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ASSESSING AESTHETIC PERCEPTION OF URBAN SPACES:

THE EXAMPLE OF NEW YORK CITY

By

Submitted in partial fulfillment

of the requirements for the degree of

Master of Arts

in

Geography

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Second reader:	Date

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DIDICATIONS

I dedicate this paper to New York City and my family.

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It is amazing how everything is interconnected. I want to thank everyone who contributed to this study in chronological order:

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CHAPTER 1: Introduction

Geography is a study that determines the landscapes and nature that people perceive, and that is responsible for which industries are being promoted within the city, or the amount of people that try to cluster in the limited space the city provides, leading to an increase in population density and so on. Such factors have both a direct and an indirect influence on the aesthetic perception of a certain urban landscape (Nikolaev, 2005).

The aesthetics of urban locations impact where people choose to live. Daniel Kahneman, who received the Nobel Memorial Prize in 2002, proved that people tend to make their decisions based on the emotional factors rather than rational. Aesthetic perception is certainly an emotion and therefore it is important to understand the insights of this emotion.

This thesis aims to explain the concept of aesthetics perception of urban landscapes. First, it will define the aesthetics and explain the aesthetics' structure. Second, it will explain human trains of thoughts from the psychological point of view and will attempt to recreate the structure. And third, this thesis will demonstrate the difference in the aesthetics among NYC's neighborhoods by the ways of using GIS. These steps will help to showcase the importance of Aesthetics in Urban Studies as well as decision-making process for choosing a place to live.

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The distinctive skylines of New York, Boston, and other major American cities all bring tourists and immigrants alike who want to visit or settle. When these aesthetics begins to be damaged by urban decay, capital flight, or other forms of harm, these spaces can lose the luster that brought people there. The aesthetics of New York and its cultural landscape both influence how people wish to live in the Big Apple and make it one of the most sought-after locations in the world for immigration. The nature of the geographic and economic landscape strongly determines the opportunities for the development of the cultural landscapes of a certain city, particularly in terms of bringing vibrant people who will create a new cultural landscape.

FIGURE 1. AERIAL VIEW OF DOWNTOWN AREAS

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In the United States, New York has the largest population of immigrants. This includes their children only if they were also foreign born (DiNapoli, 2013). With present statistics reporting an approximation of over 8,537,673 people, this large population has seemed to provide urban spaces in the form of human personnel for investors and cultural diversity in the form of tourist attraction. As a result, such large numbers significantly influenced the image of culture in the New York City. This share of the city's residents has always defined the city - thirty seven percent of the city is made up of immigrants, and children of immigrants. Forty-four percent of the city's workforce is made up of immigrants, showing that the people who come to New York are seeking opportunities to work in it, often to make "an American dream come true". New York constantly draws and attracts people, and not just immigrants who are seeking jobs for reasons of poverty, but also people who are interested in the unique things that New York has to offer. In the historical context, New York has always attracted immigrants seeking internal, external, political, collective, spiritual and other sorts of freedom (DiNapoli, 2013)

The New York City Metropolitan Statistical Area (NYC MSA, Figure 3) historically gained and regained its economic and strategic advantages amongst other US cities for a variety of the following reasons. First, the Dutch had chosen the place to establish the colony, because of its physical geography: the protected

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harbor with practical chains of hills and canals with the Hudson River (Figure 2). Second, the construction of the Erie Canal provided economic benefits and led to the construction of one of the largest ports in the US, helping to connect the industrially booming Midwest to the rest of the world. The Erie Canal served the boating population especially in providing safe and inexpensive passage to different parts of New York State and beyond. Third, in the post-industrial era (1970s) NYC experienced an industrial decline for about a decade, which led to high unemployment and high crime rates, the city had almost become a bankrupt. Nevertheless, the government made many emergency decisions that helped the city to reestablish its economic strength, including public housing project, the broken window policy and environmental improvements (parks, plazas, and beaches were created, cleaned and organized).

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FIGURE 2. NEW AMSTERDAM

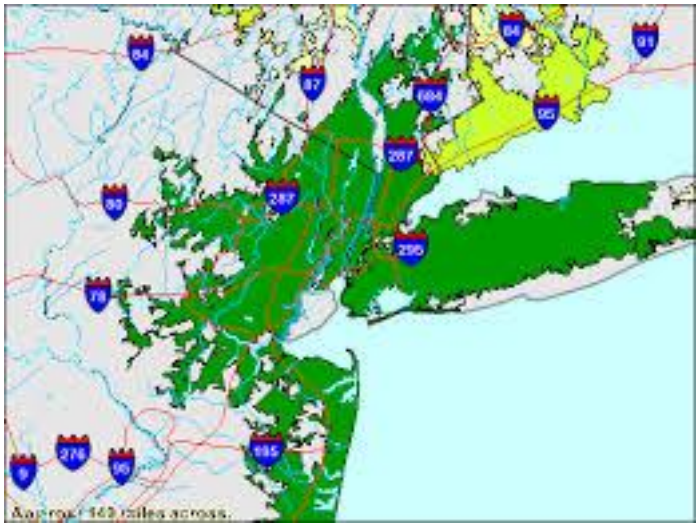

FIGURE 3. NYC MSA

New York is largely island based. The island geography of the city, with Manhattan, Brooklyn, Queens and Staten Island situated on three different islands separated by the ocean waters and the Hudson River (even though each

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borough does contain smaller islands), causes the city to be defined around water. Staten Island, Long Island and Manhattan define the city, though the Bronx is located on the mainland. For example, the connections of its waterfront have transformed the city with new parks, new industrial activities, and a better transportation system. Most international shipping is now in Port Elizabeth, N.J. Also, creative and high-tech industries like software development and Internet services are facilitating its development.

This creates a unique landscape design characterized by high degrees of urban density, and abundance of water nearby. Most people are within walking distance to some body of water, including the Hudson River, the Bronx River, Long Island Sound, multiple creeks, lakes, and even swamps. Bridges, ferries, and the nature of transportation are in turn impacted by the physical geography. They also have a great effect on the city's cultural geography.

New York cultural landscape is also unique. Various ethnic groups who immigrated to the area during different waves at different times between international and domestic migration have shaped it. This large cultural diversity has been described to be social and a key in ensuring peace and the development of human cultural landscapes explaining human perception for urban spaces for immigrants' settlement and tourism.

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New York may have areas that do not look as pleasant as others, but they still feel like the city. Due to the geographical limitations – NYC has not changed its borders since 1898 – "not attractive areas" are becoming extremely reasonable and profitable for major US and international developers. Some of these areas were perceived as undesirable just about 10 years ago and now they are "gentrified" and "expensive" (Casale, 2017, Jul.12).

Theories of the cultural and landscape development being connected indicate that there is a kind of cyclical relationship between the perceived landscape of a city and its actual physical layout (Malpas, 2011, 1-7). Jeff Malpas argues that a landscape is a perceived abstraction as much as a real thing. One sees a very different city from the ground as compared to the air.

"Everything is related to everything else, but near things are more related than distant things," the first of Waldo Tobler's laws of geography, is certainly applicable to NYC. The way that rivers flow, the city is divided up, create different opportunities for cultural mingling and expression. The physical geography of the city outlines distinctive cultural, economic, food, and arts centers and. However, even more centrally, a city must have some degree of opportunity, whether cultural or economic, and New York City has that.

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This study focuses on New York City (NYC) because it has economic and strategic advantages compared to other US cities. Its physical location and geography of the surrounding land permeated by a chain of hills and canals, as well as cultural landscapes, have formed the external image of New York City that is known to everyone in the world today. In fact, such natural elements like the Hudson Valley and close proximity to the Adirondack and Catskill mountain ranges have formed a force for tourist attractions and human settlement.

Of course, the aesthetic appeal of an area, making it more attractive, depends on a whole set of geographical factors such as the location itself, proximity to recreational recourses, awareness, and historical significance. As a result, New York has seen sustained growth, which has made it a place for investors to park their hard earned capital. Places like Manhattan Island and other surrounding areas have become safe havens for investment, especially in real estate and other businesses. However, these factors are not the only ones influencing the aesthetic perception of the entire city. This is the reason why this thesis focuses on such determining factors that are capable of influencing the perception of certain spaces and human mind to make specific decisions.

New York City has a great diversity of people, interests, and activities. Those who have immigrated and decided on settling here have now planted their

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roots are in the third and fourth generations. This means that the cultural preferences of the Dutch, Irish, British, French, Italian, German, Eastern European, Latin American, and East and South Asian immigrants have shaped the cultural landscape of the city. New York is still a primary destination for those who expect to find social, economic, and cultural support systems. NYC is characterized by cultural and financial development, and people are keen on living in a prosperous place, permeated by finance and culture.

The city is characterized more by in-migration and self-realization, which are more of a primary goal compared to people in other cities, due to the fact that migration if selective. Despite the fact that some areas of New York still might be considered dangerous for living, the city still attracts people due to the presence of other social factors.

In order to analyze many factors at the same time, one must apply a framework to analyze the urban space of New York City. This framework will enable one to group and categorize these factors. The Analytical Hierarchy Process (AHP) was selected to address the task of evaluating factors that attract people to a place. The AHP is a mathematical instrument that will analyze all the important factors and provide the results of this complex testing. It helps to

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categorize the factors into a conceptual model using their qualitative characteristics.

In order to analyze many different factors, the lenses framed in Maslow's hierarchy of needs have been used. By applying Maslow's concept, a researcher can simulate human consciousness (Figure 4) that influence the choices an individual makes. The brain automatically integrates all sensory data it encounters as it moves around the environment, continually making both aesthetic and other judgments.

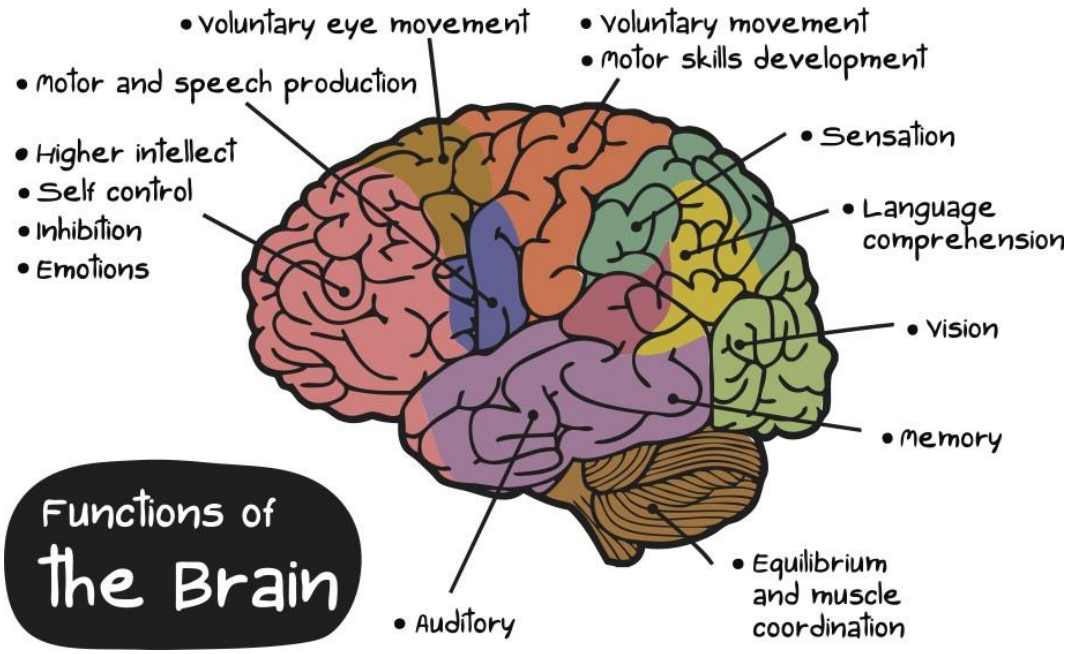

FIGURE 4. FUNCTIONS OF THE BRAIN

The process of analyzing the aesthetic perception of urban spaces in New York is a process that has to be carried out in several stages. Initially, the factors

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need to be categorized in accordance with their functions and needs in view of Maslow's hierarchy of needs, and later through the use of the AHP. Still, each factor needs to be layered and combined.

One must remember that despite the fact that aesthetic perception is important, the scientific interpretation of space is also important. Harvey (2006) suggested that the aesthetic meaning of space is primary and it helps to form the scientific meaning, which reflects resourcefulness of a certain landscape. The concept of space and place is observed by many scholars through the prism of the landscape (Malpas, 2011). The majority of them conceptualize landscape as a space created by knowledgeable actors: structures, institutions, and human agents (Dear & Flusty, 2002, 1998). Therefore, this study attempts to use the urban landscape as a theoretical framework and the desired outcome would be to determine the factors influencing the aesthetic development of specific regions of the city.

This study is an essential tool for planning purposes and social and environmental justice among the regional units. Although the current scientific world is lacking a comprehensive methodology for assessing the social superstructure, the aesthetic framework is potentially very useful for many aspects of sustainable and resilient urban development.

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The aesthetic framework helps to indicate, on a scale of a chosen region, the territories that lack urban development that the society needs to achieve certain goals of self-actualization, which is not possible without completion of Maslow's layers below.

This thesis consists of 5 chapters each pertaining to the structure of an academic paper and looking into a specific problem with the introduction to the problem, literature review, methodology, results, and specific conclusions.

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CHAPTER 2: Literature Review

Beauty is no quality in things themselves:
It exists merely in the mind which contemplates them

David Hume, 1757

This famous quote helped to create a framework for the current thesis. Nonetheless, the main idea of the framework is to duplicate human thinking process, which consists of two main groups of factors: personal experience and social construction through education enclosed in traditions and culture.

2.1. Space, Place and Landscape

Aesthetic perception is the ultimate field of interest in many aspects of everyday human life. It affects individual and social unconscious behavior and is strongly related to the decision-making processes among human minds (Ingold, 2000; Malpas, 2002, 2011; Nikolaev, 2005; Rose, 1992; Tuan, 1979; Wilson, 1982). This thesis investigates the proper approach for assessing the aesthetic perception of urban landscape.

In historical context, the improvement of certain visual aspects of urban landscape such as removing graffiti, cleaning the streets, fixing broken windows etc., had a positive effect on socio-economic factors (Smith, 1992; Keizer, Lindenberg & Steg, 2008; Wilson, 1992). For instance, in the mid-1970s, the New

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Jersey State Government implemented the "Safe and Clean Neighborhoods Program" in New Jersey (Wilson, 1982). Wilson suggested that this program was very successful and it was later implemented in other states.

In the 1990s, New York City performed the "Quality of Life Campaign", which focused on the cleanliness of the city that empirically proved the power of aesthetics on gentrification (Keizer, Lindenberg & Steg, 2008). During this program, in 1991, police raids 'cleaned' Tompkins Square Park of roughly 300 homeless people, which were perceived as a symbol of the high unemployment rate (Smith, 1992). Although Smith (1992) presented the campaign in a negative context, almost evil, the government officials believed that this helped to gentrify the Lower East Side. These events are examples of how aesthetic components affect the social unconscious and perception. Weinberg (2007) gives the most cited definition of social unconscious:

> "The social unconscious is the co-constructed shared unconscious of members of a certain social system such as community, society, nation or culture. It includes shared anxieties, fantasies, defences, myths, and memories. Its building bricks are made of chosen traumas and chosen glories," (p. 308).

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Therefore, place and space also form the social unconscious. Space is continuously being examined by human brain from two different perspectives: aesthetic – perceived by all human physical senses, and scientific – the deeper metaphysical analyses that helps one to understand hidden qualities.

Production of space is one of the primary characteristics of aesthetic perception (Smith, 2008). Smith (1992) advocates that not only production of space but also social power is essential to the landscape. Tuan (1976, 1977, and 1979) conceptualized space and place from the humanistic perspective, which focused on activities and their products that are distinctive to human spaces. Spatial capacity could be perceived as a variable in the notion of human perception. Even though the authors might have different approaches to the notion of space, they share a common understanding of space, which ought to be analyzed as a structure. Later on, Gustafson (2001) writes that meaning of place has an essential impact on human's minds, and that meaning is shaped by the traditions and cultural uniqueness.

It is possible to analyze places through the concept of the landscape, thus geographers and anthropologists addressed the experience of landscape as an important phenomenon. (Malpas, 2011). In order to perform this task one needs to conceptualize landscape as a space created by knowledgeable actors:

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structures, institutions, and human impacts (Dear & Flusty, 2002, 1998). This study uses the urban landscape as a theoretical framework. A philosopher Jeff Malpas (1999; 2011) identified landscape as a philosophical notion. He characterized place as a structure that corresponds to space-time capacity being both influenced and influencing by other spaces.

Harvey (1992) argues that [urban] landscape must be structuralized and/or planned with seven interrelated components: efficiency, economic growth, aesthetic and historical heritage, social and moral order, environmentalist-ecological perspective, distributive justice, and communitarian aspects. Therefore, the attributes for the concept of aesthetic perception will be categorized according to these characteristics

2.2. Conceptualizing Aesthetic Perception

In addition to reviewing landscape, place, and space, this research addresses the concept of aesthetic perception. Some parts of this concept can be embraced in the architectural implementation of perspective and proportion. For instance, the height, size, and architectural complexity of buildings could demonstrate power relation in urban structures. Meanwhile, the unbalanced block faces (visually) from the harmonic perspective, could be perceived negatively (Nikolaev, 1999; 2005).

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Some scholars believe that poetic experience is the dominant influence on the concept of nature (Smith, 2008); however, most scientists agree that landscapes are perceived as desired objects. Water in a landscape is perceived as a resource for physical needs, forests for construction, mountains as potential resources of water, metals, coal, and other bosom goods, while flowers are associated with fruitfulness (Ingold, 2000; Malpas, 2011; Nikolaev, 1999, 2005, 2011; Rose, 1992).

There are differences in landscape perception by people with different identities. Sevenant & Antrop (2010) used a latent class model (relates to the set of observed indirect multivariable variables) to analyze aesthetic preferences by using living environment, age, class, and educational level as attributes. They suggest that personal identity may have a significant effect on aesthetic preference. On one hand Ingold (2000) argues that the biggest differences may occur between compared Western and non-western cultures. On the other hand these differences among different identities (age, educational level, social class, race) did not appear statistically significant (Jungels, Rakow, Allred, & Skelly, 2013; Nikolaev, 1999, 2005). Moreover, individual minds analyze nature with inbuilt associations (Smith, 2008).

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"Visually, the traditional cultural landscape presents itself as a structured wholeness, as a unity, which is experienced aesthetically as a harmonic and pleasing entirety, even today" (Nohl, 2001). There were several surveys performed to analyze the aesthetic perception of various landscapes. Most of the research concluded that landscapes with the biggest variety of components had better results on the Likert scale (Dobbie, 2013; Junge et al, 2015; Simonič, 2013; etc.). Furthermore, the homogeneous, conformed landscapes are often perceived as 'un-aesthetic' (Nohl, 2001).

In ecology, well-balanced ecological structures (ecosystems) are referred to as the climax community, and Gustafson (2001) suggested that these climax communities could be used as a framework. There are thousands of factors that are interacting with each other and shape the climax communities. The strength of each factor and/or absence of one can significantly affect the balance in the ecosystem. That is why it is important to indicate and systemize all known factor to create a conceptual model that will be as close to reality as possible. His idea helps to understand the methodological conceptualization for the current thesis. That is why there is a need review as many factors that have an effect on aesthetic perception of space as possible.

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Altogether, there are two sides of aesthetic perception: the positive side, which has a well-balanced environmental structure, with the consciously or unconsciously desired components, and the negative side, which is generally homogeneous, or has undesired components.

Hauru *et al.* (2014) found that the unconscious analytical thinking of individuals perceived decaying or fresh logs in the urban landscape with no difference. Therefore, even decaying components of the landscape could be a part of the ecosystem's wholeness, similarly in urban landscapes abandon plants can play the same role – one of the examples could be DOMINO Sugar plant in Williamsburg, Brooklyn (Figure 5). The plant was closed in 2004, and there were plans to demolish the building, because the plant is located by the Williamsburg Bridge, and has a great view on Midtown Manhattan. However, in 2007, the building gained its landmark status and become a symbol of industrial era of NYC (Postal, 2007).

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FIGURE 5. Domino Sugar Refinery, Brooklyn

In one's viewpoint, the balance is met through the application of the theories of Social Constructivism and Pragmatism. Social Constructivism was chosen because it states the development of the human mindset is constructed through interactions with others (McKinley, 2015) and is fulfilled in every available artistic form, namely in the aesthetic perception of urban places in New York. Social constructivism is a special type of constructivism, formed within the framework of social and human sciences, focused on the idea of a non-reflective, constructive nature of cognition, the mediated understanding of the world by

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individual and collective constructs, the multiplicity of ways to conceptualize objective reality. It cannot be said that according to social constructivism, scientists "construct worlds" in a literal sense, just as engineers construct machines, or architects homes. Here the constructivist approach is limited to a weaker thesis about the active construction of images of cognizable objects and events in the consciousness of the subject through which ultimately it is possible to reach certain fixed structures of reality, the "facts of the world" that can only be achieved through interaction and perception.

However, on the other hand we have Pragmatism, which generally means to find the perfect solution through interaction and communication (James, 1906). A person in principle should be regarded as an acting subject with a will, and not as an object passively obeying the laws of nature, capable only of contemplating and scientifically cognizing "objective" processes independent of human will in the natural and social environment. The social environment here includes other active organisms, and a person becomes a person in the process of interacting with this active environment. Society can be understood through analysis of interaction and mutual influence of individuals. The term "interaction" first appeared in pragmatism. In fact, the very existence of society was reduced in pragmatism to the totality of communication processes that form the "common

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property" (James, 1906) for all people into more or less identifiable goals, views, and expectations. Thus, the initial image here is the image of society as something created along the way, in the course of communication.

2.3 Exploring Influential Aesthetic Components

Nikolaev (2009) explains that unbalanced environment is often stabilized by anthropogenic power, and without these interactions, the urban environments will be destroyed over time. The examples are: introduction and watering plants in desert environment; replanting flowers in the urban plaza; commercial lights of advertising in Times Square; air conditioning; heating; food markets; elevators; transportation; and so forth – all of these and many other factors that have a significant effect on the aesthetic perception of urban spaces – these factors are being balanced out by the anthropogenic power, and without it Manhattan will be perceived as an absolutely undesirable place to be.

Theoretically, there are several components in the landscape that consciously or unconsciously influence humans: water, mountains, vegetation, sights of productive spaces including sunflower and tulip fields, apple orchards, grape vineyards, swimming pools, skyscrapers, flower shops, and libraries, and other aspects that reflect on human needs.

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To consider these components, empirical evidence is provided throughout this literature review. Dobbie (2013) finds that the complexity of wetlands slightly increased aesthetic appreciation. Simonič (2003) concludes that most of the respondents prefer large open areas with naturalistic landscapes. Junge et al (2015) concludes that respondents prefer either vegetation diversity or 'elements with long-lasting flowering periods'. Jungles et al (2013) found that overall, green roofs have a good aesthetic influence on the urban landscape. Any landscape that has a river is perceived better than those that do not have one (Junker & Buchecker, 2008). Vartanian *et al.*(2015) emphasized that more spacious places were perceived as more beautiful. Enclosed spaces have a negative impact on human amygdala, which is part of human brain responsible for emotions. Benfield *et al.* (2010) demonstrated that anthropogenic noises had negatively affected the individual perception of landscape, while 'natural' sounds had minimal or even positive effects.

