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research plan

revitalise the secluded city by the implementation of public transport

by Pepijn Francissen

Figure 01: Electrified tram towards Ras Beirut, 1900s (image retrieved from Old Beirut)

Abstract
In the historical context, Beirut has established itself as a gateway between east and west where innovation, modernisation, the social and cultural exchange took place. As the city was extending there was a longing for a fast collective public transport: the tram. However, the increased welfare of the citizens in Beirut led to the private ownership of cars which eventually caused the demolition of the public transport network. Nowadays the homogeneous transportation ensures a lot of congestions and environmental impacts such as pollution which both contributes to extensive economic losses. Due to the 'solution' in huge infrastructural developments of highways, not only spatial but also social barriers emerged within the dense city. This thesis will investigate the potential of re-establishing a new public transport network together with the role of the station as typology. Moreover, it will address the revitalisation of the Central District as it aims to overcome the social and spatial borders and attract different social-cultural residents, new establishments of (international) headquarters and tourists.

Keywords
Beirut - social-spatial barriers - public transport - central metro station

Beirut, Lebanon's capital city can be recognised as one of the oldest cities as the foundations of the city can be traced back for more than 5000 years. As in other cities worldwide, the urbanisation of Beirut increased exponentially in the 19th century. In this time frame, the progress of steam navigation accelerated exchanges and led to an increased volume of transported goods by sea. The Middle Eastern Mediterranean shore, which was under Ottoman rule, developed due to the source of raw materials to supply the new European factories (Arnaud, 2008). To stimulate and help Beirut's influence in the region and maintain its strategic role as a gateway between East and West, several infrastructural projects were established. The port was extended and new docks were constructed to house the increasing size of the (steam)ships. In addition, the city also became connected by railroads with other cities in neighbouring countries such as Istanbul and Damascus (Nabti, 2004). Less than a decade before the fall of the Ottoman Empire in 1919 the tram was introduced as public transport service for the inner city. With the help of a Belgian Company, the tramway was inaugurated in 1909. After the fall of the Ottoman Empire and during the French Mandate, the tramway was still operating. It had four lines serving the inner suburbs and connecting these with the city centre (Nammour, 2002).

In the 1950s, the car began to play a bigger role with the introduction of the shared taxi, or as it was called the "Service". It provided not only fixed routes along the tram line but also other routes which were not served by the tram. The emerging suburbs were connected by microbus services. Later on, in the 1960s, the increased welfare of the citizens in Beirut led to the growing ability to affordability of the private ownership of cars (Nakkash, 2017). In 1965 the tram service decommissioned and the multiple tram tracks were removed to make way for the car. There were incidents of pickpocketing, sexual harassment and even some hijackings. Due to several price hikes, the tram service was boycotted in both 1909 and 1931, the last of which lasted as long as three months. All this ensured a quicker shift from the public service to the emergence of the much safer and reliable taxi service (Baaklini, 2014). The general public believed, at that moment in time, cars were the solution to all transport-related problems. They believed that the tram network was occupying valuable road space and needed to be removed to create space for the car. The cars were seen as the future of transport and this was not only in Beirut but was rather a worldwide trend. After the end of the Second World War, the inner cities tram networks disappeared almost completely in many countries all over the world (Nakkash, 2017).

However, in the 1980s, most European cities had started to realise that removing the trams network was a critical mistake and thus started re-establish them. At that time, Lebanon was fallen into the Civil War (1975-1990) with multiple Israeli invasions. The once transport hub that the Central District of Beirut was called due to the intersections of the many tramlines, became after the war nothing more than a wasteland. No area was more undertaken by the was than the city centre as it became a buffer zone, also known as the Green Line, dividing East Beirut from West Beirut (Makdisi, 1997). Subsequent to this, due to the heavy economic loss-

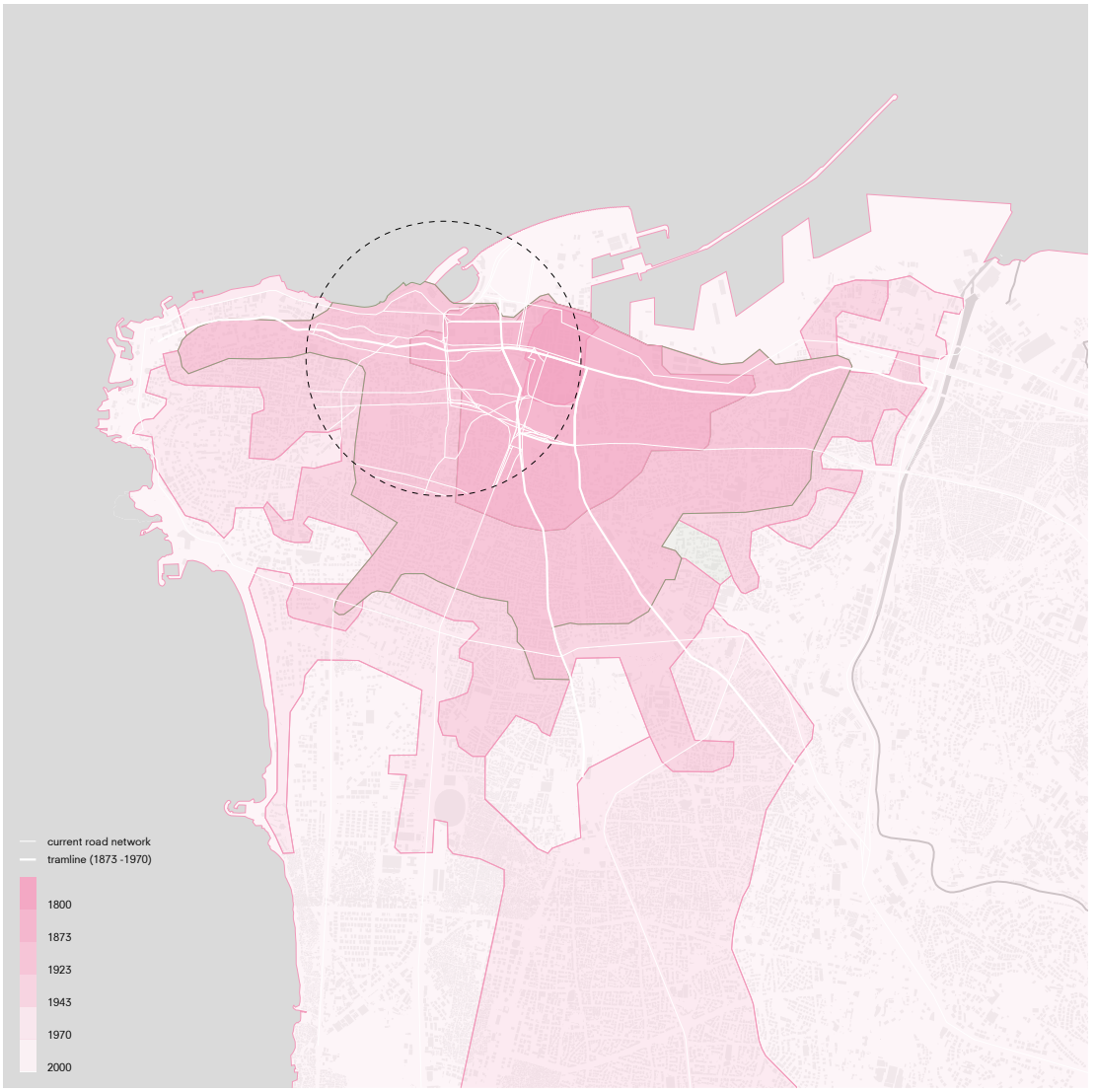

Figure 02: historical development of Beirut with tram network (own illustration, 2021)

es Beirut could not afford a proper public transport service. Eventually, this led to an increase in car ownership and even more dependence on it (Nakkash, 2017).

Problem statement

Nowadays, the whole Lebanese land transport sector consists only of road-motorised vehicles, since the non-existence of appropriate infrastructure for non-motorised vehicles. Due to this, Lebanon knows a high car ownership ratio, 865 out of every 1,000 residents own a car (Kabboul, 2020). Passenger cars make up the majority, 85%, of the total vehicle fleet of the 1,58 million registered vehicles in the GBA (Greater Beirut Area). Because of the high car ownership rate in Lebanon, the private passenger car makes up the majority, 69%, of the market share of transport systems in the GBA. Public transport services consist of taxi services (15%), minibuses (8%), private buses (5%) and public buses (3%) (Ministry of Environment, 2015). Due to the limited public transport services, the total daily car trips doubled in the last decade only to more than 6 million car trips. This has been led to heavy congestions and increased the daily journey of commuters up to 46% of their trip. These congestions are now having a big impact on the daily work time of employees which led to an economic loss of 8-10% of the total GDP of Lebanon (Kadi, 2016). To combat this problem, several master plans have been proposed in the past. Already before the outbreak of the Civil War, in 1963, a new transportation masterplan was proposed by French architect and urban planner Michel Écochard. The plan attempt to decongest the inner-city traffic and was a layout for future suburban growth. Although the plan was not fully implemented, parts can be found in the current urban layer of Beirut. In 1966, the Fouad Chehab Avenue, located at the south of the BCD was completed and the Fakhreddine Street, located at the west of the BCD was widened corresponding to the master plan of Écochard. During the Civil War, the Fouad Chehab Avenue was extremely damaged. This led to the development of transforming the avenue into a highway by doubling the capacity (read: doubling in width), adding two overpasses above large intersections and expanding it south towards the Airport. All this was done as it was perceived as the connector of three main nodes: the airport, the sea and the Central District, according to the new transportation plan of 1995 (Saliba & Al-Tayeb, 2014). Besides the urban plan, this was also done to combat the increasingly severe congestions due to the rising numbers of private cars on the road. However, this caused emphasising segregation between the rebuilt Central District and the adjacent neighbourhoods.

Furthermore, the transport sector has also a huge environmental impact. It is the second consumer of fossil fuel, after energy production and also contributes to more than half (62%) of the national NO2 emissions and the majority (99%) of the total national CO2 emissions (IPT Energy Centre, 2016).

Concluded, the homogeneous transport mode ensures a lot of congestions and has a huge environmental impact in the way of noise and air pollution which both contributes to extensive economic losses. Due to the ‘solution’ in huge infrastructural developments of highways within the dense city, not only spatial but also social barriers emerged.

