

AMERICAN UNIVERSITY OF BEIRUT

Sustainable Air Right Development over Inner-City Highways:  
The Case Study of the Southern Edge of Beirut's Central  
District.

By

RUDY GHASSAN MAROUN

A thesis  
submitted in partial fulfillment of the requirements  
for the degree of Master of Urban Design  
to the Department of Architecture and Design  
of the Faculty of Engineering and Architecture  
at the American University of Beirut

Beirut, Lebanon  
April 2015

AMERICAN UNIVERSITY OF BEIRUT

SUSTAINABLE AIR RIGHT DEVELOPMENT OVER INNER-CITY HIGHWAYS: THE CASE STUDY OF THE SOUTHERN EDGE OF BEIRUT'S CENTRAL DISTRICT.

by  
RUDY GHASSAN MAROUN

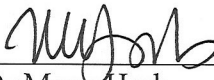
Approved by:



---

Dr. Robert Saliba  
Professor Architecture and Urban Design

Advisor



---

Dr. Mona Harb  
Associate Professor

Member of Committee



---

Mr. Omar Aziz Hallaj  
Visiting Assistant Professor

Member of Committee

Date of thesis defense: April 27, 2015



## ACKNOWLEDGMENTS

The accomplishment of this thesis would not have been possible without the guidance, support and contribution of many individuals in a direct or indirect way.

I would like first to thank my advisor, Professor Robert Saliba for his unconditional guidance and invaluable support in the development of this document and during classes in the MUD program.

I would also like to extend my gratitude to my committee readers Professor Mona Harb and Professor Omar Aziz Hallaj for examining my draft and providing me with a critical feedback.

Many thanks to Professor Mona Fawaz, who provided: rich learning experiences in the classroom, an unconditional support, and general wisdom during my experience in the department.

Thanks to Professor Amy Zenger from the writing center at AUB for her guidance and the precious time she spent with me editing and putting together this document.

Finally my sincere gratitude to my family and more specifically my father and mother for their unconditional support throughout my education years , also for their patience and encouragement in keeping me motivated and helping me to bring this final document to completion.



## AN ABSTRACT OF THE THESIS OF

Rudy Maroun for Master of Urban Design  
Major: Urban Design

Title: Sustainable Air Right Development over Inner-City Highways: The Case Study of the Southern Edge of Beirut's Central District.

This thesis explores the concept and practice of sustainable air right development over inner-city highway corridors, initially conceived as a traffic engineering solution for the decongestion of central cities. The thesis provides an elaboration on a graduate urban design studio conducted at the Department of Architecture and Design, American University of Beirut titled: *Re-Envisioning Infrastructural Breaks: Urban and Landscape Design Strategies for the Southern Edge of Beirut's Central District* (Spring 2012). Taking Fouad Chehab Avenue as case study, the studio addressed various undesirable consequences resulting from air and noise pollution, the discontinuity of the street network between the city center and its periphery; and the creation of a transition zone of dilapidated buildings and empty plots awaiting development. In response to these issues, 'air right development over infrastructure' was proposed as a strategy to re-connect the urban fabric and to initiate the functional and formal integration between the BCD and the adjoining neighborhoods. Using Scott Campbell sustainability theory (1996), this thesis critically assesses the studio proposal against case studies in the Western context - Massachusetts Turnpike Air Right Development, Boston, and three highway developments projects, Malietoren, Equinox, and Grostiusplaats in The Hague - with the purpose of extracting a set of best practice guidelines applicable in the Beirut context.

# CONTENTS

ACKNOWLEDGEMENTS .....	v
ABSTRACT.....	vi
LIST OF ILLUSTRATIONS.....	xii

Chapter	Page
<b>I. INTRODUCTION .....</b>	<b>1</b>
A. Problematic Context .....	1
B. Issues and Approach .....	6
C. Objective and Goals .....	7
D. Thesis Question .....	7
E. Significance .....	7
<b>II. METHODOLOGY: FROM STUDIO TO THESIS .....</b>	<b>9</b>
A. Studio Approach .....	10
B. Thesis Methodology .....	13
<b>III. LITTERATURE REVIEW .....</b>	<b>14</b>
A. Definition and Historical Evolution of the Air Right Development over Infrastructure Concept. ....	14
B. Sustainable Urban Development .....	16
1. Concept of Sustainability. ....	17
2. Sustainable Development and its conflicts. ....	18

VI. Revisited Urban Design Intervention .....	98
BIBLIOGRAPHY .....	118
ANNEX 1: COMPARATIVE MATRIX	
ANNEX 2: PRESENTATION	

# ILLUSTRATIONS

Figure	Page
1. Figure 1.1: Location map of the city of Beirut, within neighboring countries. Retrieved via <a href="http://www.ezilon.com/maps/asia/lebanon-road-maps.html">http://www.ezilon.com/maps/asia/lebanon-road-maps.html</a> .	2
2. Figure 1.2 : The Fouad Chehab Highway (Highlighted in red) within the urban fabric of Beirut	3
3. Figure 1.3 : The Fouad Chehab Highway within the urban fabric of Beirut , picture taken from the Saifi side.	3
4. Figure 1.4: Areal view of the Fouad Chehab Avenue and the surrounding neighborhoods. Retrieved via Google Earth ,spring 2012.	4
5. Figure 1.5: Photographic survey of the Ghalghoul intersection on the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio.	4
6. Figure 1.6: Photographic survey of the Ghalghoul intersection on the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio	4
7. Figure 1.7: Photographic survey of the urban fabric on the southern side of the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio	5
8. Figure 1.8 : The Fouad Chehab Highway within the urban fabric of Beirut , picture taken from the Yesouiye side by Karim Saad. Retrieved via Google Earth.	6
9. Figure 2.1: Study Process of the thesis	12
10. Figure 3.1: Ponte Vecchio bridge. Source: <a href="https://apetcher.files.wordpress.com/2009/11/ponte20vecchio2001.jpg">https://apetcher.files.wordpress.com/2009/11/ponte20vecchio2001.jpg</a>	15
11. Figure 3.2: Ponte Vecchio Bridge interior. Source: <a href="http://eropa.panduanwisata.id/files/2013/10/ponte_vecchio01.jpg">http://eropa.panduanwisata.id/files/2013/10/ponte_vecchio01.jpg</a>	15
12. Figure 3.3: Park Avenue 2010. Source: <a href="http://www.sothebyshomes.com/neighborhood/24.jpg">http://www.sothebyshomes.com/neighborhood/24.jpg</a>	16
13. Figure 3.4: Park Avenue 1905. Source: <a href="https://ephemeralnewyork.files.wordpress.com/2013/01/parkavenue56thstreet1905.jpg">https://ephemeralnewyork.files.wordpress.com/2013/01/parkavenue56thstreet1905.jpg</a>	16
14. Figure 3.5 :Prudential Mid-American building Chicago . Source: <a href="http://s254.photobucket.com/user/Irishtom29/media/chicago/burnhampoint.jpg.html">http://s254.photobucket.com/user/Irishtom29/media/chicago/burnhampoint.jpg.html</a>	16
15. Figure 3.5 :Prudential Mid-American building Chicago 2010 . Source: <a href="http://2.bp.blogspot.com/-vMubb1NZpfc/UMN8s1GwQyI/AAAAAAAAADa8/rt9r3KNqWIO/s1600/IMG_0329.JPG">http://2.bp.blogspot.com/-vMubb1NZpfc/UMN8s1GwQyI/AAAAAAAAADa8/rt9r3KNqWIO/s1600/IMG_0329.JPG</a>	16
16. Figure 3.7: simple Venn diagram of SUSTAINABLE DEVELOPMENT THEORY. (Source: The ANNALS of the American Academy of Political and Social Science 2003; 590; 35)	19
17. Figure 3.8: SUSTAINABLE DEVELOPMENT AND ITS CONFLICTS (source: Campbell 1996)	20

18. Figure 3.9: Massachusetts Turnpike cutting through Down Town Boston (source: Campbell 2004)	24
19. Figure 3.10: Massachusetts Turnpike cutting through Down Town Boston. Source: <a href="http://www.hdtimelapse.net/content/HDtimelapse.net_City/HDtimelapse.net_City_2568_hirez.jpg">http://www.hdtimelapse.net/content/HDtimelapse.net_City/HDtimelapse.net_City_2568_hirez.jpg</a>	25
20. Figure 3.11: Massachusetts Turnpike selected project (source: Campbell 2004)	26
21. Figure 3.12: Copley Square 1950's. Source: <a href="http://www.bostonstreetcars.com/uploads/2/0/7/4/20744966/2071449_orig.jpg">http://www.bostonstreetcars.com/uploads/2/0/7/4/20744966/2071449_orig.jpg</a>	27
22. Figure 3.13: Copley Square 2012. Source: <a href="http://www.gsd.harvard.edu/images/content/5/2/v2/524407.JPG">http://www.gsd.harvard.edu/images/content/5/2/v2/524407.JPG</a>	27
23. Figure 3.14: Civic Vision for Turnpike Air Development in Boston. Source: <a href="http://www.cnu.org/sites/files/Boston%20civic%20vision.jpg">http://www.cnu.org/sites/files/Boston%20civic%20vision.jpg</a>	30
24. Figure 3.15: Civic Vision for Turnpike Air Development in Boston Goals (Source: Campbell 2004)	31
25. Figure 3.16: Columbus Center Vision for Turnpike Air Development in Boston (Source: Campbell 2004)	32
26. Figure 3.17: One Kenmore Vision for Turnpike Air Development in Boston (Source: Campbell 2004)	37
27. Figure 3.18: One Kenmore Vision for Turnpike Air Development in Boston Sustainability diagram	44
28. Figure 3.19: Maleitoren Building. Source: <a href="http://www.vno-ncw.nl/SiteCollectionImages/Statisch/malietoren_2.jpg">http://www.vno-ncw.nl/SiteCollectionImages/Statisch/malietoren_2.jpg</a>	46
29. Figure 3.20: Maleitoren Building. Source: <a href="http://www.vno-ncw.nl/SiteCollectionImages/Statisch/malietoren_1.jpg">http://www.vno-ncw.nl/SiteCollectionImages/Statisch/malietoren_1.jpg</a>	46
30. Figure 3.21: Equinox Building. Source: Google Earth	47
31. Figure 3.22: Equinox Building. Source: <a href="http://www.zja.nl/en/page/669/grotius--the-hague">http://www.zja.nl/en/page/669/grotius--the-hague</a>	48
32. Figure 3.23: The Hague Sustainability diagram	51
33. Figure 4.1: Site Historical Development	56
34. Figure 4.2: Site and infrastructure Historical Development	57
35. Figure 4.3: Urban Fabric Historical Development	58
36. Figure 4.4: Site zones	59
37. Figure 4.5: Infrastructure impact on land use	60
38. Figure 4.6: Land use on different scale	63
39. Figure 4.7: Gardens	64

40. Figure 4.8: Undeveloped Lots	65
41. Figure 4.9: Cemetery	65
42. Figure 4.10: Morphological aspect	66
43. Figure 4.11: Building Height	67
44. Figure 4.12: Building Conditions	67
45. Figure 4.13: Building Under Construction	67
46. Figure 4.14: Site within the city circulation network	69
47. Figure 4.15: Site traffic analysis	70
48. Figure 4.16: Site Connectivity	71
49. Figure 4.17: Site Connectivity and circulation	72
50. Figure 4.18: Zones and Regulations	73
51. Figure 4.19: Zones and Regulations	73
52. Figure 4.20: BCD Master Plan Source: <a href="https://therearenosunglasses.files.wordpress.com/2014/01/solideremasterplanpromote8.png?w=793&amp;h=600">https://therearenosunglasses.files.wordpress.com/2014/01/solideremasterplanpromote8.png?w=793&amp;h=600</a>	74
53. Figure 4.21: Land Price	75
54. Figure 5.1: Strategic Master Plan	79
55. Figure 5.2: Proposed intervention	82
56. Figure 5.3: Conceptual sheets	84
57. Figure 5.4 to 5.13: Urban Design intervention	90
58. Figure 5.14: Beirut Sustainability diagram	103
59. Figure 5.15: Pedestrian Connections concept	107
60. Figure 5.16: Level +7.00 m	108
61. Figure 5.17: Level +12.50m	108
62. Figure 5.17: Level +16.50m	109
63. Figure 5.18: Axonometric view	109
64. Figure 5.19: Cultural Building	110

# CHAPTER I

## INTRODUCTION

### **A. Premise / Problematic context**

This thesis explores the concept and practice of air right development over highway corridors that were implemented in the 1950s and 1960s as a traffic engineering solution for the decongestion of central cities. The thesis is an elaboration on a graduate urban design studio conducted at the Department of Architecture and Design, American University of Beirut titled: *Re-Envisioning Infrastructural Breaks: Urban and Landscape Design Strategies for the Southern Edge of Beirut's Central District* (Spring 2012). As stated in the studio syllabus, "through their imposition on the fabric of inner cities, traffic arteries became catalysts of urban change, generating a dynamic of differentiation along their edges and within the adjoining districts." As case study, the studio addressed the Fouad Chehab Avenue that defines the southern edge of Beirut's Central District (BCD) and cuts across the continuous urban fabric that formed the first extension of the medieval town. Two separate entities were formed undergoing each a distinct process of change. On the Northern side of the highway, the BCD evolved into a Post War Reconstruction District entrusted by the government to a private real estate company, Solidere, and having its own detailed master plan. On the southern side, the pre-existing neighborhoods are still subject to an outdated blanket zoning law, and are currently undergoing an accelerated process of redevelopment and gentrification that is redefining their economic and social structure.

C. Case Studies .....	23
1. Boston Turnpike .....	23
a. Historical Background	
b. Copley Square	
c. Columbus Center	
d. One Kenmore	
e. Lessons Learned	
2. The Hague .....	35
a. Historical Background	
b. Malietoren	
c. Equinox	
d. Grotiusplaats	
e. Lessons Learned	
IV. CONTEXT APPRAISAL .....	51
A. Brief Introduction of Beirut’s Urban History .....	51
B. Site Analysis : .....	53
1. Historical and Spatial Development	
2. Character and Connectivity	
3. Policy and Market Appraisal	
C. Diagnosis .....	74
V. URBAN DESIGN INTERVENTION .....	76
A. Strategic Master Plan .....	77
B. Design Development .....	80
C. Concept Development .....	83



65. Figure 5.20: Hotel Building	111
66. Figure 5.21: Iconic Building	112
67. Figure 5.22: Residential Building	113
68. Figure 5.23: Cultural Building	114
69. Figure 5.24: Section BB	115
70. Figure 5.25: Section AA	115
71. Figure 5.26: Section DD	115
72. Figure 5.27: Section CC	116
73. Figure 5.28: Open Space BCD Side	117
74. Figure 5.29: Development Phases	118
75. Figure 5.30: View toward the development taken from the Saifi side	119
76. Figure 5.31: Development Massing	119



Figure 1.1: Location map of the city of Beirut, within neighboring countries. Retrieved via [www.ezilon.com](http://www.ezilon.com)



Figure 1.2 : The Fouad Chehab Highway (Highlighted in red) within the urban fabric of Beirut



Figure 1.3 : The Fouad Chehab Highway within the urban fabric of Beirut , picture taken from the Saifi side.





Figure 1.4: Areal view of the Fouad Chehab Avenue and the surrounding neighborhoods. Retrieved via Google Earth ,spring 2012.



Figure 1.5: Photographic survey of the Ghalghoul intersection on the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio.



Figure 1.6: Photographic survey of the Ghalghoul intersection on the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio



Figure 1.7: Photographic survey of the urban fabric on the southern side of the Fouad Chehab Avenue taken in February 2012. Source Urban Design studio





Figure 1.8 : The Fouad Chehab Highway within the urban fabric of Beirut , picture taken from the Yesouiye side by Karim Saad. Retrieved via Google Earth.

## **B. Issues and Approach**

Besides generating air and noise pollution, various undesirable consequences resulted from building the Fouad Chehab Avenue. They include the discontinuity of the street network between the city center and its periphery; and the creation of a transition zone of dilapidated buildings and empty plots waiting for highway frontage development.

In addition to the disruption of the urban fabric, inner city highways go against the economic, environmental and social principles of sustainability. Economically, they consume centrally located public land with a high potential for development reducing opportunities for increased municipal tax revenues. Environmentally, they represent a lost opportunity for creating open green spaces in dense built-up urban districts. Moreover, socially, they disrupt the historical urban fabric and segregate socially cohesive neighborhoods.

### **C. Objectives**

In response to these issues, I proposed for the urban design studio the approach of ‘air right development over infrastructure’ as a strategy to re-connect the urban fabric and to initiate the functional and formal integration between the BCD and the adjoining neighborhoods. In this thesis, I intend to elaborate on my studio proposal by critically assessing the implementation of this approach in different Western contexts, with the main purpose of extracting a set of best practice guidelines for their application in the Beirut context.

### **D. Research Question**

Hence, this thesis is an attempt to answer the following questions:

- How to re-conceptualize **inner-city traffic arteries as catalysts of integration** rather than generators of physical, spatial and functional segregation? More specifically,
- How to apply ‘air right development over highways’ for promoting a *sustainable approach* to urban design?
- How could such a strategy be adapted to the Beirut context and more particularly to the southern edge of the BCD, taking into consideration its performance in different Western contexts such as Boston and The Hague?

### **E. Significance**

Contemporary approaches to solving problems of urban mobility are discouraging the imposition of major transport networks on the dense fabric of inner cities. Instead, a higher emphasis is placed on public transport and ‘soft connections’ with strong limitations on vehicular accessibility to reduce pollution and promote spatial and social integration. Still, the existing highways and ring roads implemented during the modernist period remain a major challenge to be addressed by urban

designers who have to respond to the three main concerns brought forward by sustainability: economic vitality, environmental integrity and social cohesion. This thesis builds on this global design agenda to assess the applicability of ‘sustainable air right development over inner-city Highways’ to a non-Western context such as Beirut. By exploring a set of solutions already tested in major cities, this thesis contributes to the introduction of strategic thinking in a local context by widening the scope of design strategies and implementation tools to encompass the principles of sustainability.



## CHAPTER II

### Methodology: From Urban Design Studio to Thesis

For evolving from a studio to a thesis, the research is divided into three parts: urban design studio process, theoretical underpinning and an assessment and revision of the studio design proposal.

The first part adopts a problem solving inductive approach in order to retrace the process followed in the urban design studio, which started with ‘context appraisal’ leading to a ‘strategic plan’ and to the ‘design development’ of selected action areas. The context appraisal was conducted along three tracks: 1) historical and spatial development; 2) character and connectivity appraisal; 3) community, policy and market appraisal. The strategic master plan was concerned mainly with the allocation of land-uses and the articulation of an infrastructural framework. The design development focused on issues of mobility and spatial segregation, and used ‘air right development over infrastructure’ as a response to the site problematic.

The second part explores the theoretical underpinning of sustainable air right development over infrastructure. Because this subject is weakly theorized, the review took a case study approach. As defined by Francis (2000) the case study approach is : “a well-documented and systematic examination of the process, decision-making and outcomes of a project, which is undertaken for the purpose of informing future practice, policy, theory, and/or education” (P: 2). In contrast with the first part, the second part approach is deductive. Since most of the case studies explored promote for sustainability goals, the concept of sustainability is investigated in the literature

review in order to assess the sustainability of the air right development over highway corridors approach.

Based on literature review findings as well as a comparative assessment of the case studies (table 1.1) the initial design proposal of the BCD southern edge sustainability and implementability will be assessed. This will result in an amended urban design proposal for the BCD southern edge.

## **A. Studio Approach**

This section retraces in a systematic narrative, the data gathering and data analysis process. The collected information was used to investigate the area's historical and current condition and to establish a solid base upon which future design intervention can rely. During the studio, two types of research methods were used, library research and field research.

### **1. Data Gathering**

First, library research investigated the context historically and identified case studies related to the issues of mobility and infrastructure especially when highways intersect with inner cities. This method of investigation focused on finding and analyzing historical maps, records and photographs of the site as well as official documents and professional studies previously conducted on the area. Most of the gathered data, was found at the American University of Beirut library or directly handed down by the studio instructor with official maps. Finally, online investigation was also used to complete the gathered data and to identify relevant case studies.

Library research was complemented by field research. A preliminary reconnaissance study of the site allowed the students to articulate each a vision expressing a

subjective perception for the site potential development. Comprehensive field research was then accomplished to gather data about the study area, using a non-participant direct observation method where recording notes, sketching, photographing and mapping were the relevant techniques. This method investigated the study area in terms of its morphological evolution, unique physical features as well as the social, institutional, and economic dynamics affecting its urban form.

## **2. Data Analysis**

Context appraisal and thematic mapping are the main methods adopted in order to analyze the data gathered. This stage aimed at understanding the dynamics of change affecting in particular the study area and infrastructure break in general. In order to define the opportunities and constraints for future development a series of comparative investigation was used to examine the gathered data along four tracks: (a) historical and spatial development, (b) character and connectivity appraisal, (c) community, policy, and market appraisal, and (d) landscape urbanism and typological urbanism case studies assessment. The result was the production of thematic maps highlighting issues in relation with changes affecting the urban fabric, identity, permeability, continuity and development opportunities.

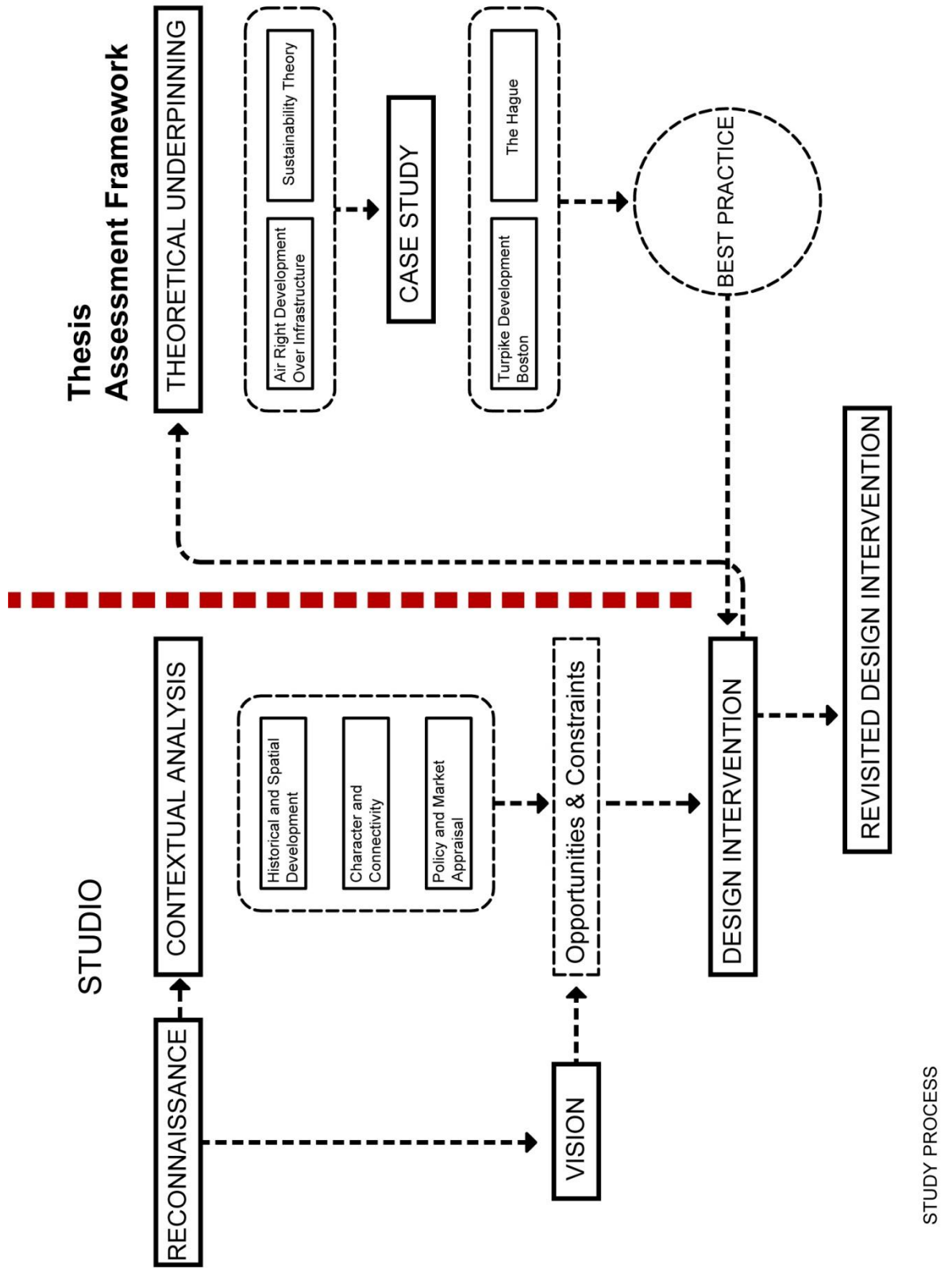


Figure 2.1: Study Process of The Thesis

## **B. Thesis Approach**

The second part of this thesis explores the theoretical framework of sustainable air right development over infrastructure and its historical evolution, through relevant case studies.

The review explores the two cases of Boston and The Hague, in order to extract from them a set of best practice for sustainable air right development over infrastructure in inner cities. Since both case studies promote a sustainability approach, the concept of sustainability is used as an assessment framework utilizing S.Campell's (1996) definition and theory. Accordingly, a set of best practices is deduced to evaluate the sustainability and adaptability of the air right development over highway corridors in the Beirut context.

## CHAPTER III

### LITERATURE REVIEW

This chapter intends to locate the initial design proposal for the Southern edge of Beirut Central District within related theories, research and case studies on the topic of “Sustainable air right development over highway corridors”. The first part of this chapter will strategically trace the historical evolution of the air right development over infrastructure concept in western context. From the historical research, the concept of sustainability emerges as a focal idea in all redevelopment strategy over or near infrastructure. Accordingly, the second part will explore the sustainability concept, its origin, the way it evolved. I will adopt Campbell’s (1996) sustainability definition, theory and diagram in order to locate and test the sustainability of air right development over infrastructure projects. The third part of this chapter will investigate the extent to which air right development over infrastructure is sustainable, using two different case studies: the Massachusetts Turnpike in Boston and The Hague city development over highway corridors. Accordingly, this chapter will be divided into four parts: a) Definition and Strategic Historical Evolution, b) Sustainable Urban Development, c) Case studies and d) Best Practice.

#### **A. Definition and Historical Evolution**

Savvides (2004; P: 48) defined air right development over infrastructure based on the definition of the National League of Cities (Godwin, 1968):

The term ‘airspace’ refers to a specific, legally described area that lies under or over another structure, such as a highway facility or railway tracks, etc. The

term ‘air rights’ refers to the right to use and control open space above the property owned by another party, and these have been typically granted for the space above railways, highways or other property.... As the underlying properties will continue to operate and remain publicly owned, these projects differ from traditional land development projects that typically involve the sale or long-term transfer of the entire parcel for long-term use... Moreover, as air rights development is executed in the airspace above existing structures usually owned by a third party, it is unique in that it unlocks land value from what is usually perceived as dead space.

Furthermore, this kind of development is often undertaken over publicly owned property or transport infrastructures, providing an opportunity for cities to densify when large developable lands within become less available.

The concept of integrating building with transportation corridors goes as far as the renaissance period in Italy. The Ponte Vecchio Bridge over the Arno River in Florence supported vivacious commercial developments on both sides of the bridge still in use today.



Figure 3.1: Ponte Vecchio bridge.(Source:wordpress)



Figure 3.2: Ponte Vecchio Bridge interior. (Source:panduanwisata)

In most cases in the United States of America, the practice of air space development first occurred over the railway tracks around which many industrial

cities grew. The first air space development experience took place in New York City in the early 1900s with the construction of the Park Avenue project and the Grand Central Terminal over the underground tracks of the New York central Railroad (Savvides 2004: 2). Air rights projects like the Prudential Mid-American Building in Chicago and Madison Square Garden in New York proved that this kind of growth over transportation infrastructures is reasonable and practical (Campell 2004 : 15).



Figure 3.3: Park Avenue 2010



Figure 3.4: Park Avenue 1905



Figure 3.5 : Prudential Mid-American building Chicago .  
(Source: photobucket)

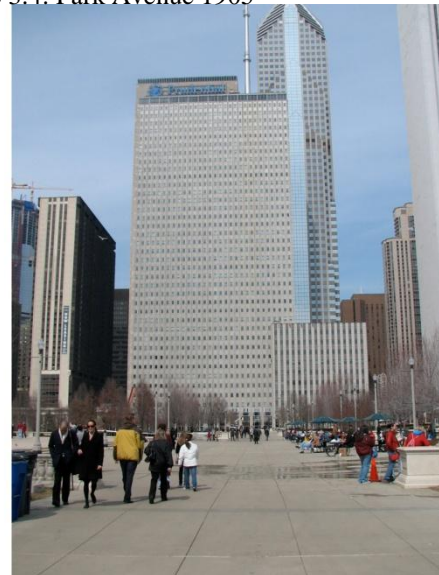


Figure 3.6 : Prudential Mid-American building Chicago 2010. (Source: blogspot)

In the 1950's most of American cities downtown suffered from congestions, pollution, and degradation of the livable environment. Thus, urban sprawl boomed and suburban development started. Many citizens moved from the congested polluted cities to the suburbs seeking a better quality of life for their families, but still needed



to commute on a daily basis to their place of work in the city. That issue created a mobility problem and led to the implementation of highway corridors in order to decongest the city centers and facilitate through traffic.

Highway right-of-ways passing through the core of urban areas actively provided efficient mobility; however, they had harsh consequences on the urban fabric. They proved to divide and disturb neighborhoods, displace people and businesses, create undesirable edges, consume land that would have presented valuable development opportunities and increase the pollution from automobile emissions within the city (Campel 2004: 18). Shortly after the implementation of these transportation corridors and after experiencing their undesirable effects, neighborhood associations and city planning authorities intervened in order to find and propose solutions for this problem. However, the economic situation at the time made air rights development over highways an impractical solution. Nowadays with rising real estate values for land in prime locations in cities' downtowns, undeveloped parcels become rare, making the unused dead space above highway corridors cutting through city centers increasingly desirable (Savvides 2004: 56).

## **B. Sustainable Urban Development**

Research and practice have proven the feasibility and desirability of air right development over highway corridors. This kind of development is emerging as a valuable type of development that promotes revitalization and sustainability (Campell 2004: 9). Accordingly, the following part of this chapter focuses on the sustainability of Air Right Development over inner city highway corridors.

## **1. Concept of Sustainability**

The sustainability concept offers a practical evaluation framework for urban development. First defined by the World Commission on Environment and Development (WCED) in 1987, "*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*"

A more developed definition by Agyeman, Bullard, and Evans 2002 refers to sustainability and sustainable development as "the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems" (p. 78). Accordingly, sustainable development seeks certain equilibrium between social equity objectives, economic vitality and environmental integrity. This balance is widely illustrated by a Venn diagram (See Figure 3.1) considered as "the overarching visual representation of sustainability" (O'Riordan 1999).

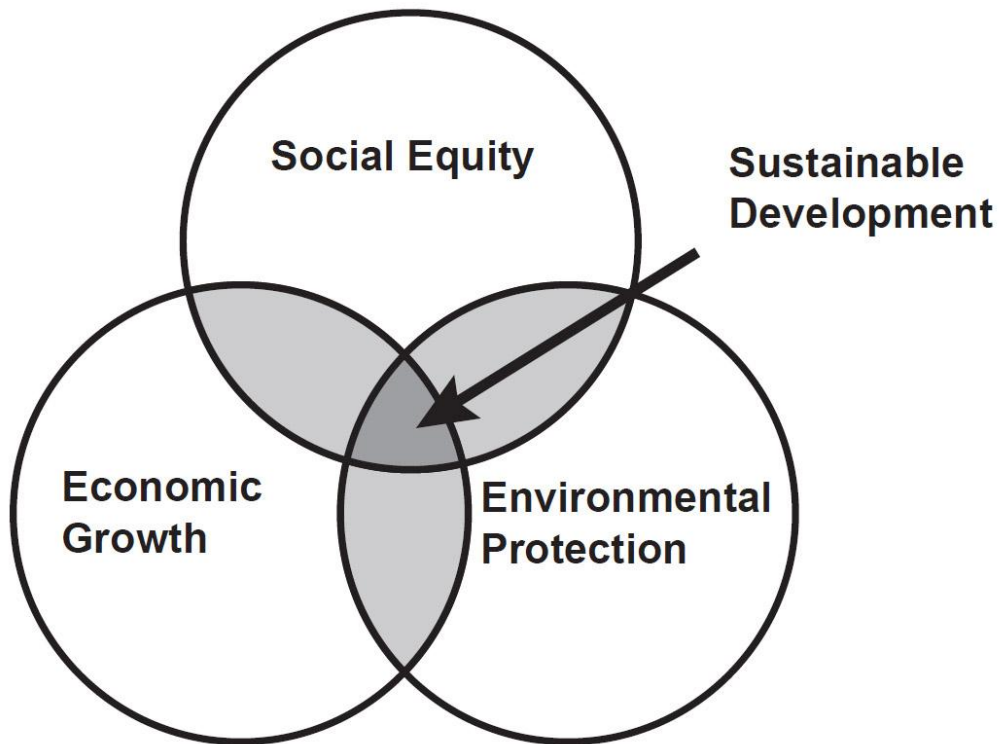


Figure 3.7:simple Venn diagram of SUSTAINABLE DEVELOPMENT THEORY.(Source:The ANNALS of the American Academy of Political and Social Science 2003; 590; 35)

## 2. Sustainable development and its conflicts

The interpretation of sustainability not only differs among scholars but also among planners and their standing from the previously cited goals. S.Campbell (1996) looked at the model and theory of sustainability as a “simple triangular model to understand the divergent priorities of planning” (Campbell 1996: 298), and anticipate conflicts between their interests. Conflict among these goals are neither superficial nor conceptual, they go back to the historic core of planning. (Campbell 1996: 296)

As an academic planner, Campbell (1996) identified these conflicts as “the property conflict” (between planning for economic growth and social justice), “the development conflict” (between planning for social justice and environmental protection), and “the resource conflict” (between planning for economic growth and

environmental protection) (see Figure 3.2). Campbell triangle focuses not only on the conflicts, but also on the potential complementarities of interest between these goals. He saw the planner's role as moving toward the center of the triangle, toward sustainable development ("green, profitable and fair") (Agyeman, Evans 2003: 4).

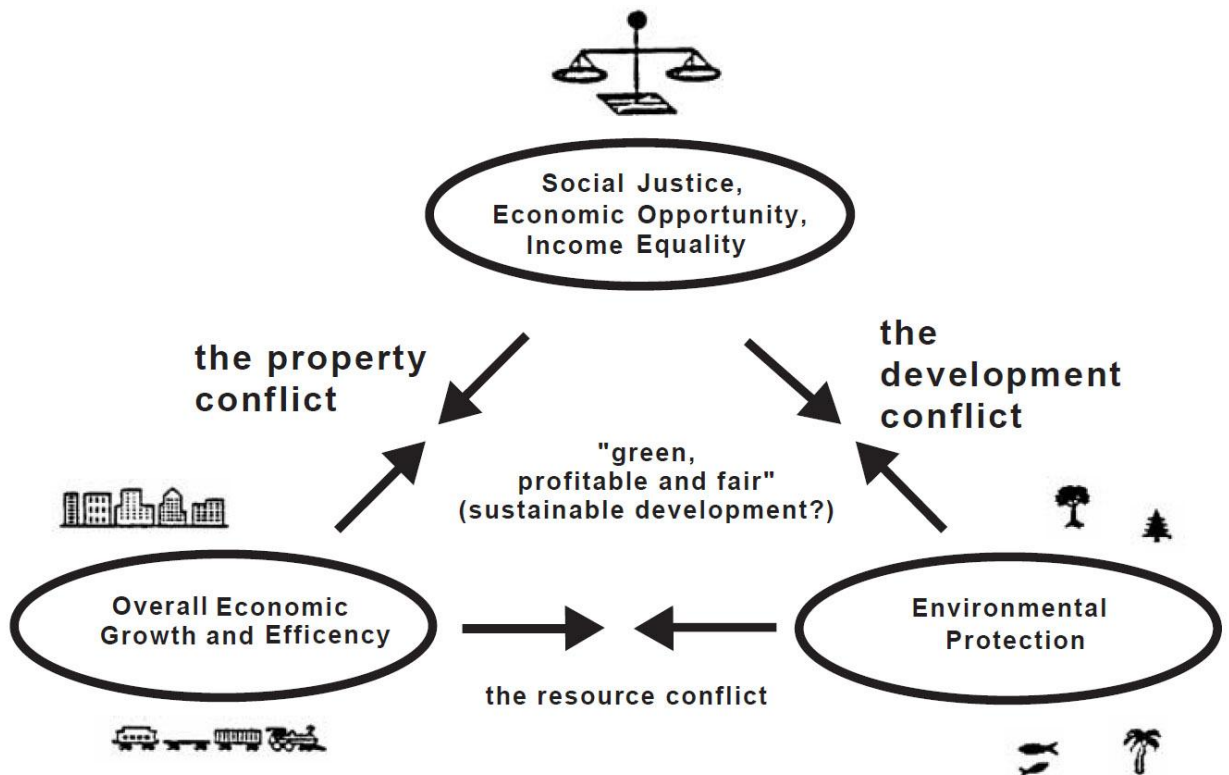


Figure 3.8: SUSTAINABLE DEVELOPMENT AND ITS CONFLICTS (source: Campbell 1996)

According to S.Campbell's interpretation, the sustainability Venn diagram is read as priorities and conflicts, where each priority leads to a different vision of the city.

The following section is based on Campbell's interpretation of the sustainability Venn diagram, and will be used to test the sustainability of each case study and extract a set of best practice as they intersect at the level of the diagram ( Table 1.1).

## ***2.1 Priority points (The Economy, the Environment, and Equity)***

Each of the sustainability priorities leads to a completely different perception of the city. For the economic development planners, the city is a product in competition with others, lead by the market, and shaped by the infrastructure. The environmental planners envision the city as a tumor that poses a threat to nature. For them the city needs to be sharpened by natural feature such as greenways, forests, and rivers basins. The equity planners envision the city as a conflicting zone between its social components where the space of access and segregation is the social space of the community.

## ***2.2 Conflicts***

The divergence in the triangle leads to three fundamental conflicts: The property conflict, the resource conflict and the development conflict.

### **The property conflict**

The property conflict as stated by S.Campbell “defines the boundary between private interest and public good” (Campbell 1996, P: 298). This conflict between economic growth and equity arises from different stakeholder’s use and perception of the property, such as between owner and tenant, developers and long time residents. This tension finds its source in the proper nature of the property. While the property is privately owned, it relies on public intervention, such as zoning to regulate, and guarantee its valuable social evaluation such as value. The complexity of this conflict lies in the fact that each side “needs the other for its own survival” (Campbell 1996, P: 298).

### **The resource conflict**

The resource conflict is a conflict between growth and environment. In this conflict, the debate goes around how much of our environment we are willing to sacrifice to secure a steady growth so that the resource (Nature) will continue to revitalize itself in the future. Societies have tendencies to resist regulation when exploiting the surrounding environment, but at the same time need regulation to protect those resources. According to Campbell, this conflict defines the boundary between the city limit and the natural environment: “the boundary is not fixed; it’s a dynamic and contested boundary between mutually dependent forces” (Campbell 1996, P: 299).

### **The development conflict**

The development conflict is the conflict between the two poles of social equity and environmental protection. This conflict emerges from the difficulty of addressing both the property and the resource conflict at once. Protecting the environment leads to a slowdown in the economy and increases the inequality between rich and poor not only on a local level but also on international level by increasing the difference between developed and undeveloped nation. Most of the time poor urban communities when faced with the choice of development or environment, will take a stand for the development on behalf of the environment. Planners also face challenges on how to choose between implementing regional rail lines that will encourage the suburban middle class to adopt a mass transit option and upgrading the local buss network in the inner city that will help inner city poor in their everyday travel. The first option will have a direct implication on the environment by reducing pollution while the second will make transportation access more equitable. This example shows the dilemma faced when choosing between environment and equity.

Even though strong conflicts emerge between the three triangle points, none of the point can exist alone: “The nature of the three axial conflicts is mutual dependence based not only on opposition, but also on collaboration”(Campbell 1996, P: 300). The triangle center represents sustainable development where the balance of the goals and the conflicts solutions merge. The planner, according to Campbell, must address the challenge of sustainable development in a dual way: 1) to manage and resolve conflicts; 2) to promote creative technical, architectural, and institutional solutions. Therefore planners must while negotiating the conflict procedure, promote a sustainable development vision, and the challenge for them is to deal with the conflicts between competing interests by discovering and implementing complementary uses.

### **C. Case studies**

To assess the ‘development over infrastructure’ as a sustainable urban design strategy, I critically reviewed a selection of projects encompassing large platform urban developments such as the turnpike in Boston and I also investigated architectural superstructure projects developed over highway corridors and railway stations in The Hague. As previously mentioned in the methodology section, S. Campbell triangle of conflicting goals (Figure 3.8) offers a solid base upon which the previously mentioned case studies will be assessed in order to extract a set of best practices for sustainable air right development.

## 1.0 Boston: Massachusetts Turnpike Air Right Development



Figure 3.9: Massachusetts Turnpike cutting through Down Town Boston (source: Campbell 2004)

The Massachusetts Turnpike in Boston provides an excellent case study from which a set of best practice guidelines for air development over highway corridors can be extracted. The originality of the Bostonian experience lies in the fact that it offers an opportunity to trace the highway air rights development over a certain period, and therefore learn from the successive amendments to the original design. The Boston Model includes key planning and design elements that offer a solid comparative ground with regard to the proposed approach in redeveloping the Fouad Chehab ring road area. The fact that it is located in the United State of America enhances the example as it grant planning, design tools, and strategies from a western lens.

Most of the information concerning this development comes from Bonnie E. Campbell's(2004) master's thesis conducted at the Massachusetts Institute of Technology, entitled "Creating Sustainable Air Right Development Over Highway Corridors: Lessons from the Massachusetts Turnpike in Boston". My purpose is not only to use the outcome of this research but also to assess it in relation to the triangle of conflicting goals of S. Campbell (1996).

### 1.1 Historical Background

In the 1950,'s, the Massachusetts Turnpike was built in an attempt to revitalize Boston's depressed economy, and provide direct access to downtown.



With the city's economy recovering during the 1970's and 1980's, the consequences of this development became apparent and various undesirable consequences were deduced, such as: dividing and disturbing neighborhoods, displacing people and businesses, consuming land that would have presented valuable development opportunities, and increasing pollution emissions from automobile dependency (Campbell 2004). With the improvement in the city's economy, demand for space especially in down town increased which raised the land price. Undeveloped parcels become rare, making the unused dead space above the turnpike increasingly desirable to a point where development over the highway in Boston became affordable.



Figure 3.10: Massachusetts Turnpike cutting through Down Town Boston (source:hdtimelapse)

For the purpose of her study, B. Campbell selected three projects, each in different development phase, in order to be able to trace the process for air right development over the turnpike and assess it. (Figure 3.10)

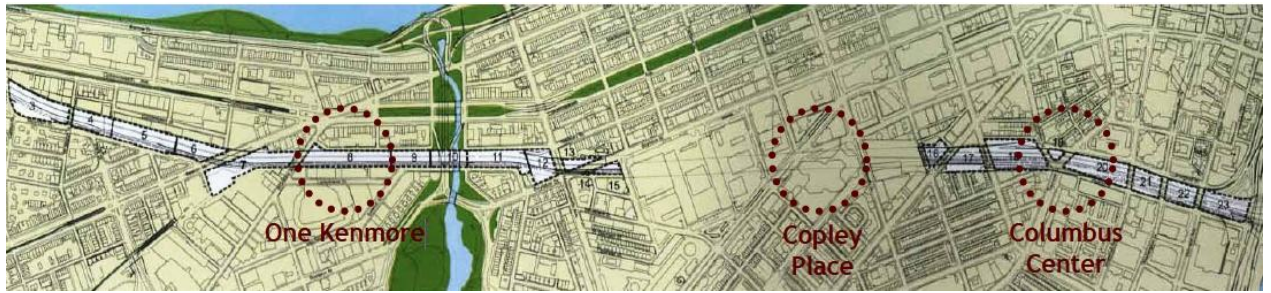


Figure 3.11: Massachusetts Turnpike selected project (source:Campbell 2004)

## 1.2 Copley Place:

The implementation of the turnpike extension into Boston in the 1950's created a barrier between the two existing neighborhoods of wealthy Back Bay and working class South End. After that period several developers unsuccessfully intended to create a feasible project over that portion of the Turnpike Air Right site; they failed because of the site physical constraint and the real estate market that discouraged development. In 1977 with the improvement of the regional economy, development became feasible and the process of developing over the turnpike started with a Memorandum of Understanding between the Massachusetts Turnpike Authority, the developer Urban Investment and the development corporation (UIDC).

In order to avoid a complex, costly and time-consuming process the state decided to work with one developer instead of requesting a development competition. The design and planning that took place in the next three years faced several public protest that forced the developer (UIDC) to engage in a three-year community review process with the surrounding neighborhoods. This review took the form of the Copley Square Citizen Review Committee (CRC), which led to the establishment of certain guidelines that have to do with physical design, land use, jobs, pedestrian circulation, traffic, housing, wind and shadows, and economic impacts.



Figure 3.12: Copley Square 1950's (source: bostonstreetcars)



Figure 3.13: Copley Square 2012 (source:gsd,harvard)

### **Copley Place summary of development attributes:**

The Copley square development is a mixed used development of 316 thousand square meters completed in phases throughout the eighties. Because of the absence of a strong real estate market at that, time the development needed excessive public funding. Nevertheless, it established an antecedent of sustainability in air right development over the turnpike by connecting the development to the surrounding neighborhoods, and by forwarding the following goals and resolving some of the conflicts among them according to the CRC (2004).

### **Copley Place Goals:**

#### *Social Equity Goals*

- Fill a major gap in existing neighborhood and urban texture.
- Maximize the opportunity for community residents and groups to benefit from employment opportunities.
- Create pedestrian links that are appropriately scaled, safe and active.

- Leverage state housing funds to create affordable housing on-site to reinforce the mixed-income residential character of surrounding communities.

### ***Environmental Goals***

- Mitigate potential wind and shadow impacts of development and of the highway corridor.
- Encourage transit and pedestrian amenities to minimize automobile usage.
- Cover and ventilate the highway corridor to reduce carbon monoxide levels in the area.

### ***Economic Goals***

- Compliment and reinforce the commercial character of the surrounding area and not undermine existing retail on Washington Street.
- Generate new tax revenue for the city.
- Create a mix of uses that is economically viable and provides necessary returns to developers and investors.

### **Copley Place Conflicts**

***Property Conflict:*** This conflict arises between social equity and economic growth goals as previously mentioned. In the Copley Place case, the creation of the CRC offered a tangible solution for this conflict by establishing some guidelines of development that developers must follow.

***Resource Conflict:*** In air right development over highway corridors cases, this conflict is not obvious because any intervention that is mitigating the negative impact

of the highway is a plus for the environment. It is a win win situation were economic growth serves the environmental cause.

***Development Conflict:***

In Copley Place case, some can argue that the extensive public funding used to make this project feasible could have been used in social development schemes or to upgrade the existing public transportation system in order to minimize car dependency for suburban residents and thus have a better air quality in the whole city.

**1.3 Columbus Center**

Located in down town Boston over the turnpike between Back Bay and South End the Columbus Center is a 28300 square meter development, comprised over four air right parcels. In 1996, the MTA selected Winn Development of Boston to develop the previously mentioned parcels. Accordingly, the developer started the site design without engaging a community review process, as the Massachusetts general law do not require that for air right development over the turnpike. However, concerns are raised about this particular development impact on the surrounding neighborhoods. Those concerns pushed the Massachusetts Legislature in 1997 to force the Turnpike Authority and the City of Boston to outline a review and approval process for air rights development. This review took the form of a guiding document entitled ‘A Civic Vision for Turnpike Air Right in Boston’.





Figure 3.14: Civic Vision for Turnpike Air Development in Boston (source:CNU)



Figure 3.15: Civic Vision for Turnpike Air Development in BostonGoals(Source:Campbell 2004)

With the adoption of the Civic Vision in 2000, Winn development as specified in the Civic vision presented their design proposal to a community review of neighbor's stakeholders and government representative. This committee rejected the design, which forced Winn development to start all over on a blank paper and conduct a community review process for the next 18 month in order to get the permits and approvals.



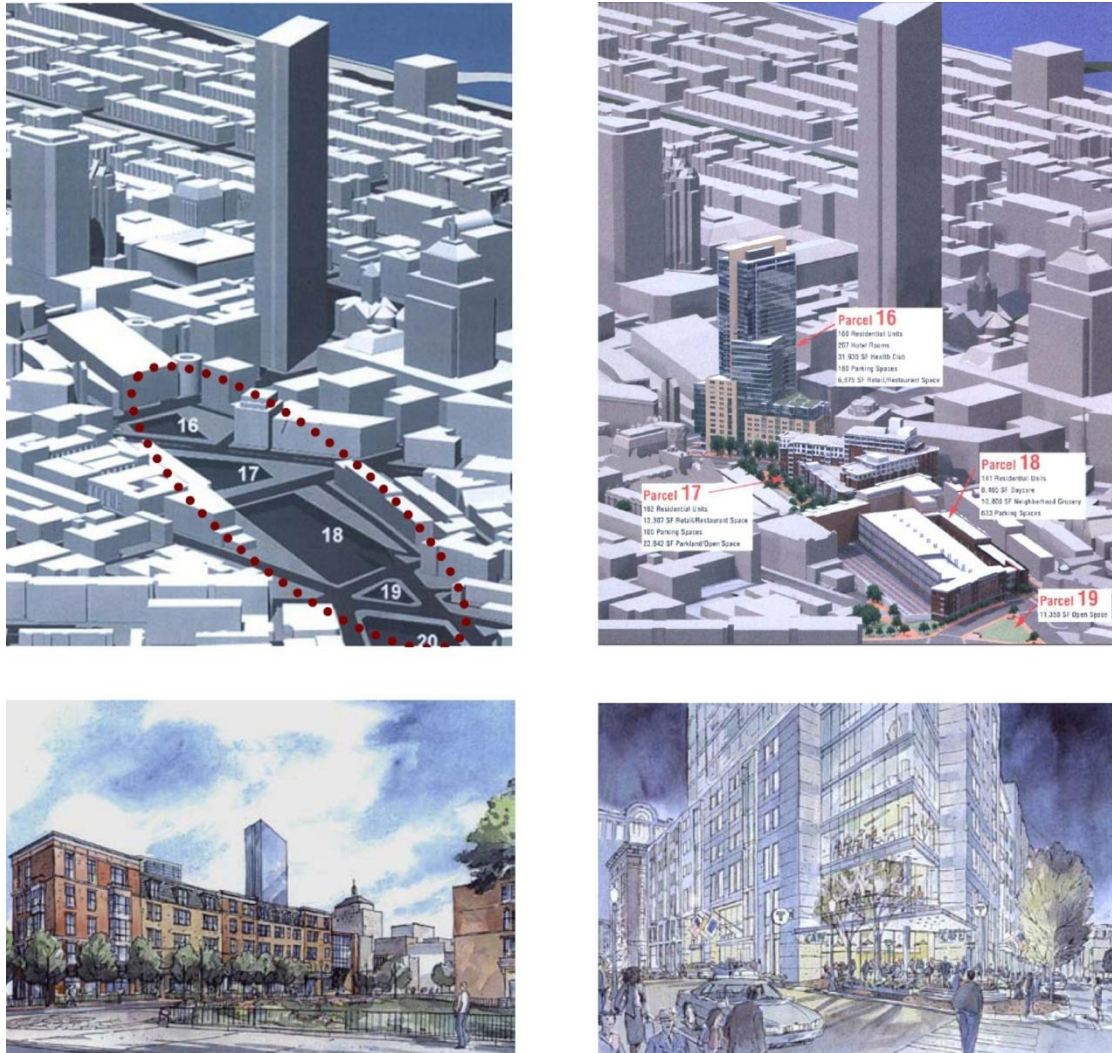


Figure 3.16: Columbus Center Vision for Turnpike Air Development in Boston (Source:Campbell 2004)

**Columbus Center summary of development attributes:**

Columbus center is a mix use development that according to its developer is trying to “transform a three-block long canyon into a vibrant, pedestrian friendly community complete with landscaped sidewalks, residential entries and front gardens, small parks, and retail storefront typical of the surrounding neighborhoods.” (Winn Development Brochure, 2004)

As stated in Winn Development brochure one of Columbus Center goals is to connect the development to the surrounding neighborhoods, not only on the physical level but also on the: economic , social and environmental level. This aspiration makes this



development more than any previous development over the turnpike a prototype for a more sustainable urban redevelopment with the following goals (Winn Development Brochure, 2004).

