RESIDENTIAL TYPOLOGICAL STUDIES: SAN JUAN, PUERTO RICO

by

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Bachelor of Architecture, Cornell University (1974)

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Signature of Author...........................................
Department of Architecture, May, 1978

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Horacio Caminos, Professor of Architecture, Thesis Supervisor

Accepted by.........................................................
Julian Beinart, Chairman, Department Committee for Graduate Students

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Submitted to the Department of Architecture
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ABSTRACT

The thesis presents a study of five residential communities in Metropolitan San Juan, Puerto Rico. These communities were chosen because they represent the five most typical communities in the Metropolitan Area: squatter settlements, public housing projects, colonial Spanish settlements and early 20th century "barrio" settlements.

Horacio Caminos, Professor of Architecture, Thesis Supervisor
The urbanization of Metropolitan San Juan is primarily the result of the process of conurbation, the growth of communities through accretion around an existing urban center.

Some of these communities were, by economic necessity, imposed and artificial, as in the case of public housing projects. Others were born as marginal living areas, as in the case of squatter settlements. Some were started by speculators, but developed by the users, as in the case of the "barrios" of East Santurce. Others were instant developments, acquired complete and unchangeable, as in the case of the tract housing developments, the "urbanizaciones". Or they were communities which reflect a legal restrictive framework coupled with an infill developed by the users, as in the case of Viejo San Juan.

This makes the study of existing communities important because it is in the comparative study of them that one can understand them and, through that understanding formulate policy governing their creation, development and maintenance.

Unfortunately, in the last twenty years, this has been ignored or, worst, mis-interpreted. The government's housing policy of a "decent" home and environment for every family or individual has resulted in the creation of instant complete communities: the public housing projects and the tract housing developments. Though mostly the result of economic pressure (through Federal Aid), they are also the result of the lack of interpretative historical hindsight on the part of the planners who created housing policy after 1945 and all but ignored the communities already established and the teachings to be found in them.

With this in mind, the following case studies present the physical and socio-economic conditions which exist in five representative communities in Metropolitan San Juan. They were chosen as examples because comparatively and by themselves they show the physical and socio-economic advantages of the community they represent; information which should be used in the creation and development of urban residential policies.
URBAN HISTORY

HISTORY: The development of Metropolitan San Juan can be divided into three periods which parallel closely periods of political, social and economical change, not only in the city but also in the country. These periods correspond first to the Spanish hegemony prior to 1898; second, to the rise of American interests in sugar between 1898 and 1940 and the subsequent depression, and, third, to the rise of an industrial state after 1940.

When the Spanish government left in 1898, they left little urban evidence of their stay in Puerto Rico. Their occupation had been restrictive and restricting. From its start in the 16th Century, through the 17th and most of the 18th, Spain considered Puerto Rico mainly a military colony not worthy of any significant economic development. Trade with the exterior was curtailed or inhibited; interior trade was hindered by taxes and poor communications, and agriculture was hindered by laws of usufruct and inheritance. The native population was poor and dependent on the decisions of the military/clerical colonial government.

The city of San Juan which evolved in this period was not only the result of limitations established by the law of the Indies, the fortifications, and the locale but also of politics and economics. The northwest areas of the city, where urbanization began, became the residential area for the civil, military and clerical representatives of the Spanish empire in Puerto Rico. The main civic and religious areas and buildings were located in this area, a fact underlined in the later centuries of development by the great number of buildings two stories or higher. The periphery of this area, particularly on the northeast, was the quarters of the poor devoid of any important civic or religious building or area, and single story in character. Bordering the bay were the trade facilities which served the ships between the Americas and Spain.

By the start of the 19th Century, Spain had begun to loosen its stifling grip on Puerto Rico and San Juan. The first steps had started in the mid-18th Century when Spain, recognizing the economic burden of the island and its potential as a market, authorized commerce between Puerto Rico, Hispaniola and Spain. By the end of the 18th Century, Puerto Rico not only traded with Spain and its colonies but also with various neutral nations. Though this did not mean the end of military influence on Puerto Rico it meant a new economy, based not on Spanish doles but on labor intensive agriculture and external trade, and the rise of internal social, economical and political aspirations.

The city reached its saturation within the planned walls in the 18th Century, but until the mid 18th Century it still retained the social, economical and political segregation of previous centuries. However, the mercantile implications of the new policies changed this pattern. The city became a warehouse of transient goods, and the main center for processing, exporting and importing trade between the Island and the exterior. This gave rise to a whole new insular class: traders, businessmen, etc., whose newly found wealth and physical necessities were reflected in the physical character of San Juan through the creation of newer and better physical facilities for their residential, economical and social necessities. It also encouraged better communications and growth between San Juan and the surrounding towns of Rio Piedras, Catano, Bayamón, and Guaynabo, which were growing as centers of interchange between the city of San Juan and the agricultural areas.

When the war between the U.S. and Spain started in 1898, Puerto Rico was, in relationship to Spain, in a very advantageous position since it was in the administrative process of becoming semi-autonomous. Even for its small size, it had a potentially strong economy based on agriculture; primarily, labor intensive coffee and secondarily, sugar and tobacco. Its population was mainly rural composed of tenant farmers, "agregados," living on coffee estates or in small sugar or tobacco plantations. Only 1% of its population was urban, and of this only 1/3 were in San Juan.

The American invasion changed all this. Unlike the Spaniards, the Americans recognized immediately the economic important of Puerto Rico as a source of cheap, seasonal labor, as well as cheap, accessible flat land. The result was the transformation of an economy based primarily on labor intensive coffee, with small to medium size estates in the mountains to large corporation-owned sugar plantations on the coastal plains. This resulted in a large migration to the plains, then to the cities, particularly to San Juan, of a large percent of the coffee plantations' "agregados," who could not find work in the sugar industry or were laid off during the slack season.

San Juan's economic base continued its importance as a trade center. With the increasing population, a large urban market was created. Puerto Rico's source of income, mainly through the exportation of sugar was based on trade with the U.S. Now, with a large captive urban audience which could rely less and less on locally produced goods, it also became a primary market for U.S. goods. At first, this trade reflected on basic necessities but when the market was proven, the created necessities of the foreign imposed lifestyles were also imported. At a local level, a consumer society was created which varied from large financial institutions and large American-type stores to local commercial enterprises and small "cottage" and tertiary industries catering to the urban poor.

The city grew physically in two ways. In the first two decades of the Twentieth Century, a "natural" growth was concentrated in the areas of Puerta de Tierra, Santurce and adjacent to the main highway and train line which ran north to south, connecting San Juan to its most important client town, Rio Piedras. But with the ever increasing migration into the city, squatter settlements began to appear around the west shore of San Juan bay, the Cabo Martin Pena and Laguna San Jose. The Island of San Juan, Old San Juan and Puerta de Tierra deteriorated with the subdivision of houses into tenements for the poor.

In Santurce, Rio Piedras and in the land between them, housing was located in "Barrios" (Neighborhoods), in properly constructed and subdivided land, oriented by standards set by the Health Department with all the complimentary infrastructure and community services.
In the Bay, the Caño and the Laguna, most houses were shanties, constructed on flooded or floodable marsh areas belonging to the government, lotified by eminent domain, and lacking infrastructure as well as community services. The people of these "Barrios" comprised the bulk of the urban population; the merchants, teachers, businessmen, medics, government workers, contractors, etc., which the urbanization of San Juan demanded. The people of the squatzer settlements were the displaced poor, dependent on a tertiary economy in which they were in the lowest level. During this period, an attempt was made by the private/public sector to provide the low income with lots which they could buy for a minimal cost and which included infrastructure and community services. This resulted in the urbanization of the eastern part of Santurce in the areas of Villa Palmeras, Barrio Obrero, Las Palmas, etc.

In a limited way, it was successful but the influx of poor people was too great and most could not even afford to buy the small lots. The economics of sugar, the social well being of the ruling class and the provision in the first three decades of the Twentieth Century of political gains, such as American citizenship, no federal direct taxes, had helped the socio-economic and political status quo to be accepted with little opposition from the ruling Puerto Rican establishment.

But, by the late 1930's, the sugar economy had begun to falter and American interests began to look elsewhere for investment of their capital. The fall of this one-crop industry tremendously reduced the relationship between the U.S. and Puerto Rico in the late 1930's and spurred various pro-autonomy or independence movements. This, coupled with a depression, natural disasters, New Deal ideas, as well as the coming war, forced the U.S. to look at Puerto Rico with new eyes.

The lack of planning was noted and various studies were undertaken. In directive terms, these plans came to naught, but were the seed of other ideas in the next decades. The Puerto Rico Reconstruction Authority was created to coordinate economic recovery from the depression. Though ambitious in social goals, most programs under this agency only resulted in public work projects. It also resulted in a division within the agency which was in charge of the urbanisation aspects of planning and from which many ideas of urban architecture and planning of the next three decades were to emerge. The economy, both at the island as well as the city level, was based upon consumer goods as well as work given by the government to provide jobs.

The 1940's and the beginning of the 1950's saw a change from a rural economy to an industrial one, and a change from a government dominated by Americans to a representative government dominated by Puerto Ricans. In 1942, an agency for planning at urban, municipal and insular levels was created. Though not as ambitious as originally proposed, it had far reaching powers at all levels of planning and was not, theoretically, subservient to political impact. It was entrusted with the creation of a plan for the integral development of Puerto Rico. In 1947, the Industrial Incentives Act opened the door for Operation Bootstrap and the industrialization of Puerto Rico by attracting to the island manufacturing firms through tax exemptions, cheap trainable labor, and a benign economic climate. The rise of manufacturing followed with construction and then tourism. The Planning Board was to be a planning and regulatory agency. However, the Agency stopped its main goal of formulating insular regulatory plans and was mainly concerned with zoning, granting construction permits and creating socio-economic reports which would assist the industrialization and development of Puerto Rico.

All this was reflected in the physical development of San Juan after 1940. One of the first undertakings after the World War II was over was the eradication of all squatter settlements in San Juan. One vehicle for this was the creation of Public Housing, the first of various programs to provide housing for the poor using the concept of subsidized rent or mortgage. Though modest at first, the projects became bigger and they soon became known as "caserias" because they grouped a large number of walk-up structures in one area. The "caserias" were also one of the first signs of an urbanized area whose physical character was dictated by U.S. standards, a provision asked by the U.S. Government in exchange for complete, matching, or partial aid in the construction of this type of housing.

At the start of the 1950's, two other transplanted urban phenomena occurred in Puerto Rico. The end of the war and the process of industrialization had created a large middle class in Puerto Rico desirous of detached housing. The housing policy in Puerto Rico encouraged by the Junta de Planificacion and the newly created housing authority was that every family should have its own home, but most families were unable to acquire conventional mortgages from local banks. The Federal Government made mortgages accessible through the Federal Housing Administration, Farmers Home Administration, and Veterans Administration. The price San Juan was to pay for this was large scale federal housing regulations and urban sprawl through tract housing developments. Urban sprawl and the dispersion of industrial areas created the necessity for more and better vehicular circulation. A large scale, pre-planned vehicular circulation network was created, funded mainly with Federal funds and thus subject to Federal regulations and standards.