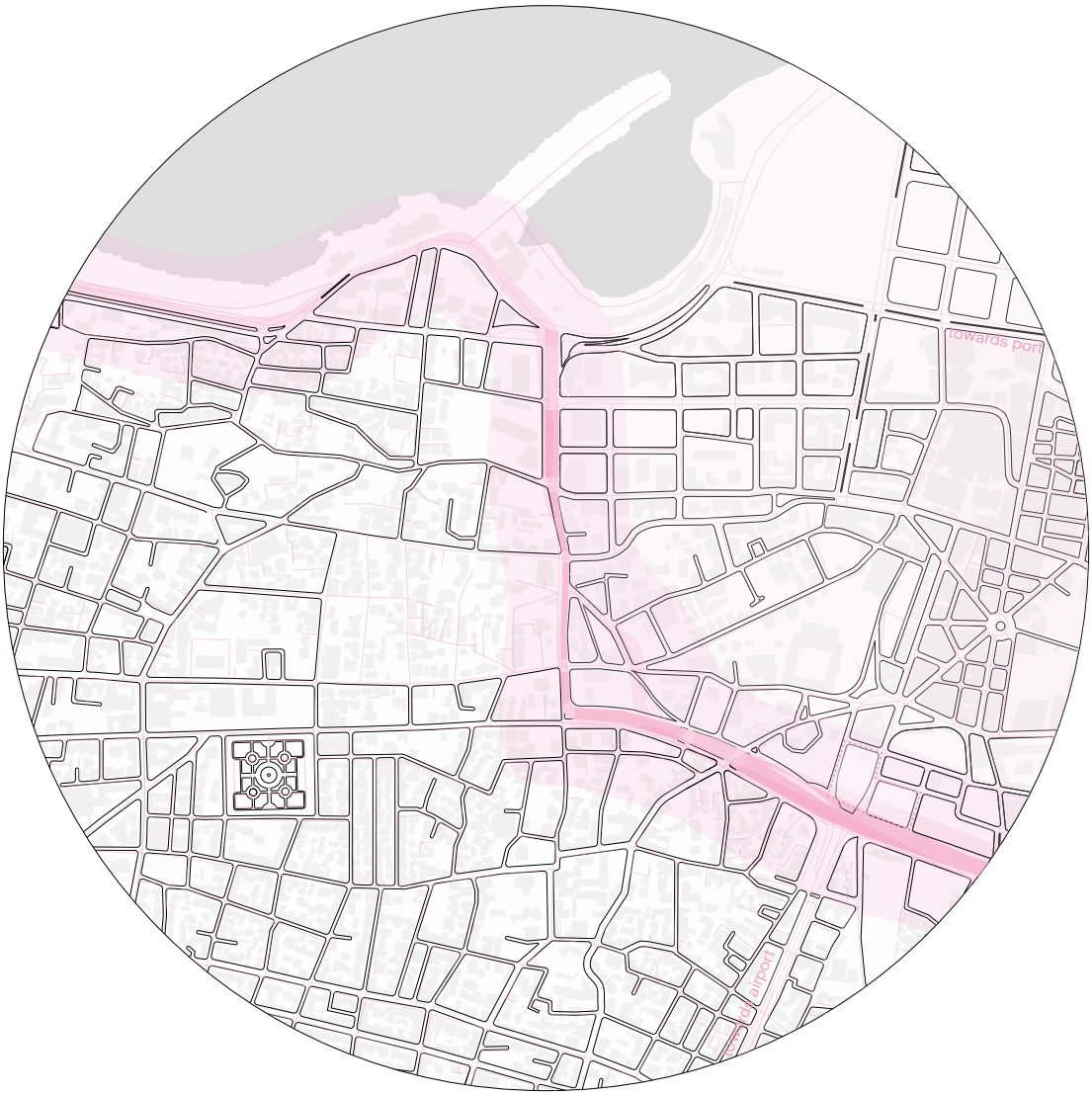

Figure 03: social-spatial border (own illustration, 2021)

Research questions

Within the overall research group, analysis of different treads led to an overall conclusion that there is a will of the municipality to revitalise the historical Central District of Beirut. However, due to the historical events, economic losses and the corrupted government, the area has become a plaything of (foreign) investors. The area is secluded as the Central District became the base to only the wealthiest people, where the general public has no business. Adding to this, the country has sunk into the biggest financial crisis, political instability and lack of prosperity which may only further isolate the city centre with adjacent neighbourhoods. To address the issues regarding homogeneous mode of transport and the additional daily congestions, lack of public transport and social-spatial barriers within the site, the thesis seeks to explore the following research question: *How can an infrastructural network of public transport support the further development of the now secluded Central District and overcome the social-spatial barrier?* In order to propose a solution as an answer to the stated main research question, the following sub-questions can support this: *What is the historical development of the Central District and how affected the Greater Beirut Area? What kind of transport mode is the most potential in the context of Beirut, regarding the social and spatial context, (noise and air) pollution and travel time? How can you ensure the shift of the general public from a homogenous mode of transport (read: the car) to a public transport network? How could the building contribute to the shift to a public transport network and what program can stimulate this? What is the historical development (read: trend) of metro station buildings?*

Research Methodology

In order to obtain answers, further research can be conducted. Therefore the research will first investigate the urban growth and historical development of the Central District of Beirut of the last centuries to get a better grasp of the context. Therefore literature such as "Beirut Reborn. The Restoration and Development of the Central District" done by Angus Gavin and Ramez Maluf and "The reconstruction of Beirut and the lost opportunity" done by Nabil Beyhum will be used. Demographic and mobility studies will further shape the profile of the site's character. In addition studies of different kinds of transport, modes will be investigated in themes such as travel time and capacity to understand which transport mode is the most potential within the context of Beirut. Therefore there will also be looked at case studies of public transport networks in comparable cities around the world to showcase their development. There will be looked at the following cities: Baku in Azerbaijan, Houston in the United States, Tunis in Tunesia and Naples in Italy. These cities are comparable with Beirut in number of population and are showing how a public transport network could look like. Furthermore, the research will investigate the historical development of the station by analysing the evolution of its typology in terms of function, programme and its impact on social and economic interactions. Among literature such as "Stations as Nodes" edited by Manuela Triggianese, Roberto Cavallo, Nacima Baron and Joran Kuijper, "Living Stations" edited by Manuela Triggianese, Olindo Caso and Yagiz Soylev and "Reweaving UMA: urbanism mobility architecture" done by Luisa Maria Calabrese will be used explore the typology of

the station. To comprehend the literature, case studies will be introduced whereas it will focus on several mobility stations projects in a range of different sizes and public transportation networks in other cities. Hereby it's important to make a distinction between larger projects which are situated in or near the city centre, projects of stations that are focussed on the spatial relations in the urban context and projects of smaller sizes which are focusing on the (spatial) design of it. A lot of the used case studies will be traced back to western countries as the public network system is the most developed, but there will also be looked at context-related case studies. The compilation of this research will form the basis for the design investigation and thesis contribution to the new proposed spatial program and function of the central station.

Theoretical framework

As written in the book "Stations as Nodes", the notion of the station and the role it takes in the urban context has changed dramatically. Traditionally, the station functioned as a place for citizens to exchange the mode of travelling when going towards a destination as Marcel Hertogh describes (Hertogh, 2018). Stations were symbols of national pride and were often designed with a monumental character which was representing and expressed the awe-inspiring architecture of that time. Later on, the stations became more functional instead of monumental as there was a growing development of new highways, roads and metro lines within the city. The station became more fluent as there was no central core anymore but rather several different junctions and intersections (Manuealla, 2018). However, the station was still perceived as mono-functional. As time moved on and cities developed furthermore functions were added to the station. As in the beginning, a small kiosk emerged to serve the needs of their users, currently, stations are providing far more than that. Nowadays the station has evolved as a destination itself due to the central location within the city. The station, or public space as one could say, has the power to encourage physical and social interaction between different social groups to qualify the way of living among the citizens (Van Timmeren, 2018).

As Caso mentioned in the book "living stations", the station should therefore function as public living places and reflect the vibrancy, efficiency and public ambitions of the city. To stimulate the complementary interactions between dissimilar social-cultural groups implementation of a cross-over between the moving users of the mobility infrastructures (the public field as transition) and the staying visitors of the cultural infrastructures (the public field as permanence) is necessary. In addition to this, the distribution of mixture in the program could stimulate emerging lifestyles and activate the attractiveness of the location (Caso, 2021).

Despite the notion of a station that has been developed in recent years, enlarged in function and program, the system is still the same as it was used in the early day stations. As is stated by Hertogh, the system is originated from a small station with two tracks, when it expanded, the station did this horizontally, whereby other modes of transport are kept outside (Hertogh, 2018). However, in designing a station it's crucial to take into account the pedestrian movement and its space. Hereby the transfer time between the different servic-

es should be focussed on a pleasant experience towards users (Kachousangi et. al. 2018).

Ambitions

The proposed site location lies on the boundary of the nowadays secluded Solidere area (read: Central District) and the residential neighbourhoods Patriarcat and Bachoura along the Fouad Chehab highway intersection that is connected to the highway directly. The project aims to overcome the social and spatial border that is perceived as the highway whereas both areas are characterised by different challenges. Whereas the Central District is redeveloped partially with help of foreign financial investments, the area is abandoned due to gentrification, high-income apartments for only investments housing an insignificant number of residents, no public space to be found and only luxurious shopping malls whereas 74% of the population lives in poverty. In contrast with the Central District, the residential area is mono-functional as it only accommodates the now extinguished middle class, undergoes heavy congestion on infrastructural networks and is heavily polluted. By acting as a threshold that aims to diminish the contradiction between the two areas and overcome the social-spatial barrier, the new Central Metro Station undertakes to attract different social-cultural residents, new establishments of (international) headquarters and tourists. Its position further attempts to create a relationship on a global level due to the connections with the main port and airport, reinforcing the Central District as the "Seed" of Beirut.

By investigating the function of the (central) station typology throughout history, as well as the role of the current role, the new Central Metro Station aims to propose a part of future proof and sustainable way of transportation for the Greater Beirut Area, which can be a stepping stone for the shift towards a dense public transport network. The thesis hypothesises the possibilities of the station as a mixed-use typology that not only functions as a place for citizens to exchange the mode of travelling but also a place for cultural activities expressing the ideologies of the general public.

Figure 04: Nørreport station in Copenhagen, Denmark (Rasmus Hjortshøj)

Annotated bibliography

Caso, O., Triggianese, M., & Söylev, Y. (Eds.). (2021). Living stations. TU Delft.
This book describes the shift of stations as mono-functional towards an urban place of sociality and encounter - an extended public space beyond it service to mobility itself. It describes how these stations could be conceived in order to act as public places for collective action and which (archetypical) devices therefore could be designed. Moreover, it shows conceptual work of speculated and forecasted future scenarios for the metro in Rotterdam.

Mango, T. (2004, February). Solidere : the battle for Beirut's Central District. Massachusetts Institute of Technology.
This thesis describes the historical development of the nowadays Solidere area. It shows, by using literature, how the area became a private area in the hands of a private owned company.

Triggianese, M., Cavallo, R., Baron, N., & Kuijper, J. (Eds.). (2018). Stations as Nodes. TU Delft.
This book shows, due to the use of multiple authors from different practices and institutes, a brief historical development of stations, experiences and specific aspects and problems of the current station. It describes also how the station could perceived in the future as an intermodal node in the dense city.

Bibliography

Antrop, M. (2004). Landscape change and the urbanization process in Europe. Landscape and Urban Planning, 67(1–4), 9–26.

Arnaud, J.L. (2008). Modernization of the Cities of the Ottoman Empire (1800-1920). Raymond André; Petruccioli Attilio; Holod Renata. The City in the Islamic World, Brill, pp.953-976 & 1399-1408. halshs-01219076

Baaklini, J. (2014, March 5). Ten Things You (Probably) Don't Know about Lebanon's Old Tramway. Beirut. https://www.beirut.com/l/31455

Calabrese, L.M. (2004, April 19). Reweaving UMA: Urbanism Mobility Architecture. [Doctoral dissertation, Delft University of Technology]. TU Delft.