### **Columbus Center Goals:**

#### ***Social Equity Goals***

- Turnpike Coverage: Replace the canyon caused by the turnpike with three new city blocks that stretch between Clarendon and Arlington.
- Open Space: Create neighborhood parks and open spaces for community use.
- Mix of Uses: Create a mix of uses that serve the neighborhood needs, including housing (10% affordable), grocery store, daycare center, and health club.
- Public Spaces: Promote pedestrian activity and connectivity through streetscape amenities (lighting, sidewalks, planting) and connections between uses (retails spaces, cafes, etc)
- Linkage: provide \$800,000 in new linkage funds to mitigate the impact of the development and promote social equity.
- Community Entrepreneurship: Subsidize commercial rent for local small business owners.

#### ***Environmental Goals***

- Noise: Significantly reduce noise of Turnpike and rail corridors.

- Air Quality: Significantly improve the air quality over the corridor through coverage and appropriate ventilation.
- Wind: Wind will be reduced at many locations due to Turnpike coverage, project design and new street walls.
- Groundwater: ensure that project produces no adverse impact on local groundwater levels by installing groundwater monitoring wells and working with the Boston Groundwater Trust to find long term solutions to the groundwater problem.
- Traffic Mitigation: Minimize vehicular traffic generation through improved transit connections (new MBTA orange line entrance), car sharing, and bicycle lanes and storage areas.

***Economic Goals:***

- Employment: Create 350 new permanent jobs.
- Tax Revenues: Generate \$4 million in new real estate tax revenue and \$1 million in hotel tax revenue.
- Development: Provide developer, equity investors, and lenders with a credit worthy development that provides fair risk-adjusted returns to all parties.

**Columbus Center Conflict**

***Property Conflict:*** In order to resolve this conflict the Columbus Center took advantage of the Civic Vision for the Boston Turnpike adoption in 2000. Never the less, developers were not able to complete the permitting phase without conducting a community review process. Despite facing major problem between stakeholders

during the process, the project was profitable enough and completed the phase because of the high land price surrounding the development

***Resource Conflict:*** In air right development over highway corridors cases, this conflict is not obvious because any intervention that is mitigating the negative impact of the highway is a plus for the environment. It is a win win situation where economic growth serves the environmental cause. In this case, the creation of public open spaces and a park in parcel seventeen contributed not only to cover the highway and mitigate its inconvenient but also to provide a green clean environment for the community an attribute that didn't exist before.

***Development Conflict:***

Because of the high price of land surrounding this development, no public funds were needed in order to compensate the extra cost of developing over the high way. Thus, public fund can be directed elsewhere. This development project not only became a source of revenue to the city through direct taxes ( property tax ) and indirect by providing jobs for the surrounding neighborhoods inhabitant but also resolved a problem generated by a public intervention through the private sector without necessitating public funding.

#### **1.4 One Kenmore**

One Kenmore development is located in Kenmore square over the turnpike, it also include once parcel on terra firma. This terra firma parcel proved to be a “*significant development advantage*” (B.Campbell 2004, P: 30) for the developer Meredith Management since they own it. In this development, the developer is also a key stakeholder on the same level as community groups, the Boston Red Sox, Boston University and the Boston Art Academy. Throughout the design phase, Meredith Management spent large amount of time with those key stakeholders and the authorities in order not just to understand and vet issues in relation with the development program and design but also not to face the permitting complication of the Columbus Center. They also vent the merit of designing plans that “mirror the use recommended in the civic vision” (29). The site is currently facing a seasonal economy in relation with university activity and Baseball Games.

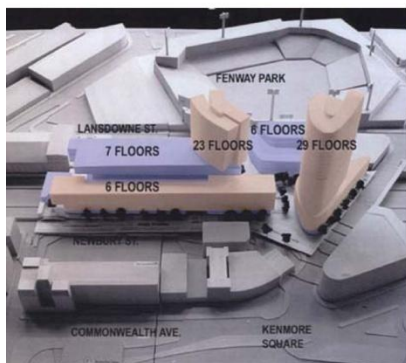
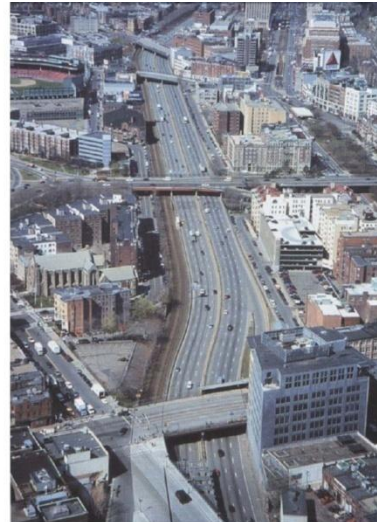
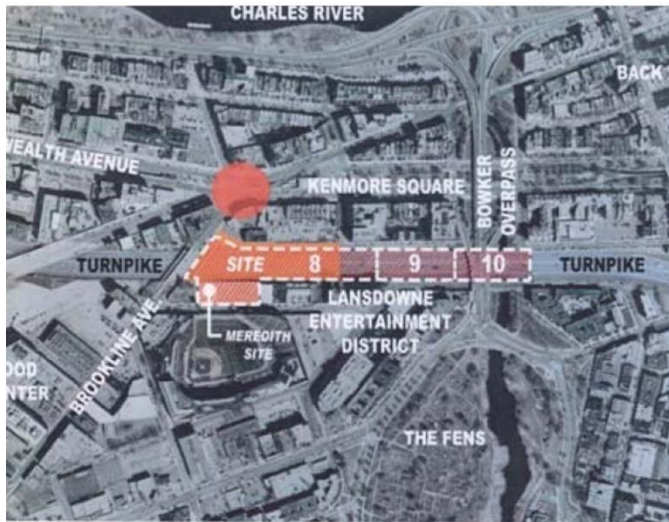


Figure 3.17: One Kenmore Vision for Turnpike Air Development in Boston (Source:Campbell 2004)

## **One Kenmore Summary of Development.**

The developer plan is to create a balanced mixed-use smart growth development in an attempt to revitalize adjacent area. For that purpose open space, public plazas and pedestrian connections are center to the development plan. From the three case studies explored in Boston, One Kenmore is the one that goes the furthest in promoting the highway air right as an opportunity for a catalytic form of urban development, beneficial not only for the developed parcels but also for the whole neighborhood. One Kenmore promotes connections not only with the neighborhood but also with the city public transportation system (MBTA). They also went far in addressing a more sustainable and green development through the Leadership in Energy and Environment Design (LEED) certification. For Campbell (2004, P: 33) the developer worked on the following goals while designing the project:

### ***Social Equity***

- Deck over 108,000 square feet and rail corridor.
- Activate a blighted section of Newbury Street with housing, restaurant and retail space.
- Create a year round neighborhood that currently suffers from seasonal economy.
- Establish public realm benefits including pedestrian plazas, pocket parks; improve sidewalks and bikeways.
- New affordable rental and homeownership opportunities on-site ( 50 units) and a capital contribution for 25 additional units off-site.

## **Environmental**

- The project is planned to reduce noise levels on portions of Brookline Avenue, Lands down Street, and Newbury Street due to decking over the Turnpike and rail lines.
- The project contemplates the implementation of Green Engineering and Sustainable Design techniques, including day lighting, waste reduction, passive solar energy, water conservation, etc., and with the further development of design and engineering will investigate the feasibility of Leadership in Energy and Environmental Design (LEED) Certification.
- Minimizes new automobile trips through: integration with the MBTA transit system, improved pedestrian environment/connectivity, support of shared vehicles service on-site (Zip-car), shared parking facilities, and on site bicycle amenities.

## **Economic**

- Approximately \$4,000,000 in new annual real estate taxes which will support City fire, police, schools and other services.
- Over 350 new permanent jobs (retail, maintenance, parking, restaurant, etc.)
- Development is expected to help stabilize Kenmore Square by generating a more diversified set of uses that keep the area active 7-days a year, year-round (versus a seasonal economy based upon local universities, night clubs, and baseball)
- Provide fair risk adjusted return to project investors and lenders.

## **One Kenmore Conflicts:**

### ***Property Conflict:***

Like Columbus Center developers, the developers of One Kenmore took advantage of the Civic Vision in order to resolve this conflict. They also addressed issues in relation with the stakeholders and community review at an early development stage, to understand issues in relation with the development program and design, thus avoiding complication in the permitting phase like the one faced by the Columbus Center development. Owning a parcel on terra firma proved to be a key factor in the developer strategy success, because it allowed a higher flexibility in the design approach to connect the development over the turnpike to the surrounding neighborhoods. It also placed the developer in a better position during the community review phase. Despite allocating a large amount of land for the public realm, the project was profitable enough because of the high land price surrounding the development

### ***Resource Conflict:***

In air right development over highway corridors cases, the resource conflict is not obvious, because any intervention that is mitigating the negative impact of the highway is a plus for the environment. It is a win win situation where economic growth serves the environmental cause. In this case, the allocation of a high percentage of land serving the public realm as park and pedestrian connection contributed to not only cover the highway and mitigate its inconvenient aspect but also to provide a green clean environment for the community an attribute that did not exist before. Linking the development to the existing public transportation system will minimize car dependency and thus contribute to a cleaner sustainable environment;



this contribution will be strengthened by LEED certified design and building construction methods.

### ***Development Conflict:***

Because of the high price of land surrounding this development, no public funds were needed in order to compensate the extra cost of developing over the highway, thus, public funds can be directed elsewhere. This development project not only became a source of revenue to the city through direct taxes (property tax) and indirect taxes by providing jobs for the surrounding neighborhoods' inhabitants but also resolved a problem generated by a public intervention through the private sector without necessitating public funding.

### **1.5 Lessons Learned**

The Bostonian model of development over the turnpike is considered to be a leading example in Air Right development over highway corridors. This model not only offers the opportunity to trace cases in different stages of their development, but also is a learning experience with the complexity surrounding its site.

By tracing the development process of the three case studies over the Massachusetts Turnpike in Boston, many lessons were extracted.

### **Policy and Planning Lessons**

The lack of robust regulation and jurisdictional overlap negatively affected the development of Copley Square and Columbus Center. This problem forced the developer in both cases to go through a very costly public review during the design phase for each development in order to pass the permitting phase. The implementation of the Civic Vision in 2000 during the design phase of Columbus Center forced any

future developer to follow certain goals while designing projects over the turnpike. Nevertheless, a community review process will always be needed. The developer of One Kenmore took advantage of the two previous experiences and conducted the community review prior to any design commitment in order to save money and time.

### **Design and Development Lessons**

When Copley Square was designed, connecting the development to its surrounding was not seen as a necessity. This decision affected negatively the development and prevented its intended role of becoming a catalyst for development in the surrounding neighborhoods. During the Columbus Center design phase, a significant amount of time and effort was put by the design team and the community into connecting the development to its surrounding not only physically but also by incorporating uses that complement the surrounding neighborhoods. In One Kenmore, the issue of connecting the development to its surrounding took another dimension because the developer owned a parcel of land adjacent to the allocated Turnpike lots that helped with the high land price to accommodate a design that benefits the community. Significant amount of time was also spent in order to connect the development to the existing road and public transportation network and not disturb them during the construction phase.

### **Sustainability and Environment**

Sustainability and environmental concerns were clearly not focal points when development started over the turnpike. Never the less by just mitigating some highway externalities like noise and pollution the Copley Square development helped in creating a livable environment for the surrounding neighborhoods. Columbus Center took this concept to another level by allocating one of the parcels over the

turnpike for the creation of a public park. From the three developments explored in Campell (2004), One Kenmore proved that air right development over highway corridors is or can be more sustainable and beneficial than any other development. In One Kenmore, many of the sustainability development conflict were positively addressed: the public realm was significantly extended, pedestrian connectivity was reinforced and more important the development was financially viable and didn't need any public funding. From the three developments, One Kenmore was the first to promote sustainability as core to the design; it's a LEED certified project.

As explored, the development process over the turnpike through time shifted from a financial target oriented development in Copley square to a sustainable auto sufficient development in One Kenmore.

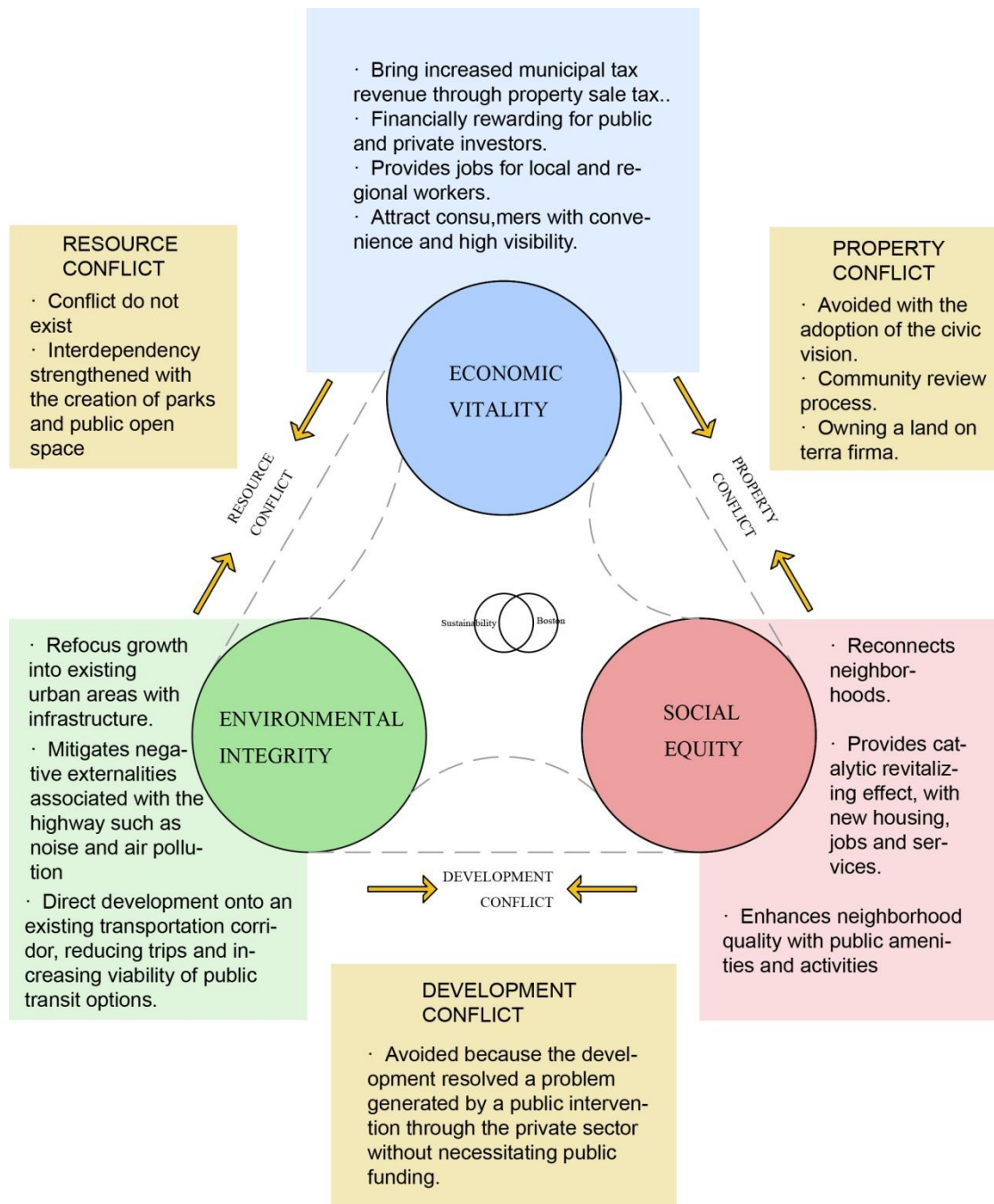


Figure 3.18: One Kenmore Vision for Turnpike Air Development in Boston Sustainability diagram

## **2. The Hague**

In continuity with the platform development concept explored in the Boston case study, the following part will explore superstructure development over highway and transportation corridors. For that purpose, three case studies were selected in The Hague city in the Netherlands.

The two cities adopted two different strategies for dealing with the highway while intersecting with the urban fabric. In Boston, they hid the Turnpike by covering large portion of it with developable platforms. In opposition, The Hague opted for a smaller scale of intervention and relied on the power of one building to connect and transform its surroundings while focusing on the design to reinforce the trace of the highway.

### **2.1 Historical Background**

The three development project chosen in The Hague are all located in one area above the highway. This zone was subjected to heavy bombing during the World War II and had been extensively damaged. This offered a decade later an opportunity to align the highway right of way through this area. The city expanded over the years around that corridor, and suffered externalities related to the highway environment like pollution, noise, and rupture in the urban fabric. In the 1990's and in order to address the highway related problems and to revitalize the area the city of The Hague commissioned the Spanish urban designer Juan Busquets to develop a master plan for the area while several architects were asked to design allocated buildings.

(Savvides 2004)

## 2.2 Malietoren



Figure 3.19: Maleitoren Building (Source:vno-new)



Figure 3.20: Maleitoren Building (Source:vno-new)

According to Savvides the master plan vision for Malietoren was to “make a city gate with two unique identities on the two sides of the building” (Savvides 2004, P: 12) and to mark the crossroad intersection underneath in the architectural design. Savides further describe the building:

“The height of the tower was therefore important in marking this location as a point of reference in the urban context. The trapezium elevations of the two facades sought to create a false three-dimensional perspective, giving the building depth and reinforcing the directionality of the highway. This perception applies to both the building occupants and the highway users. Whereas the former are made aware of the fact that the structure is sitting on top of a heavily used highway, the latter, due to the transparency of the building from front to back, are made aware of passing through the building” (Savvides 2004, P: 12)

This Building, designed by Crouwel Architect from Amsterdam and completed in 1996, accommodated 18000 m2 of offices over twelve levels, five levels of parking and a conference center. The Confederation of Netherlands Industry and Employers (known as VNO-NCW) which is the largest employers' organization in the Netherlands and its affiliated association occupy the office levels.

### 2.3 Equinox

The master plan requested for the development of this particular location: a complete transparency toward the Utrechtse baan highway, to define the street line of the bridge traversing it, and connect the residential community to the west side to the office district on the east side.



Figure 3.21: Equinox Building (Source:Google Earth)

The building consists of two parallel blocs jointed at two levels by bridges, in order to create the transparency requested by the master plan and to define the vehicular bridge street line. On the ground floor retail and exhibition space are allocated in order to hide the parking level and serve the public in continuity with the streetscape



on both side of the bridge (Savvides 2004). Responding to the development over high way corridor constraints, this 8800 m<sup>2</sup> office building has no foundation it is using the bridge foundation to offset its own weight.

## 2.4 Grostiusplaats

Designed byZwarts&Jasma Architects, the two elevated bridges building concept was to delimitate an enclosed plaza between them serving the multi-use office building around it (Savvides 2004).A number of features were also implemented such as water fountains and gardens in order to minimize highways externalities such as pollution and noise (Savvides 2004). The main purpose behind this project was to reunite an area severely segmented by the highway into one functional entity (Zwarts&Jansma Architects 2014).



Figure 3.22: Equinox Building (Source:zja)





Figure 3.22: Equinox Building (Source:zja)

These buildings are conceived as gateways, both at street level and driving on the Utrechtse Baan. The office blocks are raised two stories above the level of the square in order to create as much openness as possible. A glass entrance and a transparent shop space are all that stand beneath. In order to establish a connection with the ‘canopy plan’ of the urban design, the first office story above the glass structure is set back from the façade (Zwarts&Jansma Architects 2014).

## **2.5 Lessons Learned**

The Hague model of development over the Turnpike can be considered as a leading example for air right development over infrastructure in Europe. It is also a leading example of how a small-scale architecture project can transform an area and give it a new identity. Scale differences between the Turnpike Air Right development and The Hague development make any comparison between their goals irrelevant.

Nevertheless, they share many economic and environmental goals; while the social goal is central to the Bostonian development, it is almost irrelevant in The Hague case

except at the Grostius plaats where the city required the construction of a public housing unit executed elsewhere. Since the area sustained severe damage during World War II and was divided by the implementation of the infrastructure, the property conflict that arise between social equity and economic growth goals did not exist. The area needed a development to exist from social and economic perspectives.

As mentioned in a previous section, the resource conflict in air right development over infrastructure is not obvious, because any intervention that mitigate the negative environment of the highway is considered as positive and serve both the environment and the growth. Since no developments executed over the highway in The Hague necessitated any public funding to make them feasible, the development conflict was avoided and the gateway identity given to the area consolidate the interdependency relation between the social and economic goals by offering the inhabitant an identity that they can identify themselves with.

While both cities, Boston and The Hague, adopted the same urban design tool of intervention, they differed in their vision, scale and social implication. I personally consider the Bostonian development as a form of a more complete sustainable development that goes the furthest to the center of Campbell triangle of conflicting goals because it dealt with most of the site conflicts and completely resolved the entire problems caused by the infrastructure.

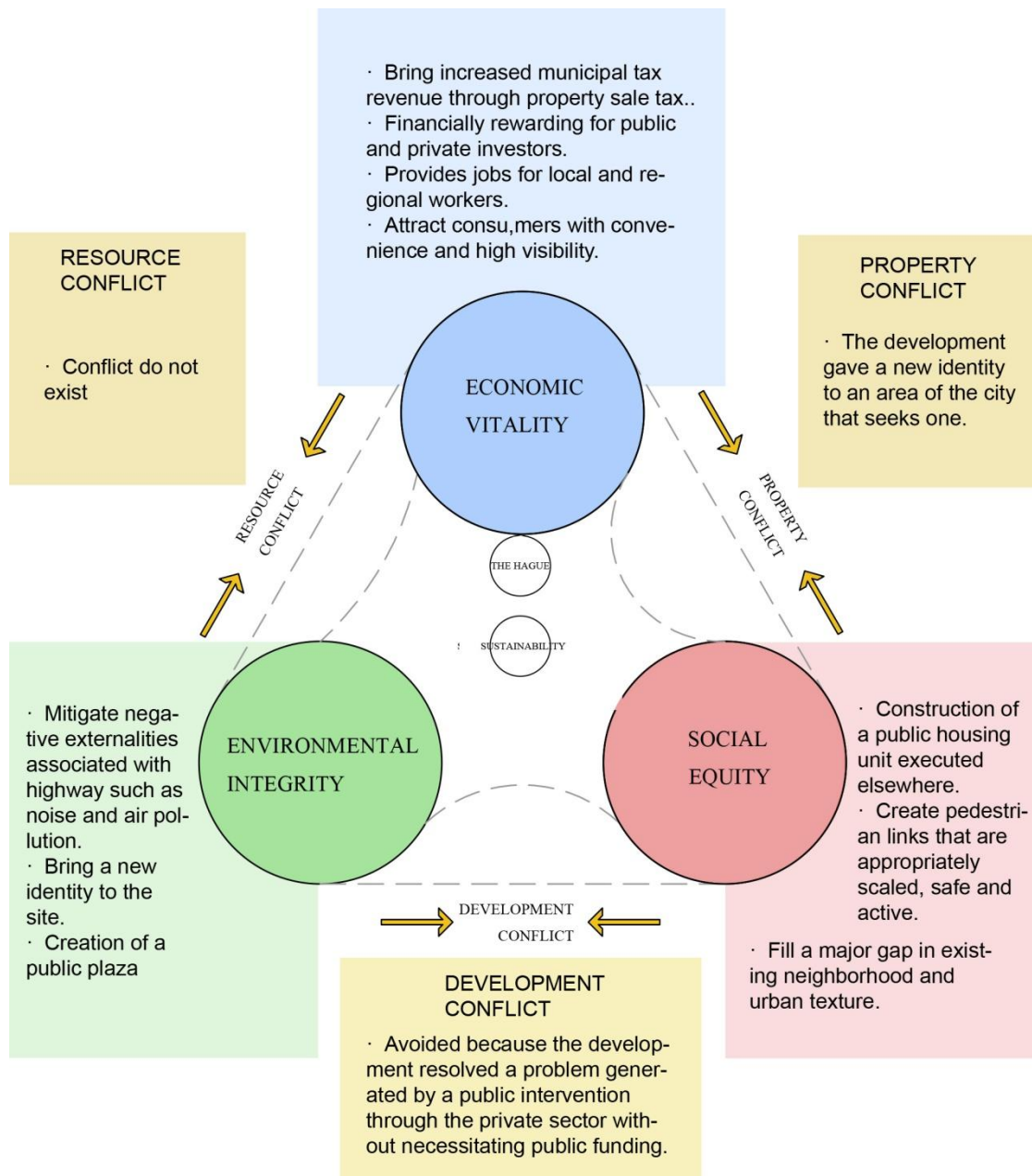


Figure 3.23: The Hague Sustainability diagram

## CHAPTER IV

### CONTEXT APPRAISAL

The following chapter starts by providing a brief introduction of Beirut's urban history, recounting chronologically the circumstances that shaped the city. This introduction is then followed by a site analysis of the existing situation conducted along three tracks: 1) Historical and Spatial Development, 2) Character and Connectivity 3) Community, Policy and Market Appraisal; each assessing the site strengths, weaknesses, opportunities and challenges. Based on this analysis the chapter will conclude by providing guidelines on how to respond to the site problematic.

#### **A. Brief Introduction of Beirut's Urban History**

The area of what is known today as the Beirut Central District and its immediate surrounding has been settled continuously for at least 4000 years. Successive civilization occupied the site, because of its outstanding location on the east side of the Mediterranean, and physical properties that offered a natural deep sea port sheltered from the prevailing winds and military defensible (Beirut Central District , 1997).

The Phoenicians were the first known civilization to take advantage of this location and establish a settlement. In 1400 B.C, Beirut was already known as a Phoenician city evolving around its port. The Hellenists followed the Phoenicians and occupied the site of the earlier city that extended inland from the port.

With the invasion of Beirut in about 10 A.D the Roman re-established the city over the ruins of the Hellenist city (Beirut Central District , 1997). During the Roman era

and the city begun to differentiate itself from its surrounding cities in the eastern Mediterranean. The Emperor Augustus made Beirut an imperial colony thus the city presents at that time all the characteristic of a classic Roman city: City grid pattern, temples and public building. The grid had two main axes, the *Decumanus Maximus* and the *Cardo Maximus*, whose alignment survive today in those of Weygand and Maarad-Allenby streets. The Forum was situated between the Fosh and Alembly street to the south of the Place de L'Etoile( Plan directeur d'amenagement du centre de Beirut). During the Roman era, Beirut was also known for its celebrated school of law.

With the partition of the Roman Empire in the 6<sup>th</sup> century A.D and a series of natural disaster hitting (earthquake, tidal waves .. ) the city its importance receded. During the Islamic era that started in the 7<sup>th</sup> century, Beirut became the military port of Damascus( Beirut Central District , 1997). The crusader followed the Islam era and fortified the city with castles and ramparts. Following the Roman dominance, the city of Beirut didn't grow significantly and was contained inside its wall. It was with the destruction of these walls in the 19<sup>th</sup> century and the implementation of the Tanzimat that were the first modern effort in organizing the city on a European model during the Ottoman period ( early 16<sup>th</sup> to early 20<sup>th</sup> century) that the city started growing exponentially.

The French mandate from the 1920 introduced European notions, including zoning, density controls, and the superimposition of new public space and boulevard development. The creation of the Place de L'Etoile or Nijmeh Square is one of the most notable marks left by the French mandate on the urban form of the city. This square a radial one was partially constructed on the remains of medieval buildings in the area of the ancient Roman forum. This square was consolidated with the

implementation of the Lebanese parliament on one of its side and many financial and cultural institutions on the other sides. Beirut became during the second half of the 20<sup>th</sup> century the financial hub and the cultural place of the Arab world with its renowned university, banks and libraries. It also hosted a very diverse and mixed society, especially in its center that was at that time a microcosm of the Lebanese society. The modern development of Beirut was essentially planned during the 1950's and 1960's, following the independence of the Lebanese republic. In 1950 the "Plan directeur general" was adopted followed in 1954 by the a zoning plan and a construction code that fixed the exploitation, building height and setbacks all over the city. In 1964, a French urban planner M. Ecochard proposed a plan that was adopted for the development of the city of Beirut and its suburbs placing roads and highways as key elements in the city development as it was promoted at that time by the modernist's movement. During the war period from 1975 till 1990 most of the great historic center of Beirut was torn apart, devastated by a war that dismantled its role as a unifying place for all Lebanese from all social and religious categories. With the end of the war in 1990, and in order to regain Beirut's economic, cultural, and regional role the government entrusted a private real estate company, Solidere, to reconstruct and redevelop the demolished historical center. Solidere developed a detailed master plan for the area that covered about 180 hectares of land that previously formed the historical Beirut.

## **B. Site Analysis:**

### **1. Historical and Spatial Development**

From the 1940's until the start of the civil war in 1975, plans for a 3.6km "ring road which was to surround Beirut's expanded city center" were created (Bodenstein 2005: 88), potentially cutting-off the fine grain street networks connecting the BCD to

its peripheral districts (Minet el-Hosn, Zokak el-Blat, Ghalghoul, Bachoura, and Saifi, and Mar Maroun). Accordingly, the Fouad Chehab Avenue (constituting the southern section of the ring road) was planned to bisect the districts of Zokak El Blat, Bashoura' and 'Saifi, and "create a direct east-west link between residential Ashrafieh and commercial Hamra. The avenue construction took place between late 1960s and the early 1970s and required major expropriation and the demolition of around 50 houses in Zokak el-Blat alone. Additionally, In the early 1970s, a new radial road from the city center to the airport – Rue Ahmad Mukhtar Beyhum/Rue Salim Salam [(a through traffic artery situated to the south of the BCD along a north-south axis and perpendicular to the Fouad Chehab Avenue)] – sheared through the east of Zokak el-Blat. Over throwing old property structures and reorienting access ways. In the early 1990's, the launching of the reconstruction of the war-torn BCD necessitated the expansion of the Fouad Chehab Avenue into a highway. In ruin at the time due to the heavy damage sustained during the Civil War years. Accordingly, the period after 2004 witnessed the widening of the Fouad Chehab Highway (double in width) and the addition of two elevated overpasses. Landward, the elevation of the Fouad Chehab Highway through an overpass at Zokak El Blat allowed the Salim Slam Highway to connect the BCD to the airport, as opposed to its adjacent neighborhoods. Seaward, with the opening of the Martyrs' Square Axis after the war and the elevation of the Fouad Chehab Highway at Bashoura, the visual and functional permeability between the seaport and BCD was enhanced. Consequently, the northern edge of the Fouad Chehab highway, previously characterized by a stock of traditional buildings with distinct architectural styles dating back to the 19<sup>th</sup> century, is currently deteriorating under the effect of negative environmental factors and noise pollution related to vehicular transport, and accordingly, awaiting re-development.

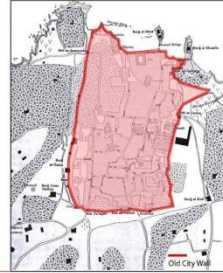


**Intra Mural City: 1841**

City Walls: Protect & delineate the Old City

Urban Fabric: Confined within the walls

Infrastructure: Inexistent

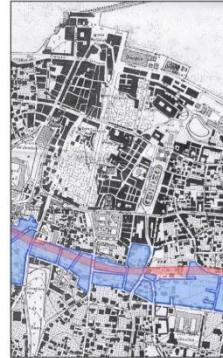


**Pre Ecochard City: 1920**

City Walls: Dissolved & Porous

Urban Fabric: Rapid Southern expansion, existing residential blocks on the future Southern ring road

Infrastructure: Organic & Incremental solutions for vehicular mobility



**Modern City: 1968**

City Walls: Symbolic Blue delineates Old City Fabric but no physical wall

Urban Fabric: Ecochard's implantation enlarged the scale of city blocks & avenues

Infrastructure: First Northern Part of Fouad Chehab Bridge completed



**Contemporary City: 2009**

City Walls: Ring is a new type of wall, delineating 2 different planning systems

Urban Fabric: an interface between block design & lot design

Infrastructure: Aims to repositioning Beirut as a Connecting Center. Doubled in capacity, it provides fast access to the airport & port, East & West Beirut & main central areas.

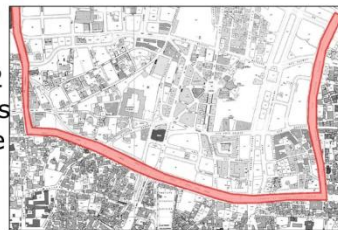


Figure 4.1: Site Historical Development

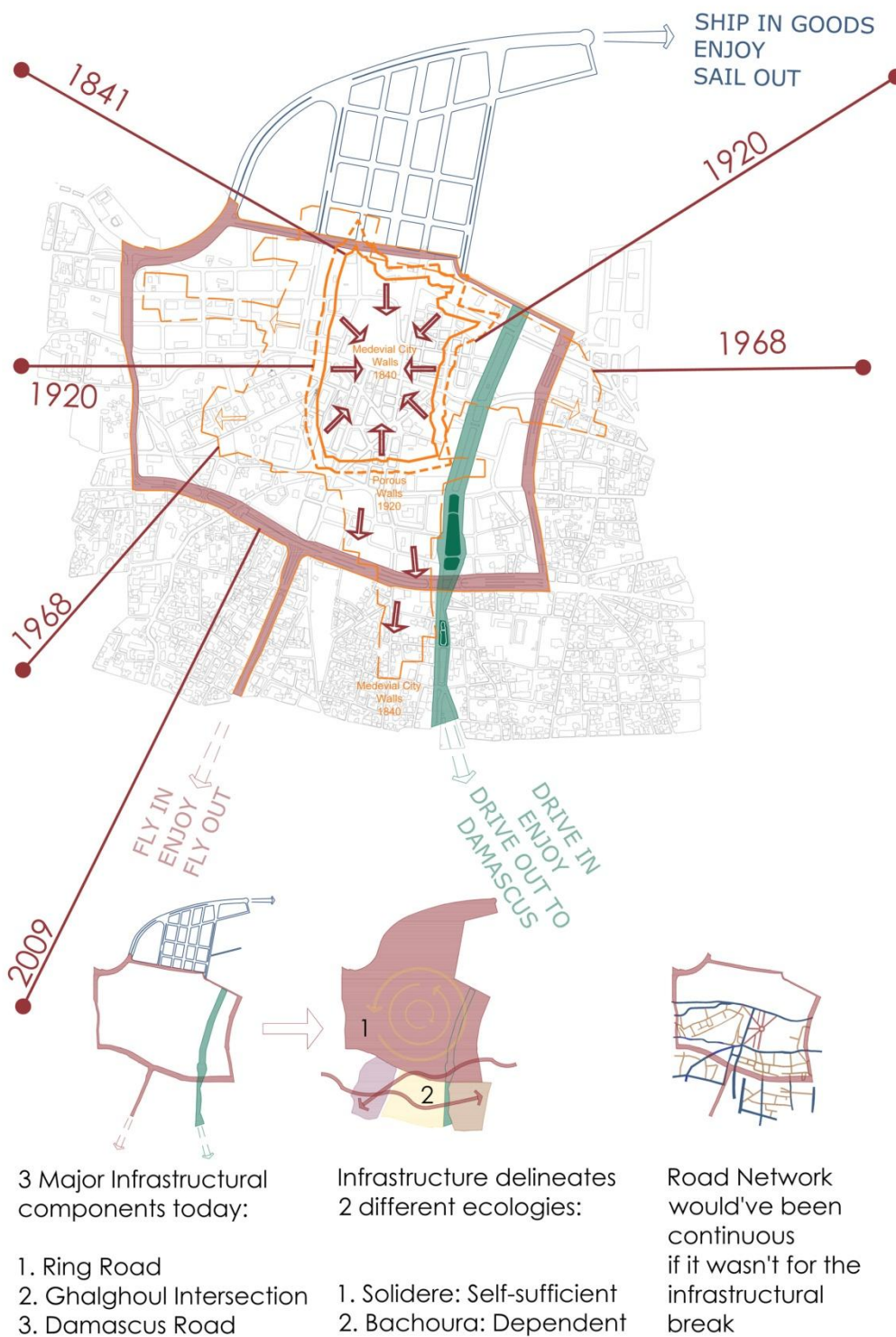
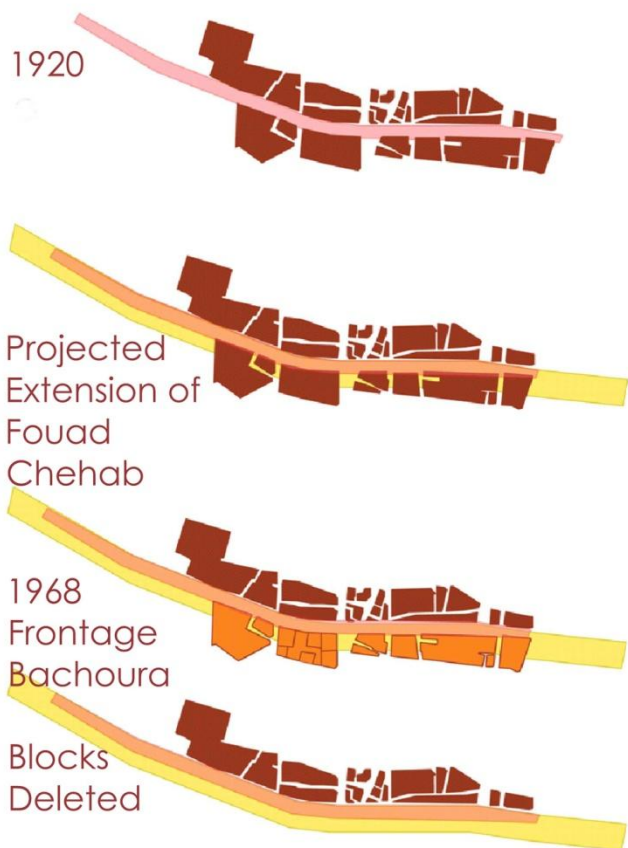


Figure 4.2: Site and infrastructure Historical Development



1920 Skyline: Before the bridge, the Urban Fabric was continuous

1968 Skyline: First Northern Section of Bridge Completed. Continuous urban morphology on both sides

2009: Second Southern Section of Bridge Completed. Discontinuity in the urban fabric

Figure 4.3: **Urban Fabric Historical Development**

## 2. Character and Connectivity

This part will explore the character and connectivity of the site from a land use, morphological and connectivity perspective.

The site picture itself clearly into three adjacent zones (fig 4.4), with different urban characteristic along the Fouad Chehab infrastructure. This avenue cut through three different districts; the BCD on the bridge northern side with Zoukak El Blat and Bachoura neighborhoods on the southern side. The infrastructure, being an entity by itself imposed on the area, has its own topography, moving from ground level to up six meters high when intersecting with the Damascus road and the Ghalghoul intersection. The bridge played an important role in shaping its surrounding environment, creating its own spaces and highly affecting the dynamic interaction between the previously sited neighborhoods.



Figure 4.4: Site zones



## A. Land Use and Morphology

From a land use and morphology perspective, the site is divided into three adjacent zones with distinct character. Zone one encompasses the Zoukak el Blat neighborhood and part of the BCD and zone three encompasses part of the Yessouieh and Saifi neighborhoods have well defined identity each; zone two that contains large undeveloped parcels shows a clear lack of identity and cohesion in the urban fabric.

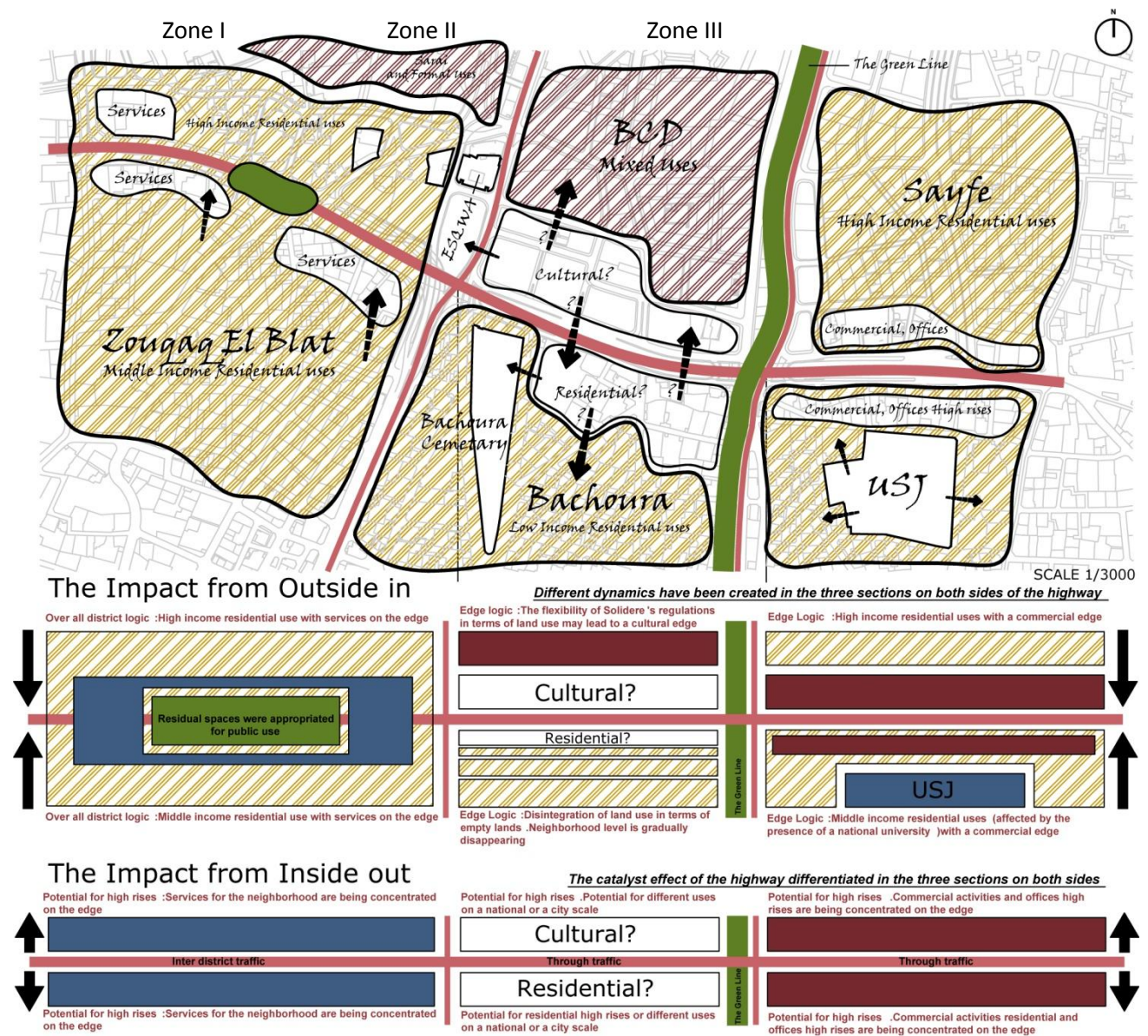


Figure 4.5: Infrastructure impact on land use

*Zone I: Zoukak el Blat section.*

The Zoukak el Blat neighborhood forms a distinct zone, that overlap the infrastructure and differentiates itself from the two other zones, because of the underpass that diverts the through traffic from the area, having an overall positive impact on the district logic. On both sides, services were placed at the edge, facing the infrastructure, while a middle-income neighborhood developed on the southern side of the bridge and a high-income neighborhood developed on the northern side of the bridge because it is a part of the BCD. The residual space between the two distinct sides above the underpass, was appropriated for public uses and transformed into a garden serving both sides. (fig 4.7) Currently both edges are subjected to a high-rise development, which over time will transform the district logic, especially on the bridge southern side.

*Zone II: BCD and Bachoura Section*

The second zone is the area where the bridge's impact is the most visible, clearly segregating functions and uses. Vast undeveloped land exists on both sides making this place the most suitable for development in the area. While the BCD side will host mixed-use high-end development according to the BCD master plan, the Bachoura side is a low-income residential neighborhood subjected to real estate speculation. A cultural edge is developing on the BCD side with the presence of DAR Beirut, a cultural center directly facing the high way. The Bachoura edge is still awaiting any form of development and might turn out to be a high-rise development residential area. The presence of the Bachoura cemetery, the oldest still in use Muslim cemetery in the world, works on giving this area a particular identity. This cemetery used to be located on the edge of the inner city; however, the outwards urban sprawl made the

cemetery in the heart of the capital. Unfortunately, it is an isolated entity with high fences and is only used for religious occasions

### *Zone III: Saifi and Yessouiye Section*

In the third zone, the Saifi and Yessouiye neighborhoods form two distinct entities. On the bridge's northern side, the Saifi neighborhood, a part of the BCD, is a high-income residential zone with commercial and office buildings on the edges. The Yessouiye neighborhood on the bridge's southern side is a middle income residential uses neighborhood where activities are directly linked to the presence of the Universitee Saint Joseph (USJ). This neighborhood edge, like most of the built area facing the Fouad Chehab Avenue, is dedicated to high-rise commercial and office buildings.

District scale land uses prevail on the southern side of the Fouad Chehab Avenue with only the Bachoura cemetery working on a city scale and the USJ on a national and regional scale. The BCD side land use scale works predominantly on city, national and regional scale with the presence of many public and international entities such as the Grand Serial that host the Lebanese government and the ESCWA building affiliated to the United Nations (fig 4.6).

On the southern part of the bridge (and this is common for the three zones), we find neighborhoods where preserved traces of the city's old urban fabric, in the form of dilapidating buildings with a high architectural value awaiting redevelopment.

Gardens like the Zoukak el Blat and the Gebran Khalil Gebran work on national and neighborhood scale. While the Zoukak el Blat garden target neighborhood uses, the Gebran Khalil Gebran garden's strategic location on the entrance of the BCD facing



the ESCWA building makes it a highly appreciated area for political demonstration thus it is also used by the surrounding neighborhoods.