From the 1950's to the present, most urban growth in San Juan has been the result of public housing on a small scale and, on a large scale, of tract housing built around shopping centers or commercial strips and industrial areas spread evenly around the city. Some squatzer settlements were eradicated while some have been consolidated and received full services and title to the land. There are plans for inner city redevelopment, but they have not been carried out for economic reasons. The only exception has been San Juan Viejo, which is being restored for historic reasons. High density solution for the upper middle classes and very low classes has been attempted in the inner city through 4th ridge condominiums and "caserios," both following Federal standards.
URBAN CONTEXT

POPULATION: The population of Metropolitan San Juan was estimated to be over one million in 1977 (851,247 in 1970 Census) which accounted for 32% of the total population and 56% of the urban population. Of this population, 18% were located in Bayamón, 12% in Cataño, 6.7% were located in Guaynabo, 5.9% were located in San Juan, 2% in Trujillo Alto and 12% in Carolina. This implies a density of 4700 persons per square miles. Of this population, 25% were under 19, 26.4% were over 65 and 30% were in the labor force. There were 188,564 households with an average size of 4 persons. The birth rate is 10.8. The death rate is 8.7.

GOVERNMENT: The San Juan Metropolitan Area encompasses most of six municipalities and seven cities or towns which lie in, or are the administrative seats of the municipalities. These are the cities and municipalities of Bayamón, Cataño, Guaynabo, San Juan, Trujillo Alto, and Carolina and the city of Rio Piedras, which is part of the municipality of San Juan. (Levittown, a track housing development in the municipality of Toa Baja, lies adjacent to the Metropolitan Area and is considered part of it.) Of these San Juan is the most important, being the largest, as well as the historic, cultural, civic, commercial and industrial hub.

The San Juan Metropolitan Area is the seat of government not only for six municipalities but also for most Federal (U.S.) and Puerto Rican government agencies. The Puerto Rican Executive offices, the Legislature and the Supreme Court, as well as the main offices of the main federal and state offices are located in the municipality of San Juan.

The six municipalities are governed by a mayor and a Municipal Assembly elected by the constituents of the municipality. Under the mayor cargo ships, as well as the container ships. and the Assembly are various agencies which deal with problems at a municipal scale or, in conjunction with other municipalities, at a metropolitan scale. Until recently, planning for the municipalities was done at the state level, but now San Juan and Bayamón have started their own Municipal Planning offices.

EDUCATION: Education in Puerto Rico is compulsory through the 12th grade. In 1970, 27% of the population of Metropolitan San Juan were in school. Of these, 20% were in private primary and secondary schools, 6% were in public primary and secondary schools, and 17% were in private or public universities. In the public schools, 37% were in primary and 63% in secondary schools.

TRANSPORTATION: In the public sector there are buses belonging to the Metropolitan Bus Authority and the ferries which shuttle between San Juan Viejo and Cataño. In the private sector, there are buses, metered taxis, "publicos" (fixed rate cars), as well as private automobiles, of which there are 278,269 in the metropolitan area.

There are two airports in the Metropolitan area. The main airport, Aeropuerto Internacional de Isla Verde, is located in the municipality of Carolina and is the main point of connection between Puerto Rico, the U.S. mainland, and other countries. The other airport is Isla Grande, in the municipality of San Juan, and is used mainly by private planes. In 1975, 5,200,000 passengers flew in or out of the Island through the Aeropuerto Internacional de Isla Verde as well as 235,000 tons of cargo.

Port facilities for the Metropolitan area are located in San Juan Bay. Facilities are available for large ocean liners, general cargo ships, and container ships.

URBAN POPULATION GROWTH
Horizontal: dates vertical: population
Source: U.S. Census

URBAN POPULATION DISTRIBUTION
Horizontal: percentages vertical: ages males: M females: F
Source: U.S. Census 1970

URBAN ANNUAL INCOME DISTRIBUTION
Horizontal: percentages vertical: dollars
Source: U.S. Census 1970
GEOGRAPHY: The San Juan Metropolitan Area lies on the north of the island of Puerto Rico on the intersection of 18°29' N latitude and 66°7' W longitude. It is bordered by physical boundaries on two sides—to the north is the Atlantic Ocean and to the south the slopes of the Cordillera Central. Within its boundaries there are several important bodies of water: a bay (San Juan Bay), three lagoons (Condado, San Jose and Torrecilla), two large rivers (Bayamon and Rio Grande de Loiza), and two important channels (Martin Peña and Suarez). Topographically, the land is flat between the Cordillera Central and the Ocean but there are two major exceptions. The first are the 15 to 45 mts cliffs in the north-northwest part of the island of San Juan. The second is a long low hill, 25 mts high, which lies between the Atlantic Ocean and the Caño Martin Peña. There is also one island, that of San Juan.

CIRCULATION: The existing circulation layout is mainly the result of efforts made after World War II to interconnect the Metropolitan Area and give it access to the rest of the island. There are three main limited access highways: De Diego Expressway which runs from the center of the Area to the west, Loiza Expressway which runs to the east, and Las Americas Expressway which runs to the south. There are two main limited access highways in the city: Luis Munoz Rivera and Baldorioty de Castro. There are three interior divided highways: Roosevelt, Pinerio and Barbosa as well as three divided highways leading out of the city: Kennedy, 65 De Infanteria and Route 181. The main avenues inside the city are Ponce de Leon and Fernandez Juncos.
LAND USE: The land use of Metropolitan San Juan reflects mainly three things: the influence of zoning and construction regulations, the influence of vehicular circulation, and the results of urban sprawl. Prior to 1950, most industrial/manufacturing facilities were near San Juan Bay. The planning directives of the 1950's dictated that the new manufacturing plants be displaced to accommodate the residential areas of the employees of the plants. The main commercial area in 1950 was the strip created around Ponce de Leon and Fernandez Juncos between San Juan and Rio Piedras. After 1950 with the new zoning ordinances, tract housing developments clientele, and the developing system of highways, zoned and regulated commercial areas grew around the main circulation strips, linearly or in shopping centers. Residential development prior to 1950 was mainly concentrated north of Caño Martin Pena, in the island of San Juan, around the commercial strip between San Juan and Rio Piedras, and around the other town. The rising economic mobility, accessible subsidized housing, easier vehicular circulation and the new planning directives fomented tract housing development and urban sprawl. This accounts for most of the residential areas to the west and south of the Bay, to the south of the Caño Martin Pena and to the southeast of the San Jose Lagoon.
GROWTH: The growth of Metropolitan San Juan reflects the change in Puerto Rico from a rural society based on agriculture to an urban society based on manufacturing, and the population explosion in the twentieth century. Prior to 1900 the city was only urbanized within the walled city, parts of Puerta de Tierra, Santurce, Hato Rey, Rio Piedras, Caparra, and in the surrounding towns. Between 1900 and the 1920's, the city grew through accretion between Old San Juan and Rio Piedras around Ponce de Leon Avenue and the then existing railroad tracks. Prior to World War II, with the ever increasing rural urban migrations, the area of Santurce was saturated by squatter settlements in marginal lands and by speculative subdivisions. After 1950, due to new policies, most growth results from the great number of large scale housing developments and public housing projects and their complimentary, industrial, commercial and institutional facilities.
The San Juan Metropolitan Area is the richest and most important area, economically, in Puerto Rico. Though having only 30% of the population, it produces 59% of the income; it has 38% of the jobs, 60% of the commercial activity, 40% of the manufacturing activity and 50% of the government activity.

The per capita income of the city in 1975 was estimated to be $3,865 and the income per family was estimated to be $9,720. The total amounted in 1975 to $3.8 billion. In 1970, 46% of the families were below the established poverty level of $4,000, 36% were between $4,000 and $10,000, and 18% were above $10,000.

In 1970, 30.8% of the population of Metropolitan San Juan was employed. The official unemployment rate was 5%, but the real rate is approximately twice that. The principal generators of income in the city were commerce, government, industry and construction representing, respectively, 19%, 17%, 13% and 10% of the total income. In terms of the labor force, this implied 21% were in commerce, 17% were in industry, 14% were in government, and 8 to 10% were in construction.

The pattern of income distribution in the Metropolitan Area reflect not income but also the dwelling environments of the area. The areas or municipalities which are mostly suburban tract housing developments, as in the case of the municipalities of Guaynabo and Carolina, are mostly high income. The areas where these type of development mixes with semi-rural "barrios" or squatter settlements is mainly middle income as in the case of the municipality of Bayamón. Some areas which are economically depressed and composed of "barrios", squatter settlements and public housing, as in the case of Cataño, are poor in income. The municipality of San Juan, though rich in source of income is mixed, due to the various types of residential environments.
TYPOLOGY: Housing settlements in San Juan can be divided into five parts.

The first type is the Spanish-Colonial town laid out according to the Law of the Indies and composed of open recreational areas and masonry constructed blocks of housing interspersed with commercial and institutional facilities.

The second type is the squatter settlement of which there are basically two kinds: those started inside the city on marginal land during the depression years and those which started in the periphery after 1950. The first are now urban in quality, very dense and with complete infrastructure. The other are rural "barrios" with little infrastructure services.

The third type are those areas developed legally in San Juan between the World Wars. There are two types: those occurring around commercial strips and consisting of a mix of single story-detached house and apartment buildings and those composed of single story detached houses. Both followed designs based on speculation, rural traditions and Department of Health regulations.

The fourth type are public housing projects. There are two kinds. Prior to the late 60's there were large projects composed of apartment buildings. After the late 60's a large number of projects were high rise buildings, as well as row and individual houses.

The fifth type are the tract housing developments which in Puerto Rico are called "urbanizaciones." They are single story, detached housing which follow F.S.A., Fm.H.A., V.A., and local planning standards. There are two kinds: instant developments for the middle classes, and site and services developments for the upper and lower classes.
CASE STUDIES

1 VIEJO SAN JUAN
SPANISH COLONIAL SETTLEMENT

2 EAST SANTURCE
TRADITIONAL URBAN BARRIO

3 BUENA VISTA
SQUATTER SETTLEMENT

4 LUIS LLORENS TORRES
PUBLIC HOUSING PROJECT

5 LAS VEGAS
TRACT HOUSING DEVELOPMENT
VIEJO SAN JUAN
SPANISH COLONIAL SETTLEMENT
1 VIEJO SAN JUAN

LOCATION: Historical San Juan is located on the western end of the island of San Juan. To the north are the city walls, the La Perla squatting settlement and the Atlantic Ocean, to the south is San Juan Bay and the La Punta terrace, to the west the grounds of El Morro Fortress and to the east Fort San Cristobal and Puerta de Tierra.