Gavin, A. & Maluf, R. (1996). Beirut Reborn. The Restoration and Development of the Central District. John Wiley and Sons, London.

IPT Energy Center. (2016). Road Transport Sector and Air Pollution Case of Lebanon 2016.

ITDP (2010). '10 principles for transport in urban life'. New York: ITDP. Klarus, B. Wilde, S. de. Transit Oriented Development. KpVV Programma Ruimte & Mobiliteit. Utrecht: Movares.

Kabboul, T. (2020, March 6). Lebanon Among Top 25 Countries with Highest Car Ownership

Kadi, S. (2016, December 4). Traffic congestion adds to Lebanon's many woes. Arab Weekly.

Ministry of Environment. (2015, May). National Greenhouse Gas Inventory Report and Mitigation Analysis for the Transport Sector in Lebanon.

Nabil B. (1992). The Reconstruction of Beirut and the Lost Opportunity. Rami al-Khal, Beirut. p. 61

Nabti, J. M. (2004). Leveraging Infrastructure: Sustainable Bus Rapid Transit Route Planning in Beirut, Lebanon.

Nakkash, N. (2017, July 20). Beirut: From Public Transport Guided Growth to Automobile Dependence. Linkedin. https://www.linkedin.com/pulse/beirut-from-public-transport-guided-growth-automobile-nabil-nakkash

Nammour E. (2002). Une histoire du tramway électrique de Beyrouth à travers le bi-mensuel Lisan Al-Hal, in Chronos, no.6: 173-195

Oger-Liban, Beyrouth. (May 1986). Centre-Ville Reconstruction. pp. 4-53.

Richard Sennett. (1993). "Introduction," in S. Khalaf and P. Khoury eds., Recovering Beirut: Prospectsfor Urban Reconstruction. Leiden: E. J. Brill

Samir Khalaf. (1993). Beirut Reclaimed. Dar An-Nahar, Beirut. p. 79

Samir Khalaf. (1993). "Urban Design and the Recovery of Beirut," in S. Khalaf and P. Khoury eds., Recovering Beirut: Prospects for Urban Reconstruction. Leiden: E. J. Brill

Saree M. (1997). Laying Claim to Beirut: Urban Narrative and Spatial Identity in the Age of Solidere.
CriticalInquiry, 23(3). p. 662

Yassine, H. (2021, May 3). Everything You Need To Know About Solidere. The961. https://www.the961.com/everything-to-know-about-solidere/

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design brief

revitalise the secluded city by the implementation of public transport

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Introduction

Due to civil conflicts resulting from tensions among Beirut's Christian and Muslim populations the long term Civil War divided the city in two. Whereas the Christians occupied the east part of the city, the muslims covered the west part resulting the rise of the demarcation line, also known as 'the green line' with the city centre as battleground. As the Civil War ended, the once vibrant city centre was now a no-man's land as more than 80% of the buildings were demolished. The rise of Solidere was accompanied by huge investments in constructing new infrastructure projects to connect the city centre with better traffic flows. Nowadays, the city centre is still secluded, as it was also during the Civil War, from the ordinary citizen, despite the failed attempts of Solidere. This is partly due gentrification which is caused by the also joint-stock and on the profit-making company Solidere. The Central District serves only the very rich of Beirut and neglect the others. On top of that, the large infrastructural ring road around the Central District discourage the (nearby living pedestrian) citizens to visit the city centre.

Figure 05: Before the Civil War (1970 - 1990)

Figure 06: After the Civil War (1995)

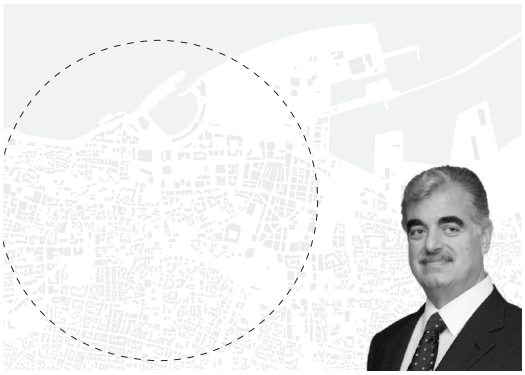

Figure 07: Current situation (2022)

Ambitions

The car dependancy of the city and growing congestion is placing an excessive strain on the current infrastructure as nowadays almost 9 out of 10 Beiruti owns a car. The car is space consuming as it takes more space than all other transport modes such as the bike, tram, bus or train to transport less people. On top of this, the car is also the cause of the bad air quality in the city as it is, together with the port, the main polluter in terms of air and noise.

To accommodate better transportation flows and thus better connection between the airport and the redevelopment of the explosion site a metro line will be constructed. This direct metro line will strengthen the strategy of Bidhara'I Beirut as the city centre is the cultural core of the city, where history and traditions of the population are demonstrated. In addition, the Central District should also reflect as the main economic catalyst of the city of today. The metro line will be represent the metaphorical line of the international aid flow that's entering Beirut though its airport and being conveyed towards the site of last year's explosion. This site will be redeveloped as a new district of Beirut with

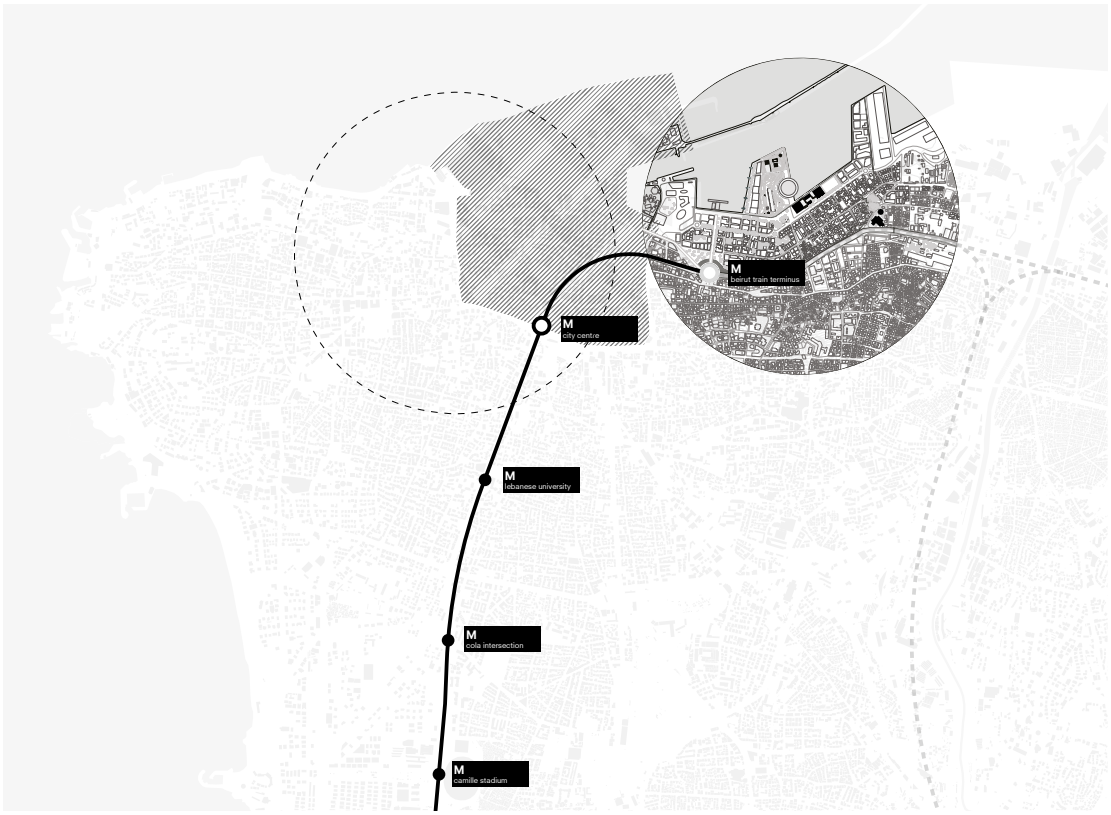

Figure 08: Proposal of metroline and stations between airport and the redeveloped blast area

help of international aid. The metro station will then be function as a hinge between these two points that accommodate the international economic aid flows.

Since the metro line will be a huge infrastructural investment, covers a large amount of Lebanon's capital but will stimulate Beirut's economical position within the global world, both the municipality of Beirut as the government of Lebanon benefit greatly. These two parties, together with the company Solidere s.a.l., as the company could easily acces to international fundings and also benefit greatly of a faster connection, will finance the whole project. The new implemented public transport within the city will be covered by the governmental Railway and Public Transport Authority, the O.C.F.T.C (Office des Chemins de Feret des Transports en Commun).

As the metro line will connect the international airport directly with Central District, the station building aims to act as anchor point for welcoming new tourist as well as locals. In the perimeter of the Central District, important landmarks, international offices, embassies and commercial districts can be found, together with the waterfront Zaitunay Bay, the district has the potential to develop as the main economic catalyst and touristic hotspot of Beirut.

On a building level, the station should act as a symbol for the modernisation and innovation in mobility in Beirut, which can be traced back since the start of the Ottoman occupation. It aims to support the everlasting further growth of the capital and encourage the shift from the current individualism to a more sustainable, collective approach in transportation. In this way, the building endorse the mingling of different social groups and combat the segmentation within the city.

Figure 09: client & user groups

Site

For the placement of the metro and its station near the centre three layers are take in account: the existing infrastructure, historical centre and the vacant plots. These layers made sure the metro line will be placed underground as there is no to zero space aboveground to facilitate this. Because of the dense (and historical) city the construction of a metro tunnel should avoid these aboveground, and sometimes underground, buildings. Due the current infrastructure, with a highway that's connecting the airport and the centre directly, and the fact that this is already property of the municipality, the best solution for this metro line is to place it under this infrastructural layer. In addition to this, a lot of vacant spots, which are now used for parking spaces, can be found at the southern border of the Central District. This will be an excellent spot to construct the new metro station in the perimeter of the city centre.

The location for this new to be build metro station can be found near the infrastructural node, the Fouad Chehab Interchange, that functions as the gateway to Solidere's Central District. Whereas the highway is connecting the city centre with the eastern and western part of Beirut, the southern axes provides a direct link from the site location to the international airport.

Along the east-west highway, which also marks the border between the Central District and Beirut, huge undeveloped building plots can be found. Nowadays the plots are being used for the few cars that are allowed to acces the Central District. The entrance of the district is being marked by the 6,000-square-meter semi public garden

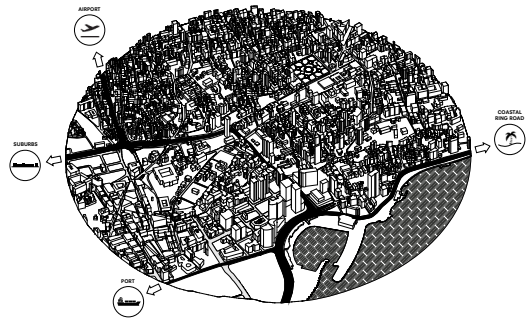

Figure 10: Infrastructual layer

Figure 11: Vacant builidng plots

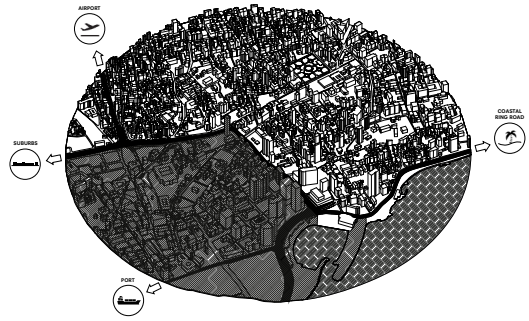

Figure 12: Historical centre (owned by Solidere)

Gibran Khalil Gibran Garden. The Garden is often used as a venue for demonstrations. The headquarter of the United Nations Economic and Social Commission for Western Asia is facing the north-side of the park. To the left of the UN-headquarter, a large excavation site can be found which will be transformed into a large public square. This square will function, together with the neglected Grand Theatre, as the main cultural node reflecting the heritage and cultural traditions of the Beiruti.