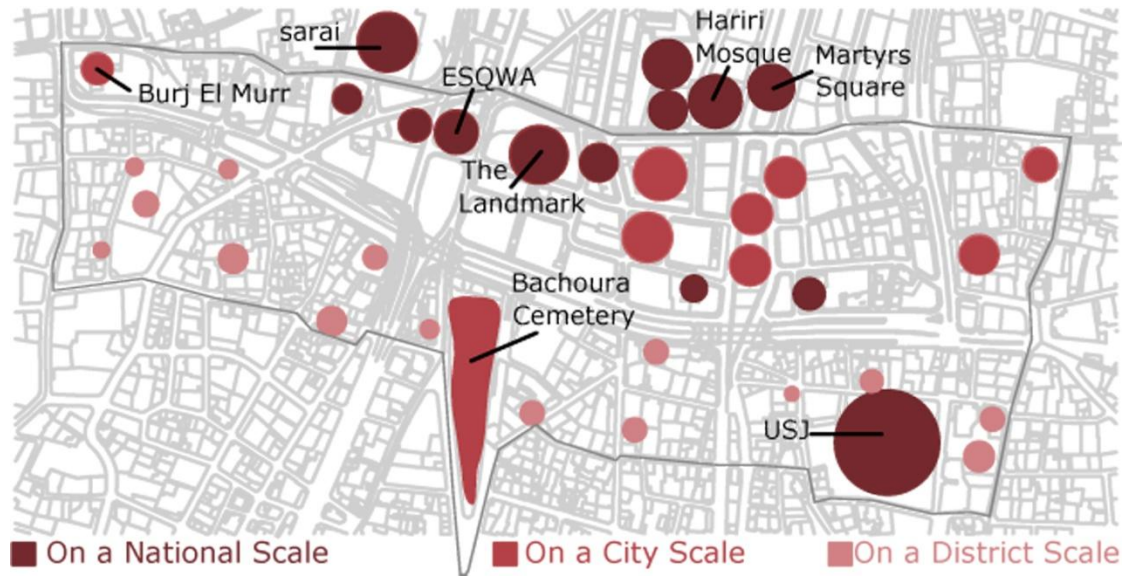
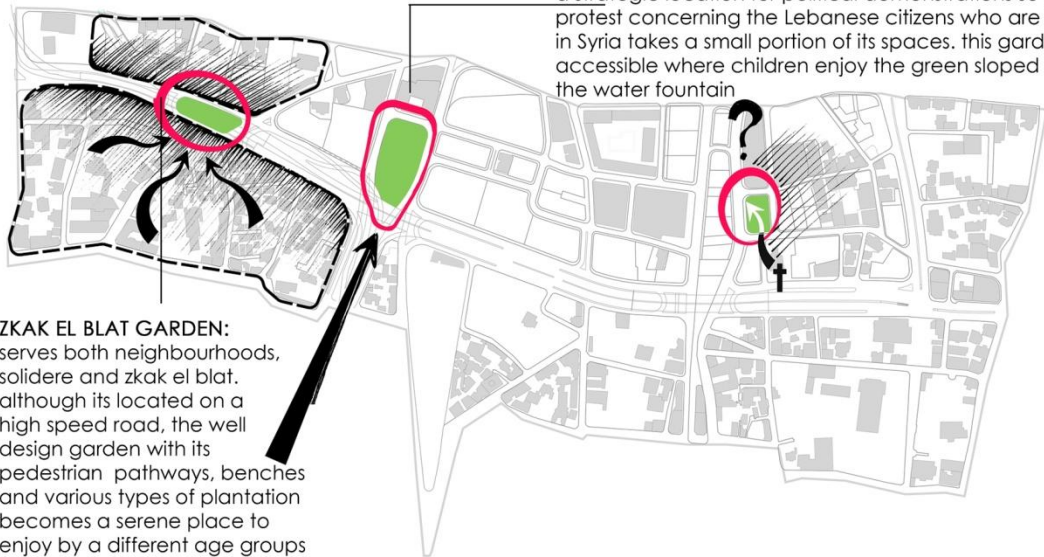


Figure 4.6: Land use on different scale

## GARDENS

### Jubran Khalil Jubran garden:

It attracts visitors on a national and neighbourhood scale, being next to the ESCWA building, this garden represents to a strategic location for political demonstrations so currently protest concerning the Lebanese citizens who are kidnapped in Syria takes a small portion of its spaces. this garden is easily accessible where children enjoy the green sloped areas and the water fountain



**ZKAK EL BLAT GARDEN:** serves both neighbourhoods, solidere and zkak el blat. although its located on a high speed road, the well design garden with its pedestrian pathways, benches and various types of plantation becomes a serene place to enjoy by a different age groups



Zkak El Blat Garden



Jubran Khalil Jubran Garden

Figure 4.7: Gardens

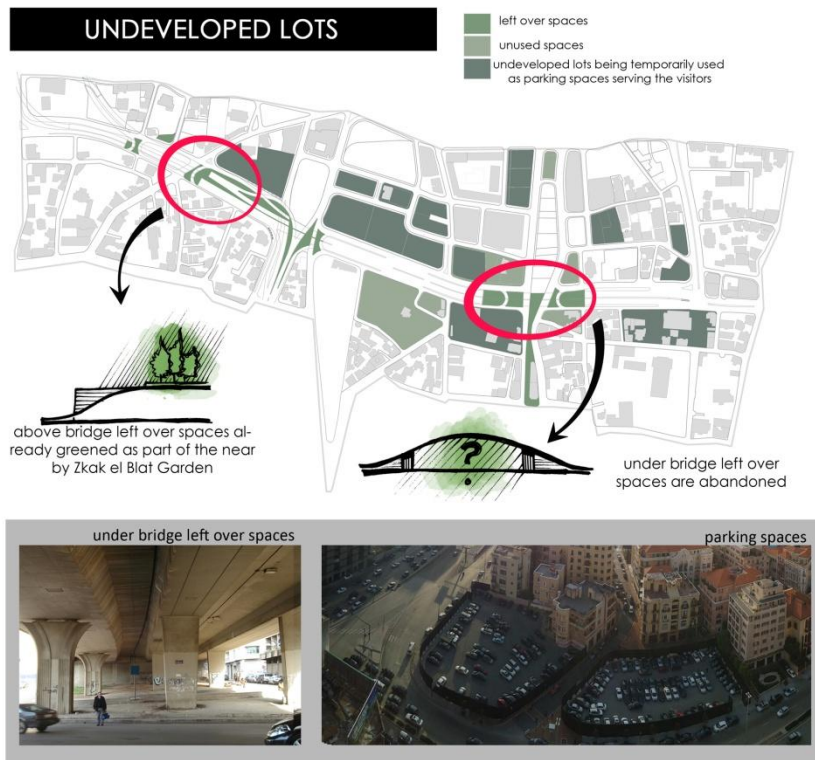


Figure 4.8: Undeveloped Lots

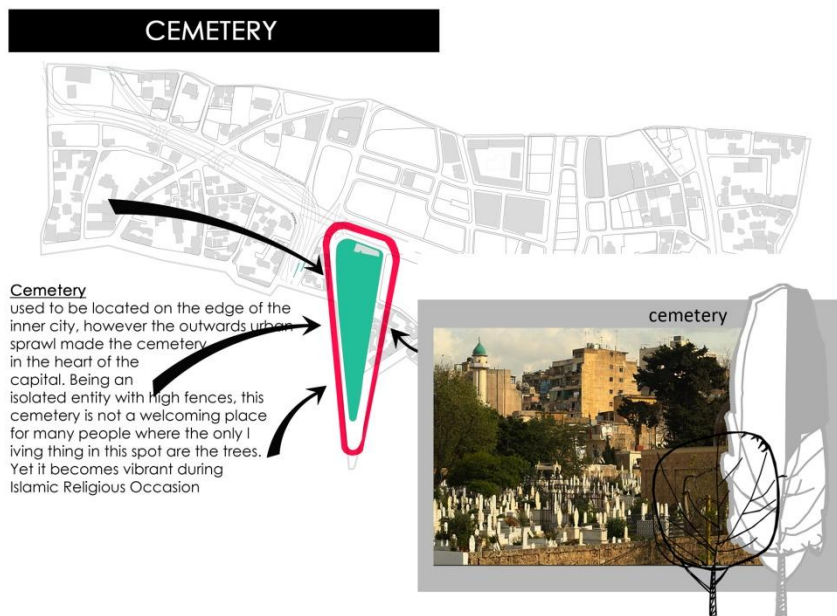


Figure 4.9: Cemetery



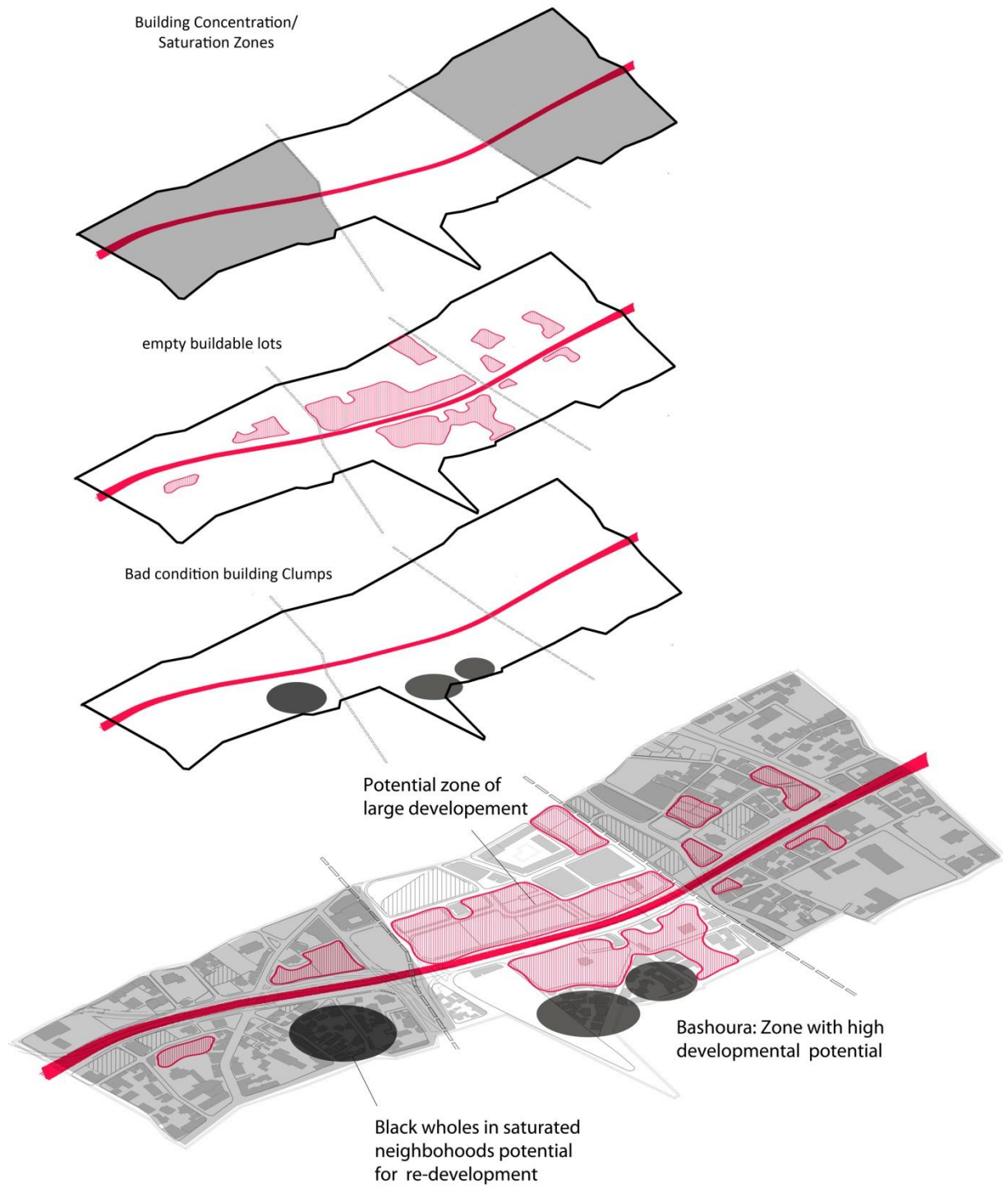








Figure 4.10: Morphological aspect

## BUILDINGS HEIGHTS

**Legend**

	1-3 Floors		12-15 Floors
	4-7 Floors		16-19 Floors
	8-11 Floors		> 19 Floors

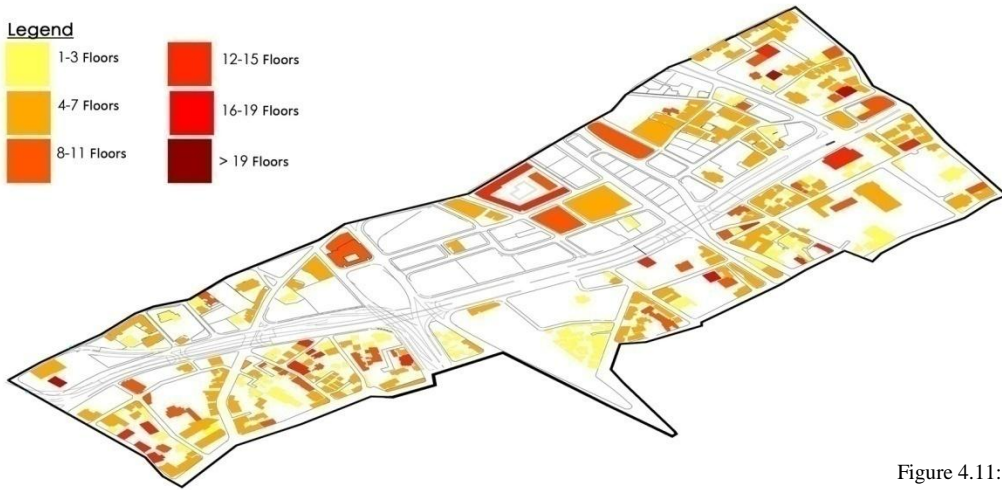


Figure 4.11: Building Height

## BUILDING CONDITIONS

	Good Conditions
	Bad Conditions
	Buildings of Heritage Architectural Value

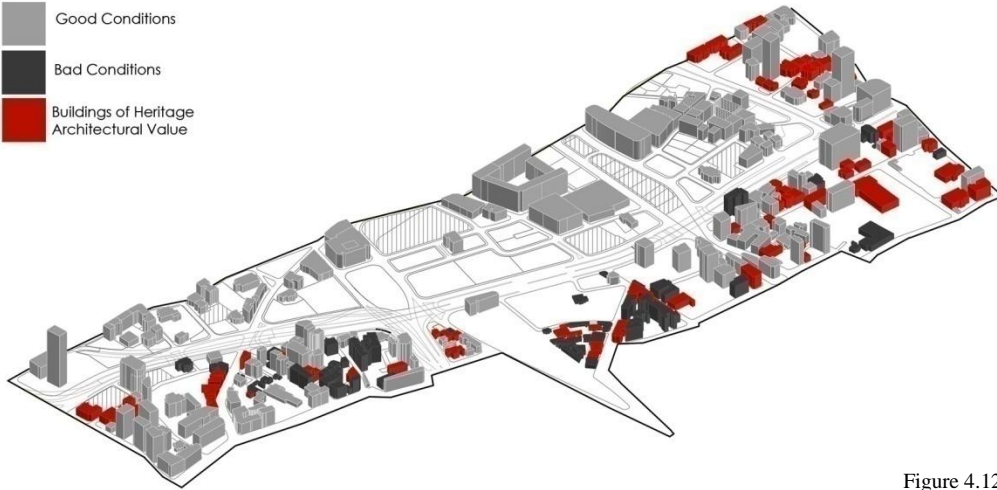


Figure 4.12: Building Conditions

## BUILDINGS UNDER CONSTRUCTION

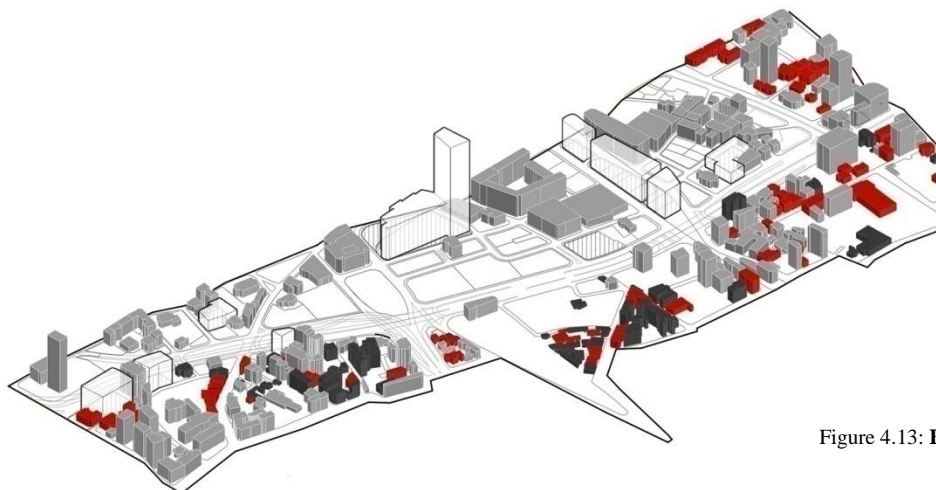


Figure 4.13: Building Under Construction

## **B. Connectivity:**

From a connectivity perspective, the site plays a key role in the national and city scale vehicular transportation network. With its strategic location it is the point of convergence for more than three national highways among whom the one leading to the Beirut port and the airport. It also plays a key role in the city road network serving most of the Beirut neighborhoods such as Hamra, Achrafieh, Ras Beirut, and the BCD. Like in the previous category, the site also depicts itself into three adjacent zones penetrated by two major axis/road: the airport highway and the Damascus road. (Fig 4.14)

In Zoukak el Blat neighborhood the vertical separation between through and access traffic reduced the highway impact on the neighborhood and kept both sides connected. In the middle section, which is also the most problematic one, a vital horizontal separation exists between through and access traffic. That separation accentuates the break presence, disconnects road networks on both sides and emphasizes the separation between the BCD and the rest of the city. In the third zone, a partial separation exists between through and access traffic on the intersection between Georges Haddad Avenue and the Fouad Chehab Avenue, while a vertical separation exists between the last sited Avenue and the Damascus Road.

Even if the site is well connected to the vehicular road network, it is neither well served with the mass transportation existing network, nor pedestrian friendly and frequently on peak hours huge traffic jams occur on both sides of the bridge.

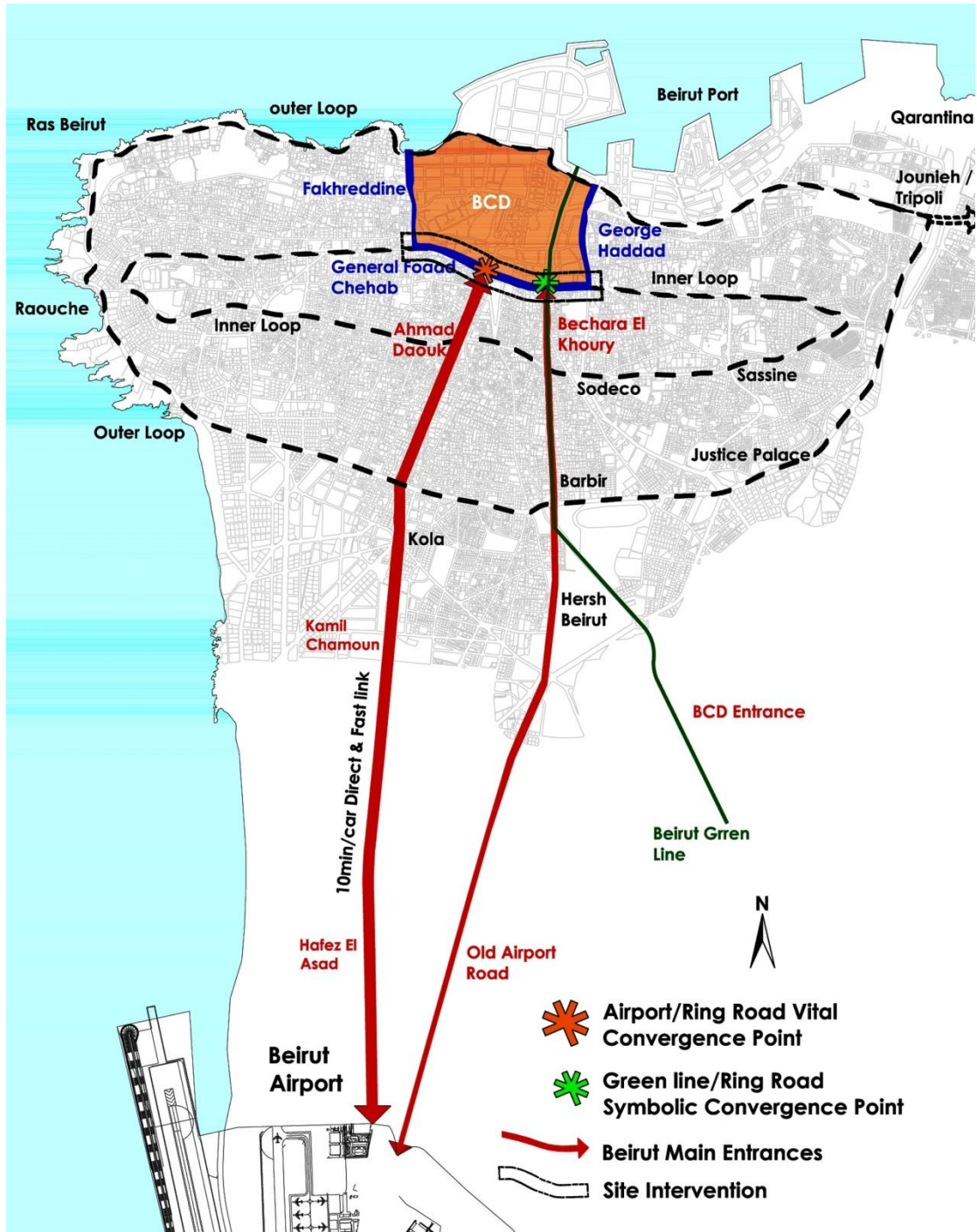


Figure 4.14: Site within the city circulation network



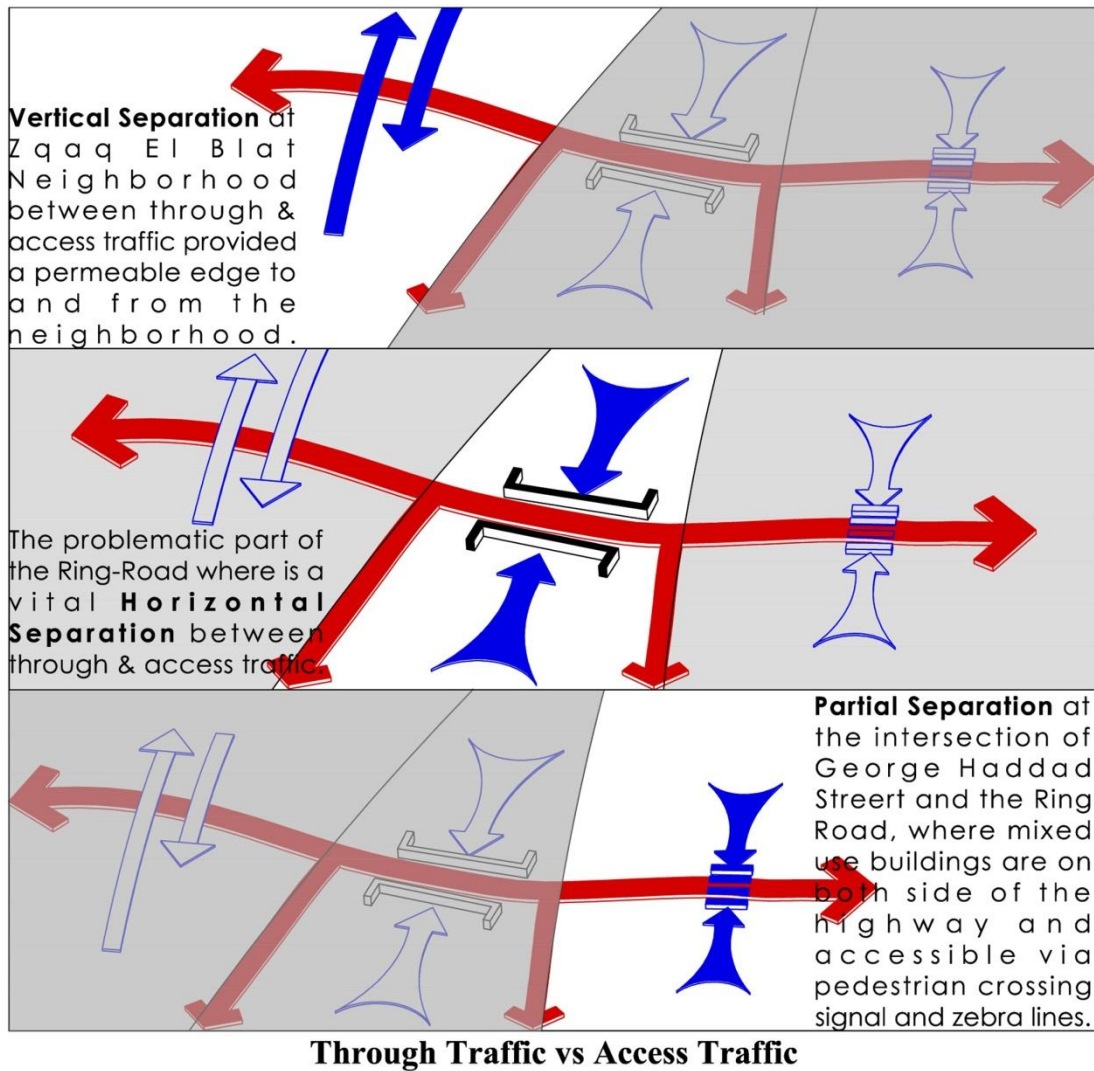
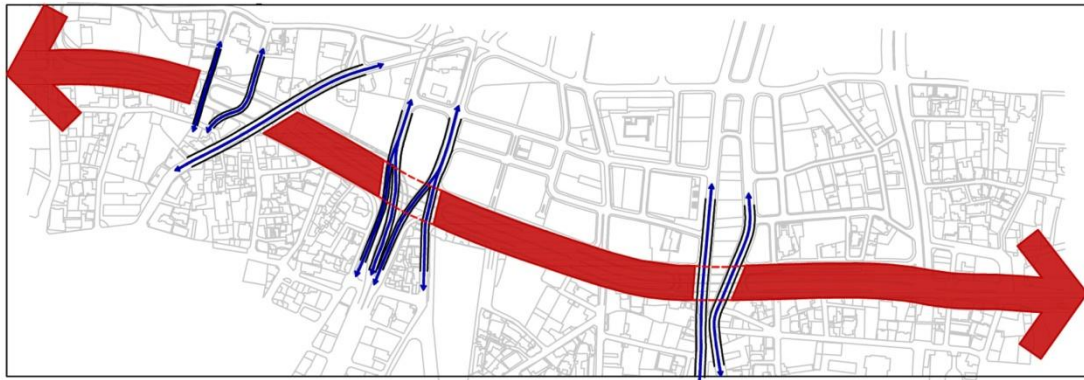
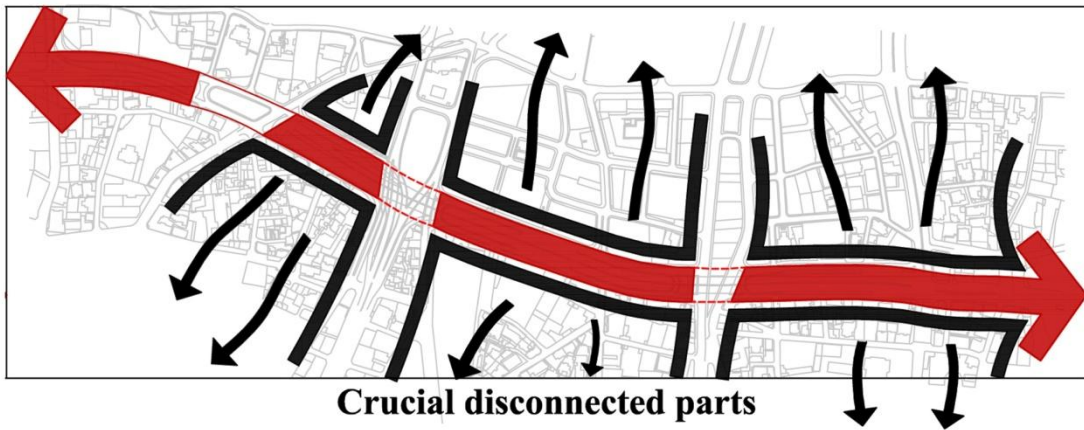


Figure 4.15: Site traffic analysis

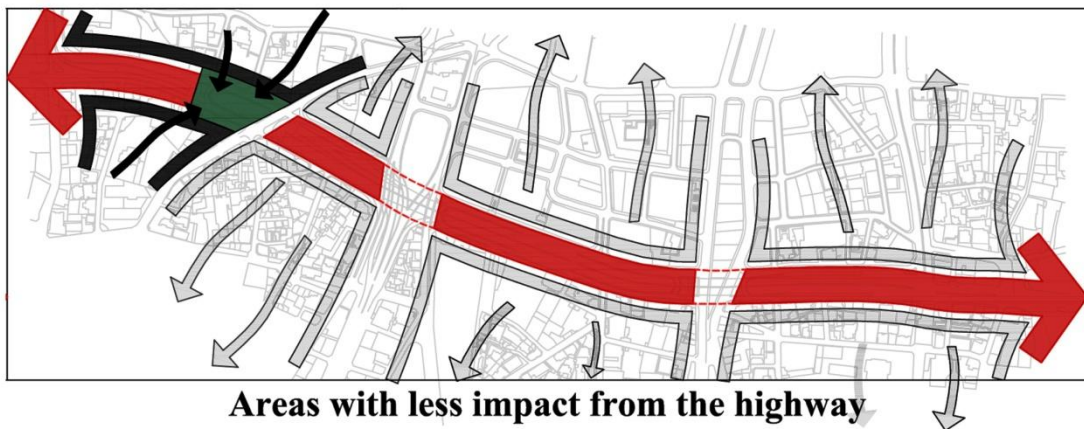
## Site Connectivity



**Vehicular Permeability**



**Crucial disconnected parts**



**Areas with less impact from the highway**

Figure 4.16: Site Connectivity

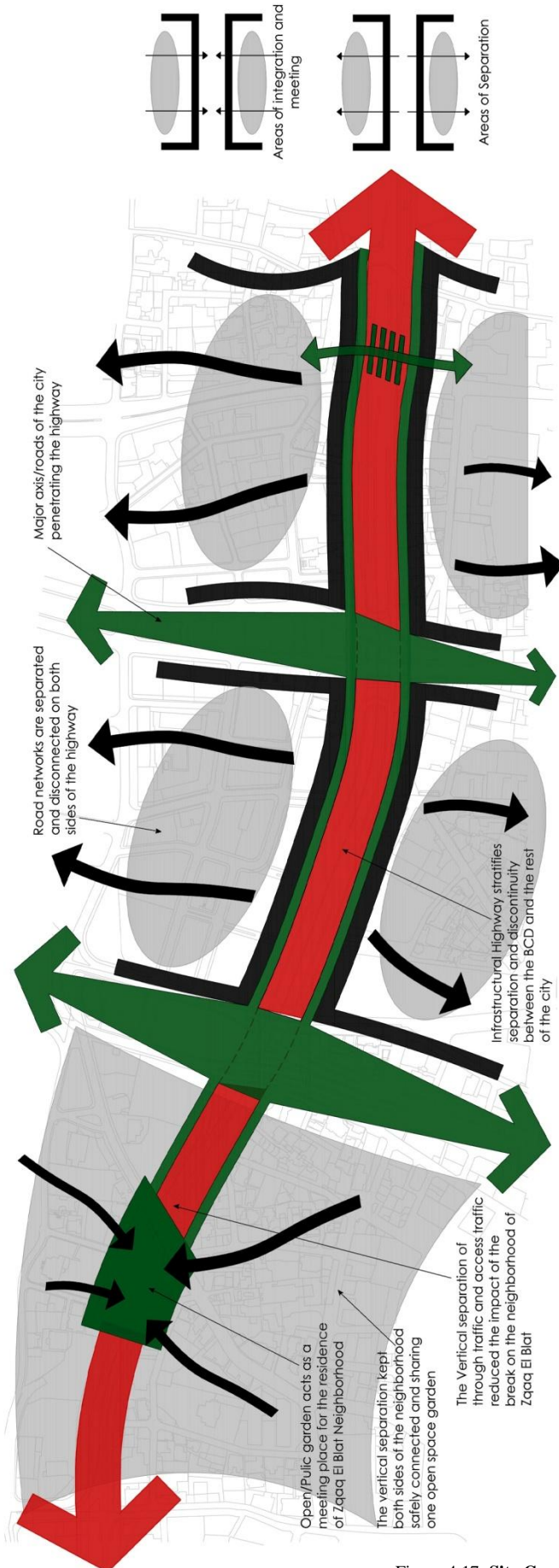


Figure 4.17: Site Connectivity and circulation

### 3. Policy and Market Appraisal.

From a policy perspective, the site is divided into two zones: One is subjected to a homogeneous legislation governed by a detailed master plan, the BCD area; the other is subjected to blanket zoning like all the districts in the city of Beirut.

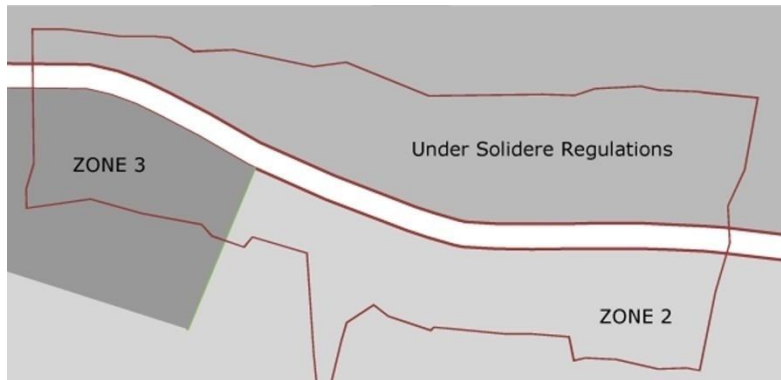


Figure 4.18: Zones and Regulations

The southern side of the Fouad Chehab Avenue is governed by a blanket zoning master plan, and is divided into two zones, that have one of the highest FAR in the city of Beirut (Fig 4.19), with no restriction on the building height except the building envelope law (Fig 4.19).

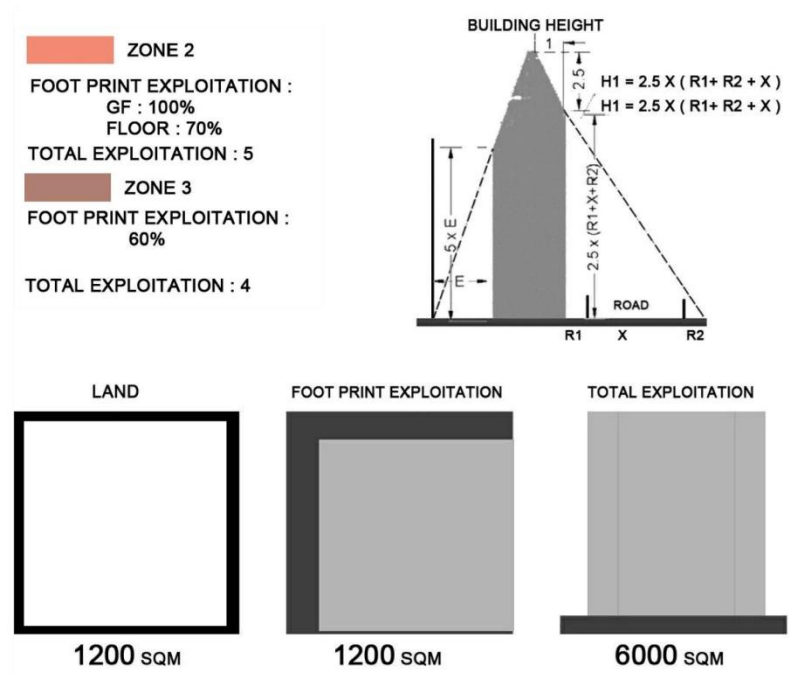


Figure 4.19: Zones and Regulations



On the northern side, SOLIDERE developed a detailed master plan with district and sub-district zones, limited building height and FAR, and established characteristics and land uses for each area( Fig 4.20).

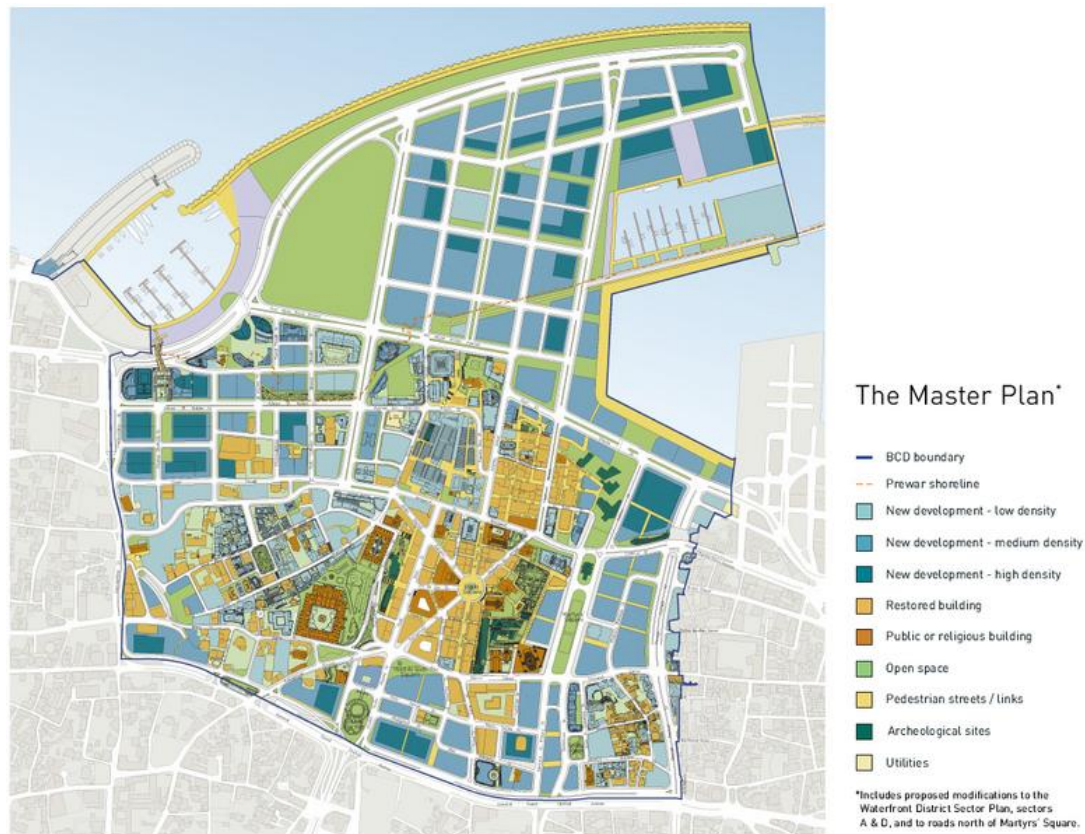


Figure 4.20: BCD Master Plan

By duplicating the original bridge on the Fouad Chehab Avenue in width, SOLIDERE intended to isolate the BCD from the rest of the city. This action created an interface zone where private developers took advantage of this decision and of the existing building law in order to go higher in some area on the avenue southern side. This, in term, will create a line of high-rise buildings along the southern avenue edge that will look like a wall. Developers also will use the gap created by the avenue to sell the view, not only on the avenue, but also on the well-planned BCD. Because of the high FAR and the opportunity to go higher this part of the city is subjected to high real-

estate speculation, which has a notable implication on the land price. Prices varies on the southern side of the avenue from 5000 USD per square meter in the inner neighborhood of Zoukak el Blat and Bachoura to 18000 USD per square meter on avenue frontage and in the BCD (Fig 4.21).

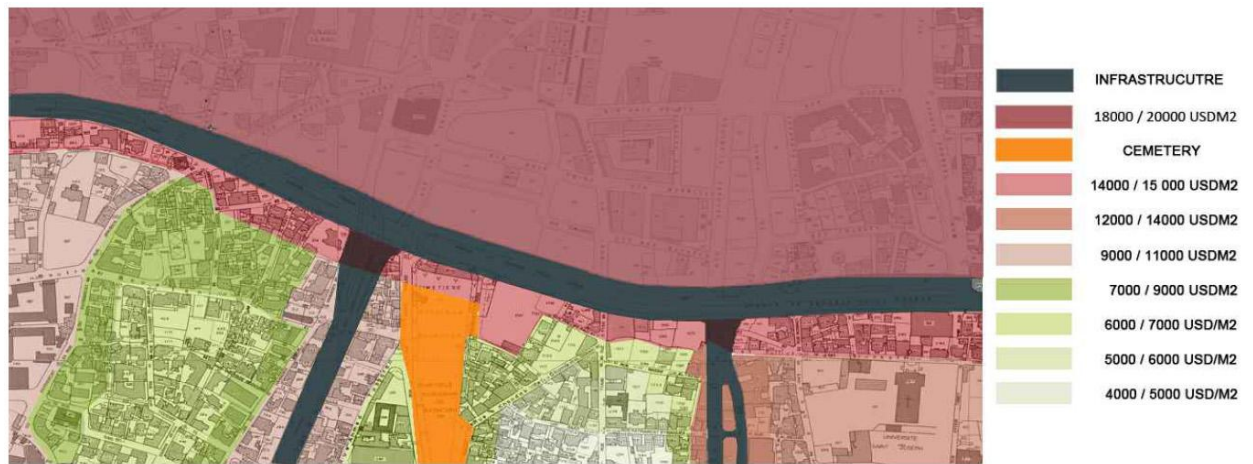


Figure 4.21: Land Price

### C. Diagnosis:

Following the research and on site data gathering as well as further analysis; the design studio identified the site as a dysfunctional connector with a high-density development potential on both sides. This infrastructure is currently negatively affecting the surrounding areas and neighborhood and not playing the role it was intended to.

In order to find a solution for current and future problems the studio proposed to:

#### A. Transport:

- Create pedestrian and public transport oriented centers at key focal points.
- Improve the east-west and north south connection in the three identified zones.

- Propose a solution for the heavy vehicular traffic jam on both sides of the bridge on peak hours.

#### B. Morphology

- Work on the physical, social, spatial and morphological connection between both sides of the infrastructure.

#### C. Open Space

- Enhance and connect the current public open spaces in the area and propose future ones.

#### D. Conservation

- Provide a solution to redevelop and connect saturated neighborhoods with high architectural value to their surrounding especially in Bachoura and Zoukak el Blat.

#### E. Mixity

- Propose social activities that promote mixture between the population, regardless of religious and social ranking.



## CHAPTER V

### URBAN DESIGN INTERVENTION

This Chapter presents the initial design intervention for the Fouad Chehab Avenue and the design sustainability assessment. The first part begins with the initial urban design proposal for redeveloping the area, initiated with a personal vision for the site redevelopment, and mostly based on site visits and assessment of the current and future conditions completed during the context appraisal phase, yet lacking a solid literature review. Participants in the studio were encouraged during this phase of the studio to work on a vision for redeveloping the site by choosing a direction based on a prominent urban design problem. In my case, the problems of connectivity, lack of open spaces and the absence of public amenities, and transportation were added to the rupture in the urban fabric, and were the focal problems. The concept of air right development over the high way was introduced to solve those issues. Beyond working on one problem on the district level, this proposal further targets urban changes on different scales, focusing on developing air rights over the highway in order to make the implementation of a public transportation system option feasible, thus giving the incentive for a public/private partnership to reach that goal.

Based on the literature review findings, the second part of the research takes a critical distance from the workshop proposal in order to assess its sustainability and its implement-ability in the Beirut context. The result was that this type of redevelopment if used as we did in the design response is more sustainable than similar developments in a western context and can serve to create a redevelopment vision for the city of Beirut.

## **A- Strategic Master Plan**

As previously stated, the design intervention aim to use air right development over the highway as an incentive to, make the implementation of a public transportation system economically feasible in a city like Beirut and to reconnect it to the BCD its newly transplanted heart. In this particular case, selling the highway air right to private investor will contribute to finance the construction of a metro station underneath the Fouad Chehab Avenue. This station will not only serve the intended developments over the highway corridor but also the high-density developments around it.

In this effort of connecting and serving, the zone was divided into four action areas overlapping on both sides of the highway (Fig 5.1). These action areas intend not only to work on the east-west, and north-south, physical connection but also to link the site to the greater Beirut area with the presence of the metro station and to different districts like Achrafieh and Hamra on the east-west connection with the presence of a tramline. The zone will be also served by the current the public bus network with the presence of bus stops along the east-west path, which currently are not available. In these action areas, parking zones will be provided in order to serve the adjacent saturated neighborhoods like Zoukak al Blat, Bachoura, and Yasouiyeh. In addition, public amenities serving the population will be placed in these action areas, like parks, gymnasium etc.

Strategic Master Plan

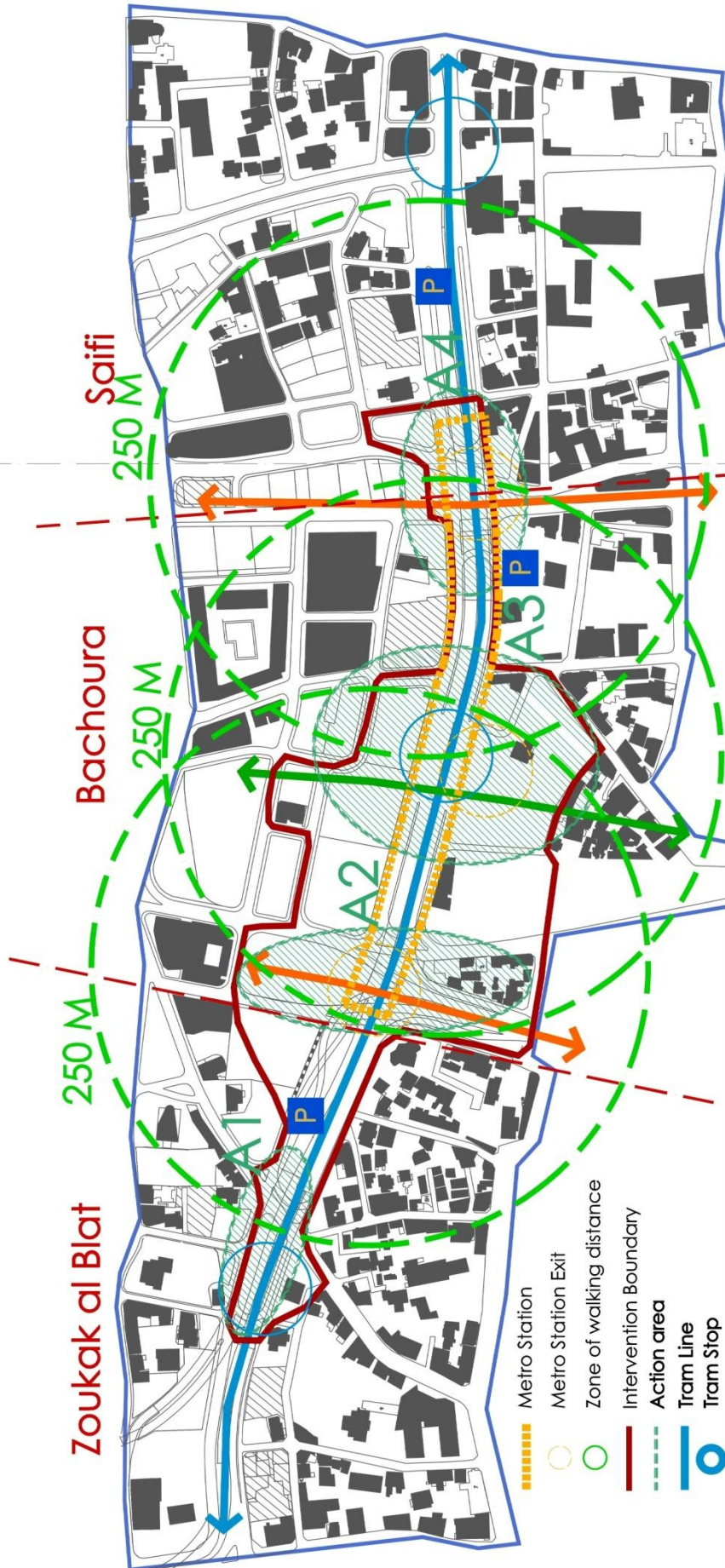


Figure 5.1: Strategic Master Plan

## **Action Area 1**

This action area is located between the neighborhood of Zoukak al Blat and the BCD just above the overpass that deflects the through traffic from this area. The aim of establishing an intervention in this area is to: 1) enhance the connection between the Zoukak el Blat garden and the surrounding neighborhoods, 2) Allocate the space just above the tunnel entrance for the construction of an office building taking advantage of the high exposure of this location facing an eight-lane highway. This location can serve as a HQ for a local or international company seeking this kind of exposure. Also placing this building on that particular section will strengthen the role played by the garden, and transform it from a left over space used as a garden to a square.

## **Action Area 2**

This action area is overlapping on the Ghalghoul intersection one of the most complicated intersection of the Fouad Chehab Avenue from a vehicular circulation point of view. In this area a metro station exit is proposed under the bridge, serving both the ESCWA building, the BCD proposed two high rise tower on both side of the Gebran Khalil Gebran garden and the Zoukak al Blat neighborhood. Also a proposition is made to transform the area limited by the three streets ( Ahmad Moukhtar Bayhoum, Cheikh Toufik Khaled and Patrakyieh street) on the southern side of the ring into a civic platform with the implementation of a city hall, considering that some municipal function already exist in this particular location.

This proposition will strengthen the role of the Gebran Khalil Gebran garden and transform the garden into a square, and will contribute in giving a powerful image to the municipality of Beirut by placing its building in the heart of the city.

### **Action Area 3**

This action area is the main over highway development on the Fouad Chehab Avenue. It is connecting not only physically the BCD to the Bachoura neighborhood but also working as a functional connector from a circulation point and a land use point. It's a mix use development served by public and vehicular transportation and linked to the BCD via: pedestrian track, public open spaces and especially by working on the physical and special connection between both sides.

### **Action Area 4**

In this action area, the intervention will take place under the bridge where the Fouad Chehab Avenue lifts off to give passage for the Damascus road. This under bridge area will be designed to grant access to the metro underground station, thus accentuating pedestrian linkages between both sides.

### **B. Design Development.**

After finishing the Strategic Master Plan phase, a decision was taken in the studio to develop action area three. The intervention area is limited from the Bachoura side with: Assad Khourchid Street, Al Khandak el Ghamik Street, and Tyane Street. From the BCD side the area's limits are with Ghalghoul Street, Syria Street, and Ahmad el Gabbouri Street.

Between the four preselected action areas, this particular action area was chosen as the most suitable zone for air right development over highway corridors that best serve the project goals and offer a high flexible design intervention in the Fouad Chehab Avenue case. This flexibility in the design is permitted by: 1) the presence of large undeveloped land on both side of the highway, 2) the bridge topography making

this zone the only area suitable for physically bridging the gap between both side taking advantage of the site natural topography and the bridge touching ground.

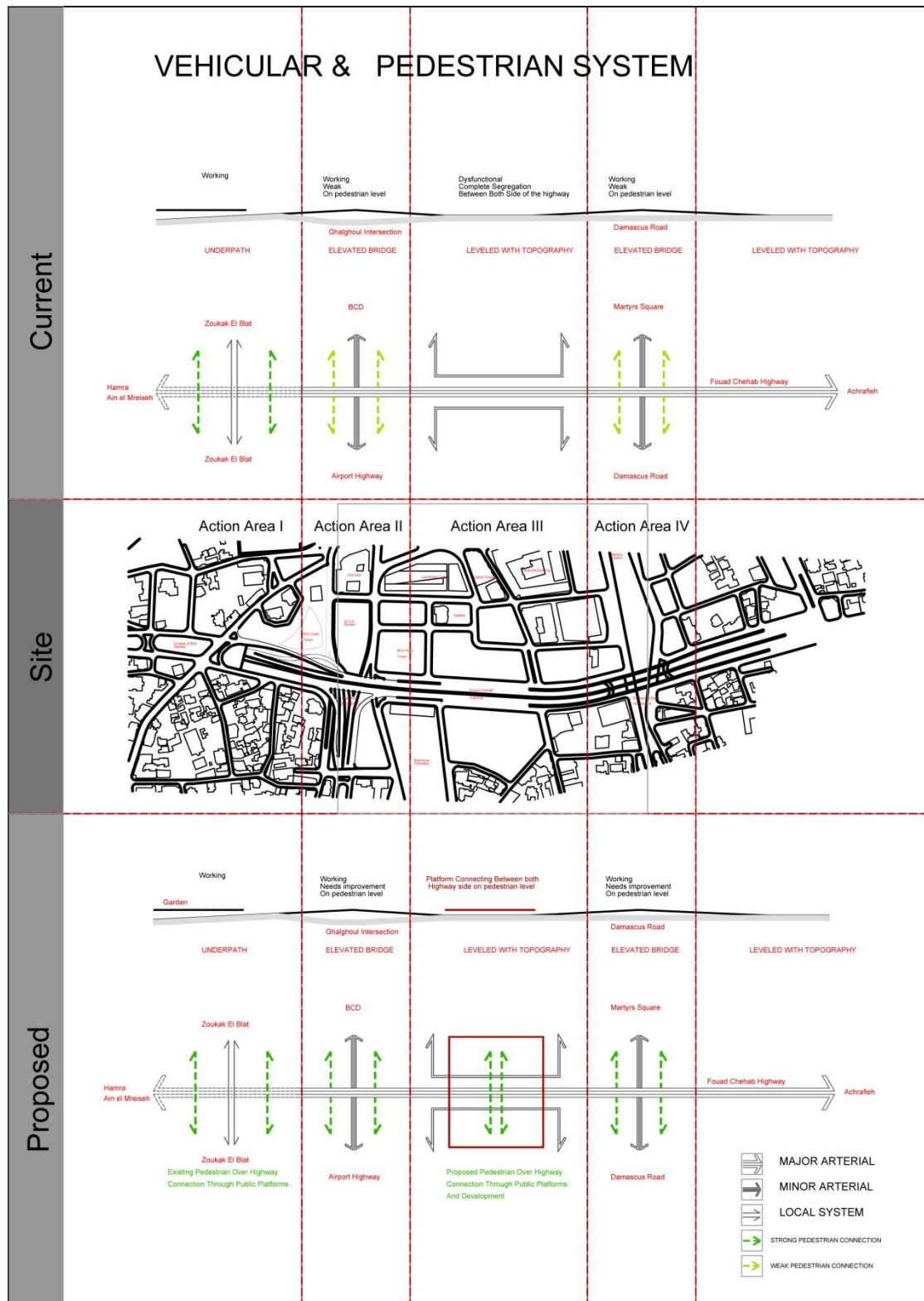


Figure 5.2 : Proposed intervention

### **C. Concept of Development**

The development is designed to work as a connector, connecting the public transportation network to the development and thus to the city, and also taking advantage of the site and bridge topography to physically bridge the gap between both bridge sides, and thus work as a physical connector between Bachoura and the BCD.

#### *Zoning*

The Master Plan provides for broad mixtures of uses in all areas, rather than nominating and separating uses. It does however compose a framework of local areas each with a particular emphasis. The areas were divided into three mixed used zones each with a predominant aspect.

The BCD part and its adjacent area over the highway was classified as a mixed use area with predominant cultural activities in continuity with the trend taking place on this BCD edge. The central part taking advantage of the highway exposure was classified as a mixed-use area with a predominant commercial, and leisure activities. While the development southern side in Bachoura was classified as a mixed-use residential area, a typo-morphological continuity of the existing Bachoura neighborhood.