New York City has a seasonal climate; therefore, many of its components will vary in the cold or warm season. For example, evergreen plants play a special role in urban landscapes in the seasonal climate, especially in winter, because they become distinguished from deciduous plants. Furthermore, evergreen plants are susceptible to air pollution to a much greater extend than deciduous plants,

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hence, they are very good indicators of air pollution in the city (Yelcinalp, Var & Pulatkan, 2009; Nikolaev, 2005). Therefore, urban spaces with high air pollution rates will have unhealthy and not aesthetically pleasing evergreen trees.

FIGURE 6. Evergreen branch affected by air pollution

The above-mentioned studies provide some empirical evidence of influencing general components for aesthetic perception. They can be parameterized into structural GIS analysis with the following viewshed categories: vastness, parks, views of landmarks, views of the ocean, urban noise sheds, urban odor sheds, architectural street faces.

Certain GIS functions, such as raster calculator, buffers, and others can help to indicate clusters of the relatively positive aesthetic perception. In future works they can be empirically verified by surveys with the Likert scale. However, this research addressed aesthetic perception of urban spaces in New York through the analysis of the thirty-seven (37) factors retrieved from open sources.

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In order to estimate the aesthetic value of a landscape, many scholars used questionnaires or surveys and ranked their results scale (Dobbie, 2013; Beza, 2010; Howley, 2011; Junge et al, 2015; Jungles et al, 2013; Junker & Buchenker, 2008; Simonič, 2003; Van den Berg et al, 1998; Vartanian et al, 2015; Vecchiato, 2012). For example, Vecchiato (2012) analyzes presence and absence of certain landscape components. His findings suggest that the vast majority of interviewed people prefer spacious places, woodlands, and wetlands. Van den Berg et al (1998) established three major groups that perceive the natural landscape differently: farmers, residents, and visitors – all based on their needs. He used computer-simulated pictures of natural landscapes: developed and underdeveloped. The result of his study demonstrated that differences between the categories of people are not statistically significant, but important for the study because it helped to find biases in the landscape interpretation. This finding suggests using needs and understanding of the social majorities to represent the general social aesthetic perception

Use of the Likert scale has its limitations. Beza (2010) used a questionnaire, and 10-point-scale of appreciation for 68 photographs of mountain landscapes. Beza argues that aesthetic valuation of the mountain terrain could not be performed because of differences in cultural and personal backgrounds among

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the study group. Later, Howley (2011) used a sampling technique of the individual perspectives of 47 categories of rural landscapes; his research suggests that the result may vary in different categories of people. The abundance of research could be misleading because of the original large set of variables. The results from the other research were more conclusive. Therefore, it is important to use a limited number of key categories in a questionnaire. However, to assemble a structuralist model, it is important to establish a systemic approach that would streamline its components.

Cosgrove (1985) argues that the aesthetic perception of the landscape is more than just a visual aspect; it must be looked at through many environmental lenses. Namely the morphological analysis of the landscape "works" at the surface level of meanings, but subjective approaches that ensure its integrity can organically complement the objective component. For instance, looking at the picture of a certain landscape in a travel journal or a Google advertisement does not give a full understanding of space that the picture represents. Physical presence in the space gives additional perceptual qualities: auditory, olfactory, tactile, and even taste.

Also, aesthetics of a landscape could be observed from the economic perspective, because it provides goods in a framework of hedonic pricing, where

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landscape could be an amenity per se (Oueslati & Salanié, 2011; Sander, 2012). For instance, knowing that the space is located in the “prestigious neighborhood”, “historic district”, and close proximity to a certain landmark can also add an economic value to a real estate, and hence can influence aesthetic meaning for the space as well. (Sander, 2012).

There has been little research conducted that conceptualizes aesthetic perception as a structure with many relatively active (biota, human activities) and relatively passive (physical geography, climate) components. He, Tsou & Lam (2002) parameterized distance, angles, and elevation into ‘viewsheds’ and introduced it to the GIS application. This approach distinguished their approach from traditional legal or watershed boundaries. After, they parameterized ‘Visual resource features’, vegetation, water, and man-made objects; they overlapped the viewshed layers of 17 equally weighted attributes. This study was one of the first to use the GIS method for the assessment of aesthetic value.

Neckerman et al. (2009) performed the second study related to the current thesis. They analyzed New York City’s poor and non-poor neighborhoods in terms of sidewalk condition and accessibility using GIS methods. They used 28 parameters to compare the neighborhoods, such as the percentage of sidewalk

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cafés, art banners, natural features and other visual objects that can affect the individual perception.

Sander (2012) used the distance from distribution of factors and distance from different phenomena in the framework of hedonic pricing to evaluate economic values of ecosystems. Sander's study has a similar methodology to the current thesis because hedonic pricing underlines the evaluation of the ecosystems based on multiple criteria.

These three studies used related methodologies, where the aesthetic perception of an urban landscape was "overdetermined" by several causes, when each factor is sufficient to "determine" the aesthetic meaning of space. Neckerman et al (2009) analyzed power relations between poor and non-poor neighborhoods and suggested that the visual aesthetic perception of a sidewalk's face is strongly interconnected to the distribution of poverty. Similarly, with their study, the current thesis will potentially detect places of aesthetic inequality in New York City.

2.4 Analytical Hierarchy Process

The Analytical Hierarchy Process (AHP) is a "theory of measurement" developed by Thomas Saaty in the 1970s. Behind the AHP operation is a

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systematic progression that is based on the decision-making process of an individual (Saaty, 1990).

However, they are the controlling factors with which one must deal and which one must be able to measure in order to obtain realistic results. To be realistic, the method must include and allow one to measure all-important tangible and intangible, quantitative and qualitative factors affecting the output.

In order to achieve this, the author decided to use the Method of Analytic Hierarchy Process (AHP). This is a mathematical tool with a system approach to decision-making problems. AHP does not prescribe any "correct" solution to the person responsible for making decisions but allows one to interactively find an option or alternative that most consistent with the understanding of the nature of the problem and the requirements for its solution. This method was developed by the American scientist Thomas L. Saaty in 1970. Since then it has been actively developed and widely used in practice. The Method of Analytic Hierarchy Process can be used not only to compare objects but also to solve more complex problems of control and forecasting (Saaty, 1990).

Of course, one could have also applied the decision matrix techniques, which are used to determine the various attributes, measure and evaluate,

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provide an appropriate conclusion with a relative ranking of each variable (Saaty, 1990). As with any method, this method has both advantages and disadvantages. On the up side, the decision matrix techniques encourage team interaction by forcing the design or analytics team to consider all variables as well as factors leading up to a potential solution, with a proper evaluation of each specific factor and its influence on the output.

The decision matrix techniques allow one to conduct a rather quick analysis of each factor, but most importantly through the use of this method, one would be able to identify the non-viable options that will not facilitate a realistic result (Golden et al., 1989). On the downside, the applied criteria may have many interdependencies decreasing the viability of the method, where risk is to be addressed as an additional factor that can influence the solution.

Therefore, considering the above, as well as the abundance of variables and criteria, this study has opted to use the AHP method. The main advantage of the AHP method is its high versatility as the method can be used to solve a wide variety of tasks: analyzing possible scenarios for the development of an area, allocating resources, compiling client ratings, and making personnel decisions. There are disadvantages, between which is the need to obtain a large amount of

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information. However, in our case, this is not a disadvantage as the necessary information is available for one to use this method. In a typical decision-making situation, the AHP method considers several solutions as well as establishes a criterion according to which the suitability of a particular solution is determined.

The AHP method is suitable, as it has been used by other scholars together with the application of a geographical information system (GIS), which is used in the current study. Nazri Che Dom et al. (2016) has used this method to analyze the factors and variables related to the spread of the dengue fever. To conduct a proper analysis and thorough evaluation, scholars use the AHP to arrange them into a hierarchical structure. In order to do this, they have calculated the relative weight and significance of each factor. The outcome of the AHP analysis as to the dengue fever zone allowed the scholars to make conclusions about the differences in the level of risk of each zone.

Another example is the application of the GIS-Interval AHP Method by Ljubomir Gigovi´c et al. (2017) to evaluate the flood hazards in urban areas. The scholars required a method to create and analyze a flood hazard map zoning in the urban area of Belgrade, Serbia. Although they used only six factors, the scholars opted for the AHP method over decision matrix techniques.

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To conclude, the Analytical Hierarchy Process (AHP) is a "theory of measurement" developed by Thomas Saaty in the 1970s, behind which is a systematic progression that is based on the decision-making process of each separate individual (Saaty, 1990). This method is used to structure the factors by constructing a multi-level hierarchy combining and analyzing all the variables at hand (the main goal, subgoals, acting forces, criteria, outcomes, alternatives, etc.) that are further compared by means of specially developed procedures. As a result, it becomes possible to obtain numerical estimates of the intensity of the interaction of hierarchy elements, on the basis of which the degree of preference for alternatives relative to the main goal is estimated. AHP is a commonly used tool for aiding in making decisions (Saaty, 1990). Saaty has developed a tool that one could use for reducing complex multi-factor decisions to a net of comparisons. These comparisons are later synthesized to produce results, which are then synthesizing the results to open up the subjective and objective aspects, which the AHP is aimed at (Saaty, 1990).

One of the closest applications of AHP to the current research is a conceptual model that combines AHP with Maslow's Hierarchy of needs. Here it is feasible to consider the study conducted by Roig-Tierno et al. (2013), where the authors used the AHP tool to help structuralize factors needed for the employees

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to achieve a final level of self-actualization. Roig-Tierno et al. (2013) provided three different factors for each of Maslow's level of needs. Nonetheless, the paper did not indicate the process of selecting the factors. This could significantly affect the results in case if there were more influential factors missing in their conceptual model. That is why to create a comprehensive model one needs to at least consider all influential factors.

2.5 Other Considerations

Aesthetic perception has always been an integral part of human lives. The literature review explored the meaning of place, space, and aesthetic perception. The discussion of the aesthetic perception has unquestionably been comprehensive in geographic science for a long period of time. In the United States, aesthetics have been improved through the "Quality of Life Campaign" of the 1990s and the "Clean and Safe Neighborhoods Program" of the 1970s. Criminology suggests a phenomenon called "the broken-window syndrome." Graffiti and broken windows are examples of negative aesthetic factors that create a negative perception. Furthermore, Neckerman et al (2009) emphasized that aesthetics is strongly connected with multiple socio-economic characteristics.

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Building on a review of the literature and common geographical, ecological, and psychological knowledge, the thesis will establish a conceptual model for assessing aesthetics in an urban landscape and detecting aesthetic inequality in urban ecosystems in general and in New York City.

The discussion in this thesis suggests that human minds consciously or unconsciously perceive the urban landscape through the lens of an economic measure of any production against the unit of contribution. Many scholars such as Gillian Rose, Jeff Malpas and others have demonstrated it in their famous works regarding landscape. Although geographers like Yi-Fu Tuan and Tim Ingold conceptualized landscape from the humanistic perspective and a sense of place, they also refer to place as a structural phenomenon.

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CHAPTER 3: Methodology

3.1. Introduction to Methodology

To assess aesthetic perception of urban spaces, it is essential to define terms that are used in this study. First, aesthetic perception is an understanding of space perceived by all senses simultaneously (Scott, 1901). Second, space is evaluated by person's mind through education and his or her personal experiences (Tuan, 1979). Third, perception is a continuous process, which changes in space and time with both conscious and unconscious awareness (Nikolayev, 2009; Vernadskij, 1989). Fourth, every component that affects a human has a certain influence on a person's perception of space. It is important to give all these components a certain weight to unite them into one structure that will replicate both conscious and unconscious human train of thought. This model shall be called Aesthetic Perception of (Urban) spaces.

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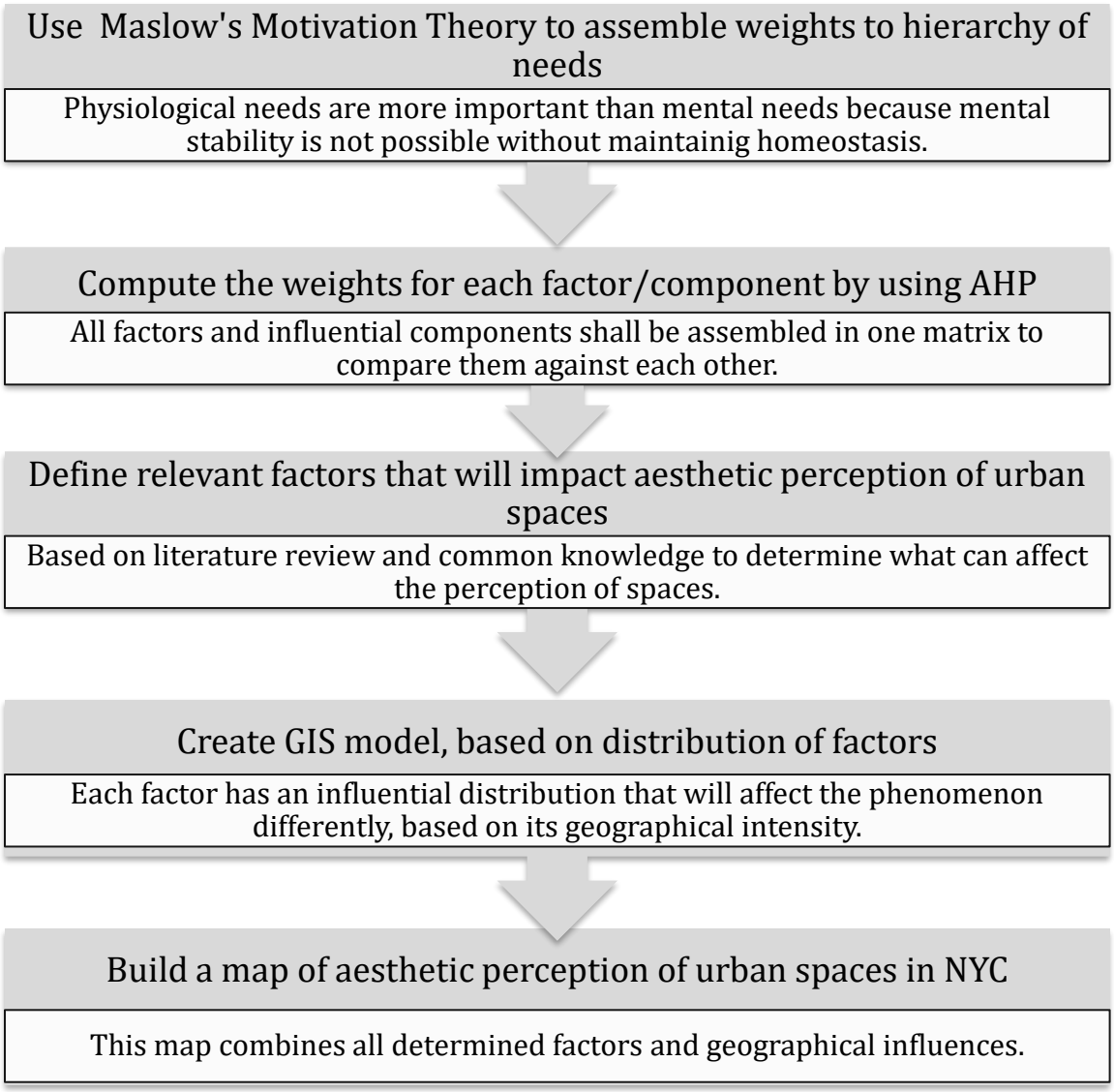

FIGURE 7. Conceptual Model: Aesthetic Perception of (Urban) Spaces

The literature review chapter introduced several case studies where scholars conceptualized and assessed aesthetic perception of place and space, and most used questionnaires and surveys, and later the Likert scale to evaluate the results (Beza, 2010, Dobbie, 2013; Howley, 2011; Junge et al, 2015; Jungles et

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al, 2013; Junker & Buchenker, 2008; Simonič, 2003; Van den Berg et al, 1998; Vartanian et al, 2015; Vecchiato, 2012). The Likert scale is often a useful tool in surveys since it offers participants the opportunity to grade certain phenomena on a rank scale. This approach has been proven to be efficient in multiple types of research. A Likert scale is usually used to assess a certain phenomenon based on proposed attributes in a selected group. However, the above-mentioned scholars indicated its limited usefulness for multi-dimensional analyses. For this project, it would have been necessary to perform multiple surveys, which would have been prohibitive. Therefore, a different approach is needed.

This study uses a framework that is mostly based on Vernadsky's concept of the noosphere and Maslow's Hierarchy of Needs. The concept of the "noosphere" is widely interpreted and there are many different definitions. Developing the philosophical content of the Noosphere doctrine, Oldfield and Barrington Shaw (2006) came to the conclusion that the noosphere should be understood as a systemically organized universal. Vernadsky, referring to the transition of the noosphere to the biosphere, to a large extent made science assess a rational reorganization of the world, but, of course, of not science as such, but all human activities affecting this transition (Oldfield and Barrington Shaw, 2006). The scientific worldview is the creation and expression of the human spirit, on par

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with the manifestations of religious worldviews, art, social and personal ethics, social life, philosophical thought or contemplation—essentially, every aspect of life that allows one to assess the aesthetic perspective of urban spaces in New York (Oldfield and Barrington Shaw, 2006).

A special role of science was distinguished by Vernadsky as it is a planetary phenomenon and its transforming power is significant, as it equips a person with powerful tools of influence on nature. In addition, science is less subjective than other types of human activity, although, of course, it is not the ultimate truth. Ecological crises (the Aral Sea, Chernobyl, the Salton Sea, and others) showed that a one-sided orientation toward science does not allow us to embrace life in its entirety. Introducing the concept of "noosphere," Vernadsky put into continuous interconnection the two main planetary/cosmic forces—the living substance and the mind of man. Namely, a living substance is a collection of living organisms; therefore, humanity as a living substance is inextricably linked with the biosphere (Oldfield and Barrington Shaw, 2006). The concept of noosphere amasses perceptions, memories, and knowledge, and therefore, makes it possible to link conscious and unconscious perceptions of urban spaces.

Considering the historical aspect space has not only been viewed as something that must be functional, but also such that can evoke an aesthetic

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appeal. Thus one aimed to consider the perception of the external appearance of space deemed in the physical perspective. At the heart of aesthetic pleasure is the discretion in the objects of expediency of form, that is, the correspondence of the object of some inner goal, inner nature. From the outside, this expediency can act as the proportionality of parts to each other as a whole or a harmonious combination of colors. The more fully expressed this expediency of form, the greater the sense of pleasure it gives us, the more beautiful it seems to us.

The peculiarity of aesthetic pleasure is its universality and at the same time the subjectivity of its sensory perception. The problem of combining the universality of aesthetic pleasure and the subjectivity of sensory perception is one of the main problems of aesthetics. This study attempts to solve the problem through the assumption of the existence of universal concepts of reason and the general logic of thinking.

Aesthetic knowledge is specific to the general nature. Aesthetics thus represent a certain system of concepts of logical categories. At present, the universality of the aesthetic knowledge of the world is reflected in the systematic character of aesthetic knowledge. Aesthetics is characterized by a logical connection, subordination, and hierarchy of concepts of categories of laws. Any

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problem of aesthetics can only be resolved if it is linked to all other problems and questions of aesthetics.

Aesthetics from this point of view appears as a system of laws and categories describing the world in its wealth and values for man and creativity according to the laws of beauty, the essence of the art of the peculiarities of the process of its development, the specificity of artistic creativity, the perception and functioning of artistic culture. Signs of the systematic nature of aesthetic knowledge are also monistic, meaning the explanation of all phenomena from the same initial bases demonstrating the principle of minimum sufficiency. The minimum number of axioms or other initial assumptions should facilitate such a development of ideas, so that in their totality they can cover the maximum number of facts and phenomena.

Aesthetics is the innate need of the people. This is something that unites every single individual in Jung's concept of the social unconscious. However, each person has an individual sense of aesthetics. Nonetheless, this is a basic need that each person strives towards.

The general need of the person is the so-called source of personal activity, because it is the needs of the person that are his motive for the actions in a

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certain way, forcing to move in a particular direction. Even as children we are more inclined to be attracted by the things that are externally appealing to us.

Personal activity manifests itself only in the process of satisfying one's needs, which are formed during the education of the individual and acquaintance with the social culture. In its primary biological manifestation, a need is nothing other than a certain state of the organism, expressing its objective desire in something. Thus, the personality needs system directly depends on the individual's way of life, the interaction between the environment and the sphere of its use. From the standpoint of neurophysiology, need means the formation of a dominant, i.e. the appearance of excitation of special cells of the brain, characterized by stability and regulating the required behavioral actions.

Human needs are quite diverse and today there are a huge number of their classifications. However, in the current psychology, there are two main classifications of types of needs. In the first classification, needs (needs) are divided into material (biological), spiritual (ideal) and social.

The realization of material or biological needs is associated with the individual-species existence of the individual. These include the need for food, sleep, clothing, security, shelter, and intimacy. Those needs, which are

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conditioned, are biological needs. Spiritual or ideal needs are expressed in the knowledge of the world that surrounds the individual allowing one to understand the sense of existence, self-realization, and self-esteem. The desire of an individual to belong to any social group, as well as the need for human recognition, leadership, domination, self-affirmation, affection of others in love and respect is reflected in social needs.

All these needs are divided into important types of activity: work as in the need for knowledge, creation and discovery; development as the need for training and self-realization; social communication as spiritual and moral needs. However, all of them are united by the need of one to perception of everything that surrounds the individual. And by perceiving everything one assesses the aesthetic appeal. These needs described above have a social direction and are thus called sociogenic or social. In another type of classification, all needs are broken down into two types: the need for personal growth and conservation. The need for preservation combines such needs as physiological, the need for safety, and preservation. Abundance is the comprehensiveness of satisfying natural needs, material needs, and biological needs, whereas the need for personal growth combines the following: the desire for love and respect; self-actualization; self-esteem; cognition, including the meaning of life; needs for sensual (emotional)

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contact; social and spiritual (ideal) needs. The above classifications make it possible to identify more significant needs for the subject's practical behavior.

The category of needs is inseparably linked with the category of interests. At the heart of the emergence of interests are always needs. Interest is an expression of a purposeful relationship of the individual to any kind of his needs. The interest of a person is not so much directed at the subject of the need, as it is directed at such social factors that make this object more accessible, mainly these are the various blessings of civilization (material or spiritual) that satisfy such needs. Interests are also determined by the specific situation of people in society, the position of social groups and are the most powerful incentives for any activity.

Interests can also be classified according to the direction or the carrier of these interests. The first group includes social, spiritual, and political interests. The second is about the interests of the society as a whole, group and individual interests.

The interests of the individual express its peculiarity, which determines in many ways the nature of any activity. In the general manifestation of interest, one can observe the true cause of social and personal actions, which is directly seen in the motivation behind a specific action that in turn evokes objective interest.

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An objectively effective and optimal way to meet needs is called objective interest. Such an objective interest does not depend on the individual's consciousness. Objectively effective and optimal way to meet the needs in the public space is called objective social interest. For example, there are a lot of stalls and shops in a market and there is definitely an optimal way to the best and cheapest goods. This will be a manifestation of objective social interest. There are many ways of making different purchases, but necessarily among them there will be one objectively optimal for a particular situation. At the same time demonstrating an objective interest, an individual attempts to find aesthetic appeal.

Representations of the subject of activity on how best to satisfy their needs are called conscious interest. This interest can coincide with the objective or slightly different, and may have an absolutely opposite direction. The immediate cause of almost all actions of subjects is precisely the interest of a conscious nature. Such an interest is based on a person's personal experience. The way that a person goes to meet the needs of the individual is called realized interest. It can completely coincide with the interest of a conscious character, and absolutely contradict it.

