RESIDENTIAL MODEL FOR STEEP SLOPES —
CASE STUDY: AJALTOUN, LEBANON

by

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ABSTRACT

The objective of this thesis is to develop a residential model for steep slopes, in the mountain village of Ajaltoun. It is anticipated that this preliminary design would represent an alternative method for residential development on steep slopes in the context of Lebanon.

The study starts with an introduction describing the existing housing conditions that resulted from the continuing civil war and the need to develop steep land, thus justifying the purpose of such a model.

THESIS SUPERVISOR: Horacio Caminos
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Finally, the author would like to dedicate this work to the people of Lebanon who suffered and are still suffering from the evil war, hoping that peace will reign again in Lebanon.

T.E.A.
PREFACE

CONTENT
Despite the continuing civil war and the uncertain future of Lebanon, developments on steep slopes, should be addressed. This preliminary design study is an attempt to develop a residential model for steep slopes in the mountain village of Ajaltoun. It is anticipated that this model will present an alternative approach to slope development in the Lebanese mountain villages, where the civil war created a pressing demand for affordable housing.

OBJECTIVES
This preliminary design will demonstrate a new solution for the problem of circulation and access to lots on a steep site, where the slope averages 80%. This design will also show a new alternative in land subdivision: This model has a provision for "condominium" or "cluster" ownership, with relatively large plots, to maximize private/collective initiative, responsibility and participation. This type of development introduces "row" dwelling units grouped together linearly or in clusters. This physical arrangement of dwelling units which is relatively new to Lebanon required a dwelling layout that would still accommodate the needs of the Lebanese family lifestyle.

APPLICATION
It is anticipated that this design will act as a model for future residential development in the mountainous regions of Lebanon. It will orient designers as well as developers to an alternative physical layout in dealing with steep slopes development.

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INTRODUCTION

HOUSING CONDITIONS BEFORE THE CIVIL WAR
Just like another city in the developing world, Beirut in the 1970s was suffering from a rapid urbanization. The population was growing at an exponential rate. Rural migrants and unprivileged immigrants from neighboring countries came to Beirut to find job opportunities. This migration was also aggravated by a large influx of refugees fleeing the unstable conditions in the south. A large portion of this population was poor and could not afford the housing supplied by the market, which only suited the upper income sector of the population. As an answer to this struggle for shelter, squatting and illegal development mushroomed around the inner ring of the city, thus accelerating the deterioration of the physical environment.

This housing crisis affected also the middle income sector of the society, where households were paying up to 50% of their income for housing. This tremendous increase in housing cost was caused by rising prices for available serviced land coupled with high construction costs. Also, substantial inflows of capital have gone into real estate speculation leading to severe distortions of the market with mismatches between supply and demand of housing types and income levels. The rental market has also been severely constrained and distorted by the application of rent control.

Urgent changes were needed in the housing process. Beirut city as well as the large urban centers were expanding rapidly; there was no urban growth strategy to anticipate and cope with population movements. Government interventions were needed in all segments of the housing process, in order to direct and accommodate the urban growth. A coherent housing policy was necessary to generate more serviced land, and basic dwelling components of lower costs, for the low and middle income sectors of the society.

In 1962 the government took a first step towards creating a coherent housing policy, by establishing housing Council whose role was to plan and regulate housing activities. A General Directory of Housing was then created in 1973, which was followed in 1975 by the enaction of a housing law and the creation of a Ministry of Housing and Cooperatives. Unfortunately, the war which started in 1975 brought the activities of these institutions to a halt.
A view of Beirut in 1970. Beirut manifests a great variety of Urban Settlements. It has a variety of mixed land use patterns and architectural forms and styles. The street structure and block arrangements are not consistent or uniform.
THE WAR AND ITS CONSEQUENCES ON HOUSING

Lebanon today is suffering from the worst man-made disaster in its history. The extremely violent and continuing civil war has been ravaging the country for the last eight years, claiming the lives of thousands of people and destroying the few remains of the Lebanese Republic. Politically, the situation is total chaos. The widespread destruction is overwhelming. While no final figures are yet available, it is clear that Lebanon's direct and indirect losses as a result of the continuing civil war and the recent Israeli invasion are staggering. One estimate puts these losses up to the end of August 1982 at around $4 billion. Apart from the massive loss of life, losses include damages to the infrastructural facilities, houses, commercial establishments, and other property.

Unfortunately the housing stock suffered the largest destruction. As a result of violent sporadic fighting since 1975 that concentrated around and within the highly dense residential areas of the capital, there has been considerable damage to the housing stock and related public services. Best estimates indicate that around 40,000 units of housing were damaged and/or destroyed during the first years of fighting. The Israeli invasions of Lebanon in mid-March 1978 and in June 1982 have added an estimated 72,000 damaged and/or destroyed units to the totals.

Dislocation resulting from the war accentuated the housing problem, increasing the number of refugees to an all-time high of 50,000 people, approximately 16% of the total Lebanese population. The refugees were from all segments of the society. A large number of them fled to the neighboring mountain villages, where the large influx of refugees and the sudden pressing demand for housing was completely unexpected. The housing stock in these villages is extremely limited. The dwellings are owner/occupied and furthermore, the difficult topography of the land coupled with the conventional construction methods and the lot subdivision layout made the expansion of these villages costly and unaffordable to most. This left the land suitable for development valued at a very high price.
MAP OF BEIRUT SHOWING THE "GREEN LINE" DIVIDING THE CITY
GOVERNMENT RESPONSE TO THE CURRENT CRISIS

In an effort to relieve the country's housing shortage and in order to alleviate the social pressure resulting from the war, the Government initiated programs of an emergency and medium term nature. The essential strategy is the provision of soft loans at preferential rates of interest to assist private sector construction, reconstruction and repair. The loans are administered through Government sponsored and/or assisted institutions.

