ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF SCIENCE ENGINEERING AND TECHNOLOGY

EVALUATION OF INTERCHANGE STATIONS AS PUBLIC SPACES: THE CASE OF SOGUTLUCESME STATION

M.Sc. THESIS

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Department of Urban and Regional Planning

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AKTARMA MERKEZLERİNİN KENTSEL MEKAN BAĞLAMINDA DEĞERLENDİRİLMESİ: ÇALIŞMA ALANI SÖĞÜTLÜÇEŞME İSTASYONU

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FOREWORD

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Sultan Selin SAĞLAM
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ABBREVIATIONS

BC1	**:** Bosphorus Crossing Contract 1
BRT	**:** Bus Rapid Transit / Metrobus System
CIAM	**:** International Congresses of Modern Architecture (Congrès Internationaux d'Architecture Modern)
CR1	**:** Commuter Rail Contract 1
CR2	**:** Commuter Rail Contract 2
CR3	**:** Commuter Rail Contract 3
DLH	**:** General Directorate of Construction of Railways, Ports, and Airports (Demiryolları, Limanlar ve Havameydanları Genel Müdürlüğü)
IBB	**:** Istanbul Metropolitan Municipality (Istanbul Büyükşehir Belediyesi)
P+R	**:** Park and Ride
TCDD	**:** Turkish State Railways (Türkiye Cumhuriyeti Devlet Demiryolları)
UN	**:** United Nations
WBCSD	**:** Worlds Business Council for Sustainable Development

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EVALUATION OF INTERCHANGE STATIONS AS PUBLIC SPACES: THE CASE OF SOGUTLUCESME STATION

ABSTRACT

The meaning of transportation and its evaluation within the framework of need developed and changed over time. The perception of change in transportation, shaped according to the transforming of societies and environmental factors, will contribute to today's assessment. Especially promoting the use of public transport is one of the most important policy and action areas in urban planning and transport planning. Improvements in public transport systems converts cities to become more accessible and liveable in several ways as it may result in decreasing private motorized vehicles which is directly related to the quality of urban life and environment. Hence, increasing the use of public transport instead of private motorized vehicles results in less energy consumption, reduced carbondioxide emissions and smaller carbon-footprint. Public transport modes provide the opportunity to make long-distance trips and travel between topographically inconvenience places which are difficult to be carried out by walking or cycling. On the other hand, besides environmental impacts there are social and perceptual impacts of public transport use on societies. Unlike traditional planning approaches which are criticized in, today's understanding of transport comprises large sets of variables related to social and economic development goals while preserving environmental values. Although these variables are mostly considered as measurable variables in academia and hence, advanced methods have been developed to measure socio-economic and environmental impacts of transport, these are undeniably inadequate to evaluate the societal perception of transport and its affects. Therefore, a range of qualitiative methods have proved to be successful in this regard.

In order to develop an understanding of of urban transport as a social phenomenon, it is essential to deepen our analysis of accessibility through different methods. This thesis builds its methodology on the readings of transport hubs, in other words, interchange stations as public spaces by mainly employing the debates by French philosophers and anthropologists Henri Lefebvre and Marc Augé, specifically deriving from Augé's development of the term 'non-places'.

Augé argued that transit or transport-related spaces suppose to be there to meet certain needs such as easing the accessibility of places. Therefore, unless the space has a historical, memorable value or designed with the the conception of creating a living space, these spaces are considered as "non-places". Although a considerable number of interchanges are designed with no specific characteristics, many designers and architects are trying to break this conception. The central question of this thesis is how people's movement and journeys may be made more meaningful and what role interchange stations have in this process? There were designed and implemented examples considered as good practices which most professionals agreed so. To the aim of supporting the understanding of designing an interchange station as a living urban space, Amsterdam Centraal Station and Denver Union Station projects are evaluated.

As a result of the evaluations, the existing criterias are expanded. The main argument is if interchange stations become more liveable spaces then the public transport use would be encouraged and overall, the urban mobility becomes more sustainable. In this regard, this thesis analyses the newly constructed Sogutlucesme Marmaray Station, and its integration with different means of transit. While analysing the station area, physical and perceptional attributions are evaluated. In order to reconcile the perceptual and physical arguments of the venue with user data, comments made by passengers on the online platform were categorized and interpreted. Under the COVID-19 lockdowns when the data was supposed to be collected, open-source data was seen as the best approach to gather passenger perceptions. In this regard, passenger data /demands obtained from Sogutlucesme Station Google reviews within a selected timeframe are compared with Amsterdam Centraal and Denver Union stations' results within the same timeframe. In conclusion, interpretations and recommendations are made for future research and projects.

AKTARMA MERKEZLERİNİN KENTSEL MEKAN BAĞLAMINDA DEĞERLENDİRİLMESİ: ÇALIŞMA ALANI SÖĞÜTLÜÇEŞME İSTASYONU

ÖZET

Ulaşımın anlamı ve ihtiyaç çerçevesinde değerlendirilmesi zaman içerisinde gelişmiş ve değişim göstermiştir. Dönüşen toplumsal karakter ve çevresel faktörlere göre şekil alan ulaşımın değişiminin algılanması bugünün değerlendirilmesine katkı sağlayacaktır. Özellikle toplu taşıma kullanımının teşvik edilmesi, şehir planlaması ve ulaşım planlamasının en önemli politika ve eylem alanlarından biridir. Toplu taşıma sistemlerinin iyileştirilmesi, kenti çeşitli şekillerde daha erişilebilir ve yaşanabilir hale getirmektedir ve kentsel yaşam kalitesiyle ve çevreyle doğrudan ilgili olan bireysel araçlanmanın azaltılmasıyle sonuçlanabilir. Dolayısıyla, bireysel araçlanma yerine toplu taşımanın daha fazla kullanılması, daha az enerji tüketimi ve karbondioksit emisyonu ve daha az karbon ayak izi ile sonuçlanmaktadır. Toplu taşıma alternatifleri, yürüyerek veya bisikletle gerçekleştirilmesi zor olan uzun mesafeli yolculukları ve topoğrafik olarak uygun olmayan yerler arasında ulaşım sağlamayı mümkün kılar. Diğer bir bakış açışıyla, çevresel etkilerin yanı sıra, toplu taşıma kullanımının, toplum üzerindeki sosyal ve algısal etkileri de bulunmaktadır. Üzerinde yeniden düşünülen ve kritize edilen geleneksel planlama yaklaşımlarının aksine, günümüz ulaşım anlayışı gelişmiş bakış açısıyla ortaya konmuş olan çok daha fazla değişken içermektedir. Her ne kadar bu değişkenler akademide genelde ölçülebilir değişkenler olarak ele alınsa da, hayatın akışı içerisinde yaşayan insanı ve insana hitap etmesi için planlanan mekanı, diğer tüm değişkenlerden bağımsız olarak, yalnızca kantitatif bir yaklaşımla değerlendirmek yadsınamaz derecede yetersiz olacaktır. Kentsel ulaşım konusunu sosyal ve kalitatif bir olgu olarak ele alabilmek için, kentsel dokuda ulaştırma yoluyla erişilebilirliğin ne olduğunu ve sistemde nasıl analiz edilebiceğini anlamak önem arz etmektedir. Bu eleştriden yola çıkarak, bu tezin ortaya çıkmasındaki asıl amacın özünde, ulaşım mekanlarının, kantitatif ve kalitatif değişkenlerinin belirlenip bütüncül bir yaklaşımla değerlendirilmesi düşüncesi yatmaktadır. Bu temel amaç doğrultusunda, mekansal ölçekte yapılacak olan eleştiri ve değerlendirmelerden sağlıklı ve verimli bir sonuç elde etmek amacıyla spesifik bir kentsel ulaşım düğüm noktası belirlenmiştir. Yukarıda belirtilmiş olan amacı desteklemek için ortaya koyan ve tez kapsamında cevaplanması amaçlanan araştırma şu soruyu sormaktadır; "Kentin akışkan bir parçası ve ulaşım ağının düğüm noktası olan aktarma merkezlerinin kentsel mekan olarak kullanımının daha tanımlı ve verimli hale getirilebilmesi için nasıl müdahalelerde bulunulmalıdır?". Araştırma sorusu doğrultusunda şekillenmiş tez, yedi bölümden oluşmaktadır; tezin amacı, kapsamı ve metodunun açıklandığı giriş bölümü, ulaşım planlaması ve kentsel ulaşımın kavramsal çerçevesi ve dönüşümü, bu çerçevenin ortaya koyduğu erişilebilirlik ve kentsel mekanın oluşumu konularının ulaşım mekanı kapsamında irdelenmesi, aktarma mekanı kavramının fiziksel olarak değerlendirmesi ve değişkenlerinin belirlenmesi, iki kentsel ulaşım aktarma mekanının mekansal olarak kritize edilmesi ve değerlendirilmesi, örnek mekan çalışmasının ve mekanının seçilme nedenleri, proje detayları, mekansal ve çevresel olarak

incelenmesi, mekan çalışması ve buna bağlı incelemeler sonucunda erişilen nihai değerlendirme ve eleştriler.

Öncelikle, tezin giriş bölümünde, araştırma sorusuna istinaden şekillenmiş olan tezin amacı ve çerçevesi aktarılmıştır. Belirlenen çerçeve içerinde, araştırmanın amacına ulaşmak için yapılandırılmış araştırma metodu ve aşamaları bu bölümde belirtilmiştir.

Tezin ikinci bölümünde, ulaşım planlaması yaklaşımlarının, toplumsal, ekonomik ve teknolojik değişimlere bağlı olarak, zaman içerisinde nasıl bir dönüşüm geçirdiği incelenmiştir. Bu bölümde ayrıca, dönüşen ulaşım planlaması algısının sonucunda yeniden şekillenmiş olan kentsel ulaşımın kavramsal çerçevesi değerlendirilmiştir.

Bir diğer bölümde ise, ulaşım konusunun mekansal ve haklar açısından temel kaygısı olan erişilenbilirlik kavramı incelenmiştir. Bir çok disiplin tarafından farklı anlamlarda ve içeriklerde kullanılabilen erişilebilirlik kavramının, ulaşım konusuna yansıması ve ulaşımda erişilebilirlik ifadesi açıklanmıştır. Ulaşımda erişilebilirliğin yalnızca ulaşım ağı kapsamında değil, aynı zamanda mekan ölçeğinde değerlendirmesi yapılmıştır. Önceki bölümlerde, ulaşım planlamasının dönüşümünde rol oynayan tartışmalar, ve bu tartışmaların ulaşım mekanı olan istasyon ölçeğine indirgenerek ortaya konması ise diğer bir alt başlığın konusunu oluşturmaktadır. Kentsel ulaşım konusunu sosyal bir olgu olarak ele alabilmek için, kentsel dokuda ulaştırma yoluyla erişilebilirliğin ne olduğunu ve sistemde nasıl analiz edilebiceğini anlamak önem arz etmektedir.

Toplu taşıma kavramı, birçok farklı ulaşım modu ve tekil sistemin bağlantılı bir ilişki kurması sonucunda meydana getirdiği bütünleşik bir sistemi temsil etmektedir. Toplumların zamanla farklılaşan ihtiyaçları ve gelişen sosyal gereksinimler, kentsel mekanizmanın aktif bir parçası olan toplu taşıma sistemine yansımaktadır. Aynı zamanda bu gelişmeler, toplumsal ve sosyal ihtiyaçları karşılamak amacıyla, tekil / kendi içerisinde çalışan ulaşım sistemlerinin entegrasyonunun sağlanmasının önemini ortaya koymuştur. Ortaya konmuş mevcut teoriler ve söylemler incelendikten ve tartışıldıktan sonra, bu tartışmalardan çıkarılmış sonuçlara dayanarak, aktarma alanını değerlendirmek için kriterler tanımlanabilir. Üzerinde tartışılmış teoriler, ulaşım mekanlarınının kentin yaşayan bir parçası olarak mekansal algısını farklı bir boyuta taşımaktadır. Augé'nin bakış açısından çıkarım yapacak olursak, ulaşım mekanları veya ulaştırmayla alakalı geçiş koridorları, insanın gerçek mekansal deneyimi yaşadığı noktalara ulaşmak için kullandığı aracı mekanlardır. Eğer ulaşımla ilişkilendirilen mekanların tarihi bir değeri veya başka bir deyişle akılda kalmasını gerektiren bir kimliği yoksa ve bu mekanlar kentin tecrübe edilecek bir parçasını oluşturacak şekilde tasarlanmadıysa, Augé ulaşım mekanlarının tamamını "yer olmayan / non-places" olarak tanımlamaktadır. Bununla birlikte, tasarlanmış ve uygulanmış olan çoğu aktarma merkezi örneğinde de görülebileceği üzere, hiç bir karakteristik özellik atfedilmemiş ve bu tasarım kaygısıyla oluşturulmamış mekanlarla karşılaşılmaktadır. Tanımlı mekanlar yaratma noktasında tasarım kaygısı taşıyan bir çok mimar ve şehir plancısı, bu sıradanlanmış konsept anlayışını kırmaya çalışmaktadır.

Bu tezi oluşturan temel sorulardan bir diğeri ise; insanların hareketi ve seyahati esnasında tecrübe ettiği mekanları nasıl daha anlamlı hale getirebiliriz ve aktarma merkezlerinin bu süreçteki rolü nasıl şekillenebilir? Profesyonel çevreler tarafından da uzun zamandır tartışılan bu sorunun cevabını yalnızca teorik çerçevede cevaplamak yetersiz kalacatır. Felsefi metinlere ve söylemlere dayalı oluşturulmuş mekansal kriterleri, somut veriler ve gözlemlerle desteklemek amacıyla uygulanmış aktarma merkezi örnekleri incelenmiştir. Örnekler belirlenirken, genel profesyonel ve akademik değerlendirmelere göre, kentsel doku ile başarılı bir şekilde bütünleşmiş,

kentli için anlamlı bir mekan ifade eden istasyonlar olmasına dikkat edilmiştir. Seçilmiş olan Amsterdam Centraal İstayonu ve Denver Union İstasyonu projeleri, genel amaç ve yaklaşımlarının yanında, proje detaylarıyla birlikte ele alınmıştır. Proje detayları, projenin tasarım ve uygulamasından sorumlu aktörler tarafından kamuyla paylaşılmış olan detaylı veriler üzerinden şekillendirilmiştir. Önceki bölümlerde tartışılmış teorik argümanlar ve kişisel gözlemler baz alınarak, belirli çıkarımlar elde edilmiş ve eleştriler yapılmıştır. Bunun yanında, yolcu Elde edilen çıkarımlar neticesinde, her iki mekanın da sosyal yapı, çevresel doku, mevcut fiziksel doku gibi değişkenler ele alınarak tasarlandığı kanaatine varılmıştır. Amterdam Centraal İstasyonu tasarlanırken, bisiklet kullanımına elverişli topoğrafya ve onlarca yıldır süregelen bisiklet kültürü gibi değişkenler göz önünde bulundurularak, Denver Union İstasyonu'na kıyasla, motorlu olmayan ulaşım alternatiflerine oldukça yer verilmiştir. Tarihi tren istayonunun renovasyonu dışında yapılan tüm uygulamalar sıfırdan inşa edilerek gerçekleştirilmiş ve bir kısmı hala devam etmektedir. İstasyona aktarma merkezi özelliği, çevredeki tüm alternatif ulaşım ağlarını aynı noktada toplayarak kazandırılmıştır. Her iki istasyonda da, bireysel motorlu araç kullanımını azaltacak ama reddetmeyecek nitelikte bir tasarım prensibi benimsenmiştir. Denver Union İstayonu tasarımında, tarihi istasyonun da içinde bulunduğu mevcut ulaşım dokusunu iyileştirerek birbirine entegre etmek amacıyla daha minor müdahalelerde bulunulmuştur. Bunu yaparken, güçlü bir kompozisyon oluşturulmuş ve kentsel ölçekte alınmış olan her karar gerekçelendirilmiştir. İki istasyon projesinde de mimari ölçekte alınan kararlar, insan ölçeğinde mekan yaratma ve fonsiyon sağlama kaygısıyla desteklenmiştir. İncelemeler sonucunda, çalışma alanı değerlendirme kriterleri genişletildi

Tezi şekillendiren bir diğer argüman ise; aktarma istasyonlarının, yaşanabilir, tanımlı ve anlamlı kentsel mekanlar olarak tasarlanması veya dönüştürülrmesi, toplu taşıma kullanımının teşvik edilmesini sağlar ve bunun sonucunda sürdürülebilir bir ulaşım ağı elde edilir. Bu argüman doğrultusunda değerlendirme yapmak amacıyla Söğütlüçeşme Marmaray İstasyonu seçilmiştir. Tezin beşinci bölümünde, istasyonun çalışma alanı olarak seçilme nedenleri açıklanmıştır. Oldukça yakın bir tarihte operasyonlara başlamış olan Gebze – Halkalı Tren Hattı bir diğer adıyla Marmaray'ın, en aktif kullanılan istasyonlarından Söğütlüçeşme İstasyonu, konumu itibariyle oldukça yüksek sayıda yolcu almaktadır. Aktarma istasyonu ve kentsel ulaşım düğüm noktası olma özelliğini, kritik konumu, Metrobüs istasyonuna ve diğer ulaşım alternatiflerinin duraklarna yakınlığı sebebiyle kazanmıştır. Öncelikle, mevcut durumu açıkça kavrayabilmek adına, Marmaray Projesi detayları verilerle desteklenerek aktarılmıştır. Daha sonrasında, Söğütlüçeşme Marmaray Projesi çevresel özellikler, erişilebilirlik, mekansal nitelikler ve daha önce literatür incelemesinde belirlenmiş değişkenler çerçevesinde ele alınmıştır. Aynı değişkenler göz önünde bulundurularak, diğer ulaşım alternatifleriyle ilişkisi, aktarma merkezi mekanı ve fonksiyonu oluşturulması kaygısıyla değerlendirilmiş ve eleştirilmiştir. Mekanın ortaya koyduğu algısal ve fiziksel argümanları, kullanıcı verileriyle bağdaştırmak adına, online platformda yolcular tarafından, son bir yılda yapılmış olan yorumlar kategorize edilip yorumlanmıştır. Elde edilen Söğütlüçeşme İstasyonu yolcu verileri, daha önce aynı şekilde değerlendirilmiş olan Amsterdam Centraal ve Denver Union istasyonu sonuçlarıyla kıyaslanmıştır. Sonuç ve nihai değelendirme bölümünde ise, gerçekleştirilebilecek müdahaleler bağlamında eleştiriler ve tavsiyeler aktarılmıştır.

1. INTRODUCTION

1.1 Aim of Thesis

In the last century, the characteristics of transport has had ever-growing advancements from technology to infrastructure projects and the ways in which people utilize them. These characteristics and the development of transport itself cannot be separated from the urban context in both morphological and spatial meanings, hence its direct relation to public spaces. If the transportation is the result of actions, then people are the subject of it. The correlation between changing face of urban texture according to social and physical transformation and transportation needs have always been parallel progresses. Thus, urban development and transportation development are interpenetrating notions.

Since the beginning of the 20th century, development in transport and technology were mostly focused on private vehicles which gained extreme popularity over the years. Unfortunately, as a result of increased private motorized vehicle ownership, cities suffer from permanent environmental damage as well as congestion and decreased urban life quality, as elaborated in following chapters. On the other hand, in order to deal with the problems related to private motorized transport and to satisfy the increased working population demand in cities eventuated in improvements on public transportation as well.

In order to achieve more accessible transport system, especially in metropolitan areas, passengers need to use different means of transportation for their trips. Especially for long distance trips or in order to overcome the topographical challenges which can be faced easily as in daily urban life, public transportation ridership is highly effective. Because of similar necessities or challenges and also inadequate urban infrastructure, it would be mostly difficult to choose solely physically demanding transportation means (e.g. walking, and cycling) for reaching the desired destination. To cope with private motorization, usually in metropolitan areas, different means of public transportation combined with sustainable means of transportation such as walking, cycling and even riding scooters are encouraged by local authorities in several cities.

Although, previously there have been many authorities that shaped their policies by putting the private motorization in the center, there have been many implementations as examples of actualizing a well-working multimodal transportation system especially in European cities.

When cities of Turkey are examined, it can be realized that most of them have only rubber-tyred vehicles for public transportation. On the contrary, the biggest cities of Turkey have embodied multimodal and more developed transportation systems. Without any doubt, Istanbul has had the most advanced multimodal transportation implementations among other cities. Regardless of top down decision-making mechanism related to transportation projects, there are several reasons trigger the accumulation of major transportation projects in Istanbul such as topographical features, population density, social conjuncture, and existing transit infrastructure.

Nevertheless, most of these newly built transportation projects have not sufficiently interacted with the urban pattern and there are numerous reasons for that. In relation to the concerns over functionality and the urban experience, especially interchanges between different modes of transportation are not effective. These important transit nodes within the urban pattern should be criticized and evaluated to suggest the right implementations for areas to produce defined and meaningful spaces in the city.

Making public transportation beneficial for all and attractive for its users in order to achieve sustainable urban mobility, interchange stations' organisational and design problematics need to be examined in depth (Bertolini et all., 2005). This thesis aims to advance the understanding of accessibility of these nodes with regard to the characteristics of liveable urban spaces while evaluating a multimodal transit area, Sogultlucesme station area as a case study which is one of the major nodes in Istanbul's transport system and its transit network.

1.2 Scope of Thesis

Technological developments in transportation and communication systems in the changing urban structure have focused on two concepts which are the basic criteria of urban life: time and space. Time and space constitute the term accessibility that referred to connectivity between whereabout to destination point (Geurs & Van Wee, 2004).

Several theories and discources of Augé (1995), and Lefebvre (1991, 2004) argued the quality of urban spaces that are shaped, reconstructed and determined by infrastructure developments as well as other processes that played important roles in the (re)production of urban space. Considering the city as a whole, transportation systems have more particular indicators and specified variables than other elements of the city.

As a consequence of standing on the middle of mega transportation investments, Istanbul has faced various challenges regarding decision-making, finance, and design issues. This thesis primarly focuses on the latter: design-related issues in intersection nodes. Yet, design of these crucial elements in the transport system cannot be evaluated separate from decision making processes due to variety of stakeholders (e.g. local municipalities, metropolitan municipality, central government service providers) all have a say in the implementation of plans.

In decision-making phases of transportation projects, especially in areas where several transport modes intersect, the design of these places should be taken into account as it should be clear allowing smooth transfer of passengers. In order to achieve accessible and liveable cities, the connectivity, flow, space indicators of these intersection nodes are very important (Castells, 1989).

In this aspect, newly built projects, and multimodal stations within the scope of these projects are open to improvement. Besides, variations of different modes that are close to each other give advantage to shape a well-working multimodal station area. Sogutlucesme Marmaray Station as a newly renovated interchange station where the high-speed rail network meets with the Bus Rapid Transit (BRT or Metrobus as locally known) and other key lines in Istanbul has been investigated in this regard. It is basically investigated in three stages. Initially, transit spaces in urban pattern is discussed with regard to social perspective. Then, discourses about physical necessities of transit spaces are evaluated and simplified as several variables. In order to support the literature discussed, two best-practices considered as well-designed interchange station projects and are evaluated and criticized.

1.3 Methodology

The primary methodology is a case study (Sogutlucesme station area) preceded by a literature review and investigation of two best-practices (Denver Union and

Amsterdam Central stations). The structure of this thesis took shape at several steps with regard to the questions on accessibility and interchange hubs in public transport. Initially, in order to understand the current conjuncture and the needs and understand the developments of transportation systems, improvements and evolutions of the global transport system in time were reviewed and criticized. Meanwhile, the milestones with the changing perspectives, policy areas, problem definitions and philosophies regarding transport and mobility were observed. According to these observations, public transportation term and the meaning for the public as a right to access services have been reviewed. Transportation planning and urban planning approaches with changing transportation demand from car-centric approach to sustainable public transit solutions have been evaluated. As a result of these evaluations, new questions came up regarding environmental and social sustainability and the ways in which integrated transportation systems may be achieved. In order to answer these questions, indicators have been determined based on the literature and analysis of best-practices. After evaluation of the existing discourses and theories rising from the literature, in order to determine the variables of the sustainable and integrated transportation space, two different approaches are determined as 'perceptual analysis' and 'physical indicators'.