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Maslow's Hierarchy of Needs helps to situate and structuralize recognized components and give them a certain relationship in space and time continuum. As a person having lived in a natural environment, at some point in time realized that it was not able to fully satisfy all his existing, at that time, needs, and decided to form an artificial environment around himself. A number of satisfied needs contributed to the emergence of new ones. As a result, the tendency to develop human needs begins to form the feeling of satisfaction which directly affects the principles of self-formation.

The pyramid of needs is a common name for the hierarchical model of human needs, which is a simplified exposition of the ideas of the American psychologist A. Maslow. The latter recognized the existence of the specific needs amongst all people and using the available classifications he managed to split everything into five categories. However, these are mostly the inferior or basic needs that the individuals demonstrate. There exist needs of a higher level of perception, and these needs are exemplified as has been mentioned in the concept of aesthetic perception.

However, a human only satisfies these needs when all inferior needs are met. This does not mean that the place of a previous need is taken up, only that the former is fully satisfied. Also, the needs are not in an inseparable sequence

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and do not have fixed positions. This pattern is considered to be the most stable; however, among different , the mutual arrangement of needs can vary. However, looking at history and modern society, there is an ambiguous idea of how the means and items that meet existing needs change.

It can not be unequivocally asserted that a man who satisfied his needs a hundred years ago is equivalent to today's fully satisfied person. The pyramid of needs itself is also subject to development and change. Being in sufficient isolation from food (for example) one would be experiencing a terrible need for food. If, according to a certain schedule, one receives certain rations, for some time the person will continue to feel dissatisfaction. However, if this normalization of portions is sufficient for existence, at some point in time the need will still be satisfied and the person will become satisfied with the proposed norm. This means that the pyramid has changed.

In order to use the Maslow Hierarchy of needs, one ought to assign weights to each factor by the ways of using a structured technique based on calculation and psychology - the Analytical Hierarchy Process (AHP), which included a comparison of each identified factor (38) on a scale from 0 to 5.

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3.1.3 Methodology Three

The methodology for this thesis incorporate an uncommon method for assessing aesthetics of space – the geographic information systems (GIS) method of overlaying, which has been used only in a few studies such as He, Tsou & Lam (2002) and Neckerman et al (2009). The GIS implementation model for this thesis combines multiple layers, which is represented by the data extremes and differences of spatial distribution within NYC.

Maslow's hierarchy of needs consists of two general categories: basic and social. Specifically, Maslow (1943) identified physiological, safety, belongingness and love, esteem, and cognitive needs (self-actualization), all the needs are visually represented by a pyramid with five levels. All the human needs are required to the sustainable development of personality and maintaining the climax. According to Vernadsky's theory of Noosphere, we perceive all aspects of surrounding space both consciously and unconsciously by the ways of human senses and knowledge, and therefore all landscape factors are affecting aesthetic needs (Oldfield and Barrington Shaw, 2006). Accordingly, this theory is transformed into the GIS implementation model.

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The first group of layers will represent biological and physiological needs: air quality, water, food, drink, shelter, and warmth (Maslow, 1943).

Although water as a drinking resource is arranged evenly by plumbing throughout the city, the distribution of open water remains uneven. The water layer in GIS is delineated by the composition of lakes, rivers, ocean, fountains, and waterfalls; it will reflect the visibility and distance of open water sources.

A comfortable environment is an essential human need. It is also distributed unevenly in urban spaces, depending on the microclimate, and the season. In the current thesis, the microclimatic characteristics are indirectly represented in the distribution of factors that cause them: proximity to the waters of Atlantic Ocean (ocean mitigates temperature amplitudes), vegetation coverage (which creates shades, and slows the winds), sunshade/sunshade, and the amount of space that one can see (which indirectly represents windiness).

The second group of layers consists of safety needs such as protection, security, order, limits, and stability (Maslow, 1943). As a coastal city, New York has experienced several major hurricanes, which encouraged the creation of hurricane evacuation zones, which will be included in the GIS model.

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Maslow (1943) believed that basic needs are the principal foundation for the following social needs. Therefore, the basic need layers require greater weight in the GIS process of overlaying. Although the following social needs were organized in hierarchical order, they are interchangeable, depending on individual and social preferences (Maslow, 1943). Hence, layers of social needs are of equal weight.

The third group of layers includes belongingness and love needs: family, relationships, and workgroup (Maslow, 1943). These layers combine spatial distribution of negative aspects such as crime rates versus control (police departments) on one hand, and business and social clustering such as location in the 'historic districts', park, or a landmark on the other.

The fourth group of layers addresses esteem needs, such as achievement, status, responsibility, and reputation (Maslow, 1943). It will combine layouts of the spatial distribution of wealth and education levels (graduate level), and location in the prestigious neighborhood "historic district", and close location to the landmark. Another factor that is considered in the current paper is the amount of space that one can see, and amount of visible sky. Both two factors have a strong psychological effect on the human being and they are both vital for

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a balanced mind, visibility gives a sense of control and achievement (Rose, 1992; Verndadskij, 1989; Nikolaev, 1999).

Due to the limitation of processing power and time, the GIS part of the current thesis is calculated in two-dimensional world. Therefore, the result (map) is showing the maximum possible positive aesthetic perception of an urban space in the NYC. One of the example will be "the amount of space that one can see": the intersection of West 34th street and the Fifth Avenue (Manhattan) has the North America's Imperial landmark (The Empire State Building). Within one location on the 2D map the observer will have very different aesthetic experiences, depending how high he or she will be situated, and thus "the amount of visible space" will also vary. Therefore, to be consistent, it is crucial to implement only the maximum strength of a certain factor.

The fifth group of layers is cognitive needs: knowledge, meaning, and self-awareness (Maslow, 1943). These layers could be reflected by the locations of major educational, recreational, and social institutions: museums, art galleries, universities, schools, etc. But, this level diverges across different social groups and individuals more than any other needs. The difference among the cognitive preferences between the people would

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The aesthetic needs are at the top of Maslow's hierarchy; they underline balance and harmony within a perceptual structure, which is normalized by visual, auditory, olfactory, and gustatory (dis) balances. The weights among the GIS layers are anticipated to go through the analytical hierarchy process (AHP).

Natural landscapes in balanced environments are perceived positively, which has been proved in multiple surveys. Parks, trees, open spaces, and open water sources represent natural landscapes in urban spaces, therefore, they have positive effects on structural aesthetic perception. The GIS implementation model will include layers of natural components accordingly.

Among urban environments, landmarks are a significant component of visual aspects and symbolic meaning in the context of perceived space; the layer of landmarks is anticipated to be a viewshed of their visibility (line-of-sight).

Auditory and olfactory dis-balances will normalize the GIS model. The urban noise layer will represent a negative component for aesthetic perception; it will reflect close locations to noise sources such as heavy traffic, railroads, police stations, fire department stations, hospitals, and large crowds of people. Urban odor/smell layers will situate factors such as waste facilities, traffic conjunctions/heavy traffic, and distance to them.

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Maslow (1943) suggested that the true aesthetic perception of social space (urban landscape) is not possible without the underlying satisfaction of the lower ranks of his pyramid. Hence, constructing and combining the GIS layers of needs will detect zones of (dis) satisfaction for aesthetic needs. To visualize this phenomenon, the GIS a function of overlaying (raster calculator) helps to construct a map for aesthetic needs based on structural combinations. The outcome (map) visualized as discrete data. It demonstrates zones of aesthetic and structural inequalities among urban spaces in NYC.

The data from the surveys will be used to maximize the similarities and the differences of information in a context of grounded theory (Creswell, 2003).

3.2. Reasoning behind the Analytical Hierarchy Process (AHP)

To implement all the needed factors in one model, we need to compare them and give them weights. For this purpose, the Analytical Hierarchy Process (AHP) has been used. This mathematical instrument helps to analyze all the important factors to conduct a proper analysis for complex cognitive examination. Some scholars might argue that AHP cannot reflect human thinking style (Whichapa & Khokhajakiat, 2017), and it is true when it comes to individual thinking. However, when it comes to social constructiveness, AHP is effective for assembling a model

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for the utility of human needs due to resembling a direct correlation to the concept of Maslow's Motivation Theory. Furthermore, Self-Actualization is not possible if the other human needs are succeeded. Therefore, the present study does not include personal needs in this geographical model.

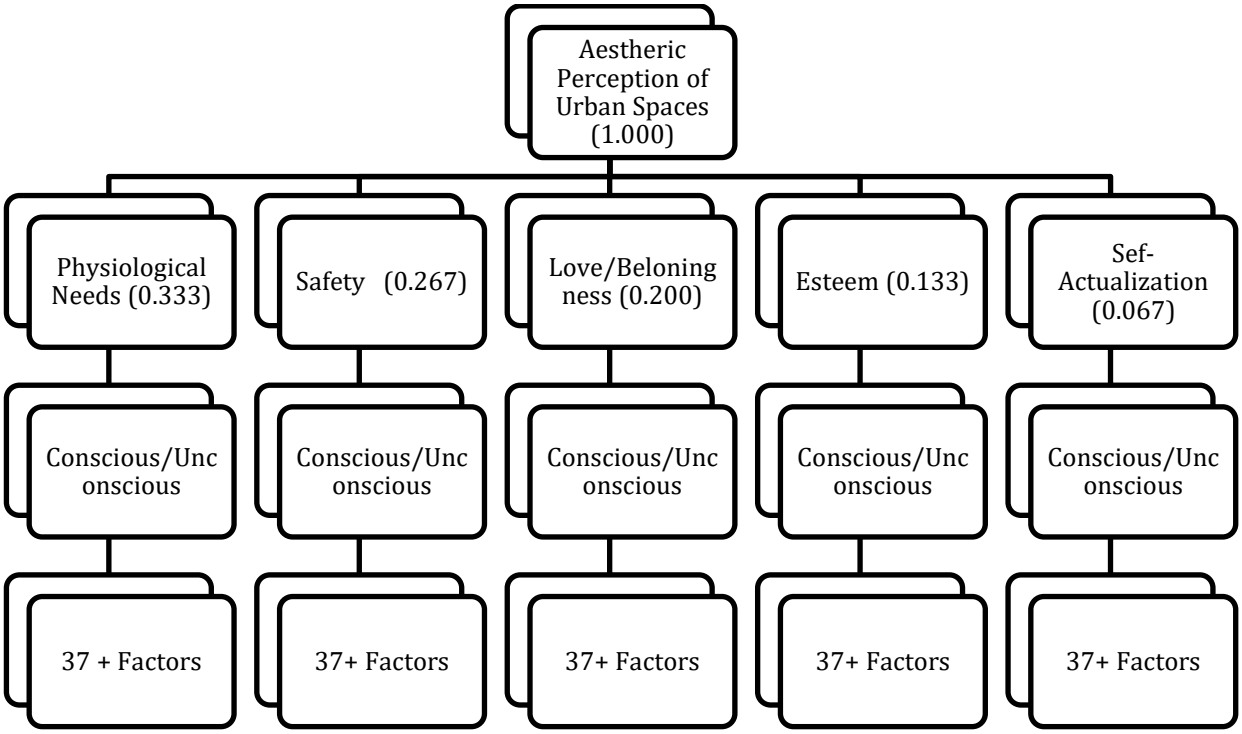

FIGURE 8. AHP Geographical Model

First, we need to assemble the hierarchical structure, which would include multiple criteria, alternatives, and other influential factors. For this purpose, there were thirty-seven (37) factors chosen to be compared from open data sources.

Second, due to its flexibility and pursuit, AHP helps to construct qualitative characteristics of all different factors into one conceptual model. For this process,

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I needed to compare all of the selected factors among each other, by creating a matrix that compares attributes in pairs, based on common knowledge, and literature review. The evaluation index V is equal 5 (Exceptional Affect); 4 (Very Strong Affect); 3 (Strong Affect); 2 (Some Affect); and 1 (Minimal Low Affect).

Lastly, all of the factors had been put together in a table and each of the factors received its coefficient, based on the AHP.

Each factor is compared to each other factor within the conceptual definition of Maslow's hierarchy. Each level is predetermined to have a weight on the scale of 5. Sum of grades is equal 15 (1+2+3+4+5), and to make a coefficient, we will have the results below.

1. Physiological needs (5/15=0.33). According to Maslow's definition it is an ability to maintain homeostasis - "the tendency toward a relatively stable equilibrium between interdependent elements, especially as maintained by physiological processes." On this level, most value will receive components that are vital for human survivor such as accessibility to drinking water, food sources and

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2. Safety needs (4/15=0.267). According to Maslow, safety-seeking mechanism/tools, world outlook, future, "new, unfamiliar, strange, unmanageable stimuli or situations will too frequent.
3. Love and belongingness (3/15= 0.20). Give and receive Love and affection. The human need emotional need to be an accepted member of the group.
4. Esteem (2/15=0.13). Stability, "adequacy, for confidence in the face of the world, and for independence and freedom"
5. Self-Actualization (1/15=0.07). A musician must make music, an artist must paint, a poet must write, if he is to be ultimately happy

Maslow's Hierarchy of Needs best illustrated in the form of a pyramid is the best methodological framework to analyze the factors pertaining to the aesthetic perception of Urban Spaces in New York. Using the predetermined AHP system with the readymade classification range from 5 (Exceptional Affect) to 1 (Minimal Low Affect). The presented methodological part looks at each factor prepared in the questionnaire and explains their connection to each stage of Maslow's hierarchy of needs. By looking at the physiological needs, safety, love/belongingness, esteem and self-actualization and the factors that can be explained through the prism of each level of Maslow's pyramid, one will be able

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to explain how the urban spaces in New York are analyzed based on their functioning.

3.3. Maslow's Pyramid of Needs

Most often Maslow's Pyramid of Needs is used in explaining the motivation behind a specific human activity. However, in the description of Aesthetic Perception of Urban Spaces in NYC, it is vital to consider the importance of each level of the pyramid when compared to each other. As has been mentioned, through the use of the AHP, one was able to determine the importance of each level and calculate the coefficient matching each level. However, in order to receive valid data from a questionnaire, it is important to make it as easily perceptible as possible. Thus, the 37 factors described in the AHP need to be divided among the five levels of Maslow's Pyramid of Needs (Figure 1). It must be mentioned that these factors may or may not be attributed to several levels, or rather must be considered from the different perspectives as offered by Maslow. Each corresponding factor is to be marked by the respondents according to the evaluation index ranging from 5 (Exceptional Affect) to 1 (Minimal Low Affect). The responses of the participants are to be included in the table for further analysis.

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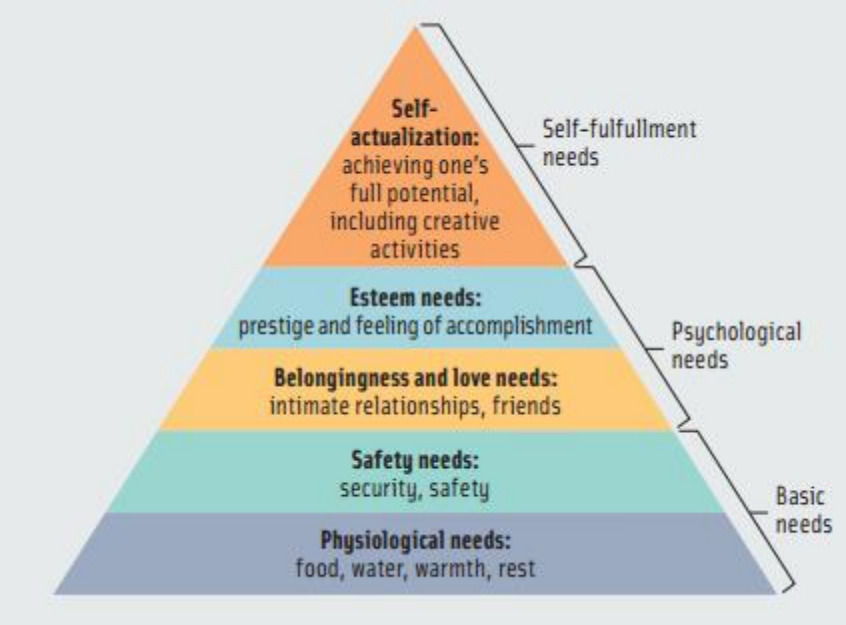

FIGURE 9. Maslow's Hierarchy of Needs **(POSTON, 2008)**

Considering the division of factors, it is important to look at each level individually.

3.3.1. Physiological Needs

The level of Physiological needs is the ability to maintain homeostasis. These needs are inherent in absolutely all living beings on the planet, and each person cannot do without them. If one does not satisfy them, then the possibility of one's very existence is put under question, let alone proper development (Adler, 1977). For example, if a person really needs to go to the toilet, one certainly will not be keen to read a book or quietly stroll through the beautiful park, enjoying the amazing scenery and observing others (Maslow, 1943). Naturally, not satisfying

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physiological needs, a person will not be able to work normally, engage in business and any other activity. The most vivid of such needs are breathing, eating, and sleeping (Adler, 1977). However, from among our factors, the following have been chosen:

General Public Health – in the vicinity of the city the air quality that the people breathe constitute the most basic physiologic need for normal functioning of the person. Polluted air causes numerous health-related issues, as well as causing discomfort, which is why this need is of significant importance. Fresh water access is important for the normal functioning of the organism, as its lack will have an adverse effect on the Here one must also mention hospitals, whose staff is always on standby to help any resident in need, and treat the person in the best possible way allowing the latter to continue doing one's own business. As is evident these factors can be grouped under health. Two more factors can be attributed to this category. The first of these is a gymnasium. One can get fit there and retain one's health at the appropriate level. However, it must also be considered that the presence of a large multitude of people produces an immense amount of waste. Thus, a whole multitude of waste facilities is a necessity to uphold the normal functioning of every resident of New York City.

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Airports – in New York, airports are among the basic physiologic needs as New York is among the most important travel hubs in the world. Millions of people travel to and through New York on their business or vacation. Just like the presence of highways, which the residents and visitors of the city use to get to their place of destination faster and at a better pace.

Besides constant work, the residents of New York, just like the resident of any city, require a place where they can get fresh foods like the Food Market. One can, of course, buy them at the supermarket; however, it is important to have some greengroceries that would provide fresh locally raised "organic" that would not only fruits and vegetables that would not only provide residents with healthy nutrition, but would also bring certain aesthetic value to a neighborhood.

Amount of Shade and the amount of Sunlight are two factors that allow the people to feel enough comfort to continue working and living in the fast pace of the city. These two factors go hand in hand with elevation and elevation ranges, "trees", "trees in autumn", and "parks as designated territories". In the immense hustle and the bustle of New York, its residents need a location or a place where they can rest and restore their energy. Most people in New York come home mostly to spend the night and live their lives out in the City, so the city must provide them with everything necessary for their basic functioning and rest.

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Access to coastlines and beaches also provides excellent recreational possibilities, just as access to greens such as grass and green roof gardens. Snow is important as it allows the New York residents and visitors of New York to look at the same Urban Space from a different perspective and use it under different conditions. One more factor plays an important role in the psyche of the person, which is the access to the visible sky. Being constantly surrounded by numerous skyscrapers has a detrimental effect on the person, as the person might feel oneself in a cage. Thus, the visibility of the sky will make the person feel better.

As New York is a large city with a population of millions, the level of Crime, or the Crime Rate factor, adds to the comfortable dwelling and living of the person within the city limits. The presence of the police department is important, too, as the level of professionalism of the police officers and also their quantity does influence the level of the crime rate and its potential to decrease.

Physiological needs are not only those that are formed by nature but also some needs, designed by culture, human life in a certain environment, repeated patterns of behavior. A person has a natural need for food, but it can be transformed into gluttony, finickiness, and fastidiousness. These new social additions to natural needs can be just as inexorable in their urges, as are the basic physiological needs (Adler, 1977). Physical needs act as motives for people's

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behavior, being decoded with the help of cultural codes, assimilated by an individual (Maslow, 1969). This means that the same need is satisfied in different cultures in different ways. Realizing the need for food, the individual prepares dishes that are accepted in his culture, has drinks that are typical for this culture (Maslow, 1969). A hungry person dreams of eating, but in different cultures, different dishes pop up in the imagination. Faced with pain, one decodes the signal sent by the body, based on his ideas about his body. In different epochs and in different countries the same symptoms are decoded in different ways, respectively, they react differently and react.

3.3.2. Safety

The level of safety concerns safety-seeking mechanism/tools, world outlook, future, "new, unfamiliar, strange, unmanageable stimuli or situations will too frequently elicit the danger or terror reaction" (Chulef, Read, & Walsh, 2001). This group includes the needs in the individuals' security and stability. To understand the essence, one can consider the example of children. While still in the unconscious age of a toddler, on a subconscious level child seek, after satisfying their thirst and hunger, protection (Chulef, Read, & Walsh, 2001). And only a loving mother can give them such a feeling (Maslow, 1970). In a different,

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somewhat milder form, the situation is similar to adults as for reasons of safety they seek, for example, to insure their lives, install solid doors, put locks, etc.

More so, the high population density in the central areas of large cities leads to an increase in crime and vandalism, and also makes such areas the main target of terrorists. This has a direct impact on the economy, politics and personal wellbeing of people. For urban control, security solutions that do not interfere with people's interests are needed. Additionally, a consideration of a wide range of vulnerabilities, procedures, and systems by various emergency services (police, fire, ambulance, emergency services, etc.) are to be taken into account (Zimbardo and Gerrig, 1999). The security and safety of the city concern all factors aimed at protection of the population, the material and spiritual values of the city from possible damage, allowing to maintain the ability of the normal functioning of urban life support systems, to maintain a decent standard of living of citizens (Zimbardo and Gerrig, 1999). Besides, this also concerns the stability of economic, socio-political situation, favorable ecologic, demographic, technogenic, moral, social and psychological conditions of the city development. There is the constant danger of causing damage to the material and spiritual values of the city, legal entities located in the city, and individuals permanently or temporarily located on its territory (Franken, 2001). Safety and security are a unity of socio-economic,

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political, legal, organizational and technical, special, moral, psychological, information-analytical and other steps taken by those responsible for the safety of the people (Franken, 2001).

Considering the factors that have been determined for analysis, almost each has to be considered from the perspective of safety, as every stage of human action, as well as the development of a city, has an immense amount of dangers to the well-being of the person within this city. This is why the following factors are to be considered:

Air Pollution, Airports, Amount of Shades, Amount of Sunlight, Amount of Visible Space, Bridges, CITI Bike Station, Commercial Light (Night), Crime Rates, Elevation Ranges, Elevation, Fire Department, Fresh Water, Green Roofs/Grass, High School/Educational Facility, Highways, Hospital, Oceanic Water, Parking Lots, Parks as a designated Territory, Police Department, Protected Bike Path, Rail Roads, Trees, Trees Blooming, Visible Sky and Waste Facility.

3.3.3. Love/Belongingness

At this level, love and belongingness refers to the social needs of the person. It finds reflection in such aspirations as to how to make new acquaintances, find friends and a partner in life, to be involved in a group of people (Hoffman, 1999). A person needs to show love and receive it in relation to himself. In a social

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environment, a person can feel his usefulness and significance. This is what motivates people to meet social needs (Pervin and John, 2001)

At this stage, one observes the appearance of the market of services for organizing communication (Pervin and John, 2001). Around the town appear various clubs, restaurants and cafes, recreation zones, public organizations, etc. Here the people develop nationalistic and patriotic feelings, various kinds of national movements appear (Hoffman, 1999). "It's extremely important for a person to know that one lives in his homeland, at home, next to those people close to him and those who understand him, that he is surrounded by" his own ", that he belongs to a certain clan," (Maslow, 1999). Of course, this may cause irritation about the "aliens", namely foreigners and immigrants, that surround oneself in your hometown, speak an incomprehensible language, follow strange customs, eat and drink something different from what the locals are used to (Poston, 2009). On the other hand, immigrants have a desire to be closer to their own, to the reproduction of the traditional national lifestyle, the cultivation of national cuisine, clothing elements, and other aspects of culture in a foreign country. New York is the best place as it is the heart of the multicultural nation that America is. More so, New York is a gateway to America, through which a whole multitude of people has come into the country.