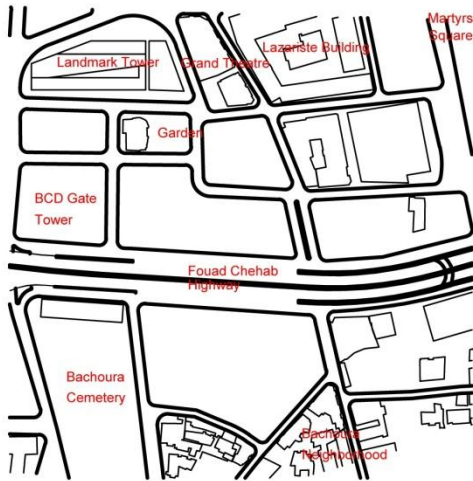
The development platforms will be allocated for retail and leisure uses. A large portion will be developed as a souk while the other part will be designed for other leisure activities such as cinemas and pubs.



## I – Contextual Features

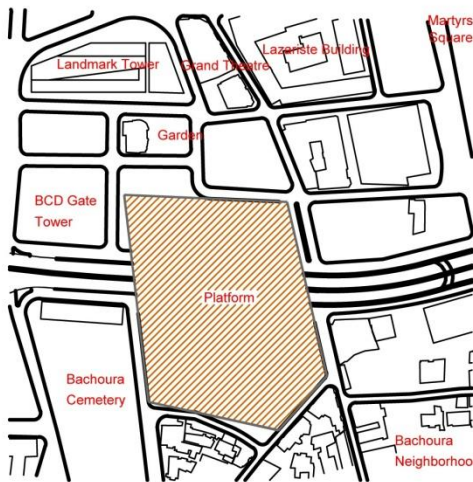
The site contextual features like: the bachoura cemetery , the residential neighborhood, the landmark tower , the grand theatre, the martyrs square and the Fouad Chehab highway; will serve to shape the master plan on two level:

- 1) The Program : By allocating functions that serve and reinforce the other functions around.
- 2) The Design: By creating a proper balance between the development and the surrounding buildings on the massing level.



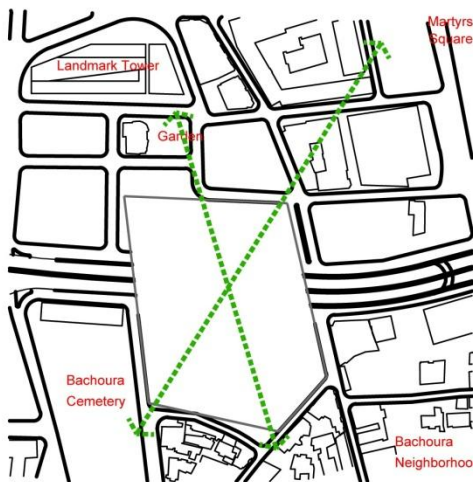
## II- Development Platform

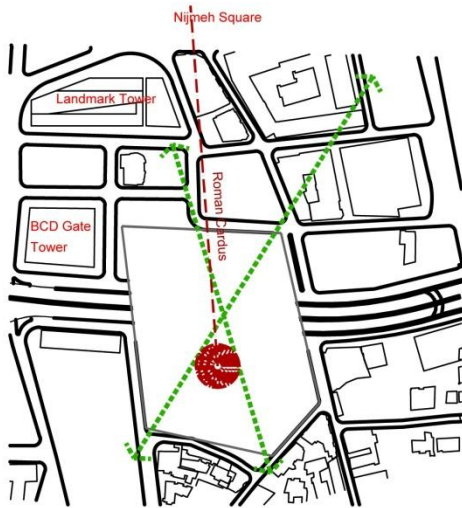
A platform development is envisioned to link both side of the highway, insure the presence of public open spaces and serve as a base for connecting the feature on both side of the highway.



## III- View Corridors

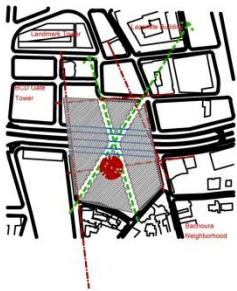
Public open spaces are used to shape the master plan, thus reinforcing its integration within surrounding neighborhoods throughout a certain hierarchy. The most predominant open space is a large pedestrian boulevard that is firmly established with its dynamic space visually linking the Bachoura cemetery to the martyrs square on the northeast south-west axis. The other axis on the north-west southeast orientation, link the Bachoura neighborhood to the cultural area in the BCD. The other open spaces are set to preserve and create important views, space and panoramas through the development . There role is also to enhance the physical and visual connection between both highway side.





#### IV- Iconic Tower

The signal tower, its location and orientation in the heart of the development has both historical and functional connotations. From an historical perspective the tower is placed like most of important building during the Roman era, right on the axe of the Roman Cardu, currently in the alignment of AL Maarad and Allenby Street and the Place de L'Etoile. From a functional perspective the tower is used to signal the main entrance to the underground metro station.



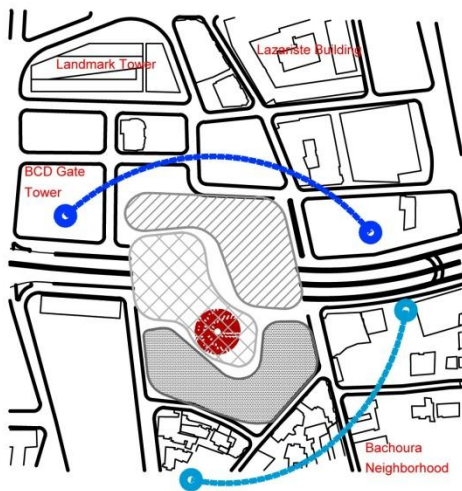
#### V- Connecting Platform






The development platforms will be allocated for retail and leisure uses. A large portion will be developed as a souk while the other part will be designed for other leisure activities such as cinemas and pubs.



#### VI- Preferred Land-Use

The Master Plan provides for broad mixtures of uses in all areas, rather than nominating and separating uses. It does however compose a framework of local areas each with a particular emphasis. The areas were divided into three mixed used zones each with a predominant aspect.



-  Dedicated for Residential uses
-  Dedicated for Office uses
-  Dedicated for Cultural and services uses
-  Predominant Cultural and Offices
-  Predominant Residential

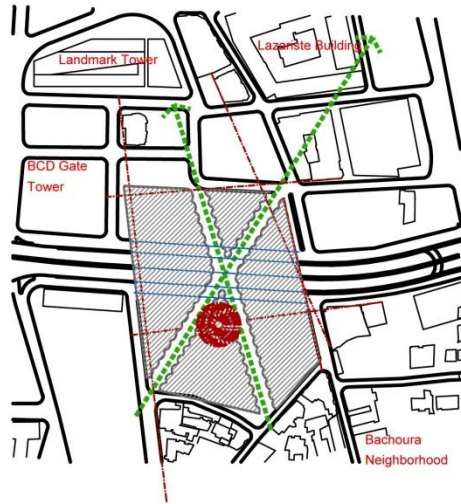


Figure 5.3: Conceptual sheets

## VII- Massing and spatial relationship

The focus is upon street continuity rather than disengaged massing. The central purpose is to ensure that the massing of individual building particularly on their lower level is coordinated in order to form the space and character of the streets and to support an active street life. Carefully define the volume of streets with the base levels of buildings along their edges, so that the streets become the primary social spaces in the development.

### *Public Realm*

Fundamental to the design is the formation of public spaces. These include streets and pedestrian boulevards in all areas, and special public space that not only contribute in providing the southern bridge side neighborhood with cruelly missing spaces but also are essential in shaping the site development plan and in reinforcing the development role as a layered connector.

Such spaces have been introduced throughout the site Master Plan. They occur at key places and are generally established by serving locations of different types in relation with the service given.

### *Public Amenities*

In order to compensate for the non presence of any public amenities such as gymnasium, basketball courts, etc. in the surrounding neighborhoods, spaces in this development will be allocated to serve this issue, thus making the development a high mixing space for all social categories and contributing in its success.

### *Visual Design Guidelines*

As stated in the previous section, public open spaces were used to shape the master plan, thus reinforcing its integration within surrounding neighborhoods throughout a certain hierarchy. The most predominant open space is a large pedestrian boulevard that is firmly established with its dynamic space visually linking the Bachoura cemetery to the cultural area in the BCD. Both ends of this space represent a certain pedestrian circulation node in the scheme. Other important open spaces are the Bachoura Public Garden serving the planned and existing residential areas. The piazza and the garden on the BCD side serve the surrounding buildings and can be used for

cultural and special activities. These public spaces will provide an exclusive sense of place to this new development. The focus is upon street continuity rather than disengaged massing. The central purpose is to ensure that the massing of individual building particularly on their lower level is coordinated in order to form the space and character of the streets and to support an active street life.

Reinforcing the presence of the highway while limiting its externalities was one of the key element in the massing and building design. In the development central part, the two identical separated buildings serve to reinforce the directionality of the highway. This perception applies for both the building occupant and the highway users. On the opposite side an arched building, offer the same sensation.

The signal tower, its location and orientation in the heart of the development has many historical and meaningful connotations. From an historical perspective the tower is placed like most of important building during the Roman era, right on the axe of the Roman Cardu, currently in the alignment of AL Maarad and Allenby Street and the Place de L'Etoile. From a meaningful perspective the tower is used to trace the main entrance to the underground metro station and thus virtually linking the existing city space to the future and planed one; the underground public transportation network.

### *Car Parking*

Due to the parking problem faced in the Bachoura neighborhood, major underground garages will be built to serve the surrounding neighborhoods and the development itself. Nevertheless, the ratio of car spaces in relation to the occupied new space will be less than the standard required because of the presence of the underground metro station. The aim is to ensure adequate provision while reducing the car dependency.

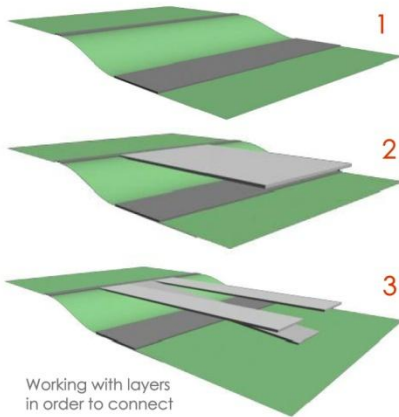
### *Accessibility*

The public transportation station and the tram stop will be the main available site access. Vehicular accessibility will be provided for all building on the street level underneath the layered platforms thus separating pedestrian and vehicular circulation.





Working with the Levels



VIZIBILITY



- Visual Design Guidelines :
- Land Mark tower
  - Martyr square axis
  - Open Spaces
  - Public transportation
  - Highway
  - High density buildings in solidere

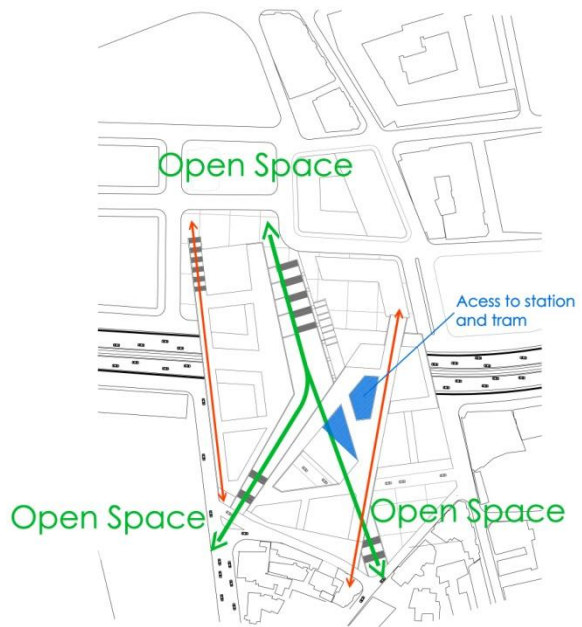
LAND USE ZONING

Cultural

Business  
Hotel

Residential

Linkedge



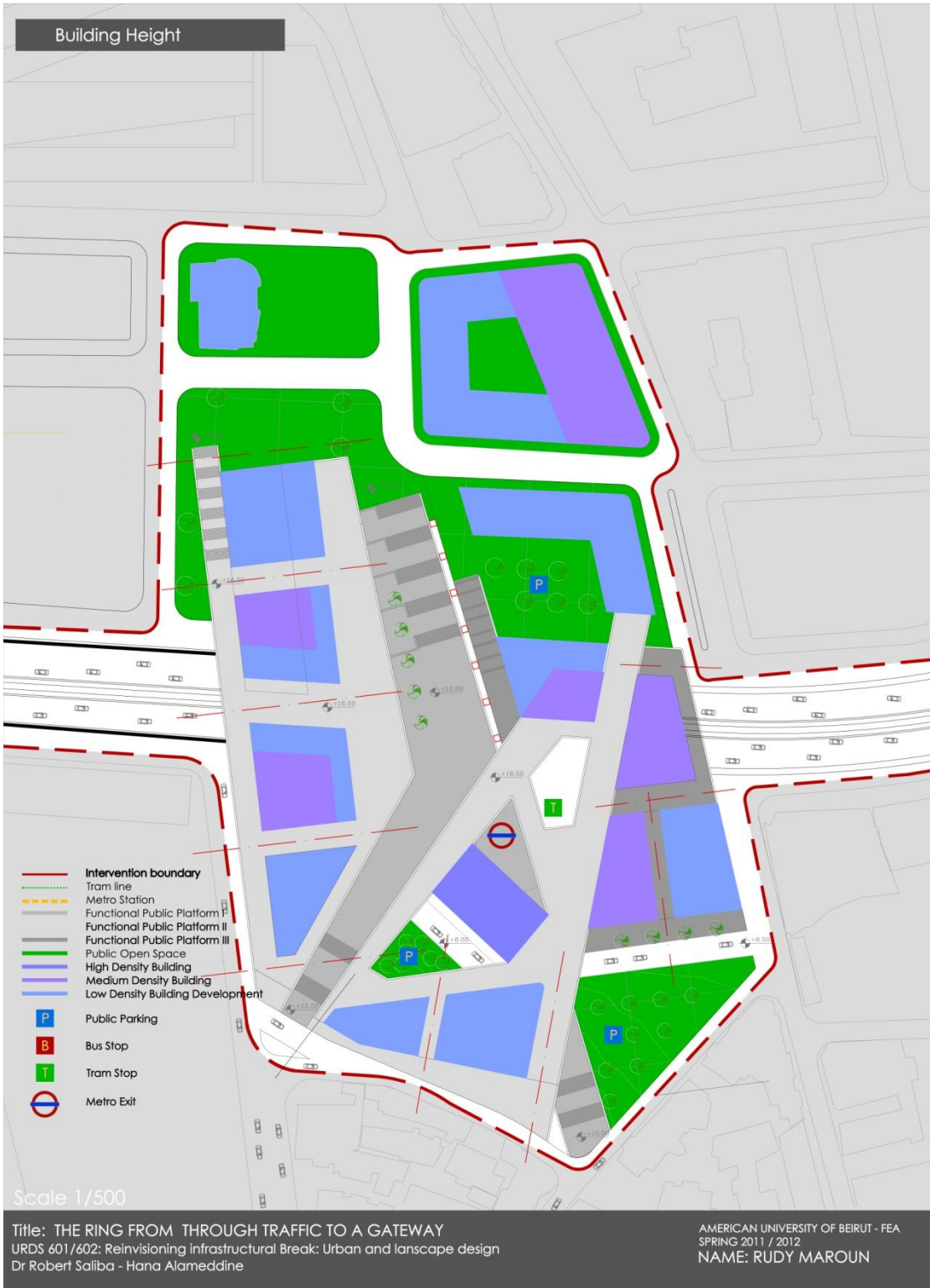
Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisioning Infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN

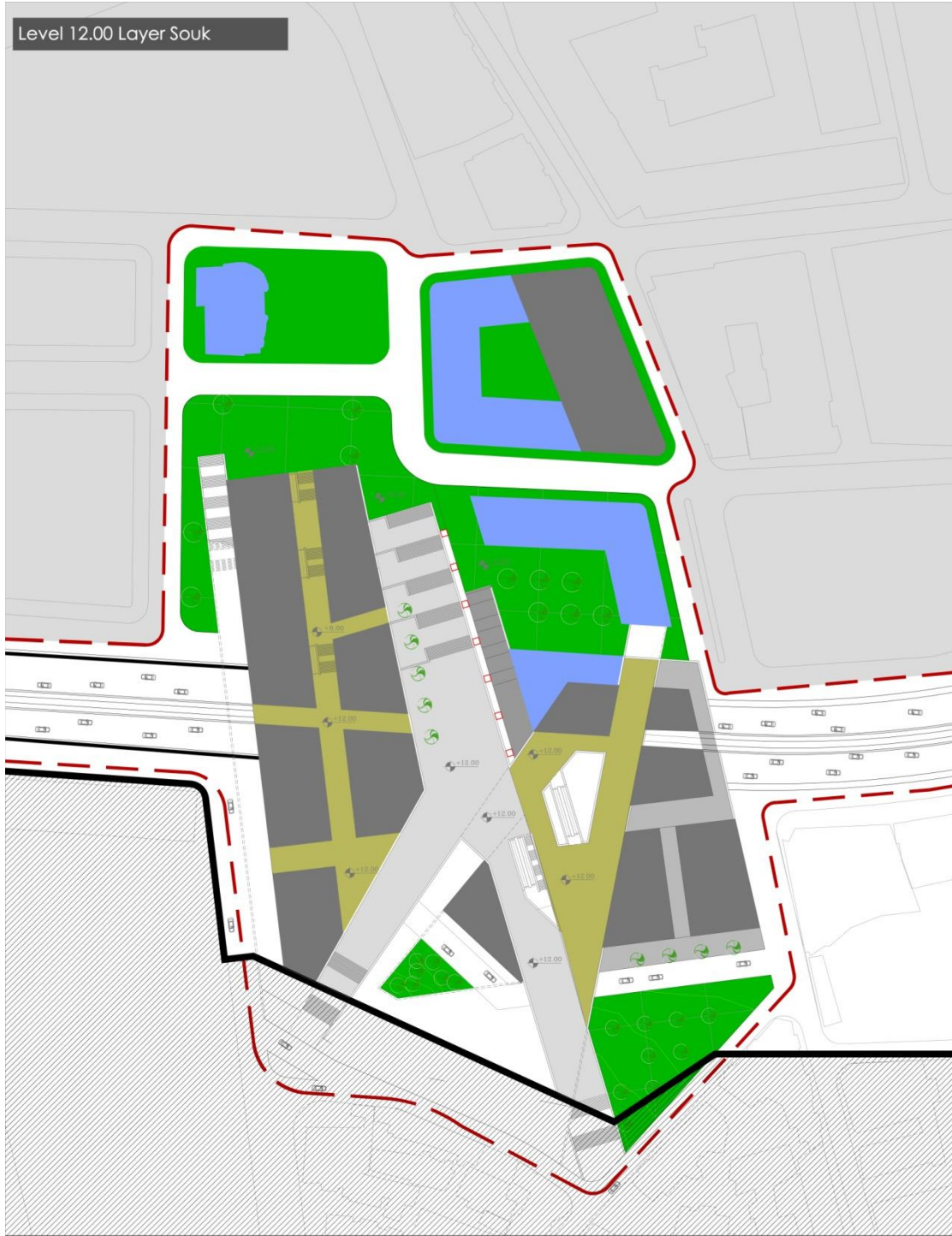








Level 12.00 Layer Souk

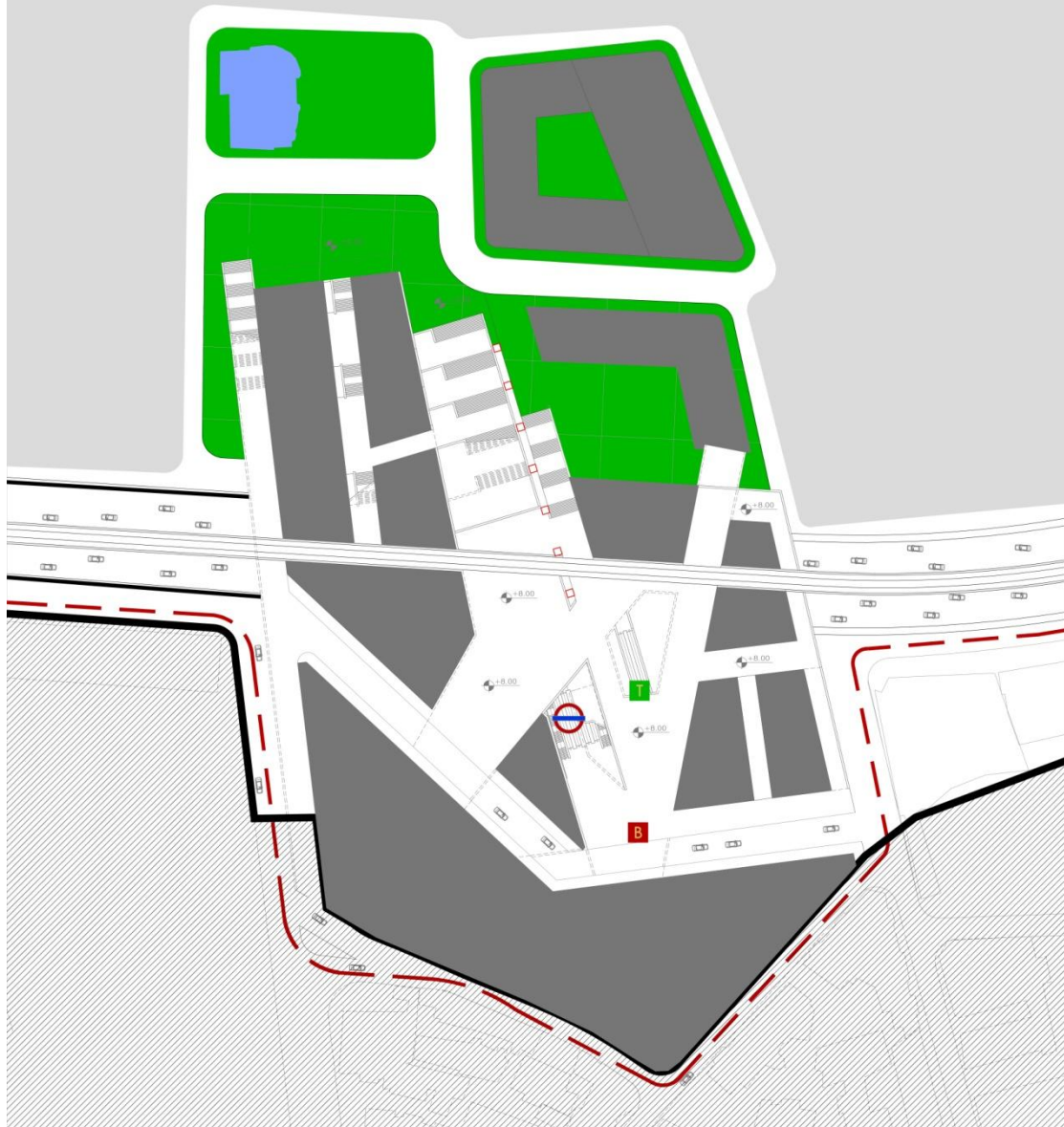


Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisioning Infrastructural Break: Urban and landscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN

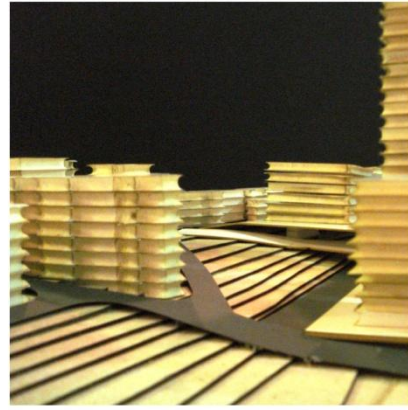
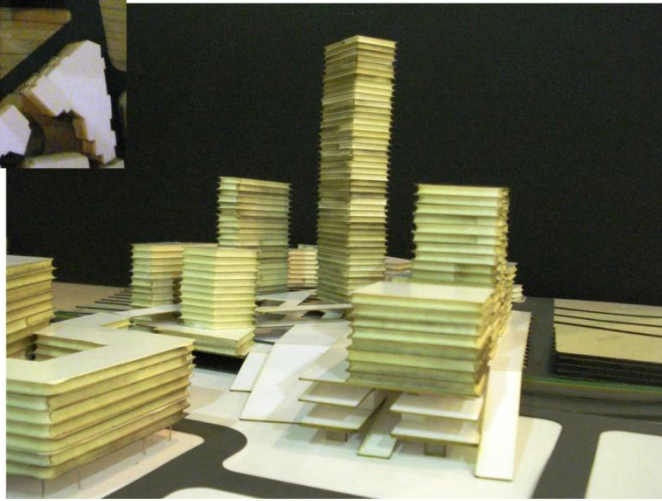
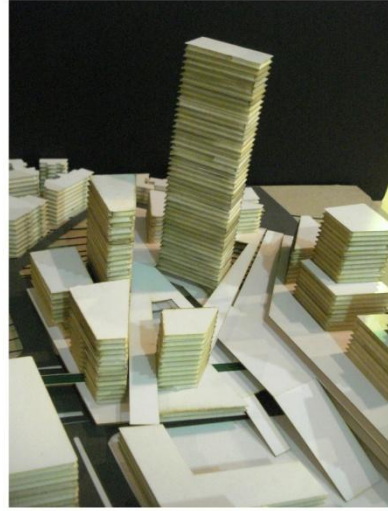


Level +8.00 Entertainment



Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisioning Infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

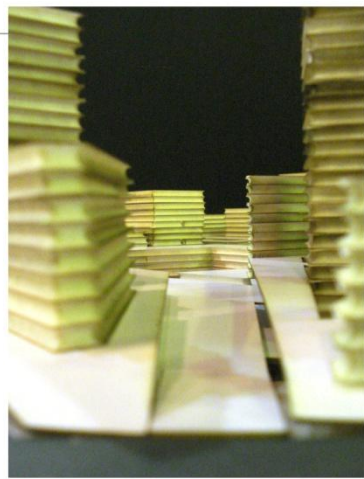
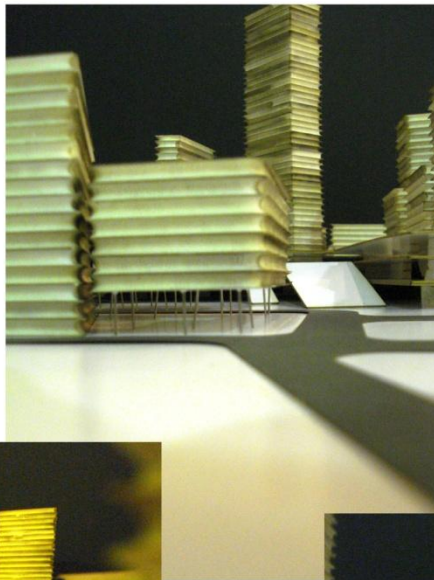
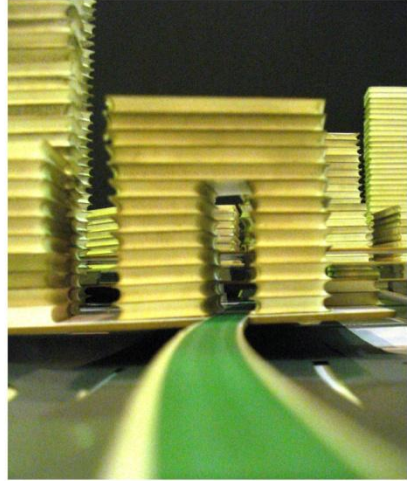
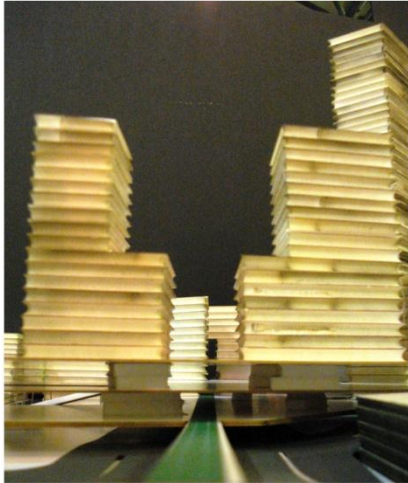
AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN



Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisioning infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN





Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisioning infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN

## CHAPTER VI

### REVISITED URBAN DESIGN INTERVENTION

In this section, the studio design response is assessed in relation to Campbell triangle of conflicting goals in order to test the design intervention sustainability and implement ability in the Beirut context.

#### **Design assessment**

The development plan was to: create a balanced mixed-use development in an attempt to revitalize adjacent area, create linkages between both side of the Fouad Chehab Avenue, and use the over highway air right as an opportunity for a catalytic form of urban development, on micro scale serving the surrounding neighborhood and macro scale affecting the whole city development. The design addressed the following goals in the design process framed into three categories: Social Equity goals, Environmental goals and Economic goals.

#### *Social Equity Goals*

- Establish public realm benefits including plazas, parks, pocket parks; improve sidewalk and bikeways and provide public amenities such as gymnasium public pools etc.
- Implement a public transportation strategy on a city scale and a metro station on the district scale
- Create New affordable rental and homeownership opportunities in the Bachoura neighborhood side, targeting students.

### *Environmental Goals*

- Reduce noise levels on portion of the Fouad Chehab Avenue, due to decking over the avenue.
- Minimize new automobile trips through integration with the planned metro station underneath/planned tram stop; improved pedestrian environment/connectivity shared parking facilities and onsite bicycle amenities.
- Create green area like parks and pocket parks and gardens non present previously in the neighborhood.
- Implement Green Engineering and Sustainable Design techniques, including day lighting, waste reduction, solar energy, water conservation etc., and the investigation of the feasibility of Leadership in Energy and Environment Design (LEED) Certification.

### *Economic Goals*

- 300 000 000 USD from selling the highway airspace, to be invested in the metro station underneath.
- New annual city real estate taxes.
- New jobs ( retail, maintenance, parking, restaurants, hotels, etc.)
- Stabilize the Bachoura neighborhood in particular and in general the whole area by providing a more diversified set of uses that keep the area active 7 days a week year around.

### **Action Area III Conflicts**

#### *Property Conflicts:*

The property conflict is as defined by Campbell “the boundary between private interest and public good” (Campbell 1996, P: 298) In the Fouad Chehab Avenue case this conflict does not exist since the private interest is placed in the service of public good. The concept in this development was to use the private interest and push it to invest in a development where both its financial interest and the public interest were winners. Nevertheless, in this particular case it’s the public good that took advantage since the development contributes to the creation of a public transport scheme for the city of Beirut while providing other amenities for public uses; neither transportation networks, nor amenities didn’t exist prior to the development. Despite allocating large amount of land for the public realm, the project is profitable enough because of the high land price.

*Resource Conflicts:*

In air right development over highway corridors cases, the resource conflict is not obvious, because any intervention that is mitigating the negative impact of the highway is a plus for the environment. It is a win win situation where economic growth serves the environmental cause. In this case, the allocation of a high percentage of land serving the public realm as park and pedestrian connection contributes to not only cover the highway and mitigate its inconvenient aspect but also to provide a green clean environment for the community, an attribute that did not exist before. Using the development to implement a public transportation system will minimize car dependency and thus contribute to a cleaner sustainable environment; this contribution will be strengthened by LEED certified design and building construction methods.



### ***Development Conflict:***

Because of the high price of land surrounding this development, no public funds will be needed in order to compensate the extra cost of developing over the highway; thus, funds generated by the development will be invested in the public domain. This development project not only became a source of revenue to the city through direct taxes (property tax) and indirect taxes by providing jobs for the surrounding neighborhoods' inhabitant; but also resolved a problem generated by a public intervention through the private sector without necessitating public funding. It also established a vision for the development in the city of Beirut by contributing to the establishment of a public transportation network.

### **Conclusion**

In the Beirut context, developing over a high way corridors proved to be more sustainable than in either the Bostonian or The Hague context. It theoretically allowed the city to finance a public transportation strategy while dealing with most of the highway externalities when intersecting the urban fabric. This resolves more conflicts, which place the development more in the core of Campbell triangle of conflicting goals (Fig 5.14).

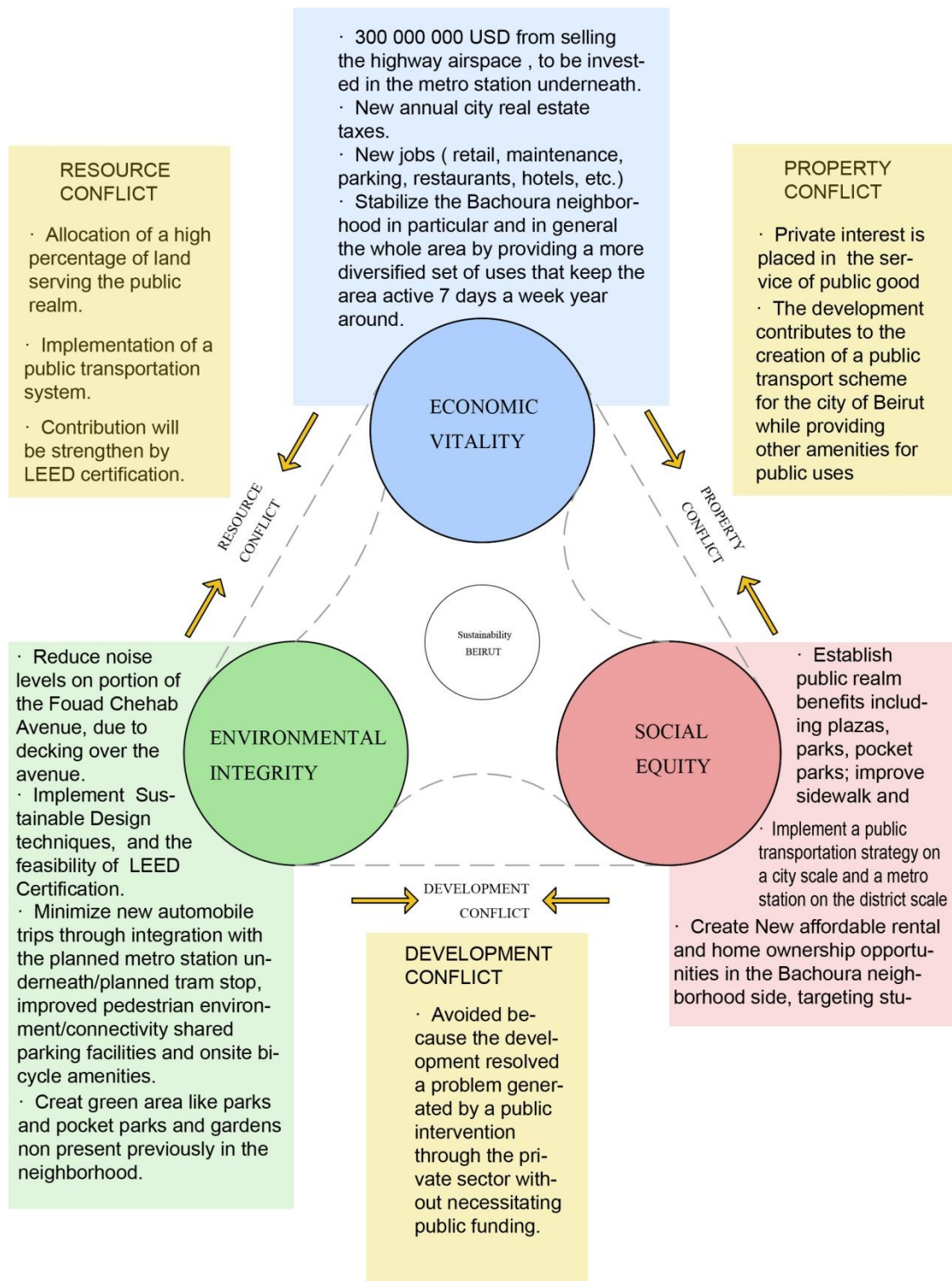


Figure 5.14: Beirut Sustainability diagram

Never the less, and in order to take advantage of the lessons learned from case studies, amending the initial design proposal was needed. Learning from what was done in Boston and The Hague the proposal needed some modification on two levels: 1) The Program, 2) The Design.

## **The Program**

### 1. Public / Private Partnership

In the three Boston Turnpike cases, a public private partnership was needed for not only the development feasibility but also credibility. For that purpose and after examining the Lebanese context, the most credible, trusted and powerful component in the Lebanese public sector is the Lebanese Central Bank. Therefore, this component will be chosen to represent the Lebanese government and institution in developing these kinds of public private partnerships in order to implement a public transportation network in the city of Beirut. Currently the Lebanese Central Bank is scattered in three building in the Hamra district, which is not in line with the national and international role played by this institution. For that reason, I proposed in my revised urban design intervention to allocate the iconic tower for the Central Bank. This will serve and consolidate its image as a locomotive of the Lebanese economy and will highlight the role played by this particular institution in framing the intended development over the Fouad Chehab Avenue and in establishing a development vision for the Lebanese economy and the city of Beirut.

## 2. Land Use

From a land use perspective, both twin towers on the western side of the development over the highway will be allocated for office uses, taking advantage of the great exposure on and from the highway.

The location is currently underserved by hotels and will need this particular service in the future. Two key locations on the master plan will be reserved in order to serve that purpose. These two locations will have a high visibility from both the development and the highway and serving as one of the links between the platform and the BCD side.

Provision is made for an “object” building to be located on the northwestern side of the development for museum or other cultural uses, with a maximum height of 16.5 m which correspond to the height of the highest platform.

### **The Design**

In order to adapt the design to the program changes and to the lessons learned from the case studies the development section above the highway was redesigned because of:

- 1) Structural and functional constrains, the buildings needed to be adapted to the highway underneath so the buildings edges are outside the highway lines.
- 2) Higher percentage of open space and exposure. Both hotels were redesigned in order to give more space for the public realm and thus give a bigger exposure from the hotels to these public open spaces.

3) Vehicular Circulation. All vehicular drop off where redesigned so each building on the platform will have a vehicular drop off and a lobby.

4) Pedestrian Connections. The pedestrian connection was enhanced through the project all public open spaces are connected and have a particular character.