Under the perceptual analysis, the perception of accessibility and the ways in which it creates urban space as well as transport space have been evaluated. Besides of perception of transit space evaluation, physical indicators of mobility, and metrics of interchanges are discussed. In order to do that, extensive readings from a variety of sources were scanned and filtered to reach a concrete content analysis. Findings from these analyses motivated the development of variables that represent mobility experience at interchange areas.

In order to support the findings and develop the variables, under the best practices part, Denver Union and Amsterdam Centraal station areas have been investigated with the help of shared data by both responsible designers, contractors, and goverments. The shared data consist of explanations of every step including decision-making, and technical drawings of projects that help to evaluate in detail. In order to support these evaluations and understand the personel experiences, Google reviews for stations made by passengers in one-year period (06/19 - 06/20) were categorized and

interpreted as a survey methodology. As a result, the evaluation variables and criterias of the case area are expanded.

After creating a strong theoretical foundation, the Marmaray Line design and construction phases have been investigated with the help of secondary data. In following chapter, Sogutlucesme Marmaray Station has been evaluated regarding its relationships with its surroundings at the urban scale as well as design specifications including technical information and individual experiences. Due to the lack of publically shared data about the station and its surroundings, more data were asked from TCDD and DLH via e-mails and phone calls. This made possible to argue the technical and spatial specifications of the station. After that, Sogutlucesme interchange area is evaluated with results of the indivudal experiences as well as researcher's own observations. Stations / stops of different modes of transport that gives interchange function to the area and the relation in between are investigated. In order to investigate pedestrian experiences, the planned survey on site was cancelled because of the COVID-19 lockdowns. In order to reach pedestrian data/demands, individual experiences of passengers shared via Google reviews for Sogutlucesme Station have been evaluated. Derived Sogutlucesme passenger data are compared with Amsterdam Centraal and Denver Union stations' data, which are collected from the same souce and made in the same time period (06/19 - 06/20).

Evaluation of the case area was supported through the indicators acquired from academic discussions on literature review and secondary data. In the conclusion chapter a critical review of the findings and recommendations for future implementations have been summarised.

2. TRANSPORTATION PLANNING

Over the last few years, there has been several transportation investments at Istanbul. Most of these projects are newly built, and some of them are developed from the old infrustructure. As a metropolitan area, Istanbul has several challenges such as its polycentric pattern, topography, density and population. Considering these challenges, and the growing demand based on the increasing population and mobility levels an accessible transportation system becomes even more important. Especially in metropolitan areas, movement from point A to B requires mostly more than one mode or line. At this point, the importance of the accessibility of multimodal stations and interchanges between these stations are inevitably interdependent and intercative phenomenons.

In this section, the relationship between urban space and movement with regard to transportation, historical development of transportation, public transportation and conception of multimodal transportation are elaborated.

2.1 Transportation, Movement, and Space

Transportation can be explained as the movement of people, goods, energy, and information over a certain period of time for a supposed purpose on a certain way (Rodrigue, 2006). The concept of 'transportation', which is identified with the concepts of time and distance, also has 'binding' features for various land uses, and nodes (Geurs & Van Wee, 2004). According to Rodrigue et all. (2006), "the unique purpose of transportation is to overcome space, which is shaped by a variety of human and physical constraints such as distance, time, administrative divisions and topography". Correlatively there are confered by a friction to any movement, so the term is commonly known as the friction of space (Ingram, 1971). However, the friction can be circumscribed with the extent to which this is done has that varieties that greatly according to factors such as the distance involved, safety of infrustructure and environment, the capacity of modes, and the demand of who are being transported. The aim of transportation is that to transform the geographical attributes of people,

from starting point to a destination, while attribute a meaning of the process and the experience (Rodrigue, 2006). Transportation planning shapes the spine of the urban development. Starting with rapid urbanization, people felt free to enhance their mobility limits and meet their transportation needs. While exploring mobility limits, car dependency increased severely.

2.2 Development of Transport Approach

Transportation planning shapes the spine of the urban development. Starting with rapid urbanization, people felt free to enhance their mobility limits and meet their various needs. While exploring mobility limits, car dependency increased severely. Through the car dependency, despite the undeniable fact that cars reflected credit upon several benefits on city, undesired and severe environmental and social consequences have occured.

Ritter (1964) defined the urban transportation system as an important tool for one can use to build a sustainable and liveable city. The structural pattern of the city comprises of social infrustructure, economy, and technological developments involved as a part of the working mechanism of this important tool. The reason why the transportation planning is such an integral part of contemporary societies, it is capable of concluded significant benefits however it is possible to generate many negative impacts. To minimize these inconveniences, in accordance with Rodrigue el all. (2006), the allocation, design, and construction phases of this mechanism must be subjected as careful planning by public or private designers and policy makers. Therewith the global technological developments gathered momentum, the number of motorized vehicles were excessively increase. While this increasing phenomenon were happening, urban impacts and possible results have been mostly neglected. It is surely beyond doubt that these developments have had benefits with respect to accessibility and such. However, in time, as a result of raising numbers of private motorization, insufficient road networks resulted with congestion in cities, and excessive usege of private vehicles resulted environmental pollution and decreased life quality. These issues resulted in increased importance of urban planning and architecture.

Maybe the most known name of the modern architecture is Le Corbusier who was quite popular in 1930’s, was defending the thought that economic, social, and cultural life in cities were all dependent on a highway network development. At the assembly

of International Congresses of Modern Architecture (CIAM) in 1933, maybe the most controversial urban doctrines were discussed. Most of the congress members aggreed on the medieval cities are not appropriate for the future urban developments because of the street patterns (Mumford, 2000). Transportation needs which had related to modern means of transportation such as car was seen inevitable not to accept. Furthermore, they recommended that high-rise residents, green areas, and social facilities should be located adjacent to transportation network. These thoughts about transportation were reflected to the designs of urban planners' and architects' design works. Le Corbusier's Ville Radieuse / Radiant City design is one of the best examples of the doctrine they upholded.

The phenomenon continued with the various transportation policies and urban renewal projects were come out made by virtue of increased popularity of car use in all cities. These policies and projects were concluded of aim to achieve sustainable transportation networks to create more liveable spaces. The period beginning after 1950's, traditional planning approach which was affected by rapid technological developments with the belief in the technology what was sufficient to overcome traffic problems. In the beginning, it was assumed that the only problem of car-dependency was traffic congestion. As a consequence of this assumption, transportation planning in that period was about designing to provide maximum efficiency of vehicular accessibility. Hence, transport planners prefered to enhance the capacity of existing roadways and build new highways instead of rejuvenation of existing modes of transit. Although, those approaches of planning resulted with positive impact on accessibility depending on car usage, it arose problems that public transport, cycling and walking have become less attractive, and environmental problems have consequently deepened in time. From opposite perspective, as a consequence of these planning approaches new developments were started to be built in peripheral areas of the cities disregarding sustainable and long-term solutions. These solutions come with numerous related material and non-material costs such as construction, maintenance, parking infrastructure, excessive noise and air pollution that resulted in reducing attractiveness and amenity of cities, especially within central areas and urban nodes where congestion levels were the highest. On the nature of its tendency to deal with localized problems, traditional transportation planning approach is mostly focused on local problems which require more exact and specific solutions than inclusive policies

adopted in transportation planning (Rodrigue, 2006). In this sense, he critisized that engineers and other professionals who have dominance on traditional transportation planning and he named them as distinctly mechanistic characters.

Since 1963, this car-dependent point of view of urban related professional society changed the direction with the Buchanan report. In the report, Buchanan put emphasis on that the reasons of traffic congestion and negative consequences of traffic as the experts who directed society to private car use instead of public transportation, on the other hand, encouraged solely engineering solutions as a definite solution of those problems (Buchanan, 1963).

The 1973 oil crisis is accepted as a milestone of awareness regarding the necessity to tackle with the 'car problem' in cities and starting point of decreasing these traffic problems that increased without restraint and last over half century (Gehl & Gemzoe, 2000). After the crisis impacts were encountered, it was aggreed on that building more capable roadways and cities to meet the expected growth is not an efficient solution for car-based transportation planning problems. It was realized that transportation studies are in direct relation with architecture, urban planning, sociology, economy, geography, and even history of societies. This being the case, transportation planning approach evolved to a multi-disciplinary area for achieving inclusive and better coordinated transit systems (Gehl & Gemzoe, 2000). The new contemporary approach of transportation is not only about providing accessibility but also about creating liveable environments by enhancing comfort, safety, and health as a consequence of reduced carbon emissions (Rodrigue, 2006). On the contrary of traditional type, contemporary transport planning aims to enhance maximum accessibility with minimum costs and negative environmental impacts.

It is a matter of fact that, with the impacts of 1980's vision, transportation planning, which can already be considered as a humanist study, concerns were widened to traffic accidents, global warming, design concerns besides environmental pollution. These concerns require transform in public attitudes and planning approaches as concomitants. Starting with this turning point, a new term called sustainability emerged in almost every fields of professions. In short, for mobility to be sustainable, it must improve accessibility while avoiding disruptions in societal, environmental, and economic wellbeing that more than offset the benefits of the accessibility improvements (WBCSD, 2001). The impact of sustaiable development phenomenon

has increased with each passing day since 80s. The wider definition is that, with United Nations' definition, sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (UN Brundtland Commission, 1987). Due to still growing environmental problems related to transportation, the concept of sustainable transport has been considered as a part of sustainable development. Sustainability in transit refers to means of transportation with as lower impact as possible on the environment in every aspect, such as walking, cycling, public transportation. It involves developing and promoting urban transport system. As an inference it can be said that the transportation system, and in parallel with the city should be developed in respect of affordability, reliability, accessibility, and level of environmental impact. There are correlations between every aspects of the quality of urban spaces and sustainability in terms of form and function and the best results of these subjects are possible via efficient urban planning. According to UN sustainability presentation (UNDP, 2005), sustainable urban transportation goals should be as given below;

- Accessibility: the city supposed to be designed for people instead of cars. The city should be convenient to live without a private motorized vehicle as with one.
- Equity: Everyone in every cimcumstances should have access to services and parts of the city via several modes of public transportation.
- Environment: Transportation systems should operate in a way that cause minimum pollution.
- Integration: Integrated planning approach should be adopted in the system within a policy framework.
- Public participation: Public projects details and decisions should carry out in transparency. Public should be consulted in planning phase via local governments.
- Economy: Determined fares of public transportation should be as low as possible. On the other hand, private motorized vehicle users should be charged for economic, environmental, and social impacts of their transportation.

To the aim of to build equitable, accessible, integrated and economically viable cities, sustainable transport planning has a critical role for reversing the motorized vehicle related problems. As an abstract of the goals of sustainability at transportation is the ability to meet the needs of the public to gain access to services, establish social relation, and move without obstacles without scarifying any essential humanitarian and ecological values today or in future (WBCSD, 2001). While balancing computable variables which are environmental, structural, and economic goals, there must be ensured the social rights and needs of public about accessing and mobility. As a consequence of adaptation phase of the sustainability, it is inevitable to create a whole transit network system which has integrated modes of transport with encouraging non-motorized means such as walking and cycling. However, there is a gap between practice and theory, as always (Büttner et all., 2018). According to Büttner et all. (2018), the accessibility level of the metropolitan region of Munich was in question, three main questions came up during the practice stage: how to reduce car dependency in an area to improve its environmental and social sustainability, how to achieve better integrated land-use and transport modes by identifying locations; and to solve economic issues related to gasoline prices.

As a matter of fact, practices showed that convenient design of the urban pattern, and encouragement policies resulted in the increasing use of modes like walking, cycling and public transport. Contemporary perceptive of sustainable planning includes the concept of travel demand with its relation to the environment and life, while traditional planning concern is carrying goods to supply. On the contrary of traditional approaches, contemporary perception aims to balance between supply and demand correlation through travel demand management (Anderson, 2013).

Travel demand can be basically described as the number of passengers who choose to use a specific means of transport (Nash & Sylvia, 2001). This variation helps to determine the interchange size; this aspect defines the need for space and access characteristics to the aim of reducing car-dependency, traffic congestion, and environmental pollution as a result of sufficiency of integrated modes of public transport (Monzon et all., 2016). In this context, it is differantiated from traditional planning approach, which can be best described as to predict the growth in road traffic and to expand the road capacity to meet that travel demand as a solution. There are various design principles and management policies are needed to shape the orientation

of transportation, to reduce the tendency to private motorized vehicles and to increase the liveability of cities within a sustainable framework. These principles can be detailed as follows:

- Physical regulations for encouraging use of non-motorized means of transit and design regulations for increasing availability of pedestrianization in cities.
- Regulatory measures and restrictions on private motorized vehicle ownership and use based on long-term transformation period strategies.
- Design strategies on urban and architectural level to the aim of directing persons to public transportation instead of private motorized vehicles.
- Building integrated transportation network which is also embedded in land-use and environment. Integration of walking, and cycling cannot be considered out of topic while shaping healthy and effective integration.

2.3 Urban Public Transportation

Transportation is one of the basic functions of the urban spaces that directly influence environmental, social, and economic characteristics. As discussed before, the main reason behind the most of problematic issues in cities is the dominance of private motorized vehicles over the other means of transportation. Especially in metropolitan areas car-based pollution, noise and congestion turn the city's atmosphere into unhealthy, depressed and an unliveable environment. In the course of time, some measures and design strategies have been defined regarding to the discouragement of private car use to the aim of reversing this explosion, particularly by policymakers and professionals of developed countries (Hennig et all., 2016). While these strategies were being set, new urban public transport approaches were developed within the frame of mobility and accessibility which resulted with pedestrianization and tendency to use public transport modes (Nash & Sylvia, 2001). As a natural result of growing traffic congestion, there have been trying to redevelop the transit networks of many cities. After arguing Zurich's transportation network example, Nash and Sylvia specified that there are two main choices. The expensive and time-consuming option is building an entire new transportation network from scratch. The other option which is considered as more affordable and faster is renewing the existing network or stations to a proper and better system with pursuing "transit priority techniques". After 1987 Amsterdam

transit strike, which was triggered as a result of oil crisis, the urban strategies were focused on discouragement of private motorization (Figure 2.1). The photo on the right shows how the city was built around public transit and non-motorized means of transport. It may be seen as a good example demonstrating the interaction between land-use and public transportation.

Figure 2.1 : Damrak, one of the most important transportation axes of Amsterdam City; 1987 vs. 2010 (Te Brömmelstroet, 2020).

The public transportation term can be defined as a holistic system designed to meet the transportation demands of the people, which refers elements that enables the mass mobility of the passengers between places, and the relations between these elements. On the contrary of private transportation, this system has limitations defined in accordance with public demand and structural city layout.

It is surely beyond doubt that, the usage of public transportation significantly decreased negative environmental effects of car-dependency. As a result of controversial approach about the issue, the Muenster traffic posterwas designed and released in 2001, claims how problematic issue is that dependency on cars and it compares the required spaces to transport same number of passengers via bicycle, private car, and bus (Figure 2.2). Obviously, as shown in the poster, the occupied

public space related to use private car is way more than spaces need for non-motorized and mass transit alternatives.

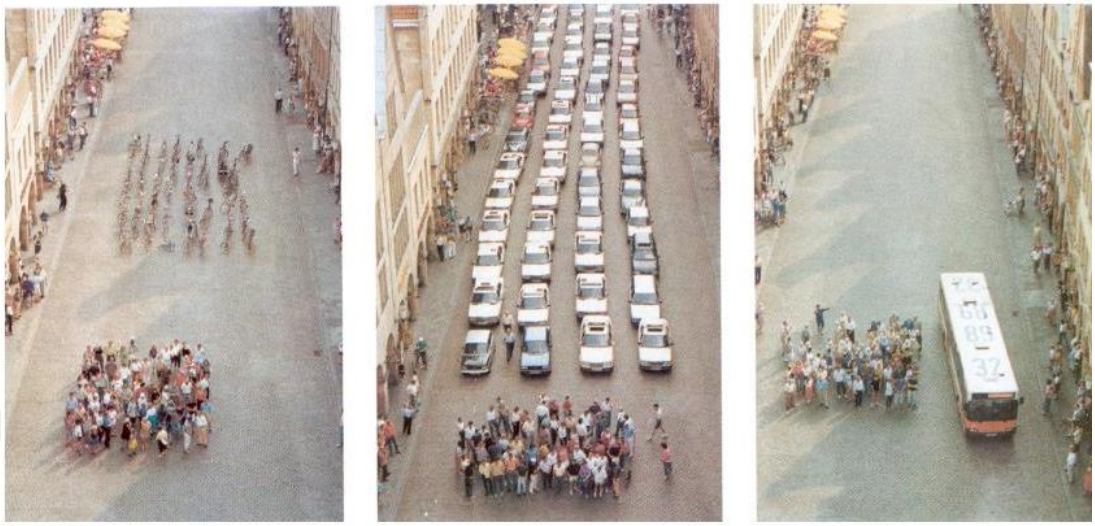

Figure 2.2 : Gross amount of public space required to transport 60 passengers via bicycle, car or bus (Muenster Planning Office's traffic poster, 2001).

In spite of each city adopting different strategies, there is a common point of view that a well-working public transit system can provide an effective alternative to private motorised transport in order to meet the needs of citizens. In accordance with the sustainable urban transportation planning approach, the initial goal of policymakers is to make public and intercity mobility as comfortable and attractive as possible by prefering public transportation vehicles instead of privately used cars (Hennig et all., 2016). Attractiveness of urban public transport is in relation with not only physical design measures but also some legal sanctions against private motorized vehicle ownership and use. Taking into consideration that the transportation related areas as urban spaces, established sensory perception of the society on these spaces can be taken as an importatant variable too (Stewart, 2017). These measures are interdependent to all quantitative and qualitative variables that support each other and has powerful impacts on the entire transit network of the city. To reach the most effective impacts and results, urban transit alternate modes should be considered in competitive but not repudiative way with car-oriented perception in terms of created spaces for preferred experiences, convenience, speed, comfort, and safety.

Public transportation has played an integral part of both political interest and social life in urban places of many countries. In fact, this phenomenon is continuing especially at developing countries (Bos & Lee, 2012). A well-designed public transport system backed by the right policies, and public transportation vehicles and stations suitable for passenger use can surely give results of reducing the need for additional roads and parking spaces that occupy the public space. Even a spatially renewed railway station or increased number of bus lanes in accordance with public participation will also support and encourage to prefer walking and cycling even so it is for interchanging. While carrying out these revisions and implementations, the concepts of sustainability and mobility are inseparable parts of the procedure in order to achieve long-term and better results.

3. ACCESSIBILITY

Accessibility has several explanations that have been used by many different professions in many distinct ways. In this chapter, accessibility is referred to connectivity or accessing services that can clarify the part of transportation plays. ın addition to technical definitions of accessibility, its perception is also under investigation in this thesis. The following sections will cover these as well as the dynamics of built environment (location and its specifications), temporal components (arrival – departure time of vehicle, traffic flow, business hours) and passenger expectations and experiences will be reviewed.

3.1 Perception of Accessibility

Transportation cannot be handled just as a physical system of the urban pattern. Differentiating from most of the physical elements of the city, transportation system has its own characterized movement similar to living organism, so the impact of the system can be constantly evaluated. While designing a public transportation system, it has been always aimed to create connectivity between two points. Connectivity is one of the dimensions of the network reliability (Bell, 2000). This explanation implies that the destinations or nodes of the city should be capable of being accessible.

In generally, car-dependent transportatation network through highway access is well integrated with designing multiple routes and connected destinations (Auma, 2015). On the other hand, the connectivity as well as integrity of the public transportation modes are significantly insufficient (Büttner et all., 2018). This absence of integrity creates a major inequality and massive barrier in front of the car-free accessibility (Warade, 2007).

One of the most comprehensive definition of accessibility is that the accessibility is extent to which land-use and transportation systems enable persons to reach services, activities, or destinations desired and need (Geurs & Van Wee, 2004). The term itself is directly related to both qualities of the transportation system such as time gap between departure and arrival or technical / physical competence of the station and

also land-use characteristics which include structural morphology or functional densities (Bertolini et all., 2005). Hence, it can be said that building an accessible and functional transportation systems give individuals freedom and right to reach both social and physical services such as freedom of education, ease to get health services, employment and so on (Figure 3.1).

Figure 3.1 : Accessible transportation services relationship (photo credit: WHO /S. Volkov, 2018).

In accordance with the quantative approach, the measure the efficiency of the accessibility can be realized in several ways with putting forward measurement methods because there are numerous variables. A large number of academics and researchers have described different ways of measuring the accessibility by using different kind of methods. As a result of which, all measurements coming from the methods were related to certain kind of components of accessibility (Geurs & Van Wee, 2004). As a result of filtering numerous researches, Geurs et all. (2004) identify four types of components of accessibility measure: landuse, transportation, temporal and individual. It is discussed that accessibility measures should be taken with all variables and elements within these core components into account. However, most of these methods used were based on one or more elements. They also categorize the measures under four topics, which are infrastructure-based, location-based, person-based, and utility-based measures. Table 3.1 given below a matrix of variables of the transit space in accordance with the measures and the components.

In accordance with the table, under the component of transport, measures are given as,

- For the infrustructre-based measures; travel speed, headway and time lost in congestion,
- For the location-based, person-based, and utility-based measures; travel time between locations of activities.

Table 3.1 : Perspectives on accessibility (Geurs & Van Wee, 2004).

Measure	Component			
	Transport Component	Land-use Component	Temporal Component	Individual Component
Infrastructure -based measures	Travel sped; headway or time lost in congestion		Peek hour period	Trip-based satisfaction
Location-based measures	Travel time and cost between locations	Spatial distribution of demand for supply of opportunuties	Differentiated costs and time according to the location	Satisfaction of the social identitty of the population
Person-based measures	Travel time between locations of activities	Spatial distribution of supplied opportunities	Temporal constraints for activities and time available for activities	Accessibility analyzed at individual level
Utility-based measures	Travel timi between locations of activities	Spatial distribution of supplied opportunities	Differentiated costs and time according to the location	Utility is derived at the homogeneous population group level

Under the component of land-use, measures are given as,

- Spatial distribution of demand for supply of opportunities for the location-based, person-based, and utility-based measures,

Under the component of temporal, measures are given as,

- Peak hour period, for the infrustructre-based measures,
- Differentiated costs and time according to the location, For the location-based, and utility-based measures,
- Temporal constraints for activities and time available for activities, for the person-based measures.

Under the individual component, measures are given as,

- Trip-based satisfaction, for the infrustructre-based measures,
- Satisfaction of the social identity of the population faced, for the location-based measures,
- Accessing services and accessibility in general at individual level, for the person-based measures,
- Utility is derived at the homogeneous population group level, for the utility-based measures.

After assessing these measures given above, it can be mentioned that to put equity in public transportation practice requires information coming from the field surveys those reflect how a public transportation system meets passenger needs in accessing the necessities of everyday life. The characteristics of these data and measures let us distinguish the terms of access from accessibility. Basically, access term can be used from passenger perspective, on the other hand, accessibility term is mostly related to location and environmental perspectives (Geurs & Van Wee, 2004). From passenger perspective, the evaluation of accessing perception about the public transportation is expressed in the pyramid of satisfiers (Peek & van Hagen, 2003) based on the pyramid of Maslow's hierarchy of needs (Figure 3.2).

Figure 3.2 : Evalution attributes in public transportation (Peek & Hagen, 2003).

Passenger evaluation attributes shapes this pyramid, which represents the fact that higher evaluations of passengers for the specific attributes such as gaining experience and feeling comfort leads to *satisfiers* and lower evaluation for the generic attributes which are convenience of space, time spending on transit, safety and punctuality leads to *dis-satisfiers*. The bottom part of the pyramid, given as safety and punctuality, represents the basic requirements depends on the fundamental needs of passenger, is for 50% the main aspect of the evaluations by passengers. It is the fact that the variable of punctuality is mostly not included in accessibility analysis (Geurs & Van Wee, 2004). Besides, both comfort and convenience variables are excluded from academically driven, and transportation-based accessibility measures more often the reason why the obtained data about these measures are usually unavailable or quantifying the results are far from possible.

3.2 Station as Urban Space

According to Castells, urban space can be considered as places and spaces of flows and the conception of space expresses and defines the society fundementally (Castells, 1989). For the traditional approach of land-use planning, spaces connect locations that are important for network and exchange. These subjects can be handled nowadays through telecommunication and transportation.