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3.3.4. Esteem

This is the stability, "adequacy, for confidence in the face of the world, and for independence and freedom." After a person satisfies the need for love and belonging to the society, the immediate impact of others is reduced, and the focus is on the desire to be respected, the desire for prestige and recognition of the various manifestations of one's personality (talents, characteristics, skills, etc.) (Wahba and Bridewell, 1976). Only in the case of successful realization of one's potential and after reaching someone's recognition, it comes to the person's self-confidence and own strength. Everyone needs to assess the society's merits (Larsen and Buss, 2002). The need for recognition in Maslow will be divided into a person's desire for achievements and reputation (Wahba and Bridewell, 1976). Having achieved something in life and earned a certain reputation, a person becomes confident in oneself and personal abilities. Not achieving the fulfillment of this need, as a rule, leads to weakness, depression, a sense of despondency can lead to irreversible consequences (Larsen and Buss, 2002).

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3.3.5. Self-Actualization

This stage is last and there are spiritual needs expressed in one's desire to develop as a person or to develop one's spirit, and also to continue to realize one's potential. As a consequence one becomes open to creative activities, starts to attend cultural events, has the desire to develop one's talents and abilities (Koltko-Rivera, 2004). In addition, a person who has managed to satisfy the needs of the previous steps and has reached the fifth level begins to actively seek the meaning of life, study the world around him, to try to contribute to it, even may begin to form new views and beliefs (Zimbardo and Gerrig, 1999). Considering the aesthetic perception of urban spaces in New York, it is impossible to consider the previously determined factors in this context. A musician must make music, an artist must paint, a poet must write if he is to be ultimately happy. However, this state of happiness is in no way characterized by the urban surrounding.

These five points, or rather stages, comprise the whole pyramid, that is, the hierarchy of Maslow's needs. As the creator of the theory of motivation himself noted, these steps are not as stable as they seem. There are people whose order of needs is an exception to the rules of the pyramid. For example, for someone self-affirmation, the realization of one's needs in love and relationships are more important.

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The achievement of success depends on the person trying. Another example is of the people focused on their careers. Naturally, many scientists challenge the pyramid of Maslow's needs. And the main concerns are not about the instability of the psychological approach suggested by Maslow, but the presence of numerous non-standard situations. For example, during a war or in extreme poverty, people manage to create great works and perform heroic deeds. Thus, Maslow's critics have tried to prove him wrong by trying to prove that even without satisfying their basic and basic needs, people can realize their potential. However, Maslow is considering the average person in normal surroundings, which is why his pyramid of needs can be applied to the research on the Aesthetic Perception of Urban Spaces in New York.

3.4. Factor Analysis

Air Pollution (Negative)

People would not be able to live without air, as it is the most vital component for human metabolism. The human brain, just as an average person will die without an external exchange of CO_2 and O_2 for more than 5 to 7 minutes. Although oxygen is distributed evenly throughout the atmosphere, the other air components are not. Some of these components are very harmful and can

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significantly affect human's health. Therefore, on the behalf of air, we shall consider air quality as a factor that will affect aesthetic perception of urban spaces.

Physiological needs	In the vicinity of the city the air quality that the people breathe constitute the most basic physiologic need for normal functioning of the person required for normal homeostasis.
Safety	Polluted air causes numerous health-related issues, as well as causing discomfort.
Love and Belongingness	Not applicable.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Airports (Negative)

NYC MSA has three major airports: JFK, Newark, and LaGuardia. NYC is considered a major transportation hub, and millions of passengers pass through its airports annually. An airport is a structure that passengers first see upon arrival and thus it must be considered as such that will affect aesthetic perception of urban spaces. Even though the airports are important for transportation purposes, they also bring negative effects on the urban aesthetics. First, air pollution is caused by airplanes. Second, negative impact is noise pollution: an aircraft at takeoff produces a loud sound that can reach up to 200 dB within 200 feet (Branch, 1970).

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Physiological needs	The airport is an important structure and is part of the NYC transport system. It is a vital element in the homeostasis and normal functioning of the entire city.
Safety	The airport has an increased level of security measures which are necessary to protect the city from undesired elements (e.g. potential terrorist threat or illegal immigrants) (Adler, 1977)
Love and Belongingness	People meet their arrivals showing signs of affection, love and allowing those who are arriving to have a sense of belongingness.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Amount of Shade (1/4) and Amount of Sunlight (3/4)

These two factors ought to be considered together. The amount of shade and the amount of sunlight are two factors that allow the people to feel enough comfort to continue working and living in the fast pace of the city. The sun facilitates the development of vitamin D in the body, just as shade allows people to cool down.

	Amount of Shades	**Amount of Sunlight**
Physiological needs	Important as it facilitates a comfortable lifestyle of each individual	Important as it facilitates a comfortable lifestyle of each individual
Safety	Allows a better protection from the sun	Provides sunlight
Love and Belongingness	Not applicable	Allows for couples and individuals to spend time together in the park developing their relationships
Esteem	Not applicable	Generally means good weather improving the mood of the individual
Self-	Not applicable	Not applicable

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Actualization		

Amount of Visible Space

The presence of visible spaces allows the person to feel a sense of freedom and not be too caught up in the routine one can easily find oneself. At the same time the presence of visible spaces, allow the person to look around often and be aware of anything approaching. This parameter allows one to control safety and feel secure.

Physiological needs	Not applicable
Safety	The presence of visible space allows one to make a proper assessment of the approaching danger and allows time for proper action. These visible spaces tend to be less congested, thus decreasing the danger of a terrorist strike.
Love and Belongingness	Not applicable.
Esteem	Visible spaces presuppose a potential for development, as well as a thoughtful strategy in city planning.
Self-Actualization	Not applicable.

Bridges

Bridges are an important element in the NYC transportation infrastructure. Since four of the five boroughs are on islands, they are connected by bridges and

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tunnels. Besides, some of the bridges, like the Brooklyn Bridge, are world famous and are must-see places for tourists.

Physiological needs	Not applicable
Safety	The presence of a bridge facilitates a safe crossing of the river or entry and exit to Manhattan. At the same time a bridge is a strategic aspect of road-and-street infrastructure as it allows a swifter access to various areas of the city.
Love and Belongingness	Bridges are favorite places for couples to make photos as they are perceived among the top romantic places in the City.
Esteem	Not applicable.
Self-Actualization	Not applicable.

CITI Bike Stations

Subways, buses, and cars don't completely meet the transportation needs of New Yorkers, who have another option, which is to rent a bicycle. The CITI Bike Stations allow one to do just that. This facilitates ease of transportation of an individual in NYC.

Physiological needs	Not applicable
Safety	The bicycle can be safer than the car or bus. The subway can have accidents or can become a target of terrorists.
Love and Belongingness	The CITI Bike system provides membership for a fee nurturing a sense of belongingness
Esteem	Those using a bicycle instead of the car not only keep themselves fit, but also help to decrease the carbon footprint of NYC
Self-Actualization	Not applicable.

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Commercial Light (Night) (1/2)

Once the center of the neon lights universe was Times Square, however huge flat screens replaced glass tubes filled with gas from the walls of surrounding buildings, and now they can be found only on the walls, shop windows and signs of some shops and restaurants of the city. Fortunately, despite the fact that the trend has already passed, New York is filled with their cozy light. Besides, these lights constantly advertise something for people to buy.

Physiological needs	Not applicable
Safety	The commercial lights add to the public lighting system allowing increasing visibility during the night, as well as attracting attention of the police patrolling the area.
Love and Belongingness	Commercial lights, especially neon lights, add to the romantic flair making the atmosphere in New York unique and one to remember
Esteem	Having commercial lights around New York helps maintain the perception of the city as the world's center of trade and commerce.
Self-Actualization	Not applicable.

Crime Rates (Negative)

Although NYC has a low crime rate relative to its population size, crime still must be considered as it directly affects the well-being and safety of the people. An

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increase in the crime rate would adversely affect almost every sphere of the individual's life in the Big Apple.

Physiological needs	In order for the normal functioning of the people, the crime rates must be as low as possible (Koltko-Rivera, 2004).
Safety	The increase of crime rates destabilizes the situation and people lose a sense of security.
Love and Belongingness	Although, generally, the increase of crime rates presupposes the growth of gangs, which do nurture a sense of belongingness, a high crime rate prevents the development of normal love relationships.
Esteem	
Self-Actualization	Not applicable.

Elevation Ranges* and Elevation

The maximum and minimum height when compared with the sea level provides important data on the overall location of the city. Considering the difference of levels, one will be able to make calculations as to overall and specific Elevation of the city. This is important as it allows determining the potential weather in the corresponding region of the city.

Physiological needs	The geographical difference in the elevation of the NYC areas allows the air that people breathe to be more or less diversified in terms of the cleaning cycle.
Safety	Due to the presence of higher ground, city residents who live at sea level can be moved to safety in case of hurricanes and other flood events.
Love and Belongingness	The elevations in NYC provide the residents and visitors with numerous romantic places that provide a

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	great overview of almost the entire city.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Fire Department

Each city will inevitably encounter certain risks in the form of natural cataclysms. The Fire Department has its aim to prevent, or as a case of last resort to save the people from potential danger situations.

Physiological needs	Not applicable.
Safety	The fire department and firemen work to provide maximum security from fire to all residents of NYC.
Love and Belongingness	The care and attitude of the firemen toward anyone in trouble evokes admiration, thus it is difficult to pass by the fire department with scorn or hate.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Flower Shops and Flowers (1/2- parks)

Parks and other recreational areas are very important for cities. This is enhanced by flowers and flower shops.

Physiological needs	Not applicable.
Safety	Not applicable.
Love and Belongingness	Flowers as a symbol of a deep and nurturing feeling causes millions of people to buy them and present to their loved ones.
Esteem	A flower shop is a stable business allowing hundreds of florists in NYC to earn a living.
Self-Actualization	Not applicable.

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Food Market and Fresh Water

In order to keep the human body alive we must both eat and drink. Food markets provide a source of nutrition, whereas the presence of fresh water is vital for human health and survival (Larsen & Buss, 2002).

Physiological needs	People need to eat to restore energy; otherwise starvation will be followed by imminent death. Without fresh water people might get sick and will eventually die of dehydration. Thus this is most vital to human survival.
Safety	Food must meet safety and quality standards, and food markets are also held to high cleanliness standards. If the water would be poisoned this would wipe out the entire population of NYC.
Love and Belongingness	By simply going to the market or purchasing fresh water in the store, one inevitably meets other people. A lot of relationships are made in stores and supermarkets where people meet as if by chance.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Art Galleries

Besides food for the body to keep one going, one needs food for the mind. Cultural development can be achieved through attending art galleries. Observing the works of many artists, one can learn to distinguish between art pieces and increase cultural appreciation.

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Physiological needs	Not applicable.
Safety	Not applicable.
Love and Belongingness	Galleries are a fantastic place for a date where the relationship of a couple, or a potential date might evolve to a new level.
Esteem	Thousands of artists have put their feelings on canvas or into their masterpieces for others to see and observe in galleries.
Self-Actualization	Not applicable.

Green Roofs/Grass

Green roofs are one of the innovative solutions to fight air pollution within the limits of a congested city. In addition to the presence of Central Park and numerous squares, green roofs and access of New Yorkers to grass will have a positive effect on the health and lifestyle of people. The implementation of various systems, such as rain collection, sprinkler, and ventilation, can improve the habitat and living conditions of the entire house.

Physiological needs	This is an innovative alternative contributing to the city's with sustainability.
Safety	The more oxygen there is the more secure a person feels. Thus, the greener roofs/grass there is, the more oxygen NYC residents get.
Love and Belongingness	Perfect place for resting and a get-together
Esteem	Green roofs are non-conventional, and each has a unique design. Thus the artistic qualities are demonstrated in full.
Self-Actualization	Not applicable.

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Gymnasium

In a contemporary economy, many people have a job where they sit in front of a computer and work with minimum movement and activity. Gymnasiums, or "gyms," are vital to keeping one fit and healthy.

Physiological needs	An individual needs to stay fit and healthy.
Safety	Not applicable.
Love and Belongingness	Millions of people go to the gym to stay fit. Hundreds of relationships form there. More so, the membership in many gyms creates a sense of belongingness.
Esteem	Allows each person to stay fit and achieve something more with one's body.
Self-Actualization	Not applicable.

High School/Educational Facility

The aim of education is not limited to further successful employment (Chulef, Read & Walsh, 2001). Education serves as a social lift, a tool for integrating an individual into society both as a professional and expert, and as a self-thinking person. Such people are often critical thinkers and socially active, which stimulates development and change.

Physiological needs	Not applicable.
Safety	School in NYC is a way out for thousands of children making them stay out of the streets and not do anything criminal.
Love and Belongingness	Schools evoke a feeling of belongingness and being part of something big.
Esteem	Graduation and achieving a degree evokes a feeling of

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	a large accomplishment, thus increasing one's esteem.
Self-Actualization	Not applicable.

Highways (Negative)

The highways are an important element in the transportation system of NYC, allowing an individual access to various points in the city over a shorter time frame. However, due to the fact that NYC is densely congested with buildings and small roads, there are fewer options for building these additional highways.

Physiological needs	Allows residents to move around faster
Safety	High speed and frequent violations of the rules must be watched out for.
Love and Belongingness	Not applicable.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Hospital

Hospitals are integral to urban life. (Franken, 2001). One turns to doctors for advice, prescriptions, medication, and checkups. Hospitals are essential for times when personal physicians are not enough to address significant medical needs.

Physiological needs	Being treated by the doctor is a case of necessity in the event of an illness, thus being a basic physiological need.
Safety	Hospitals provide care and treatment able to save a patient's life.

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Love and Belongingness	The loving care and treatment, as well as high level of attention one receives from doctors and nurses are felt by the patient.
Esteem	Surviving an illness, living through an operation, or, if a health care provider proving quality care, can build self-esteem.
Self-Actualization	Not applicable.

Landmark Districts

Every city has certain sights or landmarks that are often visited by tourists. NYC has districts of such landmarks, annually attracting millions who contribute a substantial amount of money that funds the city budget.

Physiological needs	Not applicable.
Safety	Not applicable.
Love and Belongingness	A perfect place for sightseeing, getting to know the city or other people around one.
Esteem	Various landmarks are works of art, whose artists have achieved popularity as their legacy is well appreciated.
Self-Actualization	Not applicable.

Libraries

Libraries play an important role in increasing the cultural level of the individual. By means of providing access to books, textbooks, and other media, libraries are able to give residents knowledge that might even be unavailable in school or other educational establishments.

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Physiological needs	Not applicable.
Safety	Not applicable.
Love and Belongingness	Borrowing from libraries requires membership. This promotes a feeling of belongingness.
Esteem	Libraries allow visitors to gain more knowledge and thus increase one's self-esteem.
Self-Actualization	Not applicable.

Theaters

Theaters provide citizens with a possibility to increase their cultural experiences within the city. Additionally, theaters are great magnets for tourists.

Physiological needs	Not applicable.
Safety	Not applicable.
Love and Belongingness	Although museums do not require membership, museum goers are a special type of people as they go to museums for the love of knowledge
Esteem	Going to a museum and seeing all of the exhibits can be considered as an accomplishment today.
Self-Actualization	Not applicable.

Parking Lots (Negative)

Although parking lots are necessary in a city, they take up a substantial amount of space, and there is Limited Street parking available in NYC. This is a negative factor, especially since the price for parking in much of Manhattan is very high.

Physiological needs	Not applicable.
Safety	The availability of a parking lot increases the perception of safety.
Love and	Not applicable.

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Belongingness	
Esteem	Not applicable.
Self-Actualization	Not applicable.

Parks as a Designated Territory

The recreational zone of parks is especially important to the citizens of NYC. Not only do they provide the perfect place for walking, jogging, and generally resting, but also the park provides an ecosystem to its non-human inhabitants living in the city.

Physiological needs	Availability of this recreation area has a positive effect on the human mind and body.
Safety	This is a green area producing oxygen for the city.
Love and Belongingness	Perfect place for meeting someone, or bring to a date. Concerts venues are frequently organized in parks.
Esteem	Park zones are considered recreation zones, thus, their presence are an accomplishment of the city authorities and people who have managed to protect the area from construction.
Self-Actualization	Not applicable.

Police Department

The aim of the police department is to uphold law and order. By patrolling the streets, the police officers attempt to provide security for every citizen. In case of necessity they investigate a crime so as to find the potentially guilty person and bring him/her to justice.

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Physiological needs	They maintain law and order, which is required for the security of NYC residents.
Safety	Police Department is required to maintain order and provide security from all types of threats.
Love and Belongingness	Police officers belong to an organization where each and every one of them is willing to help a colleague in danger, as well as any other NYC resident.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Protected Bike Paths

Although this is considered an element of the NYC street system, the number of protected bike paths is still limited. Most often cyclists use the general streets to get around. Nonetheless, in places where they are present, cyclists feel secure and protected from traffic.

Physiological needs	Not applicable
Safety	The bicycle can be safer than the car or bus. The subway can have accidents, or can become a target of terrorists.
Love and Belongingness	Cyclists are a group that has emanated a sense of belongingness due to their mode of transportation.
Esteem	Those using a bicycle instead of the car not only keep themselves fit, but also help to decrease the carbon footprint of NYC
Self-Actualization	Not applicable.

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Railroads (Negative)

The immense cost of railroads and their relatively high passenger flow have made this means of transportation challenging. With large numbers of the city's workers commuting via rail, this remains an important component of the city's transportation infrastructure.

Physiological needs	Not applicable.
Safety	Using a railroad or commuting next to it (driving, riding, and cycling) can be dangerous, as although the crossings are regulated, the high speed is still a danger to the surrounding area.
Love and Belongingness	Today people are still fascinated by trains.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Snow (1/24)

Precipitation in the form of snow can paralyze traffic. At the same time, many residents love snow, as this is an opportunity for them to do something different.

Physiological needs	Precipitation is required for the surrounding area. New York's primary freshwater source is from regional snowmelt north of the city.
Safety	Not applicable.
Love and Belongingness	Not applicable.
Esteem	Snow usually means winter, when everyone is in a holiday mood and a sense of accomplishing something over the year is present.
Self-Actualization	Not applicable.

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Trees

The vegetative world of the Earth is huge, and trees are the most essential inhabitants of our green planet. Without these plants, the life of mankind and the animal world would be unsustainable. A diversity of trees adds to tree and human health.

Physiological needs	Trees are required for the surrounding. Production of oxygen and exchange with CO_2 maintains a healthy atmosphere.
Safety	The presence of trees allows people to breathe.
Love and Belongingness	Nature is beautiful, and so are the trees that are planted around NYC in parks and along streets and sidewalks.
Esteem	Not applicable.
Self-Actualization	Not applicable.

Trees in Autumn (1/6)

The foliage of trees in autumn is beautiful but leaving dead leaves uncollected can be harmful to one's health. Pollutants absorbed by leaves can enter the groundwater. Additionally, higher levels of carbonic acid from decomposing leaves can affect the infrastructure below street level.

Physiological needs	Constitute a change of cycle and the approach of the new season.
Safety	Not applicable.
Love and	Autumn leaves are a great background for

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Belongingness	photographers. The parks are beautiful in this season.
Esteem	Fallen leaves can make people think aboutthe way the tree sheds its own leaves (problems) and starts life anew in the spring.
Self-Actualization	Not applicable.

Trees Blooming (1/24)

Flowering trees are most beautiful when blooming. However, those people who are allergic to them suffer immensely. The trees, nonetheless, attract millions of people and insects, creating a pretty picture.

Physiological needs	Not applicable.
Safety	Allergies are an issue to be considered when approaching blooming trees.
Love and Belongingness	Trees bloom in spring, which is considered the most romantic period in the year when most of the relationships are started.
Esteem	The blooming trees make people think about life from a new perspective.
Self-Actualization	Not applicable.

Visible Sky*

In NYC the issue of visible sky is most acute in downtown Manhattan. The concentration of skyscrapers has almost entirely blocked the city skyline as if trapping people within and limiting their freedom (Zimbardo & Gerrig, 1999). In other areas of NYC the visibility of the sky is also somewhat limited due to light pollution and new construction of skyscrapers in other parts of the city.

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Physiological needs	People must not feel lack of freedom, which is why the visible sky is important.
Safety	Abundance of skyscrapers in NYC constitutes a potential danger of something falling from above, or even an airplane rocketing into a building.
Love and Belongingness	The sky has always been thought of in a romantic way. The visible sky allows one to see the stars and thus dream on and enjoy the beautiful creation.
Esteem	Having a visible sky over one's head can be considered an achievement.
Self-Actualization	Not applicable.

Waste Facility (Negative)

Today, residents of New York throw away 1.5 million pounds of plastic bottles, 460 thousand pounds of cardboard, 440 tons of metal cans, and 84,000 tons of other garbage weekly.

Physiological needs	People need a clean area and city that would not be polluted. Thus a waste facility is a requirement.
Safety	The city buries its garbage, but transporting it contributes to air pollution.
Love and Belongingness	Not applicable.
Esteem	Not applicable.
Self-Actualization	Not applicable.

The pyramid of Maslow's needs is challenged by many scientists. The main concerns are not about the instability of the psychological approach suggested by Maslow, but the presence of numerous non-standard situations. For example

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during a war or in extreme poverty, people manage to create great works and perform heroic deeds (Maslow, 1969). Thus, Maslow's critics have tried to prove him wrong by showing that even without satisfying their basic and basic needs, people have realized their potential (Wahba & Bridewel, 1976). However, Maslow is taking the average man in normal surroundings (Maslow, 1970; 1999), which is why his pyramid of needs is being used for this research on the Aesthetic Perception of Urban Spaces in New York.

3.5 GIS Operationand Data Sources

One of the goals for the current thesis was to use software and data accessible to the general public. Therefore, QGIS was chosen as free software, available to anyone, who needs to use GIS.

Each of the aforementioned factors is represented in an individual GIS layer. Every factor has its geographical influential distribution and therefore every factor ought to be analyzed separately. Due to the time limitation, some of the factors were excluded. For best reviewing, all of geographical influences are combined in a spreadsheet table (Table 6).