HISTORY: The city was founded in 1521, when the capital was changed from the interior of the island to the center for economic and administrative reasons. It was laid out according to the Law of the Indies. The first part developed was the northwest sector around what is now Cristo Street. The city walls were laid out during the 16th Century in order to fortify the whole island of San Juan. The city reached saturation within these walls in the 17th century. During this time, the lots were subdivided many times and the buildings changed from makeshift structures to masonry structures, but it was not until the 19th century that the city acquired the character it retains today. With the American administration the city changed little until the start of the depression when poor people moved into units created from the dwellings of a middle/upper class which left the city. The city continued to deteriorate until the late 50's and early 60's when the possibilities of restoration were rediscovered, and young middle and upper class people began to move into the city.

SOCIO-ECONOMIC: In the first two and a half centuries of Spanish occupation, the economy was military oriented. This was reflected in the society by the differences between the military/eclesiastical classes who ruled and the insular lower class who served them. By the mid 19th century, with the rise of agriculture and increased trade the position of the military and the church was supplanted by an insular upper class whose economic interests and main residences were in San Juan. The resulting mixture of employers and employees lasted until the 1930's depression when a large number of the upper and middle classes left the city, and additional poor people moved in, resulting not only in an economically depressed area but also in a rapidly shrinking population. This trend did not end until the early sixties when preservation and restoration of the city was begun and attracted people with higher incomes to the area.

The population today is low for an extensively reconstructed area. There is still great disparity between the low income families who live there and the upper income families who are now moving in. Of the former are many single people or elderly couples living in dilapidated tenements. In the latter there are many young singles or couples living in renovated apartments or houses. There are fewer families without young children than normal perhaps reflecting the lack of acceptance of San Juan as an area to bring up children.

LAYOUT: The city is built on a sloping site. Its highest point lies in the northwest corner, almost 160 meters above sea level. The city slopes toward the bay 5% north to south on its east edge, 5% west to east on its north edge, and 3% north to south on its east edge. The city, as specified in the Law of the Indies, is based on a grid of approximately 60 meter by 60 meter blocks, which the fall of the land and tenement development in the 16th and 17th centuries has corrupted in certain areas into rectangular blocks. The streets are narrow (9 meters) with narrow one meter sidewalks on both sides. The lots are the result of continuous progressive subdivision of the blocks and the result of need rather than definite codes.

DWELLING: The buildings that abut the sidewalks are usually narrow and one to two stories. In general, buildings were built on two to four parallel masonry brick bearing walls, with wooden floors and wooden/masonry flat roofs. Facades were always masonry. There is usually an interior court created for light and ventilation. The interior subdivision of the unit is the result of the basic structural bays and a court. In the single family, single story unit, the living/dining facilities are usually found in the front of the unit facing the street. The sleeping area is usually in the back, parallel to or around the courtyards. The bathrooms are usually in the middle or in the back. The two story houses follow the same pattern but make provisions for vertical access circulation and sometimes for commercial on the first floor. The houses are detailed in such a way to make the dwelling comfortable by the use of high ceilings, thick walls, shutter windows, and attached balconies.

LAND USE: San Juan is a very heterogeneous area in terms of land use. There is a large number of institutional facilities at the state and city level as well as a large number of private or public cultural facilities ranging from small galleries to large museums. There is excellent accessibility to recreational facilities ranging from parks and plazas within the city to large open parks on the periphery of the city. The commercial occurs at two levels. For the general and local public, it is located around the main streets of San Francisco, Fortaleza and Cristo. For the local community, the commercial is found in streets more accessible to the residences and is local in character (bars, markets, bakeries, etc.). Mixed use also occurs within the same lots with commerce or institutions on the first floor and residences on upper levels or in the back of the lots.

CIRCULATION: Three main avenues begin or end on the southwest edge of the city: Ponce de Leon, Fernandez Juncos, and Baldorioty de Castro. The major streets within the city are the commercial streets of Fortaleza and San Francisco, which enter and leave the city east to west and run parallel to each other. The major secondary streets are: first, Cristo Street, a commercial/institutional street which runs north to south on the west edge of the city and intersects both Fortaleza and San Francisco; second, Norzagaray Avenue, a residential street on the north edge of the city; and third, Recinto Sur, a commercial street on the south-east edge of the city. There are also various "escalinates," stair-stepped streets, as well as pedestrian alleys.

VEIGO SAN JUAN CASE STUDY SOURCES:

Plots: (accurate) Aerial Photo, DOP, 1975.
Land Use Patterns: (approximate) Zoning Maps, Planning Board, P.R., 1975 and Field Survey by author, 1977 and 1979.
Segment Plans: (accurate) Aerial Photo, DOP, 1975 and Tax Maps, Department of the Treasury, 1975.
Block Plans: Typical Diagrams found in Field Survey by others.
Socio-Economic Data: (accurate) IBID. by author
CASE STUDY: VIEJO SAN JUAN

### LOCALITY BLOCK LAND UTILIZATION DATA

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total</th>
<th>Area (Hectares)</th>
<th>Density (N/He)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>17</td>
<td>.8</td>
<td>21.2</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>128</td>
<td>.8</td>
<td>159.6</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>112</td>
<td>.8</td>
<td>139.6</td>
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### AREAS

<table>
<thead>
<tr>
<th>Areas</th>
<th>Hectares</th>
<th>Percentages</th>
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</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>.18</td>
<td>24%</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>.62</td>
<td>76%</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>.8</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### NETWORK EFFICIENCY

- **Network length (streets, walkways):** 450M/He
- **Areas served (total area):**

  **LOTS**
  - Average area, dimensions = 362 M²

**LOCALITY BLOCK PLAN**

![Locality Block Plan](image)
## Case Study: Viejo San Juan

### Physical Data

<table>
<thead>
<tr>
<th>Dwelling Unit</th>
<th>Type: Rooms, Apartments, Houses</th>
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<tbody>
<tr>
<td>Occupied</td>
<td>76.8%</td>
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<tr>
<td>Ownership</td>
<td>9.3%</td>
</tr>
<tr>
<td>Rental</td>
<td>90.7%</td>
</tr>
</tbody>
</table>

- Persons per living unit:
  - 1: 41.5%
  - 1-2: 24.3%
  - 3-4: 10.6%
  - 5 or more: 10.6%

- Land/Lot Utilization:
  - Private: 74.6%
  - Legal Rental/Ownership: 24.3%

- Dwelling Location:
  - Historic City Center

- Dwelling Type:
  - Row Courtyard House

- Units in Structure:
  - 1: 30.1%
  - 2: 29.7%
  - 3-4: 16.9%
  - 5 or more: 24.3%

- Utilization:
  - Multiple/Single: Fam./Singles
  - Physical State: Deteriorated to Good

- Dwelling Development Mode:
  - Progressive

- Dwelling Facilities:
  - Service Connections:
    - Water: 100%
    - Sewer: 97.8%
    - Electricity: 97%
    - Individual Services: 31.9%
    - Cooking Facilities: 31.9%
    - Plumbing: 31.9%

- Dwelling Unit Payment:
  - Cost of Unit: $27,900
  - Payment Per Month: $477

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $3000</td>
<td>35.0%</td>
</tr>
<tr>
<td>$3000-6000</td>
<td>21.9%</td>
</tr>
<tr>
<td>$6000-10000</td>
<td>13.7%</td>
</tr>
<tr>
<td>$10000 or more</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

### Socio-Economic Data

<table>
<thead>
<tr>
<th>General: Social</th>
<th>User's Ethnic Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>85.9%</td>
</tr>
<tr>
<td>Native (foreign parents)</td>
<td>7.0%</td>
</tr>
<tr>
<td>Foreign (born)</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>Elementary</td>
</tr>
<tr>
<td>High School</td>
</tr>
<tr>
<td>College</td>
</tr>
<tr>
<td>Median</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Data: Number of Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Children Under 18: 36%</td>
</tr>
</tbody>
</table>

### General: Economic

<table>
<thead>
<tr>
<th>Employment Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government: 16.5%</td>
</tr>
<tr>
<td>Private: 32.7%</td>
</tr>
<tr>
<td>Self-Employed: 32.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment Type: Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing: 10.5%</td>
</tr>
<tr>
<td>Transportation: 4.6%</td>
</tr>
<tr>
<td>Community Services: 2.2%</td>
</tr>
<tr>
<td>Trade: 14.2%</td>
</tr>
<tr>
<td>Finance: 4.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Migration Patterns Year Moved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960-1970: 74.8%</td>
</tr>
<tr>
<td>1950-1960: 18.7%</td>
</tr>
<tr>
<td>Before 1950: 7.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Travel to Work Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car (own): 14.3%</td>
</tr>
<tr>
<td>Car (others): 4.3%</td>
</tr>
<tr>
<td>Bus: 27.4%</td>
</tr>
<tr>
<td>Walking: 41.8%</td>
</tr>
<tr>
<td>Work at home/other: 10.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Family Data Number of Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocational: 9.9%</td>
</tr>
<tr>
<td>College: 10.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Personal Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General: Income Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7%</td>
</tr>
<tr>
<td>Public Administration: 8.4%</td>
</tr>
<tr>
<td>Other: 2.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<tbody>
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<td>$6000-10000: 13.7%</td>
</tr>
<tr>
<td>$10000 or more: 13.3%</td>
</tr>
</tbody>
</table>
CONCLUSION

The oldest and smallest community of the five case studies, Viejo San Juan, holds a privileged position in the urban fabric of Metropolitan San Juan because it represents a settlement whose positive characteristics have not been matched anywhere else in the city.

Viejo San Juan is, at one level, a strictly planned city. The Law of the Indies stipulated certain conditions for the planning and building of colonial cities. This included a grid layout, open areas, definite types of streets, provision for civic and religious buildings as well as other provisions for the welfare of the inhabitants.

Viejo San Juan is an interpreted city. Changes were made in the grid to accommodate the slope of the land. The blocks were further subdivided into smaller lots: first in half, then in quarter and thereafter, in as many ways as possible, respecting, mainly, two things: lot frontage and a court house design. Land use followed the circulation sequence created by the interconnection of a series of plazas and civic/religious buildings as well as the needs of the community.

The physical community which exists at present is mostly 19th century but the character of the city reflects the 400 years of progressive development under Spanish rule. The grid, the cornerstone of colonial planning, defines now, as it did in the past, circulation, and through circulation, residential, commercial and institutional development. The narrow streets, though difficult for vehicular traffic, are "pleasant" areas to walk in, protected by the row buildings which abut the sidewalks. The scale of the street also encourages community interaction due to the immediacy of the houses not only on the sides but also to the house opposite. The series of plazas and public buildings creates a series of sequences within the city which de facto encourages division of the city into 2 areas: one where the main commercial, institutional and recreational facilities are located, and one where it is mainly residential with local commercial and institutional facilities. The subdivision of the blocks and the development of the lots through the use of row, natt texture court housing has created a large variety of living units: from large, one to two stories one-lot houses, to apartment buildings. It has also encouraged mixed land use with the use of buildings for commercial and/or institutional purposes combined with the residential within the unit and/or within the block.

