect and aesthetic/visual effect.
Canteen	The green area in the immediate vicinity of the canteen building provides an aesthetic/visual effect.
Viewing Terraces	The green areas on the viewing terraces immediate provide an aesthetic/visual effect and hide the level difference.

#### **4. Discussion and Conclusion**

University campuses accepted as a small-town model, direct spatial development of a city with their location, size, and open-green areas for common use and affect the urban identity. University campuses are successful to the degree that they provide education-teaching, research, housing, transport, application, health, relaxation, recreation, and shopping functions to both academic and administrative personnel and to students. As a result, university campuses and campus landscaping should be in line with certain planning and design principles.

Studies by Tolon (2006), Özer (2008), Ayvaci (2009), Ertekin & Çorbacı (2010), Koç (2011), Büyükşahin Sıramkaya & Çınar (2012), Atabeyoğlu (2014), Düzenli et al. (2017), Eminağaoğlu & Arslan Muhacir (2018), Şahin (2019), Ünal (2020), Türker & Deneri (2021) and Şahin Körmeçli (2022) about planning and design of university campuses were investigated to develop the methods (step 1: literature review, step 2: field study to determine current situations, step 3: generating orthophotos and maps, step 4: evaluation, conclusion and recommendations) used in this study. In contrast to the studies found in the literature, this study integrates field and observational work with a technological

infrastructure by establishing an updatable digital infrastructure in the GIS environment using the ArcGIS 10.5 program. Within the scope of the study, the status of Amasya University Yeşilirmak Campus landscape planning and design was assessed in detail in terms of environmental, functional, and aesthetic aspects.

Within the scope of the study, the components of the spatial character and landscape character of Amasya University Yeşilirmak Campus were assessed in detail in terms of function, status, environmental and aesthetic features. The Faculty of Theology, Faculty of Theology Mosque, Technical Sciences VC, Faculty of Engineering, College of Foreign Languages-Distance Education Center, Social Sciences VC, library and academic café, canteen, workshops, Faculty of Architecture-Design VC, indoor sports center, indoor swimming pool buildings and parking areas, sports grounds, roads, and paths around these buildings comprise the spatial character of the campus. The green areas remaining outside areas of the buildings, comprising the spatial character of the campus, form the landscape character of the campus. According to the map in Figure 3, there are 23,318.22m<sup>2</sup> buildings, 1,435.82 m<sup>2</sup> sports grounds, 82,491.12 m<sup>2</sup> hard surfaces in open spaces (roads and paths, parking spaces, social areas, etc.), 201,781.49 m<sup>2</sup> forestry area with a total of 225,605.1 m<sup>2</sup> green areas in the campus. The sizes of these areas have been calculated using the digital base map of the current orthophoto of the campus in the GIS environment with the ArcGIS 10.5 program. The 201,781.49 m<sup>2</sup> forestry area comprising the landscape character of the campus provides ecological contribution, while the 23,823.61 m<sup>2</sup> green areas provide aesthetic/visual effect. These contributions were identified through on-site observations in the light of the principles of landscaping design studies conducted by Yıldızci (1988), Erkman (1990), and Seçkin (2011). The car parking and social areas in the campus appear to be inadequate based on the number of users of the campus. A current orthophoto of the campus was produced with the aid of a UAV and this digital underlay was used to obtain maps of the spatial character, landscape character, social areas and parking areas of Amasya University Yeşilirmak Campus in the GIS environment using the ArcGIS 10.5 program. With this study, an updatable digital infrastructure of the campus was created in the GIS environment with the ArcGIS 10.5 program. This study can be used in the creation of the campus information system that is planned to be built in the future. It is also thought that this study will be an example for the planning and design process of other university campuses and the creation of a campus information system in the GIS environment.

In light of the findings obtained in the study and studies about planning and design of university campuses in the literature (Tolon, 2006; Özer, 2008; Ayvaci, 2009; Ertekin & Çorbacı, 2010; Koç, 2011; Büyükkahin Sıramkaya & Çınar, 2012; Atabeyoğlu, 2014; Düzenli et al., 2017; Eminağaoğlu & Arslan Muhacir, 2018; Şahin, 2019; Ünal, 2020; Türker & Deneri, 2021; Şahin Körmeçli, 2022), the following recommendations are made to improve the landscape planning and design of Amasya University Yeşilirmak Campus.

- A transport system prioritizing pedestrian access should be created within the campus
- Design of planting along paths and roads providing circulation within the campus should be made attractive during the four seasons, with planting design providing aesthetic/visual impact, as well as having directive features
- Green areas within the campus should be redesigned in line with planting design principles to create spaces, provide ecological contributions, camouflage, create focal points and ensure aesthetic/visual effect.
- The hard ground proportion within the campus should be reduced with quality planting design
- Plant taxa to be used within the campus should be appropriate for Amasya city climate
- Seating units placed in the campus should be brought together to create spaces allowing for socialization
- Ground covering should be chosen allowing easy access for all campus users and not creating a risk of trips within the campus.

- A bicycle path should be designed in accordance with slope and standards within the campus and connecting both the city and other campuses
- Ramps should be created with appropriate slopes 0-6% for use by individuals with disability at all building entrances and in social areas within the campus
- As the riser heights of steps located at building entrances and in open-green areas in the campus are very different, they should be adapted to standard measurements like 15 cm.
- The number of social areas in common areas of the campus and close to buildings, number of sports grounds and recreational activity diversity should be increased according to the number of campus users
- As the riser heights of seating steps around sports grounds are very different, they should be adapted to standard measurements
- Considering the number of campus users, parking areas near buildings should be increased in accordance with standard measurements
- Ground covering of viewing terraces with beautiful views should be repaired, they should attract all campus users by creating spaces with equipment and planting design
- Water features, statues and artistic objects should be used to reflect the campus identity in common areas of the campus
- In addition to educational functions of the campus, the campus should be adapted to be able to meet the needs of users like shopping, entertainment, and recreation.

In the development of the proposed applications to enhance the landscape planning and design of Amasya University Green River Campus, the idea of addressing issues in components that constitute the spatial character of the campus (buildings, vehicular and pedestrian pathways, parking areas, equipment elements, sports areas, social spaces) and improving the active use of sports and social areas by students has proven effective. It is anticipated that the implementation of suggested practices for quality landscaping design will lead to a reduction in the proportion of hard surfaces on the campus by approximately 5-20%.

This study is considered to act as a guide for landscape planning and design studies related to the campus in the future by revealing the current landscape status of the campus. Maps obtained within the scope of the study and proposed solutions will contribute to making the campus more livable, more modern with a more defined identity chosen more by students. Recommendations will ensure that users spend quality time in the campus.

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#### **Author Contributions and Conflict of Interest**

All authors contributed to the article equally. The authors report there is no conflict of interest.

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