To use all of the GIS layers in one system, all layers were in raster format, with data, standardized all from "0" to "1". In order to standardize the raster file, I used standard arithmetic formula (1), which was employed in the raster

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calculator. The second step was to introduce each distribution of factors into the Aesthetic Model, by multiplying the standardized raster dataset by a calculated weight in the AHP model (2). And lastly, all of the weighted GIS layers were added in raster calculator (3), and as a result of the calculation, we have a Map of Aesthetic perception of Urban Spaces, based on Maslow's Hierarchy of Needs.

$$\boldsymbol{y = \frac{x - x_{min}}{x_{max} - x_{min}}, 0 \leq y \leq 1} \textbf{ (1)}$$

$$\boldsymbol{y_{f_n} = y \times f_n} \textbf{ (2)}$$

$$\boldsymbol{A = y_{f_1} + y_{f_2} + \cdots + y_{f_n}} \textbf{(3)}$$

Where:

Y – standardized segment [0,1],

X – a value of the raster dataset

x_{max} – the largest value in the raster dataset

x_{min} – the smallest value in the raster dataset.

f_n- calculated coefficient of Aesthetic influence for a particular factor, based on the Aesthetic model

y_{fn} – weighted raster dataset for a particular factor

A – Aesthetic Perception of urban spaces, $0 \leq A \leq 1$

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Most of data for the current project had come from sources available to general public. For clear understanding and visualization, the all data sources are combined into one table (Appendix 1). All data can be generally organized in the following categories:

1. Physical Geography (topography, elevation ranges, sunshine/sunshade, oceanic water, lakes, creeks, trees). The topography raster dataset is a base layer for many geographical factors. For example, it was used to calculate the amount of visible space, amount of visible sky, sunshine/sunshade, and elevation ranges.
2. Socio-Economic Geography (Schools, Fire department, police stations, hospitals, waste facilities, museums, etc.). NYC OPANDATA has a free dataset "facilities" in CSV format, and by massaging data with filters in Microsoft Excel, multiple files were created that later were visualized with geolocations option in QSIS. These were used to create fixed distance buffers, according to the geographical influence of a certain amenity (ATT). The underlying factors for determining a geographical influence were comfortable walking distance (200 feet), walking distance (400 feet),

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walking distance (1,000 feet), safety awareness distance (1,000-2,000 feet).

3. Psychological Geography (amount of visible space, amount of visible sky, crime rates). The psychological component for the geographical distribution of the certain factor can be determined from stereotypes that are often used in real estate companies for marketing of a particular property ("million-dollar view," "walking distance to a park," "belonging to an historical district" and so on.)
4. Environmental geography (distance to hazardous facilities, air pollution). Every year people are getting more aware of many negative environmental impacts on them and the landscape, and it certainly can influence the aesthetic perception of any spaces. Many negative environmental actors are not visible, and some people might argue that they do not have any influence on the perception of a certain landscape. However, conscious (and socially unconscious) awareness of a negative impact can have a tremendous effect on the understanding of space. Air quality (pollution, smell, colour, visibility, radiation) and water quality (pollution, smell, color, visibility, radiation, temperature, healthy biota) can be generalized in factorial source of the qualitative characteristic.

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It should be noted that these general characteristics have certain interconnectedness and therefore, it is only a relative classification. Since the beginning of the project, more data has become available. For instance, in 2015 there were no open data for the freshwater hydrological map available to use, and therefore it was manually drawn from Google satellite extension in QGIS. In 2017, OPENDATA made a shapefile downloadable, making the analysis easier.

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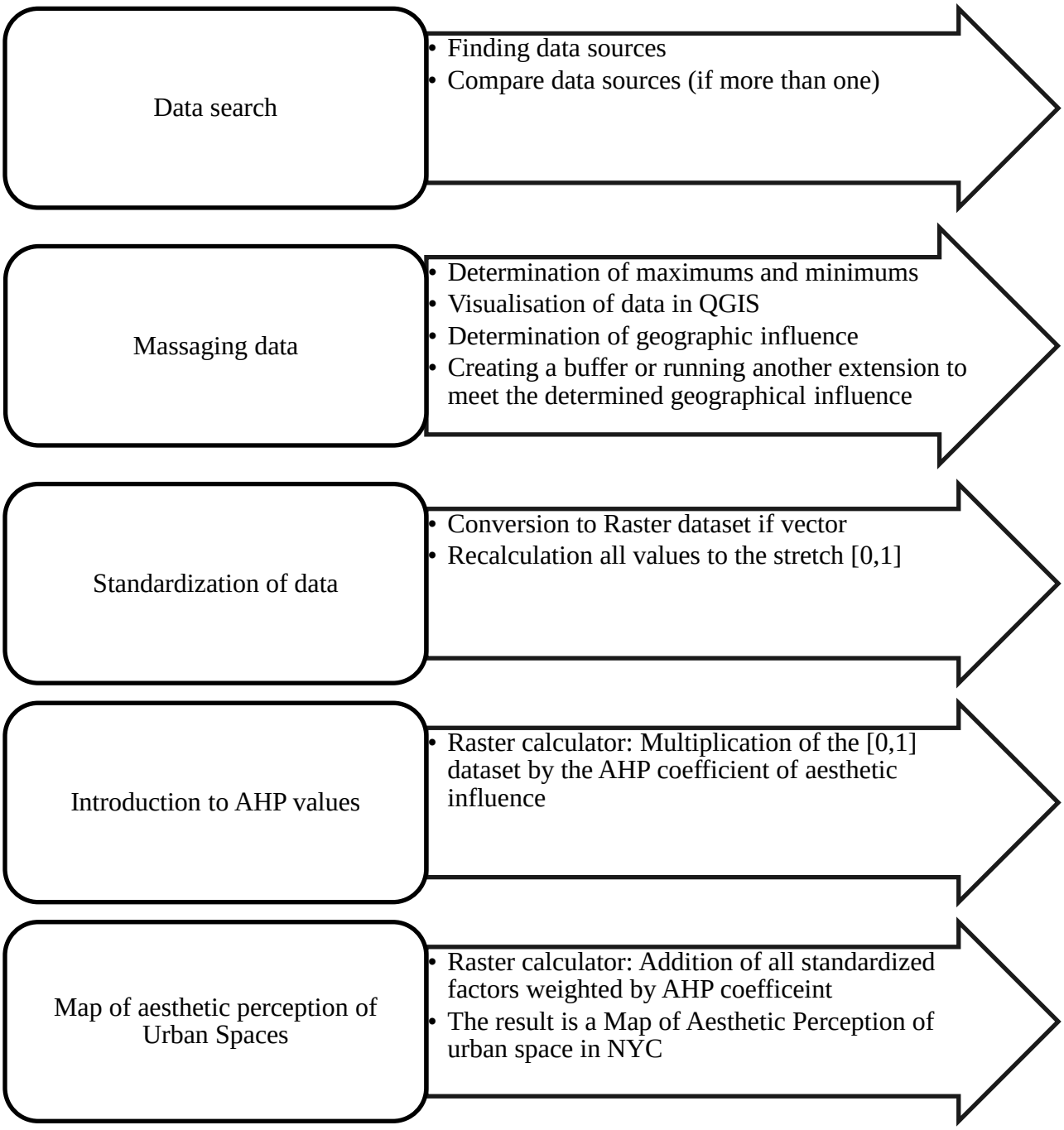

FIGURE 10. GIS Procedure

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CHAPTER 4: Results

4.1. Introduction to Results

Assessing aesthetic perception of urban spaces for the current work was a multi-step process. First, it is important to review all possible influential factors. Thirty-seven factors have been chosen for the analysis. Second, the Analytical Hierarchy Process (AHP) was used to relate and weigh all factors against each other, where the sum of the coefficients (weights) equaled 1. Third, each factor was introduced into the QGIS layer. There were 28 factors employed for the current thesis. Fourth, each factor was standardized in the format [0; 1] and multiplied by a calculated AHP coefficient. Fifth, all layers that represent factors were combined (added), and the result was a Map of Aesthetic Perception of Urban Spaces: New York City. The map shows the areas where the aesthetics of urban landscapes are likely to be perceived positively or negatively. The next section will demonstrate certain aspects of the final result—the maps.

4.2. Interpretation of results

The Maps of Aesthetic Perception of Urban Spaces: NYC (MAPUS) are a combination of influential factors that originally mean to show values from 0—minimum—to 1—maximum—values. However, there are no places in NYC where

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all of the positive factors have influence, or where none of the factors have influence. The maximum calculated value on the raster dataset is 0.89—the Empire State Building—and the minimum is 0.001—a small area at John F. Kennedy International Airport. It should be noted that, theoretically, it is possible to have a negative value on the map [max -0.115], because some of the factors have a negative impact (proximity to waste facility, nearness to highways, railroads). In future research it can be fixed in the Raster Calculator (N)—which will create a map of spaces with no negative influence.

$$y = x + x_{min}(\mathrm{N})$$

The MAPUS demonstrates many areas where the aesthetic perception is more or less possible. Of course, in the historic perspective the results may have been different due to area development; therefore, let us examine some of these pre-determined areas from the perspective of the present.

Each MAPUS has three general categories of aesthetic value:

1. High [0.6-1.0]
2. Medium [0.4-0.5]

Low [0.0-0.3]

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4.2.1 Manhattan (North)

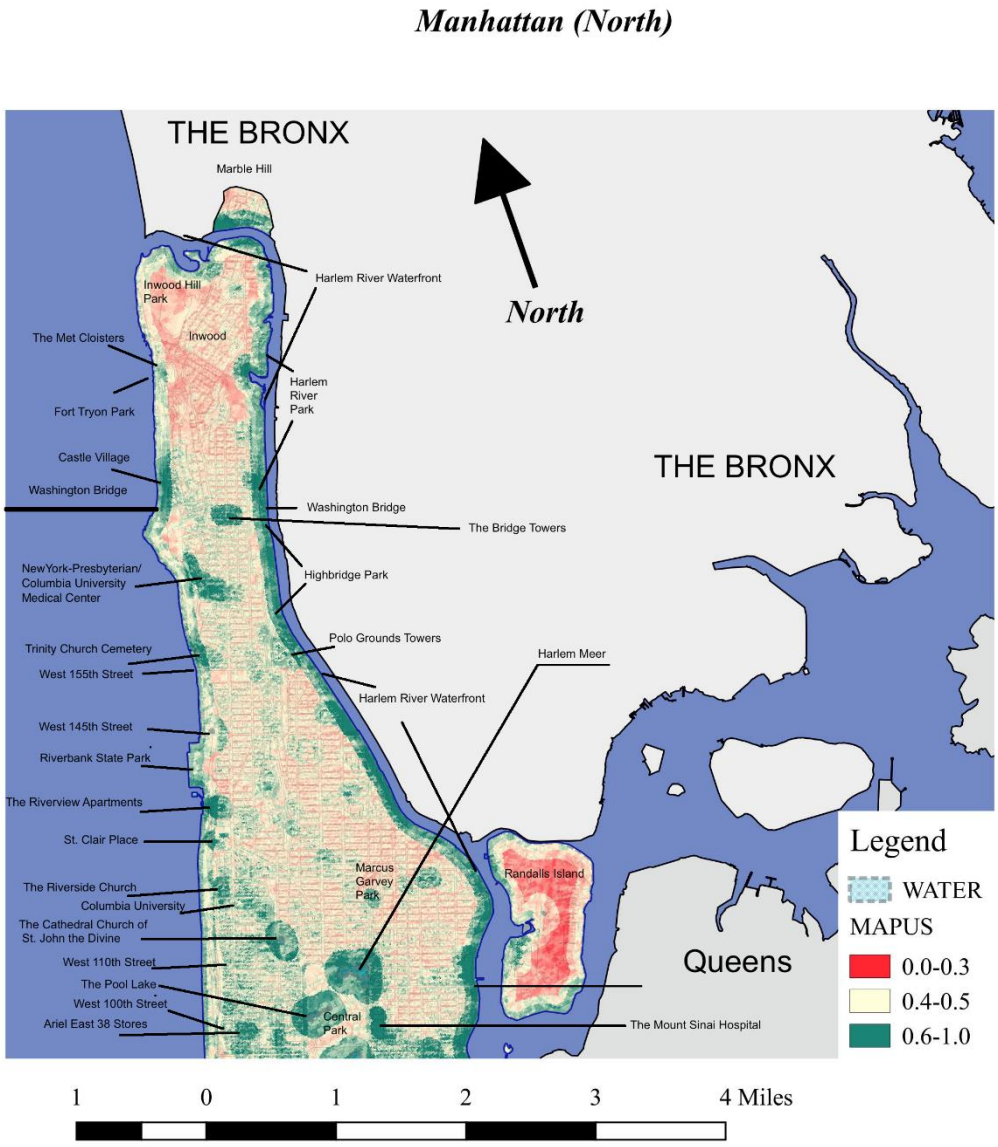

FIGURE 11 MAPUS MANHATTAN (NORTH)

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Manhattan (North) is the first map in the Results section. It shows multiple outlines of neighborhoods. The highest scores of the MAPUS (0.6-1.0) are along the Hudson and Harlem rivers. Close proximity to water and the amount of space one can see make these areas stand out from the other selected areas. However, the open railroad and the Henry Hudson Parkway, which lower the overall aesthetic value of the area, significantly affect the Hudson River side.

Another outstanding area is the Upper West Side, bracketed by the Riverside Church, Columbia University, the Cathedral Church of St. John the Divine, Central Park, and the Hudson River. This area has a higher elevation in relation to its surrounding areas. There are many other clusters, which are calculated using different criteria, such as the view of the George Washington Bridge, large open spaces, and close proximity to different parks. The map indicates certain exceptional clusters of aesthetic value, such as the Church of St. John the Divine, which has an outstandingly high score in the northern part of the Central Park area [0.8]. The area gained its value due to its close proximity to Morningside Park, a high average aesthetic influence of social factors, and the size of the cathedral.

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Although the largest part of Manhattan (North) has a mostly homogeneous outcome with a medium score of 0.4-0.5, it should be noted that even within one city block the difference varies, from 0.2 to 0.5. Such fluctuations can be due to factors that include the amount of space one can see and close proximity to a college, university, or even a small church. The relatively even distribution of average scores suggests that Manhattan (North) is developed consistently in terms of infrastructure and other aesthetically significant factors.

The lower score of 0.3 is in Inwood, and is due to the absence of art galleries and Citi Bike stations. In addition Inwood has a gap between hospitals; heavy traffic on Broadway, which links via a bridge to the Bronx; and a large train depot on its western boundary.

The lowest MAPUS scores, except for the waterfront, are on Randall's Island, which does not have any urban infrastructure to fulfill aesthetic needs.

Another interesting part of the Manhattan (North) map is the Harlem River. The Dawning Village Complex received a calculated value of 0.85, the highest in East Harlem. On the east side of the Harlem River is situated Randall's Island, which has scores from 0.1 to 0.75, a sizable range within areas of close proximity. This difference, however, is justified by the presence or absence of all the considered factors at the same time. However, it is important to note that some

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of the factors are located in Manhattan, which is separated from the Randall's Island by a body of water. The two islands are connected by the Wards Island Bridge, a pedestrian crossing, and the Robert F. Kennedy Bridge, a tollway. Therefore, the "walking" fixed-distance buffer, calculated around socially important amenities, can give a false representation of the landscape, because the walking distance is technically lengthened by the accessibility.

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4.2.2 Manhattan (South)

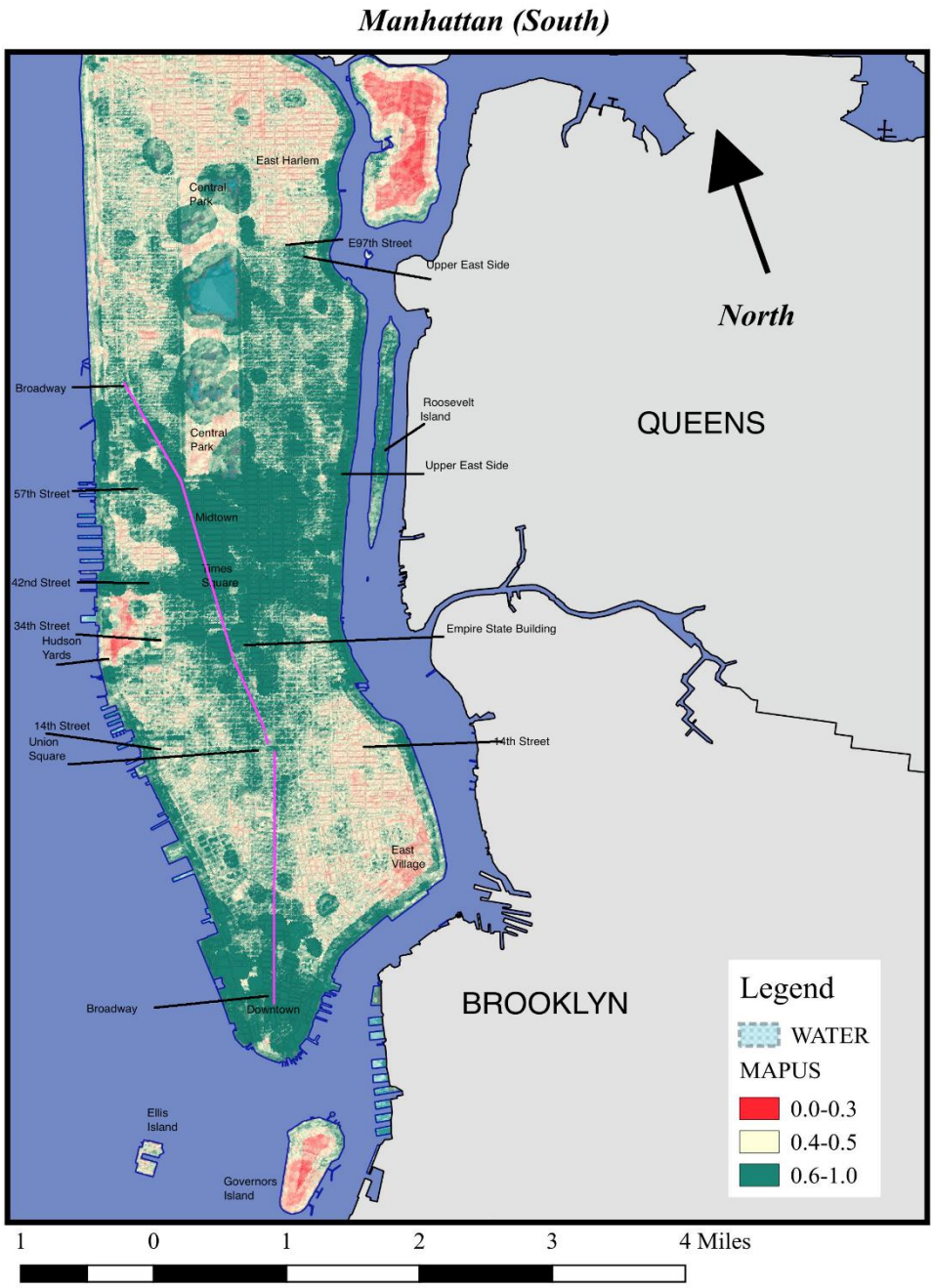

FIGURE 12 MAPUS MANHATTAN (SOUTH)

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Manhattan (South) has received the highest average score in New York City. The urban landscapes fulfill the first three layers of Maslow's hierarchy of needs and embody all of the selected influential factors for aesthetic perception.

Nonetheless, there are some outstanding clusters within the selected area. The highest calculated aesthetic [0.8-1.0] is within Downtown, Midtown, Times Square, the Upper East Side, the Upper West Side, and the Hudson, Harlem, and East River waterfronts.

The waterfronts receive high scores due to their close proximity to water and the amount of space one can see. Still, not every waterfront has a high score; for example, the lack of urban infrastructure and other aesthetically influential factors minimizes the MAPUS rate significantly. Such examples are the waterfronts at Governors Island, Hudson Yards, and Ellis Island.

Despite the fact that Midtown and Downtown Manhattan have a lack of natural sunlight, these neighborhoods have high scores because of their highly concentrated social infrastructure. Central Park South, Fifth Avenue from Central Park South to the Empire State Building, and the area around the World Trade Center has received the largest totals for calculated aesthetic value [0.9-1.0].

Medium-high scores [0.4-0.8] appear in the majority of Manhattan (South). These results are caused by harmonic balance of many social amenities in those

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areas, which in turn, make the residential neighborhoods in those areas desirable to live in. The landscapes within Central Park have a generally even distribution of aesthetic values [0.5]. However, closeness to freshwater bodies and elevation ranges can change the scores [+/- 0.25]. For instance, (#2)—Harlem Meer; (#3)—Jacqueline Kennedy Onassis Reservoir; (#4)—Conservatory Water and the Lake; and (#5)—the Pond—received the highest aesthetic values in the Central Park area: 0.55–0.85. Also, the elevation ranges helped to determine certain landmarks, such as Central Park South [0.85]—an area that perhaps has all of the important aesthetic factors. The San Remo (#4) [0.85] and El Dorado—(#3) [0.8]—are two of the most-photographed buildings in New York. Moreover, the San Remo is reflected in the Lake, which is surrounded by the greenery of trees, relatively high elevation, and exposure to sunlight, an amount of space one can see, and a combination of socially important factors.

The area west of Central Park South (#7), commonly called Lincoln Square, received a score of 0.5-0.8. Lincoln Center, the area internationally known for having the world's largest opera house and other renowned performance venues, received a score of 0.5, significantly lower than the surrounding landscapes. The low score is due to lack of sunlight, because the square is surrounded by high-rise buildings that deprive the public space of light; lack of trees and grass as the

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square is covered with concrete; and the absence of art galleries, which are present only in the surrounding areas. It also should be noted that the calculation of aesthetic values did not include landmarks or architectural recognition layers, which could have affected the value positively.

Some neighborhoods, such as the East Village, Alphabet City, and East Harlem, are sharply identified on the MAPUS as having medium-low scores. East Harlem, for its part, borders the Upper East Side, at 96th street. East Harlem's score arises from the following two facts: it has a sudden decrease of elevation, moving north from the Upper East Side, and a railroad, which is a negative factor for aesthetic perception.

The East Village received a relatively low (for Manhattan) score due to the influence of the following: No universities or hospitals are within walking distance; it has relatively low elevation, resulting in the area's being flooded with light and the consequent lack of shadow; and it is in close proximity to an open railroad (the subway line on the Williamsburg Bridge) and to highways (the FDR Drive). It should be noted that some of the aesthetic perception is compensated for with trees, parks, and museums, which lift the scores to the average of [0.3-0.4].

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Hudson Yards is the landscape that received the lowest score—0.2-0.3—in the borough of Manhattan. Area #3 has a very high potential due to its prime location in Midtown; however, it needs a thoroughly urban development of numerous socially important elements, such as a hospital, trees, and parks. The area has also been affected by close proximity to highways and multiple open railroads, including the Hudson Yards depot. In 2003, the city of New York issued a plan of development for this expanse. In 2010, the development completed its most complicated stage—demolition and foundation building for most of the buildings. As of 2017, most of the buildings' superstructures had been completed. Therefore, the aesthetic perception of the urban landscapes there will be changing soon.