According research (ITDP, 2010) a metro station has a certain influence on (public) buildings, public spaces and other functions that can be found in it's near perimeter. These so called 'attraction nodes' are or at least should be easy reachable for pedestrians and cyclist. Therefore two imaginary circles can be drawn with the station as centre point. The circle for pedestrians has a radius of 1.000 metres (1 km) as the circle of cyclist has a radius of 3.000 metres (3 km). Both transportation modes are important to look at as the bicycle culture becomes more popular in Beirut due to the problems caused by the car, e.g. space consuming; pollution; congestion; the high gas prices stimulated by the scarcity of oil. Mapping these attraction nodes and it's fastest routes

Figure 13: The radius of influence and its routes towards the attraction nodes (pedestrian 1km, bicycle 3km)

concluded that better connections should be made to accommodate safer, faster and reliable routes from the metro to these attraction nodes. A new connection in the west can therefore shorten the now existing route of 13 minutes walking towards the new Sports and Leisure Centre reduced to only 6 minutes of walking. In addition, by transforming the existing highway to a more pedestrian friendly avenue, which fits in the group strategy, a new bicycle path can be implemented to provide safer and bicycle finely connections. This is also in line to provide faster connections to attraction nodes, e.g. the current route to the national library can be reduced from 13 minutes to 10 minutes.

The reason for the non-existing of these connection possibilities is a result of the current obstructions in infrastructure, topography and security. The from multiple layers existing infrastructural barrier shows also the demarcation between the neighbourhoods. The sunken highway which comes from the airport is a border between the two residential neighbourhoods. The four lane highway is split up into the entrance and exit of the city centre and the connection with the above ring road around the Central District. This ring road exist of 6 lanes and is elevated and does not provide pedestrian crossings. The topographical barrier is expressed in multiple enormous height differences between certain areas. For example, the west area is 15 metre higher then the lower-lying park and UN-headquater which results in a cliff between these areas. In addition, the security barrier ensures the non-accessibility of the Central District. Due the instability and the critics among government policies and corruption,

Figure 14: The infrastructual barrier

Figure 15: The topographical barrier

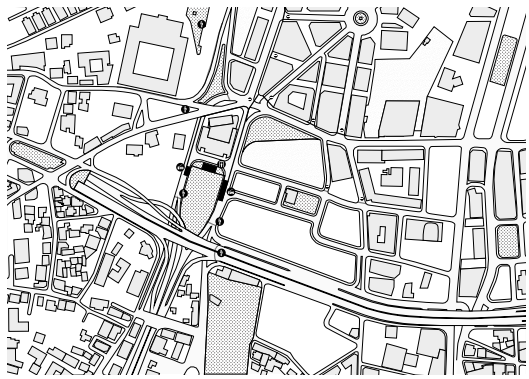

Figure 16: The security obstructions

Figure 17: The pedestrian connections between points A1 to A2; B to C; A to B (as shown from left to right)

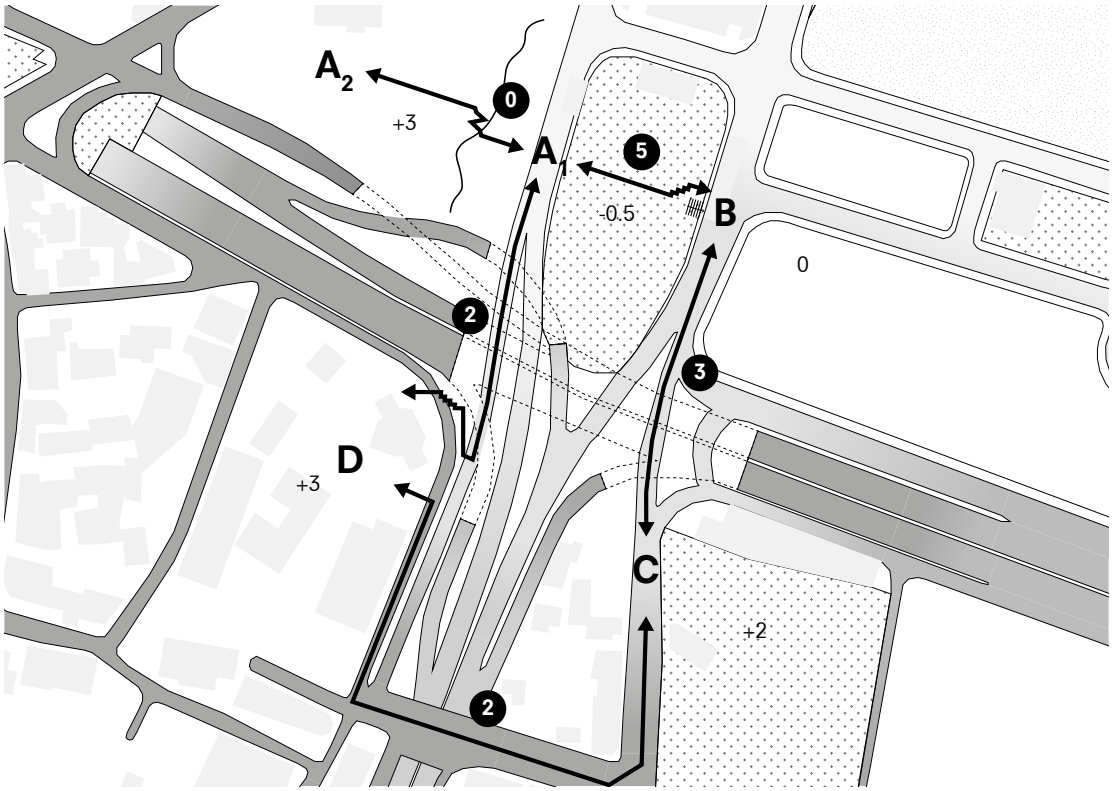

Figure 18: The possible pedestrian connection between the certain areas

huge walls around municipalities and governmental institutes and offices can be found. Besides these concrete walls, concrete road blocks, moveable elements and multiple checkpoints are also part of these security obstructions. As new functions in the Central District will be implemented based on the emergence of a new cultural centre as well as a new international, governmental and financial district, more people will be attracted to visit the Central District. Therefore this infrastructural node should not function as barrier but more as a connector.

To understand the current connection between these neighbourhoods, there is looked into how pedestrians will be crossings this barrier between the predetermined points. In conclusion, there is no current connection between point A1 and A2 as there is a possible connection between the other points. However, the degree of usability and preferability of using this connections differs. Only the connection which traverse the park, is labeled as excellent unlike the connections that intersect the highway as pedestrians has to use the road, which is dominated by the car, to be able to cross the highway. In conclusion, there are a few opportunities to create new and redevelop better pedestrian connections between these areas.

As the metro line and its platforms will be situated underground, the placement of it is important as it will affect the building aboveground due the vertical transportation. The placement is determined by the means of the surrounded constructions, obstructions and the dimensions of the platform. This means that the station itself, including the platforms should be placed in between the UN-headquater building and the elevated highway. For creating more space there is looked into the security obstruction of the UN-ESCWA buildings. In the current situation three security buildings can be found which are placed in and around the Gibran Khalil park. These security

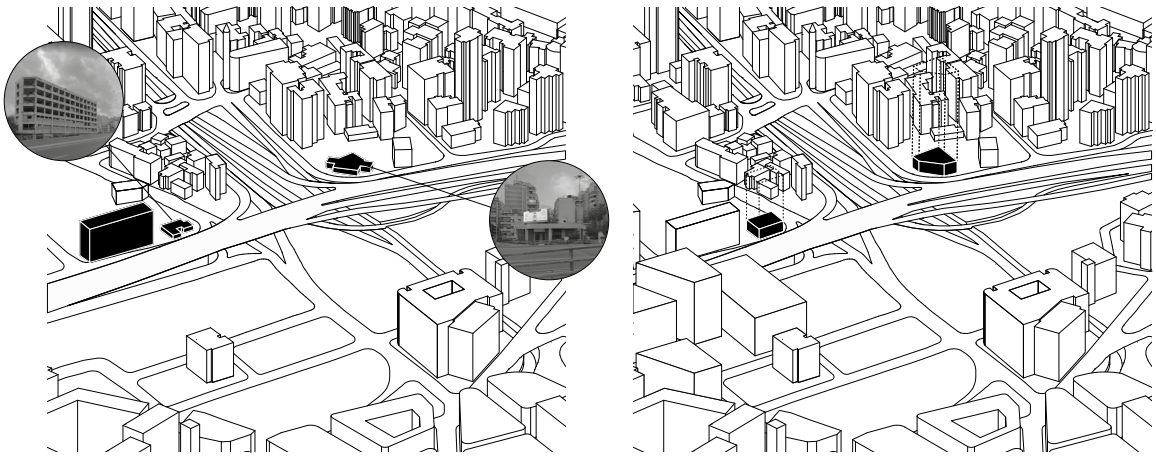

Figure 19: From abandoned buildings to new redevelopments

buildings are still necessary in the future, unlike the other security obstructions when Lebanon will be more stabilised in the future. However, this could be much more efficient and less space consuming.

As the metro station as a whole, included with the main entrance, will be placed on the Central District area connections with the adjacent neighbourhoods, across the highway are more difficult to be design. This is also due the lack of space within the residential area. With the ambition to provide pedestrian friendly connections between these neighbourhoods two abandoned buildings can be used to redevelop to new attraction points with an smaller entrance to the station on the ground floor. These abandoned buildings can be found on the corner of each of the two neighbourhoods along the intersection. On top of this, the space of the current Gibran Khalil park could function as a landmark, as important sightlines can be recognised in favour of the park. The landmark echoing the 'gateway' to the city centre with the glorification of public transport as stimulation for the Beiruti and others.