Emergency Program:

i. The Government of Lebanon, by enacting Legislative Decree Law 20 in January 1977, established a framework for a home repair and reconstruction program for Lebanese citizens whose housing was damaged during the Lebanese civil war since February 1975. The Government plans to retain Decree Law 20 as its major vehicle for the provision of reconstruction credit.

ii. Following the Israeli invasion of Southern Lebanon in mid-March 1978, the government began to address the particular problem of repairing damaged houses in that part of the country. The government launched a program aiming at encouraging people to return to their villages and make repair on their homes, through funds available from the government.

iii. At present there is an urgent need for reconstruction of temporary emergency shelter to house the displaced, although the government is emphasizing construction of permanent housing so as not to create a problem of temporary camps that could develop into permanent slums. Displaced persons, for the most part, have been able to find temporary shelter in public buildings, vacated upper income apartments, and beach houses, in addition to constructing shanty huts and permanent multi-story buildings in territories owned by Government and private concerns.

Medium Term Program:

The Government embarked on a loan program for construction and/or purchase of housing units, to address the needs of middle and limited income groups. This program is based on an anticipated need estimated to be roughly at 400,000 dwellings between 1983 and the year 2000, i.e., an average of 21,000 units per year.

Easy credit for middle and limited income groups is being provided through institutions created by the Government since 1977:

1. The Housing Bank, (a semi-private institution) whose main undertaking is financing housing projects covering construction, reconstruction and upgrading of housing units and compounds. Eligible beneficiaries are Lebanese families with annual incomes above LL. 40,000, ($10,000). The Residential Model presented in this work addresses this income group.

2. The Housing Fund, a semi-autonomous government agency related to the Ministry of Housing and Cooperatives. The main task of
this agency is the construction and ownership of 20,000 units. Eligible beneficiaries are Lebanese families with annual incomes of less than L.L. 40,000 ($10,000).

3. The low-cost housing program is a nonsubsidized easy credit program, especially designed to meet the needs of families with annual incomes below the national median income, which is estimated to be roughly in the neighborhood of L.L. 24,000 ($6,000).

The government, by initiating these programs, is establishing a housing policy that would encourage the private developers and individuals to:

i. build new units for both rental and ownership,

ii. restore and maintain the housing stock.

The role of the public sector in this plan is not perceived as a builder of housing units but rather as a facilitator, a creator of circumstances in which individuals can build for themselves. Therefore, the government intervention is geared towards alleviating supply constraints by ensuring access to finance that would ultimately develop into a financial market for housing.

CONCLUSION

It is anticipated that the preliminary design of this housing project in Ajaltoun, which is initiated by one of the largest land developers in Lebanon, would fit within this general framework and, furthermore, would act as a model for future residential development on steep slopes, the only type of land that is still affordable and available for development. The creation of financial market for housing, referred to in the previous paragraph, will be crucial to the project, success and replication.
BEIRUT, LEBANON

URBAN CONTEXT

PRIMARY INFORMATION
Beirut is located at the center of the east coast of the Mediterranean Sea; latitude 34° north, longitude 35°30' east. Beirut's latitude is slightly south of Los Angeles, California. It enjoys a Mediterranean climate with warm summers and mild winters, where the temperature ranges between 10° and 33°C with an annual precipitation averaging between 4 and 15 cm.

Beirut is the capital of the Republic of Lebanon. Lebanon, which is a small territory of 10,452 square kilometers, has a highly dense pattern of settlement. Bordering Lebanon to the east and to the north is Syria, south, Israel, and to the west, the Mediterranean Sea.

HISTORY
The city of Beirut dates back to the 14th century B.C. During the 12th century, Beirut was invaded by armies from Mesopotamia and Egypt. Towards 1165 B.C. Beirut was united to the Selucide Kingdom of Syria, where it played the role of the commercial agent between the east and the west. Beirut was occupied by two Roman legions in 14 B.C. and took the name of "Julius Augustus Prospectrous Beryte." During the 5th century it became the most important Roman town in the region. Beirut was then conquered by the crusaders in 1101, and by the Ottomans in 1516. After Lebanon's independence from the French in 1943, Beirut has maintained its importance as a center of trade, finance, and culture, until the recent civil war that has ravaged the country for the last eight years. As with the rest of the country, Beirut became divided along sectarian lines, the Moslem west and the Christian east side. This put an end to all efforts of unification. The major battlefield was the famous "Green line" -- an important road exceeding 60 meters in width -- that connects Beirut to Damascus, running from the commercial downtown through the heavily populated residential southern suburbs, crossing the rugged mountainous range of Mount Lebanon. The area neighboring the road, which became the dividing line between the two regions, witnessed the fiercest fighting and suffered the heaviest destruction. Large residential city blocks were leveled, thus forcing the local residents to take refuge in safer areas, mainly the Lebanese mountains.