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4.2.3 The Bronx

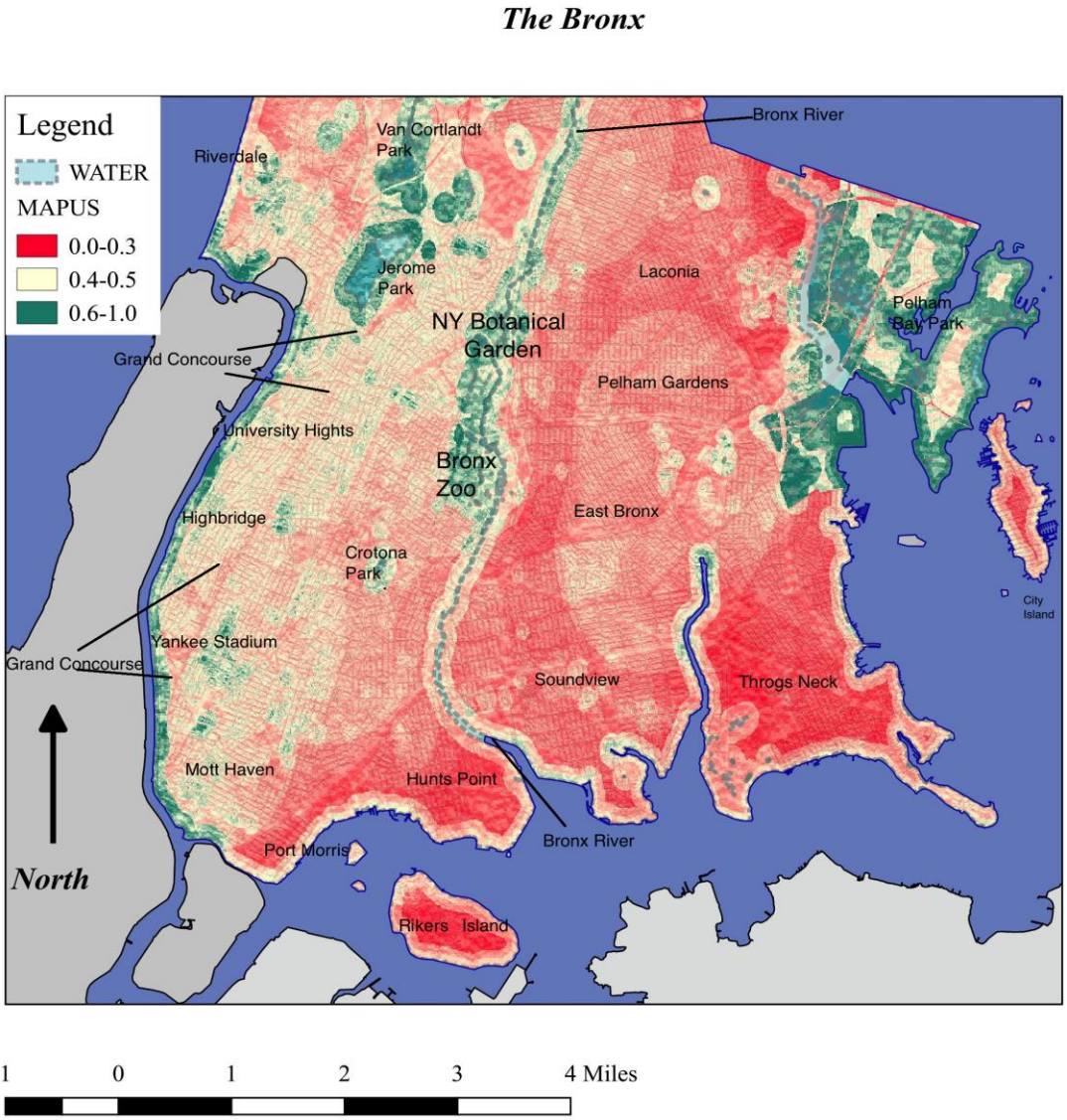

FIGURE 13 MAPUS THE BRONX

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The Bronx is very diverse in its results, with well-defined borders between the areas with high, medium, and low aesthetic perceptions.

The highest MAPUS scores are mostly linked to parks with lakes, rivers, creeks, and a close proximity to oceanic water. The largest high-score area is Pelham Bay Park in the northeast part of the borough. One interesting result comes from the presence of a highway in the park—it leaves a plume of outstandingly low aesthetics in relation to the rest of the park.

The second-largest area with high aesthetic values is that of the Bronx River, which includes two large clusters represented by the New York Botanical Gardens and the Bronx Zoo. Close proximity to the river, the presence of lakes, a large amount of vegetation, and abundance of natural light give the area aesthetic superiority in relation to surrounding locales.

The third-largest area with high aesthetic values is the valley of Saw-Mill Creek, which includes Van Cortlandt Park, with a golf course, and Jerome Park, with a large water reservoir. Similarly to the Bronx River corridor, Saw Mill Creek gains its aesthetic points due to natural components in the urban landscape. However, some parts of the creek valley are obscured by the negative presence of highways, which lower the high MAPUS scores along the creek.

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There are other small clusters of high aesthetic values in the Bronx, such as Riverdale, Crotona Park, Yankee Stadium, Mott Haven, and the Harlem River banks. They are not, however, as large as the above-mentioned ones.

The area between the Jerome Park Reservoir and Van Cortlandt Park, which represents average aesthetic values, received a higher score than its surroundings due to the influence of bodies of fresh water and a designated park area.

The rest of the Bronx can be divided into two large areas: an area with medium values [0.4-0.5] located on the west side of the Bronx River, and an area with medium-low scores [0.2-0.4] on the east side of the Bronx River. While the areas have similar urban landscapes, there are socially constructed differences between them. These differences consist of the presence/absence of universities, the density of high schools, the presence/absence of protected bike paths, a difference in elevation, and the presence/absence of museums.

The lowest aesthetic scores [0.0-0.3] are distinct to Port Morris, Hunts Point, Rikers Island, and Throgs Neck. These areas have a significant lack of social infrastructure, and its concomitant effect on the human unconscious, therefore decreasing the aesthetic value, because Maslow's Pyramid cannot be realized.

One of the most well-known neighborhoods in the Bronx is Riverdale, with its historically upper-middle-class population. This neighborhood was expected to

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have a higher score than other parts of the Bronx, and indeed, some parts of the neighborhood did receive a high score [0.8]. Nonetheless, some parts have a low urban aesthetic value [0.1], the lowest part being the Wave Hill Public Gardens. This area is far away from many socially important amenities, and very close to an open railroad—Metro-North, which has a negative influence on the aesthetic perception. The highest aesthetic value is attached to the building at 2400 Johnson Avenue, above the Big C Rock. People in the building have an unparalleled view of Inwood Hill Park, and enjoy the requisite factors to have a positive AP.

The territory around Pelham Bay in the Bronx is separated into four distinct parts: Pelham Gardens and Middletown-Pelham Bay, with an average score of 0.3; Pelham Bay Park and Pelham Bay & Split Rock Golf Courses, with an average score of 0.5; City Island, with an average score of 0.2-0.3; and Throgs Neck and Schuylerville, with average score of 0.1. Area #2 shows how highways lower the aesthetic value, leaving orange scars with value of 0.2-0.3 in the park areas of the northeast portions of the Bronx. City Island, due to the lack of many recognized aesthetic values, is separated into two general areas: Close to Oceanic Water, with a score of 0.3, and Central Area [0.2].

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4.2.4 Brooklyn

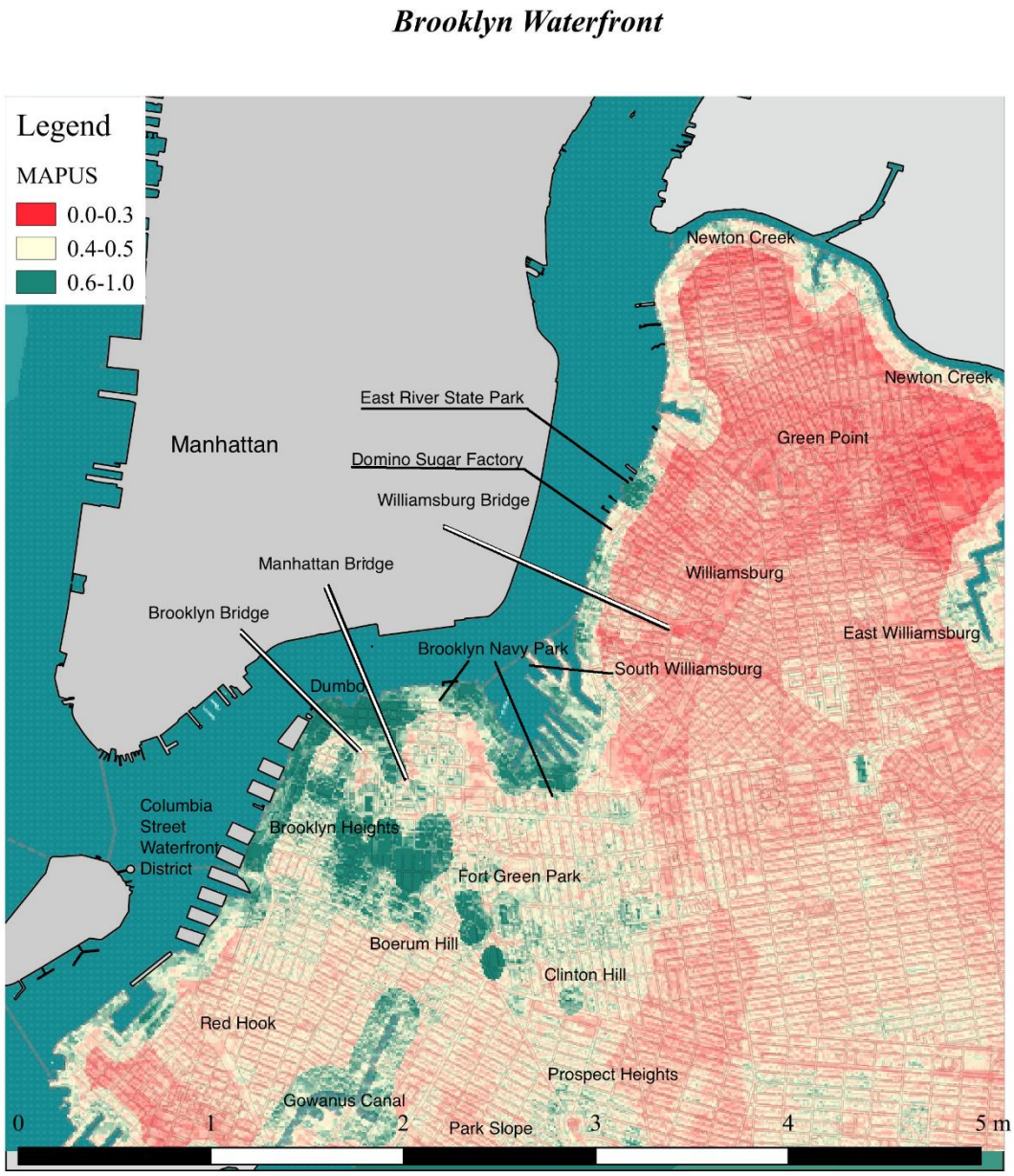

FIGURE 14 MAPUS BROOKLYN WATERFRONT

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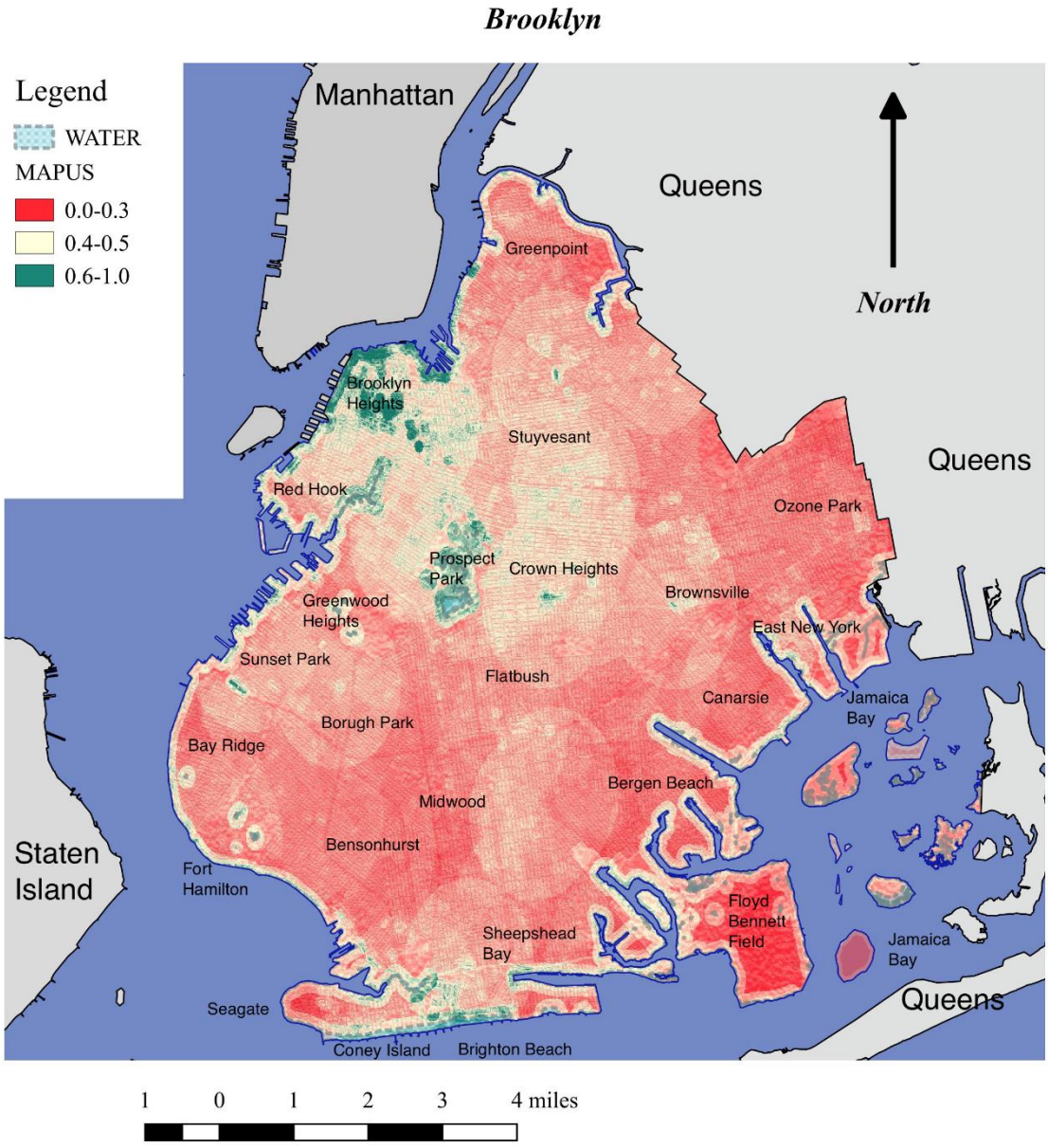

FIGURE 15 BROOKLYN

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Brooklyn is the most populous borough of New York City, and, although it is not urbanized as evenly as Manhattan, it requires special attention to even development. MAPUS of Brooklyn demonstrates a number of distinct areas with high [0.6-1.0] calculated urban aesthetic values. The highest ones are associated with Brooklyn Heights, Prospect Park, and Coney Island/Brighton Beach. These areas perhaps are the most desirable neighborhoods in the borough.

The medium MAPUS scores [0.4-0.5] are mostly connected to the clusters with high scores. These medium neighborhoods are Bedford-Stuyvesant, Crown Heights, Red Hook, Sheepshead Bay, and Greenwood Heights. For the most part these areas share the sociological structure of human needs with their nearby high-scored neighborhoods.

The largest area of Brooklyn has medium-low scores [0.2-0.4]—Greenpoint, Ozone Park, Canarsie, Bergen Beach, Midwood, Bensonhurst, Borough Park, Bay Ridge, and Sunset Park. These areas have mostly low-rise buildings, with their accompanying low population density. As a result, urban and social infrastructure is spread out, which makes needs less accessible/ less convenient. Therefore, the aesthetic value is low.

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There are two areas with the lowest scores [0.0-0.3]—Seagate and Floyd Bennett Field. Both of these areas are far removed from social infrastructure and therefore cannot aesthetically benefit from it.

The neighborhoods of Williamsburg and Greenpoint are divided into two general areas: the waterfront, which has relatively high scores [0.5 to 0.8], and the rest (0.3- 0.5).

Brooklyn's MAPUS illustrates two stagnant trends of rising aesthetic values of urban spaces: toward downtown Brooklyn and Manhattan and toward the ocean. Even though the trends are persistent, the actual amplitude is only 0.2, which is two times smaller than that in Queens.

Seagate, a gated community in southwestern Brooklyn, shows a sharp border of calculated aesthetic values [0.1-0.3] due to its remoteness from the urban center of Coney Island. Such low scores are also explained by the fact that Seagate is surrounded by water and is prone to the hostile attitude of nature. In 1992, a storm hit the area from the northeast, forcing residents to evacuate. One house was washed into the ocean, and the storm itself caused considerable damage. In 1995, the federal government completed the restoration of the beaches of Coney Island and the construction of new breakwaters. Unfortunately, this led to even greater erosion of the Seagate coast from the Atlantic Ocean.

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According to the 2010 census, there are 832 houses in Seagate, built in different styles. There are no stores in the area. Another factor that significantly decreases the score is that Seagate is surrounded by a special fence topped with barbed wire. In addition, both entrances to the community are guarded. This is not accidental. In the immediate vicinity there is a poor neighborhood, with many high-rise buildings where people who have hardly anything reside.

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4.2.5 Queens

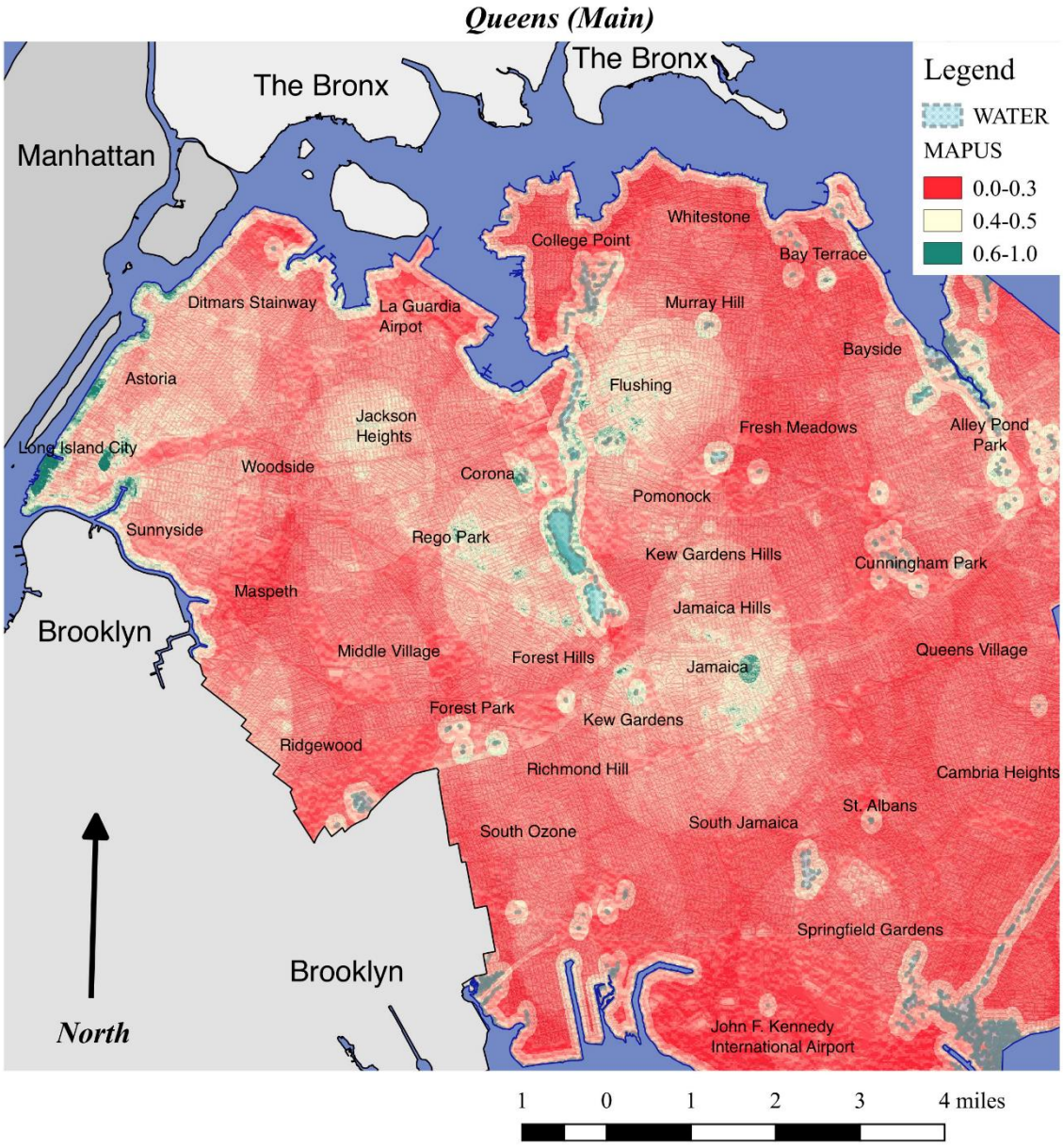

FIGURE 16 MAPUS QUEENS (MAIN)

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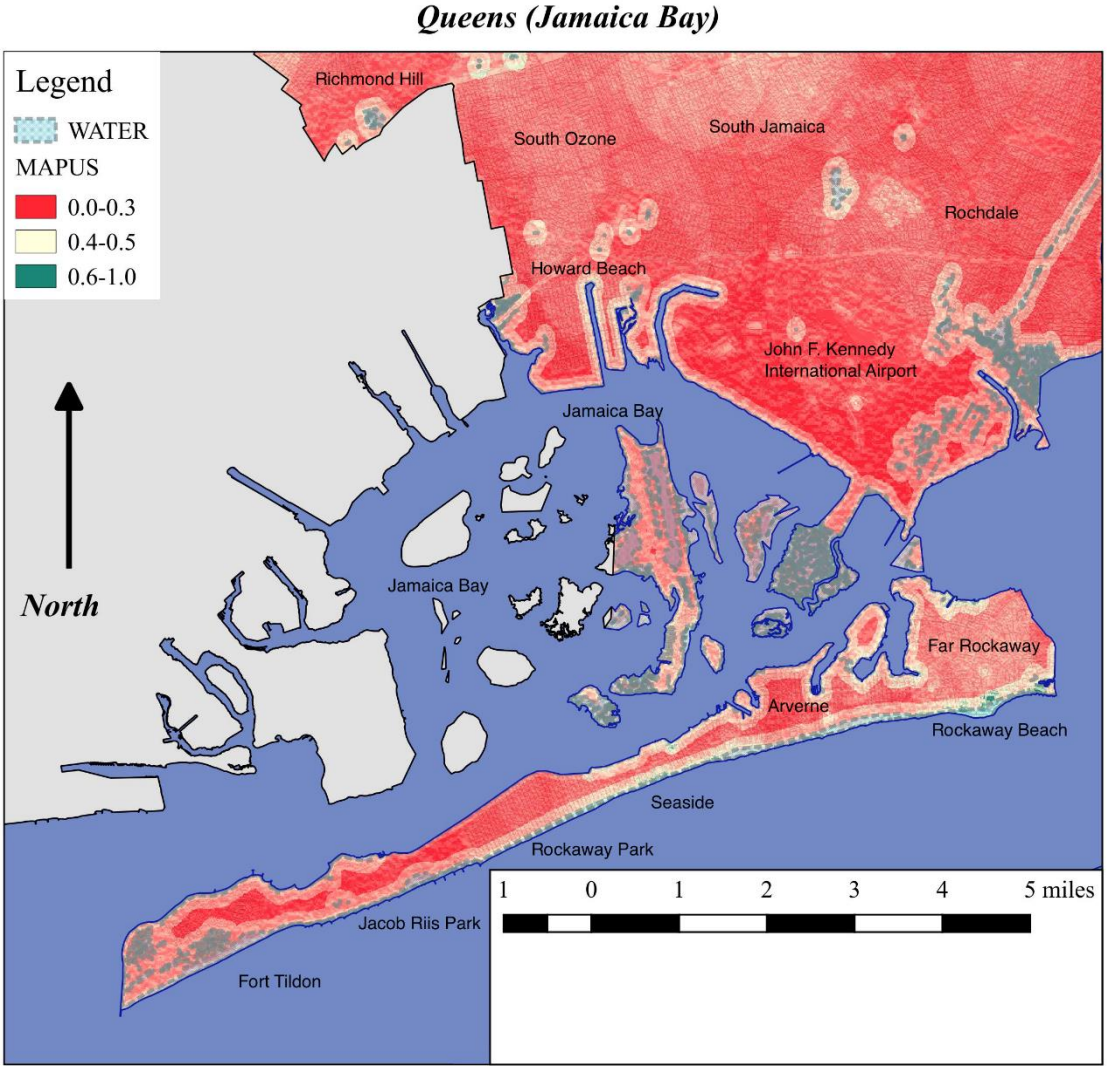

FIGURE 17 MAPUS QUEENS (JAMAICA BAY)

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The Calculated aesthetic perception of urban spaces in Queens shows a large range [0.01-0.85] that is indicative of distinct neighborhoods.