The problems of Viejo San Juan are not created by its physical plan but by recent, external pressures. The first of these problems, and definitely the most important, is the view of the city in the eyes of the policy makers. When, after 30 years of deterioration and neglect, Viejo San Juan was declared a historic zone worthy of restoration, a process of "mythicization" of the city was started. The idea of Viejo San Juan as a reflection of an on-going process was considered but was superseded by the idea of Viejo San Juan as an example of Spanish Colonial planning and architecture: a museum city. If restoration was to take place, it was within certain canons: canons which, with time, would become inflexible. In Viejo San Juan's restoration this meant that the 19th century form was to be the function and that "modern" design ideas, even in the unseen interiors, would not be tolerated. This was a great mistake in policy for it violated one of the most important tenets of the development of San Juan.

The second mistake was economic. Restoration of most buildings in the city guaranteed, if done according to the Restoration codes, a property tax exemption for a great number of years. The problem was that historical restoration was, and is, expensive; it requires a large initial amount of cash involvement, has little access to federally guaranteed mortgages, and is not considered a good risk by banks. Therefore, restoration was not accessible to the poor and middle class who lived in the city when the process was started. It was attractive to some of the upper classes who could afford it for their own use, or more frequently, for speculative apartment units. This in turn raised the price of the land and of rents driving many poor families out or into substandard dwellings.

Another problem is the automobile and the importance it has to the average family. Viejo San Juan is a pedestrian city. There are few buildings with provisions for automobiles, and there is little parking in the street. However, there are provisions for parking in the city edges but they are public, and, in the eyes of many, too far away.

But the main problem confronting Viejo San Juan is the lack of identification of the modern Puerto Rican lower/middle class with the lifestyle the city proposes. Brought up mainly after World War II on transplanted U.S. middle class values (tract housing developments, shopping centers, industrial parks, mass transportation, etc.) most can not or will not, identify with the city and the advantages and possibilities it offers once they are willing to accept and develop it to respond to their needs of work, institutional services, commercial services, enjoyment and security.

San Juan offers great possibilities as a model for the development of other communities in the Metropolitan Area. The type of layout has the possibility of a high private to public ratio of infrastructure, costs in development and maintenance. The mixed land use, incorporating sources of labor as well as institutional, commercial and residential works better than the zoning systems which now exist because at the community level it reduces the problems created by the automobile and foments neighborhoods where living, work, education, commerce, social welfare, and recreation mix on equal terms, in a cohesive way. The ratio of number of units to land is high in this type of layout, a fact enhanced by the variety of units and their potential for creating different economic residential markets within one small area. The type of units are responsive to high density, low rise development as well as to climate.

The problems of lifestyles which afflict Viejo San Juan could be solved. In the same way Metropolitan San Juan's lifestyle was changed in the fifties and sixties through planning and economics, the process could be reversed making the new/old lifestyle attractive; at first through economic or policy reasons (mortgages, sources of labor, zoning laws, etc.) but eventually, as it happened with tract housing, for social reasons (accessibility and acceptability of local markets, social services, schools, parks, etc.).
EAST SANTURCE TRADITIONAL URBAN BARRIO
2 EAST SANTURCE

LOCATION: East Santurce, commonly called Barrio Obrero, is composed of various barrios: Pulqueo, Chicarco, Saboroco, Loiza, Villa Palmeras, Herrera, Shanghai, Merhoff, Maria Moco, Las Palmas, Monteflores and Barrio Obrero itself. The area is cohesive as a unit mainly through its residential, “barrio” character. The area is bordered to the west by the Sagrado Corazon College, San Jorge Street and the western part of Santurce, to the east by the Las Casas housing project and the San Jose Lagoon, to the north by Baldorioty de Castro Avenue, and to the south by the meshing boundaries of Rexach Street and the Cano Martin Peña settlements.

HISTORY: East Santurce represents, at its center, some of the first attempts by the private sector to capitalize on the problem of the rural immigrants of the 20’s and 30’s. Until the 1920’s, the area was used for agricultural and recreational purposes. After World War I there were some squat settlements in the area. Between the 30’s and 40’s part of the land was subdivided for speculative reasons into regular rectangular blocks, which were lotified, provided with minimum infrastructural services, and sold. The families in turn constructed their homes, usually single story, based on their rural background and on guidelines set by the Health Department. This created a series of detached, mostly single story, wood houses whose character the whole area still retains.

SOCIO-ECONOMIC: During the first decades of the area’s development a great number of the people who lived in the area were first generation immigrants who were of a higher economic position than those living in the squatter slums and who could buy a property and were more easily absorbed into the new urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy. Prior to World War II, the area became the main stepping stone into the urban economy.

LAND USE: The land use of East Santurce is heterogeneous in terms of scale and distribution but somewhat deficient in terms of type. The main commercial facilities are located on Bori Quinn Avenue in the south of the area. The secondary commercial facilities are along Eduardo Conde Avenue, Barboza Street, Puerto Rico Street, Degetau Street and Tapia Street. There is also a great number of small scale commercial activities and establishments at the street level. The main institutional facilities, other than schools and churches, are a community center, a hospital, a dispensary, a post office, a police station, a fire station, a cemetery, as well as various social services centers.

East Santurce case study sources:

- Plan: (accurate) Aerial Photo, 1977.
- Block Plans: (accurate) As built survey by author, 1977.
- Physical Data: (accurate) Census, U.S. Dept. of Commerce, 1970
- Socio-Economic Data: (accurate) 1970, by author.
CASE STUDY: EAST SANTURCE

LOCALITY CIRCULATION PATTERN

- Vehicular
- Pedestrian

LOCALITY CIRCULATION PATTERN

1:10000
**LOCALITY BLOCK LAND UTILIZATION DATA**

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total</th>
<th>Area</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Hectares</td>
<td>N/Ha</td>
</tr>
<tr>
<td>LOTS</td>
<td>40</td>
<td>.92</td>
<td>43.3</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>45</td>
<td>.92</td>
<td>48.7</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>282</td>
<td>.92</td>
<td>305.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways,</td>
<td>.24</td>
<td>26%</td>
</tr>
<tr>
<td>open spaces)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>schools, community centers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops,</td>
<td>.68</td>
<td>74%</td>
</tr>
<tr>
<td>factories, lots)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>.92</td>
<td>100%</td>
</tr>
</tbody>
</table>

**NETWORK EFFICIENCY**

Network length (streets, walkways) = 547M/Ha

Areas served (total area) =

Lots

Average area, dimensions = 175 m²
RESIDENTIAL TYPOLOGICAL STUDIES: SAN JUAN, PUERTO RICO

SECTION

ELEVATION

PLAN

TYPICAL DWELLING

LR Living Room
D Dining
BR Bedroom
K Kitchen
T Toilet/Bathroom
L Laundry
C Closet
S Storage
R Room (multi-use)
CASE STUDY: EAST SANTURCE

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT

type: INDIVIDUAL HOUSES
occupied: 93.0%
ownership: 43.0%
rental: 57.0%
persons per living unit
1: 16.6%
2: 22.1%
3,4: 36.1%
5 or more: 25.0%
median: --

LAND/LOT
utilization: PRIVATE

DWELLING
location: CITY CENTER
type: DETACHED HOUSE
units in structure:
1: 74.4%
2: 12.7%
3,4: 8.7%
5 or more: 4.2%
utilization: SINGLE FAMILY
physical state: FAIR TO GOOD

DWELLING DEVELOPMENT
mode: PROGRESSIVE
developer: ARTISAN/SMALL CONTRACTOR
builder: WOOD AND/OR CONCRETE
construction types:
year of construction:
1960-1970: 7.3%
1950-1960: 17.7%
1940-1950: 26.6%
before 1940: 49.4%

DWELLING FACILITIES
service connections
water: 99.2%
sewer: 78.5%
electricity: 94.2%
individual services: 96.0%
cooking facilities: 96.0%
plumbing: 25.0%

DWELLING UNIT PAYMENT

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
user's ethnic origin
native: 96.5%
native (foreign parent): 1.8%
foreign (born): 1.7%
education level:
none: 18.6%
elementary: 60.6%
high school: 18.6%
college: 1.2%
median: 5.2

FAMILY DATA
number of families: 4240
with children under 18: 56.7%
average family size: 4.5

GENERAL: ECONOMIC
employment source
government: 19.0%
private: 10.0%
self-employed: 71.0%
employment type
construction: 12.6%
manufacturing: 16.0%
transportation: 4.0%
community services: 1.5%
trade: 22.9%
finance: 2.2%
business: 1.5%
personal services: 9.6%
health: 1.0%
education: 1.0%
professional services: 1.0%
public administration: 1.0%
other: 2.3%

TRAVEL TO WORK
mode
car (own): 17.0%
car (other): 3.8%
bike: 51.0%
"publico": 2.8%
walking: 17.3%
work at home/other: 7.1%

MIGRATION PATTERNS
year moved
1960-1970: 65.1%
1950-1960: 32.5%
before 1950: 2.4%

INCOME
income
less than $3000: 35.0%
$3000-$6000: 24.1%
$6000-$10000: 13.0%
$10000 or more: 10.0%

% of income
$3000-$6000: 18.7%
$6000-$10000: 12.1%
$10000 or more: 10.0%

PAYMENT

unit cost: $12,170
financing: BANK MORTGAGE
payment per month: $580
CONCLUSION

CONCLUSION: Since it reached saturation in the 1940's, East Santurce has largely been ignored in terms of the Metropolitan Area. Nevertheless, it is an important area in terms of development because it is a prime example of a legal, low income community developed between World Wars I and II, and because, in terms of the four cases discussed here that were built in the twentieth century, it was the one most flexibly developed.

Unlike Viejo San Juan, which is a progressively developed city based on a legal planning framework, East Santurce is an area progressively developed on a gridiron layout designed mainly for speculative reasons with little government intervention.

Though not as effective as the San Juan grid and somewhat inefficient in terms of infrastructure, the gridiron design encourages circulation particularly pedestrian. The narrow streets, although poor for vehicular traffic, are pleasant to walk in and are conducive, due to the lot and sidewalk placement, to community development between both sides of the street. The houses themselves are not as rich as those of San Juan in terms of type but the forms are indigenous and cheap to construct. The land use is heterogeneous because it caters to the public at various scales, from the immediate block facilities, such as grocery stores, to the main commercial strip with large scale services, such as large stores and government social services, offices, and because the zoning which exists came after the area had been developed and thus reflects rather than anticipates land use.

But the most important problem the area has is the lack of foresight in providing open areas such as a plaza or civic buildings to give a focus of interest for the individual barrios which form the area, and create, through the interconnection of these spaces and buildings, a sequence of spaces to bind the area as a whole as they do in Old San Juan.

Nevertheless, East Santurce has problems reflecting the laissez-faire character of the original planning and the speculative design of the area.

The first problem is the inflexibility of the gridiron block, the back to back lot layout, and the required setbacks of the units in the lot. This creates blocks with a detrimentally homogenous character only capable of subdivision or growth in a limited way.

The second problem is the size of the blocks and the detrimental effect this has on network efficiency and maintenance.