Spatial parameters lie behind movement and space concepts and could be predefined as an integrative perspective on flow of urban spaces (Cidell & Prytherch, 2015). There are countless ways in which these definitions and approaches may be conceived. As a synoptic analysis, spatial parameters were analyzed from the points of three dimensions: “accessibility and distanciation”, “appropriation and use of space”, and “domination and control of space” (Harvey, 1989).

Instead of being a basically functional transport structure in the city at first examples, today the role of stations has transformed to “magnet of the city" that attracts millions of passengers to station area forming mass gathering space (Hennig et all., 2016). However, in the eyes of a person who experince the transport space, accessibility issue in stations can be considered as steps to reaching the desired destination. Each step forms the basic functions of whole concept of transport space. Considering the transport cycle, which is given below, helps for a better understanding of spatial use for passenger to know phases (Figure 3.3).

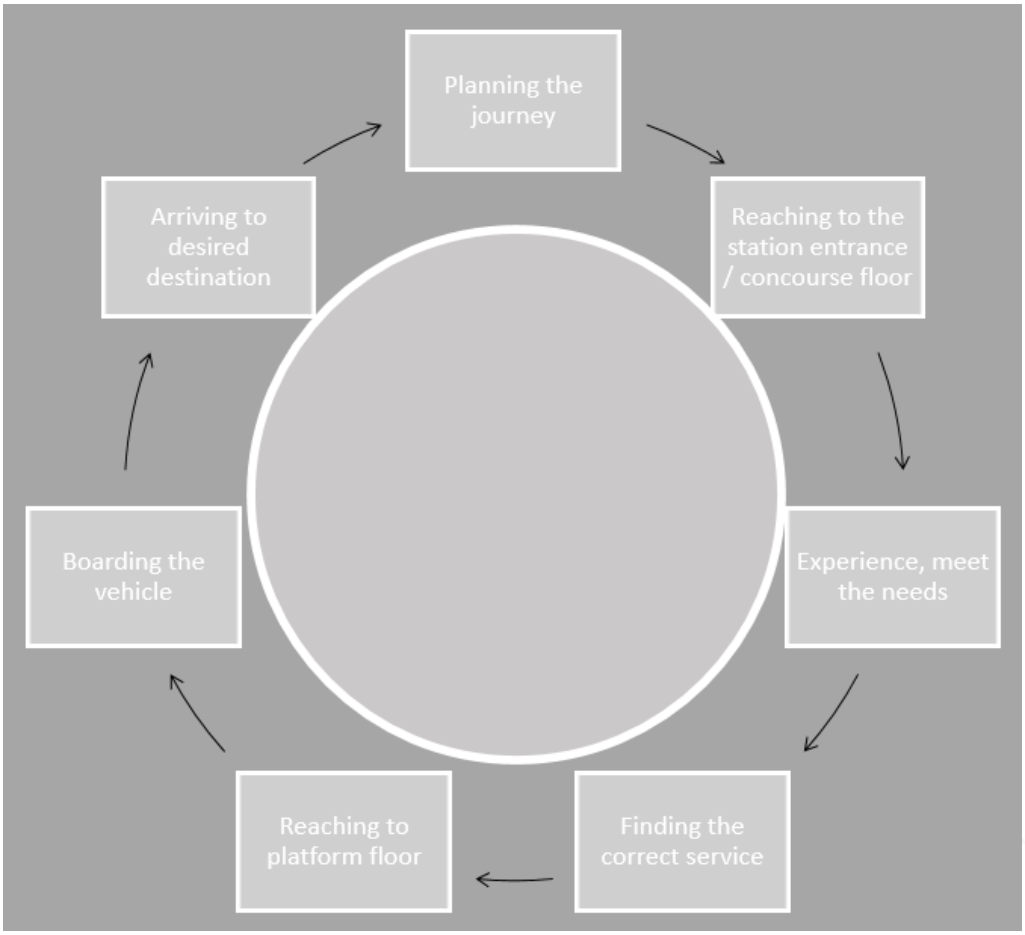

Figure 3.3 : Basic transit cycle in the eye of passenger.

There were several discources and approaches that evaluate the spaces between destinations. For these approaches transportation spaces such as stations considered as experience areas of the daily life. Over against, some argues that the spaces between destinations are simply passing spaces for reaching the aimed point. In the life of the modern individual, motion indicates a continuity. In these transitions between locations, a point reached takes place as another point passed or paused before moving on to the next point. Therefore, transportation spaces or interchange are not solely a transition between aimed points, but a whole experience covering all these transition spaces. In this context, when looking at the routine mobility in everyday life, the long-time travel activities outside of this routine, three different types of places can be mentioned covering all these mobility moments. These different types of spaces can differantiated as; public spaces that are the circulation areas to reach to the station,

station spaces that allow the passenger to be directed to the vehicle and vehicle spaces where the passengers become mobile in passive motion.

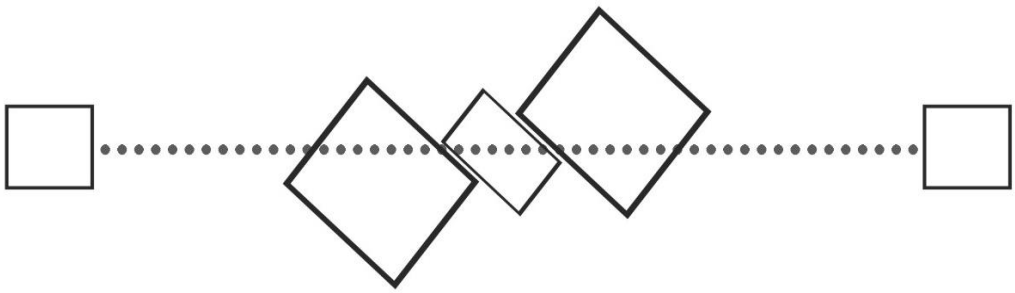

Figure 3.4 : The model represents the basic movement from point A to point B with using stations via one transportation mode.

In the action of transport can be basically defined as movement from point A to point B, these three spaces are the located between points A and B (Figure 3.4). Points A and B are the places where individuals accommodating, working and carrying out other activities. These points can be considered as spaces where people have spent a certain time and more permanent and constant than other spaces. These spaces also take place as departure and arrival points in the transit action. The resting spaces are differantiated from the circulation spaces in terms of the integration that established regarding the place and space.

Michel de Certeau (1980) defined the term ‘space’ as ‘frequented place’. According to him, the intersection of moving bodies defines the ‘frequented place’ term. The pedestrian movement creates and defined the public area into a space (De Certeau, 1980, p.202). Spaces that do not make sense help to shape movements. These spaces reflect as memories that translate the perceived space in the person’s mind as a route by adding characteristic names. These names create spaces in places; they turn these places into significant and meaningful passages.

According to socio-anthropologist Marc Augé (1995), space is a living place with soul. It exists by establishing relations with its location and surroundings, it contains historicality and is defined by its identity. In this context, most of the resting places (house, office, social areas etc.) have the feature of being a place in terms of the bond that is related by the individual, the relationships they establish with the architectural environment of the space. A place devoid of relationality, historical perspective and identity is defined as non-place by Augé's definition. According to him, places such as

highways, stations, airports, crossroads and crossings that provide accelerated circulation of people and objects are some of the “non-places” created by supermodernism. The installations that are necessities for the accelerated circulation of passengers are categorized as non-places as the means of transportation.

According to the “non-places” concept defined by Augé and the theoretical boundaries itself, it can be said that most of the circulating and mobility related places are defined as non-places. Marc Augé's interpretation that "passenger spaces may be the first place-archetype" supports this idea (1995). Urban space is categorized according to its location and function in the mobility process. According to Augé, it can be examined in three main titles with regard to its intended use or activity way, which are location/extinction-location, spatial experience and/or relation constructed by individual, and functional qualities that differ according to the type of transportation.

Lefebvre stated that the production of the urban space resulting from the interaction between the space and the individual, and the creation of new spaces by transforming the space, can be explained as a result of the lived, conceived, and perceived spaces (Lefebvre, 1991, p. 39). In everyday life, person's concern, and ways of using time also affect the mobility character, choice, and scale. In the course of everyday life, for persons who have been transport in the city in order to transit from work to home, from work to shopping or various social spaces, the reason why the weekend holidays, and annual leave is valuable and meaningful is that there are situations that break it from the routine. In the context of daily mobiliy that takes place in the triangle of home, work, school and social spaces is mostly limited to the urban scale. In this limited journey, public transportation vehicles such as train, buses, metro, trams are used and the circulation areas of the city scale such as pedestrian ways, streets, roads, stations, stops, tunnels, etc. are passed. In the eye of a person who leaves the routine, the character of the roads changes, and in addition to this, transportation places such as stations, stops, terminals become more complex structures compared to the transit spaces constantly used in daily life. At the scope of Lefebvre’s spatial theory (2004), the planning approach is redefined about the aims of planning of public spaces as concerned not only fulfilling the least conditions defined with the requirements of those who live, work in them. Considering a transit place as fluid kind of public spaces, the change of the character and the meaning of the route is possible when the

understanding of the design of the transportation related spaces goes out of necessity (Beyazıt, 2013).

In conclusion of discussing these discourses and approaches, it is converged of a common point of view. To accept a transit space as a place or a meaningful public space, the planning approach should evolve to more significative way for aiming to design more characteristic and meaningful places. This does not mean that there is no need for technical regulations, technical rules, design principles, and technical renovations to create a well-working transportation system. On the contrary, the design principles and necessities of transportation related places should be evolved to the next phase in the same direction of evolving society and its needs.

4. MOBILITY AND INTERCHANGE

In developed countries, mobility irrespective of the travel mode choice takes serious time per day of a person's time in everydaylife. Despite newly built transportation systems and extented public transort lines, the travel time and quality never reached to desirable levels. With the implementations of alternative transportation systems and lines, interactions between modes were subsequently formed as interchange areas. Public transportation systems become more reliable on the matters of time and finance of a person than private transport on everyday life.

Through the integration of transportation modes, it can be more possible to achieve sustainability and efficiency on transportation network. It is irrefutable that if the car dependency continuous to increase, designing any sustainable transport system in urban areas will be almost impossible as a whole. Benefits of changing modes or lines of public transportation alternatives to passengers change in factors such as speed, distance, and time. In order to gain benefit from public transportation at the highest level, multimodal station design principles and problematics need to be emphasized.

Pedestrians and circulation of pedestrians are the main elements in actualizing sustainable transportation network so their needs should be prioritized by existing or planned transportation system. To prevent most of the transportation-based problems regarding car-dependency, it can be given priority to the integration of different modes of transportation system more than private-motorization (Nash & Sylvia, 2001). Consedering transportation as a right, it was obstructed and limited through supporting the private-motorization. Physical limitations on mobility prohibit person from using specific modes.

Figure 4.1 : Changing periphery of a specific street of Amsterdam in decades / Haarlemmerdijk 1900, 1971 & 2013 (Url-1).

Long since, policy makers of many cities such as Amsterdam, London, Barcelona try to overcome these kinds of problems, focus on inversely correlated relationship between automobile traffic within the city center and the quality of its urban surroundings (Figure 4.1). In this focal point, cities have tried to establish a balance in transportation systems in order to reverse private vehicle dependency from motorized to non-motorized. Hence, in many ways, they supported alternative modes such as cycling and walking, besides public transport, to design and build a sustainable transportation system (Bertolini et all., 2005). In the end, this urban planning approach helps them realize more sustainable and liveable cities in which different modes of mobility integrate to each other and promote non-motorized modes more than other alternatives.

In order to achieve a well-designed and fluid city, it is important to facilitate a system that offers alternative modes as a tool for the mobility specified by the experts from different disciplines that concerned with urban planning and transportation. To achieve this goal, focusing on the problem of designing a transportation mode well will provide architectural success, but focusing on a system in which all modes of transit are integrated will provide a solution in urban scale (Rodrigue, 2006). While working on an urban scale, encouraging and facilitating walking and non-motorized modes of transit for person, will also bring an increased tendency to choose the public transportation systems. As a mode of transportation walking should be the main actor of integrated transport systems including related designs and policies, since almost all

types of transport involve walking. To create better conditions in planning development of integrated systems while supporting non-motorized modes that are aimed to give priority at the traffic, to more road areas, and parking lots, moreover, providing direct and convenient walking routes to the areas of use of these modes will increase the tendency to walk and cycling (Hine & Mitchell, 2001). The transport system design should encourage and directed the current and potential motorized vehicle driver not only to public transport, but also to non-motorized modes, especially walking. If the encouragement on the driver is successful it can be achieved environmentally healty urban places with less congestion and noise, through providing safety for pedestrians. It will be reflected in the whole society to shape the decision of a person who make up the building blocks of the society about preference of public transportation, cycling or walking as a mean of transportation.

Thus, cities have been achieved a significant reduction in traffic congestion and carbon emission through the integration of transportation, by promoting the use of the public transport system and replacing car trips to walking and cycling (Nash & Sylvia, 2001).

Achieving integration between environmental aspects and transportation spaces is another key issue to create a whole transportation system which is efficient and sustainable (Hine & Mitchell, 2001). Likewise, transport integration at the national and regional level will significantly contribute to achieving the mentioned objectives and should not be considered independent from this context. It was stated that interchange spaces design as one of the main contributors in reducing travel distances and encouraging further use of sustainable means of transportation such as walking, cycling and public transport (O'Flaherty, 1997). It is obvious that unless paying attention to the facts of sustainable planning, the city will experience disorginazed and uncoordinated urban patterns. The consideration of design and planning processes that urban activities and transportation systems are mutually supportive and balanced. In well-shaped and integrated systems, accessing to services, social interaction places, economic and residential activities via public transport modes is distinctive and fatal in the level of to reduce the car-dependency, and encourage the choose of sustainable public transport modes. Successful integration, as described, can be supported by walking and cycling routes and public transport services, providing greater transport systems.

4.1 Physical Elements of Interchanges

There are various, numerous physical factors of evaluating the interchange spaces are important in the scale of the city. In general terms, these factors can be listed as differentiated facilities, required and desired features, and the characteristics of the region and social environment where the interchange zone (Monzon & Di Ciommo, 2016). Access to services is a key factor in determining quality and success criterias. It depends on directly to the space perception and passenger flows.

It is significant that to consider as more efficient as possible and functional use of the area while determining to which facilities should be included interchange spaces or between stations of modes. The three different zones are given the figure below that related to persons as subject of the action, and also related to other transit actors, identified as located that could be considered as constitute interchange space (Figure 4.2).

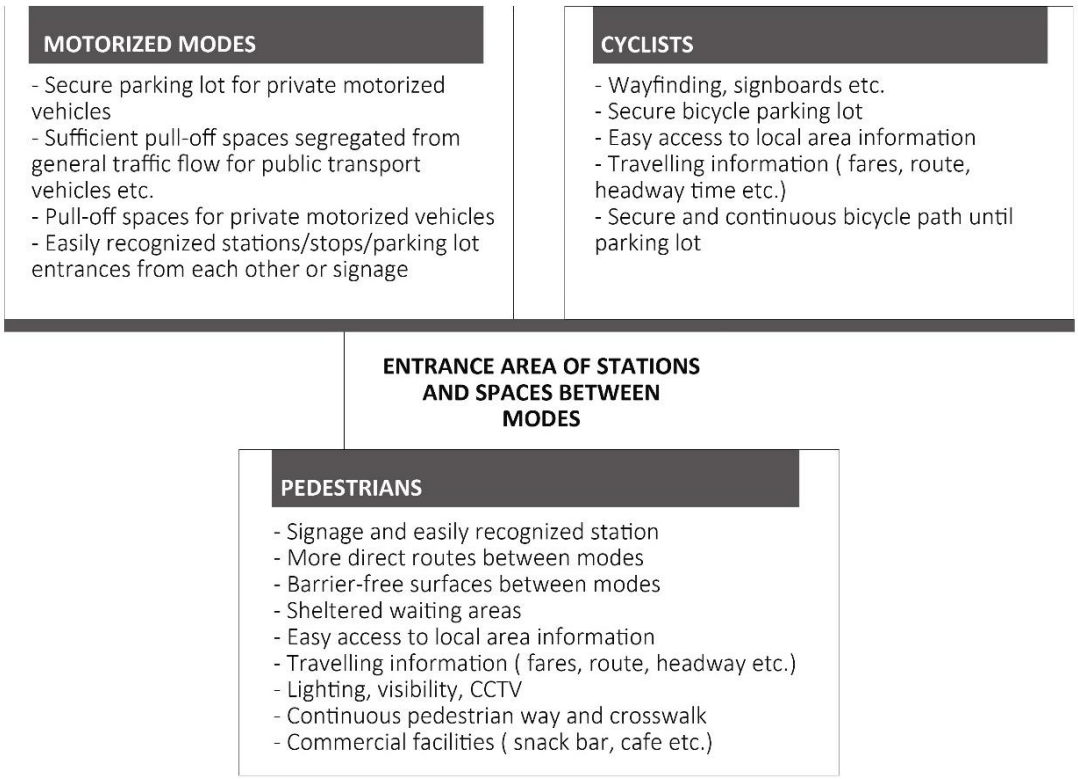

Figure 4.2 : Interchange spaces and actors (Monzon & Di Ciommo, 2016).

The entrances of stations and spaces between modes should be provided facilities and services for passengers who have differentiated needs while arriving at and leaving the stations. The actors of interchange spaces are pedestrians including people with

different abilities, cyclists, and motorised transport riders such as who prefers taxis, minibuses, private vehicles. The key facilities that should be provided in this zone are those that efficient and barrier-free movement in and out of the interchange space such as convenient access; signage and way-finding; direct routes for pedestrians and cyclists with traffic control measures such as crosswalks if necessary (Stewart, 2017). Moreover, easy access to the information about the local area, including taxis, fares, means etc. For those with bicycles or vehicles, secure parking lot is an encourageable whilst for interact the private modes with public ones. Sheltered waiting areas should be provided for pedestrians using public transport or related places (Monzon & Di Ciommo, 2016). The facilities are parts of the interchange space where passengers who would like to enjoy where they stand or have more time available to spend during the interchange can need services and activities such as shopping, having a snack or using restroom until they want to leave. Because of these reasons, shops, buffets, restrooms, and waiting areas should all be provided (Switkes, 2003). Ticket offices are located at the entrance area of the stations or between stations to provide real time information about schedule, fares etc and to keep up to date passengers about cancels, delays or changes at the line. The interchange spaces are where passengers are waiting for the time of scheduled vehicle arrive within the interchange. The station should be easily recognized, there should be convenient access for all kind of people and easy to navigate according to functioning signage (Switkes, 2003). CCTV system should be installed to make more secure places such as waiting areas, enterances, and closed public area , on the other hand, the system should be available for passengers who want to stay up to date about travel information.

These three zones and the common junction areas given in the figure are the used by passengers but with miscellaneous reasons and requirements. Althought, different type of passengers might have hundreds of priorities, variables must be categorized considering different necessities. Passengers types are differentiated according to their personal characteristics (age, profession, physical constraints), their trip choice such as (motives, mode preferance, peak-time or weekend user), and the preferance of the services and facilities during their mobility phase (Stewart, 2017). All these characteristics should be considered, analysed before starting to design phase and feed the business model of the interchange (Monzon & Di Ciommo, 2016).

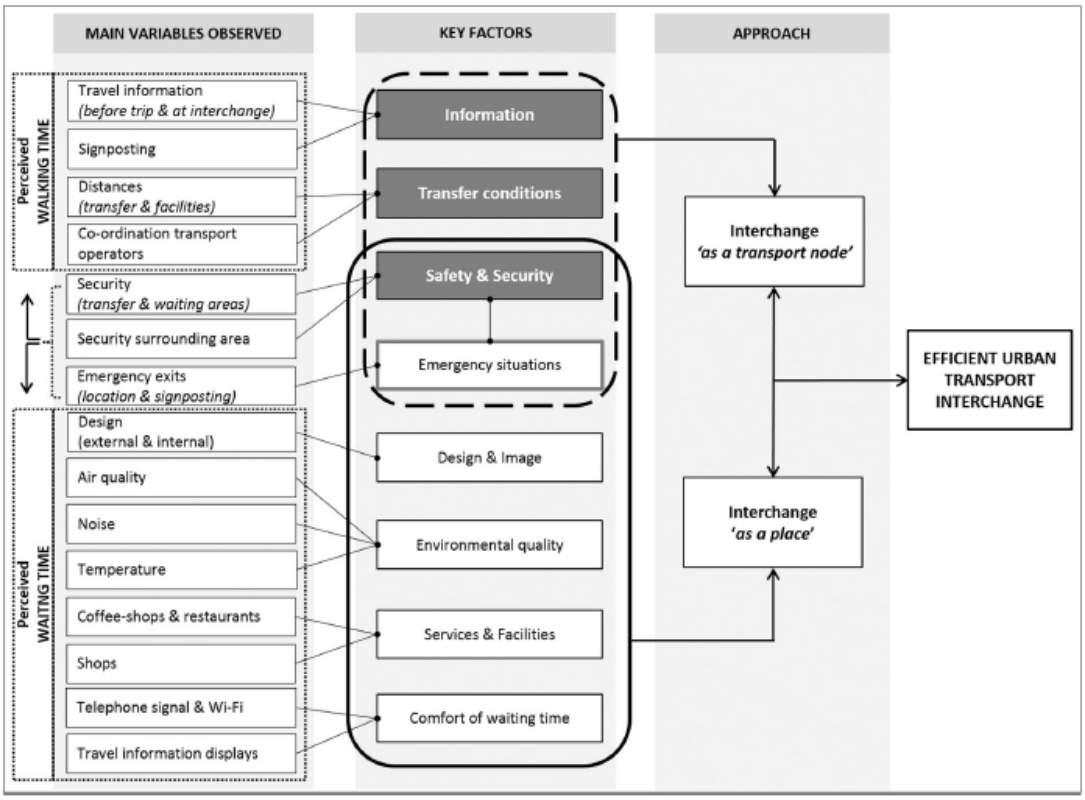

Figure 4.3 : Key factors identified to make interchange spaces more attractive for passengers (Monzon & Di Ciommo, 2016).

In accordance with the field surveys that made by Monzon and Di Ciommo (2016), in order to make interchange spaces more attractive, variables and key factors filtered from observed variables are given in Figure 4.3. To the approach of aiming an efficient urban place, the variables of interchange spaces can be evaluated under two parts as interchange as a transport node and interchange as a place. As it was discussed before with the discourses of Augé and Lefebvre, to categorize an interchange station as urban space, a transit space must have some distinct environmental and design characteristics. The figure supports this approach as well.

5. BEST PRACTICES OF INTERCHANGE STATIONS

As explained earlier in the introduction, two well known and good examples for urban interchange stations as urban spaces are selected to review the characteristics of these stations with regard to the design principles discussed in Chaper 4. In this way, new design parameters are expected to be added to the ones described in the literature review.

5.1 Amsterdam Centraal Station

Amsterdam Centraal Station was the starting and ending point of the almost all transportation modes of the Amsterdam City. With 240.000 daily ridership, it is the most crowded station in The Netherlands. The station is a transportation node not only as a railway station but also as ferry port, bus stop, taxis, bike parking lots, tram station, and P+R facilities.

In 2017, Amsterdam Municipality announced that the urban transformation project of the station area would take place from 2018 to 2023. Aims of the project is explained at the project website with details. For the planned design details, besides being a station renewal project, there are spatial goals too. There are going to be created an extra space which is planned to be covered with water and green space instead of roadway (Figure 5.1).

Figure 5.1 : Renders of the planned transformation (wUrck).

5.1.1 Project details

For the master plan decisions and planning phase of Amsterdam Central Station have started at 1999 by The Netherlands centered design firm Benthem Crouwel Architects. The project clients are City of Amsterdam, Dutch Railways, and the ProRail. Considering the requisitions, the station was planned to be expanded and renovated. While expanding, design decisions was determined in order to be capable of processing 300.000 daily passengers. According to the designer, taking account of the fact that the increasing number of passengers, the station aimed to be transformed into an efficient and comfortable transportation node offering a smooth transit between railway, metro, bus, tram, ferry and bike (Figure 5.2). Amsterdam Central Station construction was started at the year 2004. The station part was completed in 2016, on the other hand, the completion of all planned implementations is expected to the end of the 2020.