Figure 5.15: Pedestrian Connections concept



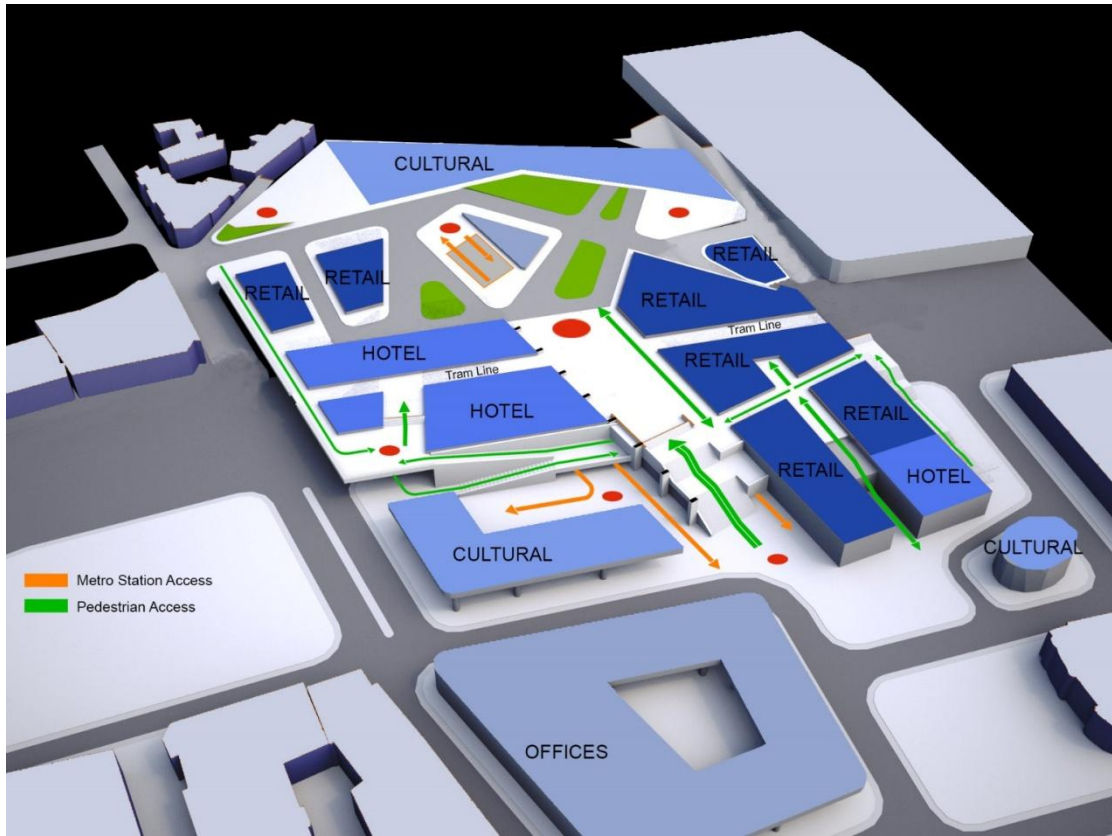


Figure 5.16: Level +7.00 m

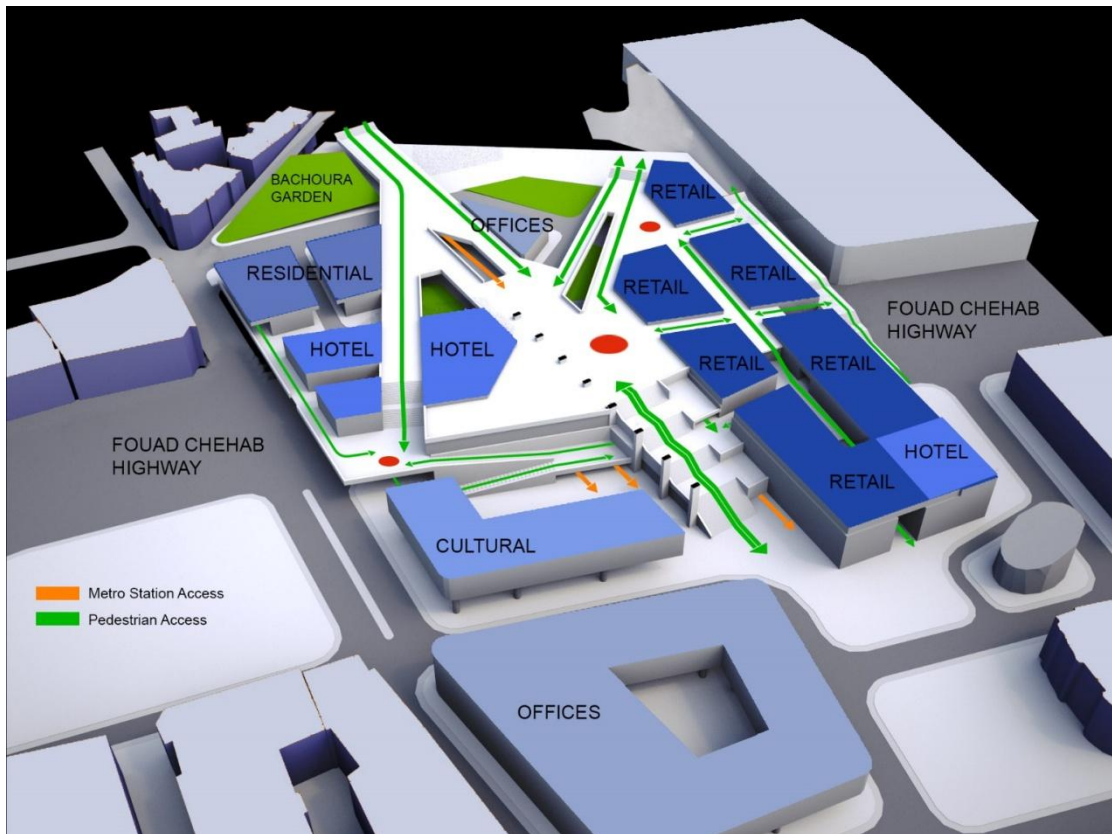


Figure 5.17: Level +12.50m

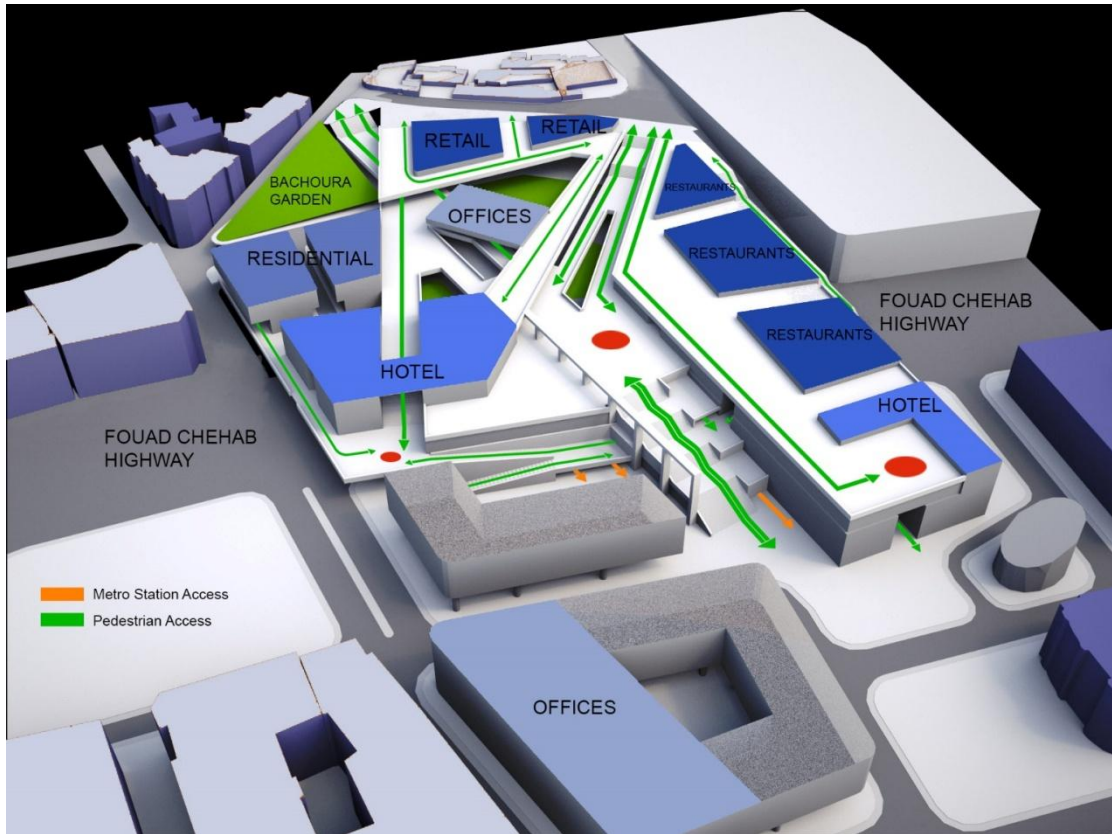


Figure 5.17: Level +16.50m

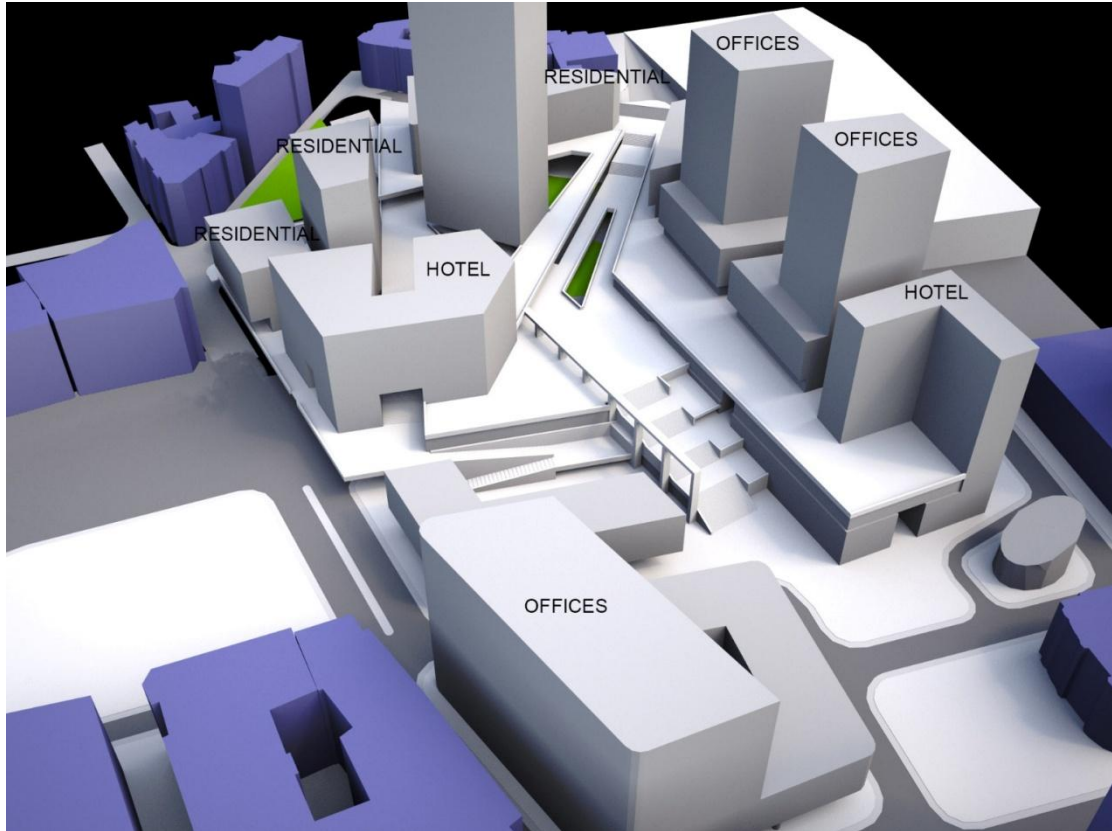


Figure 5.18: Axonometric view

## Building Types

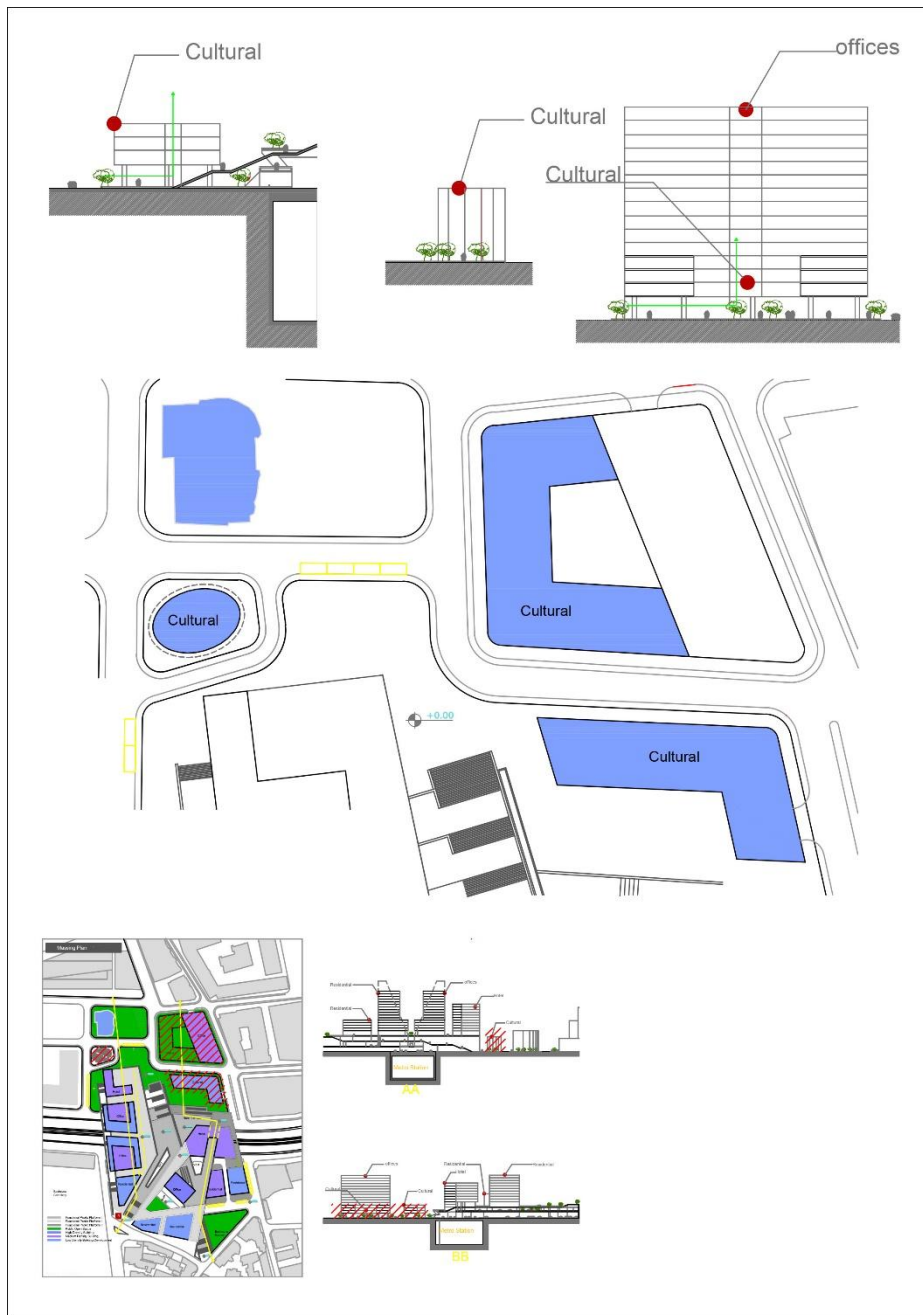


Figure 5.19: Cultural Building



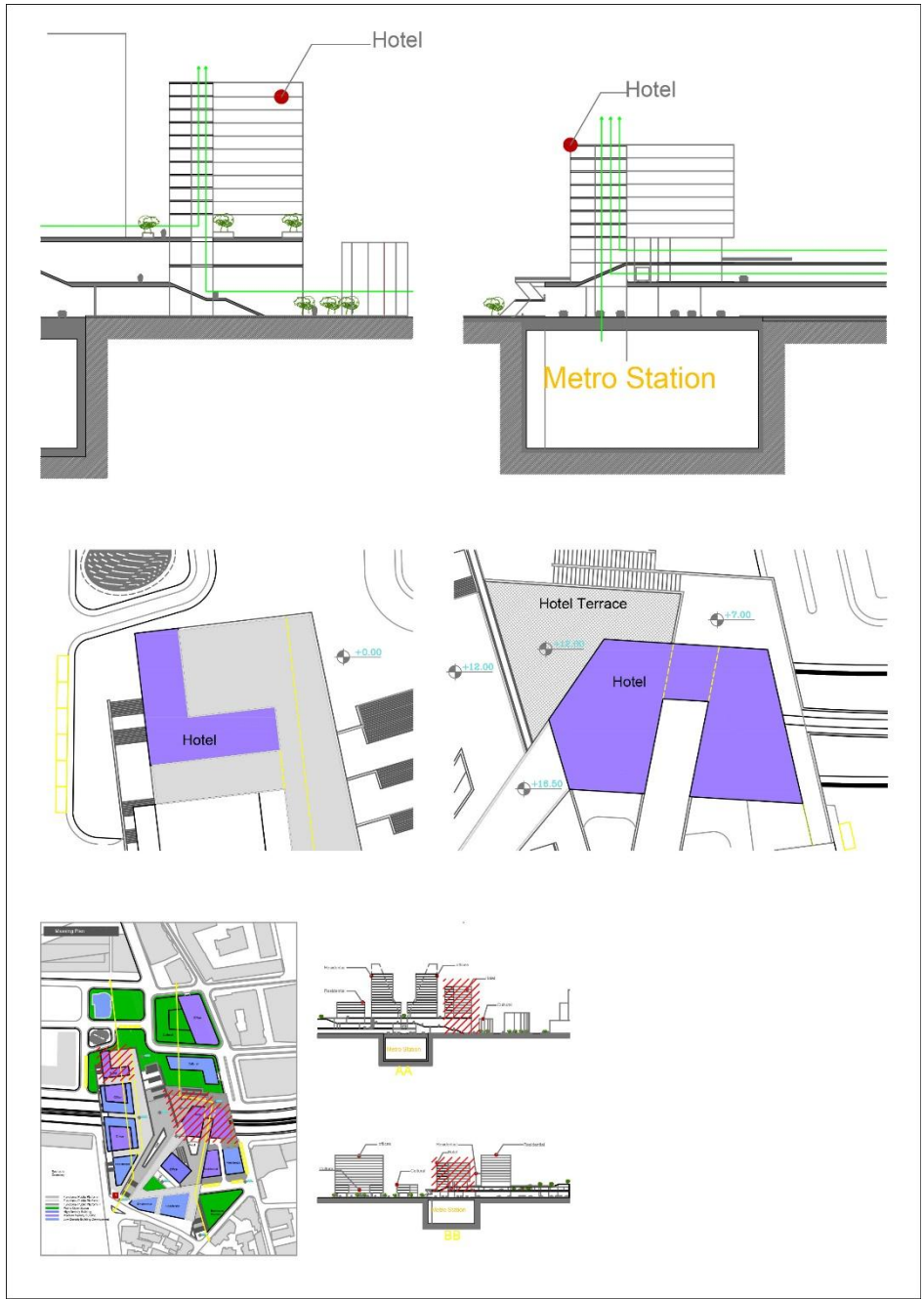


Figure 5.20: Hotel Building

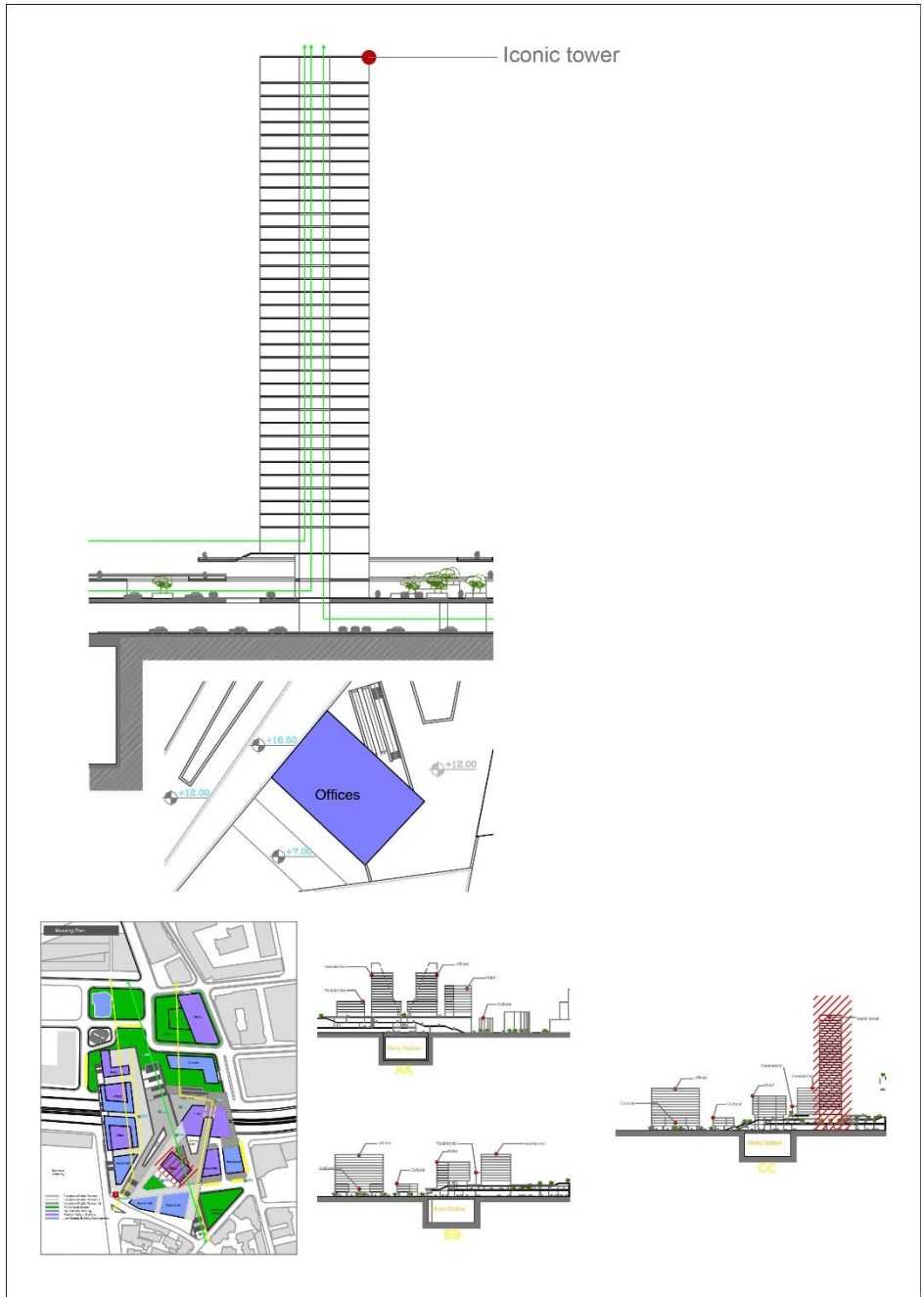


Figure 5.21: Iconic Building

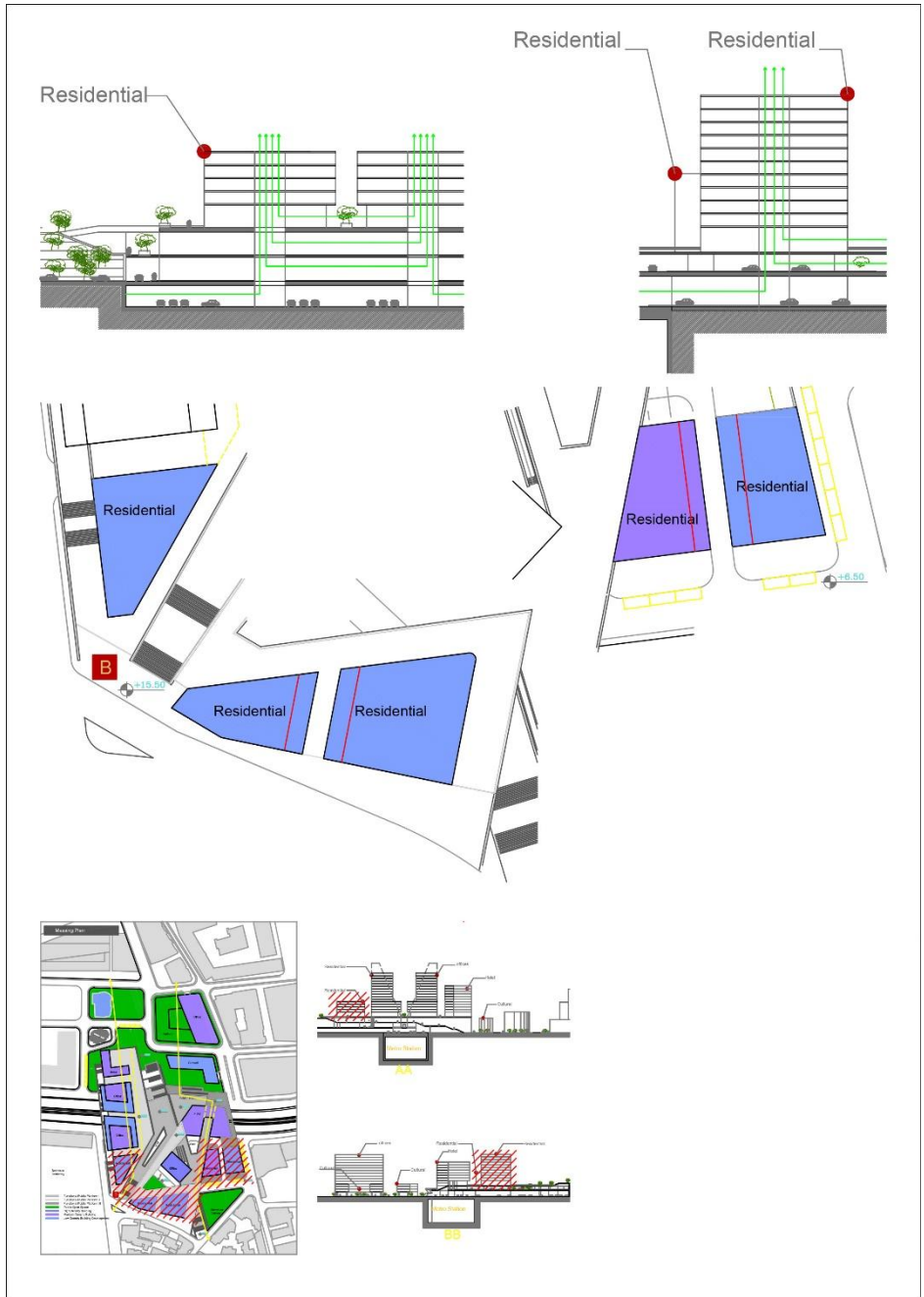


Figure 5.22: Residential Building



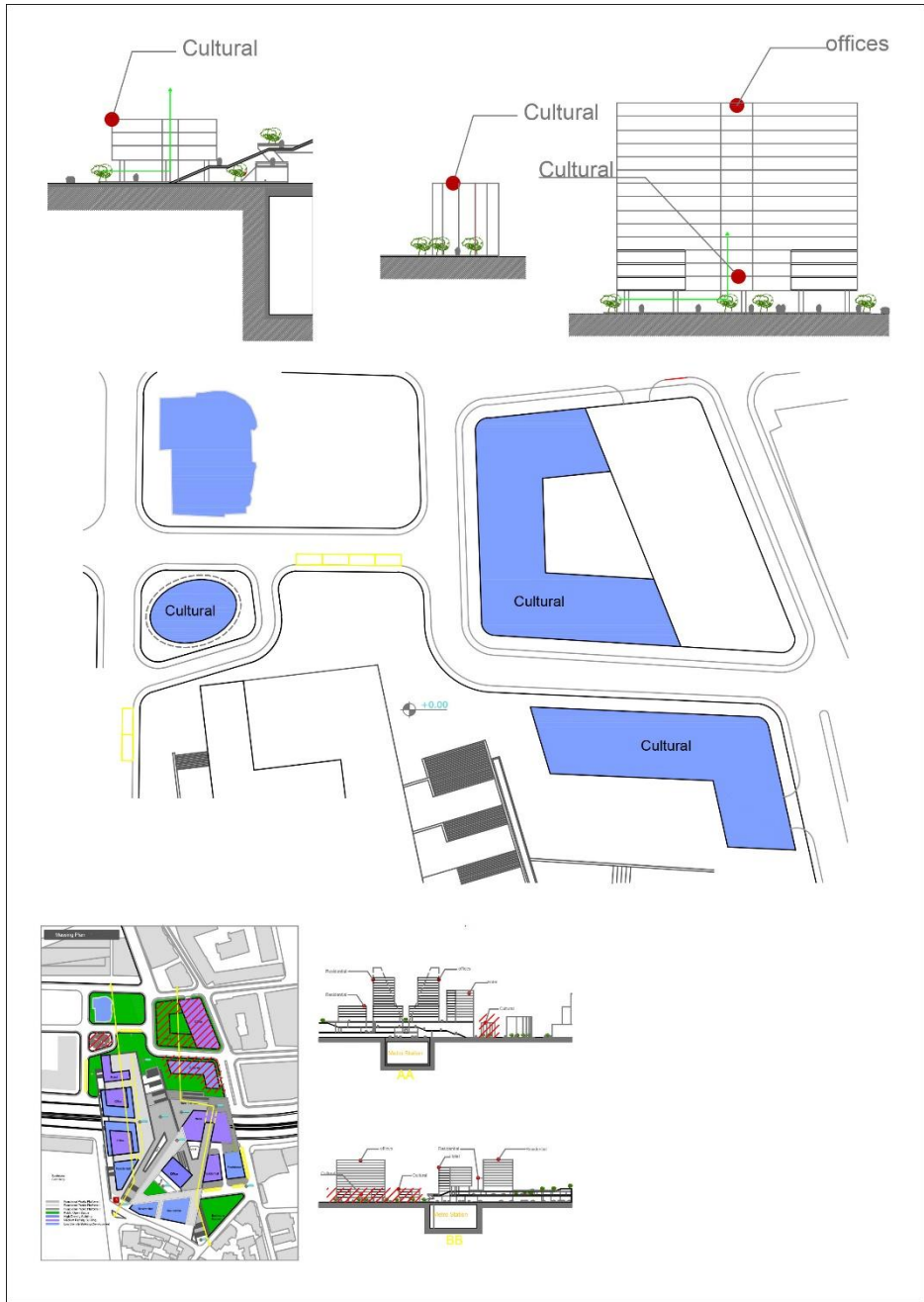


Figure 5.23: Cultural Building

## Sections

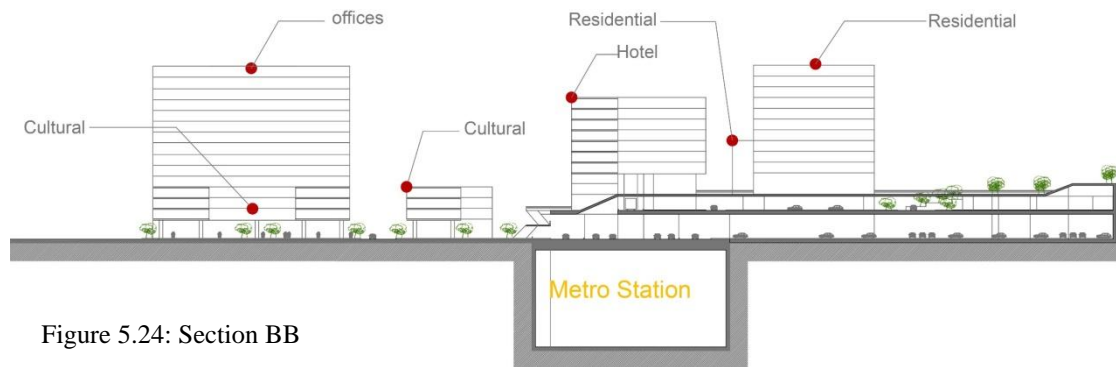


Figure 5.24: Section BB

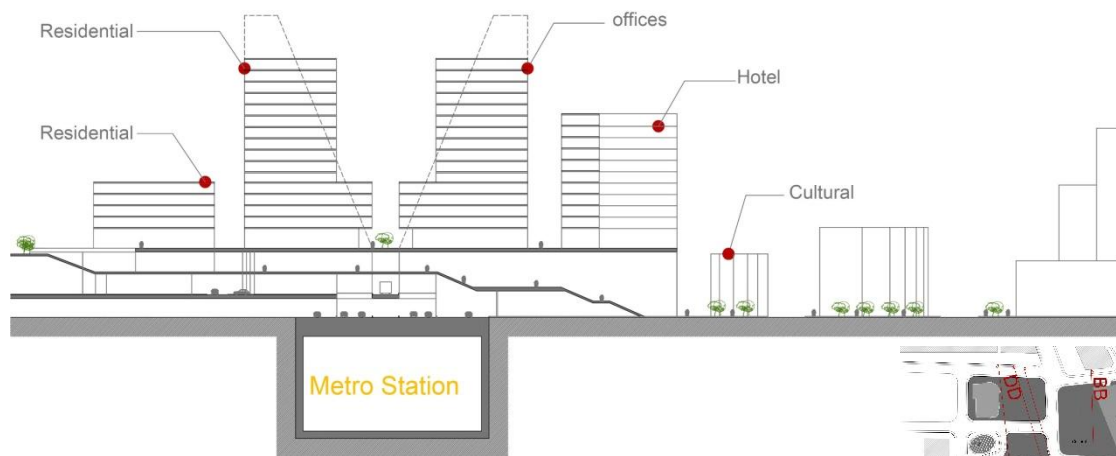


Figure 5.25: Section AA

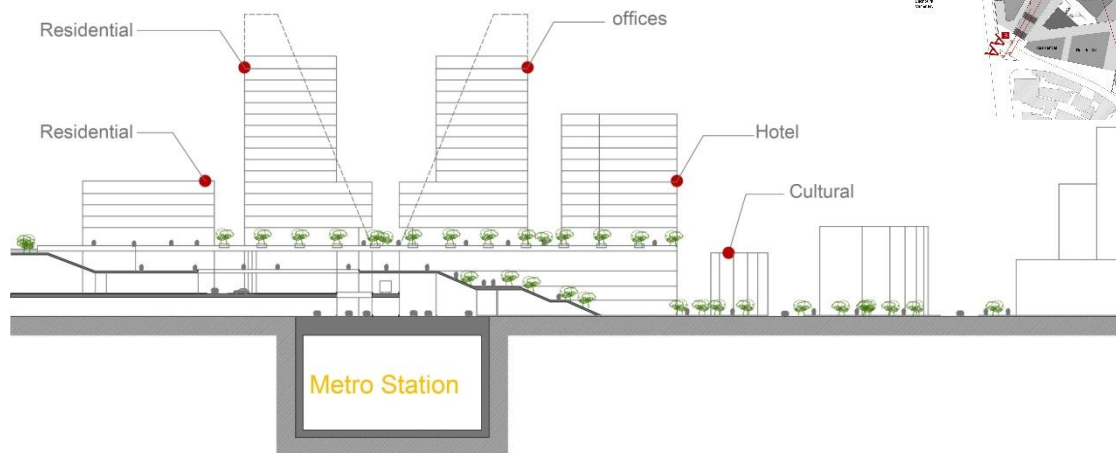
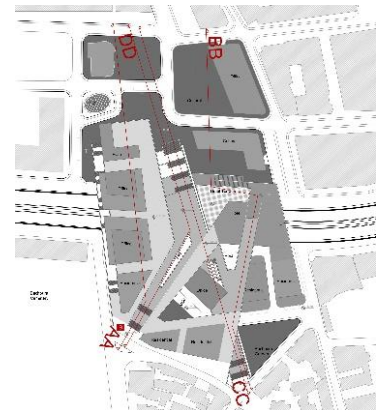


Figure 5.26: Section DD



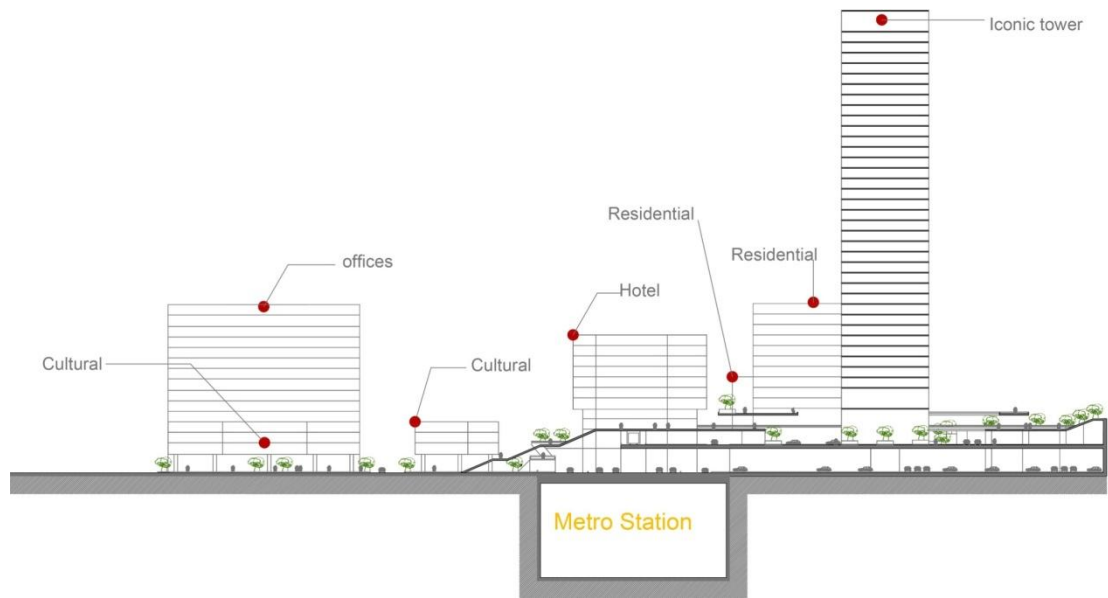
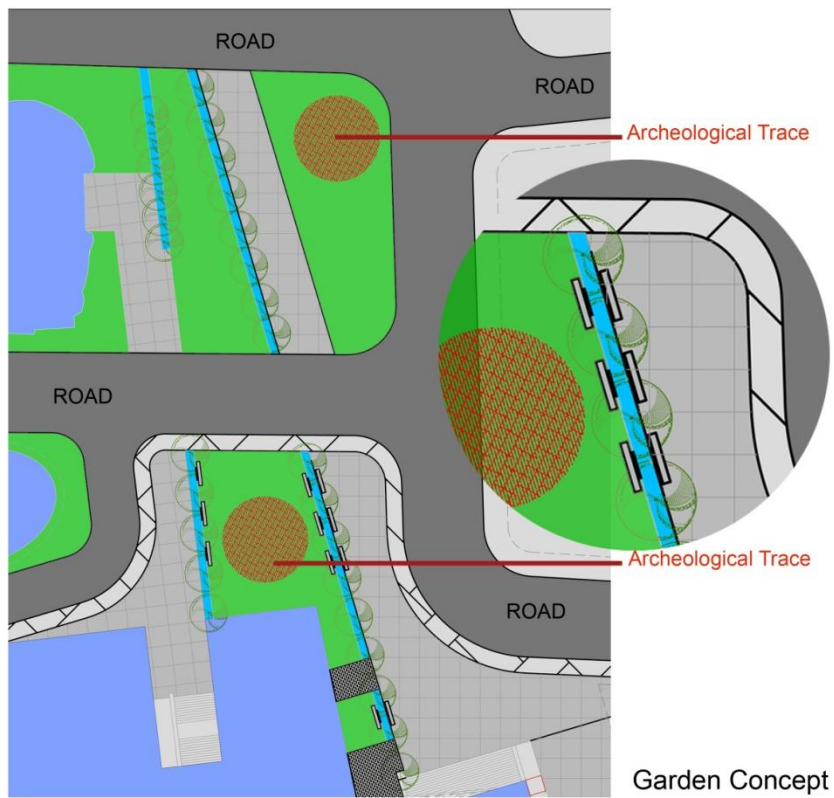


Figure 5.27: Section CC

## Open Space Development:



View I



View II



VIEW TOWARD ICONIC TOWER FROM THE BCD SIDE

Figure 5.28: Open Space BCD Side



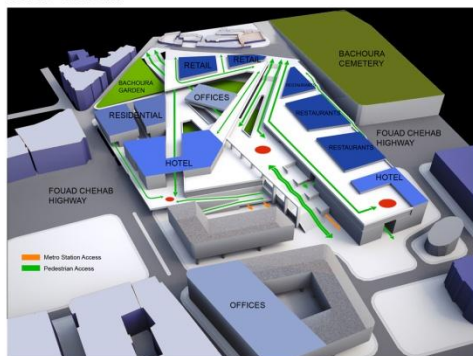
## Development Phase:



Level +7.00 m



Level +12.50 m



Level +16.50 m



### Phase I

The Phasing strategy will start with the construction of the metro station and the 1st platform on level +7.00 m over the highway. This will allow the other section of the development to be built without disturbing the vehicular traffic on the Fouad Chehab Avenue.

### Phase II

Phase 2 will be dedicated to finishing the construction of the platforms on level 12.50m which will support a vibrant retail activity and Level 16.5 m which will act as a entertainment platform.

With the construction of the platform the implementation of the public open spaces can start ( park , piazza , square, Pocket Parks..), these open spaces will provide the link to the metro station and the pedestrian connection between the BCD and Bachoura.

### Phase III

Phase 3 will show the completion of the development with the implementation of the buildings on the platforms. This will be done in phases, depending on the market demand.

The 1st buildings to break ground will be the iconic tower and the residential buildings facing the Bachoura neighborhood.

Figure 5.29: Development Phases

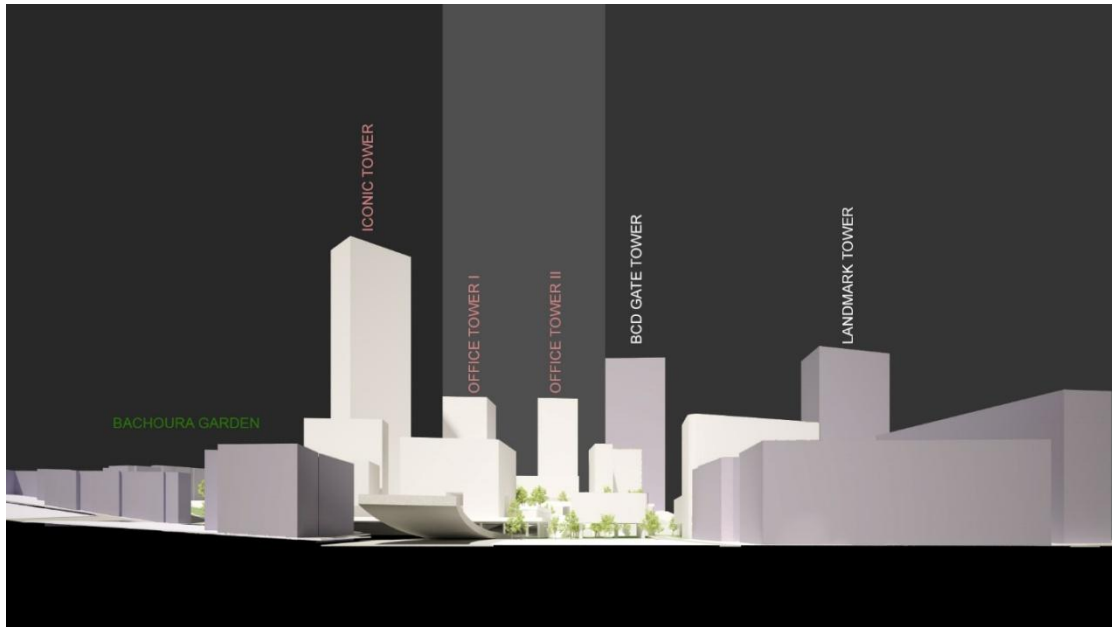


Figure 5.30: View toward the development taken from the Saifi side

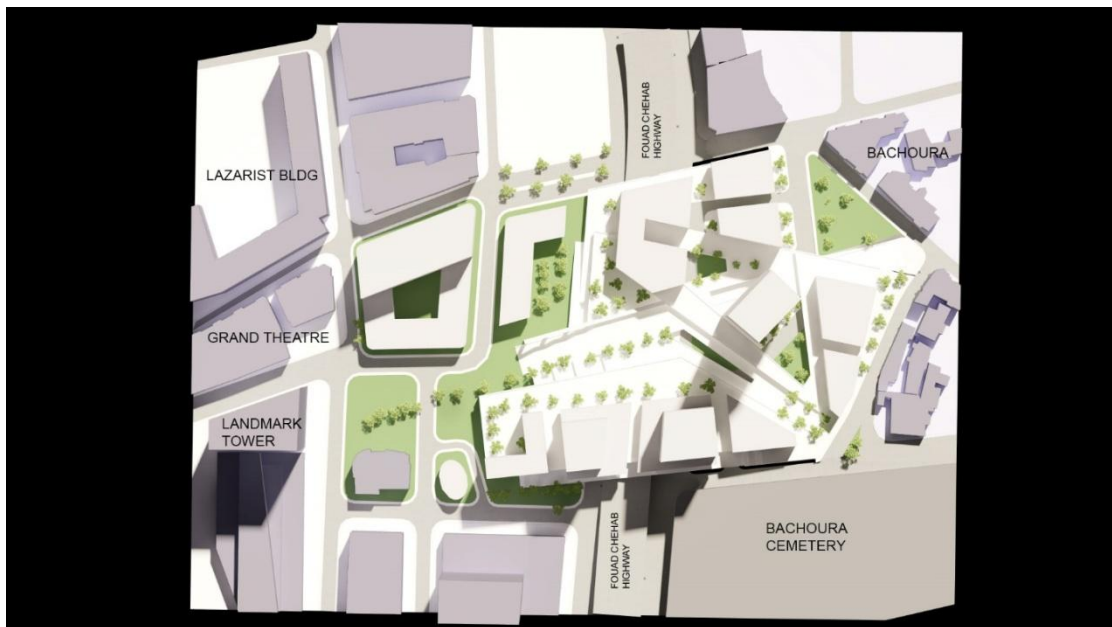


Figure 5.31: Development Massing



## **Bibliography**

### **Primary Sources**

Campbell. B. E. 2004. *Creating Sustainable Air Rights Development over Highway Corridors: Lessons from the Massachusetts Turnpike in Boston*. MIT Master Thesis, Massachusetts Institute of Technology, Cambridge, MA.

Campbell. S. 1996. *Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development*. Journal of the American Planning Association, Vol. 62, No. 3 APA, Chicago, IL

Julian Agyeman and Tom Evans, 2003. *Toward Just Sustainability in Urban Communities: Building Equity rights with Sustainable Solutions*. The ANNALS of the American Academy of Political and Social Science 2003; 590; 35

Savvides, A. 2004. Regenerating Urban Space: Putting Highway Airspace to Work. *Journal of Urban Design*.

Godwin, J. (1968) *Air Space Utilization* (Washington, DC: National League of Cities).

Francis, M . 2001. A case study method for landscape architecture. *Landscape Journal* 20 (1), 15-29 University of Wisconsin Press

### **Secondary Sources**

Clancy, S. P. 1998. *Air Rights Development: Is it Different from Traditional Land development*. MIT Master Thesis, Massachusetts Institute of Technology, Cambridge, MA.

Boston Redevelopment Authority. 2000. *A civic Vision for Turnpike Air Right in Boston*. (Boston Redevelopment Authority and Boston Transportation Department).

Gavin, A., and Maluf, R. 1996. *Beirut Reborn: The restoration and development of the central District*. London, England: Academy Editions. .

Bodenstein, R. 2005. The Making and Remaking of Zokak El-Blat: A History of the Urban Fabric, in *History, Space and Social Conflict in Beirut - The Quarter of Zokak al-Blat*, edited by H. Gebhardt, D. Sack, R. Bodenstein, A. Fritz, J. Hanssen, B. Hillenkamp, O. Kögler, A. Mollenhauer, and F. Stolleis. Beirut: Orient Institute, 35–107.

### **Others**

Chen, D. W. 2004. Traffic in the Basement. *The New York Times*, June 18, 2004.

McCown, J. 2002. Boston Air Rights. *Architecture Week*, September 2002.

Bressi, T. W. 1989. Freeway with a Fringe on Top. *Planning*, July 1989.

Galowitz, S. W. 1996. The Use and Abuse of the Term Air Rights. *Real Estate Review*, Spring 1996.

Russell, J. 1990. When there's No Place to Go but Up. *Architectural Record*, September 1990.

## Annex I

		PLATFORM DEVELOPMENT			MEGASTRUCTURE DEVELOPMENT			BEST PRACTICES
		Boston : Copley Place	Boston : Columbus Center	Boston : One Kenmore	The Hague: Grostiusplaats	The Hague: Malietoren	The Hague: Equinox	
GOALS	Economy	<ul style="list-style-type: none"> <li>Compliment and reinforce the commercial character of the surrounding area and not undermine existing retail on Washington Street.</li> <li>Generate new tax revenue for the city.</li> <li>Create a mix of uses that is economically viable and provides necessary returns to developers and investors.</li> </ul>	<ul style="list-style-type: none"> <li>Create 350 new permanent jobs.</li> <li>Generate \$4 million in new real estate tax revenue and \$1 million in hotel tax revenue.</li> <li>Provide developer, equity investors, and lenders with a credit worthy development that provides fair risk-adjusted returns to all parties.</li> </ul>	<ul style="list-style-type: none"> <li>Approximately \$4,000,000 in new annual real estate taxes which will support City fire, police, schools and other services.</li> <li>Over 350 new permanent jobs.</li> <li>Generating a more diversified set of uses that keep the area active 7-days a week.</li> <li>Provide fair risk adjusted return to project investors and lenders.</li> </ul>	<ul style="list-style-type: none"> <li>Bring increased municipal tax revenue through property and sale tax.</li> <li>Financially rewarding for public and private investors.</li> <li>Provide jobs for local and regional workers.</li> <li>Attract consumers with convenience and high visibility.</li> </ul>	<ul style="list-style-type: none"> <li>Bring increased municipal tax revenue through property and sale tax.</li> <li>Financially rewarding for public and private investors.</li> <li>Provide jobs for local and regional workers.</li> <li>Attract consumers with convenience and high visibility.</li> </ul>	<ul style="list-style-type: none"> <li>Bring increased municipal tax revenue through property and sale tax.</li> <li>Financially rewarding for public and private investors.</li> <li>Provide jobs for local and regional workers.</li> <li>Attract consumers with convenience and high visibility.</li> </ul>	<ul style="list-style-type: none"> <li>Reinforce the character of the surrounding areas.</li> <li>Generate new tax revenue.</li> <li>Create a mix uses environment that is economically viable.</li> <li>Diversify set of uses that keep the area active</li> <li>Attract consumers with convenience and high visibility.</li> <li>Financially rewarding for public and private investors</li> </ul>
	Environment	<ul style="list-style-type: none"> <li>Mitigate potential wind and shadow impacts of development and of the highway corridor.</li> <li>Encourage transit and pedestrian amenities to minimize automobile usage.</li> <li>Cover and ventilate the highway corridor to reduce carbon monoxide levels in the area.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce noise of Turnpike and rail corridors.</li> <li>Improve the air quality through coverage and appropriate ventilation.</li> <li>Reduced the wind due to Turnpike coverage, project design.</li> <li>Ensure that project produces no adverse impact on local groundwater levels.</li> <li>Minimize vehicular traffic through improved transit connections.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce noise levels due to decking over the Turnpike and rail lines.</li> <li>The project will implement Green Engineering and Sustainable Design techniques, and will investigate the feasibility of a LEED Certification.</li> <li>Minimizes new automobile trips through: integration with the MBTA transit system, improved pedestrian environment connectivity, shared vehicles service, shared parking.</li> </ul>	<ul style="list-style-type: none"> <li>Mitigate negative externalities associated with highway such as noise and air pollution.</li> <li>Brought a new identity to the site.</li> <li>Creation of a public plaza</li> </ul>	<ul style="list-style-type: none"> <li>Mitigate negative externalities associated with highway such as noise and air pollution.</li> <li>Brought a new identity to the site.</li> </ul>	<ul style="list-style-type: none"> <li>Mitigate negative externalities associated with highway such as noise and air pollution.</li> <li>Brought a new identity to the site.</li> <li>Reinforce street continuity and by allocating public open spaces.</li> </ul>	<ul style="list-style-type: none"> <li>Mitigate potential wind and shadow impacts of development and of the highway corridor.</li> <li>Mitigate negative externalities associated with highway such as noise and air pollution</li> <li>Investigate the feasibility of a LEED Certification.</li> <li>Minimizes new automobile trips through: integration with transit system, improved pedestrian environment connectivity, shared vehicles service, shared parking.</li> <li>Brought a new identity to the site.</li> </ul>
	Equity	<ul style="list-style-type: none"> <li>Maximize the opportunity for community residents and groups to benefit from employment opportunities.</li> <li>Create pedestrian links that are appropriately scaled, safe and active.</li> <li>Reinforce the mixed-income residential character</li> <li>Fill a major gap in existing neighborhood and urban texture.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the canyon caused by the turnpike with three city blocks</li> <li>Create neighborhood parks and open spaces for community use.</li> <li>Create a mix of uses that serve the neighborhood needs,</li> <li>Promote pedestrian activity and connectivity</li> <li>Subsidize commercial rent for local small business owners.</li> </ul>	<ul style="list-style-type: none"> <li>Deck over 108,000 square feet and rail corridor.</li> <li>Create year round neighborhood economy.</li> <li>Establish public realm benefits including pedestrian plazas, pocket parks; improve sidewalks and bikeways.</li> <li>New affordable rental opportunities on-site ( 50 units) and a capital contribution for 25 additional units off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Construction of a public housing unit executed elsewhere.</li> <li>Create pedestrian links that are appropriately scaled, safe and active.</li> <li>Fill a major gap in existing neighborhood and urban texture.</li> </ul>	<ul style="list-style-type: none"> <li>Create pedestrian links that are appropriately scaled, safe and active.</li> <li>Fill a major gap in existing neighborhood and urban texture.</li> </ul>	<ul style="list-style-type: none"> <li>Create pedestrian links that are appropriately scaled, safe and active.</li> <li>Fill a major gap in existing neighborhood and urban texture.</li> </ul>	<ul style="list-style-type: none"> <li>Fill a major gap in existing neighborhood and urban texture.</li> <li>Create neighborhood parks and open spaces .</li> <li>Subsidize commercial rent for local small business owners.</li> <li>New affordable rental opportunities on-site</li> <li>Residents to benefit from employment .</li> <li>Create pedestrian links that are appropriately scaled, safe and active.</li> </ul>
CONFLICTS	Development	<ul style="list-style-type: none"> <li>No solution was found this project necessitated public funding that could have been directed elsewhere.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided because the development resolved a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided because the development resolved a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided because the development resolved a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided because the development resolved a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided because the development resolved a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>	<ul style="list-style-type: none"> <li>To avoid by designing a development that will resolve a problem generated by a public intervention through the private sector without necessitating public funding.</li> </ul>
	Property	<ul style="list-style-type: none"> <li>Solution with the creation of the CRC that established some guidelines of development that developers must follow.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided by taking advantage of the civic vision adoption in 2000 and the conduction of a community review process.</li> </ul>	<ul style="list-style-type: none"> <li>Avoided by taking advantage of the civic vision adoption in 2000 and the Columbus Center experience.</li> <li>The developers conduct a community review process prior to any design.</li> <li>Owning a land on tera firma is a positive point with stakeholders and in the design</li> </ul>	<ul style="list-style-type: none"> <li>The development gave a new identity to an area of the city that seeks one.</li> </ul>	<ul style="list-style-type: none"> <li>The development gave a new identity to an area of the city that seeks one, and acted as a city gate.</li> </ul>	<ul style="list-style-type: none"> <li>The development gave a new identity to an area of the city that seeks one.</li> </ul>	<ul style="list-style-type: none"> <li>Have a certain Civic vision for the development that establishes guidelines of development that developers must follow.</li> <li>The developers must conduct a community review process prior to any design.</li> <li>Owning a land on tera firma is a positive point.</li> <li>Have a transparent public private partnership.</li> </ul>
	Resource	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist. In this particular case the development contribute in recreating a natural environment with the creation of a public park on one of the parcels</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> <li>The development contribute in recreating a natural environment with the allocation of a high percentage of land serving the public realm as park and pedestrian connection</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> <li>In this particular case the development contribute in recreating a natural environment with the creation of a piazza thus, reinforcing the pedestrian connection</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> <li>In this particular case the development contribute in recreating a natural environment with the creation of a piazza thus, reinforcing the pedestrian connection</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> </ul>	<ul style="list-style-type: none"> <li>In air right development over highway corridors this conflicts does not exist.</li> <li>Recreating a natural environment with the allocation of a high percentage of land serving the public realm as park and pedestrian connection</li> </ul>

## Annex II

An aerial photograph of a highway corridor in Beirut, Lebanon. The highway runs vertically through the center of the image. On either side, there is a mix of urban development, including residential buildings, parking lots, and some green spaces. The highway itself has multiple lanes and some overpasses. The surrounding area is densely packed with buildings and infrastructure, typical of an inner-city environment.

*Sustainable Air Right Development over Inner-City Highways:  
The Case Study of the Southern Edge of Beirut's Central District.*

RUDY MAROUN



## This Thesis:

Explores the concept and practice of sustainable air right development over inner-city highway corridors.

Provides an elaboration on a graduate urban design studio titled: *Re-Envisioning Infrastructural Breaks: Urban and Landscape Design Strategies for the Southern Edge of Beirut's Central District* (Spring 2012).

# Case Study Profile : The Fouad Chehab Avenue

Detailed Master Plan

HIGHWAY

Outdated Blanket Zoning . Gentrification



Existing Neighborhoods



HIGHWAY

BCD

Post War Reconstruction District

Private real estate company



# Undesirable Consequences



Air and noise pollution.

Discontinuity of the street networks.

Disrupt the historical urban fabric.

Creation of a transition zone of dilapidated building and empty lots.

Consume land with a high potential for development.





# Undesirable Consequences



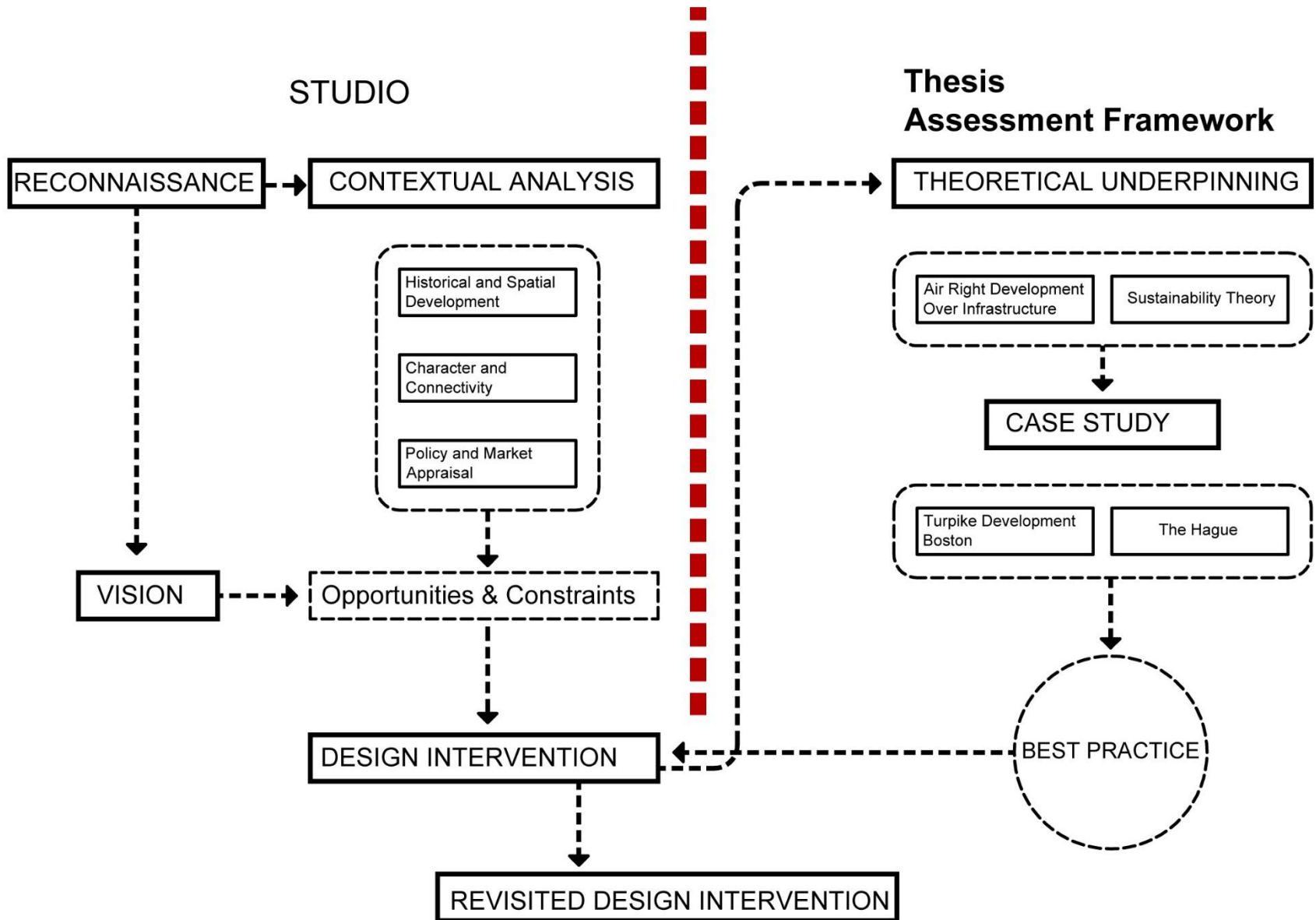
How to re-conceptualize **inner-city traffic arteries as catalysts of integration** rather than generators of physical, spatial and functional segregation? More specifically,

How to apply 'air right development over highways' for promoting a *sustainable approach* to urban design?

How could such a strategy be adapted to the Beirut context and more particularly to the southern edge of the BCD, taking into consideration its performance in different Western contexts such as Boston and The Hague?