The most important aspect of modern East Santurce are the people. Of all the case studies, East Santurce is the most heterogeneous in terms of income and in terms of age, perhaps reflecting the desire of the extended family to stay in the community.
BUENA VISTA
SQUATTER SETTLEMENT
enter public housing. The people are poor; 70% are under the official poverty level. A great number are a part of extended families or close groups which have been living in the same area for a long time. They have, second to public housing, the highest number of children under 18 per family. Their education level is also second to public housing the poorest in the city. Only 40% of the inhabitants over 18 have completed primary school. Nevertheless within their physical boundaries, they are two of the most cohesive communities in the metropolitan area, a fact frequently expressed by their reluctance to move to public housing.

**BUENA VISTA**

**LOCATION:** Buena Vista I and Buena Vista II are located in the center of Metropolitan San Juan, between the southern edge of East Santurce and the northern edge of Hato Rey. It is bound on the north by Rexach Avenue and Barrio Obrero, on the south by Quiquella Avenue and Hato Rey, on the east by Barbosa Avenue (Carpenters’ Road) and various squatter settlements, and on the west by Ponce de Leon Avenue and the Hato Rey business district. The area is divided by a canal, Caño Martin Pena, which runs from the bay on the west to the San Jose lagoon on the east.

**HISTORY:** The communities are two of the many squatter settlements which sprouted around the Caño Martin Pena between the two World Wars as a result of land invasions. The invaded land was usually public land with poor soil marshy and floodable due to its location. Land subdivision was by section or by crude imitative block and lot subdivision. Ignored at first after World War II, the government decided to eradicate these settlements and move the inhabitants to public housing. But the magnitude of the problem coupled with the reluctance of the inhabitants and their efforts through cooperative and political pressure, and changing theories resulted only in the partial eradication of the squatters. In 1973, all squatter settlements created prior to that year and not on land zoned for other purposes, were legalized by giving the inhabitants title to their land. Throughout the years, due to political pressure, the inhabitants have been given partial infrastructural services. At present, the two Buena Vistas represent the various situations of the Caño Martin Pena communities. The north sector, Buena Vista I, is under the threat of eradication because the area is zoned for a super highway. The people of the south sector, Buena Vista II, have title or right to the title of their land. There exists a vigorous cooperative movement in the community which is slowly (it started in the 1940’s) upgrading the area, west to east, to qualify for aid and full infrastructural services.

**SOCIO-ECONOMIC:** The settlements since the beginning have been the first stepping stone for poor people who want to move into the city but cannot afford to buy land or private units, and are unwilling or unable to

**LAND USE:** The use of the land reflects the type of community as well as its physical layout. The main commercial areas are on the periphery of the two communities: in Rexach Avenue, Ponce de Leon Avenue, Barbosa Avenue, and Quiquella Street. Only small local scale commercial is found in the interior of the communities. Apart from schools, the main streets of the settlements develop, creating in the process irregular rectangular blocks. In the south sector (Buena Vista II) the layout is forced by Ponce de Leon Avenue and Barbosa Avenue. From these avenues, the main streets of the settlement develop, creating in the process irregular rectangular blocks, mostly lying east to west. The lot subdivision is generally irregular, small, back to back lots, except where the urbanization occurred through imminent domain design.

**DWELLING:** Most of the houses in the Caño Martin Pena shanties but, with time, were improved according to the patterns established in East Santurce, not through obligation but through imitative desire. The houses are usually set back on the front and sides, but the set back is usually irregular. The houses themselves are on wooden platforms, stud wall construction with tongue and groove floors and walls, and galvanized iron "zinc" roofs, but are smaller than those in East Santurce, and often lacking interior services.

**BUENA VISTA CASE STUDY SOURCES:**

- **Plan:** (accurate) Aerial Photo, DMV, 1977.
- **Land Use Pattern:** (approximate) Zoning Maps, Planning Board, 1975 and Field Survey by author, 1977 and 1978.
- **Circulation Pattern:** (approximate) Volume Studies, 1977 and Field Survey by author, 1977.
- **Segment Plan:** (accurate) Aerial Photo, DMV, 1977, Tax Maps, Department of the Treasury, 1975 and 1st subdivision maps, CRUV, 1973.
- **Block Plan:** (approximate) As built survey by author, 1977.
- **Typical Dwelling:** (approximate) As built survey by author, 1977.
- **Socio-Economic Data:** (accurate) 1970.
- **Photographs:** by author.
RESIDENTIAL TYPOLOGICAL STUDIES: SAN JUAN, PUERTO RICO

LOCALITY POPULATION DISTRIBUTION
horizontal: percentages  vertical: ages
males: M  females: F
source: U.S. Census 1970

LOCALITY ANNUAL INCOME DISTRIBUTION
horizontal: percentages  vertical: dollars
source: U.S. Census 1970

LOCALITY SEGMENT PLAN
1:2500
**CASE STUDY: BUENA VISTA 41**

**LOCALITY BLOCK LAND UTILIZATION DATA**

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total Number</th>
<th>Area Hectares</th>
<th>Density N/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>25</td>
<td>.51</td>
<td>48.2</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>42</td>
<td>.51</td>
<td>81.0</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>140</td>
<td>.51</td>
<td>270.2</td>
</tr>
</tbody>
</table>

**AREAS**

| PUBLIC (streets, walkways, open spaces) | .15 | 30% |
| SEMI-PUBLIC (open spaces, schools, community centers) | - | - |
| PRIVATE (dwellings, shops, factories, lots) | .36 | 70% |
| SEMI-PRIVATE (cluster courts) | - | - |
| TOTAL | .51 | 100% |

**NETWORK EFFICIENCY**

Network length (streets, walkways) = 5899M/Ha

Areas served (total area)

**LOTS**

Average area, dimensions = 142.5 m²
### PHYSICAL DATA
(related to dwelling and land)

#### DWELLING UNIT
- **type:** INDIVIDUAL HOUSES
- **occupied:** 93.4%
- **ownership:** 59.3%
- **rental:** 40.3%
- **persons per living unit**
  - 1: 16.2%
  - 2: 17.5%
  - 3+: 23.9%
  - 5 or more: 24.3%
  - **median:** 3.4

#### LAND/LOT
- **utilization:** PRIVATE
- **tenure:** LEGAL/ILLEGAL: RENT/OWN

#### DWELLING
- **location:** CITY CENTER
- **units in structure**
  - 1: 79.6%
  - 2: 6.8%
  - 3+: 6.8%
  - 5 or more: 3.8%
- **utilization:** SINGLE FAMILY
- **physical state:** BAD TO GOOD

#### DWELLING DEVELOPMENT
- **mode:** PROGRESSIVE
- **developer:** USER
- **builder:** USER/ARTISAN
- **construction types:** WOOD AND/OR CONCRETE
- **year of construction**
  - 1960-1970: 16.2%
  - 1950-1960: 28.7%
  - 1940-1950: 41.6%
  - before 1940: 32.5%

#### DWELLING FACILITIES
- **service connections**
  - water: 99.0%
  - sewer: 72.7%
  - electricity: 99.0%
  - individual services: 93.4%
  - cooking facilities: 93.4%
  - plumbing: 12.0%

#### DWELLING UNIT PAYMENT
- **cost of unit:** $55,000
- **financing:** 33.9% RENT
- **payment per month:** 539 RENT
- **% of income**
  - income less than $3000: 30.7%
  - $3000-$4000: 16.9%
  - $4000-$6000: 16.9%
  - $6000-$8000: 16.9%
  - $8000 or more: 11

### SOCIO-ECONOMIC DATA
(related to user)

#### GENERAL: SOCIAL
- **user's ethnic origin**
  - native: 89.4%
  - native (foreign parents): 3.8%
  - foreign (born): 6.8%
- **education level**
  - none: 8.0%
  - elementary: 53.8%
  - high school: 36.0%
  - college: 7.3%
  - median: 7.7

#### FAMILY DATA
- **number of families:** 7,017
- **with children under 18:** 46.6%
- **average family size:** 4

#### GENERAL: ECONOMIC
- **employment source**
  - government: 21.9%
  - private: 7.3%
  - private (self-employed): 7.1%
- **employment type**
  - construction: 10.7%
  - manufacturing: 16.9%
  - transportation: 4.8%
  - community services: 3.5%
  - trade: 26.4%
  - finance: 2.3%
  - business: 3.7%
  - personal services: 11.5%
  - health: 4.5%
  - education: 3.4%
  - professional services: 3.7%
  - public administration: 8.5%
  - others: 2.0%

#### TRAVEL TO WORK
- **mode**
  - car (own): 28.0%
  - car (other): 5.4%
  - bus: 43.9%
  - "publico": 3.4%
  - walking: 12.9%
  - work at home/other: 4.4%

#### MIGRATION PATTERNS
- **year moved**
  - 1960-1970: 56.6%
  - 1950-1960: 18.7%
  - before 1950: 24.4%
CONCLUSION

CONCLUSION: The communities of Buena Vista as those of most Caño Martin Pena squatter settlements have long been ignored or dismissed as a true part of the Metropolitan Area due to its origins and its composition.

Of the five case studies Buena Vista is the only area in whose original development there was no government intervention. The area was progressively developed and it is out of this mode of development that it achieved its positive and negative characteristics.

The most positive aspect of Buena Vista as well as other squatter settlements was that it was built at all. Constructed on theoretically unsuitable land, ignored by the government which refused to recognize them and grant them services, the original settlers proved that they could, through the accretive process, create a true community, physically poorer than most public housing but in the character of a more desirable and appropriate lifestyle.

The second positive aspect is that of layout. Though haphazard, the layout of Buena Vista shows two things: the recognition of the surrounding area and its impact on the design of the communities through continuation or in response to it, and the design of the area according to it.

The third positive aspect is found in the land subdivision. Though haphazard and based on the desire for individual houses, the lots in Buena Vista are small, recognizing the acceptability of denser subdivision in low income settlements. There is also a larger number of alternate grouping patterns such as court schemes.

But the most important aspect of Buena Vista, and of many squatter settlements which have remained and have been consolidated, is its political strength. When, after World War II, the decision was made to eradicate the squatter settlements and move them to other housing, nobody realized the magnitude and difficulty of such an operation and the intransigence of the people to move. The result of this was that some of the squatter communities stayed in place, consolidated, and with their consolidation demanded services. This resulted in partial infrastructure and in the creation of a housing cooperative to acquire and upgrade the area.

The problems of Buena Vista are many, and are closely tied to the positive aspects.

The most serious problems are those of location and layout. The first is detrimental to the settlements because they lie on the periphery of established areas which have turned their backs on the settlements. The second is that the haphazard development of the area has created such a large variety of blocks and dead-end situations that it is difficult to provide infrastructure and it also produces poor circulation.

The other problem is that of land use. Due to the type of settlement, its position and its layout, land use other than for residential is poor. There is little commercial or institutional facilities in the settlements forcing the inhabitants to go outside for the various services.
SAN JUAN,

Of all the areas in Metropolitan San Juan, the rental public housing projects of the Llorens Torres have the lowest socio-economic indexes: 84% of its families are below the poverty level. Only 3% of all adults have finished grade school. It has the greatest number of children under 18 and the largest families. The per capita income is the lowest of the city. One of the results of this is a subculture of poverty which perpetuates itself.