ECONOMY
Before the civil war Beirut was the focal point for trading activities in the Middle East, acting as an important gold and foreign exchange market. Also Beirut was a major banking center for the Middle East, where over 100 banks operated out of Beirut. Lebanon's economy is based on private enterprise with few controls exercised by the Government. Previous to the war, two thirds of the GDP was drawn from services, primarily banking, commerce, tourism and transit trade. These resources have been severely affected by the civil war. The rest of the GDP was drawn from the major industrial activities, which included food processing, textiles manufacturing, and light industrial goods production. Beirut was also an important publishing center in the Arab region, where 50 privately owned political dailies and hundreds of periodicals were published. This cultural activity was concentrated in Beirut due to the highly intellectual environment. Lebanon's literacy rate is about 86 percent, the highest in the Arab world. Furthermore, two leading universities (The American University of Beirut and the Saint Joseph University) in addition to ten other institutions of higher learning, have made Lebanon an important center for higher education in the Eastern Mediterranean area.

The present economic situation is grim. The civil war has drained Lebanon out of its resources. The different services, such as trading tourism and transit trade, came to a halt depriving the economy from important revenues that are necessary to sustain the country economically. Furthermore, the increase in smuggled imports through ports not under government control has deprived the Government of its customs revenues. The most dramatic negative indicator available is the increase in the public debt from $2 billion in 1980, to approximately $7 billion by the end of 1981. Moreover, at the rate of deficit financing that has characterized the budget and the rates of interest paid on public debt, the total public debt projected by the end of 1984 will exceed $5 billion. One of the most important factors preventing the collapse of the economy is the extensive remittance of the Lebanese citizens who fled the war and the unstable situation to work in the neighboring wealthy countries and who do still support their families still residing in Lebanon. In summary, if Lebanon does not pull itself out of its dilemma at some point in the next three years, the Lebanese economic system characterized by free ownership and a free foreign exchange system could easily disintegrate. If that situation arises, Lebanon will then have no driving force towards development and will certainly become an impoverished nation.
Government
Beirut is the seat of a highly centralized national government. Parliamentary elections are held every four years and the deputies themselves elect the president of the Republic. The Metropolitan area is divided into fourteen municipalities whose authority over urban development is limited to the issue of building permits and inspections. Authorization for subdivisions are made by the national planning agencies.

Demography
Similar to many of the cities in the developing world, Beirut in the 1970s was witnessing rapid urbanization. An increasing number of people were abandoning the countryside to seek a more lucrative livelihood in the city. In 1971, the estimated population of Beirut Urban Area was 1,200,000, nearly 45 percent of the total population of Lebanon. The civil war that started in 1975 brought a drastic change to the situation. It divided the city into Christian East Beirut and Moslem West Beirut separated by the famous "Green line." Aside from the movement of population within the city from one area to another, Beirut witnessed a rapid expansion of the city towards the safer suburbs. Because of the difficult topography to the east, Beirut expanded northward and southward, thus consuming the narrow coastal plain that provided Beirut with its produce. Furthermore, this movement of people did not limit itself to the nearby suburbs, but also affected major coastal cities like Tripoli, Jounieh and Sidon, as well as mountain villages, where this large influx of refugees was not expected.

Socio-Cultural
The population forms a mosaic of religious communities, comprising seven major religious groups, four Christian, two Islamic, and the Druze. The religious factor plays an important role in the Lebanese politics. A critical and delicate balance is maintained among the religious communities in selecting all public officers.

Socio-Economic
In 1982 Lebanon's gross national product was estimated at more than $2.5 billion, or a per-capita income of well over U.S. $900.

Housing
Unfortunately, the housing stock suffered the largest destruction during the war. As a result of violent sporadic fighting since 1975 that concentrated around and within the highly dense residential area of the capital, there has been considerable damage to housing stock and related public services. Best estimates indicate that around 40,000 units of housing were damaged or destroyed during the earlier years of fighting. The Israeli invasions of Lebanon in mid-March 1978 and in June 1982 are estimated to have added 72,000 damaged or destroyed units to the totals. Dislocation resulting from the war accentuated the housing problem, increasing the number of refugees to an all-time high of 500,000 people, approximately 16% of the total population. Many of these refugees squatted in illegal settlements around Beirut, causing a rapid deterioration of the suburbs.

The objectives of the Government housing policy are to:

i. Increase the housing stock as rapidly as possible;
ii. Generate an active housing market in which a broad array of units, affordable to all income groups, will be provided;
iii. Ensure that these activities take place in a proper land-use pattern, respecting both the environment and the cultural traditions of the country.
THE PROJECT

This section is intended to introduce the project by defining its goals and the task it is trying to accomplish. It provides a description of the problem and a list of facts and assumptions that justify such a project.

PROBLEM DEFINITION

Since 1975 Lebanon has been suffering from a violent civil war that inflicted heavy losses of life and resources. Particularly the housing stock suffered the largest destruction. It is estimated that the number of units damaged or destroyed at the end of 1982 to be around 115,000 units. The housing sector was already suffering from a severe backlog of unmet demand for new housing estimated at 150,000 units in 1974. This resulted in an extreme housing shortage affecting all segments of the society. Dislocation resulting from the war increased the number of refugees to an all-time high of 500,000 people nearly 16% of the total Lebanese population. A large number of them fled to the neighboring mountain villages where the housing stock did not have the capacity to absorb this unexpected large demand for housing, neither the local infrastructure was ready to accommodate major residential development. Furthermore, the difficult topography of the land added to the conventional construction methods and lots subdivision layout made the expansion of these villages physically difficult and costly. In addition, substantial inflows of capital have gone into real estate speculation, thus raising up the price of land still available for development to a great premium. This led to a severe distortion of the market with mismatches between supply and demand of housing types and income levels. Clearly all indicators point out the need for more serviced land. These future developments should be economically feasible and consequently affordable by most. Therefore, new methods to develop dwelling units on steep slopes should be investigated. These new methods will have to provide new alternatives for circulation and access to plots as well as new lots subdivision layouts where private/collective lots ownership would be generated.