# FROM URBAN DESIGN STUDIO TO THESIS

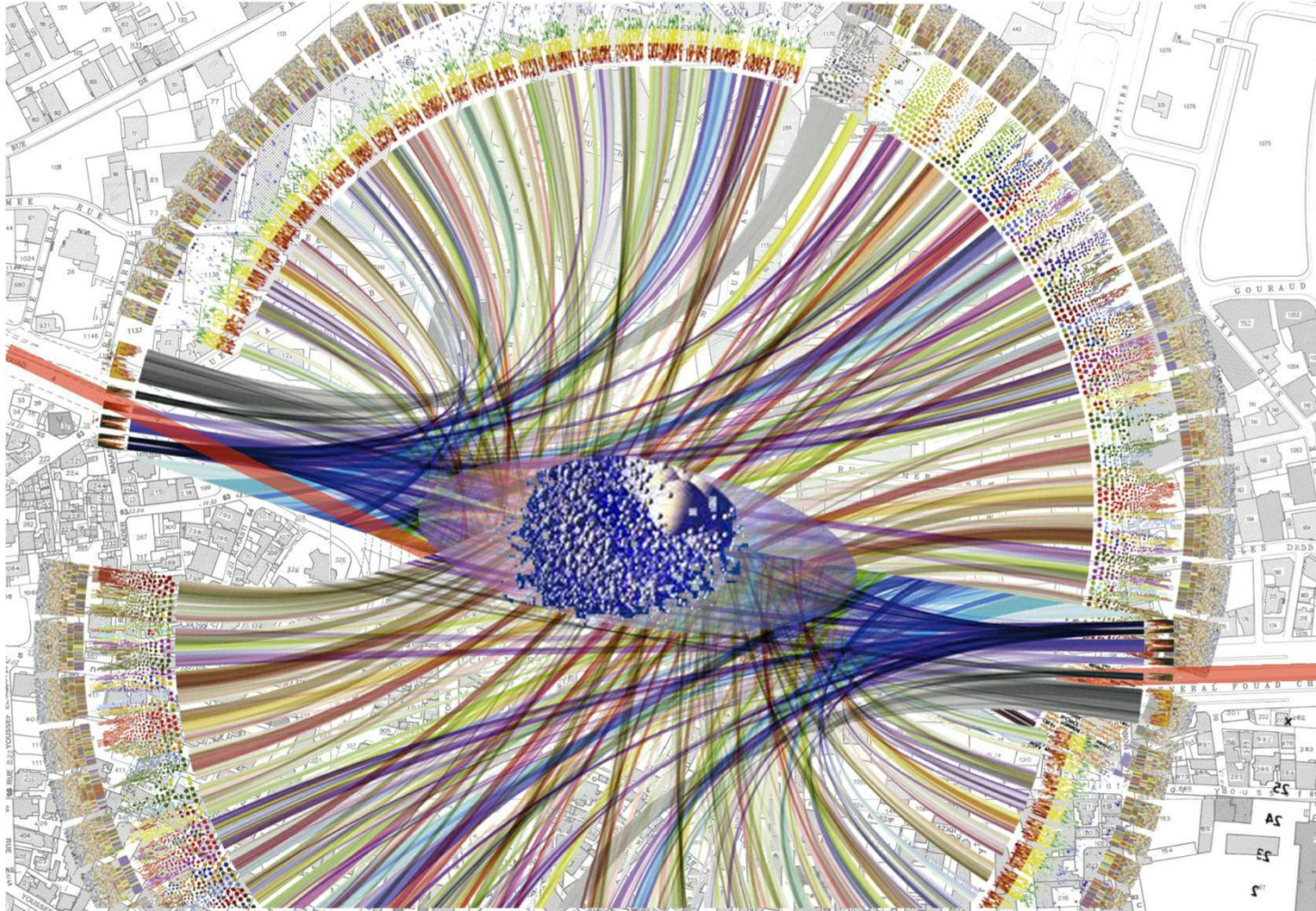




STUDY PROCESS

# STUDIO DEVELOPMENT

# LAYERED CONNECTION



I

Historical and Spatial  
Development

II

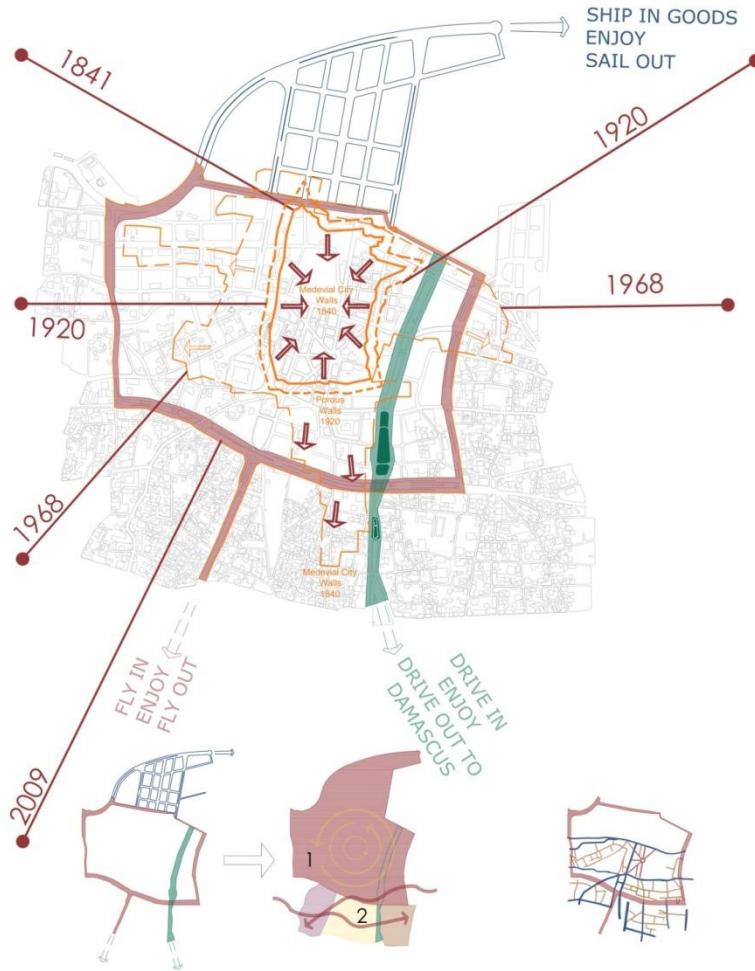
Character and  
Connectivity

III

Community, Policy and  
Market Appraisal



# I-Historical and Spatial Development



3 Major Infrastructural components today:

1. Ring Road
2. Ghalghoul Intersection
3. Damascus Road

Infrastructure delineates 2 different ecologies:

1. Solidere: Self-sufficient
2. Bachoura: Dependent

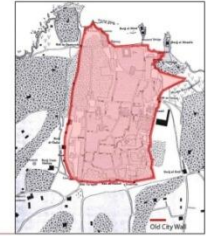
Road Network would've been continuous if it wasn't for the infrastructural break

## Intra Mural City: 1841

City Walls: Protect & delineate the Old City

Urban Fabric: Confined within the walls

Infrastructure: Inexistent



## Pre Ecochard City: 1920

City Walls: Dissolved & Porous

Urban Fabric: Rapid Southern expansion, existing residential blocks on the future Southern ring road

Infrastructure: Organic & Incremental solutions for vehicular mobility

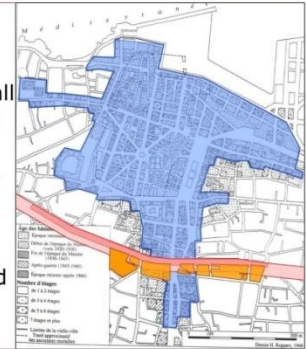


## Modern City: 1968

City Walls: Symbolic Blue delineates Old City Fabric but no physical wall

Urban Fabric: Ecochard's implantation enlarged the scale of city blocks & avenues

Infrastructure: First Northern Part of Fouad Chehab Bridge completed



## Contemporary City: 2009


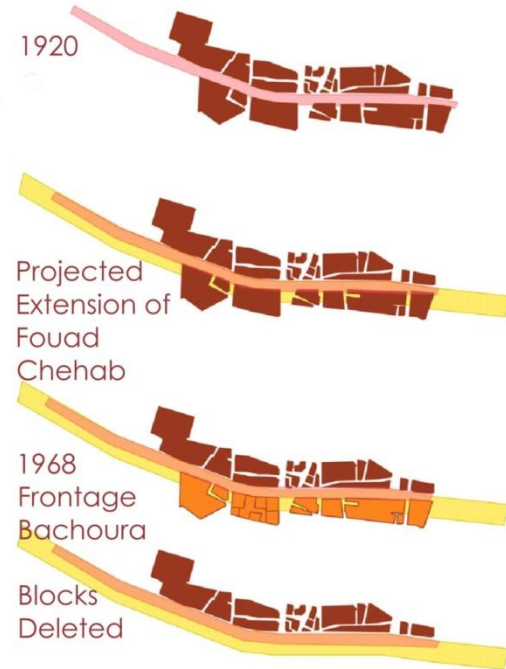
City Walls: Ring is a new type of wall, delineating 2 different planning systems

Urban Fabric: an interface between block design & lot design

Infrastructure: Aims to repositioning Beirut as a Connecting Center. Doubled in capacity, it provides fast access to the airport & port, East & West Beirut & main central areas.

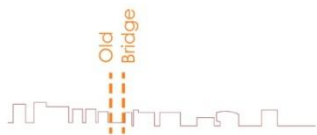


# Historical and Spatial Development



1920 Skyline: Before the bridge, the Urban Fabric was continuous

The diagram shows a continuous skyline with a vertical dashed line indicating the location of the bridge. The skyline is a simple line drawing of buildings of varying heights.



1968 Skyline: First Northern Section of Bridge Completed. Continuous urban morphology on both sides

The diagram shows a continuous skyline with a vertical dashed line indicating the location of the bridge. The skyline is a simple line drawing of buildings of varying heights.

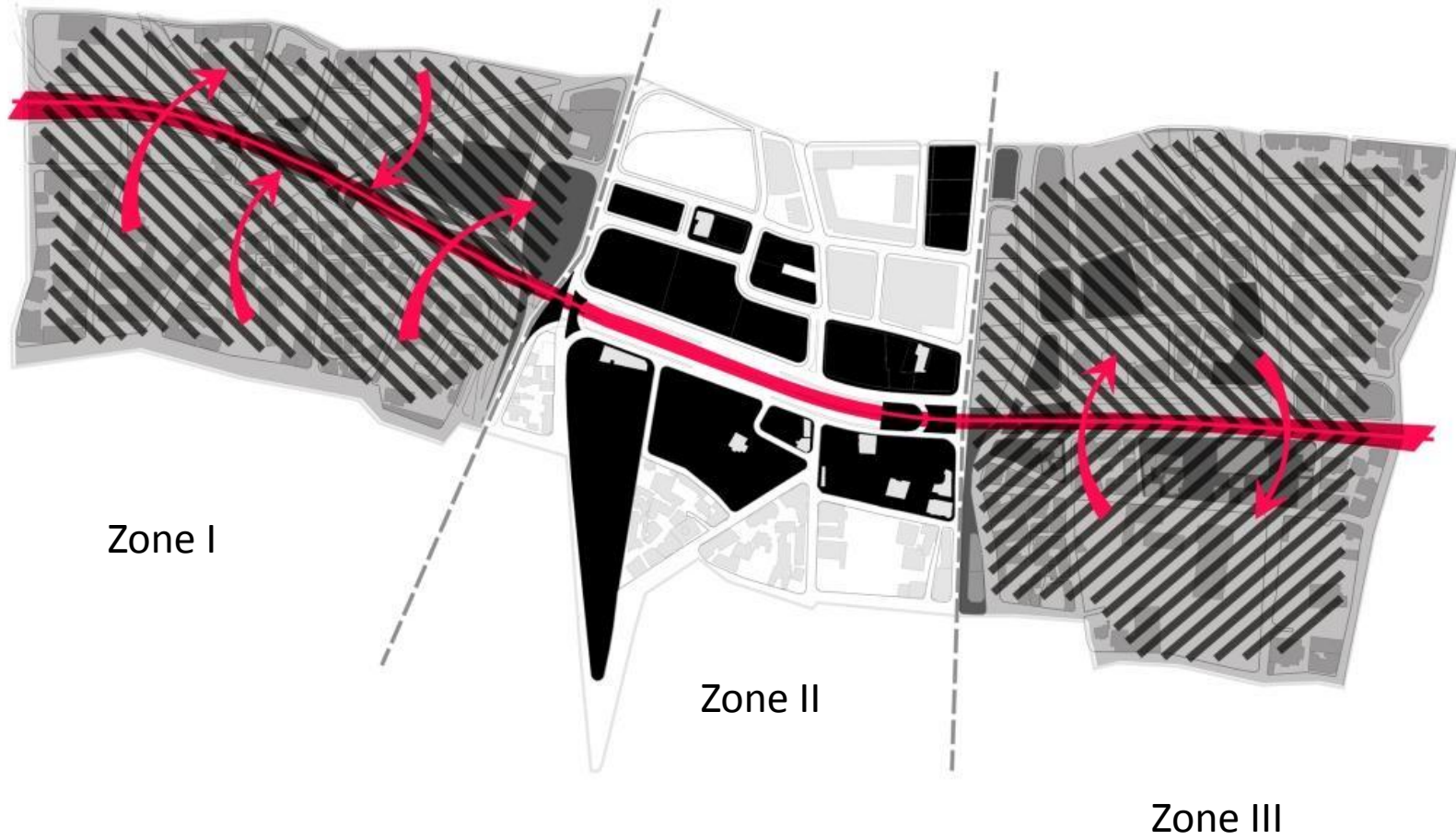


2009: Second Southern Section of Bridge Completed. Discontinuity in the urban fabric

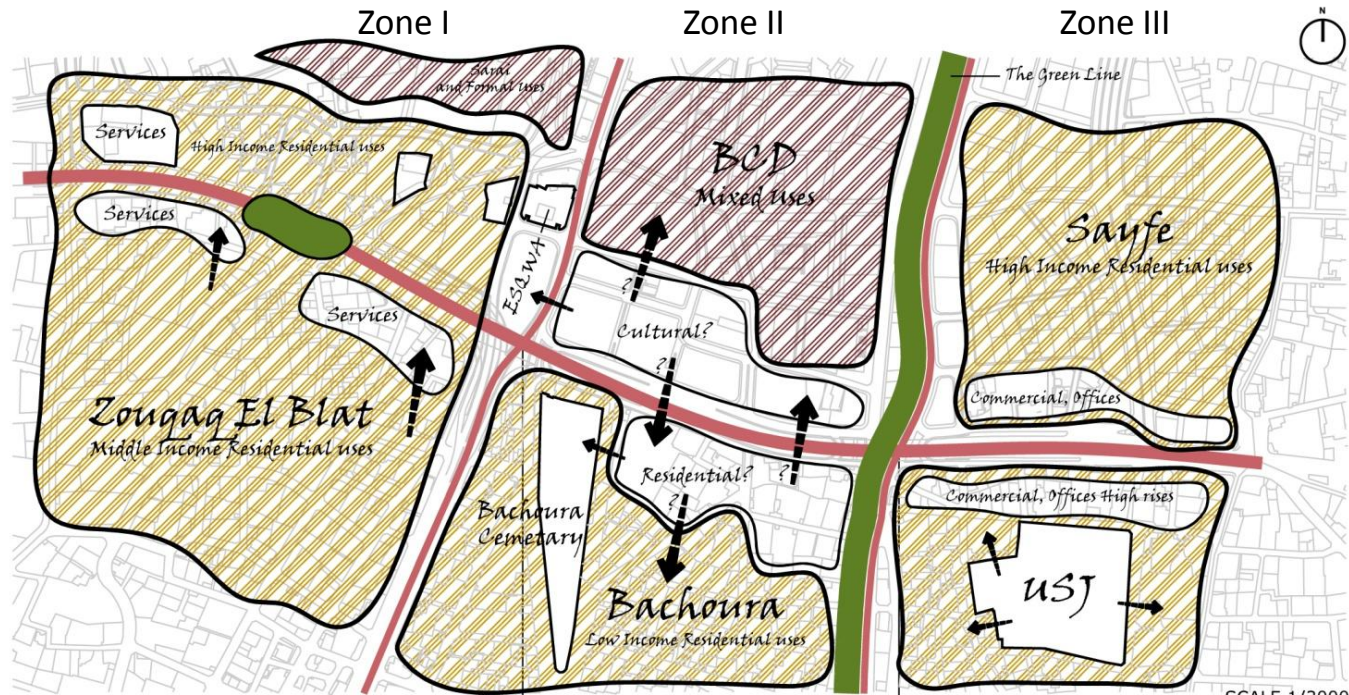
The diagram shows a skyline with a vertical dashed line indicating the location of the bridge. The skyline is a simple line drawing of buildings of varying heights, with a noticeable gap or discontinuity in the urban fabric at the bridge location.



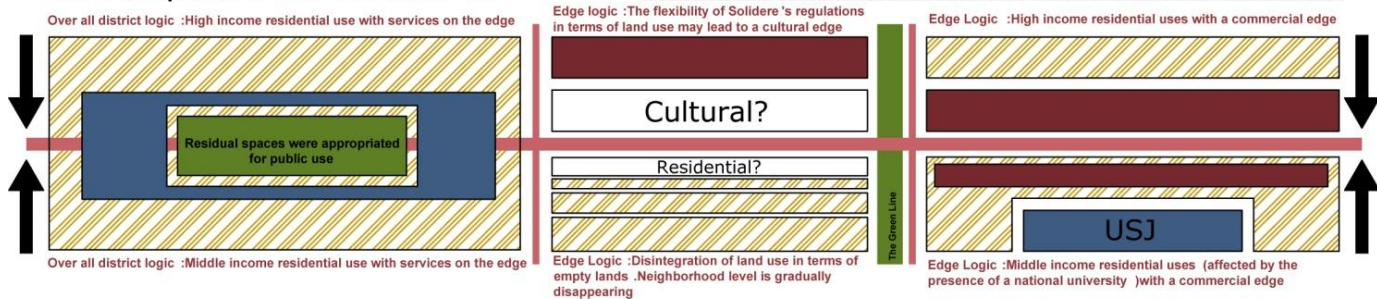
## II- Character and Connectivity



# A. Land Use



## The Impact from Outside in



## The Impact from Inside out

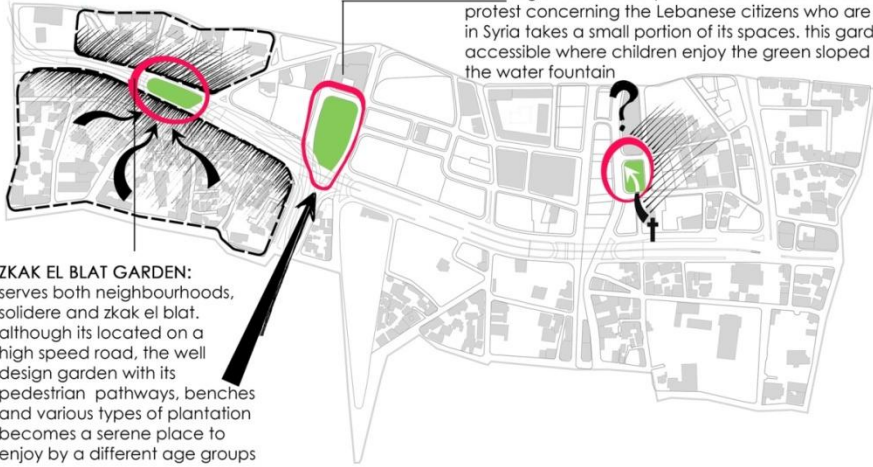




## GARDENS

### Jubran Khalil Jubran garden:

It attracts visitors on a national and neighbourhood scale, being next to the ESCWA building, this garden represents to a strategic location for political demonstrations so currently protest concerning the Lebanese citizens who are kidnapped in Syria takes a small portion of its spaces. this garden is easily accessible where children enjoy the green sloped areas at the water fountain



**ZKAK EL BLAT GARDEN:** serves both neighbourhoods, solidere and zkak el blat, although its located on a high speed road, the well design garden with its pedestrian pathways, benches and various types of plantation becomes a serene place to enjoy by a different age groups



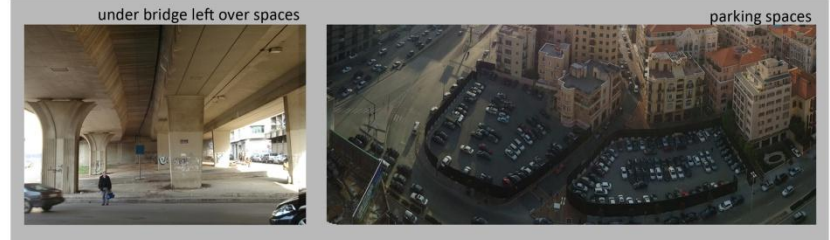
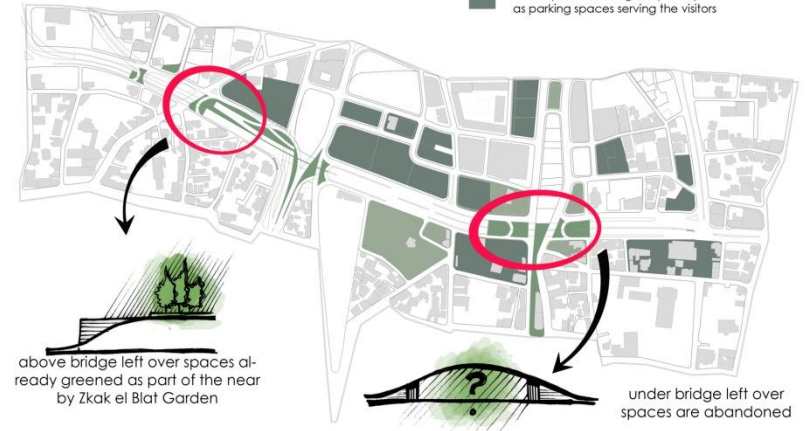
Zkak El Blat Garden



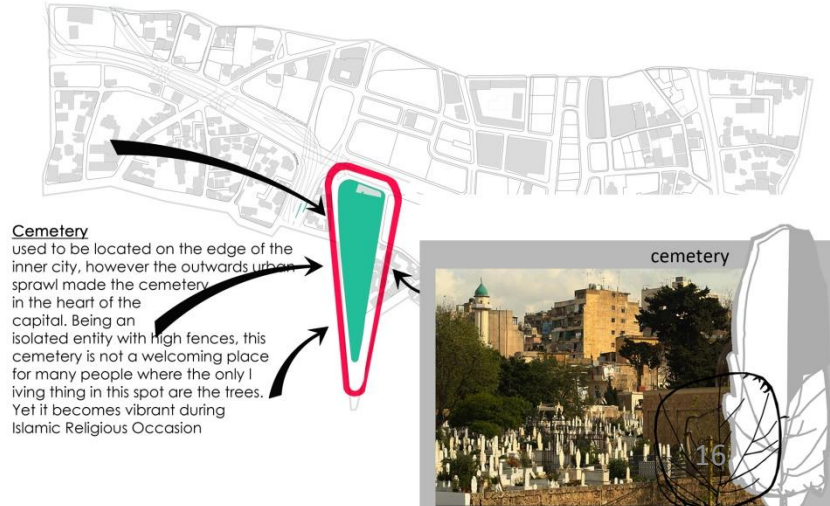
Jubran Khalil Jubran Garden

## UNDEVELOPED LOTS

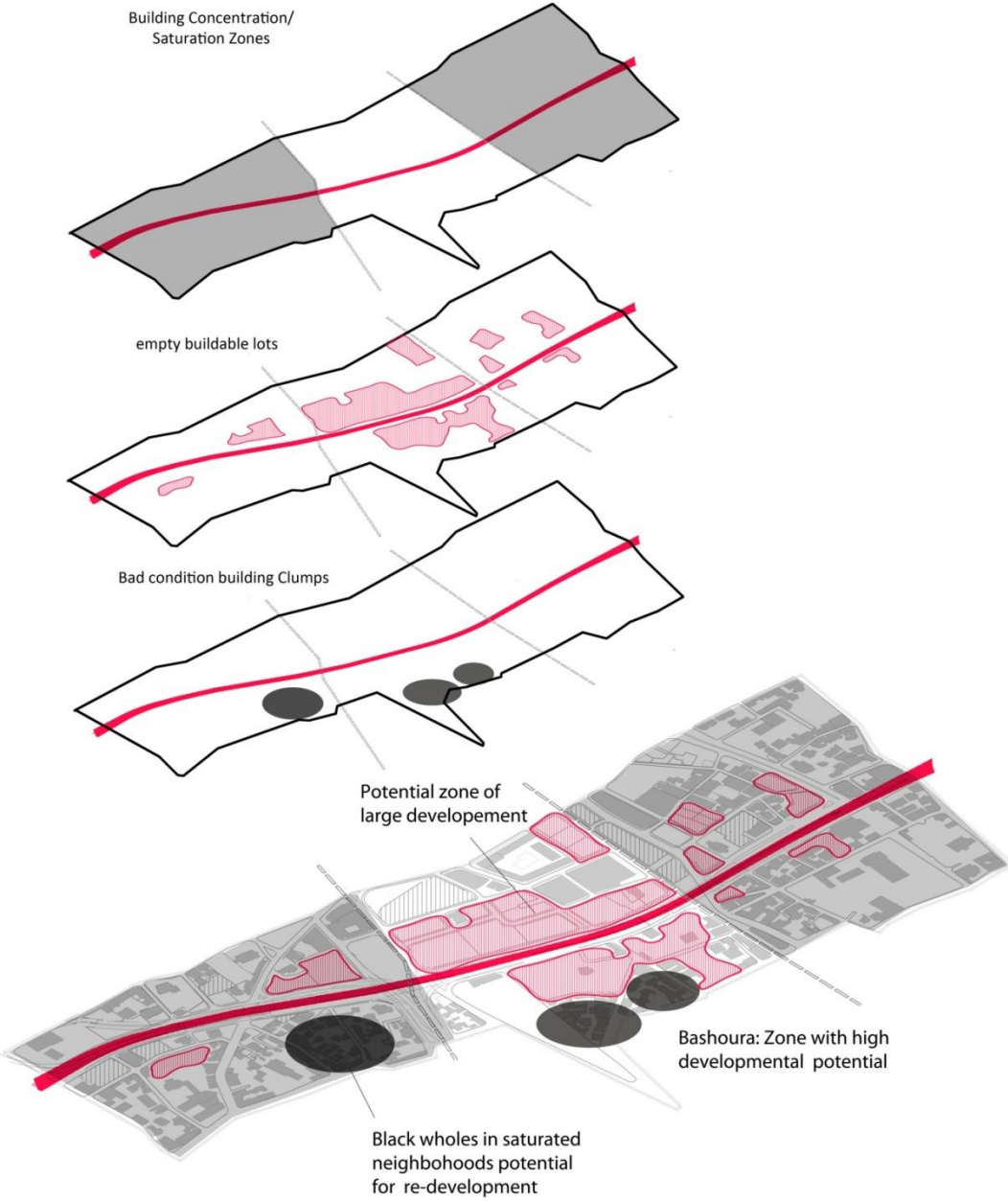
- left over spaces
- unused spaces
- undeveloped lots being temporarily used as parking spaces serving the visitors



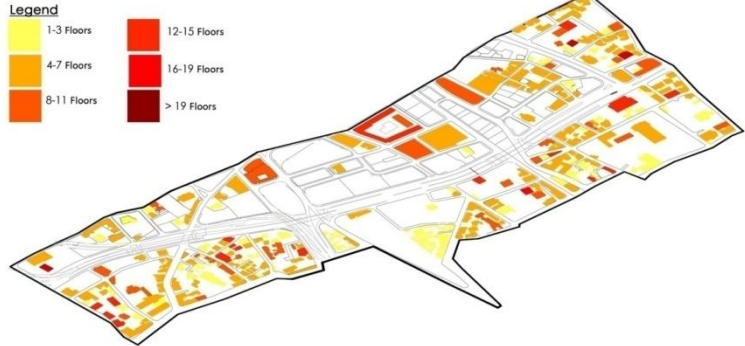
## CEMETERY



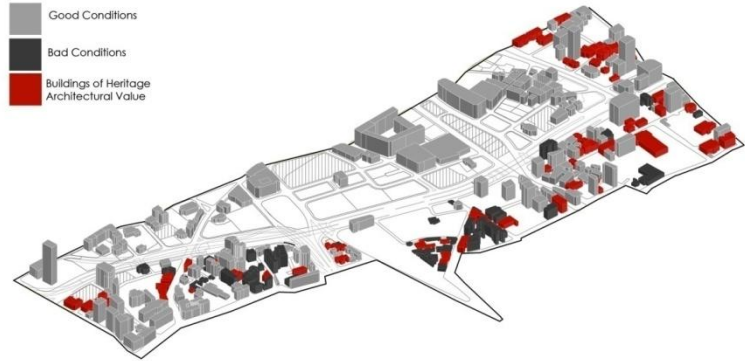
## SITE MORPHOLOGY



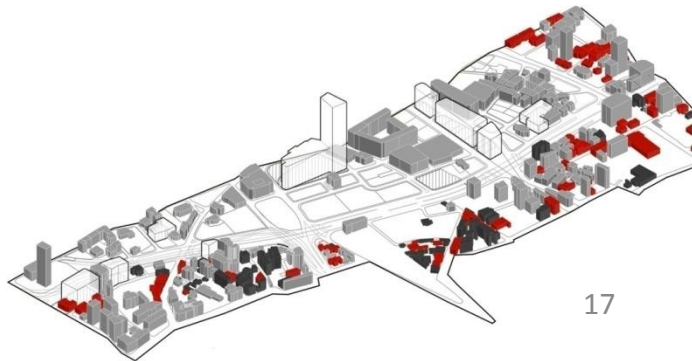
## BUILDINGS HEIGHTS



## BUILDING CONDITIONS

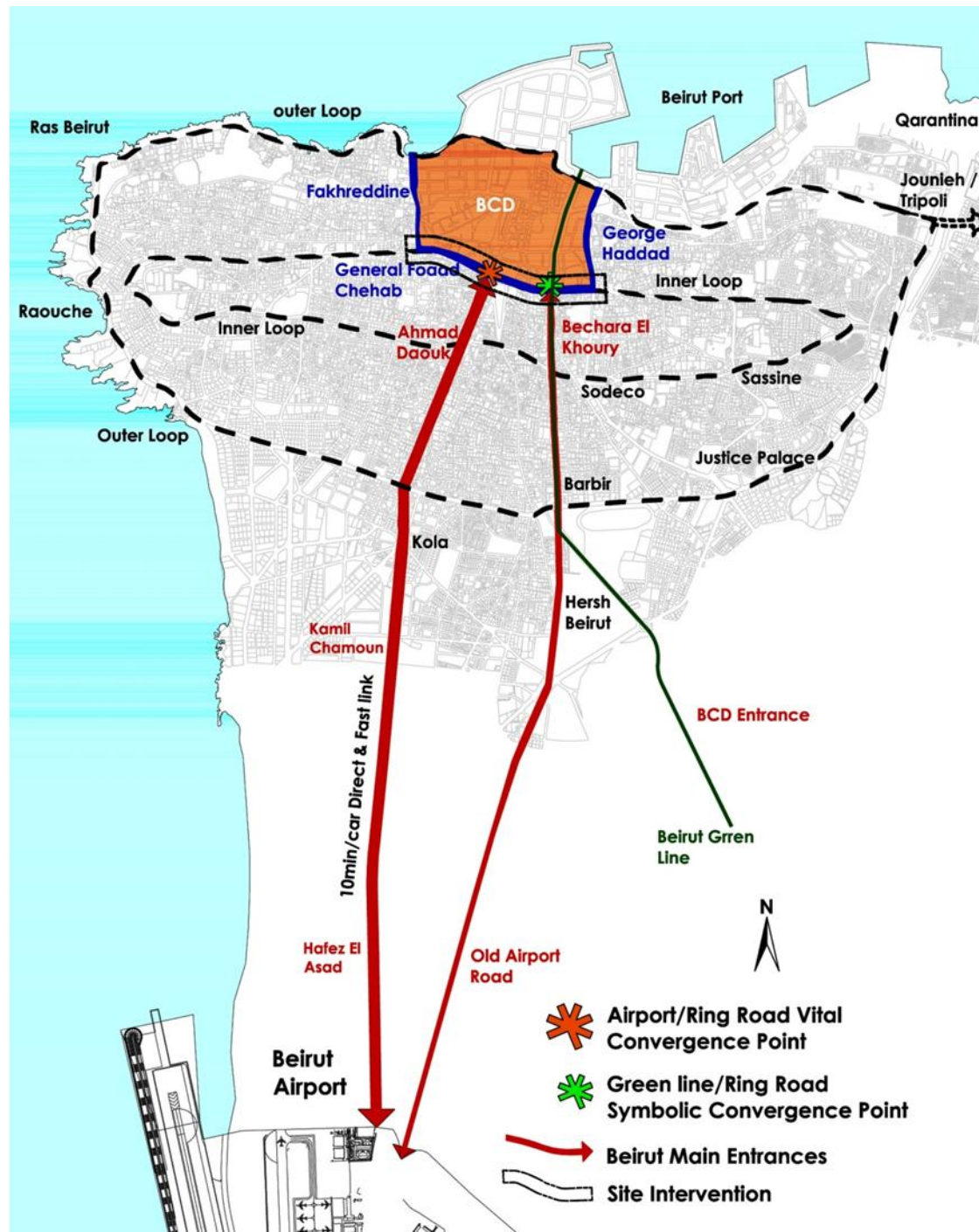


## BUILDINGS UNDER CONSTRUCTION

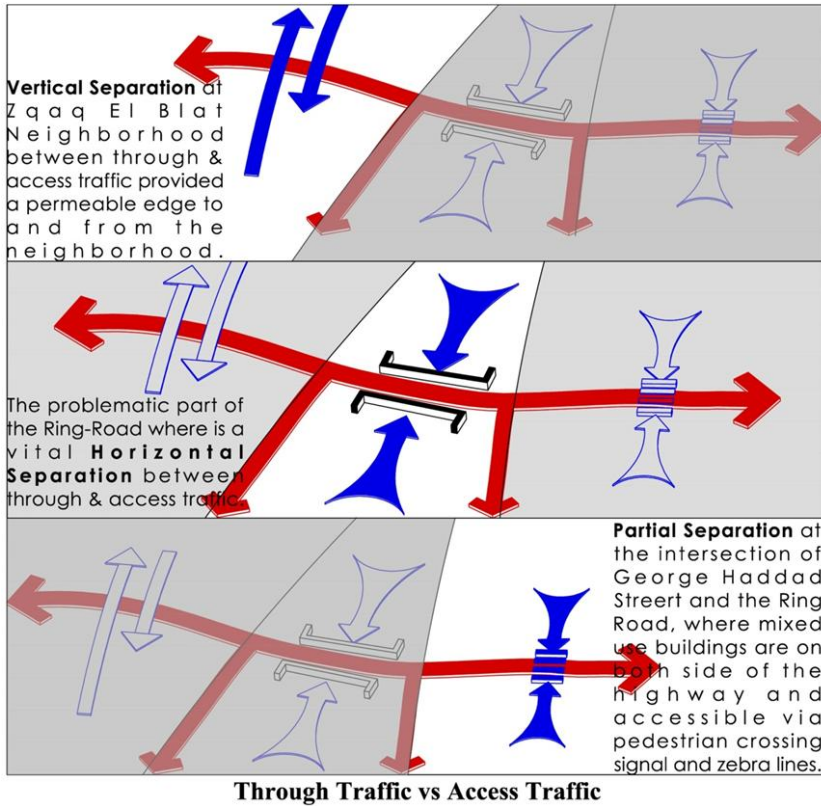




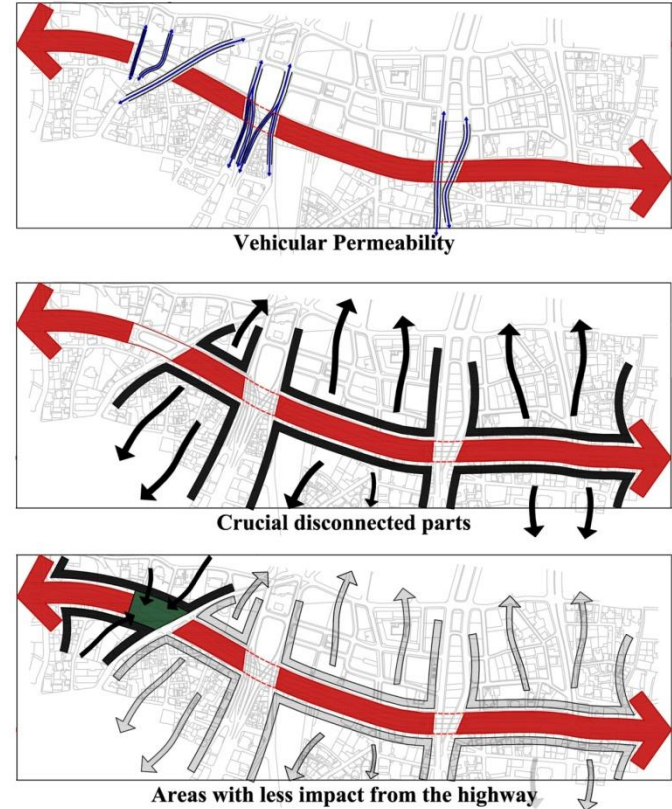
## B. Connectivity



# Traffic Analysis

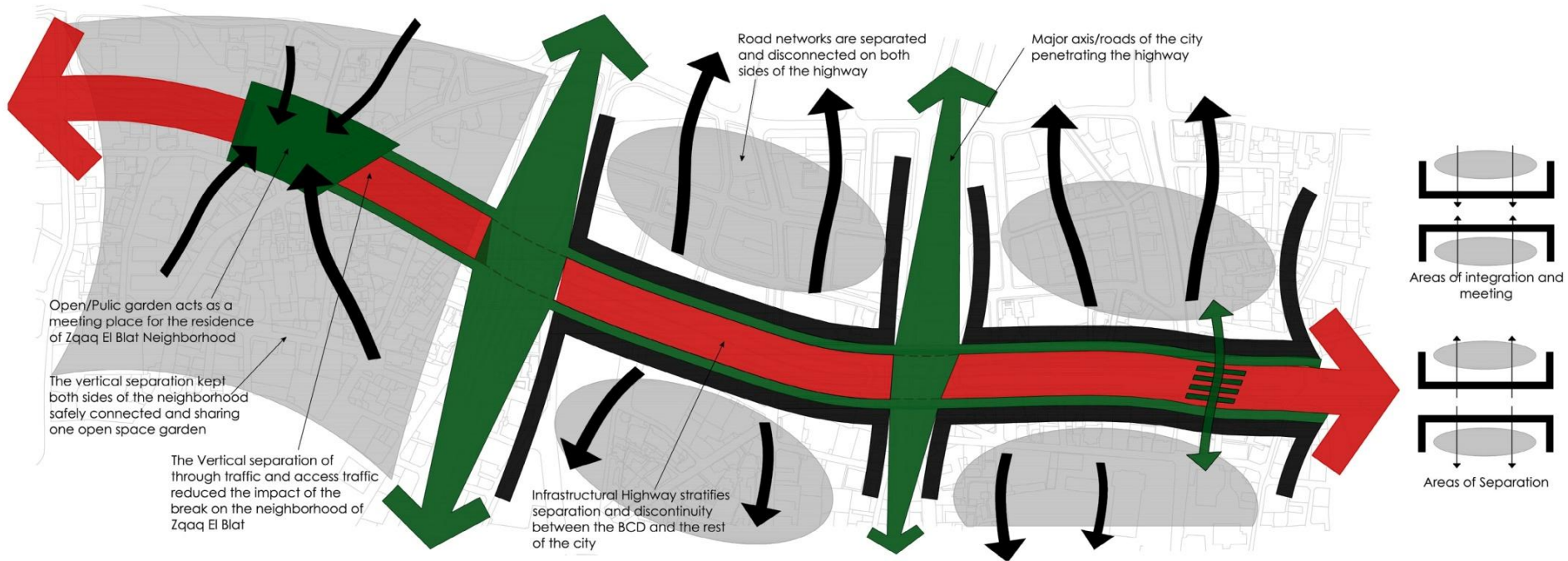


# Site Connectivity

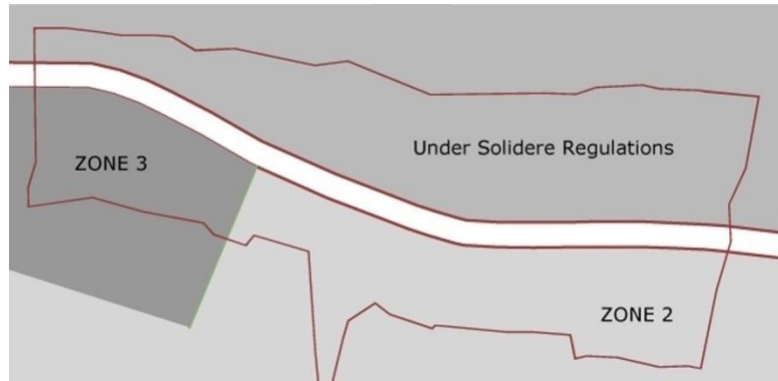




# Site Connectivity and circulation

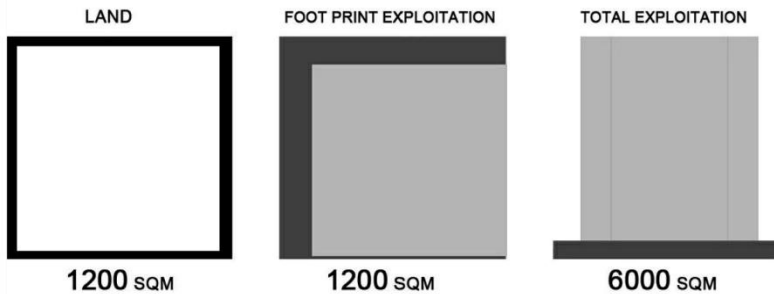
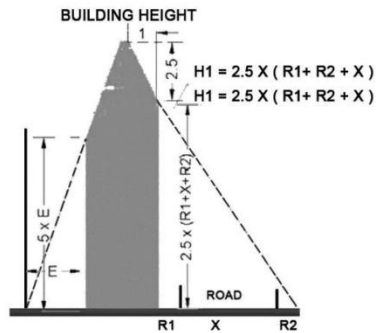


# III- Policy and Market Appraisal



## Blanket Zoning

- ZONE 2
- FOOT PRINT EXPLOITATION : GF : 100%
- FLOOR : 70%
- TOTAL EXPLOITATION : 5
- ZONE 3
- FOOT PRINT EXPLOITATION : 60%
- TOTAL EXPLOITATION : 4



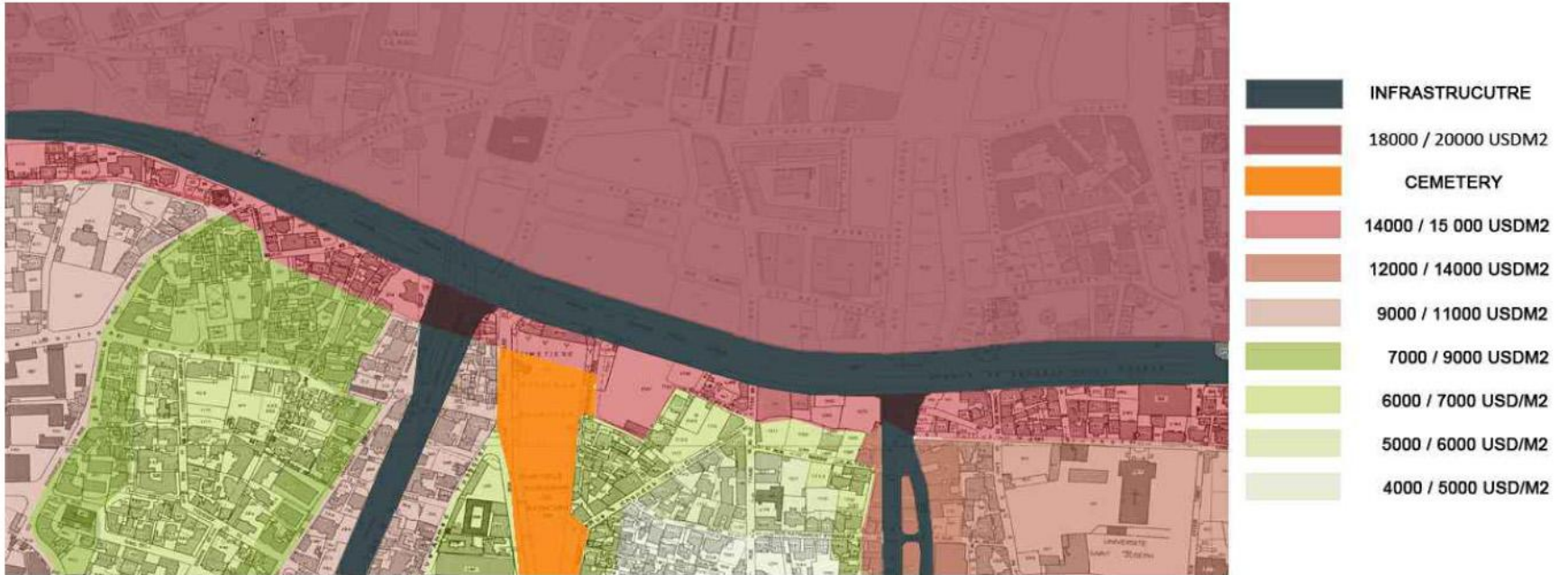
## BCD Master Plan

### The Master Plan\*

- BCD boundary
- Prewar shoreline
- New development - low density
- New development - medium density
- New development - high density
- Restored building
- Public or religious building
- Open space
- Pedestrian streets / links
- Archeological sites
- Utilities

\*Includes proposed modifications to the Waterfront District Sector Plan, sectors A & D, and to roads north of Martyrs' Square.

# Land Price



The studio identified the site as a dysfunctional connector with a high-density development potential on both sides.

The studio proposed to :

### Transport

Create pedestrian and public transport oriented centers at key focal points.

Improve the east-west and north south connection in the three identified zones.

Propose a solution for the heavy vehicular traffic jam on both sides of the bridge on peak hours.

### Morphology

Work on the physical, social, spatial and morphological connection between both sides of the infrastructure.

### Open Space

Enhance and connect the current public open spaces in the area and propose future ones.

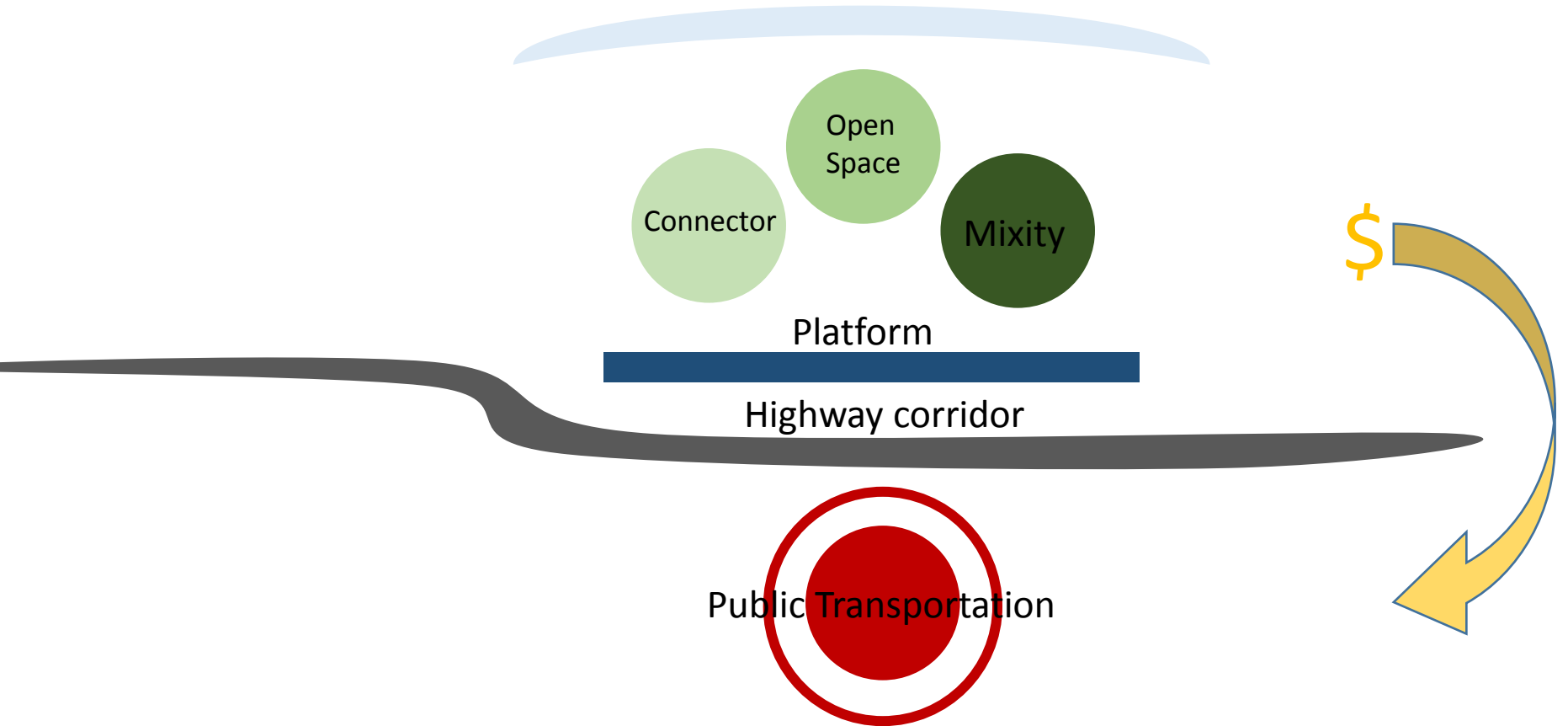
### Conservation

Provide a solution to redevelop and connect saturated neighborhoods with high architectural value to their surrounding especially in Bachoura and Zoukak el Blat.

### Mixity

Propose social activities that promote mixture between the population, regardless of religious and social ranking.

## AIR RIGHT DEVELOPMENT OVER HIGHWAY



Developing air rights over the highway not just to connect but also to make the implementation of a public transportation system option feasible.



## Definition and Historical Evolution

The term '**air rights**' refers to the right to use and control open space above the property owned by another party, and these have been typically granted for the space above railways, highways or other property. ( Savvides 2004)



The concept of integrating building with transportation corridors is not new and goes as far as the renaissance period in Italy.

In most cases in the United States of America, the practice of **air space development** first occurred **over the railway tracks** around which many industrial cities grew.



The first air space development experience took place in New York City in the early 1900s with the construction of the Park Avenue ( Savvides 2004)



Air rights projects like the Prudential Mid-American Building in Chicago, proved that this kind of growth over transportation infrastructures is reasonable and practical (Campell 2004 : 15).



Highway corridors passing through city centers had **harsh consequences** on the urban fabric:

Divide and disturb neighborhoods.

Displace people and businesses.

Create undesirable edges.

Consume land that would have a valuable development opportunities.

Increase the pollution from automobile emissions within the city.