In conclusion the plot of the building is determined by the vacant building plots, existing buildings, the theatre square,

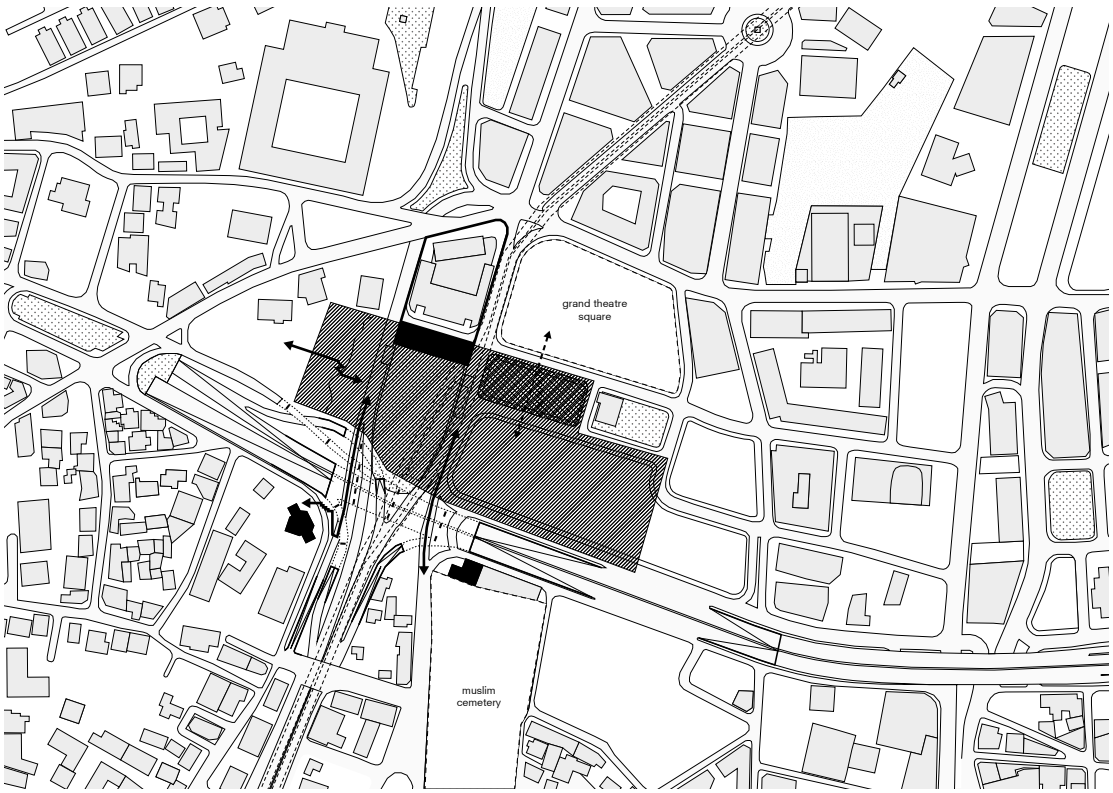

Figure 20: The buildable plotsize and its perimeters

the infrastructural construction and the topographical obstructions. All these constrains together determine a buildable site area of 25.000 square-metres. On top of this, two abandoned buildings will be redeveloped and partly used as metro entrances which gives easy acces to the adjacent residential neighbourhoods. The main entrance and it's buildings, will underneath a direct connection with the both opposite UN-ESCWA building and it's new security building as well as the new redeveloped Theatre Quarter. For this, a transition zone is important to develop. This can be done in the form of a park or square and can then at the same time also functions as meeting space. Finally, the project will go underneath multiple connections to combat the obstructions. In the end the project will stimulate a connection which will combat the topographical barrier, the connection across the highway as well as the connection with the highway itself as this will be transformed into a more pedestrian friendly avenue.

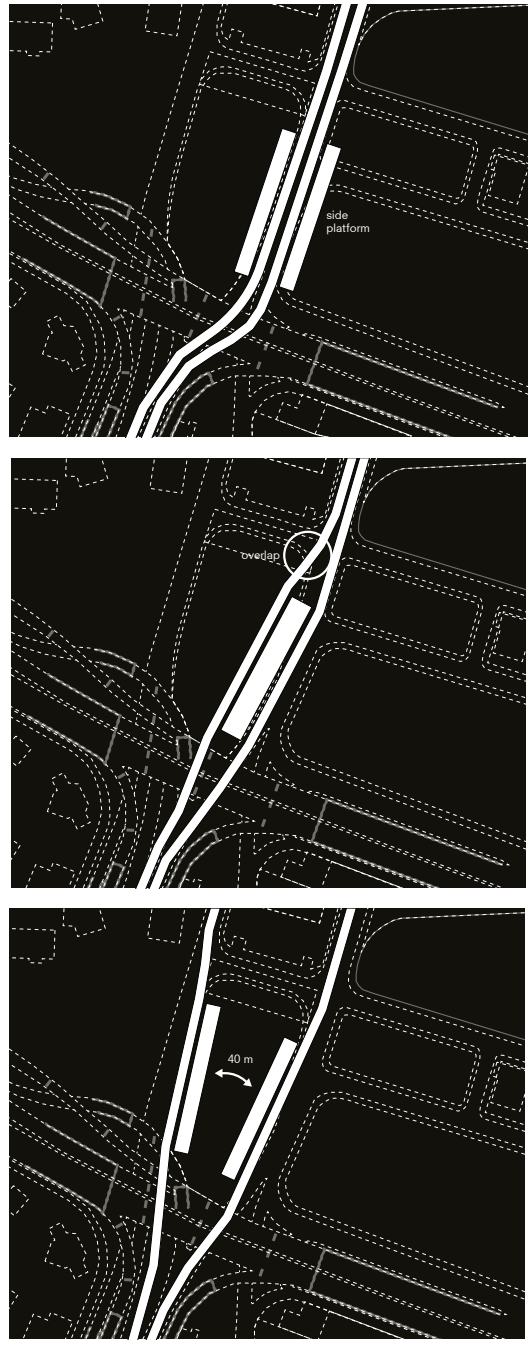

Figure 21: Possible sollution for the metroline

Program
The main program of the metro station will be mobility-oriented, as the building aims to offer new possibilities to different modes of public transportation. The station building will offer commuters to shift during their journey from the metro on to the bus, or the bicycle or to walk further. The metro platform will be situated underground as there is no space to facilitate a metro line above ground which connects the international airport with the last year's explosion site. The platforms for the bus are situated on the current highway infrastructure level as well as the bicycle path. This is also done to discourage the use of the car in the city as less space will be given to the car.

To facilitate these transfers between the different transportation options, a main vertical transportation should be designed. In addition to this, the main entrance of the station will be situated on the ground floor, as this will be the actual 'gateway' to the Central District. This entrance will be in the middle of the two transportation options and is the perfect spot to accommodate commercial activities. This base of commercial activities will function as the social catalyst and incubator for interaction between the different social groups within the city. Besides shops, cafes and a market, the commercial plinth will be enhanced with several exhibition spaces and an entertainment area which will boost the cultural and tourist function of Bidhara'l Beirut.

To strengthen this even further, a large hotel will also be implemented within the project. In this way, not only tourist but also international merchants can stay in a close proximity to the Central District with a direct fast link to the airport and thus the global world.

Multiple precedents have been studied analysed in order to conclude the program in terms of scale, functions and relations. This concluded that the typical metro station consist of three layers. There is an entrance building situated aboveground, this can be done in different ways, e.g. as pavilions or as part of a building. This entrance buildings gives acces to the underground concourse level. Situated on this concourse level are the retail and food shops as well as the ticket office.

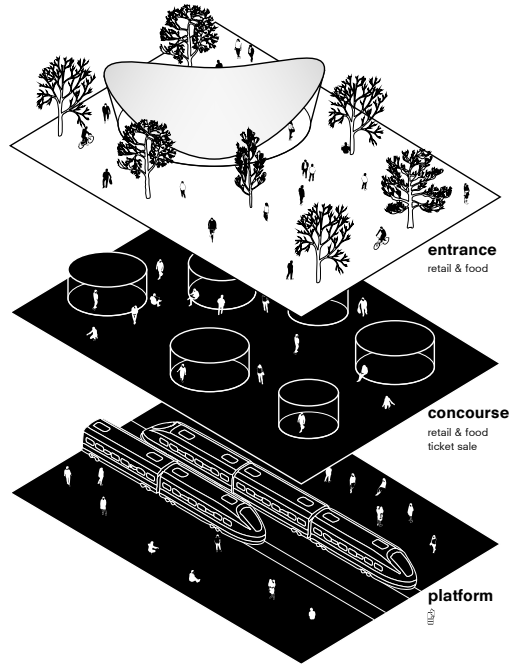

Figure 22: The general metro station layout

Sometimes are the shops also situated in the entrance building. Then the commuter can acces the platforms, when he has a ticket, underneath the concours level.

Important criteria for defining the passenger capacity are the population of the city, the location of the station as well as the fact that there will be only 1 metro line, with the option to extend it to two lines. Comparing the multiple presidents the station should be able to host 92.000 passengers per day, therefore 10.700 square metres is needed. For the commercial part of the station there is looked into bigger stations which host more retail spaces. As the metro will host 92.000 people, the commercial space can therefore be 27.400 square metres.

In conclusion the program will have a devision of 30/70. Whereas 30% of the building will be used for transportation and 70% of the buildings will be used for hospitality. The transportation includes parking and metro. The hospitality includes retail & food, hotel and office for the Railway and Public Transportation Authority. The total square metres will be 57.200. Also a park of 12.000 square metres will be giving citizens more public space. Because of the location and the requirements of the program, 45% of the total program will

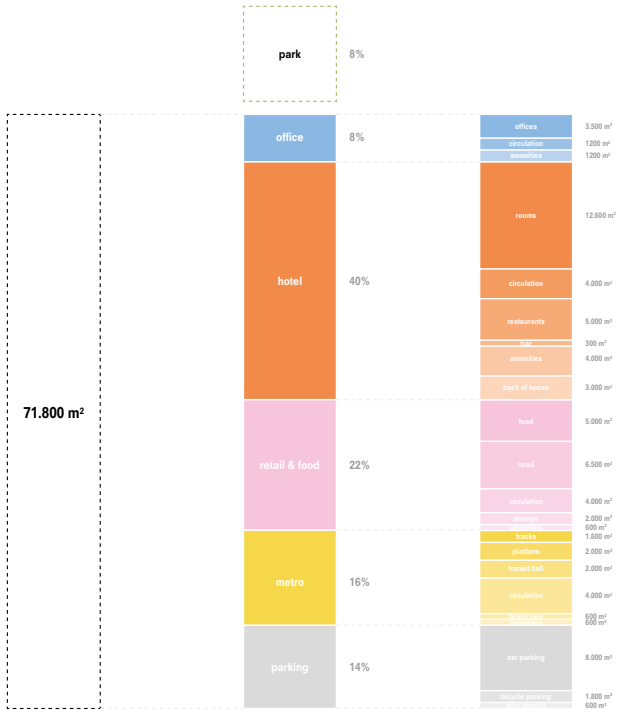

Figure 23: Programbar

be placed underground, this will include most of the retail and food program, metro and parking function. The hotel and office spaces will use the same foyer, which is accessible from the park. The transit hall, with the main entrance, will give acces to the retail and food program, platforms and bicycle park. The other two entrances will give acces directly to the retail and food program.

In the end the project tries to give an answer on the question: 'How can the metro line support the further development of the now secluded Central District and overcome the social-spatial barrier?'

By implementing the metro, not only (sub) urban connections will be made, this will also connect the centre both national as globally. Whereas the commercial program will function as a connector between the different neighbourhoods and by implementing a hotel international stimulus will be achieved

The project will fit within the group strategy as the station will function as the gateway of the the centre. It will be focussing on connecting it on a urban level as well as stimulating a new reliable and sustainable public transport mode and discouraging the use of the car.