FACTS AND ASSUMPTIONS

Lebanon now, in 1984, is suffering a severe housing shortage. The civil war that started in 1975 has inflicted tremendous destruction in the housing stock, causing the dislocation of 500,000 people, approximately 16% of the total population. A large number of these people are seeking refuge in mountain villages where the housing stock is limited and where the only land available for development is steep and expensive to develop with the conventional methods.

Politically the situation has not improved. In fact, it went from bad to worse, especially after the Israeli invasion in 1982, and the withdrawal of the Multi-National Peace Keeping Force in 1984. The civil war is ravaging new areas that were relatively stable (Recently, 50,000 people have fled the Shouf area after the latest round of fighting there). With this tremendous movement of the population, the country is also witnessing a movement of the industry and the different
commercial and business activities to relatively safer areas. This implies that the pressing need for housing in the mountain villages is not likely to decrease, but rather to increase. It is also assumed that the country's political future is the legalization of the de facto partition, making the present demography permanent. When this takes place it is anticipated that the situation will stabilize, thus encouraging more investment in housing. It is also expected that the different cooperatives in the country will be the main client. These cooperatives are well organized and already studying means to acquire housing for their members. For instance, in the summer of 1983 the Government Employees Cooperative, the cooperative of private schools teachers and the cooperative of the employees of the National Broadcasting Corporation, this is to name a few, were trying to initiate housing schemes to benefit their members. Aside from the political instability these organizations were having difficulties finding a suitable lots subdivision layout that would be economically feasible for their investment. The supply market can not yet accommodate private/collective ownership of plots. The plots offered on the market are generally small and only addressing the detached buildings type of development.

A view of a typical mountain village.

A view of a residential area in the southern suburbs of Beirut, one of the areas hardest hit by the civil war.
CASE STUDY: AJALTOUN VILLAGE

LOCATION
Ajaltoun village is located in Mount Lebanon, 26 km to the northeast of Beirut at an altitude of 850 m above sea level. Ajaltoun enjoys a mild climate, and a scenic view of the Mediterranean Sea. It sits on a mountain ridge between two other mountain villages, Reyfoun to the northeast and Balloune to the southwest. It is also bounded by deep valleys to the north and to the south.

ORIGINS
The history of the village goes back to 1307 A.D. Because of the difficult topography and access, Ajaltoun was isolated for years. This isolation made Ajaltoun a safe refuge for the Christians who were fleeing the Islamic persecution at the time. The village developed slowly until the 19th century, when silk processing became an important source of revenue for the country. Ajaltoun was then an important silk processing center in the area. In 1918 when Lebanon was under the French mandate, the first road to Ajaltoun was built, connecting Ajaltoun to the coastal city of Jounieh and to the capital Beirut. Also at that time the silk processing industry was weakened by the technological improvement in textile manufacturing, which created an economic pressure on the locals to seek job opportunities in the city. This migration was seasonal, because the summers witnessed a return of these people who used to aestivate in their home town, which enjoyed cool summers. In the 1960s a major highway was built and Ajaltoun became the summer resort of the late Lebanese president Fouad Chehab. Since then the village became an...
Residential Model Ajaltoun

AERIAL PHOTOGRAPH OF AJALTOUN VILLAGE
A typical residential building

important national landmark, and has developed its businesses and services around this seasonal major source of revenue.

The situation remained unchanged until the beginning of the 1975 civil war. Because the village was relatively safer than other parts of the country, many of the seasonal residents decided to stay until the situation improves. Unfortunately, the situation worsened, and the war included other regions of Lebanon, making their residence permanent. Furthermore, the village witnessed an unexpected influx of refugees who came mainly from Beirut and were seeking shelter and safer grounds. This situation affected the village tremendously; it grew into a town overnight, affecting the layout, the demography and the land use of the village. Other villages in different parts of the country were also subject to similar changes.

LAYOUT
The street pattern is irregular and coincidental. It was initially footpaths and narrow walkways. The streets developed in a circular pattern that grew out from the heart of the village where the church, the public square, and the market were located. Also, the farther we moved away from the center, the lots grew larger and the density became lower. The new residential developments are mainly located away from the center with a street pattern that is mainly dictated by the steep slope condition and the size of lots, already specified in the zoning code.

A pathway through the older residential area of Ajaltoun
LAND USE

The land-use is mainly residential. The commercial activity is concentrated in the old center of the village and along the major highway that was built in 1960. In addition, there is an entertainment area that developed in the past two decades and concentrated its activities around the main highway. Therefore, we find a number of restaurants, movie theatres, hotels and coffee houses in that part of the village. Also, we find in Ajaltoun the following community facilities: two primary schools, three churches, a monastery, a major public square and an old market area, all located in the center of the village. In addition, we find two secondary schools and a major hospital at the edge of the village. The streets and the public areas are well maintained mainly because of the continuous efforts of the municipality and the residents.

POPULATION

Before the war in 1975 the permanent population was 6000 people, as well as the seasonal population which brought up the population every summer to around 12,000 people. Since the civil war the number of people grew to an all-time high of 20,000 people. The majority of the population is Christian, and represent the middle and upper middle income. Most of the new residents are refugees who fled the violence in Beirut. A large number of these people still hold jobs in other areas, mainly Jounieh, and the coastal zone; therefore they commute daily to their place of business.
There is an important vehicular movement on the main highway connecting Ajaltoun with the neighboring villages and the coastal city of Jounieh. The pedestrian movement is concentrated in the old part of the village, around the market area and throughout the residential areas.
PROJECT GOALS AND STRATEGIES

This preliminary design is an attempt to develop a residential model for steep slopes. This study will demonstrate new alternatives in solving the problems associated with such type of development. It is also anticipated that this design will help developers and designers in future development in similar conditions.