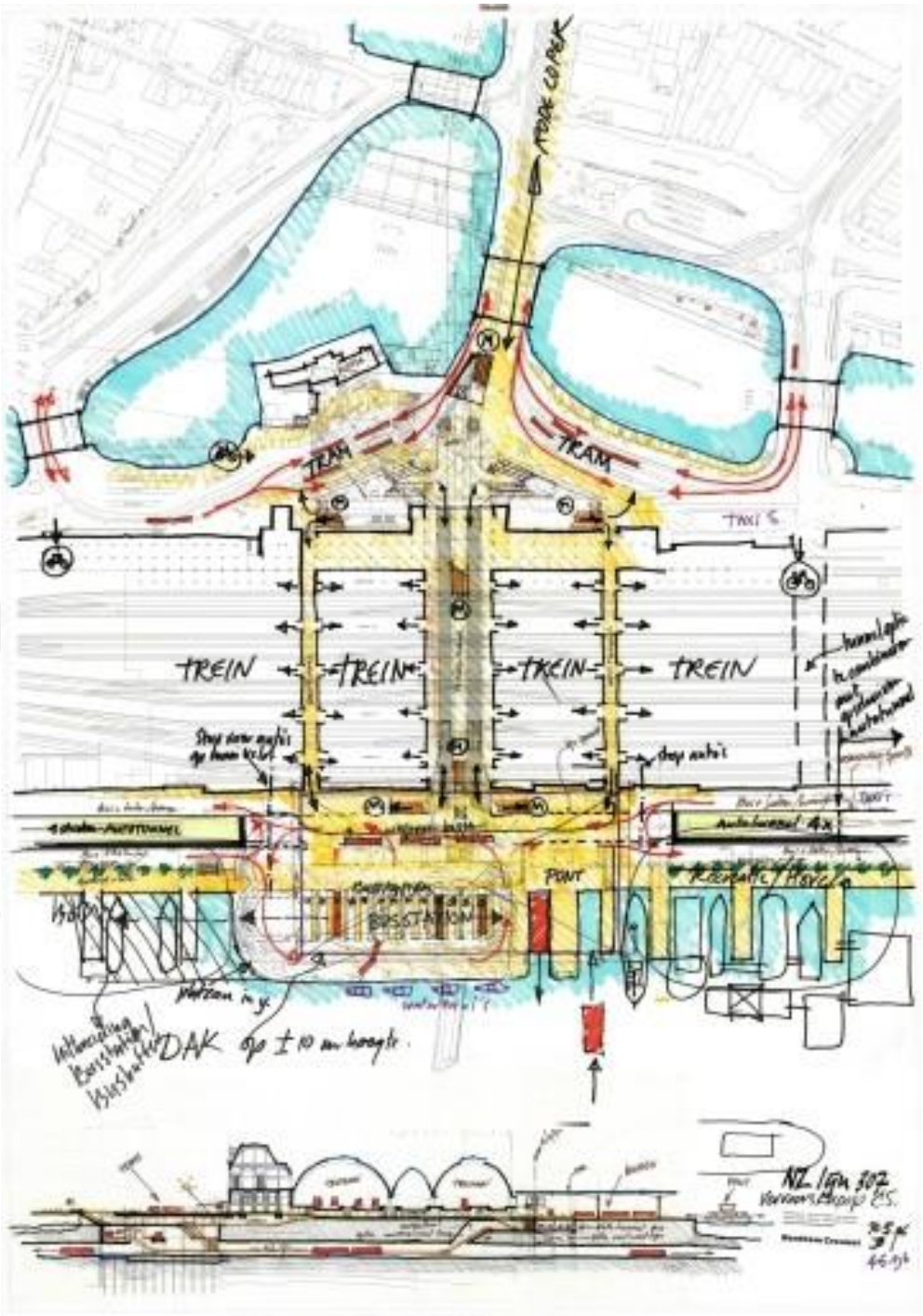

Figure 5.2 : First sketches of master plan design phase (Benthem Crouwel Architects).

Stationseiland, which is the name of the artificial island on where Amsterdam Centraal Station stands. The island is to be transformed in time into an attractive public transportation node that gained a powerful boost with the arrival of the newly built metro line which connects North to South, the high-speed intercity rail link, the new bus terminal, ferry ports and roads designed for non-motorized means of transport.

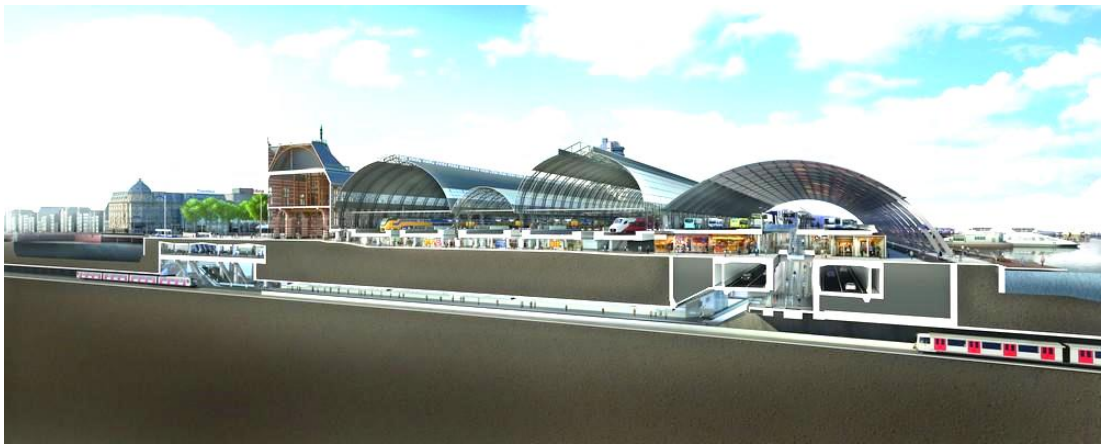

Figure 5.3 : 3D section of the interchange station (source: Benthem Crouwel Architects).

According to the publically shared information on the designer firm webpage, there were several major implementation decions made at the urban planning phase. The station square was designed to the aim of creating a pedestrianize urban space both for pedestrians and trams. In the released project details and information shared by the designer firm, the square has been purged of all obstacles and paved with granite material. The motorized traffic load flow from the underground tunnel along through the IJ river (Figure 5.3). The bus terminal where is the junction point for almost all bus lanes located on the IJ river side of the station and spatially integrated to the railway system. The decision to nodalise the bus lanes in one point resulted with carrying lower traffic load on existing roadways. Relatedly, this design decision gave the possibility to create a crossing-free pedestrian route through the Damrak street. Damrak street is the most central transit axis which connects the Dam square to the station. The other mode of the interchange area is ferries. To the aims of emphasizing the station square character and to expanding space of water for the canal boats at the historical harbour which is called Open Havenfront will be widened. This part of the project was scheduled to finished in 2020, however the construction phase is going on. Based on personal observations, it can be predicted that it will possibly be finished until the middle of 2021.

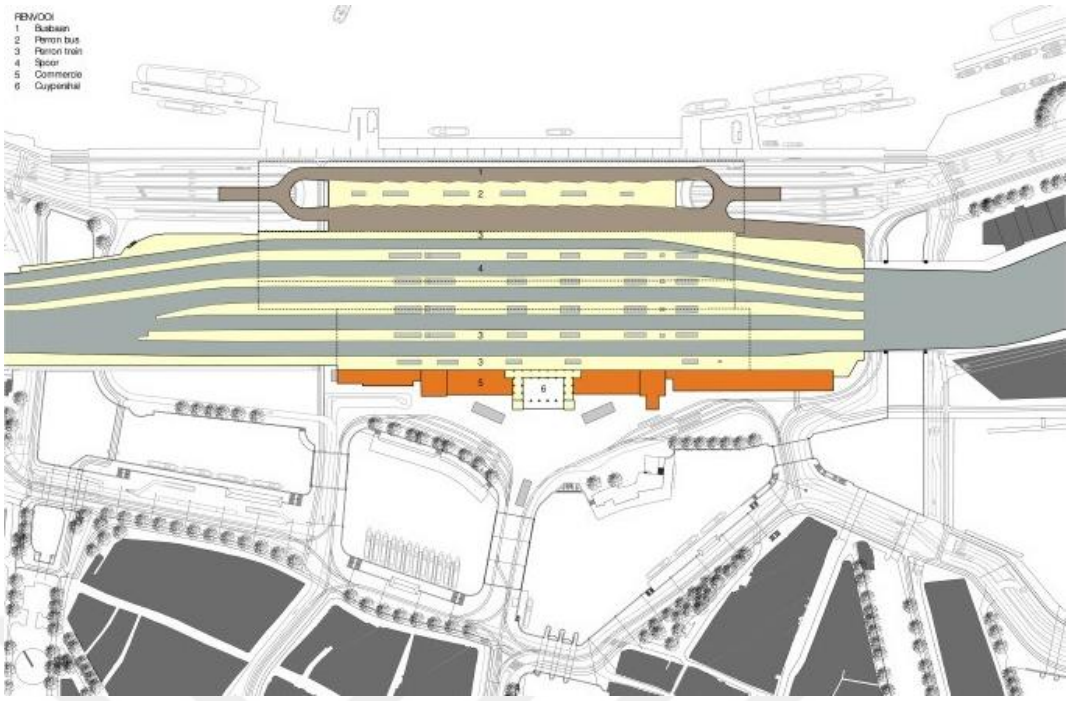

Figure 5.4 : Layout plan of the station (Benthem Crouwel Architects).

The historical railway station, designed by the architect Cuypers, was renovated to an interchange node as an urban place. The station was clearly demarcated zones according to their functions at both platform level and concourse. As mentioned, while discussing the discources of Augé, the spaces was shaped to aim of creating defined places. At the platform level, the zones were seperated as bus lane, bus platform, train platform, trainway, and commerce (Figure 5.4). The concourse level comprises of zones for meeting/entrance, facilities, information, bicycle path, pedestrian circulation area and commerce (Figure 5.5). When the place was experienced from human scale, it can be said that the zones at the station is cointegrated and perceivable. Cointegration and perceivability of the organizational scheme station let the passengers find their way with ease. As aimed in design phase, after the renovation of the historic station building, the historical face of the monumental structure and the modern new materials and implementations were clearly recognizable. To easy wayfinding, there were signages and electronic boards installed to direct and inform passengers about arrival and departure times.

The middle pedestrian axis at the concourse level was designed by Benthem Crouwel Architects and Merk X, was inaugurated in 2013. According to designers, the new spatial organization offers abundant space for passengers while including seperate units with glass façades for commercial facilities. The axis is part of the paid area of

the station, so the area is separated from the other spaces of the station in distinctive use of transportation. The passages are finished in light materials that connect to it with the monumental building. With the signage system and perceivability of the route to the platform makes passengers to easily find the desired point and destination. In other respects, the size of the commercial area and the necessity of the public for that much commerce space are arguable.

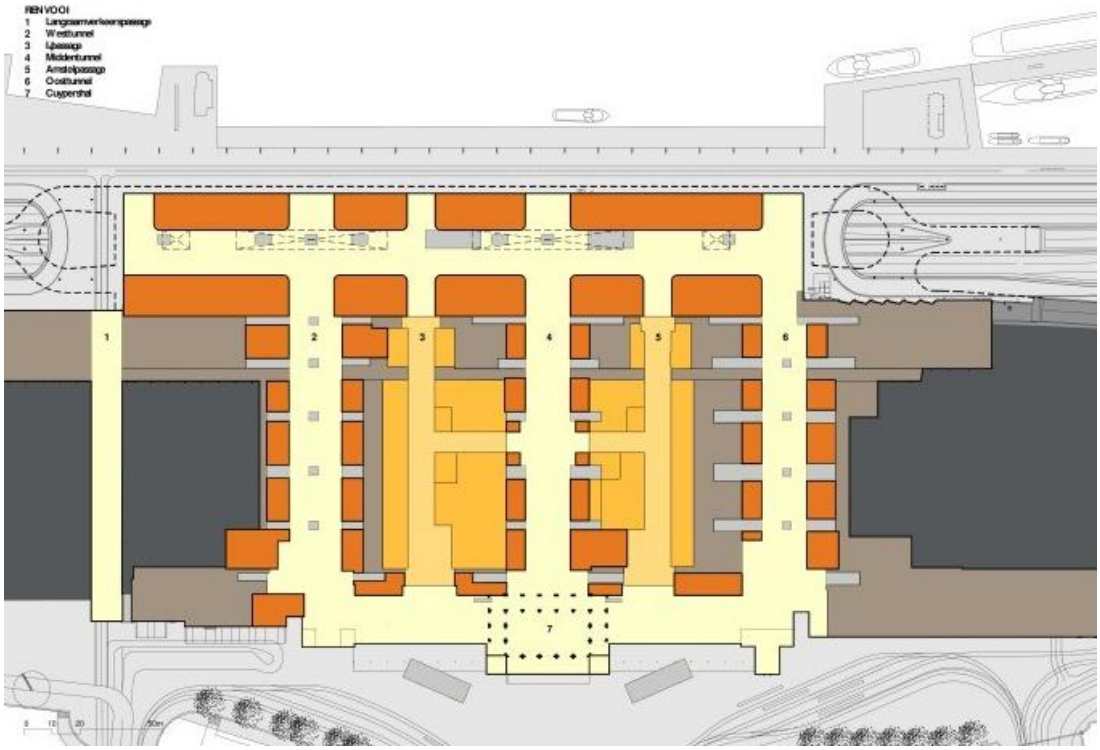

Figure 5.5 : Concourse level plan of the station (source: Benthem Crouwel Architects).

Besides the middle pedestrian axis there are two gate free passages on the west and east sides of the main passage. These passages were designed for providing leisure places such as resting places, shops, and restaurants, as well as connecting both sides of the station. These axes are part of the unpaid pedestrian area of the station, so two of these three corridors make the building permeable for public use. These parts of the station are separated from the travel domain. Hence, the particular space distinguishes the pedestrian who prefer to use the passages from the transportation flow.

The other part separated from the station with its function is the IJ hall /IJhal (Figure 5.6). The hall is easily accessible from the boulevard widened through the IJ river, ferry ports and the bus terminal. The new roofed part of the station has entances on the east and west side and provide access for the Kiss and Ride area, the planned tram line

extension and planned taxi stand at this area. The IJ hall presents a natural counterpart to Cuypers's monumetal station concourse and creates connectivity within the neighbourhoods in Amsterdam Noord via ferries. Most of all, the mode interchanges can be done effortlessly, through the vertical connection between metro system, bus terminal and railway station. Beside of the concourse passages, there are commercial spaces can also be reached directly from outside area. With the words of the designer Wiel Arets Architects of the hall, the station was designed as not just a transport building, and also a destination in itself. Neverthelater, the excessive occupancy of restaurants and shops makes a person feels that there is a shopping center instead of carrying transportation interchange function. The hall where pedestrians spend their time has an exquisite view across the water makes the place connected to the person through the face of Amsterdam city.

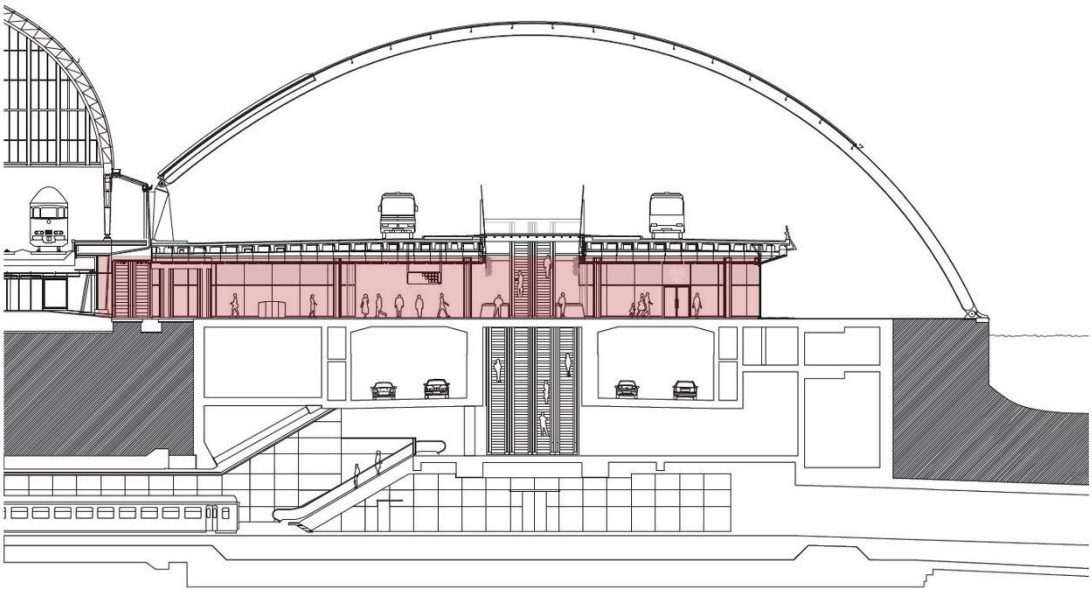

Figure 5.6 : The section of the project from the IJ hall (Wiel Arets Architects).

The aim of the bicycle passage is to build a smooth connection between bicycle path located through the IJ river and the station square connected to the city center. This passage also allows cyclists to reach the ferries and bicycle lot. Via the passage, a person who prefers non-motorized means of transit can reach the IJ in a straight line as an alternative preference instead of other passeges located inside of the station concourse. The functional clarity, and simplicity make the space safe and easy navigate

as a shortcut. Bicycle passage is accompanied by an artwork by Irma Boom, which helps to create a sensual tie between person and space.

Other mode that designed within the project is the bus terminal. There are around 100 buses per hour arrive and departure at the station. Before Amsterdam Central Bus Terminal, these buses have arrived at different and seperate locations, resulting in a very unclear connection. This was solved by bringing all city and intercity buses in one new bus station on the IJ river side (Figure 5.7). From the North/ South metro line, it is possible to change directly between metro, and bus as well as railway, ferry, motorized and non-motorized means of transit. The designers of bus station express that their aim to shape the space for passengers as the most efficient and safe environment as possible.

Figure 5.7 : Relation between slow traffic passage and the bus terminal (Benthem Crouwel Architects).

From human perspective, the bus terminal platform is quite accessible by stairs, escalators, and elevators, both from the IJ hall as well as from the three passegeways from the railway station area. Through electronic boards passengers can be informed about departure times. The bus terminal makes the passenger stands on a socially safe place even in night times because of the glazed steel structured roof which allows to receive natural light and installation of effective lighting. Large voids on the concrete

structure provide a good visual relationship and create dynamism instead of monotony, between spaces from different levels (Figure 5.8).

Figure 5.8 : The bus terminal at upper level, ferry port and train station relation from West side (source: Jannes Linders).

To this end, via the connection at the same level, passengers can interchange from bus platform to the train platforms. The interchange station building was completed with a fourth steel roof that harmonize well with the three existing contemporary roofs of the nineteenth-century monument. The extension strengthens the character of the existing building. The steel structured roof with glazed glasses provides shelter for both bus passengers, and also for the people prefer to use Kiss & Ride area, the bicycle passages and some part of the quay that helps to make switch between station and ferry ports.

The newly shaped interchange node forms an intangible bridge which connects the historic part of the city, the urban landscape, and the modern, contemporary face of the city. In spatial point of view, the new arched shaped roof is supported the feeling created through the Amsterdam Centraal Station as a landmark (Figure 5.9). As a result of transformation of the station area, this tourictic city have an efficient and accessible interchange station and a strong welcoming by the combination of historical and contemporary architectural elements.

Figure 5.9 : Three existing roof and the newly built roof composition at an aerial viewpoint (Benthem Crouwel Architects).

5.1.2 Future implementations

The Amsterdam Municipality announced that the future implementations about Amsterdam Central Station and the public places around it (Figure 5.10). Most o these planned implementations from a whole project are on the construction phase. The project completion deadline is determined as 2023.

The main access area to the station is the most ambitious and eye-catching part of this project. The entrance of the most important transportation node of the city is aimed to look quite different. The area where there were asphalt roadways, regional and tourist buses, and their stops, there will soon be water. The contours of the historic deck are intended to become visible again.

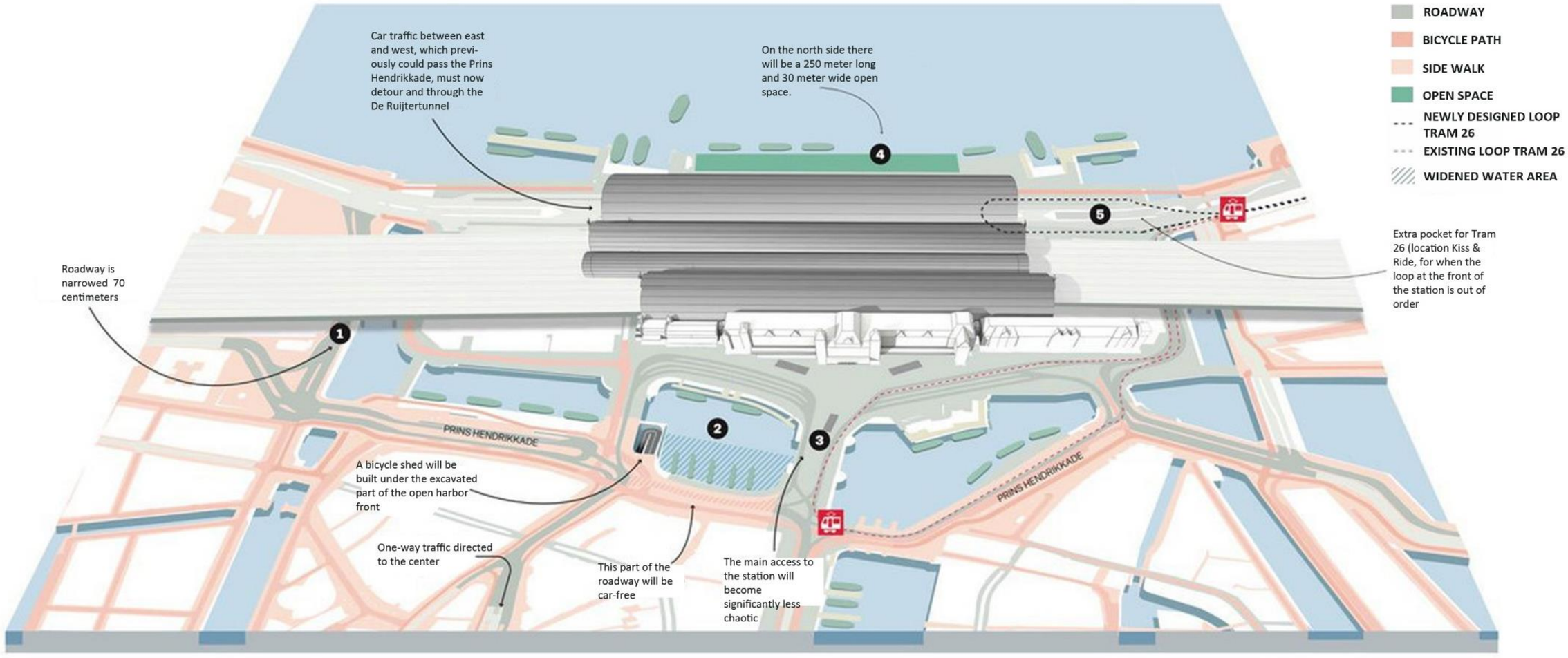

Figure 5.10 : Amsterdam Station area transformation details (Jorris Verboon & Laura Van Der Bijl, 2019).

The largest bicycle parking garage in Amsterdam, is designed by The Netherlands based design firm wUrck. The bicycle shed has approximately 7,000 spaces, is planned to be built in the water in front of the main entrance of Amsterdam Central Station. The design emphasizes the location below the water surface (Figure 5.11).

Figure 5.11 : The extrance of the planned bicycle shed from deck at widened water area (wUrck).

The bicycle parking garage is part of the Amsterdam Central Station Stationplein project. In the coming years, with this project, it is aimed that changing the face of the entire station area on the core. The parking facility, between the Prins Hendrikkade roadway and the Stationsplein, is located below the water surface; above it is the domain of the tour boats (Figure 5.12).