LAYOUT: The layout is based on the "garden" concept of planning. Vehicular interior roads were originally considered access roads mainly for emergency and public vehicles. One major street was planned in the project with the others being loop access through streets. A large planned layout of pedestrian walkways has been overlaid through the years by a popular layout created by use. In the last decades a large number of parking areas have been created between buildings.

The buildings, as well as the circulation, are laid on a northwest-southeast axis, contrary to the north-south axis of the area surrounding it.

DWELLING: The buildings are dumbell or pinwheel design, 3 story walk-ups, organized around stairwells. They are constructed of poured in place concrete and concrete blocks. The units themselves follow Federal and State minimum standards. All units have a balcony, a living-dining area, a kitchen with an exterior service balcony, a bathroom, and one to four bedrooms with closets. Windows are aluminum jalousies both for protection as well as climate control.

LAND USE: All land use in the project is the result of the original plan or accommodations to it. The original plan included a commercial mall, two schools, a church, recreational park facilities and buildings to house the institutional services and the management. But the commercial was insufficient and inefficient for the traditional small scale shops and small kiosks were built inside the project. Originally there was little parking but in the 70's parking lots were created.

The project has encouraged land speculation on its periphery. There is a shopping center on the west and a series of commercial facilities on the north.

CIRCULATION: The project lies between a major highway, Baldorioty de Castro Avenue, and a major street, Loiza Street. Baldorioty de Castro is the main connector to the east and west of Metropolitan San Juan. Loiza is the main access to the Loiza Barrios' commercial strip. There are eight street accesses to the project. There is only one major vehicular street in the project which runs east to west and is also used by buses. This street is the main access to all secondary roads and to the parking lots. Most interior circulation is pedestrian, restricted mainly by the size of the project and social variants such as crime.

LOCATION: The Luis Llorens Torres housing project is located on a plain between the hill which forms East Santurce, and the Atlantic Ocean. It is bordered on the north by Loiza Street and the Atlantic Ocean, on the south by Baldorioty de Castro Avenue and the bulk of East Santurce, on the east by the Atlantic View tract housing development, and on the west, by the Loiza "barrio".

HISTORY: The project is one of several housing developments started in the 1940's and 1950's to provide housing for people being evicted from squatter settlements. It was developed under a Federal/State program of Public Housing which involved publicly subsidized rental apartments for the poor and very poor. It is the largest public housing project built in Puerto Rico under any program. The project, probably following U.S. public housing practices of the 50's, grouped a large number of displaced poor in one area and housed them in multi-apartment walk-up units set in a pedestrian, semi-public open area. The loss of personal control over an area was expected to be balanced by the large semi-public open spaces and the on-site institutional, recreational, and commercial services but, the idea did not work. The automobile has taken over and many of the semi-public areas have been converted into parking lots. The commercial areas have been insufficient (a fact first noted by the developers of a shopping center on the project boundary) and has forced the creation of small commercial kiosks. The remaining green spaces were either taken by adjoining apartments, ignored, or used as dumping areas. The social/institutional facilities have also been misused prompting the creation of a police station for community security in the 1970's.

SOCIO-ECONOMIC: Since its inception the socio-economic character of the project has remained basically the same due to the obligations of Public Housing. This has resulted in problems which are reflected in the community. The project brought together a large group of poor families to a way of life transitory in theory but permanent in practice. The realization of the permanence of this situation led to the institutionalisation of a continuous state of poverty to maintain this status.

Of all the areas in Metropolitan San Juan, the rental public housing projects of the Llorens Torres have the lowest socio-economic indexes: 84% of its families are below the poverty level. Only 3% of all adults have finished grade school. It has the greatest number of children under 18 and the largest families. The per capita income is the lowest of the city. One of the results of this is a subculture of poverty which perpetuates itself.

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LOCALITY BLOCK LAND UTILIZATION DATA

<table>
<thead>
<tr>
<th>DENSITIES</th>
<th>Total</th>
<th>Area</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>221</td>
<td>2.37</td>
<td>93.2</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>1098</td>
<td>2.37</td>
<td>463.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>1.81</td>
<td>76%</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>.56</td>
<td>24%</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2.37</td>
<td>100%</td>
</tr>
</tbody>
</table>

NETWORK EFFICIENCY
Network length (streets, walkways) = 262M/Na
Areas served (total area) =

LOTS
Average area, dimensions = No Lots

LOCALITY BLOCK PLAN

CASE STUDY: LUIS LLOREN S TORMES 51
### PHYSICAL DATA
*(related to dwelling and land)*

<table>
<thead>
<tr>
<th>DWELLING UNIT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>type:</strong></td>
<td>APARTMENTS</td>
<td></td>
</tr>
<tr>
<td><strong>occupied:</strong></td>
<td>98.7%</td>
<td></td>
</tr>
<tr>
<td><strong>ownership:</strong></td>
<td>rental: 100%</td>
<td></td>
</tr>
<tr>
<td><strong>persons per living unit:</strong></td>
<td>1: 8.3%</td>
<td>2: 14.4%</td>
</tr>
<tr>
<td><strong>LAND/LOT utilization:</strong></td>
<td>PUBLIC</td>
<td></td>
</tr>
<tr>
<td><strong>tenure:</strong></td>
<td>LEGAL RENTAL (PUBLIC SUBSIDY)</td>
<td></td>
</tr>
<tr>
<td><strong>DWELLING location:</strong></td>
<td>CITY CENTER</td>
<td></td>
</tr>
<tr>
<td><strong>type:</strong></td>
<td>WALK-UP/GROUP</td>
<td></td>
</tr>
<tr>
<td><strong>units in structure:</strong></td>
<td>1:</td>
<td>2:</td>
</tr>
</tbody>
</table>

### DWELLING DEVELOPMENT
**mode:** INSTANT
**developer:** PUBLIC (GOVERNMENT)
**builder:** LARGE CONTRACTOR
**construction types:** CAST IN PLACE CONCRETE
**year of construction:**
- 1960-1970: 5%
- 1950-1960: 51.0%
- 1940-1950: 35.2%
- before 1940: 9.8%

### DWELLING FACILITIES
**service connections:**
- water: 100%
- sewer: 100%
- electricity: 100%
- individual services: 100%
- cooking facilities: 100%
- plumbing: 100%

### DWELLING UNIT PAYMENT
**cost of unit:**
- financing:
  - payment per month: 513 REEM
  - % of income
    - income less than $2000: 24.7%
    - $2000-$4000: 10.0%
    - $4000-$6000: 10.0%
    - $6000 or more: -

### SOCIO-ECONOMIC DATA
*(related to user)*

<table>
<thead>
<tr>
<th>GENERAL: SOCIAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>user's ethnic origin</td>
<td>native: 99.5%</td>
</tr>
<tr>
<td></td>
<td>native (foreign parents): .4%</td>
</tr>
<tr>
<td></td>
<td>foreign (born): .1%</td>
</tr>
<tr>
<td></td>
<td>education level: none: 19.1%</td>
</tr>
<tr>
<td></td>
<td>elementary: 61.0%</td>
</tr>
<tr>
<td></td>
<td>high school: 18.9%</td>
</tr>
<tr>
<td></td>
<td>college: 7.0%</td>
</tr>
<tr>
<td></td>
<td>median: 5.1</td>
</tr>
</tbody>
</table>

### FAMILY DATA
**number of families:**
- with children under 18: 66.7%
- average family size: 5

### GENERAL: ECONOMIC
**employment source**
- government: 17.6%
- private: 4.8%
- private (self-employed): 7.1%
- employment type
  - construction: 12.5%
  - manufacturing: 5.7%
  - transportation: 6.4%
  - community services: 2.9%
  - trade: 26.3%
  - finance: 2.6%
  - business: 7.3%
  - personal services: 18.9%
  - health: 4.9%
  - education: 2.2%
  - professional services: 2.6%
  - public administration: 6.1%
  - other: 1.0%

### TRAVEL TO WORK
**mode**
- car (own): 51.0%
- car (other): 18.0%
- bus: 17.6%
- "publico": 2.6%
- walking: 5.1%
- work at home/other: 1.4%

### MIGRATION PATTERNS
**year moved**
- 1960-1970: 59.7%
- 1950-1960: 36.0%
- before 1950: 4.2%
CONCLUSION

CONCLUSION: The Luis Llorens Torres Housing Project is the largest and one of the oldest public housing projects built in Puerto Rico. It is the best example of the problems large-scale public housing projects have had in Puerto Rico.

Though the entire project was not built at the same time it is considered instant because it was executed according to a pre-conceived plan and is, in physical character, homogenous and unchangeable. The few changes which have occurred, kiosks and parking lots, are more the result of imposed lifestyles than of community participation.

At its most simplistic level, public housing, and thus Luis Llorens Torres, achieved its purpose, that of giving a standard living unit to people who could not afford to buy one. It provided them also with accessible schools, an accessible commercial area, as well as certain social and recreational services.

But the project, from the very start, was a failure. There were two main reasons: the physical setting and the socio-economic character created by the project.

The first mistake made in the physical layout was that of size. Because of economics and because the idea at the time was directed toward massive relocations, the project, when completed, was the largest in Puerto Rico. The results of the size of the project have been various. Though in the middle of a residential area, it has become a ghetto separated from the surrounding community by the socio-economic character of the project as well as deep mistrust and fear between the project’s inhabitants and the surrounding communities. Due also to size, management of the area has been impossible, particularly with security.

This, coupled with the large distances between the buildings, the rise of crime, and other social ills, has created a population disfranchised from the exterior and weary of interior community development.

The second mistake was layout. Luis Llorens Torres is an example of the design concept of the fifties where the buildings were placed on an imaginary gridiron, in a garden setting unencumbered by roads and connected through pedestrian paths. This did not work for two reasons. First, there was the problem of alienation and lack of identification with areas which were public for the whole project and which could not be changed due to the law and the design. The second was the desire of the users to have automobiles and a place to park them in a protected setting.

The third mistake was in the type of building. To people accustomed to single story, detached housing in various forms, the three story walk-ups were unacceptable because of their uniformity and unchangeability, their impersonality, the semi-public stairs, and the great number of families housed in one structure.

In socio-economic terms the mistake was grouping a large number of poor families at the same time in one place, and at the same time expect them to move out of the "temporary" public housing. What resulted instead was the creation of a subculture of poverty which perpetuates itself because it does not want to go back to squatter settlements and can not or will not achieve the economic position necessary to leave the project.
LOCATION: Las Vegas, a tract housing development (in Puerto Rico, an "urbanizacion"), is bordered on the north by the Cataño and Las Palmas public housing projects and the Cucharillos squatter settlements; on the south by the De Diego Expressway Highway; on the east by undeveloped land, Insular Road #167 and various industrial facilities; and on the west, by an industrial zone, Insular Road #869, and the Bayamon River canal.