The circulation and access to lots were the main constraints. The present solution of sloped curving roads is still unavoidable for movement between levels. In order to serve all lots, a longer road network is required, making the conventional solution costly. Furthermore, access to the lots, requiring bridging from roads to buildings and cutting into the slope, have also proven expensive and impractical. This preliminary design will demonstrate a new solution for the problem of circulation and access on steep sites. In this alternative, the main circulation acting as a spine for the whole development, and the only means of movement between levels is minimized thus reducing the cost. The access roads to lots are integrated into the building structure and subsequently become part of the parking system, thus reducing cost and soil surface disturbance. As a result of this substantial reduction in the road network, the private areas are maximized.

The design also introduces new alternatives at the lots subdivision level. After studying the topography of the site and differentiating between the two types of slopes (80% and 30%), two solutions were derived each accommodating housing development on one of the slopes. Both solutions promote large plots with a provision for "condominium," depending on the slope the physical organization of these condominium changes. On the 80% slope the dwellings are organized in a linear fashion, on the other hand the dwellings are organized in a cluster shape on the 30% slope, thus taking full advantage of the topography. It should also be noted that all buildings with parking facilities at the bottom level are positioned parallel to contour, permitting easy vehicular access from the main circulation.

The two "condominium" organizations presented in this design introduces the "row" dwelling units type to the Lebanese context. The conventional type of dwelling units supplied by the market in that area is the "semi-detached" type, which has access to light from three sides. In order to compete for the market, a special interest was given to the design layout of the dwelling units. The functions that require a physical or visual contact with the outside were combined, leaving the "wet-zone" area in the middle, thus simplifying the plumbing system, while providing more flexibility to the design layout.

Structurally, the same structural system is used throughout the whole project. Only two spans between bearing walls were adopted (6.60 m and 4.40 m), thus minimizing the formwork of the concrete slab and consequently cutting down construction cost. These bearing walls are perpendicular to contour and act as foundations as well as retaining walls in some conditions. The
choice of these two spans was dictated by the need to accommodate both the dwelling and the parking functions.

Finally, this preliminary design has a provision for an incremental implementation, allowing the developer a needed flexibility in his investment. The project is staged in three parts. The first part is a conventional development, with lot’s sizes ranging between 1,000 m² and 1,500 m². This stage will require a minor investment in return for a quick cash-flow resulting from the sale of the individual plots. The second stage has a large lots subdivision layout with a provision for a cluster "condominium" development. This type of lots subdivision will allow the developer two choices, either to develop these large condominium plots on his own or to sell them to other developers or cooperatives who would undertake the development. The third stage has also large lots subdivision layout with a provision for a linear "condominium" development. The scenario will be the same as in the second stage allowing other organizations to be involved in the development.

It should be noted that within each stage an incremental development could be adopted, allowing the developer a larger flexibility in his investment.
GENERAL DATA

PRIMARY USE
The site will be developed for residential use for a community of people.

TARGET INCOME GROUP
The development will be serving the middle income group, with an annual income above $10,000 per household. The main beneficiaries of this project will be the displaced people of Beirut who came to seek refuge in the mountain villages.

<table>
<thead>
<tr>
<th>Annual Income per Household</th>
<th>Basic Area (m²) per unit</th>
</tr>
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<tbody>
<tr>
<td>10,000</td>
<td>105</td>
</tr>
<tr>
<td>15,000</td>
<td>122 - 140</td>
</tr>
<tr>
<td>20,000 and above</td>
<td>172</td>
</tr>
</tbody>
</table>

TENURE
The project will offer two types of development, small private lots to be sold individually and large condominium lots to be owned collectively.

INTENSITY OF LAND USE
The density adopted in the project is around 262 people per hectare.

FINANCING GROUP
The size of the project will demand the contribution of larger financial organizations, local cooperatives and possibly public institutions.

CIRCULATION
The streets will be used by both vehicles and pedestrians. The courtyards of the clusters will be used exclusively by pedestrians.

UTILITIES
All utility systems will be connected to the existing network already serving the village of Ajaltoun. The water will be supplied from the source of Nabh El Assal. It is anticipated that the area will need another source of water in the next five years. The area is already suffering from insufficient supply of water. It is expected that within the next 10 years the village of Ajaltoun would be connected to the main sewer system, until then alternative solutions will be adopted in the project.

DEVELOPMENT MODE
The project will be implemented incrementally, allowing the developer a lot of flexibility in his investment. The project is staged in three parts, within each part an incremental development could also be adopted, providing even more flexibility and security to the investment.
SITE LOCATION

1:10 000
THE SITE

The Ajaltoun site has the following characteristics.

LOCATION
The site is located in Ajaltoun in Kesserwan sector of Mount Lebanon. The site is situated 26 km northeast of the capital Beirut, and 10 km east of the city of Jounieh, an important employment center. The site is located in an area zoned for residential use.

APPROACHES/ACCESS
The main access route to the site is the old Jounieh-Faraya road built in the 1940s. This road passes, approximately 400 meters away from the site. The Jounieh-Faraya road connects back with the Jounieh-Faraya highway, an important access route built in the 1960s, connecting the mountain villages to the coastal zone.

TRANSPORTATION
The main transportation services, buses and taxis, run on the Jounieh-Faraya highway offering services to neighboring villages and to the coastal city of Jounieh, an important employment center.