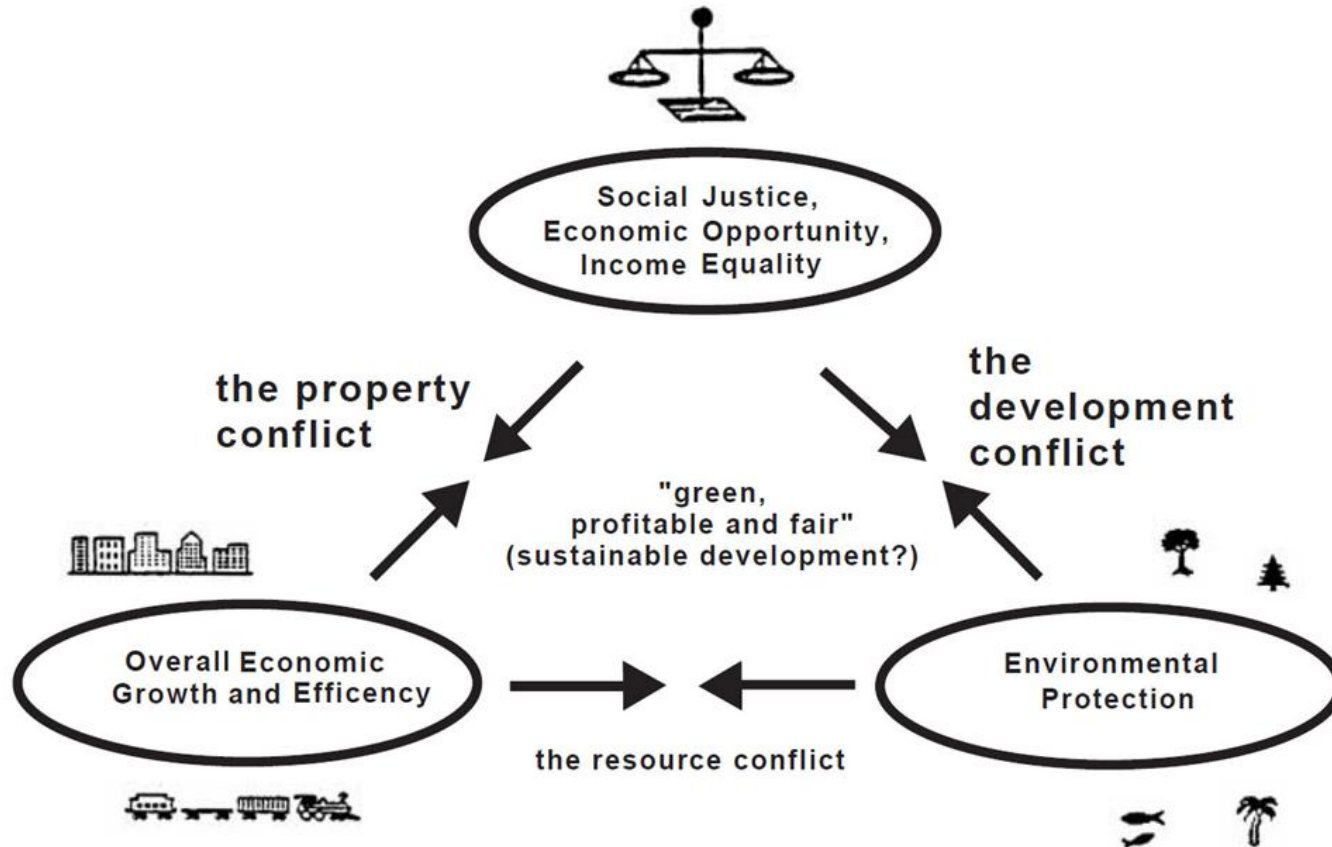
## BOSTON



## The HAGUE







# Massachusetts Turnpike Air Right Development





# Copley Place



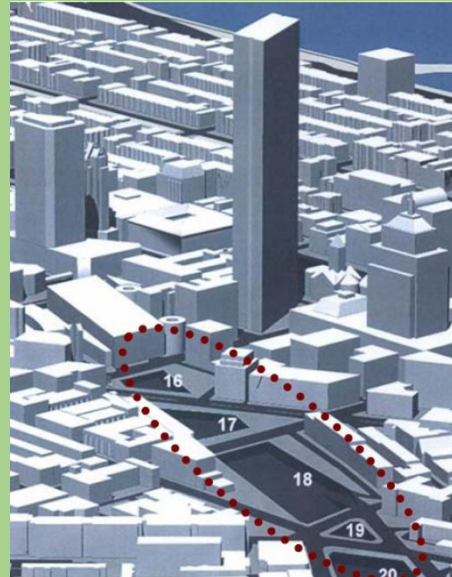
1977



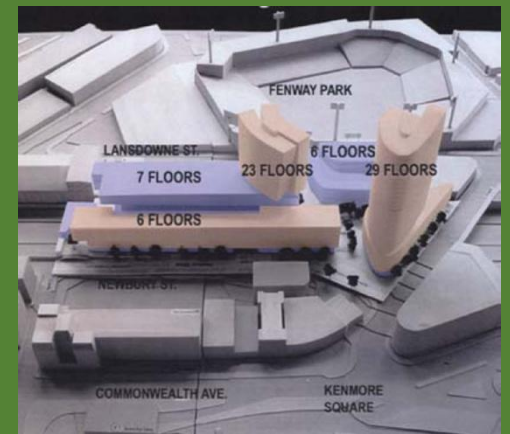
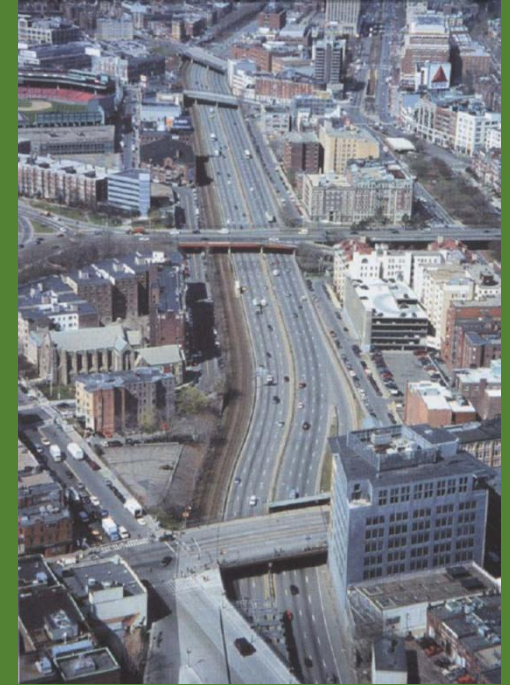
Now

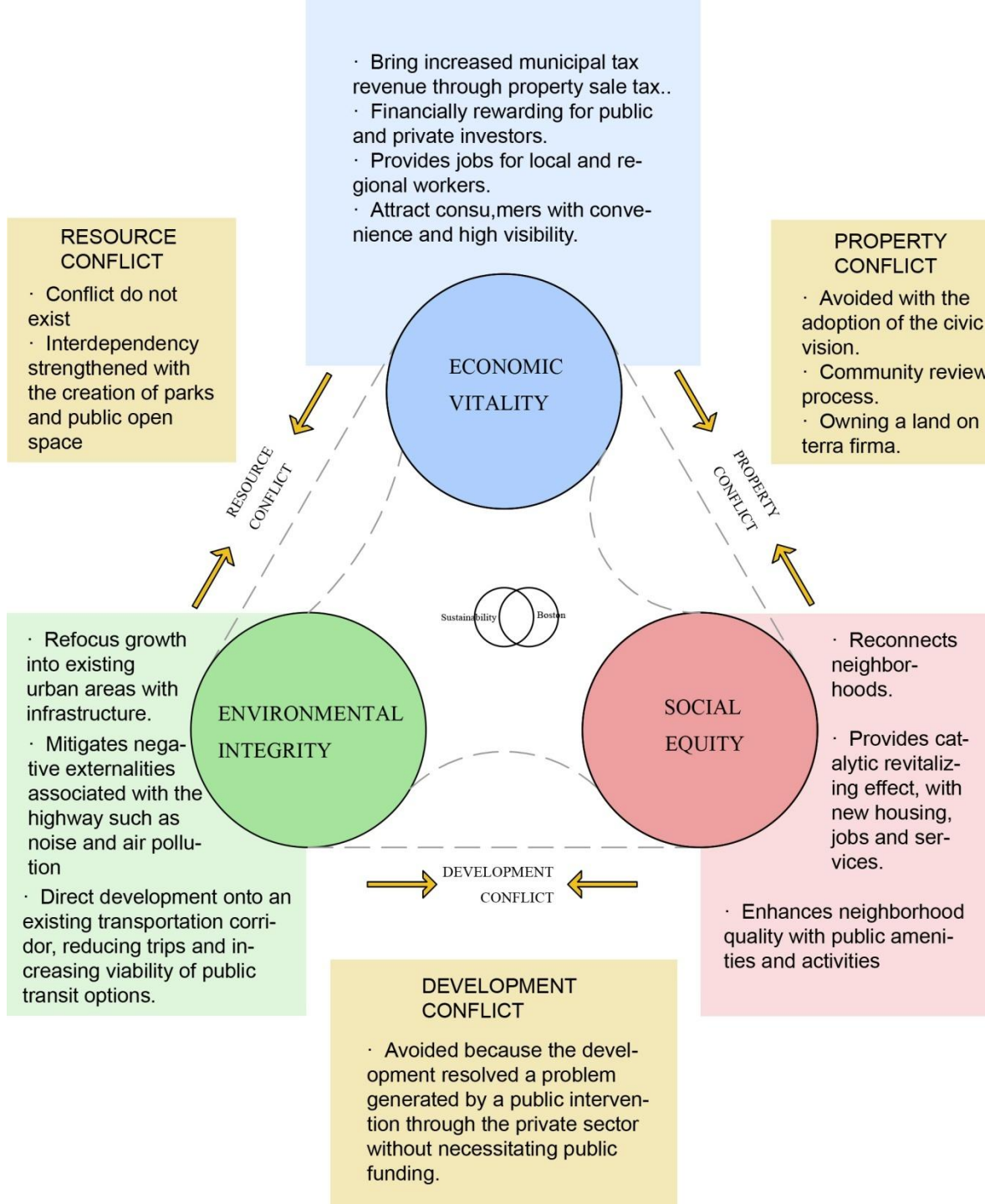


# Columbus Center



# One Kenmore





### Policy and Planning Lessons

Need for a robust regulation.

Conduct a community review process.

Have a certain vision or guidelines for developing over the infrastructure like the civic vision.

### Design and Development Lessons

Connect the development to its surrounding, not only on the physical level but also by incorporating uses that complement the surrounding neighborhoods.

Connect the development to the existing road and public transportation network.

### Sustainability & Environment Lessons

Mitigate highway externalities.

Allocate parcels for public parks.

Reinforce pedestrian connections.

Promote for a LEED certified development.



**Malietoren**

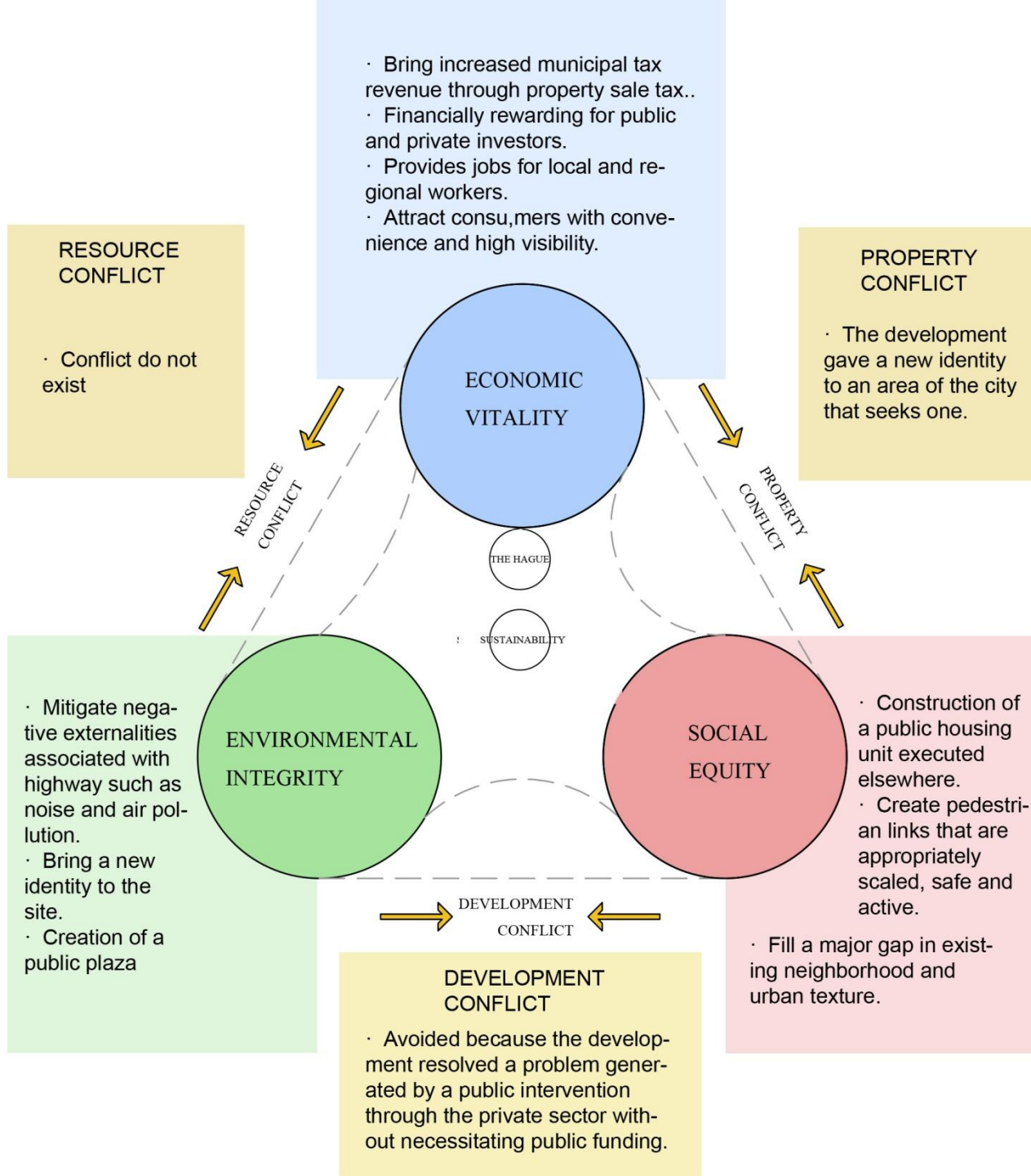


**Equinox**



**Grostiusplaats**

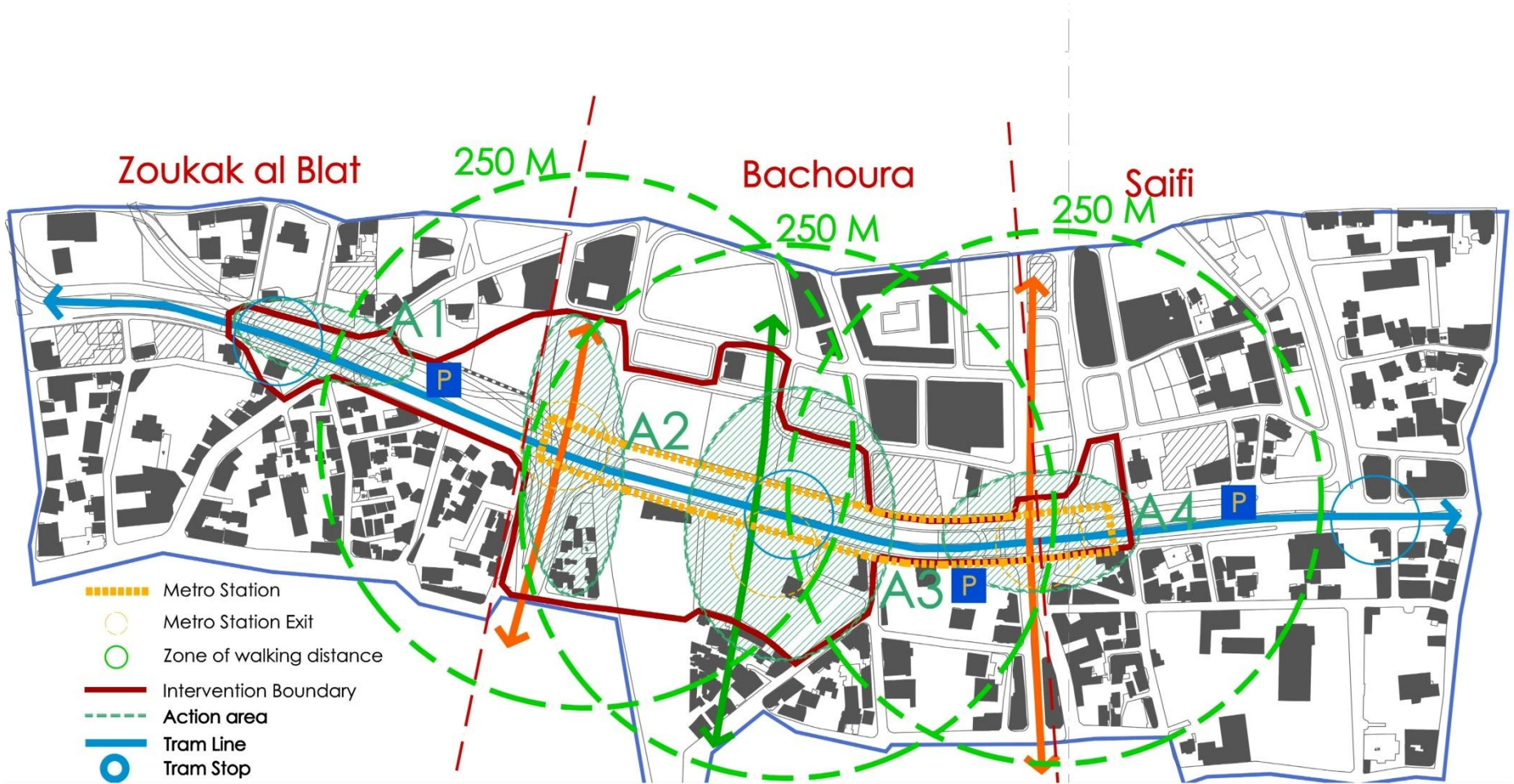




While both cities, Boston and The Hague, adopted the same urban design tool of intervention, they differed in their vision, scale and social implication. I personally consider the Bostonian development as a form of a more complete sustainable development that goes the furthest to the center of Campbell triangle of conflicting goals because it dealt with most of the site conflicts and completely resolved the entire problems caused by the infrastructure.

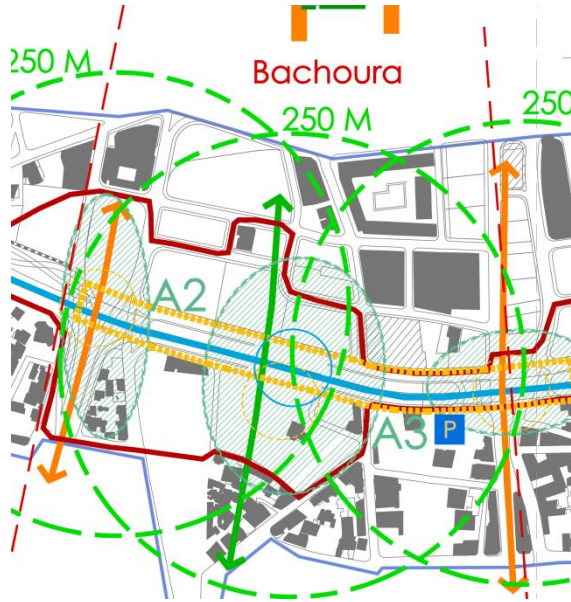
# Initial Urban Design Intervention





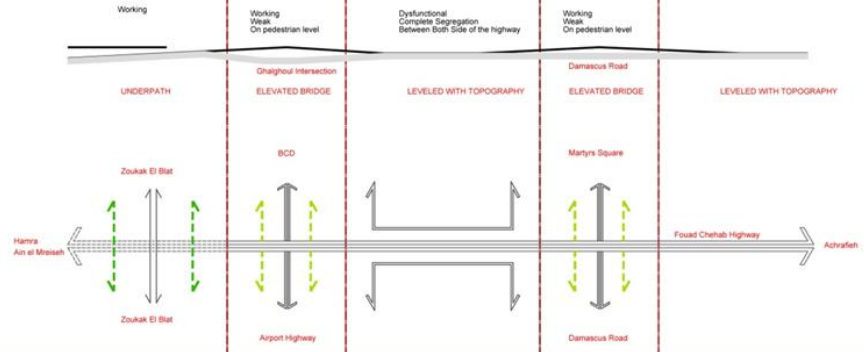


# Action Area III

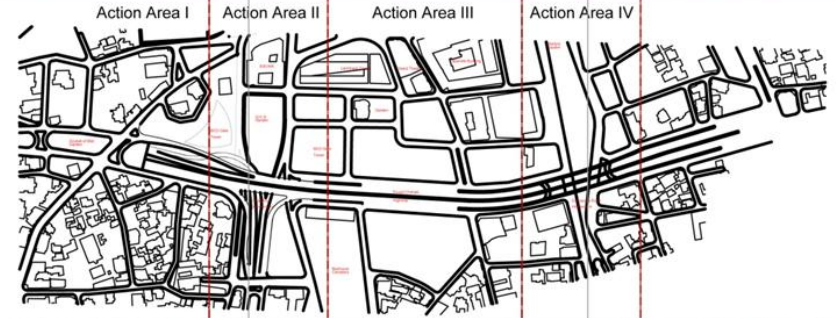


## VEHICULAR & PEDESTRIAN SYSTEM

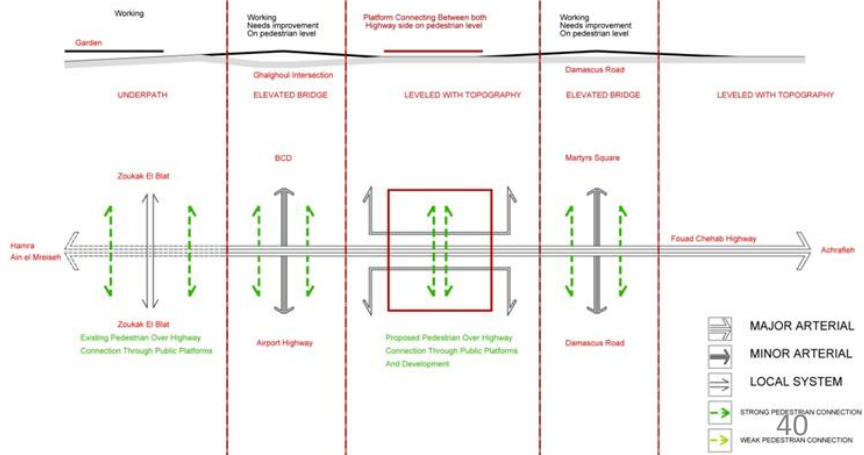
Current



Site

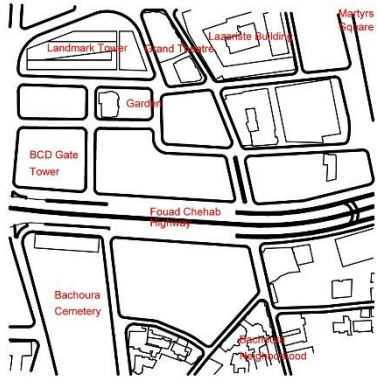


Proposed

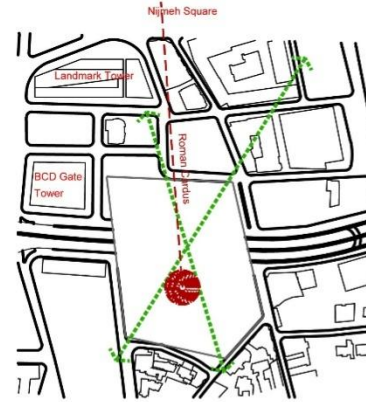


- MAJOR ARTERIAL
- MINOR ARTERIAL
- LOCAL SYSTEM
- STRONG PEDESTRIAN CONNECTION
- WEAK PEDESTRIAN CONNECTION

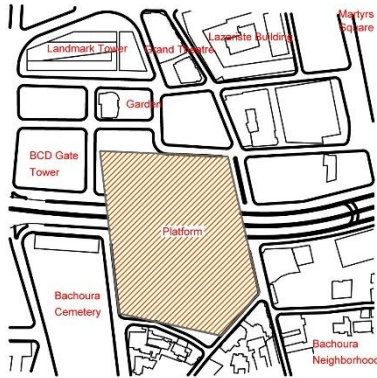
# Concept of Development



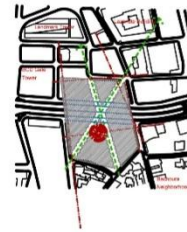
I- Site Pt of Interest



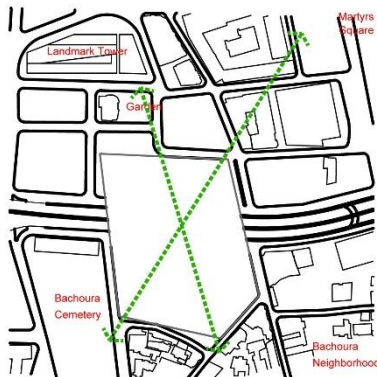
IV- Iconic Tower



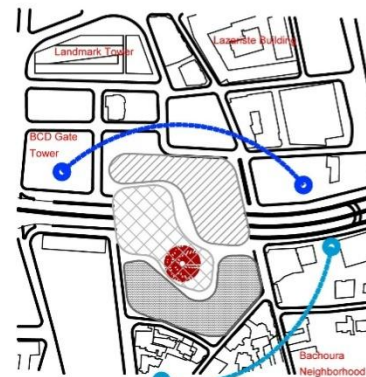
II- Development Platform



V- Connecting Platforms



III- View corridors

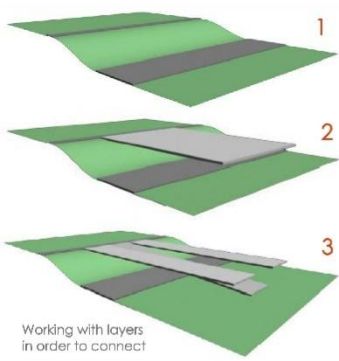


VI- Preferred Land-use

- Dedicated for Residential uses
- Dedicated for Office uses
- Dedicated for Cultural and services uses
- Predominant Cultural and Offices
- Predominant Residential



### Working with the Levels



Working with layers  
in order to connect

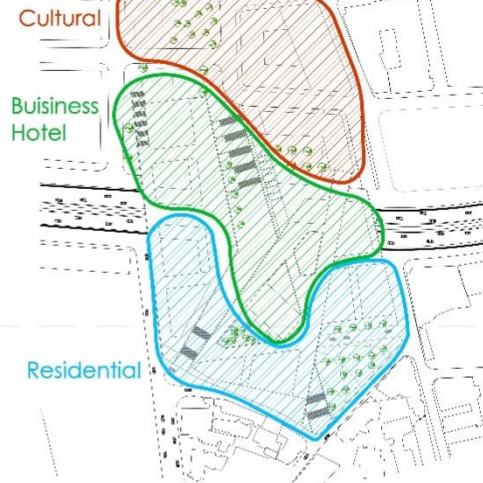
### VIZIBILITY



Visual Design Guidelines :

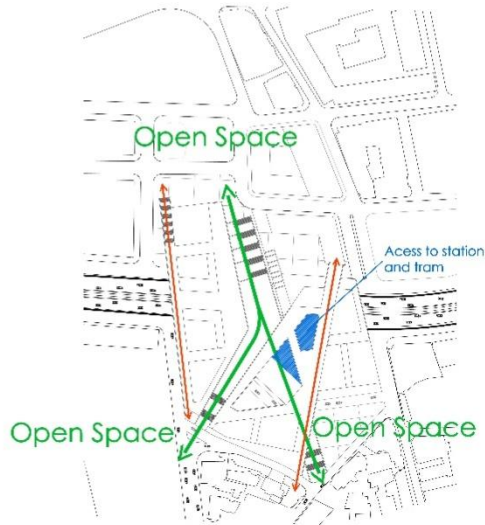
- Land Mark tower
- Martyr square axis
- Open Spaces
- Public transportation
- Highway
- High density buildings in solidere

### LAND USE ZONING



Residential

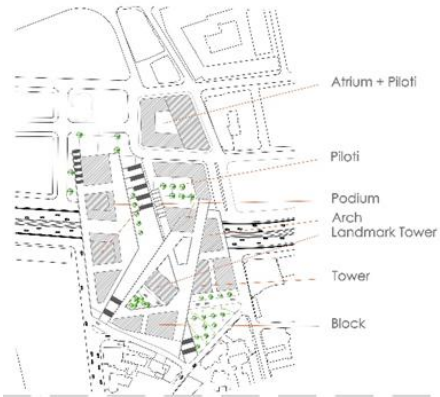
### Linkedge



Open Space

Open Space

### TYPE OF BUILDING



- Atrium + Piloti
- Piloti
- Podium Arch Landmark Tower
- Tower
- Block

### TYPE OF PUBLIC OPEN SPACE



Open spaces are established in order to provide places of special identity , to create a linkage and most of all to provide character for the social life of the city.

- GARDEN
- Piazza
- Street / Square
- Garden + Activities

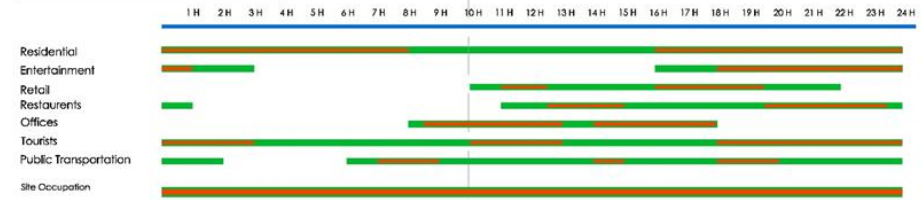
### SOLAR DIAGRAM

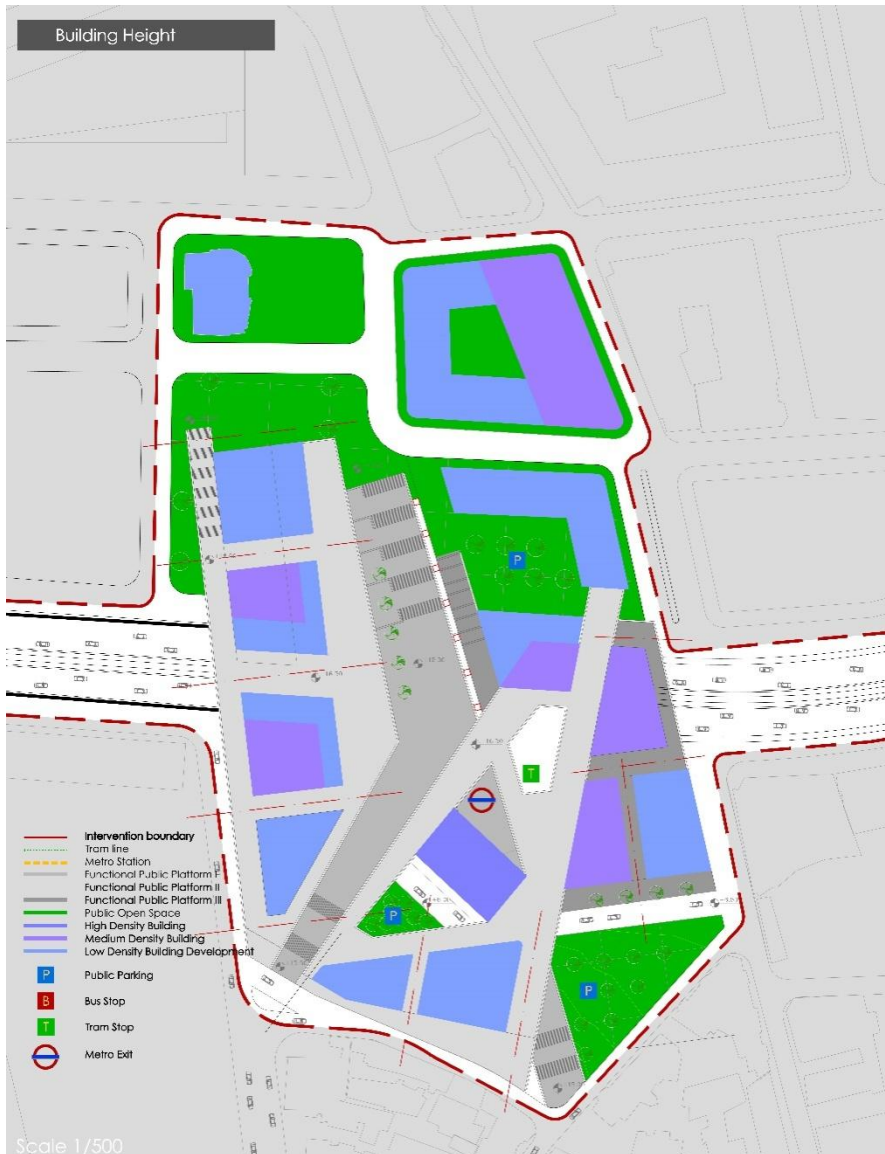


### CIRCULATION



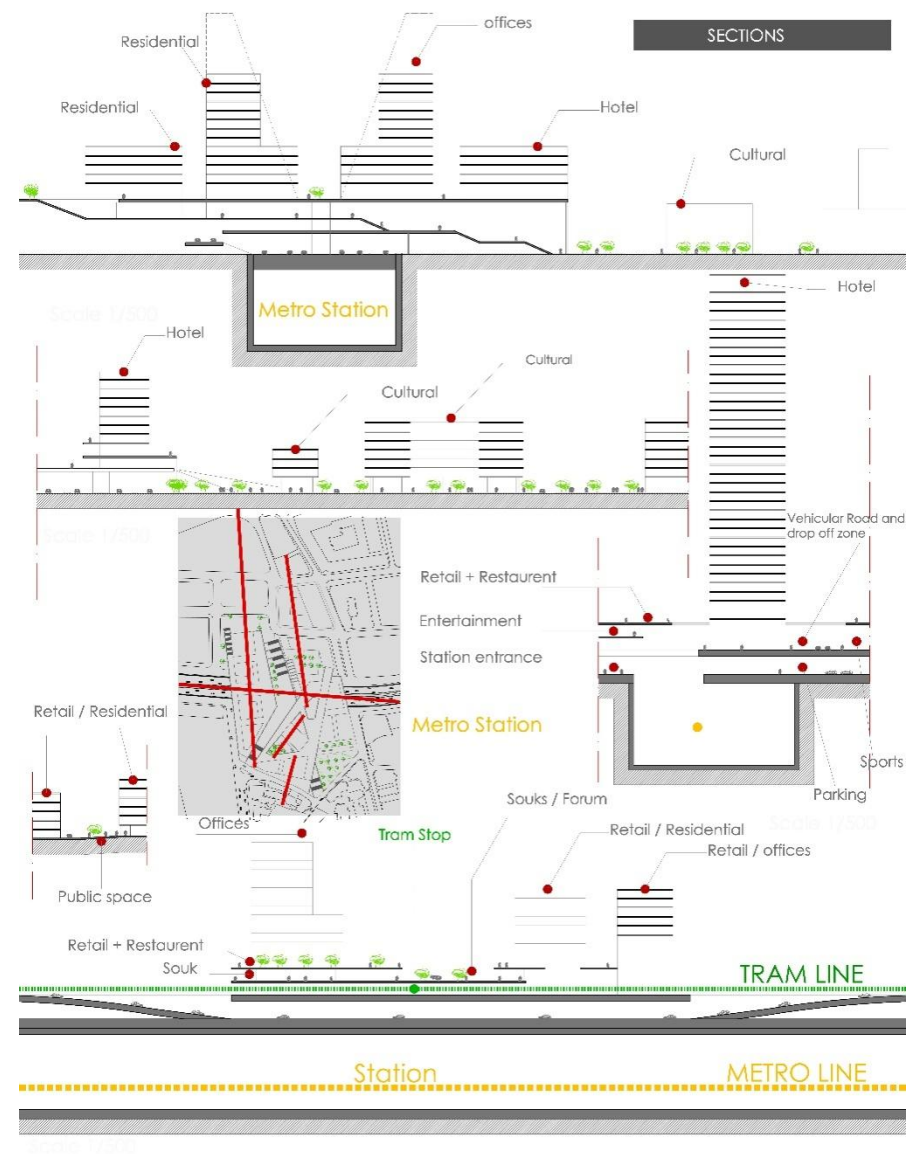
### Site occupation





Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
 URDS 601/602: Reinvisioning infrastructural Break: Urban and landscape design  
 Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FE  
 SPRING 2011 / 2012  
 NAME: RUDY MAROUN

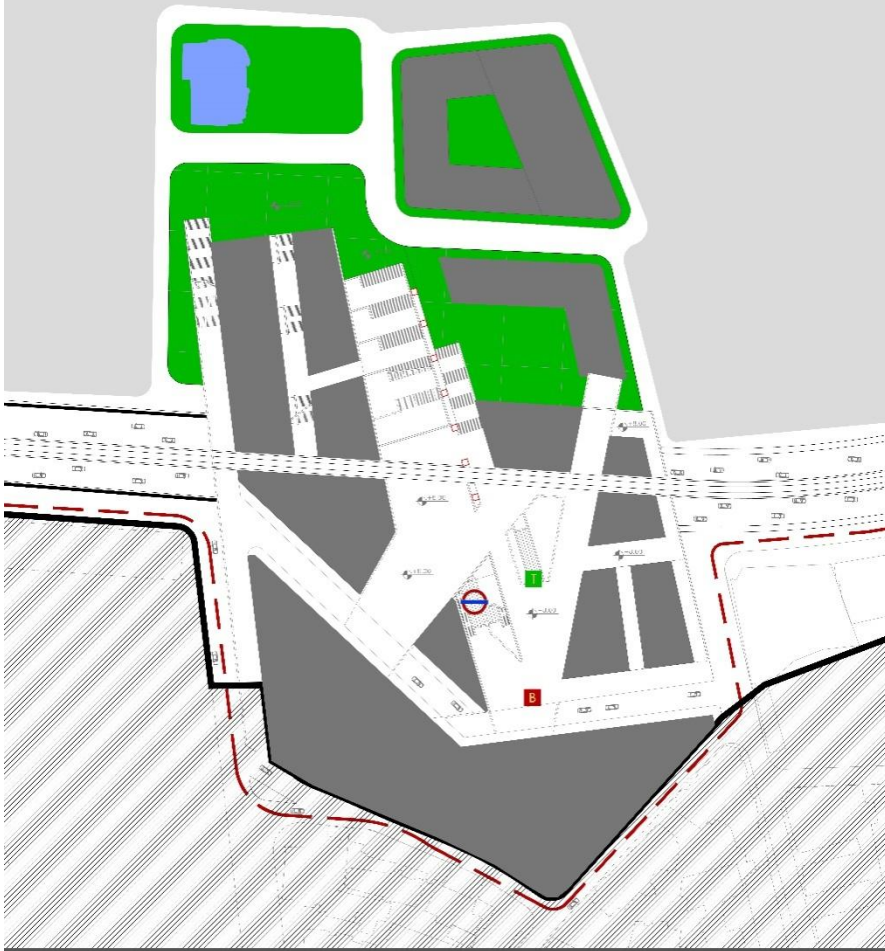


Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
 URDS 601/602: Reinvisioning infrastructural Break: Urban and landscape design  
 Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FE  
 SPRING 2011 / 2012  
 NAME: RUDY MAROUN



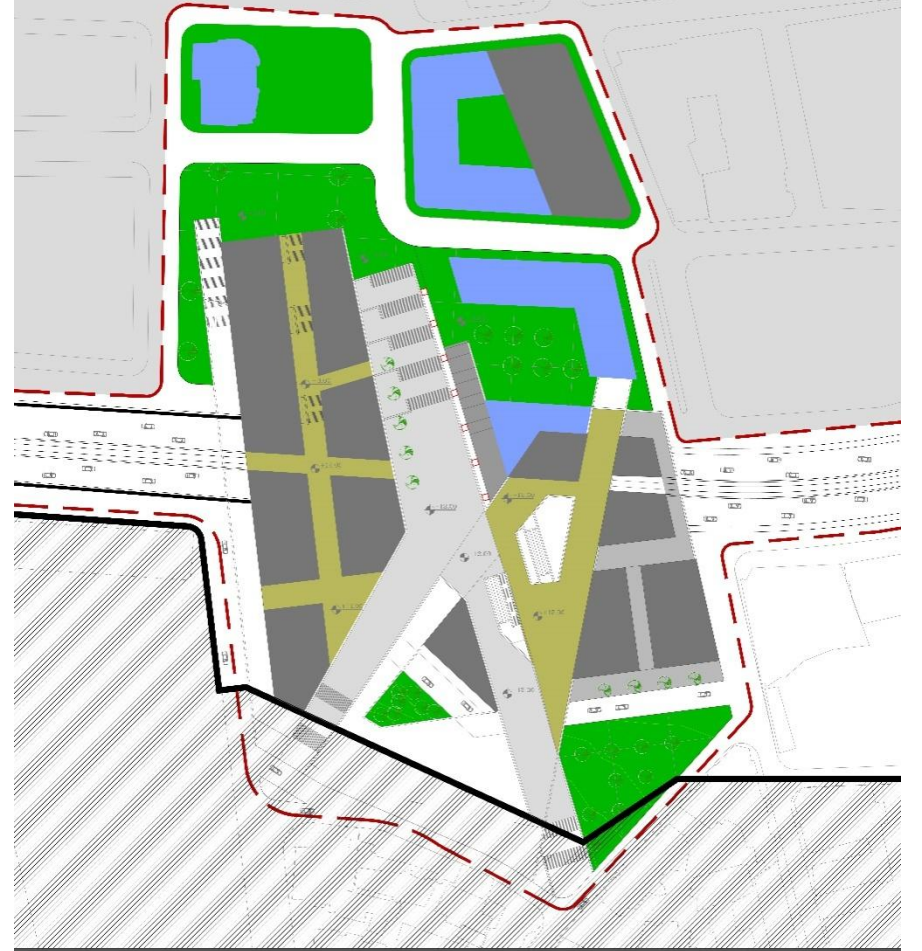
Level +8.00 Entertainment



Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisoning infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN

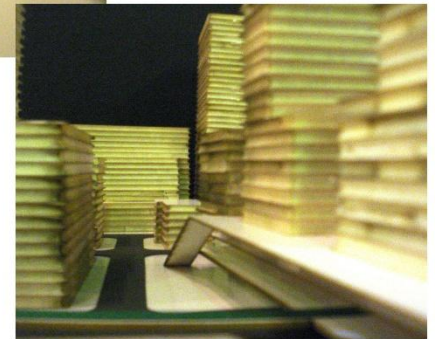
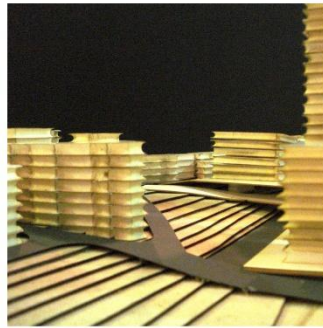
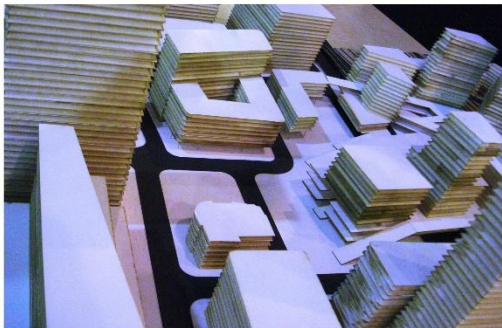
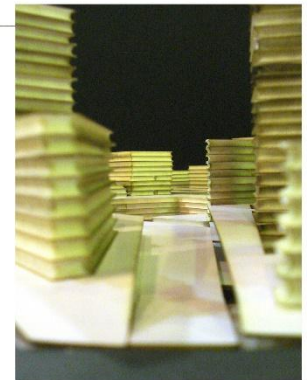
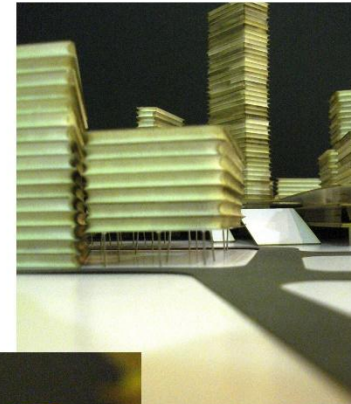
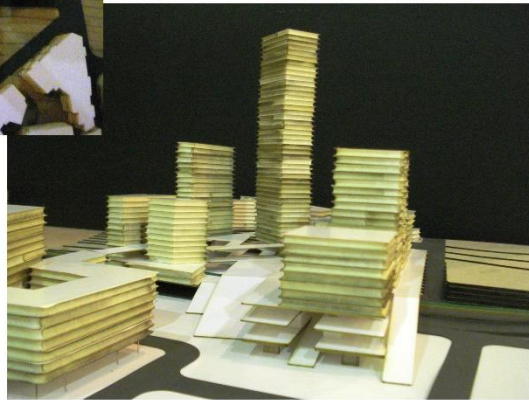
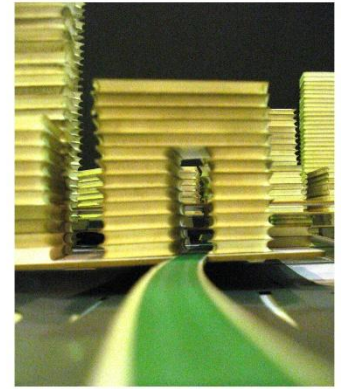
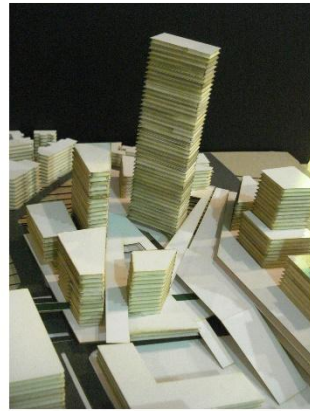
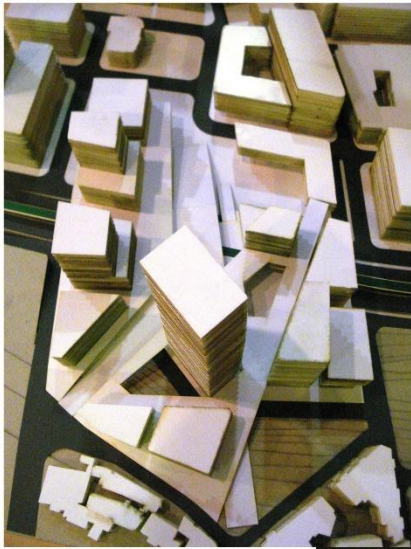
Level 12.00 Layer Souk



Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
URDS 601/602: Reinvisoning infrastructural Break: Urban and lanscape design  
Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
SPRING 2011 / 2012  
NAME: RUDY MAROUN





Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
 URDS 601/602: Reinvisioning Infrastructural Break: Urban and lanscape design  
 Dr Robert Saliba - Hana Alameddine

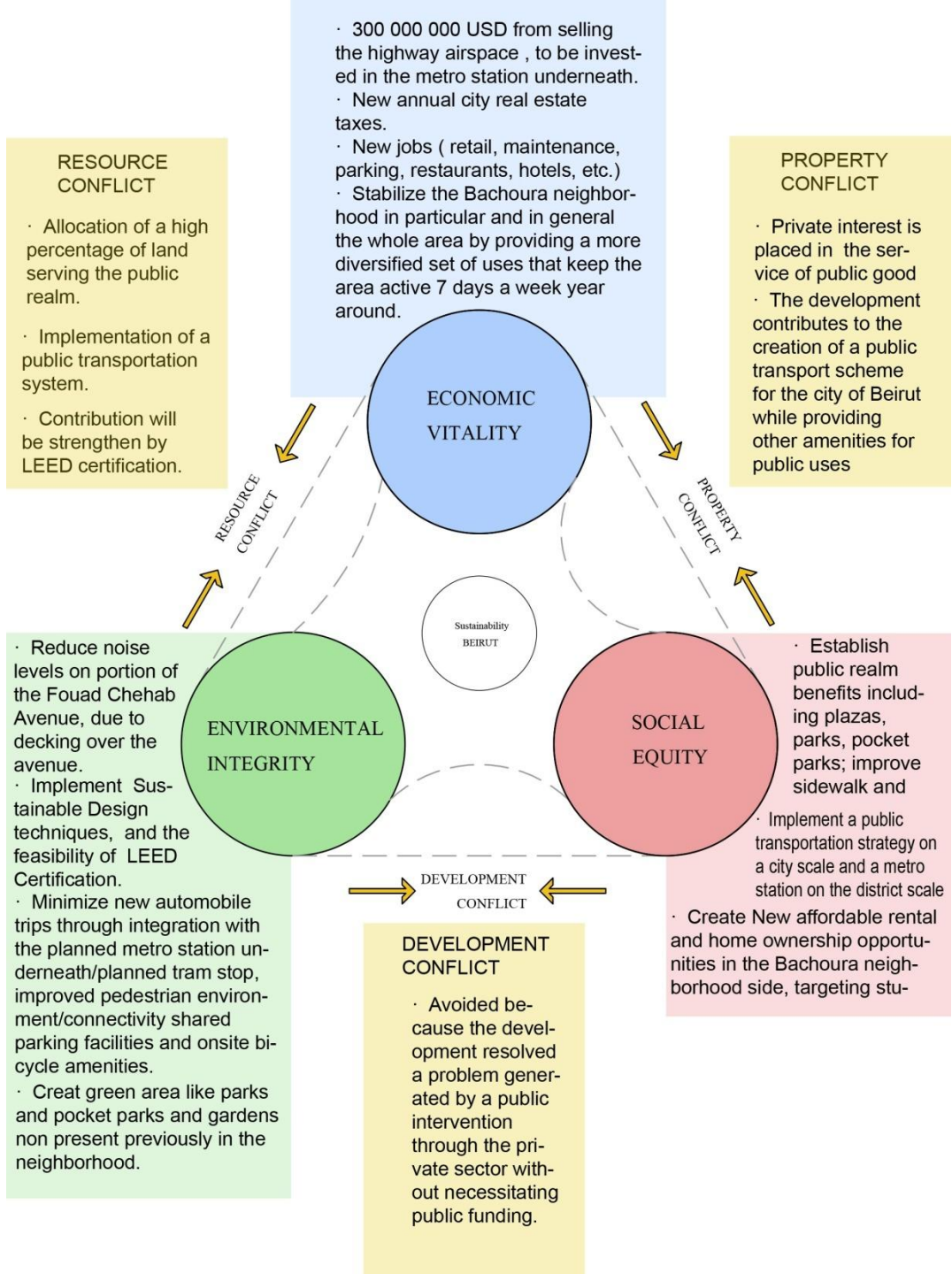
AMERICAN UNIVERSITY OF BEIRUT - FEA  
 SPRING 2011 / 2012  
 NAME: RUDY MAROUN

Title: THE RING FROM THROUGH TRAFFIC TO A GATEWAY  
 URDS 601/602: Reinvisioning Infrastructural Break: Urban and lanscape design  
 Dr Robert Saliba - Hana Alameddine

AMERICAN UNIVERSITY OF BEIRUT - FEA  
 SPRING 2011 / 2012  
 NAME: RUDY MAROUN

# Revisited Urban Design Intervention

The development plan was to: create a balanced mixed-use development in an attempt to revitalize adjacent area, create linkages between both side of the Fouad Chehab Avenue, and use the over highway air right as an opportunity for a catalytic form of urban development, on micro scale serving the surrounding neighborhood and macro scale affecting the whole city development. The design addressed the following goals in the design process framed into three categories : Social Equity goals , Environmental goals and Economic goals.