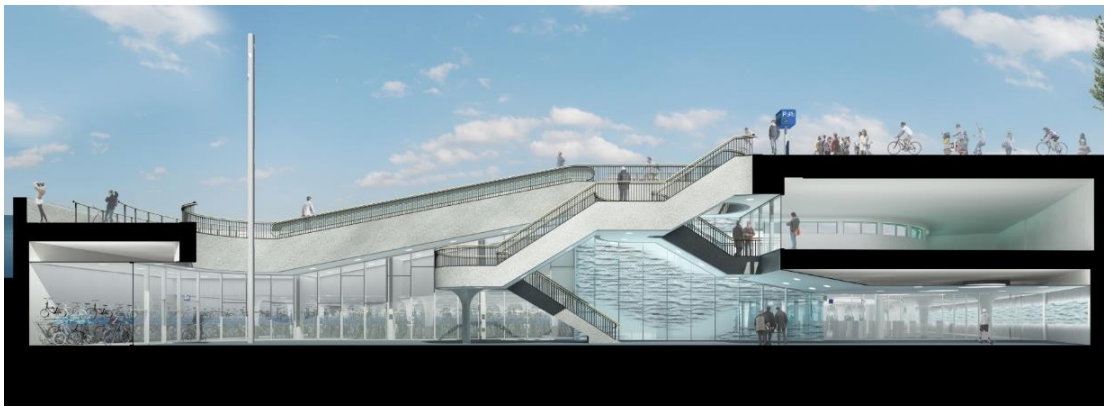

Figure 5.12 : The 3D section from the station square of the planned bicycle shed (wUrck).

5.1.3 Pedestrian experiences

With the purpose of analyzing experiences of Amsterdam Central Station passengers, online reviews from Google are evaluated as an alternative for survey. The data are eliminated using the same indicators (time period, categorization type) used in the Söğütlüçeşme transfer center (Url-2).

For the Amsterdam Central and the interchange area, there were 3849 Google reviews submitted that gives 4.5/5 median score as a result of experiences. In order to reach correct comparison, time period of the reviews is limited to the last one year which is from 06/19 to 06/20 similar to Sogutlucesme. After investigation of all reviews, most of the reviews were eliminated as they did not include any written comments. Following this elimination, the residual 571 reviews have been categorized as basically positive, negative, and irrelevant comments (Table 5.1). Since the data is quite large, the source reviews of this research can be shared online if requested.

Table 5.1 : Categorized reviews of Amsterdam Central Station passengers / users (Google, 2020).

	Component		
Categories	Positive reviews	Negative reviews	Irrelevant
Place-based comments	51%	3%	-
Operation-based comments	23%	4%	-
Total	74%	7%	19%

As a result of the investigation, findings show that 54% of the reviews consist of place related comments. It was mentioned on these reviews the comfort, safety, experience and perception of the station area and adjacencies. On the contrary of overall academic focus on transit places, only 23% of positive reviews and 4% of negative reviews are related to operational sufficiency (27% in total). Operation-based reviews were about, timetables, schedule, punctuality, and staff. Besides of that 19% of the 571 written reviews are found irrelevant, due to consisting of solely the name of the area / stations or the city.

Almost all of the place-based comments made for Amsterdam Central Station can be considered as positive. In these comments, the reviewers shared their positive experiences by mentioning the organization of the transit area, architectural qualifications of the building, availability of stores, restaurants, bars, and services. As a common point of view, almost all reviewers mentioned how “beautiful” the building is.

In addition to positive ones, 42 negative comments should not be ignored. Insufficiency of signage installations, services and seating areas in concourse area regarding to commercial areas were emphasized as negative reviews. At the same time, most of the negative comments can be categorized as constructive critics.

5.1.4 Conclusion

Widened canals and underground bike parking will bring the Amsterdam Central Station a little closer to nature and history. It is obvious that the main concern in this project is defining a public space both carrying its function and also creating a “living place with soul” with Augé’s words. The interchange function is successfully working. Cointegration and perceivability of the organizational scheme station let the passengers find their way with ease. Both horizontal and vertical connection between modes can be accessed without any obstacles, which is important for people with different ability and needs. The physical indicators of the interchange area are working efficiently without any problem in the meaning of living experience, punctuality, and safety.

To critize the zones separating to the station space, it can be said that the commercial area occupies too much space. The excessive occupied zones that carrying commercial function change the direction of transportation perception. A part of it can be designed as recreation space for passengers apart from the circulation necessity. In a contemporary design approach, the renovation of the historic station building was designed and done in a distinctive way of the historical part of the monumental structure and the modern new materials and implementations, that are complement and support to each other. Besides the function and meaning of the station space, the river view from the interchange hall and even the artwork at the bicycle path help to create a sensual connection between a person and the space, which makes the space to the place in accordance with the discources discussed before.

5.2 Denver Union Station

Master Plan of Denver Union Station presents aims for the redevelopment of the historic station as a regional multimodal transportation center. The redevelopment of Denver's central station, which is located at a densely populated city, was planned to support the existing transportation network and create a strategic transportation node for both the metropolitan region and the state. It was aimed to connect transportation alternatives at one interchange area which is the intersection point of the network. Accordingly, it was gathered both public transportation systems such as light rail, intercity rail, local and regional buses, as well as modes for individual use such as highways, high occupancy vehicle lanes, parking lot, on the other hand non-motorized means of transportation as bicycle roads, pedestrian networks at the node (Figure 5.13).

On the subject of multimodal transportation system, it was aimed with the newly designed station building, to create one urban node that integrates the whole regional transit while placing together different modes of transportation in one area in a way that is efficiency. One of the most important purposes of this redevelopment project has been declared is to make Denver the target of the local, state, regional, and federal investments that was predicted to be increased greatly and support Denver economically. With related to these goals, it is also mentioned that encouraging ridership was aimed as a conclusion.

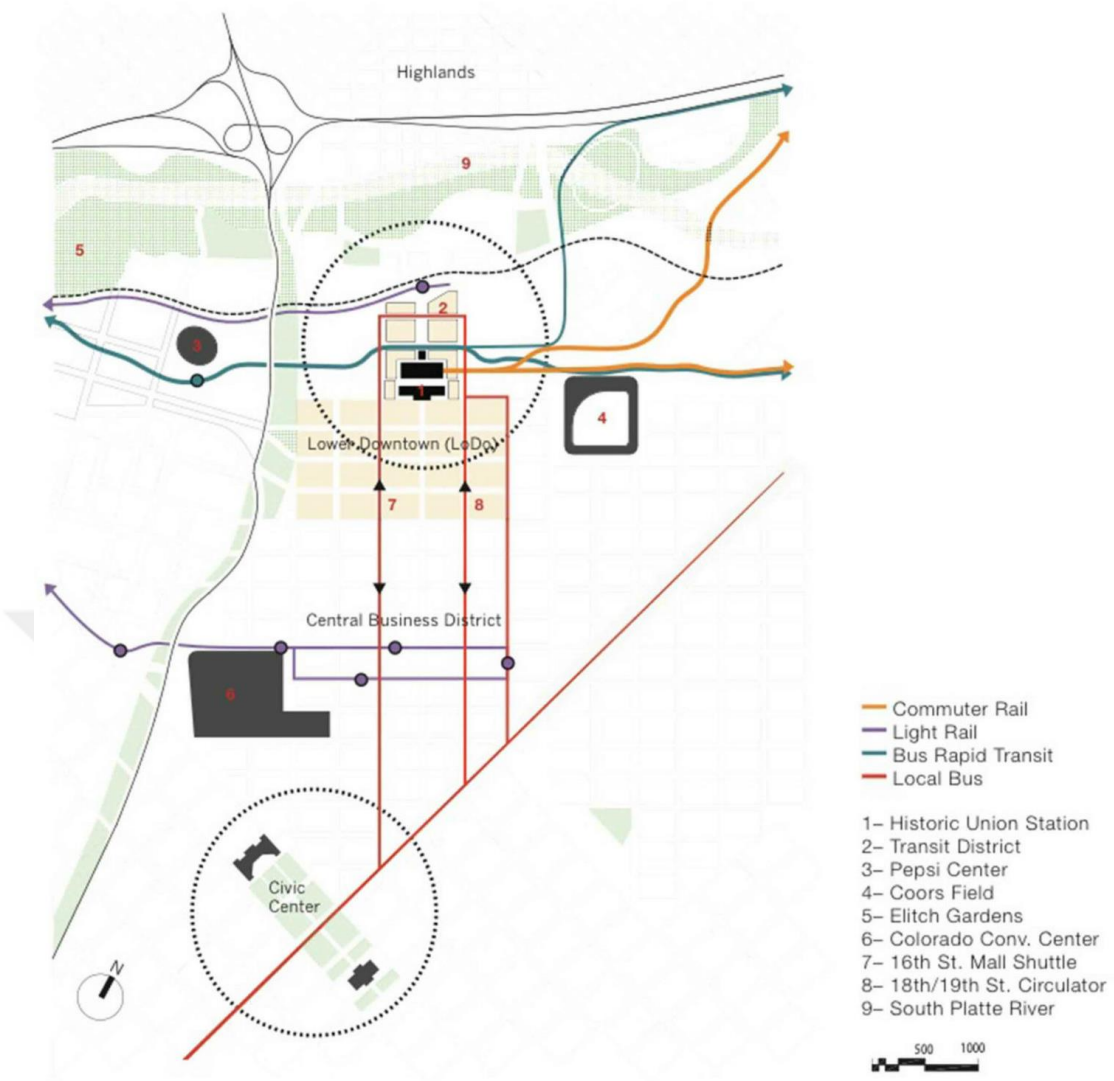

Figure 5.13 : Transportation lines and regional nodes around the station (SOM).

Denver Union Station Redevelopment Projects' initial goals and principles are explained by the authorities in the scopes of urban planning and historic preservation decisions.

The urban scale planning decions are clarified as to encourage multi-functional landuse redevelopment that emphasize the site and neighborhood. To provide the dependence of master plan decisions, it was planned to ensure that the architectural design strategies, materials chosed, and scale of new architecture implementations on the historic building and at the relation between both. After design documents and implementations evaluation, it can be seen the consistency between the master plan and the architectural installations. To the aim of enhancing integration between neighborhoods, the private means of transit, both motorized and non-motorized ones,

was supported with building new transit axes connected to the historic station site for pedestrian, bicycle, and private vehicle access. At this point, passenger access could be enhanced through creating more pedestrianized spaces and bicycle lots to support non-motorized modes.

Historic preservation was declared one of the major concern of the urban planning, and design decisions. The historic Union Station is listed in the National Register of Historic Places and also the building is considered as the landmark of the city, these mean that the perceptional relation of the building on the people living the area must be quite strong. After restoration phase and supporting through contemporary architectural installations, the building was starting to use as a living part of Denver Union Station by passengers for transportation access and to interchange, as well as for leisure purposes such as restaurants, bars etc. The size of leisure and commerce spaces at the area is perfectly adequate.

5.2.1 Project details

Historic station of Denver is a Beaux Arts masterpiece on where located on the edge of the city's central business and commercial district. The architecture office named SOM is the design responsible of the Project with two design partner firms which are AECOM and Hargreaves Associates. They express their aim as expanding and transforming the existing station area into a major regional interchange station. Accordingly to their design, the firm successfully converts the 81.000 m2 of former railway yards into an urban transportation district that consist of light railway line, commuter and intercity railway line, bus lanes, bicycle path, and pedestrian ways into an intuitive intermodal station.

To make it easy and functional for pedestrians to transfer from one mode to another, designers express their approach as putting the passenger movement and convenience in center while designing a multimodal transportation facility (Figure 5.14). The meaning of passenger movement at an interchange station can be expanded as connection of the passenger flows coming from every possible direction. According of their approach on this point of view is directing circulation and designing the route close together and within easy reach, eliminating the phycial and visual obstacles as possible to efficient use of every kind of passenger. As it can be seen at layout plan of

the project, the stations of different modes were connected both horizontal and vertical direction (Figure 5.15).

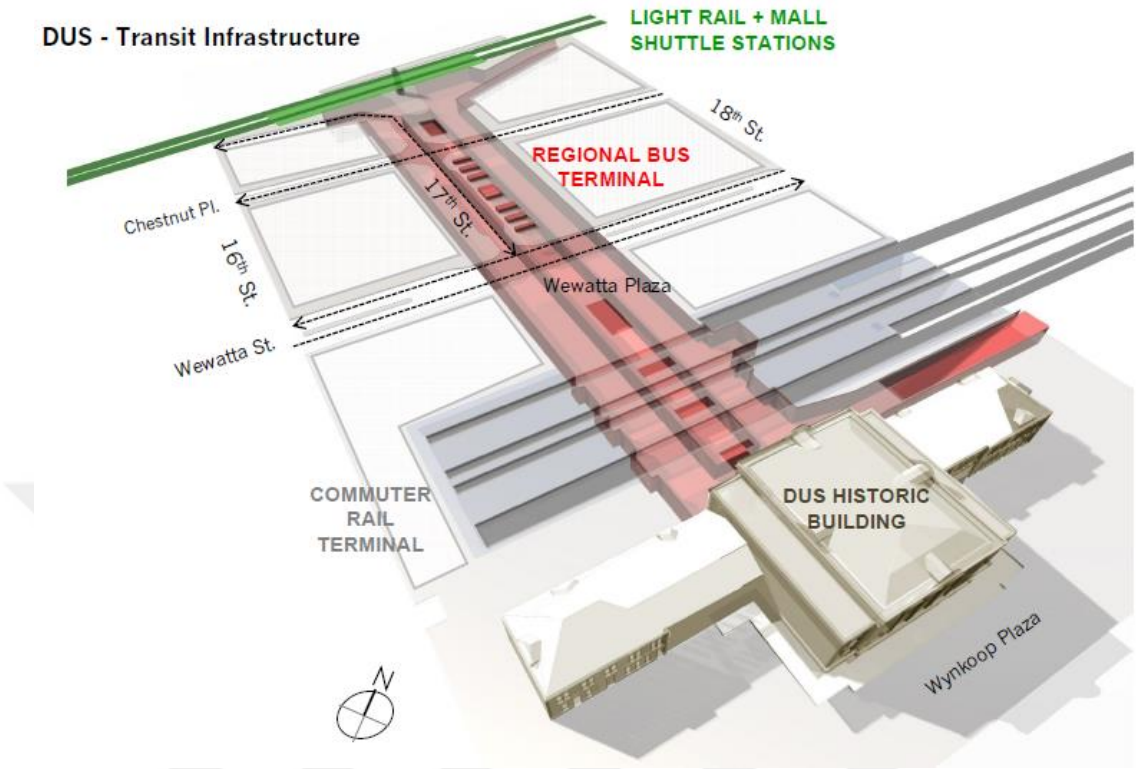

Figure 5.14 : Functional connection of the interchange station (AECOM et all.)

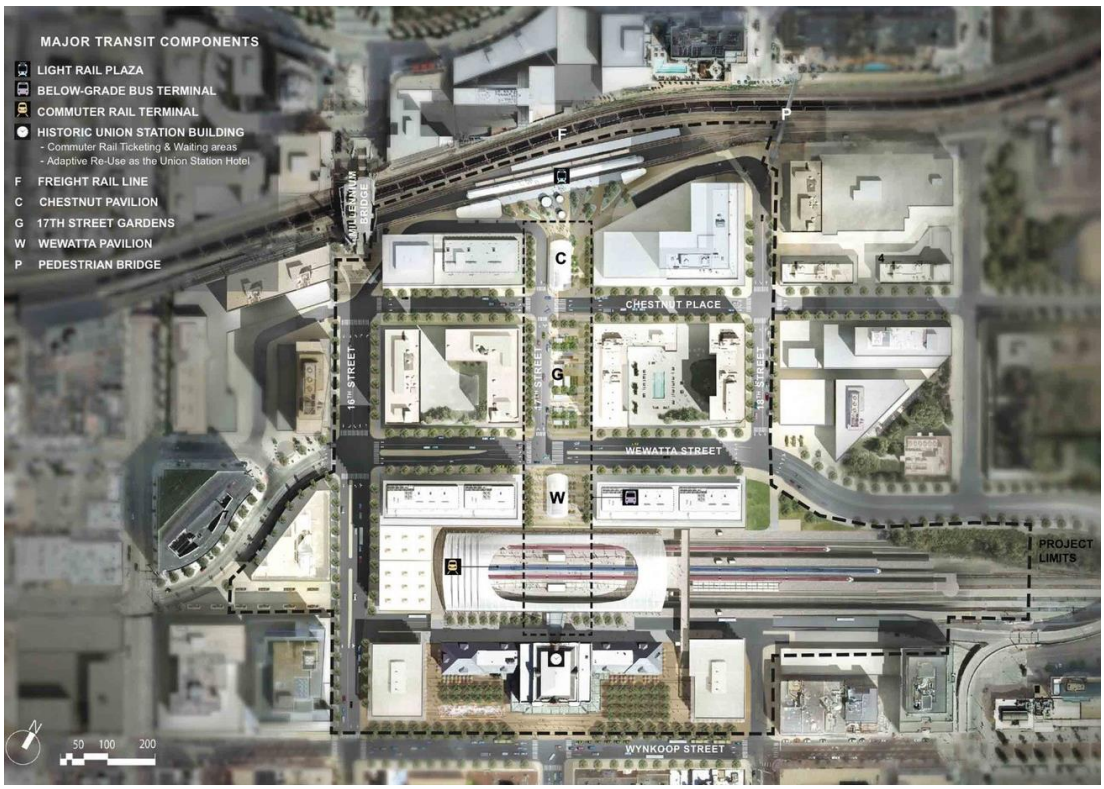

Figure 5.15 : Layout plan of the project (SOM).

Beacuse of using the existing locations of these transit systems, the horizontal connection cannot be designed in direct way so it might be take time to interchange between modes. Designers categorized their aims into two part which are quantitative and qualitative goals, and expressed that they have designed stations around these principles specified.

The architecture of the Denver Union Station aimed to offer a quiet contrast that allow to the new to represent its era, function, and culture while complementing the historical one. Nonetheless, except the entrance space which carries the welcoming function for the station, the other parts of the historic building redesigned and transformed to a hotel. This kind of implementation is kind of arguable issue in respect of public rights.

The focal point of the project is the Train Hall can be considered as the physical reflection of the new impact on the area (Figure 5.16). With the words of the designer, it was aimed to design a structure which was conceived as an efficient and expressive means of sheltering multiple railway platforms at the station. It can be seen the respectful and supported visual relation between two forms (Figure 5.17). The contemporary steel structure protects the passenger who is waiting on the platforms below while providing the view of the monumental station.

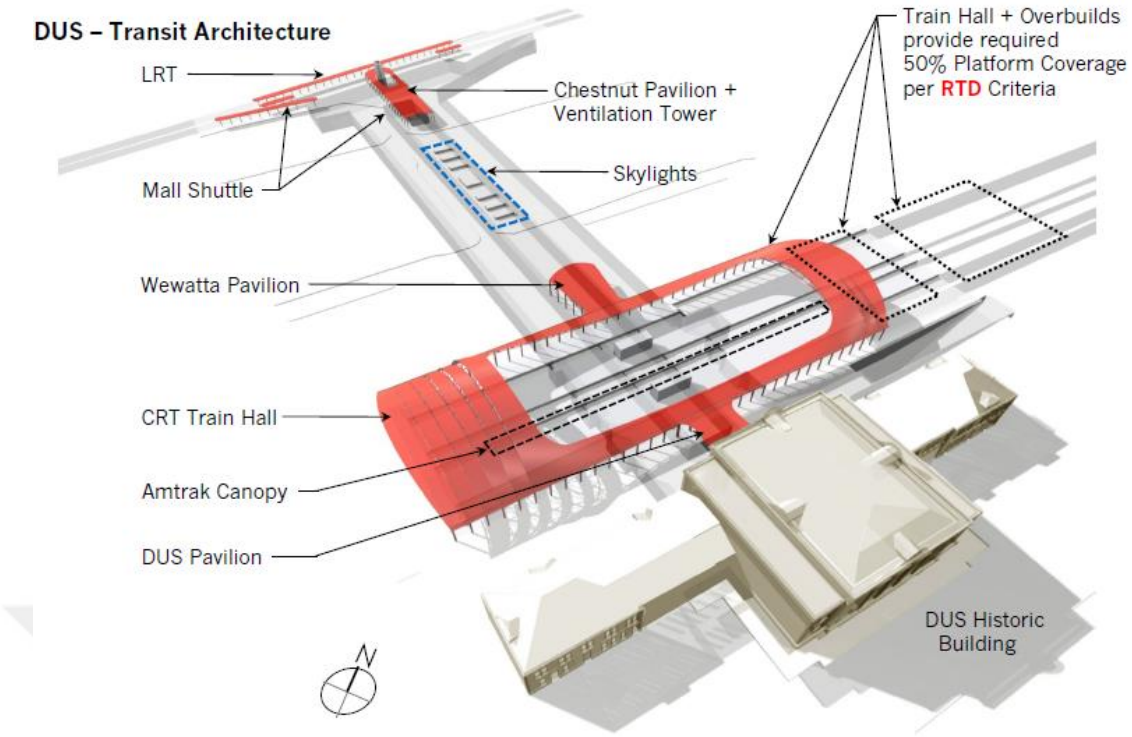

Figure 5.16 : Architectural relation of the structural composition of the interchange station (AECOM et all.).

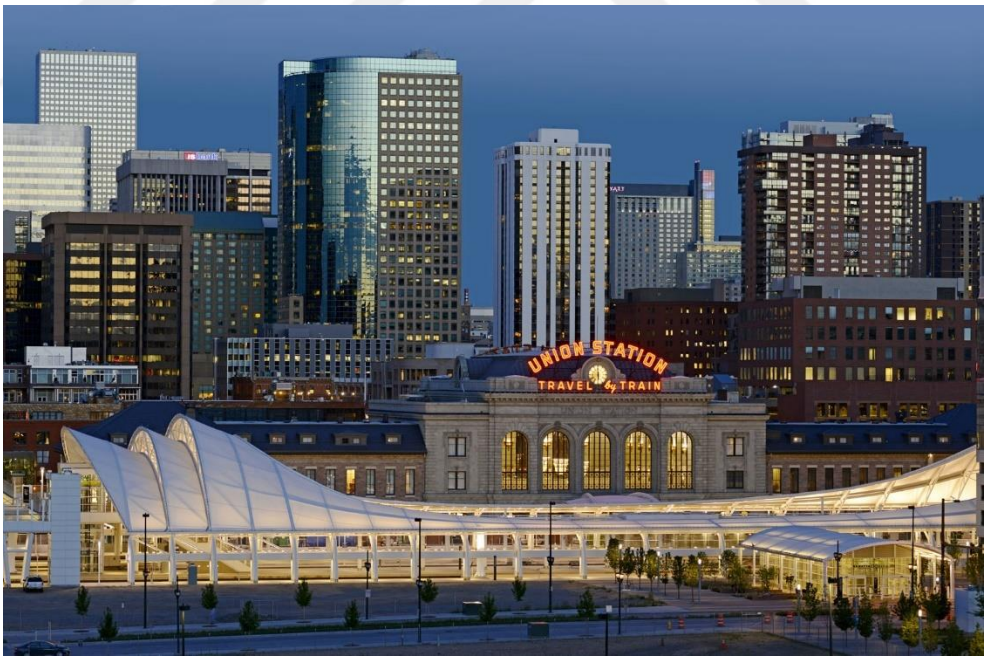

Figure 5.17 : The visual relation between business district of the city, historical station building, and new station' structure (iDesignArch).

At located underground, Union Station bus terminal can be considered as a node in respect of its services for regional, express, and local buses of the area. Also, the terminal serves a dual purpose of pedestrian passage that connects the stations of other

modes located at the site. The void on the top slab at the terminal tunnel help to get natural lighting to inside which help passengers enjoy the place while terrazzo floors and glass tilework elevate the ambience of the passage beyond the often depressive tunnel experience with sense of motion (Figure 5.18).