SIZE/SHAPE
Gross area of the site: 27.2 hectares. Triangular shape.

TOPOGRAPHY/NATURAL FEATURES/SOIL
The site overlooks the city of Jounieh at an altitude of 850 m. The site is irregular with slopes varying from 30% to 80%. The surface is covered with vegetation, bushes and trees. The soil is composed of silt and clay, with a deep rocky substrata. Limestone out-croppings are also found in several areas.

BOUNDARIES
The site is bounded to the north and to the west by a deep valley, to the east by the village of Ajaltoun, and to the south by vacant land designated for a housing development.

ZONING RESTRICTIONS/REGULATIONS
The site is zoned for residential development. Allowed ground coverage of the site 30%. Coefficient of land exploitation 0.75. Maximum height of buildings 17 m.

OTHER FACTORS
The site enjoys a scenic view of the bay of Jounieh. The site is also free of all types of pollution, and is well drained.

LAND TENURE/LAND COST
The site is owned by "Companie Immobiliere Libanaise," a private developer. The land value is estimated at $25/m^2.

INFRASTRUCTURE/COMMUNITY FACILITIES
No utilities exist on the site. All utilities are available in the surrounding areas. Commercial and community facilities are available in the village.
Residential Model Ajaltoun

PROGRAM

BASIC DATA

This residential model for steep slopes is located in Ajaltoun, Lebanon, 26 km northeast of Beirut.

| Area of the site | : 27.2 hectares |
| Target population | : 7140 people |
| Target income group | : the Lebanese middle income group |
| Number of dwelling units | : 1428 apartments |
| Number of small shops | : 24 shops |
| Supporting facilities | : none, the intended project will be supported by the existing facilities in Ajaltoun village |
| Target density | : 263 people/hectare |
| Site present condition | : At the present time the site is empty, and is covered by trees and bushes. |

It is anticipated that this project will accommodate 1428 households displaced by the war.

<table>
<thead>
<tr>
<th>Basic Area (m²) per Unit</th>
<th>No of Units</th>
<th>Total Basic Areas (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwellings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>12</td>
<td>1,260</td>
</tr>
<tr>
<td>122</td>
<td>436</td>
<td>53,192</td>
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<tr>
<td>140</td>
<td>484</td>
<td>67,760</td>
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<td>172</td>
<td>36</td>
<td>6,192</td>
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<tr>
<td></td>
<td>968</td>
<td>128,404</td>
</tr>
<tr>
<td>Shops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>24</td>
<td>840</td>
</tr>
<tr>
<td>Access stairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,680</td>
</tr>
<tr>
<td>Projected Lot</td>
<td></td>
<td></td>
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<tr>
<td>Development (buildings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>368</td>
<td>55,200</td>
</tr>
<tr>
<td>(app.)</td>
<td>(app.)</td>
<td>(app.)</td>
</tr>
</tbody>
</table>
Residential Model Ajaltoun

DWELLING UNIT:

<table>
<thead>
<tr>
<th>Type</th>
<th>Tenure</th>
<th>Land/lot area</th>
<th>Development mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>122 m²</td>
<td>APARTMENT</td>
<td>VARIETY</td>
<td>INSTANT (2 Bedroom)</td>
</tr>
<tr>
<td>140 m²</td>
<td>APARTMENT</td>
<td>VARIETY</td>
<td>INSTANT (3 Bedroom)</td>
</tr>
</tbody>
</table>

STRUCTURAL FRAME PLAN

KEY

LR  living room
BR  bedroom
K   kitchen
SR  sitting room
L   laundry
B   balcony

TYPICAL FLOOR PLAN
Residential Model Ajaltoun

DWELLING UNIT: 140 m²  172 m²

Type: APARTMENT  APARTMENT
Tenure: OWNERSHIP  OWNERSHIP
Land/lot area: VARIES  VARIES
Development mode: INSTANT  INSTANT

(2 Bedroom)  (3 Bedroom)

STRUCTURAL FRAME PLAN

TYPICAL FLOOR PLAN

KEY

LR living room
BR bedroom
K kitchen
SR sitting room
L laundry
B balcony

1:400
Residential Model Ajaltoun
Residential Model Ajaltoun

GENERAL SECTION THROUGH CLUSTERS
ISOMETRIC VIEW OF A LOT DEVELOPMENT
ISOMETRIC VIEW OF A CLUSTER DEVELOPMENT
GLOSSARY

The criteria for the preparation of the definitions have been as follows:
- Second Preference: definitions from technical dictionaries, textbooks, or reference manuals.
- Third Preference: definitions from the Urban Settlements Design Program (USDIP) files. They are used when existing sources were not quite appropriate/ available.

Words included for specificity and to focus on a particular context are indicated in parentheses. (See also: REFERENCES).