The highest scores [0.6-1.0] are found in the relatively small clusters of Long Island City, the Astoria Waterfront, Flushing, Jackson Heights, Rego Park, Corona, Jamaica, and Rockaway Beach. Except for Long Island City and Jamaica, these clusters are no larger than several city blocks.

In Long Island City, there are areas in close proximity to the East River, and the amount of space one can see helped gain a higher score compared to the neighboring landscape [+/- 0.15]. Long Island City in the last 10 years has experienced a significant development of its urban superstructure and thus there is expected to be a greater demand for socially important amenities (hospitals, police, firefighters, parks, schools, and so forth). After the expansion of these vital resources, the whole area of Long Island City is expected to gain [+ 0.4] and will be similar to the areas at the waterfront.

A medium [0.4-0.5] aesthetic value is considerably more common in the borough—in such areas as Astoria, Jackson Heights, Rego Park, Flushing, Alley Pond Park, and the large area surrounding Flushing Meadows-Corona Park. These areas have higher aesthetic values relative to other Queens's neighborhoods

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because of the presence of socially important infrastructure, such as hospitals, fire departments, universities, police departments and other facilities.

The lowest scores [0.0-0.3] are found in areas with gaps in the influences of socially important facilities. Areas such as Maspeth, Woodside, La Guardia Airport, College Point, Whitestone, Murray Hill, Bay Terrace, Bayside, Fresh Meadows, Queens Village, Cambria Heights, St. Albans, South Jamaica, Richmond Hill, South Ozone, Forest Park, Ridgewood, Howard Beach, Rochdale, Jacob Riis Park, Arverne, and John F. Kennedy International Airport are clearly seen on the MAPUS for Queens (Main) and Queens (Jamaica Bay) as having low scores. JFK Airport has the lowest aesthetic value within all of New York City.

Administratively, Rikers Island is a part of the Bronx; however, it is connected to Queens by a vehicular bridge and is adjacent to LaGuardia Airport. This island is home to NYC's large jail complex, and its average aesthetic value is very low [0.1], due to the lack of important facilities in support of self-esteem or self-actualization. Nonetheless, the northern part of the island has a higher score [0.4] due to the influence of trees, a police station (in the Bronx) and High Officer's House. Greenery plays an important part within the system for fulfilling the individual's needs and for offering aesthetic appeal. Not only does it provide shade and the oxygen that people breathe, it is also able to change the external

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look of the landscape and, indeed, the whole area, adding a somewhat pleasant look to the surroundings. Another area of the island that has a score of 0.4 is the southern part, by the bridge that connects the island to Queens. This score is the result of these influences: bridge visibility, amount of sun, and amount of space one can see.

The Far Rockaway neighborhood in Queens has an average calculated value of 0.3. This peninsula along the Atlantic coast consists of a narrow stretch of land—beaches—that is influenced by two positive factors: the amount of space one can see and close proximity to oceanic water. The easternmost part of area #6, with a relatively new neighborhood, has the highest value [0.55], due to newly constructed high-rises. The area has a high potential for additional development in the near future. Moreover, the pleasant, affluent areas of Belle Harbor, Neponsit, and Breezy Point, with their well-built houses and abundance of greenery, add several tenths of a point to the overall score for Queens.

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4.2.6 Staten Island

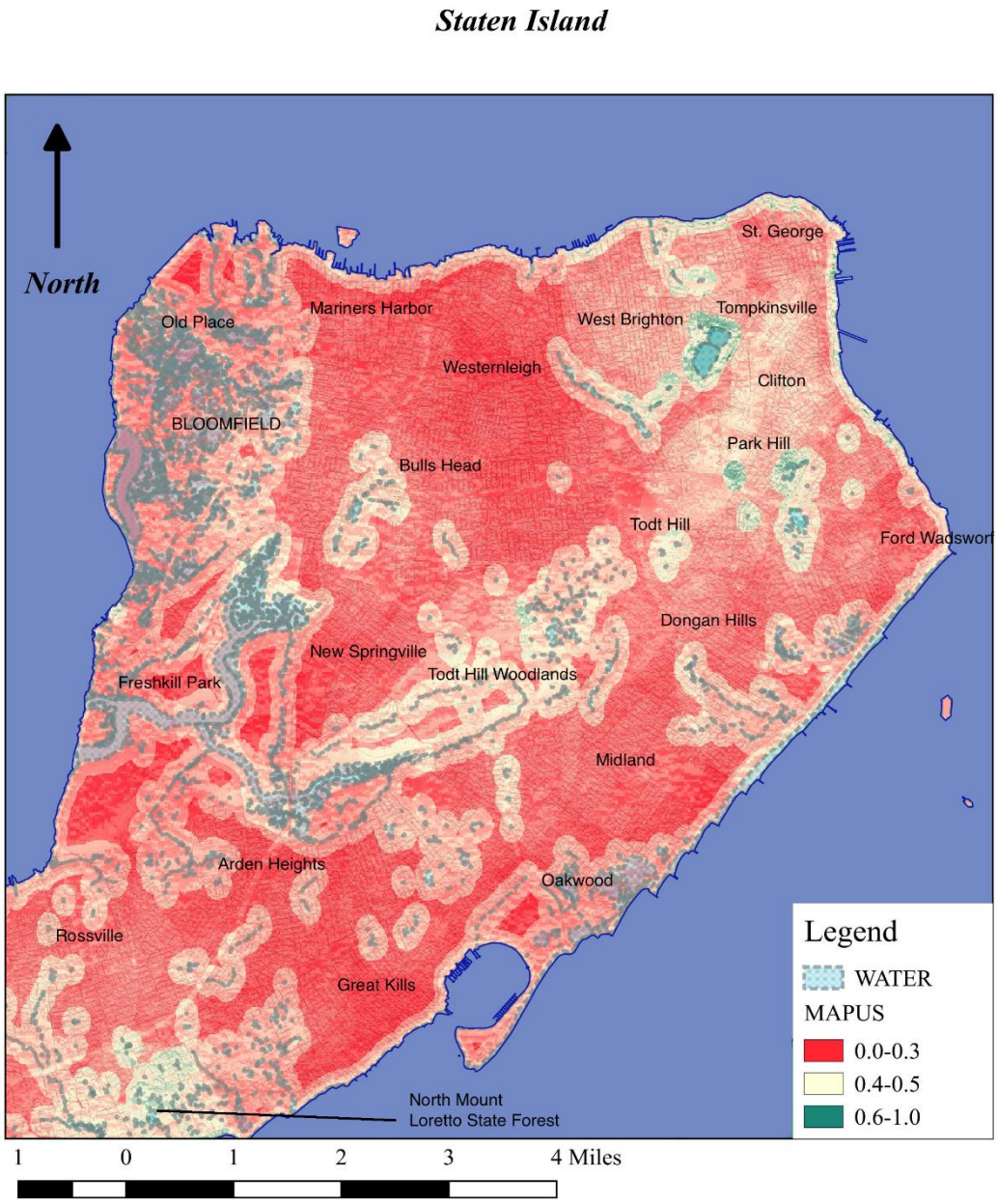

FIGURE 18 MAPUS STATEN ISLAND

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Staten Island is a unique borough, often classified as suburban rather than urban. The island is isolated from the rest of New York City, with limited connections: the Verrazano-Narrows Bridge, the Staten Island Ferry, operated by the New York City Department of Transportation, and by bus or ferry from New Jersey.

The highest urban aesthetics scores [0.6-0.8] are within the one-to-two-block area of St. George, Silver Lake, Park Hill, and Todt Hill. These areas are associated with urban centers in the borough. For instance, St. George is the heart of Staten Island's transportation system with its ferry terminal, which is linked to most bus routes and to the Staten Island Ferry. St. George also is the center of the island's cultural life, being home to the St. George Theatre, numerous restaurants, and a multi-use stadium.

In Staten Island, there are a number of areas with medium MAPUS scores [0.4-0.6]. The largest are Tompkinsville, Clifton, West New Brighton, Todt Hill, and North Mount Loretto State Forest. While Tompkinsville, Clifton, and West New Brighton have the influence of socio-demographic components, the medium scores for the rest of the areas are influenced by natural components, such as elevation, the amount of space that one can see, close proximity to a freshwater

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resource, vegetation, and close proximity to oceanic water and beaches. For instance, despite the fact that Bloomfield is only slightly urbanized, it gained medium scores, because of natural components in its aesthetic framework.

The lowest scores [0.0-0.6] belong to Great Kills, Arden Heights, New Springville, Mariners Harbor, Westerleigh, and Midland Beach. Similarly to certain areas of Brooklyn, Queens, and the Bronx, these low scores are the result of the areas' remoteness and low population and infrastructure density.

MAPUS for Staten Island shows that a natural landscape can gain a higher score of aesthetic value of urban spaces than an anthropogenic landscape. Absence of bodies of water, vegetation (grass and trees), the amount of space one can see, and the amount of visible sky are the factors that make a difference between the landscapes.

A narrow stripe of relatively high aesthetics is a result of a combination of the amount of space one can see, trees, landmark district, and close proximity to oceanic water. The presence or absence of these factors can make a considerable difference [+/- 0.4].

Among all five NYC boroughs, there were found two general trends that would significantly influence the aesthetic perception of urban spaces, which were discovered in the results. First trend is developed social infrastructure that

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helps to stand out most urbanized areas like Midtown, Downtown Manhattan, Long Island City, and Downtown Brooklyn. Second trend is natural components that help to stand out areas like Pelham Bay, The Bronx Zoo/Botanical Garden, Central Park, Rockaway Beach, and Brighton Beach.

Essentially, social infrastructure has higher impact on aesthetic perception than the natural components. On one hand Midtown Manhattan has high score despite of luck of natural components. On another hand, Jamaica Bay that has high natural scores has got overall small aesthetic score for Aesthetic perception.

Nevertheless, the highest scores are found in the combination of both Natural and socio-economic components.

CHAPTER 5: Conclusion

Each individual is responsible for choosing a place to live in accordance with specific characteristic factors. The skylines of major American cities draw tourists and those wishing to settle alike. This is the aesthetic effect that has become the central foci of this thesis. Focusing on New York and the available cultural landscape, one attempted to understand why this city has become the most sought-after locations in the world for migration. Many attribute the presence of

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a well-developed the geographic and economic landscape as facilitating opportunities for further development. This is especially the case when the city is attempting to bring new visionaries that will further develop the vibrant culture of the city.

However, the two factors of economy and geography are countered by the factor of the cultural landscape. Nonetheless, considering that geography determines the natural landscapes that people admire, the way that the industry is introduced into the cramped space of the city, the way that people cluster into spaces increasing the already high level of population density, the way that immigration levels increase, and so on, geography has demonstrated that it has a definitive impact on the aesthetic perception of a certain urban landscape (Nikolaev, 2009). In this study this certain landscape is New York as it has the largest population of migrants (DiNapoli, 2013). And interestingly enough it is the migrants who have always defined the city in search of their "American dream come true".

However, in order to accomplish the analysis of the urban space of New York, one had to group them and use a specific framework. Such a framework was found in the concept of the Analytical Hierarchy Process (AHP). This mathematical instrument helped to analyze all the important factors to conduct a proper

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analysis for complex cognitive examination. AHP proved effective in the attempts to assemble the model for the utility of human needs.

It is these human needs that one first needed to identify and categorize as they have a direct influence on the choices individuals make. In order to accomplish this, Maslow's Hierarchy of Needs was used as it the best methodological framework to analyze the factors pertaining to the aesthetic perception of Urban Spaces in New York. Illustrated in the form of a pyramid, the human needs were explained in accordance to each level and were given a score through the predetermined AHP system with the readymade classification ranging from 5 (Exceptional Affect) to 1 (Minimal Low Affect). One considered the physiological needs, safety, love/belongingness, esteem and self-actualization as the most important groups of factors that were explained through the prism of Maslow's pyramid of needs. As a result urban spaces in New York were analyzed based on their functioning.

Considering the above it is safe to say that the process of analyzing the aesthetic perception of urban spaces in New York is a multi-step process. First, 37 influential factors have been chosen for the analysis of urban space. Next the study applied the Analytical Hierarchy Process (AHP), where the coefficient was considered as equal to "1", to relate and weigh all factors against each other.

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Third, the author of the study introduced each factor into the QGIS layer, determining that only 28 factors were possible to analyze in the required context. Next the format of each factor was standardized [0; 1], and multiplied by a calculated AHP coefficient. The next step yet was to layer every factor and combine them. As an outcome one received the “Map of Aesthetic Perception of Urban Spaces: New York City” (MAPUS).

Using the map that has been developed as the outcome of the above manipulations, one was able to determine that the maximum calculated value on the dataset was “0.89” and was equal to the Empire State Building, whereas the minimum is “0.001” that is a small area in John F. Kennedy International Airport. However, according to the study it was noticed that considering the size of NYC it would have been preferable to use MAPUS for each specific area in NYC and analyze them separately. Which is why the study now focused not on NYC in general, but on South East River, Midtown Manhattan, Roosevelt Island, Queens, Central Park, Bronx (Zoo, Pelham Bay and Citi Island), Jamaica Bay, Brooklyn, and of course Staten Island.

Naturally the analysis considered not a specific place on the map but a certain area. Each of the above parts of New York City has received a designated score ranging from 0 to 1. In order to be statistically correct, one considered

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traditional neighborhoods that were in direct proximity of each other. Thus, the topmost places in terms of aesthetic appeal in South East River is SoHo, NoHo, West Village, Tribeca, Union Square, and the Garment District with a relatively high score within the range of 0.5-0.8. Here the development is rather even due to a good combination of factors influencing aesthetic perception and appeal.

Combination of significant elements within this area has also been facilitated by surpluses with multi-functional high-rises. It also should be noted that MAPUS shows a maximum possible positive aesthetic perception, which is why one of the most influential factors is “the amount of space that one can see”. This factor was calculated in a two-dimensional world, and therefore, in the same geographical location (building) people have different situations (floors), therefore, the results will vary. For the current GIS project, it was assumed that a person is located at the top floor of the building, which led to an immensely high result of 0.93.

Columbus Circle was the most prominent place in Midtown Manhattan. The Cathedral Church of St. John the Divine has an outstandingly high score in the northern part of Central Park area with 0.8. The area has a high gain due to the closeness of Morningside Park, and high average aesthetic influence of social factors. Here the most prominent neighborhood in the Bronx is the Riverdale,

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with upper-middle class residents. This neighborhood was expected to receive the highest score at 0.8.

Rikers Island is on the verge of the Bronx and Queens connecting them by a bridge, and LaGuardia Airport. This island has a largest NYC's prison complex. Naturally there is nothing aesthetically pleasing here with a 0.1 rating. There are virtually no important facilities to support esteem or self-actualization. However, here the northern part of the island received a score of 0.4, which is explained by near presence of trees, the green area, police station and high officer's house. In the direct vicinity is Jamaica Bay. The landscapes are rather similar however the score varies due to different areas of influence. The area #1 is Brownsville, Brooklyn, with an average score of 0.45.

Brooklyn is the most populous borough of NYC, and is required to have a special attention to even development. Staten Island is a unique borough, which is often classified as suburban rather than urban. The Island is objectively isolated from the rest of New York City, with an imitated ways of connections – Verrazano-Narrows Bridge, Staten Island Ferry service (provided) by MTA, and via the state of New Jersey.

As can be seen there are numerous factors influencing aesthetic perception of the various zones in the city. However, there are needs that are inherent in

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absolutely all-living beings on the planet, and each person cannot do without them. If one does not satisfy them, then the possibility of one's very existence is put under question, let alone proper development (Adler, 1977). The most vivid of such needs are breathing, eating, and sleeping (Adler, 1977).

Naturally, the pyramid of Maslow's needs is challenged by many scientists. And the main concerns are not about the instability of the psychological approach suggested by Maslow, but the presence of numerous non-standard situations. Thus, Maslow's critics tried to prove him wrong tried to prove that even without satisfying their basic and basic needs, people realized their potential (Wahba & Bridewel, 1976). However, Maslow is taking the average man in normal surroundings (Maslow, 1970; 1999). Which is why his pyramid of needs best suits the research on the Aesthetic Perception of Urban Spaces in New York.

Most of data for the current project had come from to sources available to general public. For clear understanding and visualization, the data sources have been combined into one table and categorized into the following categories:

1. Physical Geography (topography, elevation ranges, sunshine/sunshade, oceanic water, lakes, creeks, trees).
2. Socio-Economic Geography (Schools, Fire department, police stations, hospitals, waste facilities, museums, etc.).

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3. Psychological Geography (amount of visible space, amount of visible sky, crime rates).
4. Environmental geography (distance to hazardous facilities, air pollution).

The next step in the research will be the verification of the GIS model. The Likert scale survey will be conducted in the places detected by key clustering of the final data. The respondents will organize the panoramic pictures in the order of how well they are liked. It is very important that one of the panoramic pictures will be taken in the place of the survey per se – in order to be able to analyze the people's perception, those who can experience the urban space 'in face'.

Aesthetic perception is the ultimate field of interest in many aspects of everyday human life. It affects individual and social unconscious behavior and is strongly related to the decision-making processes among human minds. The current study is an essential concept for planning purposes and social and environmental justice among the regional units. Although the current scientific world is lacking comprehensive methodology for assessing the social superstructure, the aesthetic framework is potentially very successful for many aspects of sustainable and resilient urban development.

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APPENDIX

APPENDIX A. AHP RESULTS

AHP Results Based on Maslow's Hierarchy of Needs

Level I'	Level II'	Level III'	Level IV'	Level V'	APUS WEIGHT	FACTOR
1=5/15	2=4/15	3=3/15	4=2/15	5=1/15		
0.018	0.004	0.000	0.000	**0.000**	.022	Air Pollution (Negative)
0.004	0.006	0.001	0.000	**0.000**	.011	Airports (Negative)
0.000	0.000	0.000	0.000	**0.000**	.001	Ammount of Shades (1/4)
0.028	0.008	0.001	0.005	**0.000**	.043	Ammount of Sunlight* (3/4)
0.000	0.020	0.000	0.007	**0.000**	.027	Amount of Visible Space*
0.000	0.007	0.013	0.000	**0.000**	.019	Bridges
0.000	0.003	0.001	0.015	**0.000**	.018	CITI Bike Station
0.000	0.006	0.004	0.002	**0.000**	.012	Commercial Light (Night) (1/2)
0.009	0.019	0.000	0.005	**0.000**	.034	Crime Rates (Negative)
0.011	0.012	0.032	0.000	**0.000**	.055	Elevation Ranges*
0.010	0.011	0.023	0.000	**0.000**	.044	Elevation*
0.000	0.023	0.004	0.000	**0.000**	.026	Fire Department
0.000	0.000	0.016	0.002	**0.000**	.018	Flower Shops
0.000	0.000	0.003	0.000	**0.000**	.003	Flowers (1/2- parks)
0.048	0.000	0.004	0.000	**0.000**	.053	Food Market
0.053	0.008	0.026	0.000	**0.000**	.087	Fresh Water
0.000	0.000	0.017	0.008	**0.000**	.024	Galleries
0.006	0.001	0.011	0.001	**0.000**	.019	Green Roofs/Grass
0.002	0.000	0.011	0.014	**0.000**	.027	Gymnasium
0.000	0.008	0.022	0.018	**0.000**	.047	High School/Educational Facility
0.007	0.015	0.000	0.000	**0.000**	.021	Highways (Negative)
0.006	0.025	0.021	0.004	**0.000**	.056	Hospital
0.000	0.000	0.035	0.009	**0.000**	.043	Landmark District
0.000	0.000	0.013	0.012	**0.000**	.024	Library
0.000	0.000	0.026	0.008	**0.000**	.034	Museums/Theatres
0.034	0.012	0.022	0.006	**0.000**	.074	Oceanic Water
0.000	0.000	0.000	0.000	**0.000**	.000	Parking Lots (Negative)
0.010	0.002	0.025	0.010	**0.000**	.047	Parks as a designated Territory
0.002	0.022	0.009	0.000	**0.000**	.034	Police Department
0.000	0.007	0.004	0.003	**0.000**	.014	Protected Bike Path
0.000	0.012	0.009	0.000	**0.000**	.021	Rail Roads (Negative)
0.002	0.000	0.000	0.000	**0.000**	.003	Snow (1/24)
0.027	0.010	0.012	0.000	**0.000**	.048	Trees
0.006	0.000	0.001	0.000	**0.000**	.007	Trees Autumn (1/6)
0.000	0.000	0.001	0.000	**0.000**	.001	Trees Blooming (1/24)
0.017	0.010	0.017	0.005	**0.000**	.048	Visible Sky*
0.032	0.016	0.000	0.000	**0.000**	.048	Waste Facility (Negative)

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APPENDIX B. Factors Log

	Weight	***Factor***	***Done***	***Geographical Influence***	***Note***	***Source***
1	0,022	Air Pollution (Negative)	no		to be added in the future research	n/a
2	0,011	Airports (Negative)	yes	Airport territory and a buffer zone within 1,500 '	Created buffer 1,500	Manually Drawn in QGIS, from google Satelite extention
3	0,001	Ammount of Shades (1/4)	yes	Discrete Data	Calculated in QGIS with GRASS GIS plugin	Calculated in QGIS with GRASS GIS plugin
4	0,043	Ammount of Sunlight* (3/4)	yes	Discrete Data	Calculated in QGIS with GRASS GIS plugin	Calculated in QGIS with GRASS GIS plugin
5	0,027	Amount of Visible Space*	yes	Discrete Data	Calculated in QGIS with GRASS GIS and SAGA plugis	Calculated in QGIS with GRASS GIS and SAGA plugis
6	0,019	Bridges	yes	Visibility within 1,000'	Calculated in QGIS with GRASS GIS and SAGA plugis	Manually Drawn in QGIS, from google Satelite extention
7	0,018	CITI Bike Station	yes	Confortable walking distance - 200'	Created buffer 200'	https://opendata.cityofnewyork.us/
8	0,012	Commercial Light (Night) (1/2)	no	Discrete data	to be added in the future research	n/a
9	0,034	Crime Rates (Negative)	no	Discrete Data	to be added in the future research	n/a
10	0,055	Elevation Ranges*	yes	Discrete Data	Calculated in QGIS with GRASS GIS and SAGA plugis - possible visiblity analysis in future resarch	https://www1.nyc.gov/site/planning/data-maps/open-data.page
11	0,044	Elevation*	yes	Discrete Data	Topography	https://www1.nyc.gov/site/planning/data-maps/open-data.page
12	0,026	Fire Department	yes	Safety Awereness 2,000'	Created buffer 2,000	https://opendata.cityofnewyork.us/
13	0,018	Flower Shops	no	visibility analysis	to be added in the future research	n/a
14	0,003	Flowers (1/2- parks)	no	Discrete Data	to be added in the future research	n/a
15	0,053	Food Market	no	comfortable walking distance - 200'	to be added in the future research	n/a
16	0,087	Fresh Water	yes	walking distance - 400'	Created buffer 400'; possible visibility analysis to be added in future	Manually Drawn in QGIS, from google Satelite extention
17	0,024	Galleries	yes	walking distance - 200'	Created buffer 200'	https://opendata.cityofnewyork.us/
18	0,019	Green Roofs/Grass	yes	Discrete Data	LIDAR data from june, 2015	LIDAR data from june, 2015
19	0,027	Gymnasium	no	comfortable walking distance - 200'	to be added in the future research	https://www1.nyc.gov/site/planning/data-maps/open-data.page
20	0,047	High School/Educational	yes	walking distance - 1000'	Created buffer 1,000	https://opendata.cityofnewyork.us/