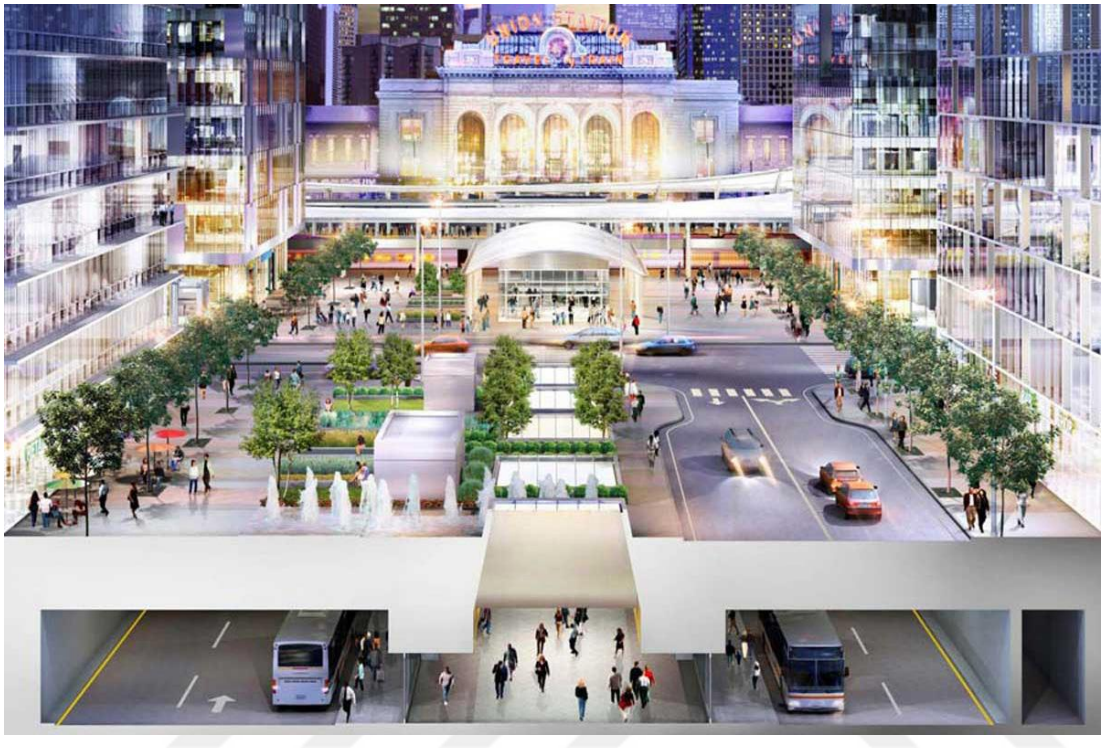

Figure 5.18 : 3D section of the project (SOM).

As a result of the renewal of the old railway areas existing in the station area, a new system has been created. As aimed ans expected, this transportation project has increased the private-sector activity around the area and attracted many investors attention. The design and implementations were made respectfully to its historical location and structure, but fundamentally it can be said that the contemporary design approach of modern structures of the Union Station embraces the standards and necessities for 21st century interchange stations.

From the pedestrian perspective, the main design concern at the station should be to make transit modes with heavy interchange flows connected which are already close to each other (Figure 5.19). This minimizes the time spend and distance walked for each passenger through the station area. This design concern is mostly reflected to the project but the pedestrian area is mostly shaped for only circulation except commerce zones. An accessible interchange station should be designed to allow passengers to change modes with ease, convinience, and safety. In accordance with the approach of

the designer, to create an attractive, enjoyable, legible, and safe pedestrian experience, the site design was included pedestrian ways and allow direct circulation. A new bicycle lot, including bicycle storage, lockers, showers, and repair area was designed located at the station area. By taking into consideration of the potential of the station, there can be said that the importance were kept the non-motorized means of transit in minimum. During level changes, using stairs, elevators, or escalators seems convenient, and identifiable for passengers according to its location and number. Signages installed for wayfinding, increase passenger travel times and make the station experience more fluid.

Figure 5.19 : The render shows pedestrian access between historical station and the newly designed station. (source: SOM.)

For people with different abilities, level changes to reaching vehicles, facilities, services etc. can be obstacles to movement, so at the project elevators and escalators are provided in respect with this concern. There were no data found about tactile surfaces for visual impaired people.

5.2.2 Pedestrian experiences

Google search results of Denver Union Station show that there were 671 reviews leaved overall (Url-3). According to the result of these reviews, the median score of the station is 4.4 out of 5. In order to reach correct comparison, reviews have been limited to last one year (06/19 – 06/20) in order to make them comparable to Sogutlucesme Station as well as Amsterdam Centraal.

In this investigation, grades with blank review section were eliminated on account of the reason that it should be thoughts or experiences shared for evaluation. After this elimination process, there are 86 reviews left which have been categorized as basically positive, negative, and irrelevant comments (Table 5.2). Similar to Amsterdam Central Station reviews, the evaluated reviews covered too many pages, so the source reviews of this research can be shared via e-mail if requested.

Table 5.2 : Categorized reviews of Denver Union Station passengers / users (Google, 2020).

	Component		
Categories	Positive reviews	Negative reviews	Irrelevant
Place-based comments	61%	9%	-
Operation-based comments	8%	16%	-
Total	69%	25%	6%

The investigation demonstrated that 70% of the written comments consist of place-based experiences and concerns. Majority of the place-based reviews are in a positive tendency; 61% of 86 reviews consist of place-based positive comments. In these reviews, reviewers defined the station and its surroundings as convenient, vibrant enjoyable and safe place. The indicators of these definitions were mentioned that impressive architecture of the structure, quality of shops, restaurants and amenities, easy wayfinding, adequate lighting of both inner and outer spaces and sufficient seatings for waiting. 9% of place-based comments can be categorized as negative. According to these comments, seating at the waiting area were occupied by homeless citizens. As far as these reviewers are concerned, the station has a security problem. However, homeless people who sleeps at the station can be considered as a social and governmental problem rather than a security problem of a specific place.

In addition to place-based ones, 21 operation-based comments should not be ignored. Only 8% of overall comments can be categorized as positive and 16% of them are negative. Functionality and ease of interchanging between modes and punctuality were

mentioned in positive operation-based comments. On the other hand, expensive ticket prices were emphasized under the most of negative comments.

5.2.3 Conclusion

The architectural approach while designing a new building related to the historic one should express its time by contemporary functions, aesthetics concerns, and regional characteristics. When we look at the new station building which was designed adjacent to the historic station building, the relation between new and old, and respect to the archiectural characteristics of historic building can be seen. The mass proportions, façade relation, and materials were defined carefully.

Although, the size of commercial zones at the area is perfectly adequate, except the entrance space which carries the welcoming function, the other parts of the historic building transformed to a hotel. This implementation makes public use restrain and the historical building should have used for public with due rights.

From outside point of view, the station area was designed and built in a functional and contemporary approach. The integration between both modes of transit and land-use is mostly accessible. As a result of evaluated pedestrian experiences, efficient integration of historic, enjoyable places and newly built transit areas reveals both meaningful and accessible interchange station.

6. CASE STUDY: SOGUTLUCESME INTERCHANGE NODE

6.1 The Reasons of Selection of Sogutlucesme as Case Study Area

Initially, the research that built this thesis started with the argument of how public transport interventions shapes the urban space and how the hubs of these interventions, as in interchange stations, may gain the characteristics of urban spaces. It was clear that discussing such a general topic would not be efficient so focusing on one of the newly built stations would allow to achieve more efficient results. In this respect, Sogutlucesme Station was chosen as a case study and under this topic it is explained the reasons.

The reasons of choosing Sogutlucesme Station as case study can be reviewed under three topics: its central location; its connections with and proximity to the stations of various type of modes; and being located in an area of responsibility of different politic administrations in Istanbul.

Figure 6.1 : Istanbul public transportation system map (Dörrbecker, 2019).

In Istanbul, especially in last decade, some mega transportation investments were carried out. Most of these investments were major railway projects that are mostly planned and built. One of these railway projects is Marmaray Railway Project which

is also known as Halkali – Gebze Commuter Rail Mass Transit System was inaugurated in March 2019. In the Figure 6.1 given above, the current transit network and Marmaray line relation (emphasized with yellow) can be observed.

After its inauguration, Sogutlucesme became one of the most important public transport nodes with considering the closeness of stations of other transport modes such as Bus Rapid Transit (BRT) / Metrobus system which was inaugurated in March 2009 and the last stop of this lane is Sogutlucesme Station (Figure 6.2).

Figure 6.2 : Location of Sogutlucesme transit area.

Besides, Sogutlucesme interchange area consists of a bus stop, a taxi stand, and parking lot which means there are park and ride (P+R) option. In the southern side of the station there are Sukru Saracoglu Stadium and Kalamis neighbourhood located. Due to closeness of the Sogutlucesme Station to the stadium, during the football games, spectators prefer to reach the stadium via Marmaray.

The third reason of choosing Sogutlucesme as case study of this thesis is that the location itself related to different politic administrations. As argued before, to put into practice an accomplished interchange transit center, connection of stations or modes must be designed in common perspective. The administrative situation of projects and

the contradictions between political administractions at Sogutlucesme area is criticized under the related topic.

6.2 Marmaray Project

Söğütlüçeşme Marmaray Station, which is one of the main subjects of the case study area, is within the scope of the Marmaray Project that connects the European and Asian sides of the Istanbul City (Figure 6.3). The line lies along the southern side of the city is not only a commuter railway line but also a part of the intercity railway system. Marmaray Project operations is in jurisdictional area of 1st Region Directorate of Turkish State Railways (TCDD).

Figure 6.3 : Marmaray commuter railway line.

The first design referred to the emergence of the Marmaray Project is the tunnel transition project, known as the "Tünel-i Bahr" which means sea tunnel, designed to connect the Historical Peninsula and Üsküdar (Figure 6.4). The tube crossing design was proposed and projected for the first time in 1892.

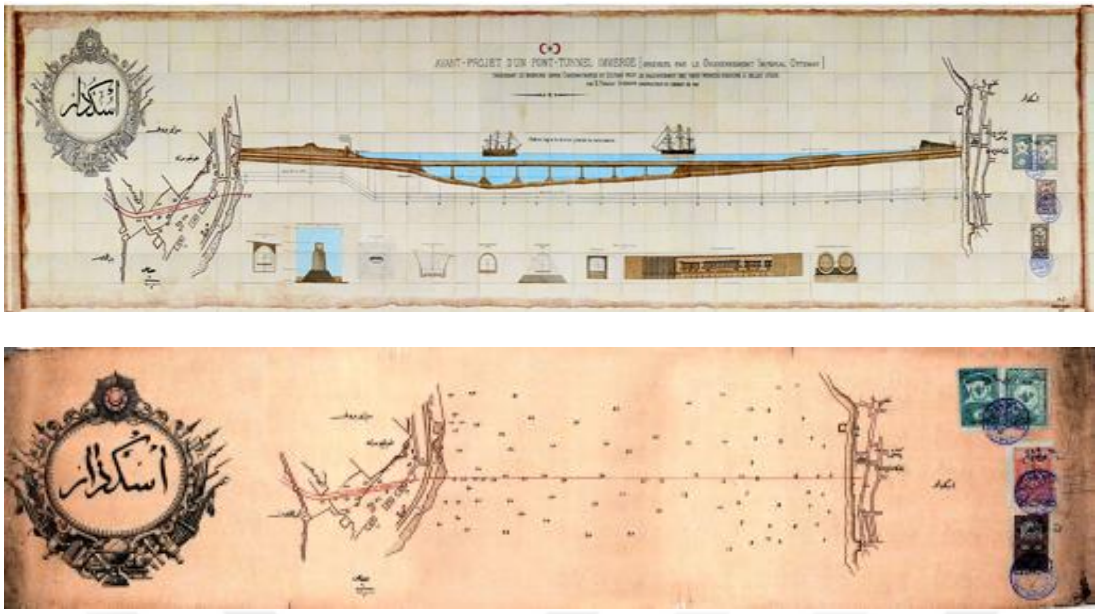

Figure 6.4 : Tünel-i Bahr Project first basic drawings (TCDD webpage, 2020).

The basic designs formed with such ideas were developed within the next 20-30 years and a similar basic design was developed in 1902 (Figure 6.5). In this design, it can be seen a railway tunnel passing through the Bosphorus was designed with the effect of the technological developments brought by its time.

Figure 6.5 : 1902 dated railway tunnel basic drawings (TCDD webpage, 2020).

The railway tunnel project evolved in time hence, it was decided to connect to the existing railway line to generate integrated, and more compatible transportation system. The existing railway lines that the Bosphorus crossing tunnel project was planned to connect were Sirkeci-Halkalı commuter railway lines and Haydarpaşa-Gebze commuter railway lines. The project of the Haydarpaşa-Gebze line was decided to build on the grounds of a law published by the Ottoman Empire in 1871 and it was built in three phases. The first phase of the project is Haydarpaşa- Pendik line started

its operations in 1872. However, the issue of renewal of suburban lines that have been active for more than 120 years due to the increase in traffic density and delay of trains because of the completion of their technical equipment life has been proposed at different times by different governmental administrations. It has been minor renovations made before however these implementations were about renewing the station buildings.

Following more than twelve years of studies and feasibility researches, in 1999, Halkalı- Gebze Railway Project (later called as Marmaray Project) funding agreement was signed between the Turkish government and the Japanese Bank for International Coorperation. According to the government predictions and calculations, the project cost was estimated as $ 4.5 billion and the funding should have covered 35% of the total cost of the project. The project has three main components as, the Bosphorus Crossing - BC1 Contract, the Commuter Rail - CR3 Contract (previously CR1 Contract) and the procurements works new rolling stock - CR2 Contract. The Ministry of Transport and Infrastructure was the main responsible of the project as the client. The project had been carried out by OHL-Siemens Joint Venture as the main contractor.

The Ministry of Transport and Infrasture explained their intentions and aims of the project as mainly to provide a permanent solution to the urban transportation problems of the city while building a railway system operates between Asian and European sides. Beside of that, forth aims of the project are reducing travel time and trafiic congestion especially in the Golden Horn, increasing public transportation ridership, reliability, accessibility, and safety, providing uninterrupted passenger transit and freight transportation.

Starting from inauguration of the BC1 section, commuter trains have started to operate from Ayrilikcesme Station which is the only surface station of the BC1 section to Kazlicesme Station. The previous modes that have had to be used for travelling between both parts of Istanbul were ferries run between several numbers of quays, and two bridges for rubber-tyred vehicles, before the Marmaray tunnel started to operate.

The regeneration project of the existing Halkalı-Gebze commuter line was built in the scope of the CR3 contract was signed in October 2011. It was aimed to build a whole system which build an effective connection among the most settled areas of Istanbul

city, and also increase the accessibility between other cities connected via intercity line. The contract comprises the modernization and renovation of existing suburban railwaylines. After a while later from the beginning of field implementations, because of undue delays expressed by the Ministry, besides OHL-Siemens JV, Kalyon-Kolin-Cengiz Marmaray Construction JV got involved as the main subcontractor. Design works of the project had been carried out by Prota Engineering. As the last section of the project, CR3 part of the Marmaray was started to operate in March 2019. Marmaray Project has 43 stations in total and various structures related to operation and maintenance. There were three types of stations in the scope of CR3 project which are A type station, B type stations and special type stations that are carried both structural characteristics or being entirely distinctive.

According to the shared data via e-mail by 1st Region Directorate of TCDD, the substantial increase of daily passenger numbers can be observed. The graph given below shows that daily ridership (Figure 6.6).

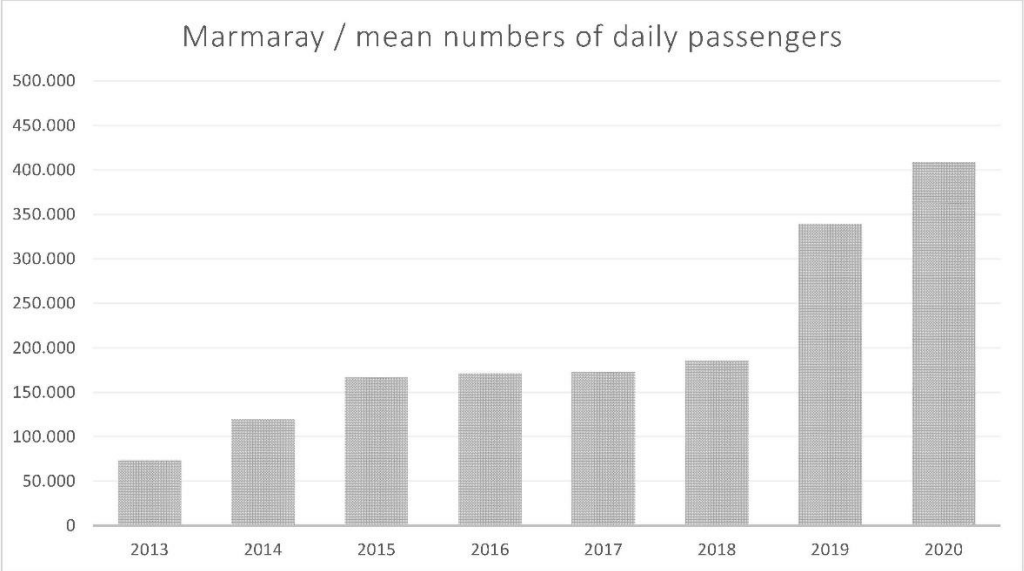

Figure 6.6 : Mean numbers of daily ridership in Marmaray (Source: 1st Region Directorate of TCDD).

The average numbers of daily ridership heretofore starting the operations of Halkalı-Gebze commuter rail were 73.344 in the year 2013, 119.547 in 2014, 167.029 in 2015, 171.128 in 2016, 172.816 in 2017, and 185.817 in 2018. The first months of the operations which was started in 2013 can be considered as adaptation period of the public, due to the concerns about the construction quality of the tunnel due to

inadequate transparency about the project's technical details. Hence the high increase between 2013 and 2014 is evaluated context free. On the other hand, when the increasing of mean numbers by year are evaluated, the daily ridership increasing rates are 39.7% in 2015, 2.4% in 2016, 0.9% in 2017, 7% in 2018. In conjunction with the activated operations of rest of the project, ridership numbers increased quite a lot that are 339.449 in 2019 (82%), and 408.917 in 2020 (20%) based on data from the first three months of the year.

Nevertheless, before the inauguration, the targeted and predicted ridership numbers were announced as 1.700.000 passengers per day so it cannot be attained the expected results based on shared data. Obviously, there are more than one variable of the issue of reaching desired performance on the whole system. While searching for the variables and detecting the problems, downscaling, and descending to particulars are going to be more efficient move.

6.2.1 Sogutlucesme Marmaray station

Sogutlucesme station is the last station in the Asian side before BC1 section which is tube connection of Marmaray Railway Project. The station also one of six high-speed intercity railway station besides being commuter rail station. Location of the station is quite strategic in accordance with centrality. Sogutlucesme Station was the beginning and ending point of the almost all transportation modes of the Asian side of the Istanbul city. With more than 17.000 daily ridership daily (TCDD, 2020), it becomes one of the most crowded railway stations in Istanbul. The station area is a transportation node not only related to the railway station but also as BRT / metrobus station, bus stop, taxi stand, dolmus[1] stop, and P+R facilities (Figure 6.7).

The station attracks the attention regarding to closeness of one bus stop (Belediye stop - municipality stop) which is also a quite strategic rubber-tired public transportation node. Dolmus[1] stop, a taxi stand and parking lot which enables park and ride (P+R) option.

[1] A para-transit mode with a designated route but without schedule. Payments are accepted during the ride and a trip starts when the vehicle is full.

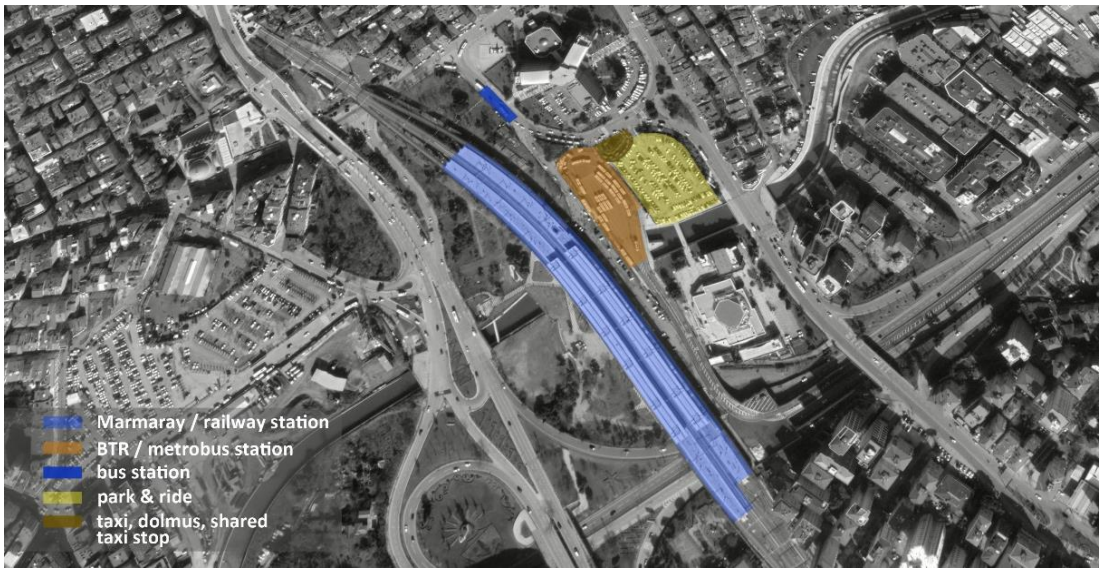

Figure 6.7 : Transportation related spaces at Sogutlucesme.

In the southern side of the station there are Sukru Saracoglu Stadium and Kalamis neighbourhood located. Due to closeness of the Sogutlucesme Station to the stadium, during the football games people prefer to reach the stadium via railway or metrobus. Regarding transportation activities, the most dominated node of the Sogutlucesme area is Kadıkoy Municipality main building and its facilities located at the northern and eastern side of the Marmaray station.

The station was designed as both commuter rail and inter city transfer station. Apart from historically protected station buildings, it is the only station in the project that the existing structure and viaduct were protected and retained (Figure 6.8). In the scope of the CR3 contract, the station must be refurbished and upgraded according to related international regulations, and technical requirements which is also the appendix of the contract. Besides, in the technical requirements documents it is mentioned that to achieve a functional and compatible commuter rail and intercity station, all engineering and architectural installations must be upgraded.

According to the architectural design manual from the technical requirements, Sogutlucesme Stations was categorized as the Special Type Station. The station is differentiated from newly designed stations with its existing structure and concourse area is located below the platform level but not underground.

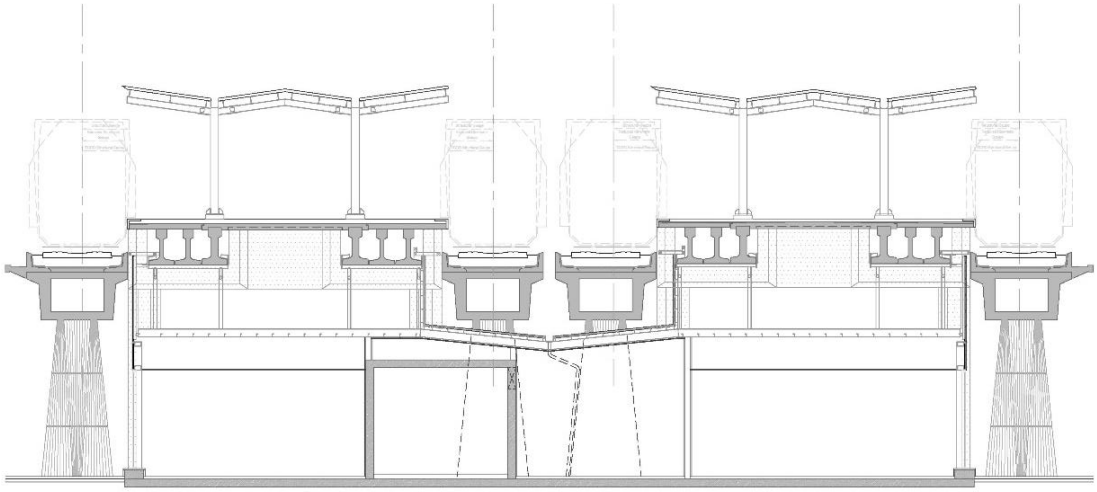

Figure 6.8 : Existing structure / cross section of the station.

The station area was defined according to the international regulations about normal operation and emergency evacuation with using predicted passenger numbers. Sogutlucesme passanger number was predicted much higher than other commuter rail stations. For the vertical circulation of passenger flow, there are a large number of stairs, escalators, and elevators installed. One of the reasons of design challenges at the station is the necessity of preserving the existing shape of the old station. As a result of increasing number of passengers in time and related regulations / standards for station design, the circulation area must have expanded. Related to this expansion, apart from transit function, there is no adequate space for efficient use as public place. In accordance with the discources of De Certeau (1980), the station area may be categorized as ‘frequented space’ but ‘insignificant passage’ as well.