ACCESS. The pedestrian/vehicular linkages from/to the site to/from existing or planned approaches (urban streets, limited access highways, public transportation systems, and other systems such as: waterways, airlines, etc.). (USDIP)

BLANK. A block is a portion of land bounded and served by lines of public streets. (USDIP)

BOUNDARY. Something (a line or area) that fixes or indicates a limit or extent of the site. (Merriam-Webster, 1971)

BUILDING CODE. A body of legislative regulations or by-laws that provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within the city, and certain equipment specifically regulated therein. (MNA, 1967)

CIRCULATION. Systematic movement of people, goods from place to place; streets, walkways, parkway areas. (USDIP)

COMMUNITY FACILITIES/SERVICES. Facilities/services used in common by a number of people. It may include: schools, health, recreation, police, fire, public protection, community center, etc. (USDIP)

COMMUNITY RECREATION FACILITIES. Facilities for activities voluntarily undertaken for pleasure, fun, relaxation, exercise, self-expression, or release from boredom, worry, or tension. (USDIP)

CONDOMINIUM. A system of direct ownership of a single unit in a multi-unit whole. The individual owns the unit in much the same manner as if it were a single-family dwelling; he holds direct legal title to the unit and a proportionate interest in the common land and areas. Two types of condominiums are recognized: HORIZONTAL; detached, semi-detached, row/grouped dwelling types; VERTICAL: walk-ups; high-rise dwelling types. (USDIP)

COSTS OF ORGANIZATION. Include the following: CAPITAL: cost of land and infrastructure; OPERATING: cost of administration, maintenance, etc.; DIRECT: include administrative, legal, technical institutions involved in the provision of dwellings. The process of preparation, financing, construction, operation is carried out by the popular sector generally for 'self use' and sometimes for profit. (USDIP)

DEVELOPMENT. Process of selecting the means and contriving the elements, steps, and procedures for producing what will adequately satisfy some need.

DEVELOPMENT LAYOUT. The pedestrian/vehicular circulation system inside the site. It should be designed based upon the exterior circulation/accesses and land development requirements. (USDIP)

DETACHED DWELLING. Individual dwelling unit, separated from others. (USDIP)

DISTURBED SOIL. Soils that have been disturbed by artificial process; such as excavation, transportation, and compaction in fill. (USDIP)

DRAINAGE. Interception and removal of ground water or surface water, by artificial or natural means. (On Pina, 1972)

DWELLING. The general, local designation of a building/structure in which people live. A dwelling contains one or more dwelling units. (USDIP)

DWELLING BLOCK. Four groups are considered: SELF-Help UNIT, where the dwelling unit is directly built by the user or occupant, the name being derived from the scale of operations, financially and materially the scale being limited to the construction of low-cost units or small. LARGE CONTRACTOR UNIT, where the dwelling unit is totally built by a large organization hired by the user, occupant, or developer; "small" contractor is defined by the scale of operations, financially and materially, the scale reflecting a more comprehensive and larger size of operations encompassing the building to the formal financial, administrative, legal, technical institutions involved in the provision of dwellings. The process of preparation, financing, construction, operation is carried out by the popular sector generally for 'self use' and sometimes for profit. (USDIP)

LAND COST. Price: the amount of money given or set as the amount to be given as a consideration for the sale of a specific thing (the site). (Merriam-Webster, 1971)

LAND DEVELOPMENT COSTS. The costs of making raw land ready for development through the provision of utilities, services, accessibility, etc. (USDIP)

LAND LEASE. The renting of land for a term of years for an agreed sum; leases of land may run as long as 99 years. (USDIP)

LAND-VALUE. Refers to: 1) the present monetary equivalent to replace the land; 2) the present tax basis value of the land; or 3) the present commercial market value of the land. (USDIP)

LAND OWNERSHIP. The exclusive right of control and possession of a parcel of land. (USDIP)

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, physical controls and responsibility. (USDIP)

LAND UTILIZATION: PHYSICAL. The physical/ environmental and personal effects. (USDIP)

LAND UTILIZATION: RESPONSIBILITY. The quality/estate of being morally/legally responsible for the use and maintenance of land by the owners/users. (USDIP)

LAYOUT. The plan or design or arrangement of something that is laid out. (Merriam-Webster, 1971)

LEVELS OF SERVICES. Two levels are considered: MINIMAL, are admissible or possible levels below the standard; STANDARD, are levels set up and established by authority, custom of general consent, as a model, example or rule for the measurement of quality, extent, value or quality. (USDIP)

LOCATIONS. A relatively self-contained residential area/ community/neighborhood/setting within an urban area which may contain one or more dwelling/land systems. (USDIP)

LOCALITY. A relatively self-contained residential area/ community/neighborhood/setting within an urban urban area which may contain one or more dwelling/land systems. (USDIP)

LOCATION. The way in which something (the site) is placed in relation to its surroundings (the urban context). (Merriam-Webster, 1971)
LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

LOT CLUSTER. A group of lots (owned individually) around a nonpublic common court (owned in common) (U.S.D.P.)

LOT COVERAGE. The ratio of building area to the total lot area. (U.S.D.P.)

LOT PROPORTION. The ratio of lot width to lot depth. (U.S.D.P.)

MODEL OF URBAN LAYOUT. A representation of an urban residential area illustrating circulation, land utilization, land subdivision, and utility network of a specific layout and lot. (U.S.D.P.)

MUTUAL OWNERSHIP. Private land ownership shared by two or more persons and their heirs under mutual agreement. (U.S.D.P.)

NATURAL FEATURES. Prominent objects in or produced by nature. (U.S.D.P.)

NATURAL UNDISTURBED SOIL. Soils that have not been disturbed by artificial process. Although natural, they depend greatly on local conditions, environment, and past geological history of the formations. (U.S.D.P.)

NEIGHBORHOOD. A section lived in by neighbors and having distinguishing characteristics. (U.S.D.P.)

NETWORK EFFICIENCY (LAYOUT EFFICIENCY). The ratio of the length of the network to the area(s) contained within or tangent to it. (U.S.D.P.)

PLANNING. The establishment of goals, policies, and procedures for a social or economic unit, i.e., city. (U.S.D.P.)

PLAYLOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

POPULATION DENSITY. It is the ratio between the population of a given area and the area. It is expressed in people per hectare. It can be: GROSS DENSITY, including any kind of land utilization, residential, circulation, public facilities, etc.; NET DENSITY, including only the residential land and does not include land for other uses. (U.S.D.P.)

POLICY. The point or area in space actually occupied by a physical object (the site). (Merriam-Webster, 1971)

PRIMER. A small introductory book on a specific subject. (U.S.D.P.)

PRIVATE LAND OWNERSHIP. The absolute tenure of land to a person and his heirs without restriction of time. (U.S.D.P.)

PROJECT. A plan undertaken: a specific plan or design. (U.S.D.P.)

PUBLIC CIRCULATION. The circulation network which is owned, controlled, and maintained by public agencies and is accessible to all members of a community. (U.S.D.P.)

PUBLIC FACILITIES. Facilities such as schools, playgrounds, parks, other facilities accessible to all members of a community which are owned, controlled, and maintained by public agencies. (U.S.D.P.)

PUBLIC SERVICES AND COMMUNITY FACILITIES. Includes: public transportation, police protection, fire protection, refuse collection, health, schools, and playgrounds, recreation and open spaces, other community facilities, business, commercial, small industry, markets. (U.S.D.P.)

RESIDENTIAL AREA. An area containing the basic needs (requirements for daily life activities; housing, education, recreation, shopping, work. (U.S.D.P.)

ROOM/GROUPED HOUSING. Dwelling units grouped together linearly or in clusters. (U.S.D.P.)

Semi-detached dwelling. Two dwelling units sharing a common wall (duplex). (U.S.D.P.)

SETTLEMENT. Occupation by settlers to establish a residence or colony. (U.S.D.P.)

SHAPE. Form/configuration of the site surface as defined by its perimeter/boundaries. (U.S.D.P.)

SITE. Land that could be made suitable for building purposes by dividing into lots, laying out streets and providing facilities. (Merriam-Webster, 1971)

SITE AREAS. Two types are considered: GROSS AREA: includes the whole site or the bounded parcel of ground. USEABLE AREA: includes only the portion of the site that can be fully utilized for buildings, streets, playgrounds, recreation facilities, gardens, or other structures on it. (U.S.D.P.)

SIZE. Physical magnitude or extent of the site, relative or proportionate dimensions of the site. (Merriam-Webster, 1971)

SOIL. Soil structure: the arrangement of soil particles in various aggregates differing in shape, size, stability, and degree of adhesion to one another. (Merriam-Webster, 1971)

STANDARD. 1) Something that is established by authority, custom or general consent as a model or example to be followed. 2) Something that is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality. (Merriam-Webster, 1971)

TERM. Two situations of tenure of the dwelling units and/or the lot/land are considered: LEGAL: having formal status derived from law; EXTRALEGAL, not regulated or sanctioned by law. Four types of tenure are considered: TENANT: where the user pays a fee (daily, weekly, monthly) for the use of the dwelling unit and/or the lot/land; LEASE: where the user pays a fee for long-term use (generally for a year) for a dwelling unit and/or the lot/land from the owner (an individual, a public agency, or a private organization); OWNERSHIP: where the user holds in fee simple the dwelling unit and/or the lot/land which the unit occupies; EMPLOYER-PROVIDED: where the user is provided a dwelling unit by an employer in exchange for services, i.e., domestic live-in servant. (U.S.D.P.)

TITLE. The instrument (as a deed) that constitutes a legally just cause of exclusive possession of land, dwellings, or both. (Merriam-Webster, 1971)

TREATMENT WORKS. Filtration plant, reservoirs, and all other construction required for the treatment of a water supply. (RNC 45-47, 1953)

UNIT. A determinate quantity adopted as a standard of measurement for other quantities of the same kind. (Merriam-Webster, 1971)

URBAN TRANSPORTATION. Means of conveyance of passengers or goods from one place to another along ways, routes of circulation in a metropolitan context. (U.S.D.P.)

URBANIZATION. The quality or state of being or becoming urbanized: to cease to take on urban characteristics. (U.S.D.P.)

USE TAX. The tax on land aimed primarily at enforcing its use or improvement. (U.S.D.P.)

USER INCOME GROUPS. Based upon the subsistence (minimum wage) income per year, five income groups are distinguished: HIGH (above subsistence level), the income group that can afford no or very limited subsidized housing; MIDDLE (1 x subsistence level): the income group that can afford limited housing and rent only with government assistance; LOW (5 x subsistence level): the income groups.

UTILITIES. Include: water supply, sanitary sewage, storm drainage, electricity, street lighting, gas, telephone. (U.S.D.P.)

UTILITY/SERVICE. The organization and/or infrastructure for meeting the general need (as for water supply, wastewater removal, electricity, etc.) in the public interest. (U.S.D.P.)

VIEW. That which is revealed to the vision or can be seen from the site. (Merriam-Webster, 1971)

WALK-UP. Dwelling units grouped in two to five stories with stairs for vertical circulation. (U.S.D.P.)

WATER SUPPLY. Source, means, or process of supplying water, for a community) usually involving reservoirs, pipelines, and often the watershed from which the water is ultimately drawn. (Merriam-Webster, 1971)

ZONE ORDINANCE. The demarcation of a city by ordinance into zones (areas/districts) and the establishment of regulations governing the use of land and the location, bulk, height, shape, use, population density, and coverage of structures within each zone. (U.S.D.P.)
REFERENCES


The Housing and Urban Development Sector, World Bank Report, on Lebanon, 1983.


Site Survey of Ajaltoun Village, Toufic Abourached, Ajaltoun, Summer of 1983.