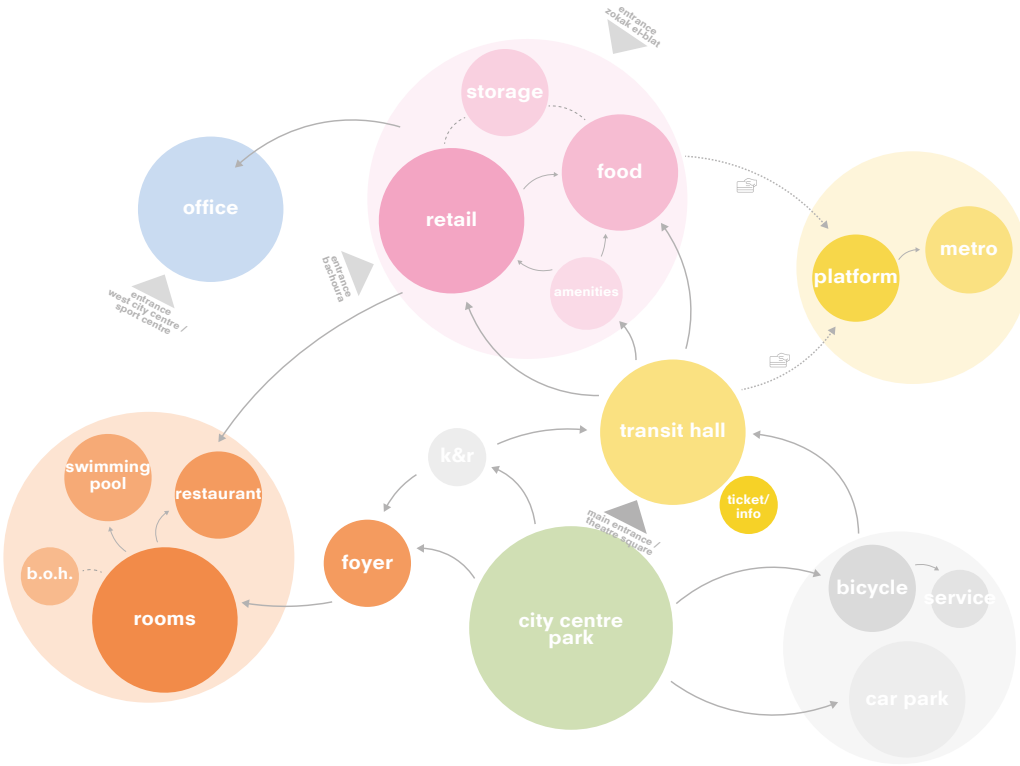

Figure 24: Program relation diagram

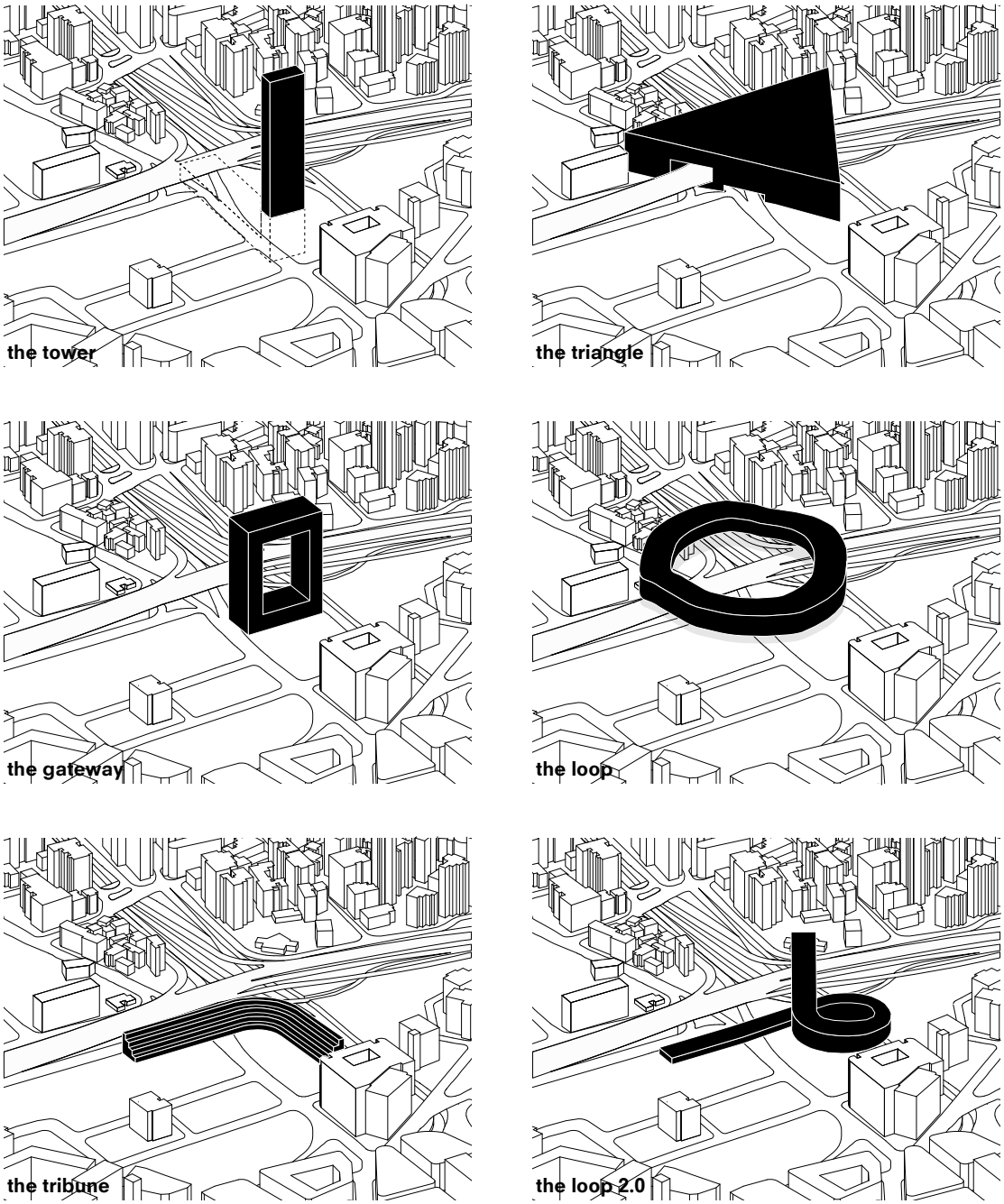

Figure 25: Massing studies

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un city hub beirut

a metro station in the city centre of beirut

by Pepijn Francissen

With the happening of the blast in 2020, Beirut is dealing with a lot of International attention and aid to deal with the redevelopment of the (former) port area. This is the exact moment to not only look at the problems which occurs in this area, but also have a look to the bigger picture. Due to the car dependancy and growing congestion within the city, it is nowadays facing a huge problem as it is placing an excessive strain on the current infrastructure. To accommodate better transportation flows and thus better connection between the airport and the redevelopment of the explosion site a metro line will be constructed. Being conveyed through the Central District, which represents not only the cultural core but also reflect as the main economic catalyst of the city today.

As the site location can be found near the infrastructural node, the Fouad Chehab Interchange, in the south, that also functions as the gateway to Solidere's Central District. This highway is connecting the city centre and the airport directly. Facing north, the UN-ESCWA headquarter, which plays an huge and important role in the middle eastern context, and the newly developed Grand Theatre complex can be found. As the site is in the close proximity

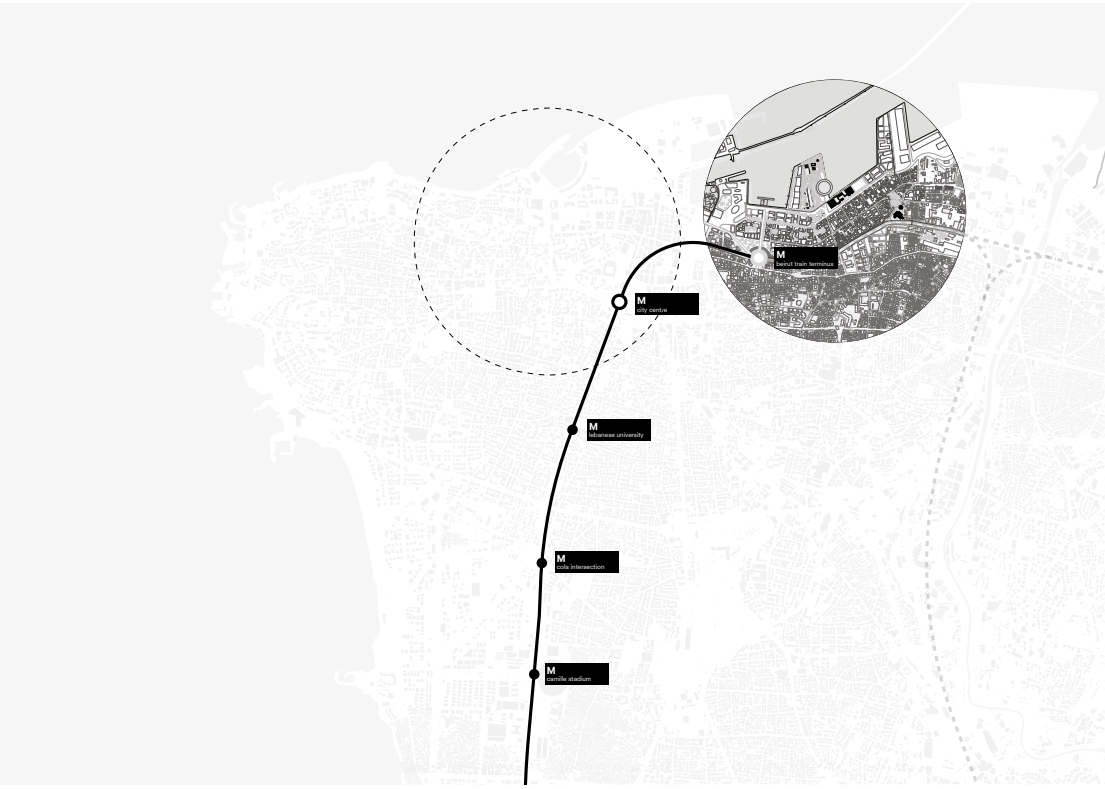

Figure 26: Proposal of metroline and stations between airport and the redeveloped blast area

of a lot of it's city centre attraction nodes, the site itself is facing some difficulties. For example, there are obstructions in the infrastructure, topography and security. As most part of the city is car oriented, the way the site works is the same. Access to and from the city park, through the site location, is almost impossible for pedestrians and cyclist due to the road layout, extensive topographical height differences and the multiple security buildings of the UN headquarter building.

The main program of the metro station will be mobility-oriented, as the building aims to offer new possibilities to different modes of public transportation. In this way the connection between these different transportation modes becomes very important, whereas a lot of commercial activities can play a role to strengthen these connections. In this way the building not only becomes a place to transfer between transportation modes but also a place to go, hang-out and enjoy. A bit detached to the actual main program, in the sense of space, but part of the building, a large hotel and museum can be found. This business hotel responds to the need of a more accessible, international cultural and economic businesses Central District.