Figure 6.9 : View from commuter rail platform to waiting area / intercity platform.

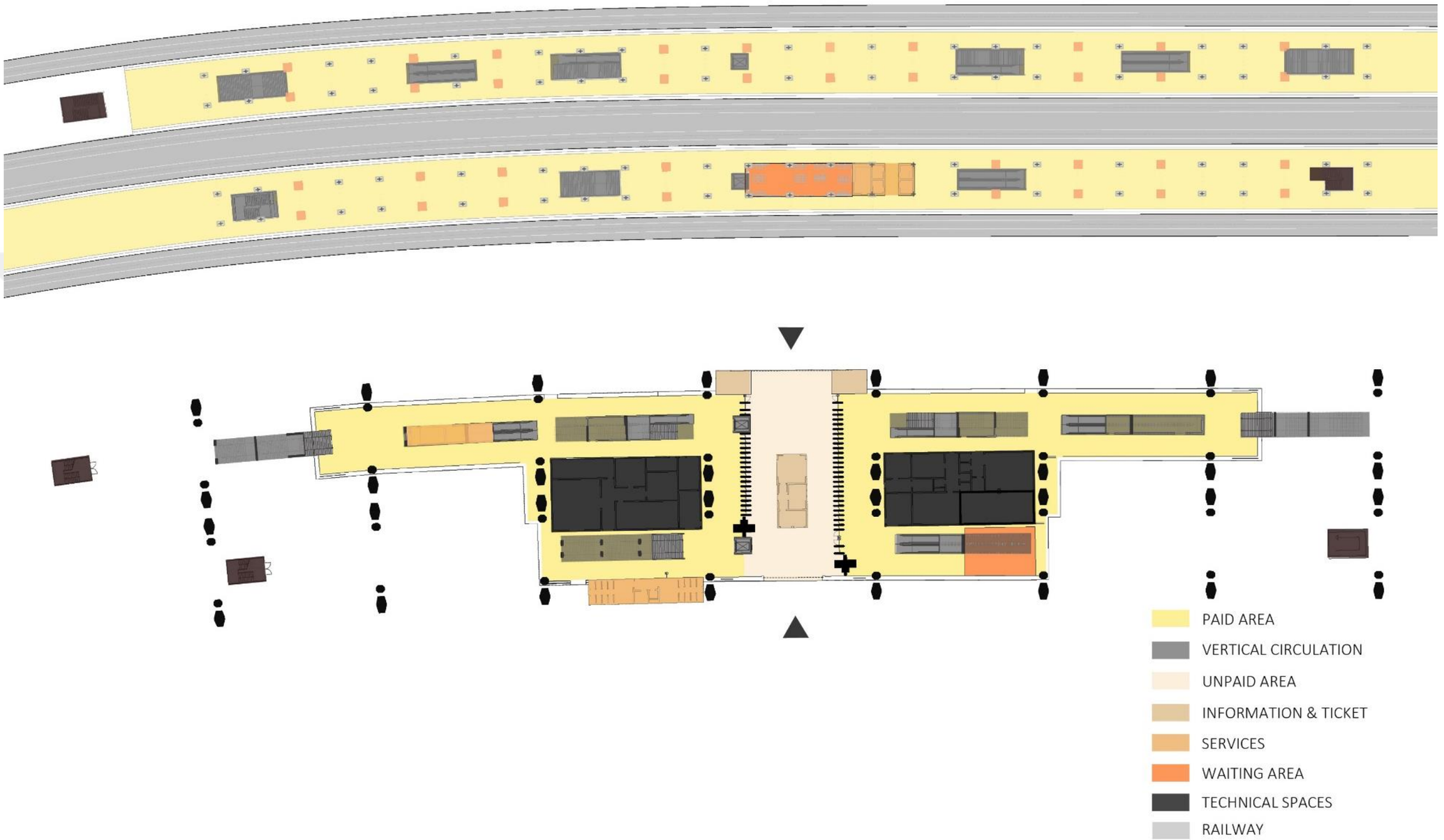

Figure 6.10 : Organizational scheme of the Marmaray Sogutlucesme Station / platfrom and concourse levels.

The station was clearly demarcated zones according to their functions at both platform level and concourse (Figure 6.10). There are also easily perceived and defined spaces in the manner that the space organization at Amsterdam Centraal Station. At the platform level, the zones were seperated as train platforms, trainway, waiting area, and service area which consist of restrooms and buffet (Figure 6.9). The platform at the north serves for commuter rail passengers and the other one serves for intercity railway travellers. As another functional alternative to waiting area, there were benches installed adjointed to the steel columns.

The concourse level comprises of zones for meeting/entrance which is also unpaid area, services, information and ticket offices, paid circulation area, and waiting area for intercity travellers. When the place was experienced from human scale, it can be said that the zones at the station are perceivable and there is adequate space for fulfilling the needs related to design manuals and standarts. Perceivability of the organizational scheme and the signage makes the passenger find their rotation with ease. The geometric shaped columns of existing structure and the modern new materials and implementations were clearly recognizable (Figure 6.11).

Figure 6. 11 : Concourse level from the south of the station.

Figure 6.12 : Ticket offices located at the concourse level.

To easy wayfinding, there are information screens to inform passengers about arrival and departure times, and signages starting from the entrances of the station, including braille maps installed for people with different abilities. The bright yellow tactile surfaces directed them starting from entrances (Figure 6.12). Despite this, at the close proximity of the station, there were no installations for people with disabilities. The spatial organization offers convenience and directness for passengers while citizens who write their comments on online platforms, complain about lack of punctuality. These comments are evaluated in the next chapter.

Figure 6.13 : Marmaray Sogutlucesme Station south entrance.

The façade with separate glass units creates transparency perception between outer and inner spaces and allows to receive natural light to inside. The unpaid area can use as a purpose of passage that helps the pedestrian reach other side of the station.

The south entrance of the station is emphasized by cantilever roof besides that, its other function is sheltering for passengers (Figure 6.13). On the contrary of the Sogutlucesme area, the area consists of the south entrance and its surroundings is quite greeny and enjoyable. Even there we an historical locomotive installed in the middle of trees (Figure 6.14). However, this specific area is neglected because of the unclear boundaries and scope of jurisdictional areas. Sered grass area and trees draw the attention but there is a potential to become a spectacular green space. There is a spectacular potential to emphasize this green area through public oriented design decisions and implementation. As De Certeau's discources (1980) discussed previous chapters, if the "frequented space" may reflect to the person's memories, the space becomes meaningful place.

Figure 6.14 : Historical locomotive located in front of the south entrance.

As a consequence of the same jurisdictional problem, the connection between sidewalks on the side of Kadikoy direction is quite undefined. The gap in the middle of fencing is an unsatisfactory entrance for this size of station and it is neither functional nor aesthetically sufficient (Figure 6.15). As a consequence of fencing, which surrounds the jurisdictional area of TCDD, a publicly restricted space is created in the middle of the city.

In the same point, dolmus passengers interchange to railway however, there were no drop off area segregated from traffic flow. This design failure eventuates in both traffic congestion and unsafe environment for interchange passengers.

Figure 6.15 : Street view shows the south pedestrian entrance of the station area.

As aimed in architectural design phase, after the renovation of the viaduct structure, the retained structure and the modern entrance were clearly recognizable. The simplicity of the entrance design emphasizes the function of the building. Besides that, the lighting and sheltering at the area in front station are quite neglected.

While walking to the Marmaray Station north entrance and metrobus station south entrance from the bus stop, there is conflict between pedestrian and car transit (Figure 6.16). There are several elements such as security cabin, obstacles, unrestrained

parking areas occupy the sidewalks which is already quite narrow condering the passenger numbers.

Figures 6.16 : Sogutlucesme Marmaray Station north entrance (3) wiew from bus stop (1), and from metrobus station entrance(2).

6.2.2 Sogutlucesme area transportation interchange analysis

Sogutlucesme has distinctive environmental advantages due to its location. Until the extension of BRT / metrobus line from Zincirlikuyu to Sogutlucesme in 2009, when the Marmaray Project construction works had not started yet, and the old line was active. This extension made Sogutlucesme to become the first station on the Haydarpasa-Gebze commuter railway line that can be interchanged and accessed to the rest of public transportation network of Istanbul. At the Sogutlucesme interchange area, many different transit nodes and their extensions are in close link (Figure 6.17). For further evaluations, the data about the Sogutlucesme BRT / metrobus Station was demanded from IBB, however there was no respond received.

One of the most active used transit node is the Belediye bus stop (Figure 6.18) where is standing on the critical point. The bus stop is located on the route of 30 public buses that are mostly starting their route from Kadikoy ferry quay area. Apart from private vehicles and taxis, getting on one of these buses is the only option for arrive in Sogutlucesme railway and metrobus stations from Kadıköy ferry quay and the center of the district. Differantiated routes of these 30 buses ended at Eastern neighborhoods of Istanbul.

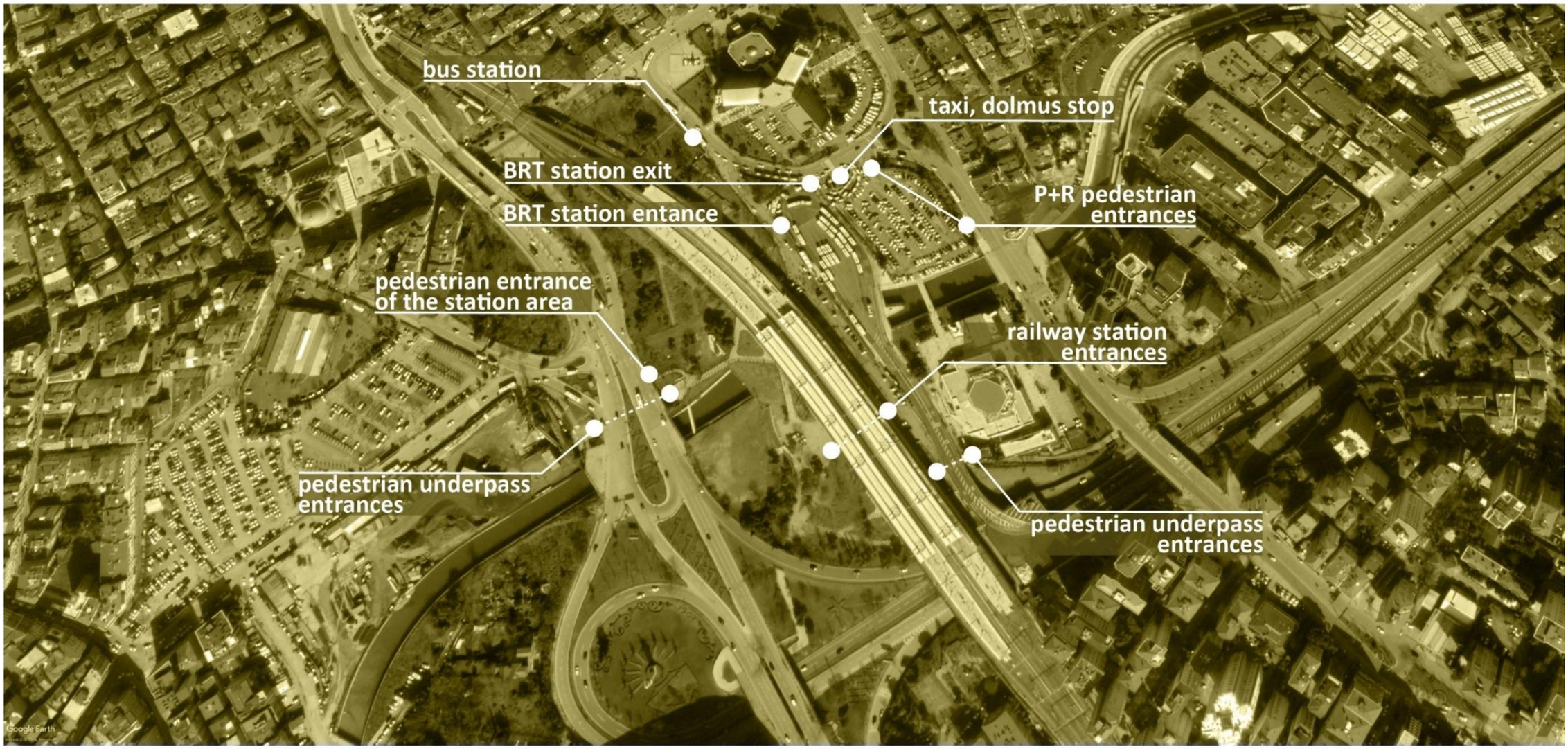

Figure 6.17 : Transportation nodes of the Sogutlucesme area.

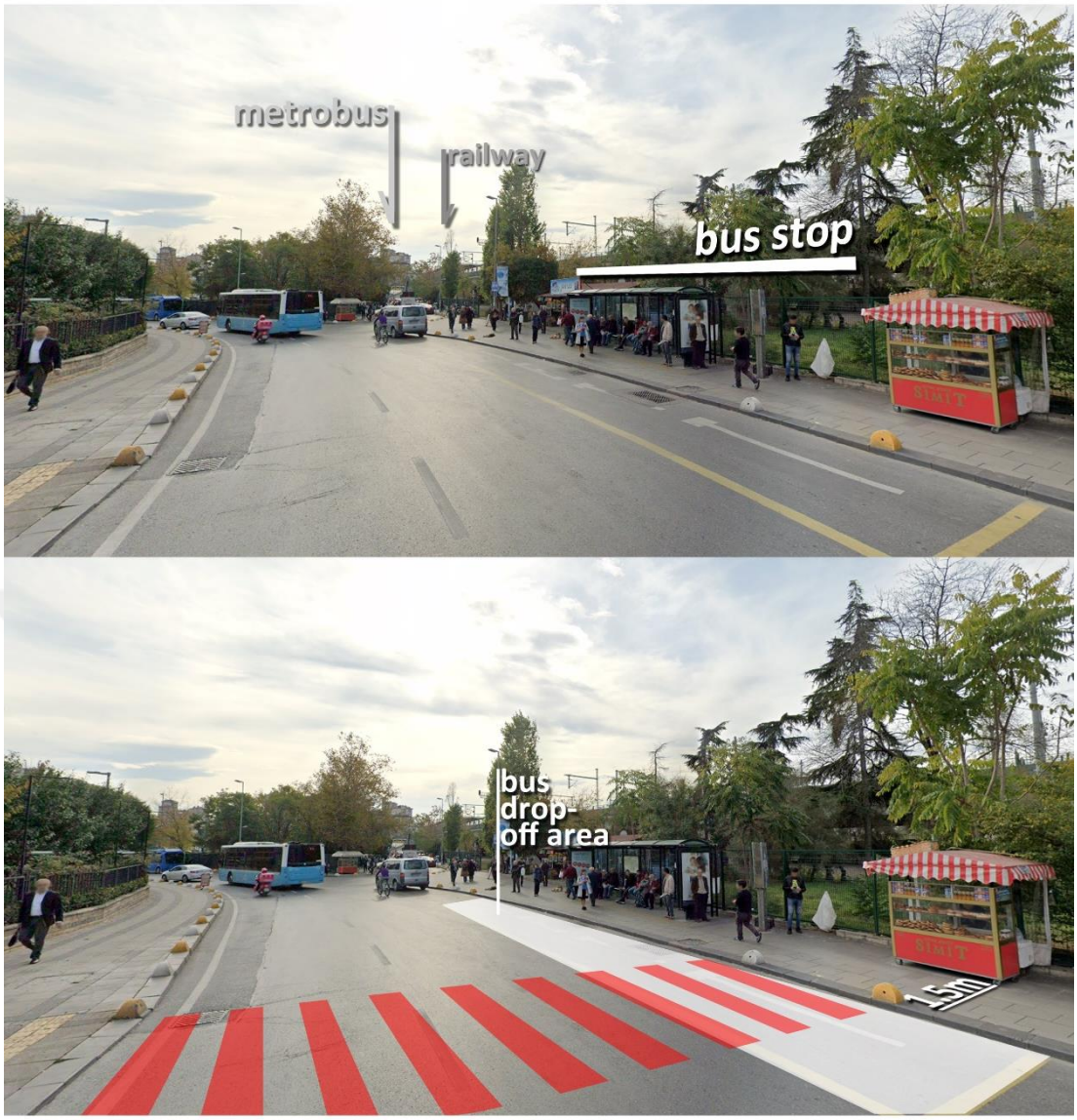

Figure 6. 18 : Street view in front of the bus stop and relation to railway and metrobus stations.

The bus station located in the middle of pedestrian way that the width of it is approximately 2.5 meter and there is approximately 15 cm. elevation difference between pedestrian way and the roadway. Hence, the bus station is not accessible for people with different abilities. Moreover, absence of crosswalks between urban and transit nodes makes it impossible to uninterupted pedestrian access. Occupation of the bus stop on the pedestrian way create over density and crowd especially at rush hours. Moreover, this inadequate sidewalk ends after a few meters while moving across to the metrobus and railway stations. The road that connects bus station, metrobus station and railway station should be rebuild without carless and obstacles as it should be according to international and national design regulations.

Figure 6.19 : Electronic signage board at the bus stop.

To ease the wayfinding, there is an electronic signage board installed next to the bus station to inform passengers about the schedule and route of the buses (Figure 6.19). Unfortunately, the reason why its size and the location, the bus stop shelter and the signage board occupied lots of circulation space when the sidewalk depth is taking into consideration.

The other transport mode serving at the area is Dolmus (minibuses). Park and Ride (P+R) facilities are designed for not only fulfill the parking needs of the area it was built but as well allow passengers to change mode between private vehicles and public transportation. However, changes should be made to improve the pedestrian access. Especially between the bus drop-off area, and P+R pedestrian entrances /exits through building uninterrupted sidewalk to the station entrances of metrobus and railway (Figure 6.20). This improvement helps people who are living around the area on the other hand, encourages people to use this sidewalk to safe and direct access to the stations as well. Streamlining circulation and marking pedestrian crosswalks would help to clarify the use of the space. In addition to the secure parking lots for private motorized vehicles, to uncourage and ease further use of sustainable means of urban transit, secure and accessible bicycle lots should be designed in the Sogutlucesme area.

Figure 6.20 : Street view shows P&R, taxis, dolmus, metrobus and railway stations' relationship.

As discussed under the accessibility chapter, one of the main design concerns at a transit interchange area should be to make transit modes with heavy pedestrisn flows more connected. The different transit nodes are already close to each other in this scenerio. This design concern makes safe and direct connection as weel as minimizes the time spend and distance walked for each passenger between stations and urban nodes. An accessible multimodal interchange area should be designed to allow passengers to change modes with ease, convinience, and safety through direct

circulation areas. In the meantime, for the purpose of creating an attractive, and enjoyable pedestrian experience, the societal and perceptional relation is important.

6.2.3 Pedestrian experiences

While shaping the thesis structure, the pedestrian survey on site was planned. However, the severe conditions caused by the covid pandemic, the site survey cannot be actualized. Instead of analyzing pedestrian experiences from the results of face-to-face survey data, as an alternative, online reviews from Google are evaluated (Url-4).

In the interest of Sogutlucesme interchange area, there were 126 Google reviews leaved that gives 4/5 score as a result of reviewers' experiences. After investigation of all reviews, based on written comments, 70 of the reviews were eliminated as they did not include any comments. Following this elimination, the residual 56 reviews have been categorized as basically positive, negative, and irrelevant comments (Table 6.1). The evaluated reviews can be found in the Appendix with details.

Table 6.1 : Categorized reviews of Sogutlucesme Marmaray Station passengers (Google, 2020).

	Component		
Categories	Positive reviews	Negative reviews	Irrelevant
Place-based comments	33%	22%	-
Operation-based comments	9%	13%	-
Total	42%	35%	23%

According to findings after investigation, 55% of the written reviews are place-based comments, so it can be said that the comfort, safety, experience, and perception of the transit place is more valuable for reviewers. In the meantime, on the contrary of common expectations, only 21% of the reviews are related to operations such as punctuality, crowdedness, the time spend in the vehicle so on. Besides, 23% of the written reviews are found irrelevant, the reason why their definitions consist of solely the name of the area or stations.

Although, 33% of place-based comments consist of positive comments, the negative place-based comments percentage is 22%. Most of the positive reviewers defined the Sogutlucesme Station as “the most beautiful station on the Marmaray line”. Place-based contents vary from conviniency for people with disability to its view. For example, “the station is designed for disabled people”, “the view is good especially at sunset”. On the other hand, negative reviewers mentioned its lack of security, services, and shelter as waiting area. To exemplify, “female WC is always locked”, “there is no indoor waiting area”, “there are no lockers”, “there are no kiosks”. As a consequence of this contradiction, there are surely quite positive impacts and results experienced after the station was activated, however there is a need for spatial and service implementations to the aim of developing the transit space should be considered.

In addition, the metrobus and railway connection and relation are emphasized in most of the reviews so, there are obviously quite a lot number of interchange passengers and their expectations for the area. From another perspective, there are 9% positive and 13% negative comments take place under the category of operation-based reviews. In the most of the operational-based negative reviews, the problems mentioned are related delays / punctuality, crowd / comfort, and inadequency of services.

7. CONCLUSIONS AND RECOMMENDATIONS

The concepts of creating new spaces in urban area are discussed within theories on different perspectives. Both Lefebvre (1991), and Augé (1995) discuss that concepts and theories due to the fact that creating new spaces over existing spaces and the connection between spaces in their works. Both thinkers took the stand on opposite points and directions. In the literature review of the thesis, creating an interchange or multimodal transit space were discussed under both ideas as stations as non-places and stations as living spaces and part of the city. Even though Marmaray Sogutlucesme Station is technically accessible for people with different abilities, it can be disputed the characteristics of being memorable or carrying distinctive identity.

The elimination of the traffic congestion of the most densely populated district of the Asian side of Istanbul will be possible by solving the physical and social problems in such a large transportation node by making it a more attractive transfer centre.

Designing a station independently of the existing urban texture and neglecting to the fact that design a part of a whole transportation system creates a several issues. When designing integrated transportation systems in the city, planning areas and transition areas fall under the responsibility of different jurisdictions. As responsibility areas often result in contradictions, they result in a poorly integrated transport system and low design standards.

As it can be seen in relation to pedestrian experiences in Amsterdam, Denver and Sogutlucesme stations within the scope of place-based and operation-based evaluation of these transit spaces, there should be particularly place-based design works and implementations to improve the perception of place (Table 7.1). Both interchange stations given as best practices are potential sources for understanding how to design interchange stations as urban spaces, since pedestrian experiences provide objective data to appraise the urban integration and its accessibility. From common point of view, both transit spaces were designed as a part of existing urban texture, even these implementations support the urban environment and architectural adjacencies in terms of physical and visual. Regarding the insufficient number of Sogutlucesme Marmaray

Station reviews, the percentage difference between positive reviews shows the need of future implementations and research for developing the perceptual and physical qualities of the interchange station and its surroundings.

Table 7.1 : Compared online reviews of Sogutlucesme Marmaray Station, Amsterdam Central Station and Denver Union Station (Google, 2020).

	Stations		
Categories	Sogutlucesme Marmaray	Amsterdam Central	Denver Union
Place-based positive comments	33%	51%	61%
Operation-based positive comments	9%	23%	8%
Place-based negative comments	22%	3%	9%
Operation-based negative comments	13%	4%	16%
Irrelevant	23%	19%	6%

In this regard, to obtain more inclusive and clean data, more detailed and wide-ranging research needs to be completed at the Sogutlucesme interchange area. This would lead the actors for future implementations and help them specified the problems and results.

The area has pedestrian facilities however the existing pattern may need considerable improvements, especially at the South entrance of the Marmaray station and the area located between P+R facility and other modes. The pedestrian facilities at the interchange area where high volumes of pedestrian flow can be observed should be designed without obstacles and sidewalks or footpaths need improvements. The road

that connects bus station, metrobus station and railway station should be rebuilt to prevent pedestrian-car conflicts and eliminate obstacles. This is highly important in order to create a safe transport system especially for non-motorized vehicle users. As a sustainable approach, walking and cycling choices should be encouraged through building secure bicycle lots and continuous bike lanes and pedestrianized spaces between the destination and modes of transit as well as in the city.