HISTORY: Las Vegas is an example of speculative housing developments started after the 1950's to capitalize on the demands of a growing lower middle class, cheap suburban land, low costs of construction, easy developer access to interin financing and greater user access to mortgages, particularly those guaranteed by the Federal Government. It was constructed in sections by a private developer, who sold each completed section to clients who usually were financed through Federal Guaranteed Mortgages. The last section of the project was acquired by C.R.U.V., the housing authority, to be rented and eventually sold to poor or poor-middle class families who the agency (and the Federal Housing and Urban Development Agency) thought capable of paying a mortgage subsidized by the government.

SOCIODEMOCRACIA: In economic terms, the project, unlike most other developments which are low-middle to high-middle income, is low and middle income and reflects the involvement of the housing agency. The physical or social profile of the area is uncharacteristic of these lower economic groups. The poor who come here aspire to become middle class and, within their limited resources, lead the life of their more affluent neighbors. There is a great number of young families in their 30's and 40's, and a great number of children under 18. There are few couples, singles, or elderly people living by themselves. The education level is high. More than half of the adults have finished high school. The greatest hindrance to community development has been the physical layout. The house has become a means of social expression. The moment they are bought, they are transformed by additions, new finishes, new facades, etc. There is great pride in ownership of a physical piece of property. Most social interaction between families occurs on the streets. Most labor sources, as well as most of the commercial, recreational, and institutional services are outside of the development.

CIRCULATION: The development is accessible to the south via the De Diego Expressway, the main high speed connector between the west and the center of the city. To the east is Insular Road #169, a main connector between the cities of Bayamon and Cataño. To the west is Insular Road #869, which connects the area to Insular Road #165 and the west of the Island of Puerto Rico. There is one main road in the interior of the project, Flor del Valle, running north to south, around which a few commercial facilities are located and which is also a main access to the public housing projects in the north. This street, along with two others that intersect it perpendicularly, serves as a collector of traffic of the secondary interior streets.


Land Use: Due to zoning laws, planning ordinances, and building regulations, land use in Las Vegas is very restricted. The central area is the zoned space for institutional, commercial and recreational facilities. At present there only exists a school, a center for drug rehabilitation, a church and a gas station. The area around these facilities is zoned for low density residential. Nevertheless there are some commercial and religious facilities in the residences primarily in the main streets. To the east and west of the development there are areas zoned for industrial purposes. To the north of the settlement the area is used for residential purposes, mainly public housing.

Typical Dwelling: (accurate) IBID.

RESIDENTIAL TYPOLOGICAL STUDIES: SAN JUAN, PUERTO RICO

KEY

- Parking
- Police
- Fire Department
- School
- Church
- Recreation
- Library
- University
- Health
- Post Office
- Social Services
- Cemetery
- Bus

LOCALITY LAND USE PATTERN

RESIDENTIAL

COMMERCIAL

INDUSTRIAL

INSTITUTIONAL

0 100 500m
1:10000
CASE STUDY: LAS VEGAS

 Diagnosis of Circulation Pattern

Expressway

Pedestrian

1:10000

LOCALITY CIRCULATION PATTERN
LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES

<table>
<thead>
<tr>
<th>Total Number</th>
<th>Area (Hectares)</th>
<th>Density (N/Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOTS</td>
<td>34</td>
<td>1.39</td>
</tr>
<tr>
<td>DWELLING UNITS</td>
<td>34</td>
<td>1.39</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>152</td>
<td>1.39</td>
</tr>
</tbody>
</table>

AREAS

| Public (streets, walkways, open spaces) | 0.29 | 20% |
| Semi-Public (open spaces, schools, community centers) | - | - |
| Private (dwellings, shops, factories, lots) | 1.10 | 80% |
| Semi-Private (cluster courts) | - | - |
| TOTAL | 1.39 | 100% |

NETWORK EFFICIENCY

Network length (streets, walkways) = 428M / 518M
Areas served (total area) = 533M

LOT AVERAGE

Area = 299 m²
CASE STUDY: LAS VEGAS

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
type: INDIVIDUAL TRACT HOUSES
occupied: 96.4%
ownership: 84.9%
rental: 16.0%
persons per living unit
1: 3.2%
2: 12.5%
3,4: 44.6%
5 or more: 39.4%
median: 4.1

LAND/LOT
utilization: PRIVATE/PUBLIC

DWELLING
location: CITY SUBURBS
type: DETACHED HOUSE

units in structure
1: 97.0%
2: 1.5%
3,4: 1.5%
5 or more: -

utilization: SINGLE FAMILY

physical state: GOOD

DWELLING DEVELOPMENT
node: INSTANT
developer: PRIVATE
builder: PRIVATE CONTRACTOR

construction types: CAST IN PLACE CONCRETE
year of construction
1960-1970: 100%
1950-1960: -
1940-1950: -
before 1940: -

DWELLING FACILITIES
service connections
water: 100%
sewer: 100%
electricity: 100%

individual services
plumbing: 100%

DWELLING UNIT PAYMENT
cost of unit: $16,000
financing: BANK, FRA, GOVT. MORTGAGE
payment per month: $106 RENT

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
user's ethnic origin
native: 95.1%
native (foreign parents): 1.9%
foreign (born): 3.0%
education level
none: 3.0%
elementary: 28.8%
high school: 47.4%
college: 20.6%
median: 12.1

FAMILY DATA
number of families: 3,674
with children under 18: 68.1%
average family size: 4.8

GENERAL: ECONOMIC
employment source
government: 30.0%
private: 8.7%
private (self-employed): 61.3%

employment type
construction: 4.9%
manufacturing: 15.7%
transportation: 6.6%
community services: 5.6%
trade: 20.7%
finance: 3.0%
business: 5.5%
personal services: 6.1%
health: 4.3%
education: 6.8%
professional services: 3.0%
public administration: 15.2%
other: 1.5%

TRAVEL TO WORK
mode
car (own): 62.5%
car (others): 10.0%
bus: 10.0%
"publico": 2.4%
walking: 3.0%
work at home/other: 2.3%

MIGRATION PATTERNS
year moved
1960-1970: 100%
1950-1960: -
before 1950: -

95.1%
1.9%
3.0%
3.0%
28.8%
47.4%
20.6%

84.9%
16.0%
3.2%
12.5%
44.6%
39.4%
4.1%

96.4%
84.9%
16.0%
97.0%
1.5%
1.5%
-3.0%
4.9%
15.7%
6.6%
5.6%
20.7%
3.0%
5.5%
6.1%
4.3%
6.8%
3.0%
15.2%
1.5%
62.5%
10.0%
10.0%
2.4%
3.0%
2.3%
100%
100%
100%
100%
100%
CONCLUSION

Las Vegas is an example of the type of neighborhood which has created the urban fabric of Metropolitan San Juan in the last 20 years and which has been the main force in creating "urban sprawl."

The project was conceived and designed as a unit and, though built in sections should be considered an "instant" development. It is different from the greater number of such projects in that it does not border or lie within other projects, it is identifiable within certain boundaries and thus does not have the problems of meshing with the surrounding areas.

The main positive point of the project, at least in the eyes of the person buying, is tenure. Tenure of a piece of property and a dwelling is important in Puerto Rico; because, in addition to being a home and a shelter, tenure of a house is a symbol of economic solvency and social status. Unfortunately, due to the relationship between income earned and cost of units this can not be achieved unless the construction is cheap or the mortgage payments are low. For the vast majority who are excluded from public housing and cannot or will not buy in the city center, the solution as in Las Vegas is tract housing whose construction costs per unit are less (thus making conventional mortgages more accessible), and which qualifies for subsidized government mortgages for those how cannot afford conventional mortgages.

Unfortunately, the tradeoff for this security of tenure is tremendous. The most important problem these settlements have is the mythification by the middle class as their residential goal in life, and the creation of government housing policy around this idea.

The second problem is the zoning of the areas. Because of inflexible standards, a certain percent of the projects are zoned for commercial, institutional and recreational uses. Usually, as in the case of Las Vegas, they are grouped in one area with access only from the immediate vicinity which requires the use of a car. The areas are under used or misused, causing the people of the community to start unsanctioned commercial and religious establishments in the immediate vicinity of the project.

The third problem is layout. The layout "bows" to the automobile in terms of street size, curbs, planting strips, storm sewers, accessible parking, etc., all of which are excessive in terms of the area served. However, it tries to curtail circulation by creating loop streets and dead-end streets. The result is not only poor vehicular circulation but also poor pedestrian circulation.

The fourth problem are the blocks. Like East Santurce and Buena Vista, Las Vegas suffers the limitations of back-to-back lots with set dimensions, a limitation augmented by the stricter codes and the types of units.

The fifth problem are the units themselves. Though the houses are handed out finished and complete, they are changed as soon as the owner is able, indicating a dissatisfaction with the uniformity and type of dwelling.

The sixth problem is one of maintenance because the infrastructure per area served remains constant while the maintenance increases.

The seventh problem is economic. In the last decade the cost of the unit has risen faster than the income of the people. This, coupled with a decline in federally guaranteed mortgages and government reservations about this type of project, has made these developments less accessible than before and
LAND USE: Of the five case studies the one with the most favorable percentages is Viejo San Juan. Due to the narrow streets and abutting sidewalks circulation area is low. The percentage of institutional and recreational facilities is high due to the great number of plazas, buildings and areas used for those purposes. Las Vegas percentages are, on the other hand, deceptive because of two reasons: The number of units served is low and the percentage of recreational and institutional reflect minimum property requirements rather than use; a fact proven by the underuse of the area. Both East Santurce and Buena Vista have the same problems. Circulation area is high due to a small rectangular grid in East Santurce and an irregular grid in Buena Vista. The percentage of institutional and recreational facilities is low due to the lack or deficiency of recreational facilities in both cases and the lack of institutional facilities in Buena Vista. Luis Llorens Torres' percentages reflect housing policy attitudes towards land tenure in very low income public housing projects. Public area is high due to the land around the buildings being used for circulation and as public facilities. Recreational and institutional percentages reflect, as in the case of Las Vegas, minimum standards rather than use.

NETWORK: The network which appears to work best is Las Vegas because it has the least length per hectare. This is, nevertheless, tempered by two things: the low number of units served by the network in a hectare and the convoluted layout. Luis Llorens Torres' vehicular/pedestrian network is low but this changes because of two things: the excessive pedestrian network (which in the representation reflect only de jure circulation) and the number of parking areas and the circulation they produce. Viejo San Juan network, though higher than Las Vegas, is low in terms of units served per hectare. East Santurce's network and Buena Vista's are quite similar in length per hectare but East Santurce is
more efficient because it is a regular gridiron layout. Both networks are extensive because of small blocks grid.