The building tries to respond and include the previous problems and opportunities in web building complex. Therefore three ambitions can be recognised. First the existing axis of the UN-buildings should be kept and reinforced. This means the park in front of the un-building is not buildable, in terms of above ground. To reinforce the axis, two volumes are placed on each side of the park which forms the axis. Secondly, it should act as a landmark,

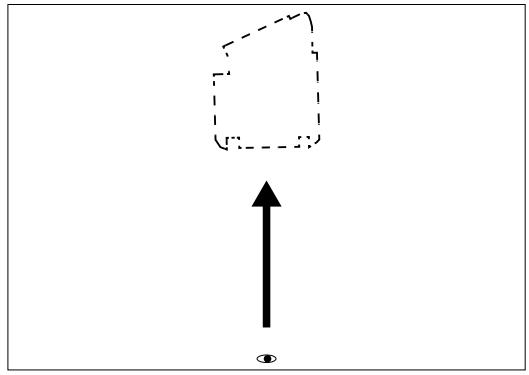

Figure 27: Axis to the UN-ESCWA

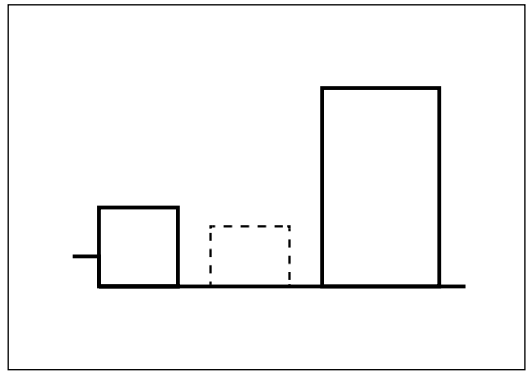

Figure 28: Tower as Landmark

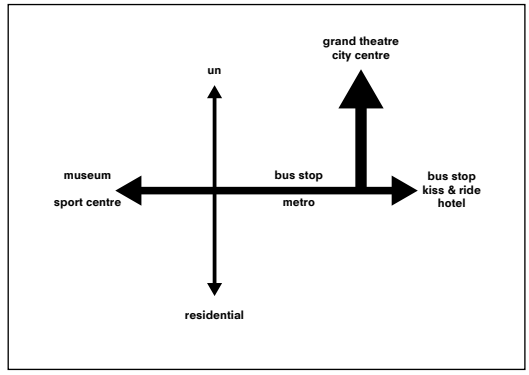

Figure 29: Connectivity

representing and stimulating the modern way of transportation but also defining the gateway to the city centre. This is be done to create a tower on one side, which is visible from all angles throughout the city. Thirdly, the building should act as a connector between the city parts and the different transportation modes. Here, a clear transit flow can be recognised, but this should also be translated to the different users of the building.

To accommodate these ambitions, a few changes should be implemented. In then current situation, the motorised vehicles can enter the city centre by a road on the right side of the park, whereas the road to exit the area is situated on the left side. To make the area more pedestrian friendly, crossing roads and providing dedicated bus lanes, the entrance road is placed to the left side of the park. For the cars that are entering the city from ring road, a new road will be constructed. In this way, the road between the building and the park will be dedicated for busses only, which becomes more pedestrian friendly.

The metro itself is placed underground, as there is no space left aboveground to facilitate an aboveground line. To facilitate the east-west connection between the two volumes a commercial strip is placed perpendicular on top of the metro platforms. The main entrance can be found in the eastern building as the building is in front of the Grand Theatre complex, which gives acces to the city centre. On top of the entrance, the hotel can be found. In the western building, the museum can be found which also includes a connection to bridge the gap in height difference of the terrain.

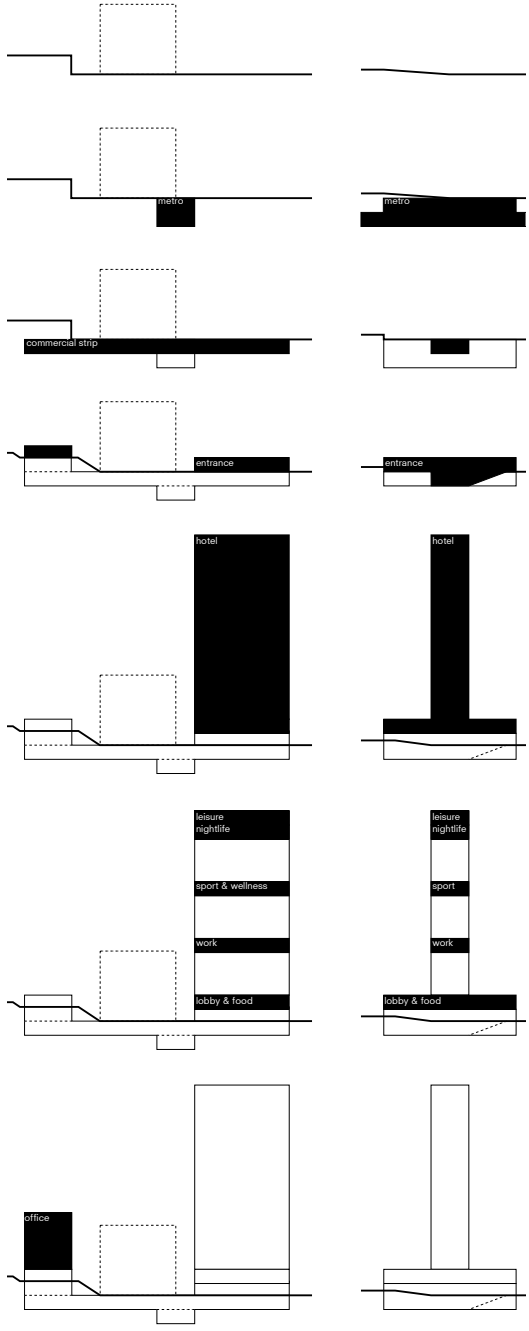

Figure 32: Design concept

The main entrance of the building is facing the Grand Theatre Square, and is situated on the ground floor. Here, in the transit hall with a triple height ceiling, the users can take a large stair or escalator downstairs to enter the concours level (commercial strip). On both east- and west side of the building a bus stop can be found which are both connected together by a wide hallway which leds to the elevators and the stairs within a large atrium. The atrium receives not only daylight from the facade, but also from the large skylight which is perforating the upper floor. At this floor, the hotel lobby can be found, which is accessible by a large stairs next to the stairs towards the concours level. Along the hallway retail and food shops can be found which forms a barrier between the transit hall and the bike parking underground.

The concours level is shaped in a plus form. This is due the entrance and exit options. The main entrance situated on the east, as the entrance for the west is formed by the museum building. Then two smaller entrances are situated on each side of the park, one towards the the UN-building and one towards the residential area. From the concours level, stairs, escalators and elevators give access to the platform underneath. In the middle

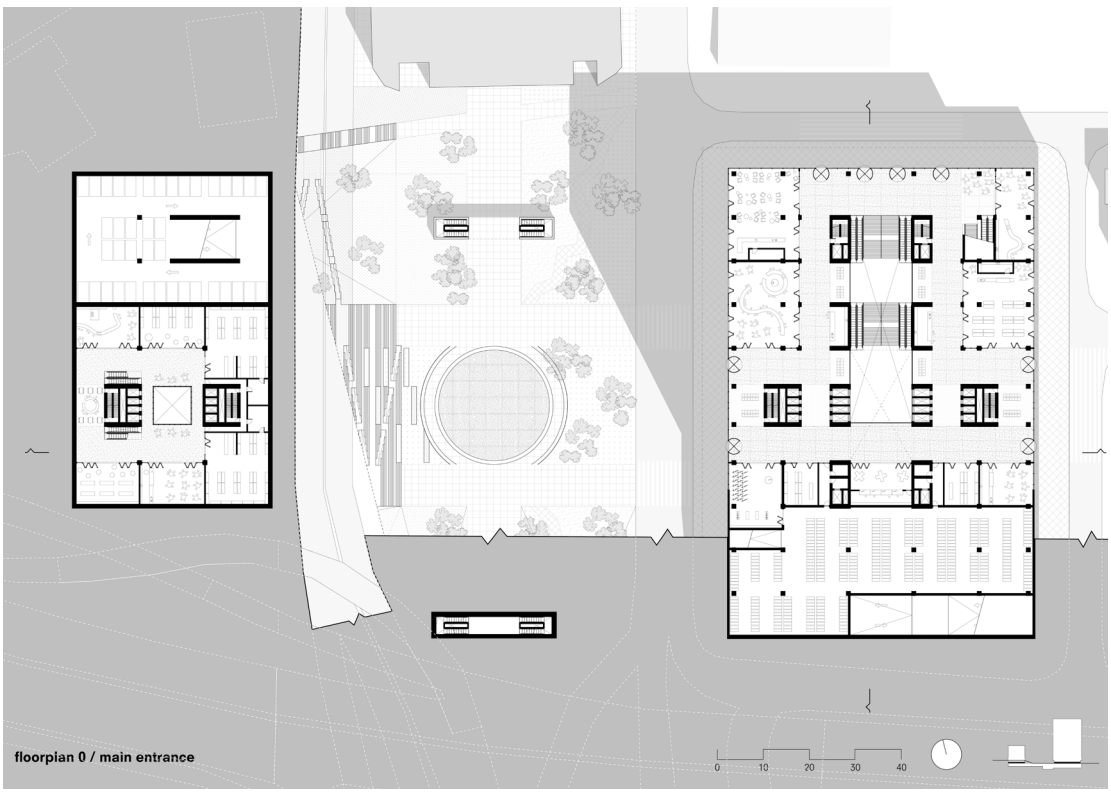

Figure 33: Groundfloor (+0)

of the underground concourse level, a rectangular skylight brings daylight. On top of the glass, a bit of water remembers the people to the context, the coastal city of Beirut. From under the fountain, the two buildings rise up in the middle of a green forest. This is also what concludes the park aboveground.