The multi-jurisdictional nature of the Sogutlucesme interchange area means that a wide range of economic, societal, and human resources are available. With these resources, it must be quite possible to reshape and renew the interchange spaces as meaningful urban places to increase quality in everyday individual experiences. Unfortunately, many of the responsible stakeholders, including the transit operators responsible, often do not consider transit access between modes or destinations as an activity that needs to meet safety and security standards as well as making transfer enjoyable for passengers. Therefore, perceptual and physical relation in spatial organization within and around stations are not the stakeholders' primary concern. Engineers and local/national authorities often focus simply on transportation function of urban mobility as a necessity.

The degree to which any jurisdictional stakeholder has the ability to affect qualities of interchanges as urban spaces are based on the scope of its responsibility, collective awareness and economic availability. Equally important in whether or not a stakeholder should have the capacity, justification and resources to actualize improvements, is the level of interest the stakeholder has in making these implementations. Since interchange area design plays a limited role in stakeholders' scope of responsibility, it is ignored more often. Moreover, the station accessibility and the interchange area needs are preempted by other goals actors may have. The value of interchange stations as important parts in daily mobility experience of passengers need to be understood by all relevant stakeholders from local authorities to national service providers and design manuals need to be prepared not only according to the standards but also with reference to urban contexts regarding societal, historical, environmental values. Only then these crucial links in metropolitan areas may provide the conditions for pleasant mobility experiences for citizens and foster sustainable urban mobility.

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APPENDICES

APPENDIX A: Positive reviews considered for pedestrian experiences section
APPENDIX B: Negative place related reviews considered for pedestrian experiences section
APPENDIX C: Negative operation related reviews considered for pedestrian experiences section

APPENDIX A

Ömer Faruk Arıcı
Local Guide · 165 reviews

★★★★☆ 3 years ago
İstanbulun her yerine ulaşımı sağlayabilirsiniz

(Translated by Google)
You can reach all over Istanbul

1 GMS
1 review

★★★★★ a year ago
Yine, yeni, yeniden tren nihayet şehir içinde. Pendiğe gidene kadar anamız ağlıyordu.

(Translated by Google)
Again, the new, re-train is finally in the city. Our mother was crying until she went to shed.

Tamer Bozkurt
Local Guide · 521 reviews

★★★★☆ 2 years ago
Metrobüs ilk durak buradan binip oturarak Beylikdüzü ne gidebilirsiniz 2 saat sürer kalabalık bir yer güvenlik var polis oluyor genellikle

(Translated by Google)
Metrobus first stop from here and sit down Beylikdüzü what can go 2 hours it takes a crowded place security

Burak Yılmaz
402 reviews

★★★☆☆ 3 years ago
Güzel :)

(Translated by Google)
Beautiful :)

BURAK ERDOĞAN
1,185 reviews

★★★★★ 3 years ago
burdan bin beylikduzunde in . butun sehri geciyorum

(Translated by Google)
Get off here in a thousand beylikduz. I'm going all night

Lutfullah Ugurer
Local Guide · 29 reviews

★★★★★ a year ago
güzel hizmet harika işler

(Translated by Google)
nice service great work

ozan oguzoglu
Local Guide · 125 reviews

★★★★★ a year ago
13 Mart 2019 tarihi itibarıyla YHT ve Marmaray trenleri bu durakta duruyor. YHT sefer saatleri de eklense haritaya daha iyi olabilir.

(Translated by Google)
As of March 13, 2019, YHT and Marmaray trains stop there. YHT can also be better on the map if the expedition hours are also added.

Августина /Наталья Spirtova
Local Guide · 425 reviews

★★★★★ a year ago
(Translated by Google) Very convenient, the final metrobus.
And then the railway station in the direction of Ankara.
A very beautiful place.
Convenient outcome.
The second line, marmaray, is the metro which added another branch.
To stop haokaly, on the European side.
Now the central road will become freer. For the main transport.

Didem Bektaş
Local Guide · 28 reviews

★★★★★ 4 months ago
Söğütlüçeşme metrobüs durağından metrobüse bindim. Cumartesi saat 16.15 ten bahsediyorum. İlk gelen metrobüse bindim. Avrupa yakası gibi kalabalık değil :)

(Translated by Google)
I took the metrobus from Söğütlüçeşme metrobus stop. I'm talking about 16.15 on Saturday. I got on the first metrobus. It is not crowded like the European side :)

Tolga Oğuzoğlu
Local Guide · 124 reviews

★★★★★ 9 months ago
Marmaray hattındaki en güzel istasyon. Treni beklerken harika bir Kadıköy manzarası izliyorsunuz. Peronlar geniş, YHT aktarmalı, Avrupa standartlarında bir aktarma istasyonu.

(Translated by Google)
The most beautiful station on the Marmaray line. While waiting for the train, you watch a wonderful view of Kadıköy. The platform is a large, YHT transfer, European standards transfer station.

Ali Fuat Arslan
Local Guide · 12 reviews

★★★★☆ 2 years ago
Yemekler nefis, mekan super, calisanlar insan otesi. Fiyatlar makul.

(Translated by Google)
The food is delicious, the place is super, the staff is the human herb. Prices are reasonable.

gamze durul
Local Guide · 176 reviews

★★★★★ 8 months ago
Olmasi gereken gibi temiz ve duzenli. Ve ücretsiz temiz wc :)

(Translated by Google)
Clean and tidy as it should be. And free clean wc :)

Acıbademli GoGoBaBa Gökhan
1,029 reviews

★★★★☆ a year ago
Çok uzun süren bir kapalı kalış ardından 2019 martında açıldı. Güvenlik ve personel çok güleryüzlü. Şimdilik trenler çok yavaş ve az sayıda. Sefer araları uzun. Ama iyi ki var. Demiryolsuz ülke mi olur yahu. Uzun yollar kısaldı. Ayrılık çeşmesi ve söğütlüçeşme iyi oldu. İlerde seferler artar ve trenler hızlanır ise dahada rahatlar ulaşım.

(Translated by Google)
It was opened in March 2019 after a very long covered stay. Security and staff very friendly. Trains for now are very slow and few. The breaks are long. But it's good to have. It's a railroad. Long roads shortened. Separation fountain and willow fountain were good. If the voyages in the future increases and the trains are accelerated more and more relaxed transportation.

hamza bozoğlan
Local Guide · 292 reviews

★★★★☆ a year ago
Daha tam oturmamış yeni yeni düzenleniyor.
Bir tarafı fenerbahçe stadına bakıyor.
Diğer tarafı metrobüs duraklarına bakıyor.
Çıkış tarafı Kadıköy Belediyesi otobüs durağı taraf.
İstanbula trenle gelip pendik te inmekten çok daha güzel.
Giriş çıkış yönlendirmesi de güzel.
Biraz personel de alışırsa yerli yerine oturur

(Translated by Google)
It's just not being settled down yet.
One side is looking at the stadium.
The other side is looking at metrobus stops.
The exit side of Kadikoy Municipality bus stop side.
It is much better to come to Istanbul by train and take a train.
The check-in direction is also nice.
A little staff will get used to it

Yakup EROZKAN
Local Guide · 23 reviews

★★★★★ a year ago
Ulaşım harika

(Translated by Google)
Transportation is great

محمد سابر
Local Guide · 157 reviews

★★★★☆ a year ago
Marmara Station is the best (Translated by Google)
terminal that connects Asia and European Istanbul

(Original)
محطة مرمره أفضل محطة التي توصل بين آسيا و الاوروبية إسطنبول

Ji Hoon Ko
Local Guide · 297 reviews

★★★★★ 5 months ago
(Translated by Google) Sometimes I change to the next train here, but at first I didn't know ... Marmaray was relatively long and had to pick a new train. But thanks to that, I took a nice TV tower and it wasn't bad. Especially good at sunset

EYÜP RAFET YILMAZ
Local Guide · 95 reviews

★★★★★ 6 months ago
Yüksek hızlı trenden marmaraya çok hızlı şekilde geçip avrupa yakasına geçiyorsunuz.

(Translated by Google)
High speed train from marmaray you pass too quickly through the European side.

Turcoman
Local Guide · 190 reviews

★★★★☆ 3 years ago
ilk duraktan yer kaparak binme keyfini yaşatan mübarek durak.

(Translated by Google)
The blessed stop that takes the place from the first stop and makes the pleasure of riding.

H. Murat Ataman
Local Guide · 244 reviews

★★★★★ a year ago
Bu hizmet çok iyi oldu, İstanbul'a daha çok demiryolu hattı lazım.

(Translated by Google)
This service was very good, Istanbul needs more railway lines.

Davut Gönültas
1 review

★★★★★ 2 years ago
İyi

(Translated by Google)
Good

canK
4 reviews

★★★★★ 10 months ago
güzel bir çözüm

(Translated by Google)
nice solution

Aysuhan Yasemin
Local Guide · 434 reviews

★★★★★ a year ago
Söğütlüçeşme Marmaray dan söğütlüçeşme Metrobüse bir merdiven inerek ulaşılmakta. Metrobüs ve istasyon engelli bireylerin kullanımına uygun dizayn edilmiş.

(Translated by Google)
Sogutlucesme will be reached from the Marmaray by a stairway to the metrobus. The metrobus and the station are designed for disabled people.

hüseyin kurt
Local Guide · 23 reviews

★★★★☆ 2 years ago
Anadolu yakasının en değerli buluşma noktalarından

(Translated by Google)
One of the most valuable meeting points of the Anatolian side

APPENDIX B

Ekrem T
Local Guide · 27 reviews

★☆☆☆☆ 11 months ago

Tuvaletler normalde ibb'ye bağlı olması gerekirken başkalarına peşkeş çekilmiş. Ben kazlıçeşme istasyonunda tuvalete istanbulkart ile ödeyerek girerken burada durum 1₺ verip öyle giriyorsunuz. Ben istanbulkart ile girmek istiyorum. Tuvaleti ibb'nşn iştirak şirketinin alması gerekli.

(Translated by Google)
While the toilets should normally be connected to the ibb, they were taken to others. When I enter the toilet in Kazlıçeşme station with Istanbulkart, the situation here is 1 and you enter it. I want to enter with istanbulkart. The affiliate company has to take the toilet.

Mahir Kara
1 review

★☆☆☆☆ 4 months ago

Söğütlüçeşme YHT istasyonuna giderseniz eğer,sakın dışarda bi tane büfe var.(başka da yok zaten) Oradan ekmek arası bişey yemeyin ve ayran içmeyin(benim midemi mahvetti)
Sonra tuvalete gittiğinizde sakın tuvalet sorumlusuna tuvalet kağıdı kalmamış ya da tuvaletleriniz pis demeyin.Yoksa;bütün tuvalere girmek,ispat etmek zorunda kalabilirsiniz bi de azar işitebilirsiniz...

(Translated by Google)
If you go to the Söğütlüçeşme YHT station, there is a buffet outside. (There is no other anyway) Do not eat anything between bread and drink ayran (it has ruined my stomach).
Then, when you go to the toilet, do not say that you don't have toilet paper or your toilets are dirty. If not, you may have to enter the whole toilet and prove it, you can hear it little by little ...

gökhan topaRlak
Local Guide · 1,825 reviews

★★☆☆☆ a year ago

Hem metrobüs hem Marmaray hem YHT hem minibüs hem sarı dolmuş hem otobüs bağlantısı olan kilit bir istasyon oldu burası. Eskiden Haydarpaşa dan önceki istasyondu ama artık Haydarpaşa devre dışı bırakılınca Aynalıçeşme ile Feneryolu arasında kaldı. TCDD nin ufak çaplı lokanta meyhane birahane arası bir mekânı vardı eskiden su içerdik testiden....

(Translated by Google)
Both metrobus and Marmaray and YHT both minibus and yellow minibus and bus connection is a lock station. Formerly was the previous station from Haydarpaşa but now it was left between Aynalıçeşme and Feneryolu when Haydarpaşa was disabled. TCDD's small-sized tavern had a place in the pub-house.

Arzu Güner
Local Guide · 8 reviews

★☆☆☆☆ 6 months ago

Çok fazla eksiği var kış için bekleyecek kabin tarzı bekleme alanları yok açık hava valizler için sorun kilitleme yada kasa tarzı kafes tarzı birşey yok her istasyonda olması gereken aparatif satan gazete satan büfeler yok var olan tek şey saçmalık beklendiği kadar da hızlı tren değil koşarak daha hızlı giderim yıllarca bekle beklediğini karşılamasın hayal kırıklığı ve apartmanların özellikle süreyyaplajı idealtepe maltepe deki apartmanların tamamen manzarası kapandı bizim 800 bin TL lik dairemiz düştü 600 bin tlye millete metro gelir 300 bin tl lik dairesi 1000 milyon TL olur bizim ki fiyat düşüyor saçmalık şansızlık

(Translated by Google)
There are too many shortages to wait for the winter cabin-style waiting areas no open-air suitcases no problem locking or safe-style cage-style thing There are no kiosks selling newspapers that should be at every station The only thing that is absurd is that I go faster than running the train not as fast as expected Wait for years to meet the frustration and expectation of apartment buildings, especially in the ideal of maltepe closed idealtepe apartment in our 800 thousand TL apartment fell 600 thousand tlye subway income to the nation 300 thousand TL apartment 1000 million TL that our price falls nonsense

Fahrettin Cengizalp
Local Guide · 27 reviews

★ 8 months ago

İstanbuldan Anadolu şehirlerine hızlı trenlerin kalktığı yerde locker (valizleri kilitleyeceğimiz yerin) olmaması çok kötü. Yemek yemek için valizlerle eziyet çekerek restoran aradık. Ayrıca İstanbul kartımızda kalan paranın iadesini de alamadık. Çifte rezillik, çifte eziyet.

(Translated by Google)
It's too bad that there are no lockers where high-speed trains depart from Istanbul to Anatolia. We called the restaurant to eat with grind. In addition, we did not receive the refund of the remaining money on our Istanbul card. Double humiliation, double persecution.

De A
2 reviews

★★★ 7 months ago

Sabah 6 seferiyle söğütlüçeşmeye geldiğimde bayan wc hep kilitli ve erkek wc açık. Bunun ne gibi bir mantığı var? Görevlilerin hepsi de bilmiyorum diyor. Sefer saatleri uzun, temizlik iyi. Ancak öğleden sonra trene binebilirseniz ne âlâ.

(Translated by Google)
When I come to the willow six times in the morning, the female wc is always locked and the male wc is open. What's the logic of that? All the officers say they don't know. Expedition times are long, cleanliness is good. But if you can take the train in the afternoon, that's good.

Bgr Den
5 reviews

★ a year ago

Lağım kokusundan durulmuyor

(Translated by Google)
No sewer smell

Zeynep Demirkale
16 reviews

★ 6 months ago

donmak isteyen buyursun gelsin marmaray her zaman dolu ve 15 dakikada bir geliyor bosuna burada beklemeyin

(Translated by Google)
marmaray is always full and comes every 15 minutes.

Cihan Şenocak
Local Guide · 85 reviews

★★ a year ago

Bilet kontrol noktası açıkta bekleme salonu sıkıntılı Yht geçişinde bilet kontrolünde zorluk yaşanıyor. Gar olarak değil istasyon olarak tasarlanmış sıkıntısı bu.

(Translated by Google)
The ticket checkpoint is in difficulty in checking the tickets in the open-air lounge during the distressed Yht pass. The station is not as short as the station is designed for shortages.

Ahmet Gürgan Çilingiroğlu
Local Guide · 565 reviews

★★★★★ a year ago

Marmaray'la yenilenen istasyon . Herşey yeni fakat istasyon da kapalı bekleme alanı yok. Kış aylarını düşünemiyorum, iyi eser.

(Translated by Google)
Station renewed with Marmaray. Everything is new, but there is no indoor waiting area in the station. I can't think of the winter, good work.

1 Share

Metehan Çetin
3 reviews

★★ a month ago

Güvenlik görevlileri kendilerini özel harekat falan zannediyor onun dısında problem yok

(Translated by Google)
Security guards think they are special operations or anything outside of him

Süleyman Sarıtaş
4 reviews

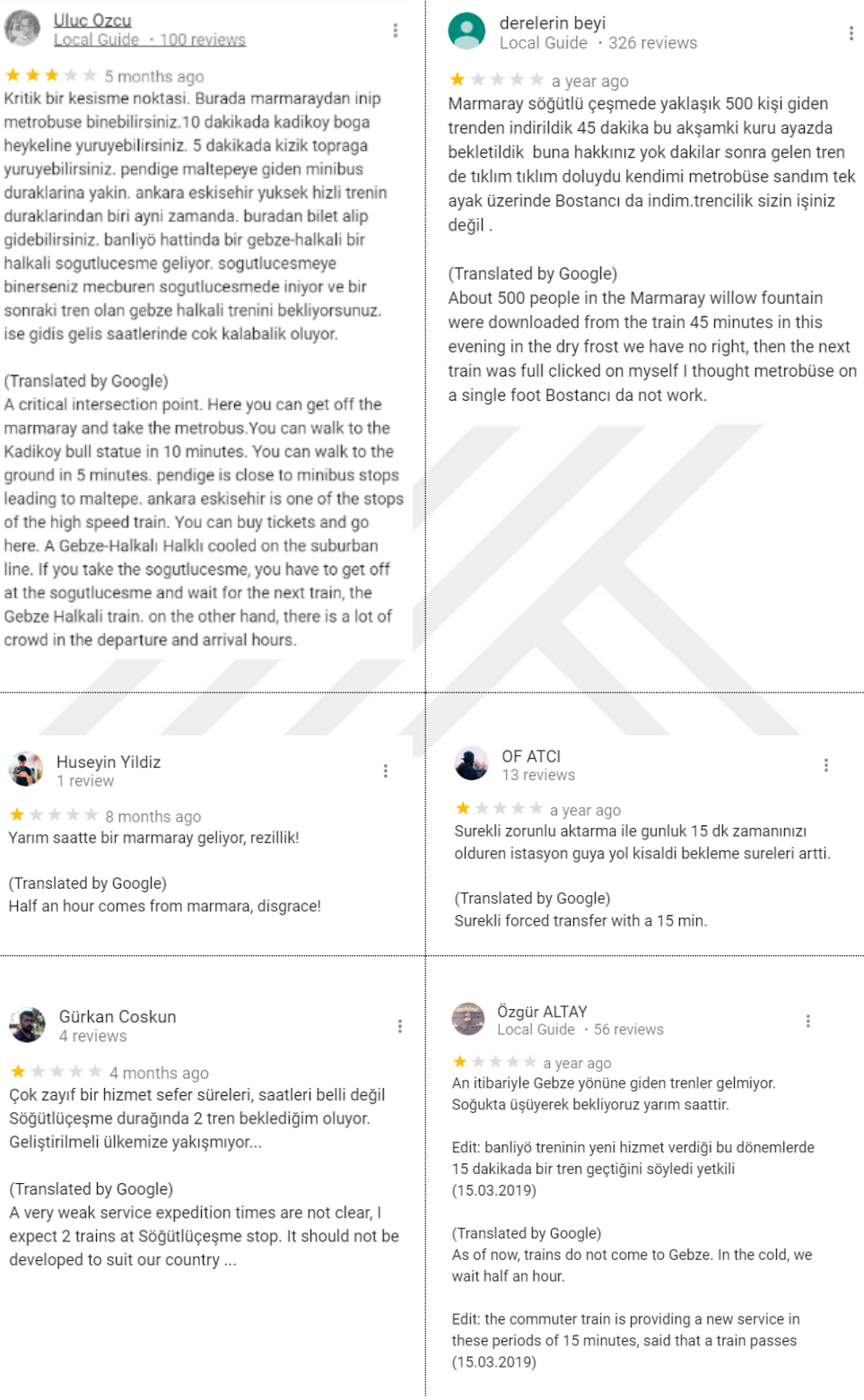
★ a year ago

Oturacak yer olmayan bekleme salonsuz en kotu ilçedeki yht durağından kotu olan istasyon

(Translated by Google)
Seat without waiting area without a dock

Like Share

APPENDIX C



Uluc Ozcu
Local Guide · 100 reviews

★★★☆☆ 5 months ago
Kritik bir kesisme noktasi. Burada marmaraydan inip metrobuse binebilirsiniz.10 dakikada kadikoy boga heykeline yuruyebilirsiniz. 5 dakikada kizik topraga yuruyebilirsiniz. pendige maltepeye giden minibus duraklarina yakin. ankara eskisehir yuksek hizli trenin duraklarindan biri ayni zamanda. buradan bilet alip gidebilirsiniz. banliyö hattinda bir gebze-halkali bir halkali sogutlucesme geliyor. sogutlucesmeye binerseniz mecburen sogutlucesmede iniyor ve bir sonraki tren olan gebze halkali trenini bekliyorsunuz. ise gidis gelis saatlerinde cok kalabalik oluyor.

(Translated by Google)
A critical intersection point. Here you can get off the marmaray and take the metrobus.You can walk to the Kadikoy bull statue in 10 minutes. You can walk to the ground in 5 minutes. pendige is close to minibus stops leading to maltepe. ankara eskisehir is one of the stops of the high speed train. You can buy tickets and go here. A Gebze-Halkalı Halklı cooled on the suburban line. If you take the sogutlucesme, you have to get off at the sogutlucesme and wait for the next train, the Gebze Halkali train. on the other hand, there is a lot of crowd in the departure and arrival hours.

derelerin beyi
Local Guide · 326 reviews

★☆☆☆☆ a year ago
Marmaray söğütlü çeşmede yaklaşık 500 kişi giden trenden indirildik 45 dakika bu akşamki kuru ayazda bekletildik buna hakkınız yok dakilar sonra gelen tren de tıklım tıklım doluydu kendimi metrobüse sandım tek ayak üzerinde Bostancı da indim.trencilik sizin işiniz değil .

(Translated by Google)
About 500 people in the Marmaray willow fountain were downloaded from the train 45 minutes in this evening in the dry frost we have no right, then the next train was full clicked on myself I thought metrobüse on a single foot Bostancı da not work.

Huseyin Yildiz
1 review

★☆☆☆☆ 8 months ago
Yarım saatte bir marmaray geliyor, rezillik!

(Translated by Google)
Half an hour comes from marmara, disgrace!

OF ATCI
13 reviews

★☆☆☆☆ a year ago
Surekli zorunlu aktarma ile gunluk 15 dk zamanınızı olduren istasyon guya yol kisaldi bekleme sureleri artti.

(Translated by Google)
Surekli forced transfer with a 15 min.

Gürkan Coskun
4 reviews

★☆☆☆☆ 4 months ago
Çok zayıf bir hizmet sefer süreleri, saatleri belli değil Söğütlüçeşme durağında 2 tren beklediğim oluyor. Geliştirilmeli ülkemize yakışmıyor...

(Translated by Google)
A very weak service expedition times are not clear, I expect 2 trains at Söğütlüçeşme stop. It should not be developed to suit our country ...

Özgür ALTAY
Local Guide · 56 reviews

★☆☆☆☆ a year ago
An itibariyle Gebze yönüne giden trenler gelmiyor. Soğukta üşüyerek bekliyoruz yarım saattir.

Edit: banliyö treninin yeni hizmet verdiği bu dönemlerde 15 dakikada bir tren geçtiğini söyledi yetkili (15.03.2019)

(Translated by Google)
As of now, trains do not come to Gebze. In the cold, we wait half an hour.

Edit: the commuter train is providing a new service in these periods of 15 minutes, said that a train passes (15.03.2019)

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- 07.2020 - ……
  Assistant Design Manager, Aygun Aluminium NL B.V., Y-Towers Project
- 07.2018 - 10.2019
  Design Office Architect, Prota Engineering, Marmaray Railway Project / Under CR3 Contract
- 09.2017 - 04.2018
  Technical Office Architect, OZ-KA Engineering, Nisantasi Sabra Textile Office Project
- 08.2016 - 05.2017
  Technical Office Architect, Gurhan Construction, Erenkoy Residence Project
- 12.2015 - 07.2016
  Site Architect, OZ-KA Engineering, Fatih Hotel Project
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  Architecture Intern, EMAY Construction, Kozyatagi Hilton Hotel Project
- 01.2013 - 02.2013
  Architecture Intern, ARUP Engineering, Ashgabat Olympic Complex Project
- 06.2012 - 08.2012
  Architecture Intern, EMAY Construction, Brandium Project / Silence Istanbul Hotel & Convention Center