In the Beirut context, developing over a high way corridors proved to be more sustainable than in either the Bostonian or The Hague context. It theoretically allowed the city to finance a public transportation strategy while dealing with most of the highway externalities when intersecting the urban fabric. This resolves more conflicts, which place the development more in the core of Campbell triangle of conflicting goals

### The Program

- 1) Public / Private partnership
- 2) Land Use

### The Design

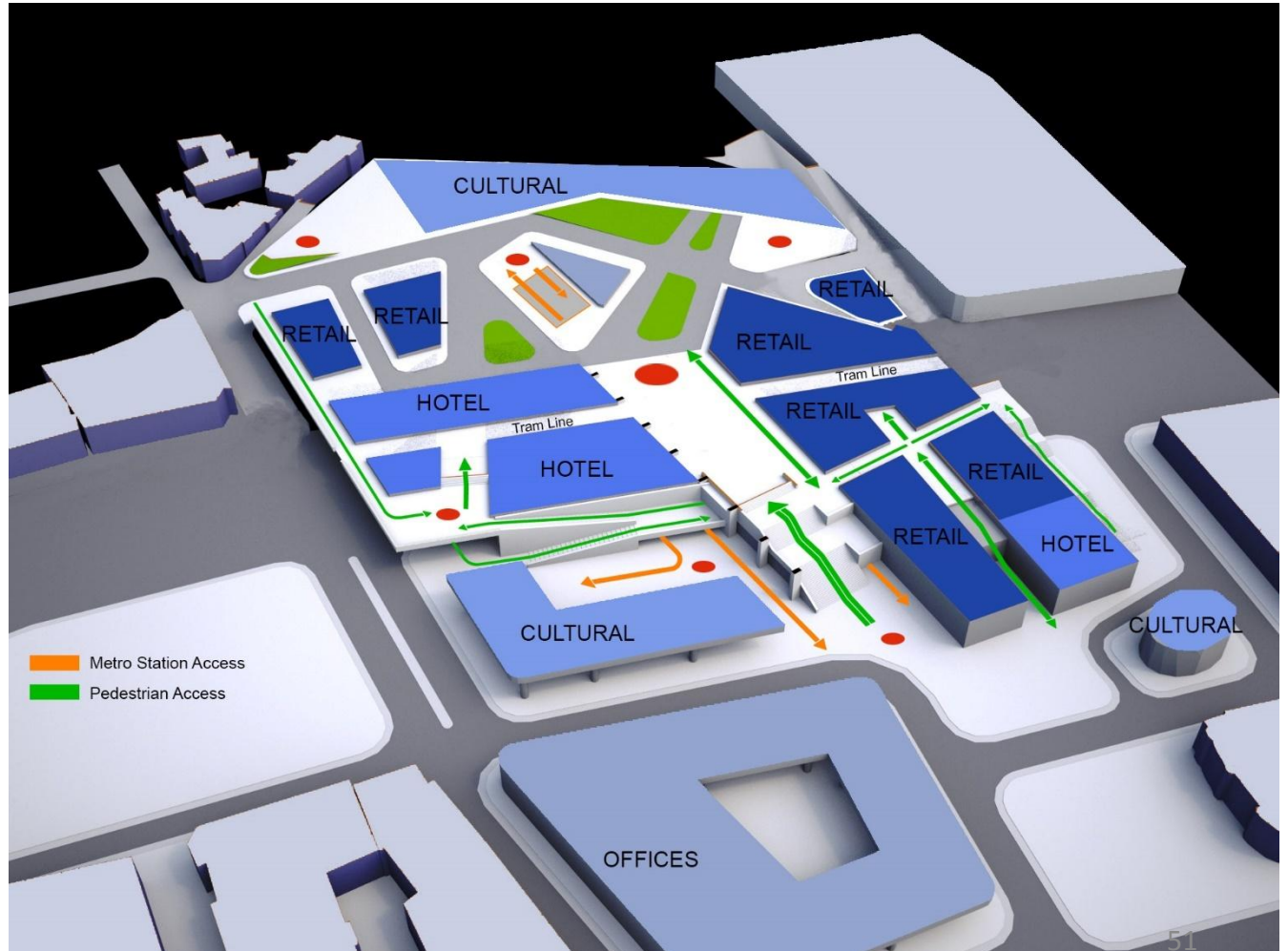
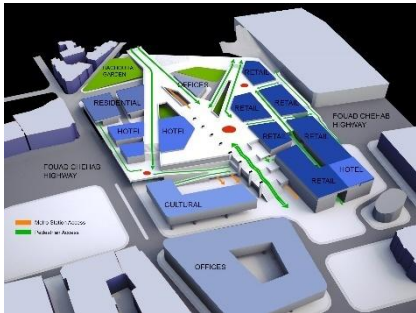
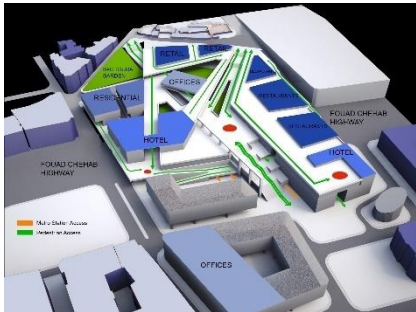
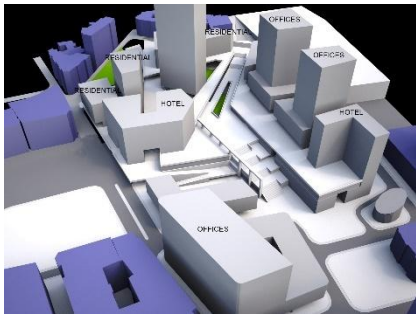
- 1) Structural and functional constraints.
- 2) Higher percentage of open space and exposure.
- 3) Vehicular Circulation.
- 4) Pedestrian Connections.



# The Platforms Pedestrian Connections

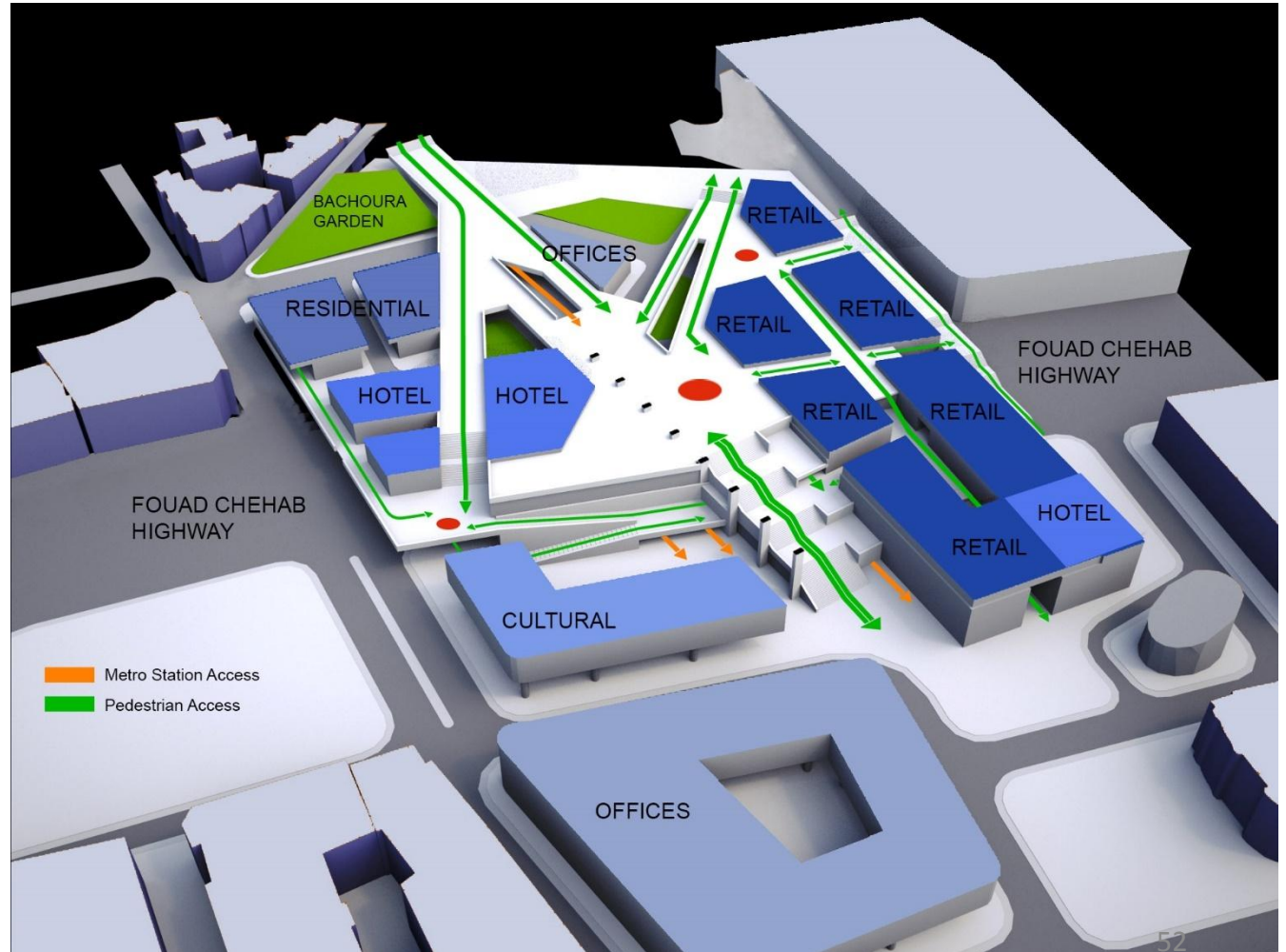
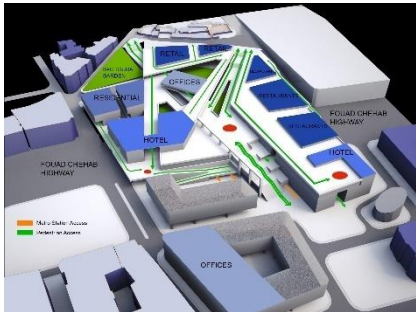
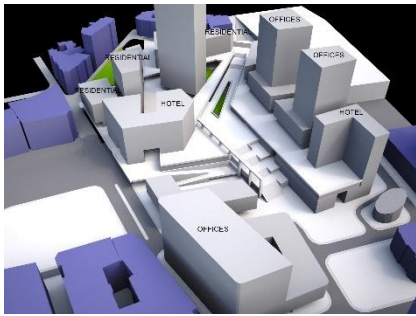


# Platform Level 7.00

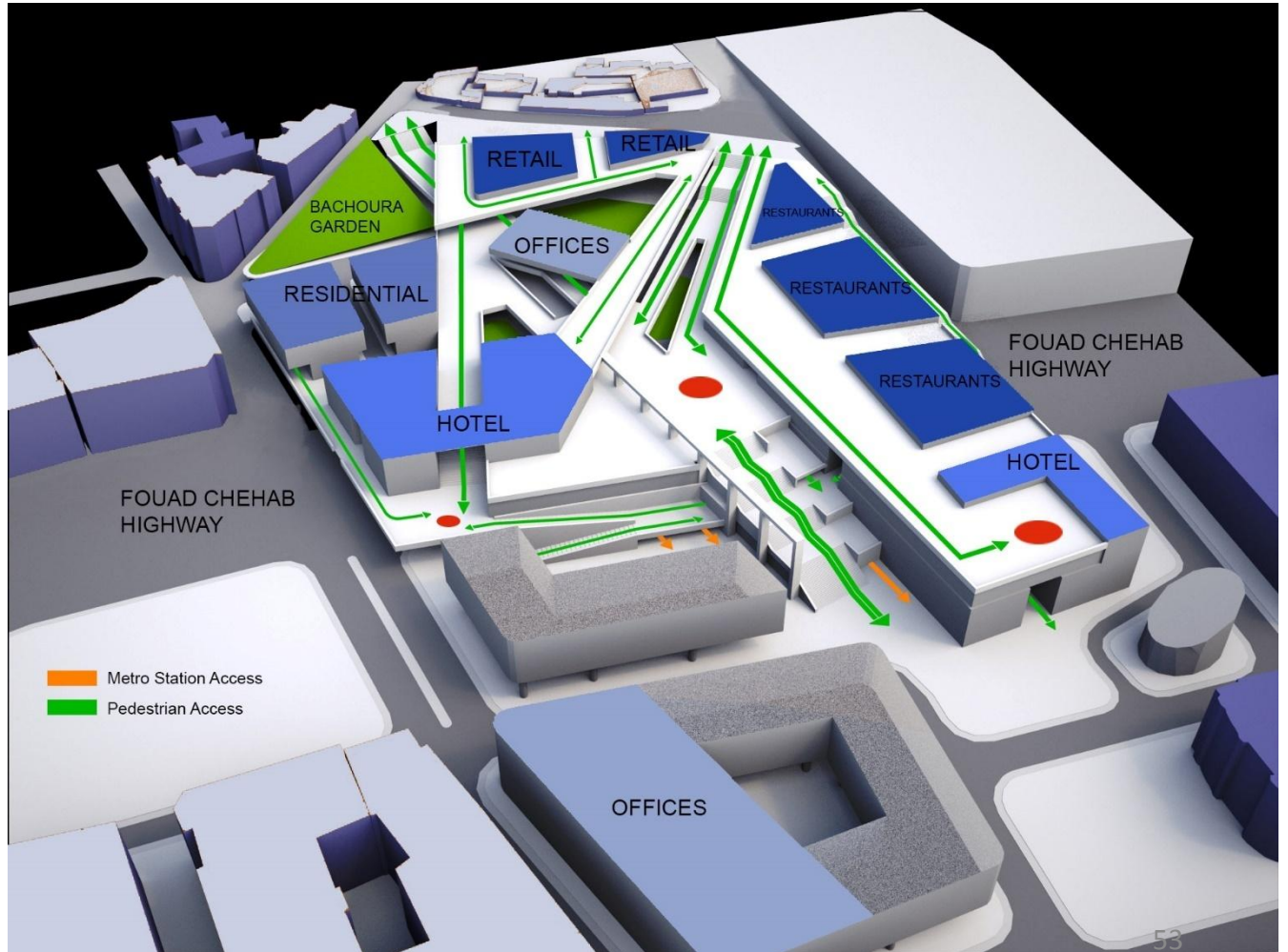
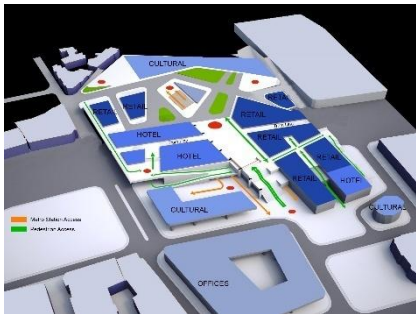
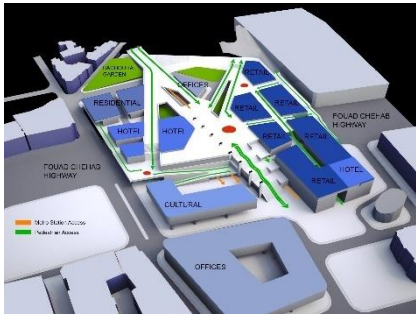
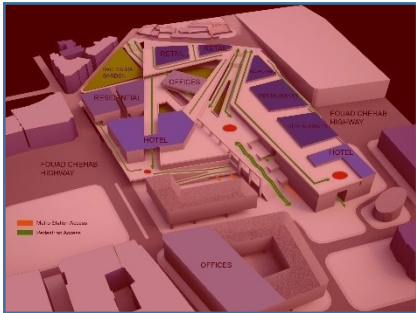
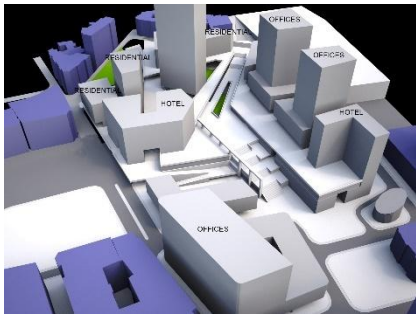




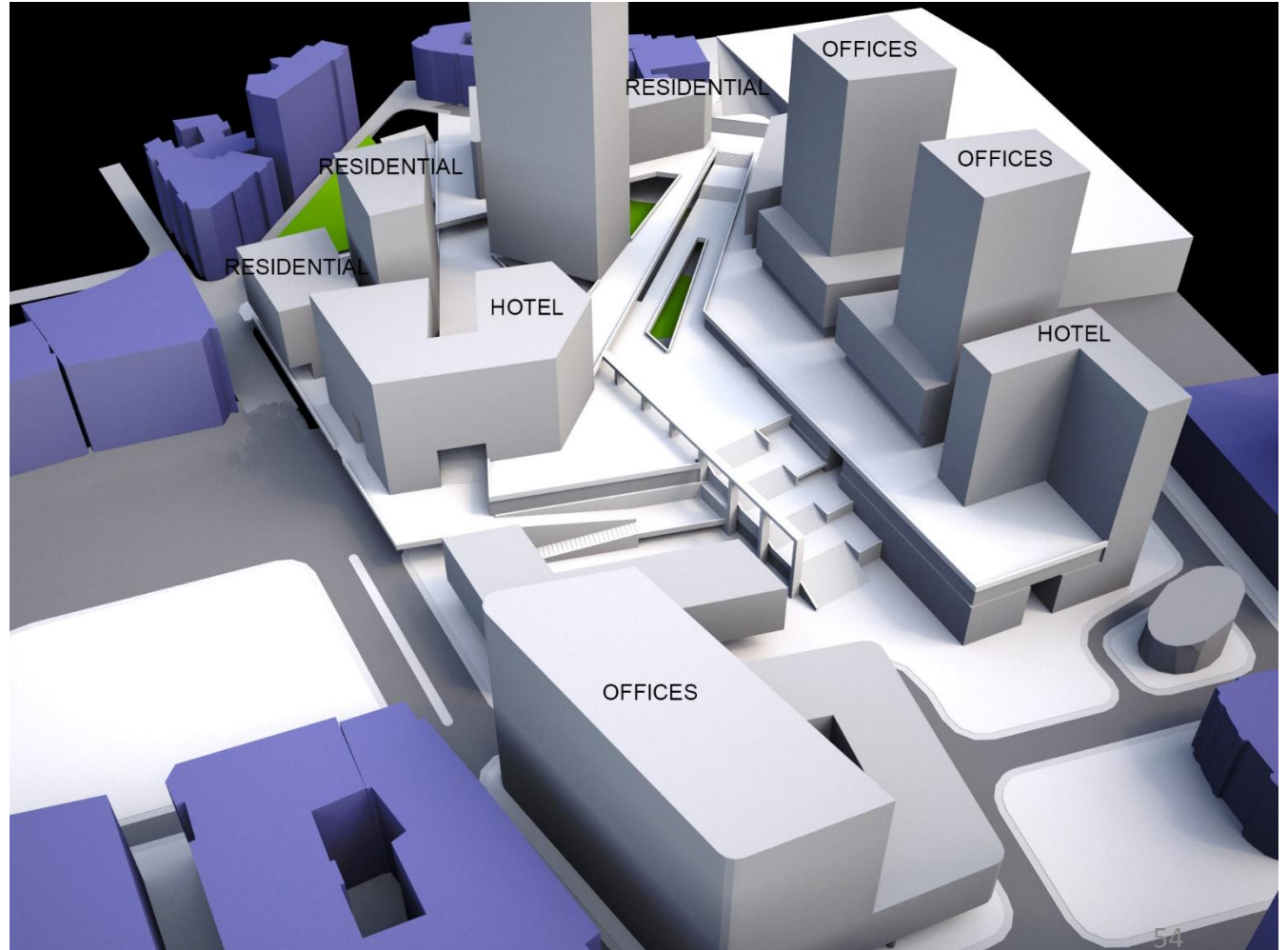
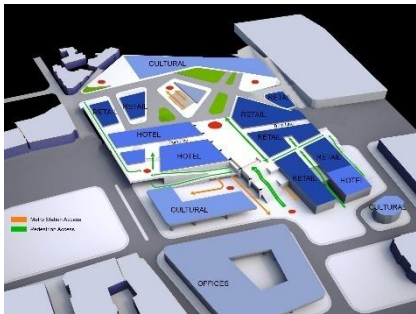
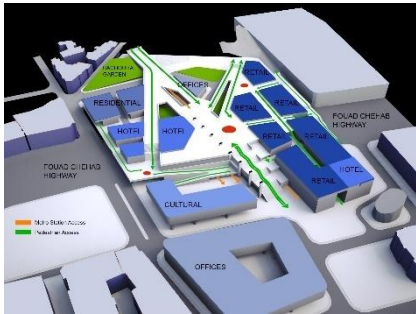
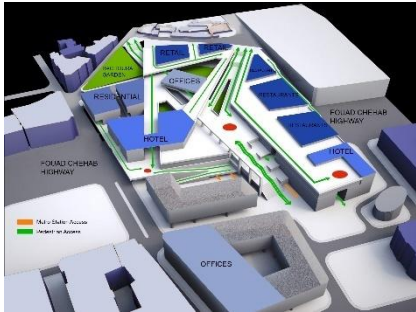
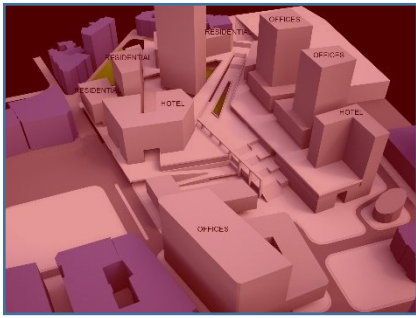
# Platform Level 12.50



# Platform Level 17.00



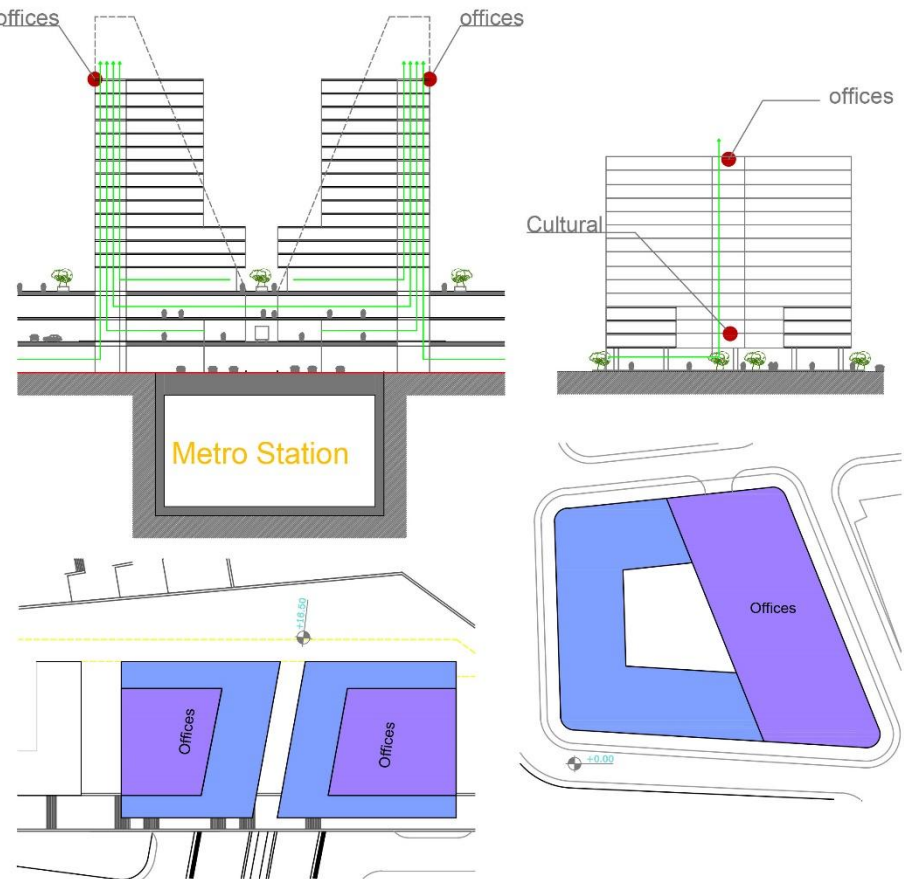




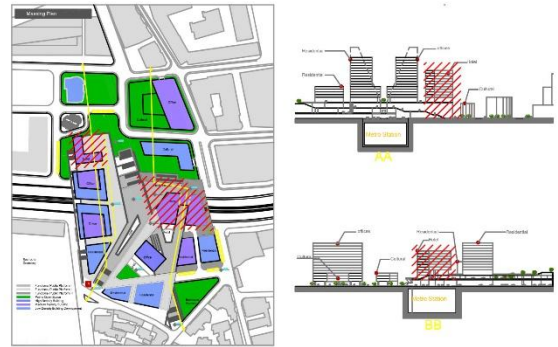
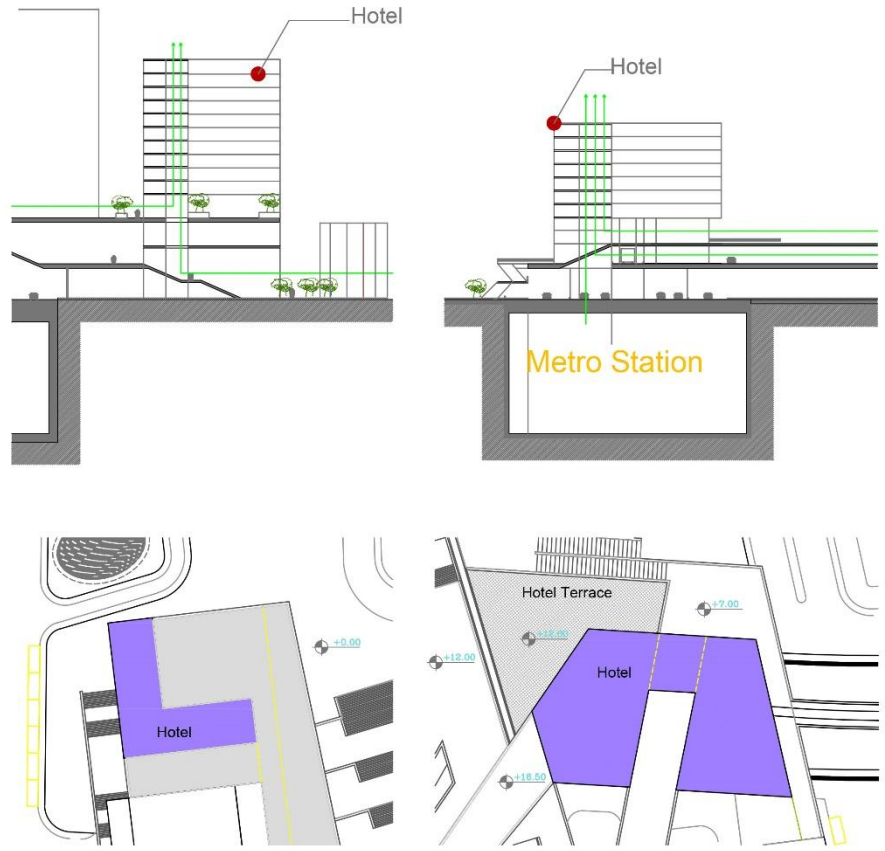




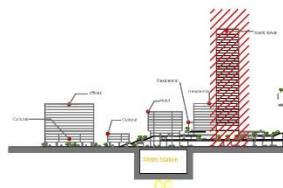
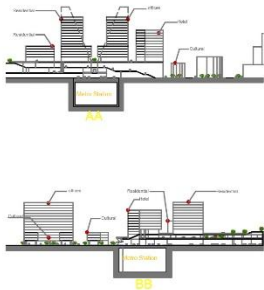
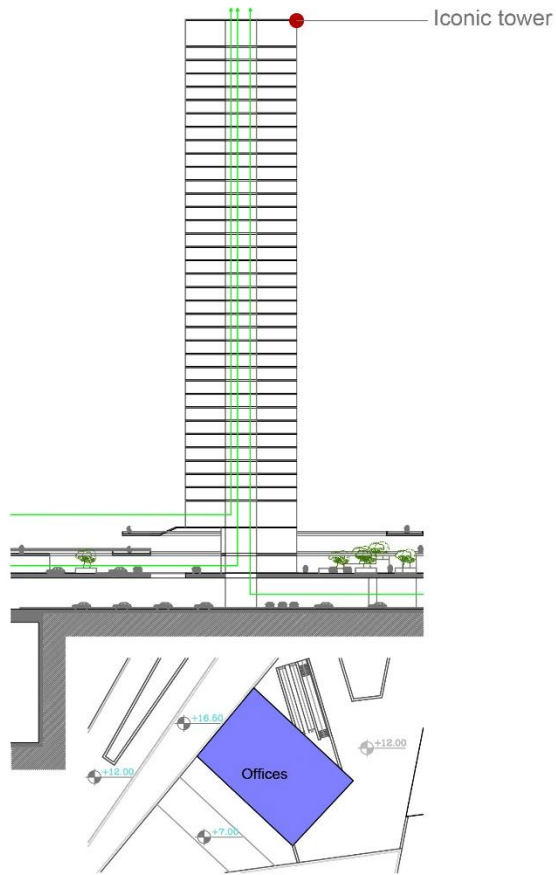
# Office Building



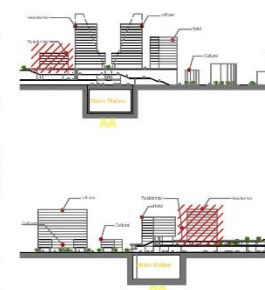
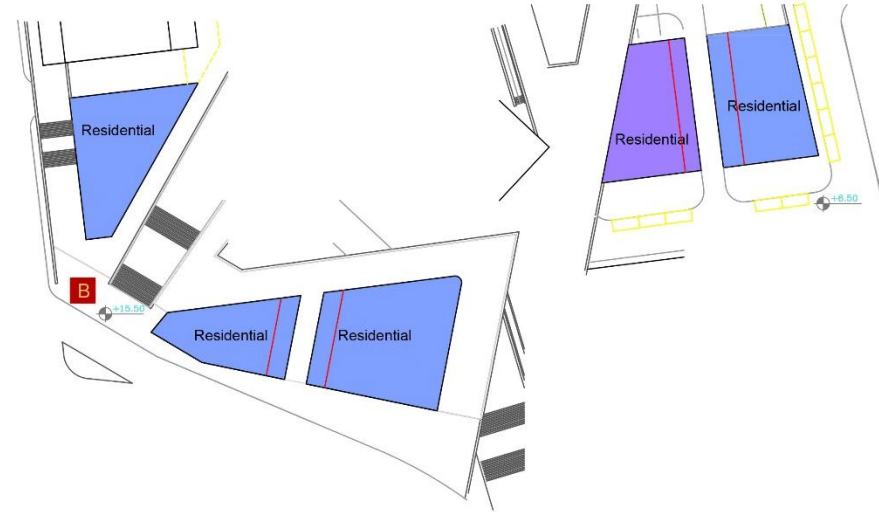
# Hotel Building



# Iconic Building



# Residential Building

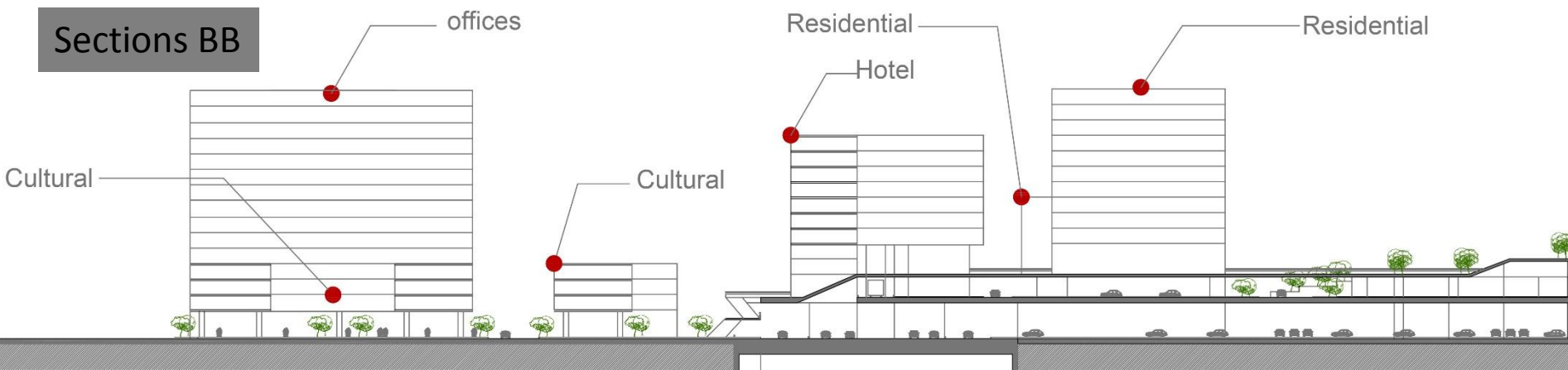




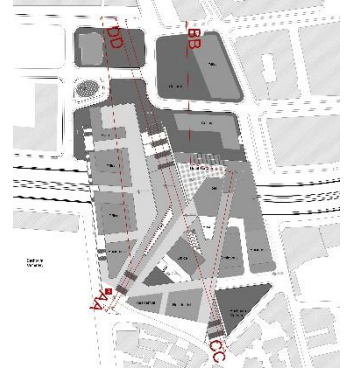
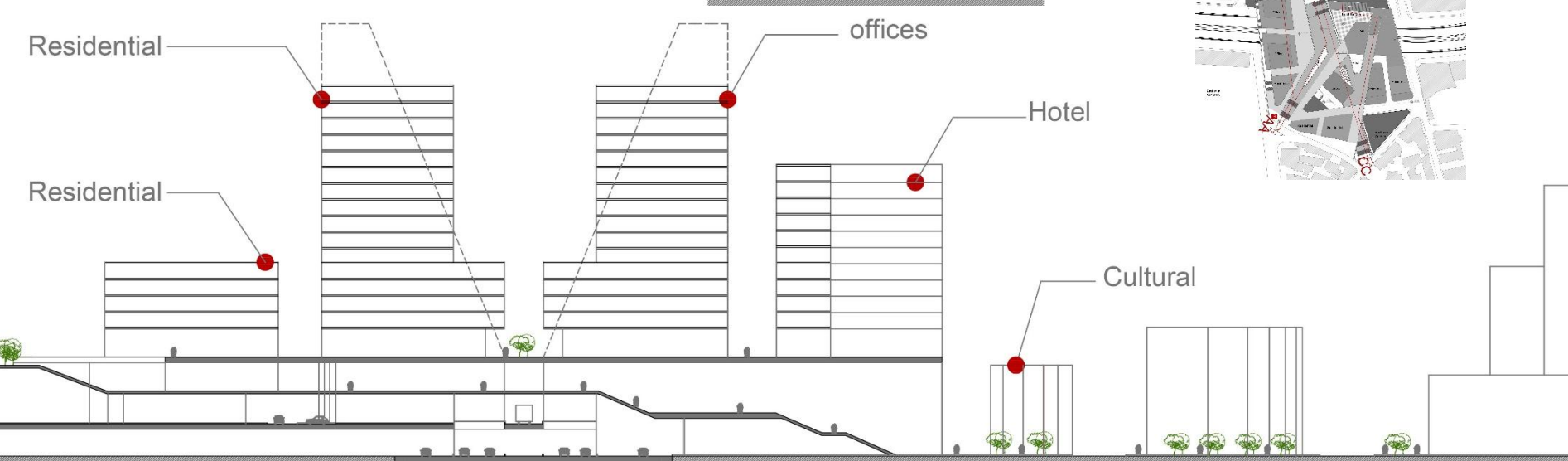




Sections BB

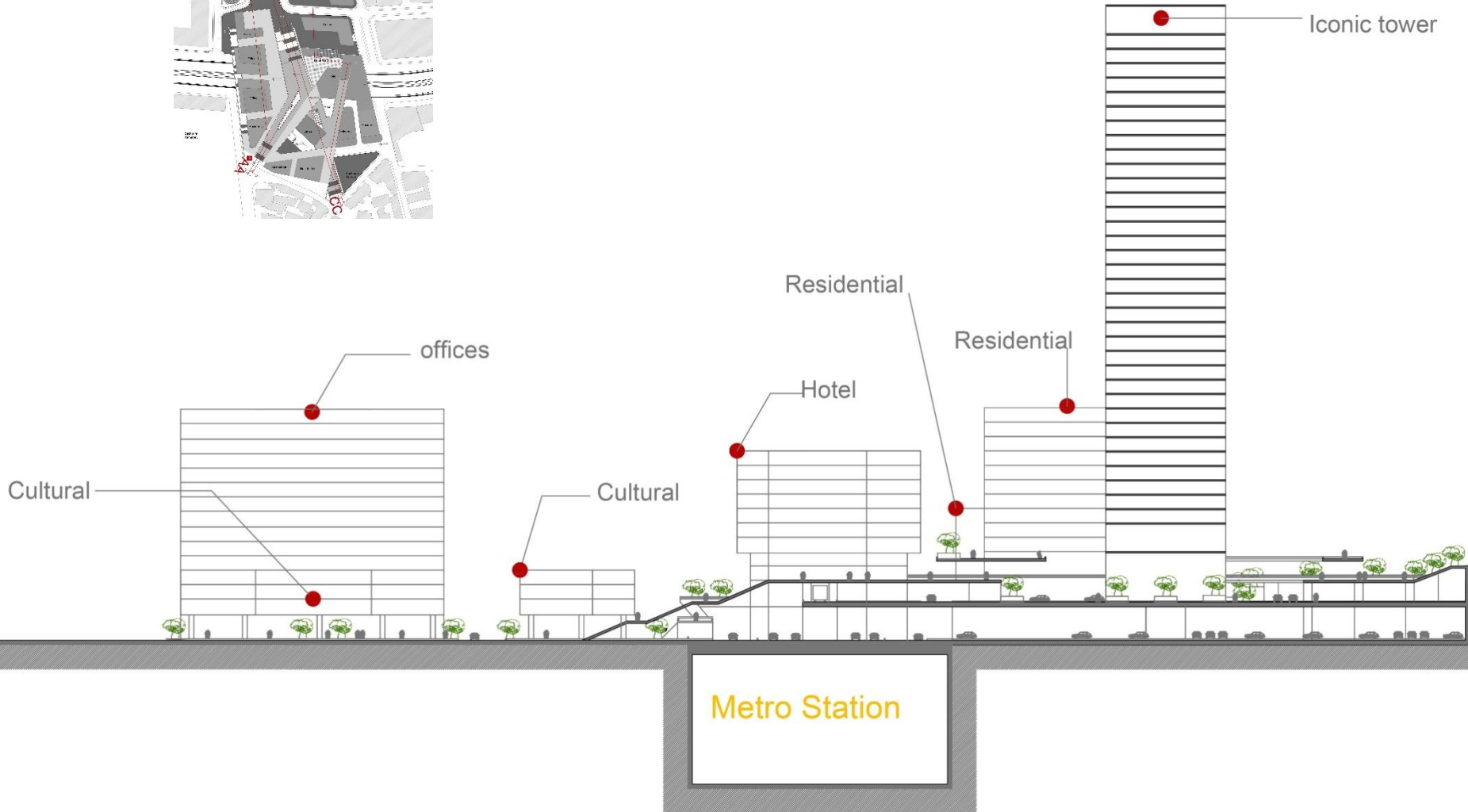
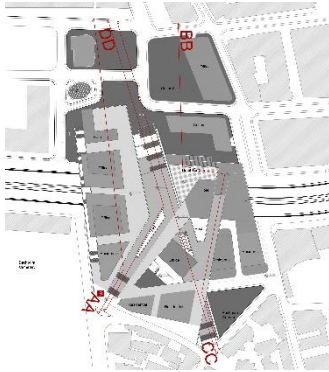


Sections AA

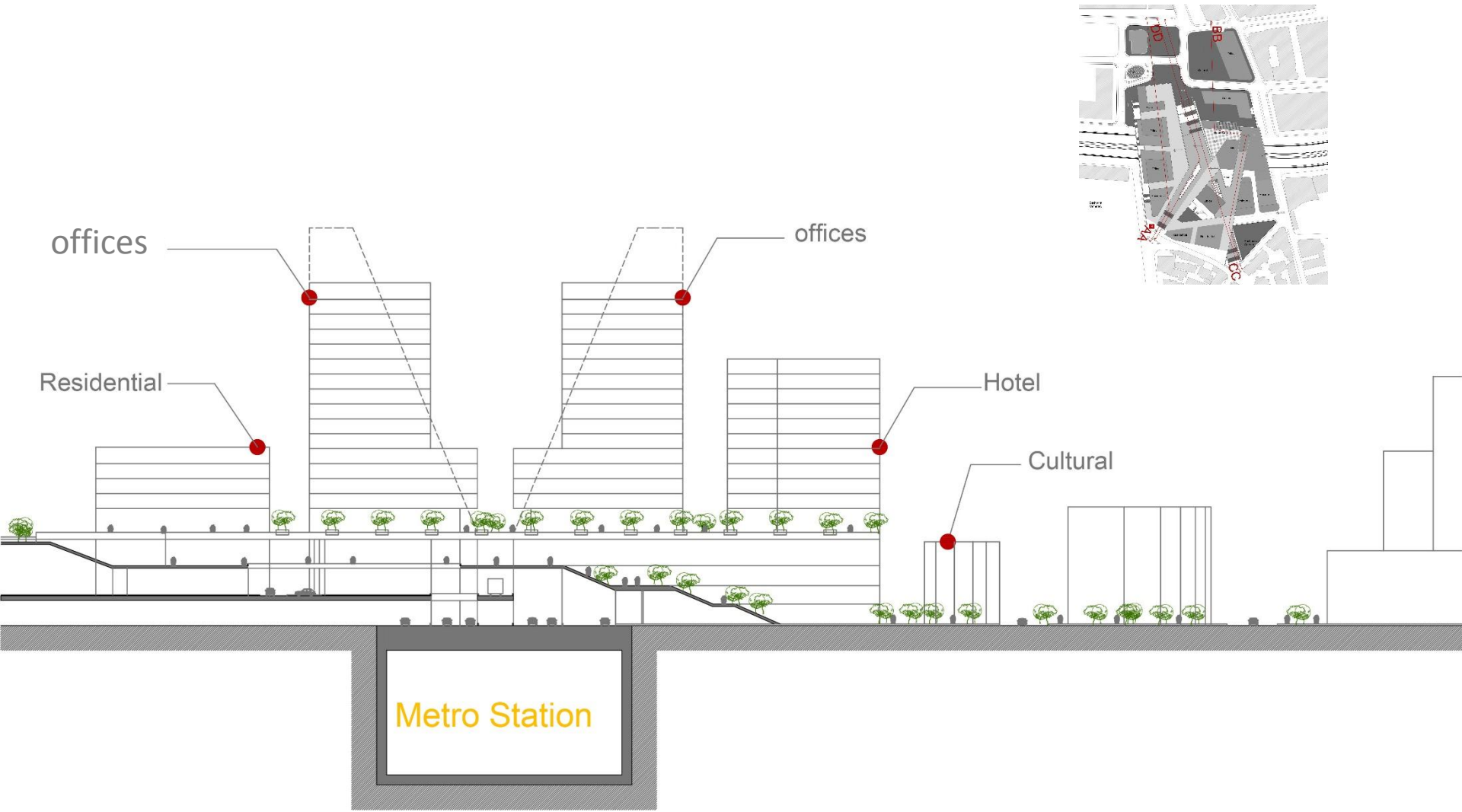


Metro Station

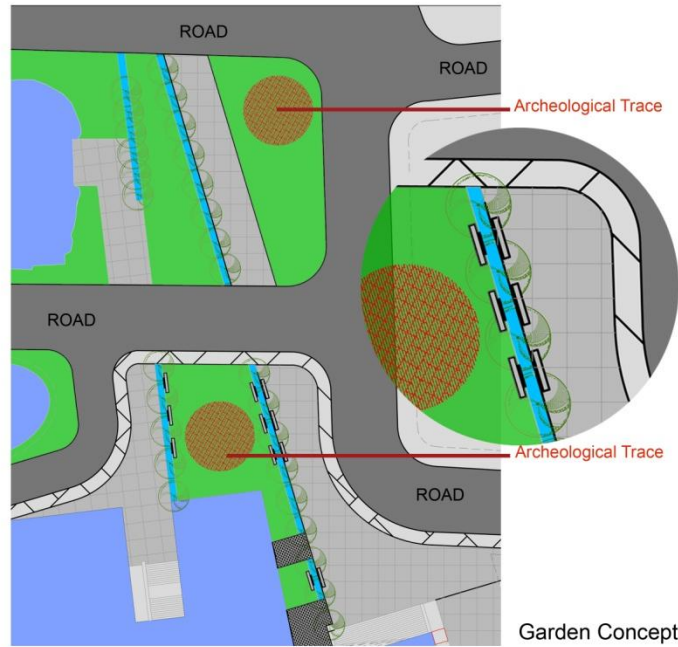
# Sections CC



# Sections DD



# Open Space



View I



View II

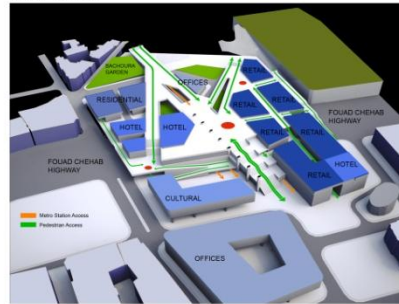


VIEW TOWARD ICONIC TOWER FROM THE BCD SIDE

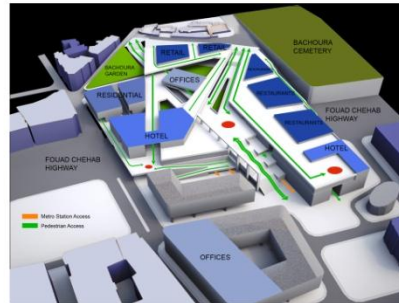




Level +7.00 m



Level +12.50 m



Level +16.50 m



## Phase I

The Phasing strategy will start with the construction of the metro station and the 1st platform on level +7.00 m over the highway. This will allow the other section of the development to be built without disturbing the vehicular traffic on the Fouad Chehab Avenue.

## Phase II

Phase 2 will be dedicated to finishing the construction of the platforms on level 12.50m which will support a vibrant retail activity and Level 16.5 m which will act as an entertainment platform.

With the construction of the platform the implementation of the public open spaces can start ( park , piazza , square, Pocket Parks..), these open spaces will provide the link to the metro station and the pedestrian connection between the BCD and Bachoura.

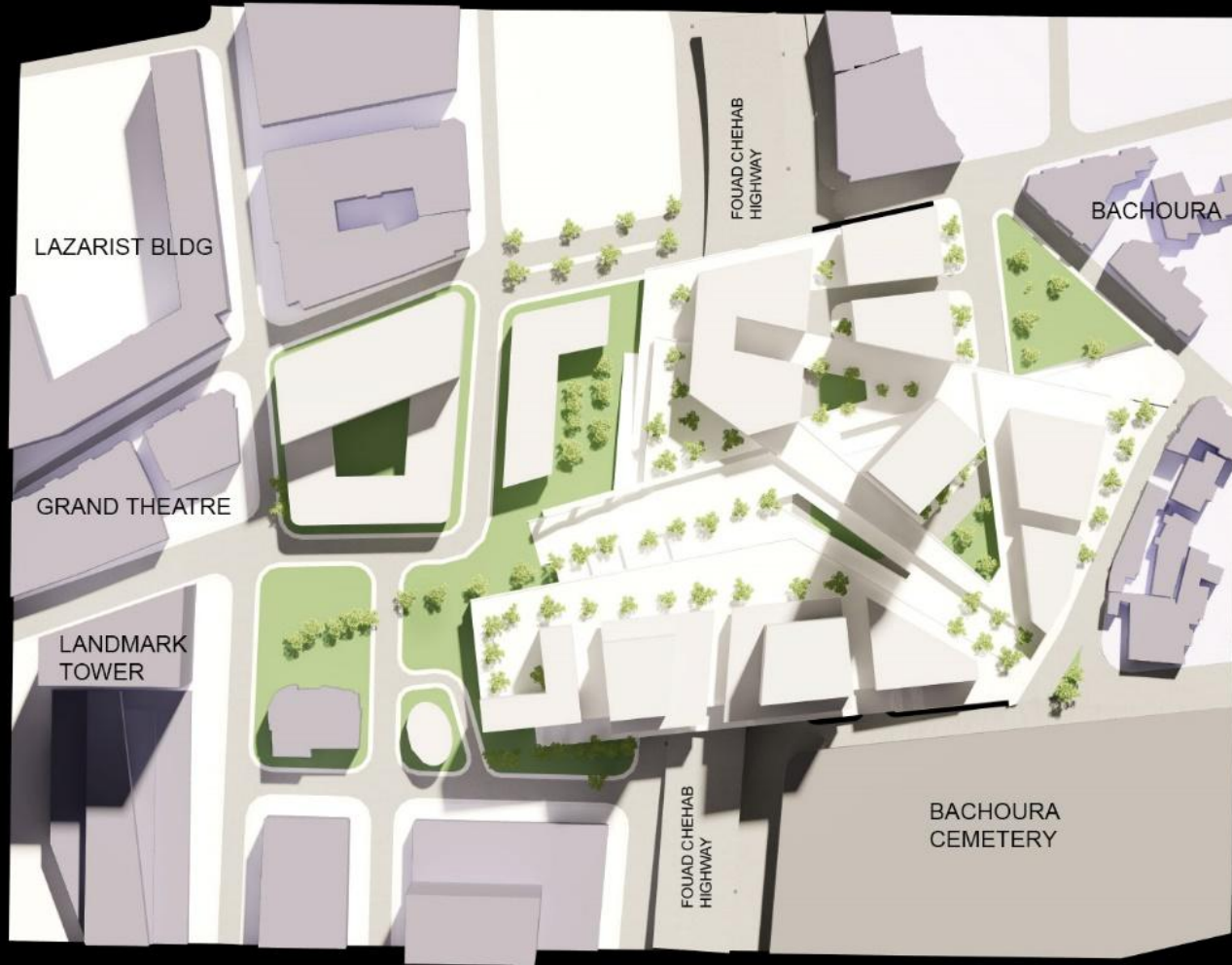
## Phase III

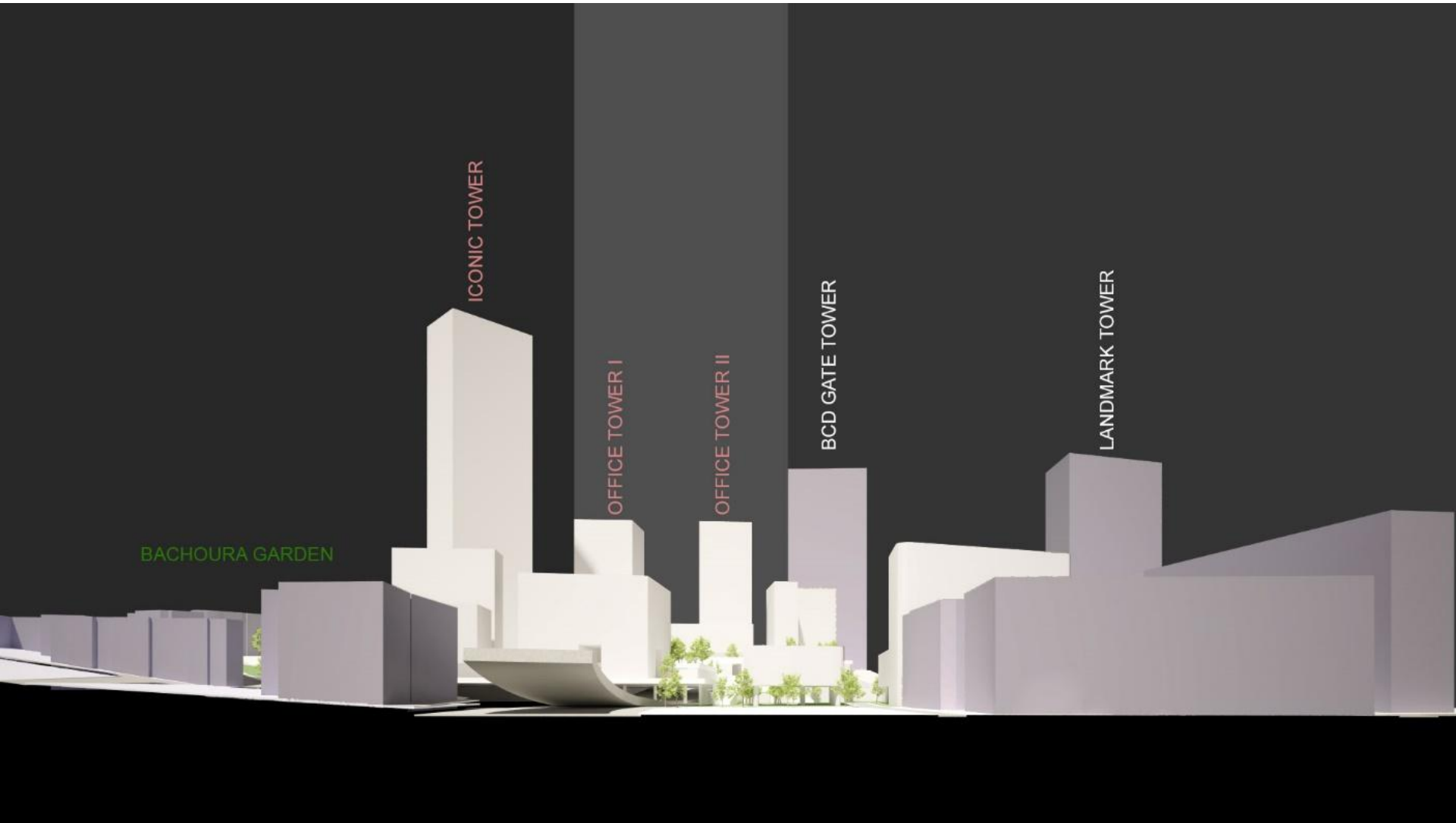
Phase 3 will show the completion of the development with the implementation of the buildings on the platforms. This will be done in phases, depending on the market demand.

The 1st buildings to break ground will be the iconic tower and the residential buildings facing the Bachoura neighborhood.



# 3D Views





ICONIC TOWER

OFFICE TOWER I

OFFICE TOWER II

BCD GATE TOWER

LANDMARK TOWER

BACHOURA GARDEN

THANK YOU