As a counteract of the 'concrete' Theatre square, the park in between will have trees, plants and grasses in it and will be a place of quiet in a bustling centre. To deal with the height difference towards the museum-building, a grand stairs is designed. These stairs also bridge the road underneath, and act as a sound barrier. In between these stairs, a platform becomes visible which the main entrance of the museum is placed

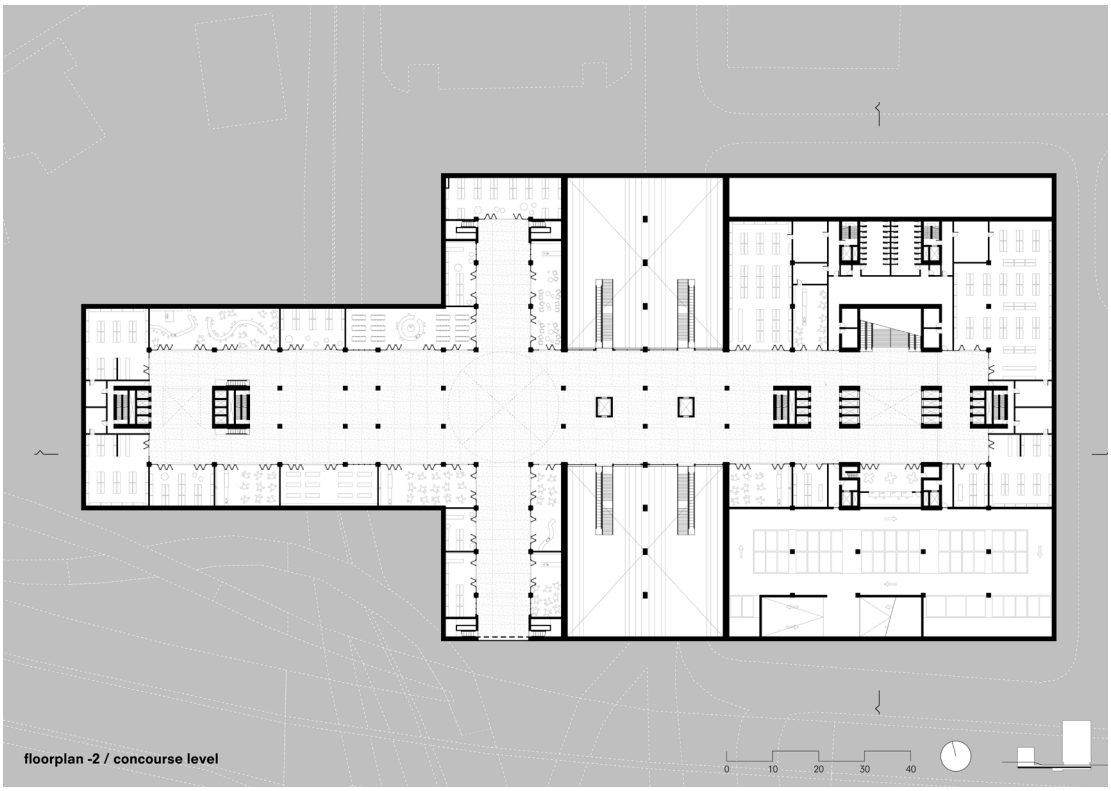

Figure 34: Concours level (-2)

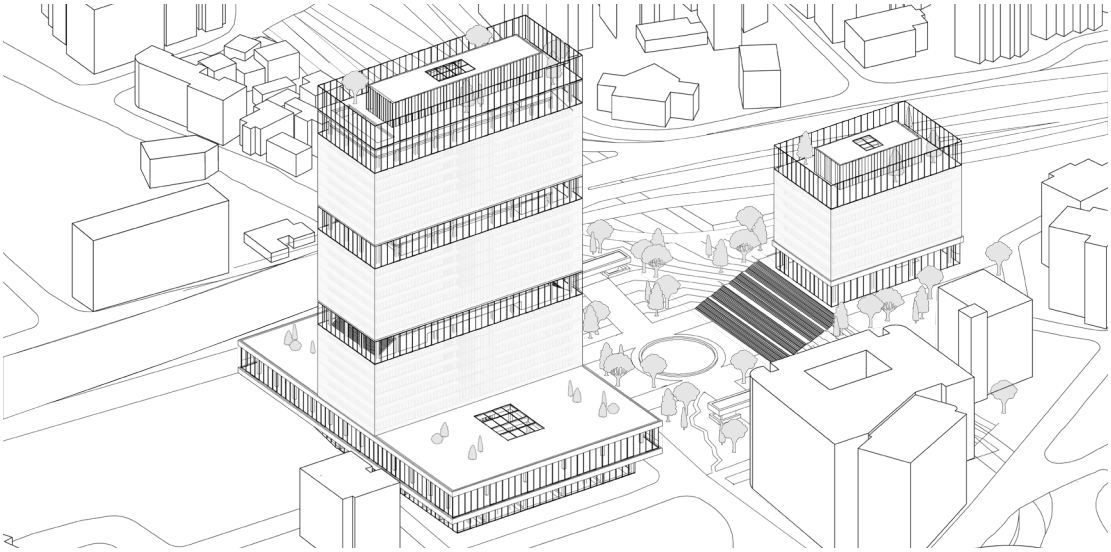

Figure 35: axo in context

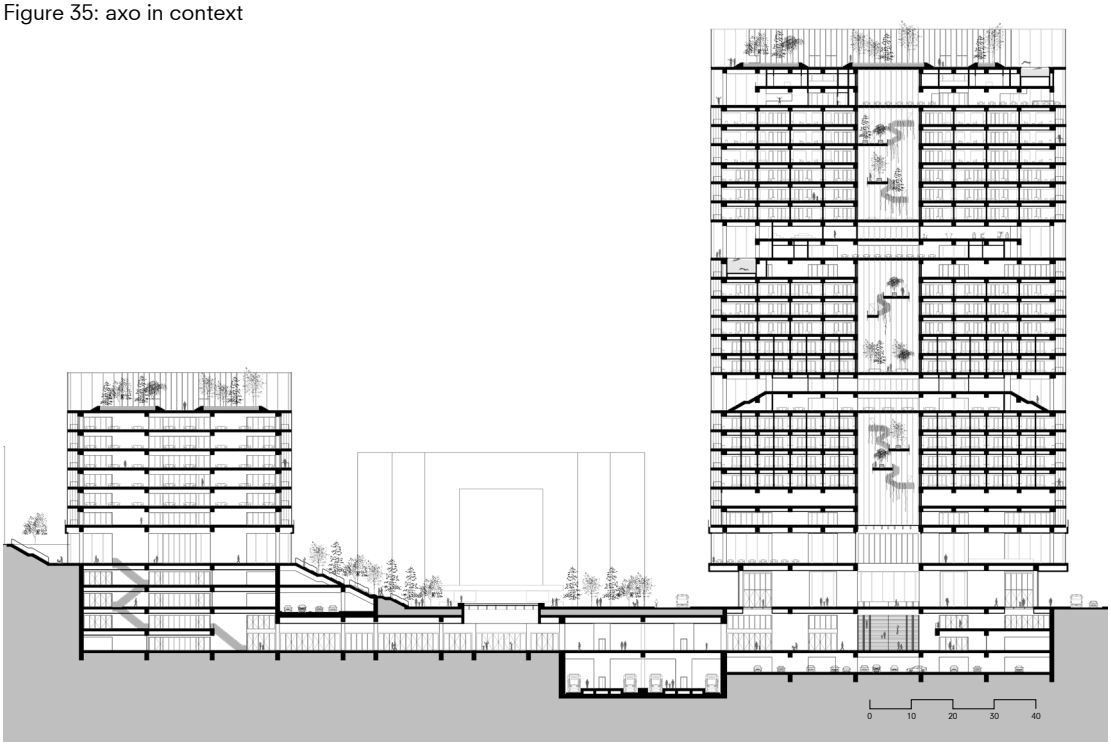

Figure 36: Longitudinal section

REFLECTION PAPER

un city hub beirut

a metro station in the city centre of beirut

1. The relationship between research and design

As the project takes its place in the middle eastern region, which is a completely unfamiliar environment by Western standards, the research takes an even bigger and more important role in the design process. By collecting in a group of people both hard and soft data about the country Lebanon as well as the city of Beirut in all kinds of possible themes (mobility, culture, history, landscape, etc) we tried to understand more about the social and spatial context of the future project(s). As the group site could be found in the city centre of Beirut, near the 2020 explosion site in the port, we also conducted research on a smaller scale and specific area within the greater Beirut. This led to defining occurring problems and opportunities for the Central District which could be divided into several themes. To every theme, a project could then be linked. In this way, the projects then should refer to one of these themes and try to answer the then known, as well as new questions, to the occurring problems or opportunities.

Because of the affection, I have for transportation, my personal topic became infrastructure and mobility. Because of the diffraction in context, a lot of research was needed on the historic overview, current situation and possible interventions for implementing new transport modes. The longing and the call of changing the current situation became persuasive after more research was conducted. Together with the conducted research about mobility in the current situation, the happening historical events and the way the city of Beirut (dis) functions gave me strong arguments for the significance of the design and the following radical change of implementing a new metro line. With help of the stated research question: 'How can the metro line support the further development of the now secluded Central District and overcome the social-spatial barrier?' the design tries to combine two pieces of research in one project. First, the design solves a lot of the current problems that can be found on and near the site, including the relationships it offers with the adjacent buildings such as the UN-ESCWA headquarter and the Grand Theatre as well as the surrounding neighbourhoods. Secondly how to create a lively station that not only serves the commuter.

2. The relationship between your graduation topic and studio topic

The aim of Complex Projects studio of 2022 regards the city of Beirut, Lebanon is 'change', as the explosion in 2020 that happened in the port area can be seen as a direct motive for this studio subject. Therefore, quoted from the Studio Poster: 'The explosion should be considered as an impetus for change.' Due to the many problems, Beirut is facing today the project tries to help return the once called 'Paris of the East' to a path of stability and development. As the project gives the Central District a new value and opportunity for not only the citizens but also for the establishments of international headquarters, embassies and tourist attractions. The new metro line helps to support this idea and in addition, also changes the car-embedded culture in the city.

3.Research method and approach chosen in relation to the graduation studio

Complex Projects is a graduation studio which offers an individual project which involves a part group work. Together with more groups research is conducted to fully understand the city of Beirut and its context in different aspects. Every group has a 1 km radius circle as site area which is analysed and a strategy with a corresponding masterplan is developed for each circle. On an individual basis, research topics support not only your own project but also add value to the group strategy. All groups share their research and ideas in a weekly newsletter.
Both the city and the circle site area are researched by mapping, which was the most important way of understanding the context. This is for example done by showing the historical growth of the city, the development of infrastructure, etc.

The main research methods for the individual project of the metro station were context-led study and typology study. The context-led study focuses on how to solve the urban disconnection of the proposed site area. The typology study focuses on multiple themes such as the size, dimensions, capacity, architecture language, etc. of metro stations in both the context as well as in the rest of the world.

By conducting individual research, the metro station supports and improves the Central District area as the gateway of the city centre to achieve the group ambition.

4. Relationship between the graduation project and the wider social, professional and scientific relevance

As Beirut faces many challenges with its infrastructural and car-oriented transportation, this can also be seen in the wider world. A lot of cities are car-oriented that now causes problems such as pollution which affect people's health and the climate negatively. As people start to realise change is needed to combat these problems to change cities' environments with help of pedestrians, cyclists and public transportation-oriented networks. As this trend is following in the western world, Lebanon isn't there yet. Creating a good, feasible and attractive alternative transportation option can be the first step toward a change. A change where the Beiruti in daily life uses the metro to go to work, to school, to the airport in minutes instead of being stuck in polluting congestion.

In addition, the metro station tries to solve the urban and social problems in the Central District. The urban disconnection is not only a spatial problem in terms of the infrastructural, typographical and security obstructions but also the cultural, political and social problem. By implementing a variety of functions as a spatial tool, the project tries to solve these in this specific situation.

5. Ethical issues and dilemmas you may have encountered during graduation

The main ethical issue regards the project is the feasibility of the project in the context of Beirut which differs compared to the 'West'. A huge infrastructural change such as a metro line through the whole city is something which is needed but will not likely be constructed. This is due to the political chaos and corruption which occurs in Lebanon. Governmental funding will not likely be available for such a project. For example, the entire city centre is constructed by one private company and owner, Solidere.

Furthermore, the ambition to overcome the obstruction of the highway was something which took a long time in the design process. The site itself was very difficult due to the layout, infrastructural layer and boundaries. In the end, the building itself will not overcome this, but in a future stadium, there is one possible way of doing this. This can only happen if future development will happen across the highway, with the direct access to the metro, this will become more realistic.