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		Facility				
21	0,021	Highways (Negative)	yes	Noise travel distance - 1000'	Created buffer 1,000	https://opendata.cityofnewyork.us/
22	0,056	Hospital	yes	Safety Awereness 2,000'	Created buffer 2,000	https://www1.nyc.gov/site/planning/data-maps/open-data.page

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	Weight	Factor	Done	Geographical Influence	Note	Source
23	0,043	Landmark District	yes	Discrete Data		https://opendata.cityofnewyork.us/
24	0,024	Library	yes	walking distance - 400'	Created buffer 400'	https://www1.nyc.gov/site/planning/data-maps/open-data.page
25	0,034	Museums/Theatres	yes	walking distance - 1000'	Created buffer 1,000	https://www1.nyc.gov/site/planning/data-maps/open-data.page
26	0,074	Oceanic Water	yes	walking distance - 1000'	Created buffer 1,000	https://www1.nyc.gov/site/planning/data-maps/open-data.page
27	0	Parking Lots (Negative)	no	least influencial factor	Not Significant	n/a
28	0,047	Parks as a designated Territory	yes	Discrete Data		https://opendata.cityofnewyork.us/
29	0,034	Police Department	yes	Safetywereness 1,500'	Created buffer 1,500	https://www1.nyc.gov/site/planning/data-maps/open-data.page
30	0,014	Protected Bike Path	yes	visibiity distance 50'	Created buffer 50'	https://opendata.cityofnewyork.us/
31	0,021	Rail Roads (Negative)	yes	Noise travel distance - 1000'	Created buffer 1,000	https://opendata.cityofnewyork.us/
32	0,003	Snow (1/24)	no	N/A	Will not be used	n/a
33	0,048	Trees	yes	visibility distance 50'	Created buffer 50' - 36.0 hour calculation	https://opendata.cityofnewyork.us/
34	0,007	Trees Autumn (1/6)	yes	-	additional points to trees	n/a
35	0,001	Trees Blooming (1/24)	yes	-	additional points to trees	n/a
36	0,048	Visible Sky*	yes	Discrete Data	Calculated in QGIS with GRASS GIS plugin	Calculated in QGIS with GRASS GIS plugin
37	0,048	Waste Facility (Negative)	no	smell travel distance 1,000'	c	https://www1.nyc.gov/site/planning/data-maps/open-data.page

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APPENDIX C. AHP Physiological Needs Lenses

Physiological Needs																																							
Ability to maintain homeostatis																																								
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**
1	**Air Pollution (Negative)**	**5**		3	3	3					1	0	3				0	0		2	4		5	0				0		0	5			0	0	0		0	0
2	**Airports (Negative)**	**4**	0		0	0					0	0	0				0	0		0	0		4	0				0		0	0			3	0	0		0	0
3	**Ammount of Shades (1/4)**	**1**	0	3		0					0	0	0				0	0		0	0		0	0				0		0	0			0	0	0		0	0
4	**Ammount of Sunlight* (3/4)**	**4**	0	3	3						4	3	4				3	3		3	4		2	3				4		2	3			4	2	4		3	4
5	**Amount of Visible Space***	**0**																																					
6	**Bridges**	**0**																																					
7	**CITI Bike Station**	**0**																																					
8	**Commercial Light (Night) (1/2)**	**0**																																					
9	**Crime Rates (Negative)**	**2**	2	1	1	0						1	1				0	0		1	1		1	1				0		1	0			0	0	1		1	1
10	**Elevation Ranges***	**2**	0	2	1	0					0		0				0	0		2	2		2	2				0		2	2			2	0	0		0	0
11	**Elevation***	**2**	0	1	1	0					0	1					0	0		2	0		0	0				0		2	3			0	2	0		2	2
12	**Fire Department**	**0**																																					
13	**Flower Shops**	**0**																																					
14	**Flowers (1/2- parks)**	**0**																																					
15	**Food Market**	**5**	4	4	1	1					1	3	5					0		4	5		5	5				5		5	5			5	5	5		5	5
16	**Fresh Water**	**5**	5	4	2	1					1	5	5				3			5	5		5	5				5		5	5			5	5	5		5	5
17	**Galleries**	**0**																																					
18	**Green Roofs/Grass**	**1**	0	1	1	0					0	0	1				0	0			1		1	1				0		1	1			1	0	0		0	0
19	**Gymnasium**	**1**	0	1	1	0					0	0	0				0	0		0			0	0				0		0	0			1	0	0		0	0

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20	**High School/Educational Facility**	**0**																																						
21	**Highways (Negative)**	**2**	0	0	1	0					0	0	2				0	0		0	2			2				0		0	2			0	0	0		2	0
22	**Hospital**	**3**	3	1	1	0					0	0	1				0	0		0	1		0					0		0	3			0	0	0		0	0
23	**Landmark District**	**0**																																						
24	**Library**	**0**																																						
25	**Museums/Theatres**	**0**																																						
26	**Oceanic Water**	**5**	4	2	1	1					0	2	3				0	0		4	4		3	5						5	5			5	0	0		5	5
27	**Parking Lots (Negative)**	**0**																																						
28	**Parks as a designated Territory**	**3**	2	2	1	0					0	0	0				0	0		0	2		1	2				0			3			3	0	0		0	0
29	**Police Department**	**1**	0	1	1	0					0	0	0				0	0		0	1		0	0				0		0				1	0	0		0	0
30	**Protected Bike Path**	**0**																																						
31	**Rail Roads (Negative)**	**0**																																						
32	**Snow (1/24)**	**1**	1	0	1	0					0	0	0				0	0		0	0		1	1				0		0	0				0	0		0	0
33	**Trees**	**3**	3	3	1	3					1	3	3				0	0		3	3		5	2				3		1	3			3		0		3	0
34	**Trees Autumn (1/6)**	**5**	3	5	2	0					3	3	3				0	0		3	5		1	5				3		1	5			5	5			5	5
35	**Trees Blooming (1/24)**	**0**																																						
36	**Visible Sky***	**5**	5	1	0	0					0	3	0				0	0		2	3		0	4				0		1	3			5	0	0			0
37	**Waste Facility (Negative)**	**5**	3	5	5	0					0	3	0				0	0		5	5		1	5				0		2	5			5	3	0		5	

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APPENDIX D. AHP Safety Needs Lenses

SAFETY																																								
safety-seeking mechanism / tools, world outlook, future, "new, unfamiliar, strange, unmanageable stimuli or situations will too frequently elicit the danger or terror reaction"																																								
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**
1	**Air Pollution (Negative)**	**3**		3	3	3	0	3	2	0	0	0	0	0				0		2		2	0	0				0	0	0	0	0	0		0		3	0	0
2	**Airports (Negative)**	**3**	0		2	0	0	2	2	0	0	0	0	0				3		3		3	0	0				0	2	2	0	3	1		0		2	0	1
3	**Ammount of Shades (1/4)**	**5**	0	0		0	0	0	0	0	0	0	0	0				0		0		0	0	0				0	3	0	0	0	0		0		2	0	0
4	**Ammount of Sunlight* (3/4)**	**5**	0	3	4		0	5	5	4	0	0	0	0				5		4		5	0	0				5	5	5	0	0	0		0		0	0	0
5	**Amount of Visible Space***	**5**	4	2	3	2		5	5	5	5	4	0	0				5		5		4	5	0				5	5	4	0	4	5		5		5	3	5
6	**Bridges**	**5**	0	0	2	0	0		5	0	0	0	0	0				0		0		0	0	0				3	4	5	0	0	0		3		5	5	0
7	**CITI Bike Station**	**3**	0	0	1	0	0	0		0	0	0	0	0				0		3		3	0	0				0	0	0	0	0	0		0		0	3	3
8	**Commercial Light (Night) (1/2)**	**5**	4	2	1	0	0	4	2		0	3	4	5				0		4		5	0	0				4	4	4	0	0	4		0		5	0	0
9	**Crime Rates (Negative)**	**5**	5	3	5	2	0	5	5	1		5	5	0				5		5		0	0	0				5	5	5	0	5	5		5		5	5	5
10	**Elevation Ranges***	**5**	3	2	5	1	0	3	2	0	0		5	0				4		5		5	0	0				5	4	5	0	0	0		5		5	0	0
11	**Elevation***	**5**	4	2	3	2	3	2	3	0	0	0		0				4		4		4	0	0				4	3	4	0	0	0		4		5	0	0
12	**Fire Department**	**5**	4	3	5	3	1	4	5	0	3	5	5					5		5		5	5	0				5	5	5	5	5	5		5		5	5	5
13	**Flower Shops**	**0**																																						
14	**Flowers (1/2- parks)**	**0**																																						
15	**Food Market**	**0**																																						
16	**Fresh Water**	**5**	1	0	2	0	0	5	4	2	0	0	0	0						5		0	0	0				0	4	4	0	0	0		0		0	5	4
17	**Galleries**	**0**																																						
18	**Green Roofs/Grass**	**1**	0	0	1	0	0	1	0	0	0	0	0	0				0				0	0	0				0	1	1	0	0	1		0		0	0	0
19	**Gymnasium**	**0**																																						

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20	**High School/Educational Facility**	**4**	0	0	2	0	0	1	0	0	3	0	0	0				3		3			0	0				0	4	4	0	4	0		4		4	4	0
21	**Highways (Negative)**	**5**	3	3	5	3	0	2	3	3	2	3	3	0				3		5		5		0				0	5	5	0	0	5		0		4	4	3
22	**Hospital**	**5**	5	3	5	5	3	5	4	5	3	5	5	3				5		5		5	5					5	5	5	3	5	5		5		5	5	5
23	**Landmark District**	**0**																																					
24	**Library**	**0**																																					
25	**Museums/Theatres**	**0**																																					
26	**Oceanic Water**	**5**	5	1	5	0	0	0	4	0	0	0	0	0				4		5		3	3	0					5	5	0	3	4		5		4	3	0
27	**Parking Lots (Negative)**	**5**	1	0	0	0	0	0	1	0	0	0	0	0				0		0		0	0	0				0		0	0	0	0		0		0	0	0
28	**Parks as a designated Territory**	**3**	0	0	3	0	0	0	3	0	0	0	0	0				0		0		0	0	0				0	3		0	0	0		0		0	0	0
29	**Police Department**	**5**	5	2	5	3	3	5	2	4	5	5	5	0				5		5		5	5	0				5	5	5		5	5		5		4	5	2
30	**Protected Bike Path**	**3**	1	0	3	1	0	1	3	2	0	2	2	0				3		4		0	1	0				0	3	2	0		0		0		3	3	0
31	**Rail Roads (Negative)**	**3**	3	0	3	3	0	5	3	0	0	4	4	0				4		0		4	0	0				0	4	4	0	3			3		4	3	3
32	**Snow (1/24)**	**0**																																					
33	**Trees**	**5**	2	1	5	2	0	0	5	3	0	0	0	0				4		5		0	5	0				0	3	3	0	4	0				3	0	0
34	**Trees Autumn (1/6)**	**0**																																					
35	**Trees Blooming (1/24)**	**2**	0	0	0	1	0	0	2	0	0	0	0	0				2		1		0	0	0				0	1	1	0	0	0		0			0	0
36	**Visible Sky***	**5**	5	3	5	3	0	0	0	4	0	3	4	0				0		5		0	0	0				0	5	5	0	0	0		2		2		0
37	**Waste Facility (Negative)**	**5**	4	0	5	5	0	3	0	5	0	4	4	0				0		5		5	0	0				5	5	5	0	5	4		2		4	5	

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APPENDIX E. AHP Love/Belonigness Lensess

Love/ Belongingness																																								
Give and receive Love and affection. The human need emotional need to be an accepted member of the group.																																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	**Air Pollution (Negative)**	**0**																																						
2	**Airports (Negative)**	**2**				0		0	2	0	3	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	2	2		2	0	0	0	
3	**Ammount of Shades (1/4)**	**0**																																						
4	**Ammount of Sunlight* (3/4)**	**3**		3				0	3	3	3	0	0	3	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	
5	**Amount of Visible Space***	**0**																																						
6	**Bridges**	**5**		4		5			4	5	5	5	4	5	5	5	4	4	4	5	5	5		5	0	0	0	0		0	5	5	5		5	0	0	5	
7	**CITI Bike Station**	**3**		0		0		0		0	0	0	0	0	0	0	0	0	0	2	0	0		0	2	0	0	0		0	0	3	0		0	0	0	0	
8	**Commercial Light (Night) (1/2)**	**3**		3		0		0	3		3	0	0	0	0	0	3	0	0	0	0	0		0	0	0	0	0		0	3	0	0		0	0	0	0	
9	**Crime Rates (Negative)**	**2**		0		0		0	2	0		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	
10	**Elevation Ranges***	**5**		5		3		0	5	5	5		5	5	5	5	5	5	5	5	5	5		0	3	5	5	5		5	5	5	5		5	5	5	5	
11	**Elevation***	**5**		4		3		0	5	3	5	0		5	4	4	4	4	5	4	5	4		5	0	0	0	0		0	5	4	4		5	5	4	5	
12	**Fire Department**	**2**		2		0		0	2	2	2	0	0		0	0	2	0	0	0	5	0		0	0	0	0	0		0	0	0	0		0	0	0	0	
13	**Flower Shops**	**5**		5		4		0	5	5	5	0	0	3		5	0	0	0	4	4	5		5	0	5	0	0		0	4	4	4		0	0	0	0	
14	**Flowers (1/2- parks)**	**5**		3		3		0	3	5	5	0	0	3	0		5	0	0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	
15	**Food Market**	**5**		3		4		0	3	0	5	0	0	0	3	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0		0	0	0	0	
16	**Fresh Water**	**5**		5		5		0	3	3	5	0	0	5	5	5	4		5	5	5	5		5	0	5	0	5		0	5	5	5		4	5	5	5	
17	**Galleries**	**5**		4		5		0	5	5	5	0	0	5	5	5	4	0		4	0	0		0	0	5	0	0		0	0	4	0		4	5	4	0	
18	**Green Roofs/Grass**	**5**		3		3		0	5	3	5	0	0	3	0	4	3	0	0		0	0		0	0	4	0	0		0	0	3	0		3	4	3	0	
19	**Gymnasium**	**5**		4		5		0	5	3	5	0	0	0	0	5	4	0	3	2		0		0	0	0	0	0		0	0	5	0		0	0	0	5	

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20	**High School/Educational Facility**	**5**		5		5		0	4	3	5	0	0	5	0	5	4	0	5	4	5			0	0	5	0	0		5	5	5	0		5	5	5	5	
21	**Highways (Negative)**	**0**																																						
22	**Hospital**	**5**		4		3		0	3	2	5	0	0	3	0	5	4	0	3	2	4	3			0	5	0	5		0	5	5	5		5	5	5	5	
23	**Landmark District**	**5**		5		5		5	5	5	5	5	5	5	5	5	5	5	5	4	5	5		5		5	5	5		5	5	5	5		5	5	5	5	
24	**Library**	**5**		5		5		4	4	2	5	3	3	4	0	5	5	0	0	0	2	0		0	0		0	0		0	1	4	0		0	0	0	0	
25	**Museums/Theatres**	**5**		5		5		4	5	2	4	3	5	5	5	5	4	5	3	2	4	5		4	0	5		5		0	5	4	5		4	0	0	5	
26	**Oceanic Water**	**5**		5		5		5	5	2	5	3	3	5	5	5	4	0	2	1	5	0		0	0	3	0			4	5	5	4		3	3	3	1	
27	**Parking Lots (Negative)**	**0**																																						
28	**Parks as a designated Territory**	**5**		5		5		5	4	3	5	5	5	5	5	5	5	5	4	3	4	0		3	0	5	5	0			4	4	4		3	1	1	1	
29	**Police Department**	**5**		5		5		0	2	0	5	0	0	3	0	5	1	0	2	1	4	0		0	0	0	0	0		0		5	0		0	0	0	0	
30	**Protected Bike Path**	**2**		0		5		0	0	3	3	0	0	3	0	2	1	0	0	0	0	0		0	0	0	0	0		0	0		0		0	0	0	0	
31	**Rail Roads (Negative)**	**2**		0		3		0	2	3	2	0	0	3	0	2	4	0	3	2	2	4		0	0	2	0	0		0	2	2			0	0	0	0	
32	**Snow (1/24)**	**0**																																						
33	**Trees**	**5**		0		5		0	5	2	5	0	0	3	5	5	4	0	0	0	2	0		0	0	3	0	0		0	4	0	5			0	0	2	
34	**Trees Autumn (1/6)**	**5**		5		5		5	5	5	5	0	0	5	5	5	4	0	0	0	2	0		0	0	5	4	0		0	5	5	5		5		0	0	
35	**Trees Blooming (1/24)**	**5**		5		5		5	5	5	5	0	0	5	5	5	4	0	0	0	2	0		0	0	5	4	0		0	5	5	5		5	1		0	
36	**Visible Sky***	**5**		5		5		0	5	3	5	0	0	5	5	5	5	0	3	2	0	0		0	0	5	0	0		0	5	5	5		0	1	1		
37	**Waste Facility (Negative)**	**0**																																						

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APPENDIX F. AHP Esteem Lenses

Esteem																																								
Stability, "adequacy, for confidence in the face of the world, and for independence and freedom"																																									
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	**Air Pollution (Negative)**	**0**																																						
2	**Airports (Negative)**	**0**																																						
3	**Ammount of Shades (1/4)**	**0**																																						
4	**Ammount of Sunlight* (3/4)**	**5**					0		0	0	0				0				0	4	0	0		5	0	0	0	4		0		4		5		5	5	0	
5	**Amount of Visible Space***	**5**				5			3	3	0				5				0	1	0	0		1	0	0	0	0		0		3		5		1	2	1	
6	**Bridges**	**0**																																						
7	**CITI Bike Station**	**4**				5	0		z	0	3				5				5	0	4	4		4	5	5	5	0		0		5		5		4	2	5	
8	**Commercial Light (Night) (1/2)**	**5**				5	0		5		1				3				0	4	0	0		0	0	0	0	0		0		3		0		0	0	0	
9	**Crime Rates (Negative)**	**5**				5	4		0	0					0				3	3	0	0		0	0	0	0	0		0		0		0		3	3	3	
10	**Elevation Ranges***	**0**																																						
11	**Elevation***	**0**																																						
12	**Fire Department**	**0**																																						
13	**Flower Shops**	**1**				1	0		0	0	3								0	3	0	0		0	0	0	0	0		0		0		0		1	0	1	
14	**Flowers (1/2- parks)**	**0**																																						
15	**Food Market**	**0**																																						
16	**Fresh Water**	**0**																																						
17	**Galleries**	**5**				5	3		3	5	0				3					3	0	0		0	0	0	3	0		0		3		3		0	3	0	
18	**Green Roofs/Grass**	**1**				0	0		0	0	0				0				0		0	0		0	0	0	0	0		0		0		0		0	0	4	
19	**Gymnasium**	**5**				5	4		2	5	5				4				3	5		0		0	0	0	3	4		0		3		4		5	5	5	

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20	**High School/Educational Facility**	**5**				5	5		3	5	2				2				5	1	2			5	5	5	5	5		3		5		5		5	3	5		
21	**Highways (Negative)**	**0**																																						
22	**Hospital**	**1**				0	0		0	2	1				1				2	2	2	0			0	0	0	1		1		1		1		1	1	1		
23	**Landmark District**	**5**				5	3		0	2	3				3				1	3	3	0		3		0	0	2		2		0		2		2	2	2		
24	**Library**	**5**				5	1		0	4	5				2				2	5	1	0		5	1		5	1		3		5		1		2	4	1		
25	**Museums/Theatres**	**5**				5	2		0	2	1				1				0	1	0	0		1	1	0		5		3		3		3		3	3	3		
26	**Oceanic Water**	**5**				0	3		2	5	2				1				1	2	0	0		0	0	0	0			1		1		2		2	1	2		
27	**Parking Lots (Negative)**	**0**																																						
28	**Parks as a designated Territory**	**5**				5	4		5	3	2				4				2	5	3	0		0	1	0	0	0				5		0		2	2	1		
29	**Police Department**	**0**																																						
30	**Protected Bike Path**	**5**				0	1		0	0	2				5				0	3	0	0		0	2	0	0	0		0				0		0	0	0		
31	**Rail Roads (Negative)**	**0**																																						
32	**Snow (1/24)**	**5**				0	3		0	2	1				2				0	1	0	0		0	0	0	0	0		0		1				0	0	0		
33	**Trees**	**0**																																						
34	**Trees Autumn (1/6)**	**5**				0	0		0	4	0				0				3	1	0	0		0	0	0	0	0		0		1		3			0	0		
35	**Trees Blooming (1/24)**	**5**				0	0		0	2	0				5				0	1	0	0		0	0	0	0	0		0		2		3		2		0		
36	**Visible Sky***	**2**				5	0		0	1	0				0				1	0	0	0		0	0	0	0	0		0		2		3		5	4			
37	**Waste Facility (Negative)**	**0**																																						

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APPENDIX G. AHP Self Actualisation Lenses. (left blank intentionally)

Self Actualization																																						
A musician must make music, an artist must paint, a poet must write, if he is to be ultimately happy																																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	**Air Pollution (Negative)**	**0**																																					
2	**Airports (Negative)**	**0**																																					
3	**Ammount of Shades (1/4)**	**0**																																					
4	**Ammount of Sunlight* (3/4)**	**0**																																					
5	**Amount of Visible Space***	**0**																																					
6	**Bridges**	**0**																																					
7	**CITI Bike Station**	**0**																																					
8	**Commercial Light (Night) (1/2)**	**0**																																					
9	**Crime Rates (Negative)**	**0**																																					
10	**Elevation Ranges***	**0**																																					
11	**Elevation***	**0**																																					
12	**Fire Department**	**0**																																					
13	**Flower Shops**	**0**																																					
14	**Flowers (1/2- parks)**	**0**																																					
15	**Food Market**	**0**																																					
16	**Fresh Water**	**0**																																					
17	**Galleries**	**0**																																					
18	**Green Roofs/Grass**	**0**																																					
19	**Gymnasium**	**0**																																					

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20	**High School/Educational Facility**	**0**
21	**Highways (Negative)**	**0**
22	**Hospital**	**0**
23	**Landmark District**	**0**
24	**Library**	**0**
25	**Museums/Theatres**	**0**
26	**Oceanic Water**	**0**
27	**Parking Lots (Negative)**	**0**
28	**Parks as a designated Territory**	**0**
29	**Police Department**	**0**
30	**Protected Bike Path**	**0**
31	**Rail Road's (Negative)**	**0**
32	**Snow (1/24)**	**0**
33	**Trees**	**0**
34	**Trees Autumn (1/6)**	**0**
35	**Trees Blooming (1/24)**	**0**
36	**Visible Sky***	**0**
37	**Waste Facility (Negative)**	**0**

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