DENSITY: The highest densities of the case studies are in the poorer areas. The highest is Luis Llorens Torres where the families are large, there are few singles or couples, and there is a large number of units per hectare. Luis Llorens Torres is followed by Buena Vista where the families are large, and there is a large number of units per hectare. Unlike Llorens Torres there is, however, a bigger percentage of older and younger singles or couples living in the area. East Santurce's density reflect the makeup of the area as well as the number of units per hectare. Viejo San Juan's density reflects various things: the exodus in the 30's out of the city, the large number of singles or couples without children as well as the large amount of area devoted to non-residential purposes. As a point of comparison San Juan had in 1900 five times the population and, thus, five times the density. The lowest density is in Las Vegas where the units per hectare is low. This is further worsened by the fact that the number of families with children is very high since there are few singles or couples in this type of community.

UNIT DENSITY: Luis Llorens Torres has the highest number of units per hectare due to its physical make-up. All the project residential structures are three stories walkups with various units clustered around the stairwell. Buena Vista's density is the result of various things: small lots, de facto condominiums within one lot and cluster conditions. Viejo San Juan's density reflects the many types of residential possibilities (single or multi-story, single house or multi unit building, cluster courts, etc.) tempered by the area which is not used for residential purposes. East Santurce's density reflects condominium policies within one block. Las Vegas reflects the legal policies under which it was created.
LAND UTILIZATION:

LAND USE: The percentages reflect two things: first, circulation area vs. public and private area as a whole and second institutional and recreational public area vs. private area.

THE SQUARE REPRESENTS 1 HECTARE

<table>
<thead>
<tr>
<th></th>
<th>VIEJO SAN JUAN</th>
<th>EAST SANTURCE</th>
<th>BUENA VISTA</th>
<th>LUIS LLORENS TORRES</th>
<th>LAS VEGAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streets/Walkways</td>
<td>18%</td>
<td>29%</td>
<td>22%</td>
<td>69%</td>
<td>22%</td>
</tr>
<tr>
<td>Recreational/Institutional</td>
<td>19%</td>
<td>5%</td>
<td>3%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Dwellings/Lots</td>
<td>63%</td>
<td>67%</td>
<td>75%</td>
<td>21%</td>
<td>66%</td>
</tr>
</tbody>
</table>

NETWORK: The grid graphic represents network length per hectare. For the purpose of accuracy the peripheral lines count for only half of their measured length.

THE SQUARE REPRESENTS 16 HECTARE

<table>
<thead>
<tr>
<th></th>
<th>VIEJO SAN JUAN</th>
<th>EAST SANTURCE</th>
<th>BUENA VISTA</th>
<th>LUIS LLORENS TORRES</th>
<th>LAS VEGAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwellings/Lots</td>
<td>58 Units/Ha.</td>
<td>48 Units/Ha.</td>
<td>86 Units/Ha.</td>
<td>69 Units/Ha.</td>
<td>10 Units/Ha.</td>
</tr>
</tbody>
</table>

DENSITY: The dot patterns represent persons per hectare with each dot representing 20 persons.

THE SQUARE REPRESENTS 1 HECTARE

UNIT DENSITY: The pattern of squares represent units per hectare with each square representing 10 units.
GLOSSARY

The criteria for the preparation of the definitions have been as follows:

- **FIRST PREFERENCE** definitions from Webster's Third New International Dictionary, 1971.
- **SECOND PREFERENCE** definitions from technical dictionaries, test books, or reference manuals.
- **THIRD PREFERENCE** definitions from the Urban Design Program (U.S.D.P.) files. They are used when previous entries were not quite appropriate/satisfactory.

Words included for specificity and to focus on a particular context are indicated in parenthesis. (See also references).

Accesses. The pedestrian/vehicular linkages from/to the site to/from existing or planned approaches (urban streets, limited access highways, public transportation system, and other systems such as: waterways, airways, etc.). (U.S.D.P.)

Actual land cost. "The cost of land is...not solely by the level of demand. The price of land is not a function of any cost conditions: it is set by the users themselves in competition." (Turner, 1971)

Ad Valorem Tax. A tax based on a property's value; the amount paid is a percentage of the total value and is usually a large or even usually the market value, but only a valuation for tax purposes. (U.S.D.P.)

Airport Easements. The act or process of destroying the rest, tranquility, or settled state of (the site) by the annoyance of airport noise, vibration, hazards, etc. (Merriam-Webster, 1971)

Airport Easements Restrictions. The regulation of the height or type of structures in the path of moving aircraft. (Ainsworth, 1971)

Alternative Current (A.C.). (an electric) current that reverses its direction of flow at regular intervals. (NESC ST 45-7, 1953)

Amenity. Something that conduces to physical or mental comfort or convenience, or which contributes satisfaction rather than money income to its owner. (Merriam-Webster, 1971)

Amperes. Amperes (amp) are a measure of the rate of flow of electric current. It is somewhat comparable to the rate of flow of water (quantity/time). A steady current produced by one volt applied across a resistance of one ohm. (NESC ST 45-7, 1953)

Appraisal. An estimate and opinion of value, especially by one fitted to judge. (Merriam-Webster, 1971)

Approaches. The main routes external to the site (pedestrian/vehicular) by which the site can be reached from other parts of the urban context. (U.S.D.P.)

Assessed Value. A valuation placed upon property by a public officer or heard as a basis for taxation. (Kaye, 1971)

Assessment. The valuation of property for the purpose of levying a tax or the amount of the tax levied. (Kaye, 1971)

Backfill. Earth or other material used to replace material removed during construction, such as in curvets, trenches, ditches, and bridge abutments and retaining walls or between an old structure and a new lining. (DePina, 1972)

Barrier. (A boundary) as a topographic feature or a physical boundary separating areas that tend to separate or restrict the free movement (to and from the site). (U.S.D.P.)

Bestment Tax. A tax on the increment in value accruing to an owner because of development and improvement work carried out by local authorities. (U.S.D.P.)

Binder Course. A horizontal course of horizontal paving between the crushed stone base and the surface course. It is placed directly between base and surface courses. (DePina, 1972)

Bitumenous. A coating of or containing bitumen as asphalt or tar. (DePina, 1972)

Block. A block of land bounded and served by lines of public streets. (U.S.D.P.)

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, in general, 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 thereon. (Plotkin, 1971)

Building Drain. Lowest horizontal piping of the building drainage system receiving discharge from soil, waste, and other drainage pipes. It is connected to the building sewer (ST 45-7, 1953)

Building main. Water-supply pipe and fittings from the water main or other source of supply to the first branch of the distribution system of a building. (NESC ST 45-7, 1953)

Cess Pool. An underground catch basin that is used when the soil or sewer system is not so constructed that sewage or other liquid waste is drained to permit leaching of the liquid into the surrounding soil. (Merriam-Webster, 1971)

Circulation. System(s) of movement or passage of people, goods from place to place; streets, walkways, parking areas. (U.S.D.P.)

Clay. A sticktight colloidal substance, plastic when moist (crystalline grains less than 0.0002 mm in diameter). (U.S.D.P.)

Clearcut. A plug or similar fitting to permit access to trunks or sewer lines. Clearcuts are usually used at turns and other points of collection. (NESC ST 45-7, 1953)

Climate. The average condition of the weather at a particular place over a period of years as exhibited by temperature, wind, precipitation, sun energy, humidity, etc. (Concrete, 1971)

Collection System. The system of pipes in a sewage network, comprised of house service, collection lines, manholes, laterals, etc. (U.S.D.P.)

Combined Sewer. A sewer that carries both storm water and sanitary or industrial wastes. (DePina, 1972)

Community. The people living in a particular place or region and usually linked by common interests: the region itself; any population cluster. (U.S.D.P.)

Community Facilities/Services. Facilities/services used in common by a number of people. It may include: schools, health, recreation, police, fire, public transportation, community center, etc. (U.S.D.P.)

Community Recreation Facilities. Facilities for activities voluntarily undertaken for pleasure, fun, relaxation, etc. (U.S.D.P.)

Component. A constituent part of the utility network. (U.S.D.P.)

Condominium. Condominium is a system of direct ownership of single units in a single building, but the owner in the unit is totally or partially built and designed to open privately owned lands for public and designed to open privately owned lands for life or limb, health, property, and public welfare, by regulation, in general, 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 thereon. (Plotkin, 1971)

Conduit. A pipe or other opening, buried or above ground, for conveying hydraulic traffic, pipelines, cables, or other utilities. (DePina, 1972)

Conservation Easement. An easement acquired by the public and designated to open privately owned lands for recreation, in compliance with the views of preservation of state land in order to preserve open space and protect certain natural values. (DePina, 1972)

Conurbation. Area of large urban communities where towns, etc. have spread and become joined beyond their administrative boundaries. (A.S. Cowie, A.S. Cowie, A.S. Cowie, 1971)

Conurbation. An aggregation or continuous network of urban communities. (Merriam-Webster, 1963)

Corporation Code/Corporation Step. A water or gas line by means of which utility-company employees connect or disconnect service lines to a consumer. (DePina, 1972)

Costs Of Urbanization. Include the following: CAPITAL: cost of land and infrastructure; OPERATING: cost of administration, maintenance, etc.; DIRECT: include capital and operating costs; INDIRECT: include environmental and personal effects. (U.S.D.P.)

Current (See: Alternating Current, Direct Current). An electric current flowing in one direction. (ROTC 45-7, 1953)

Cycle. One complete performance of a vibration, electric oscillation, current alternation, or other periodic process. (Merriam-Webster, 1971)

Dam. A barrier preventing the flow of water; a barrier built across a water course to control and keep back flowing water. (Brandt, 1971)

Depreciation Acceleration (Tax). A tax incentive designed to encourage new construction by allowing a faster write-off during the early life of a building. (U.S.D.P.)

Design. 1) The arrangement of elements that make up a work of art, a machine or other man-made object. 2) The process of selecting the means and contriving the elements, steps, and procedures for producing what will adequately satisfy some need. (Merriam-Webster, 1971)

Detached Dwelling. Individual dwelling unit, separate from others. (U.S.D.P.)

Development. Gradual advance or growth through progressive changes; a developed tract of land (U.S.D.P.)

Development Size. There are two general ranges of size: SMALL: may be independent communities requiring their own utilities, services, and community facilities; LARGE: may be large unincorporated communities that require government organization and can use its supporting utilities, service, and community facilities. (Merriam-Webster, 1971)

Direct Current (D.C.). (an electric current that) flows continuously in one direction. (NESC ST 45-7, 1953)

Discharge. (Q.) Flow from a culvert, sewer, channel, etc. (DePina, 1972)

Distance. The degree or amount of separation between two points (the site and each other element of the urban context measured along the shortest path adjoining them (paths of travel). (Merriam-Webster, 1971)

Distributed Soil. Soils that have been disturbed by artificial processes, such as excavation, transportation, and filling (U.S.D.P.)

Drainage. Interception and removal of ground water or surface water, by artificial or natural means. (DePina, 1972)

Dry/Scour. Fine dry solid particles of earth, grit, refuse, waste, litter, etc. (Merriam-Webster, 1971)

Drilling. The general, global designation of a building. A drilling contains one or more dwelling units! (U.S.D.P.)

Drilling Builder. Four groups are considered: self-built unit; where the dwelling unit is directly built by the user or occupant; artisan單位: where the dwelling unit is totally or partially built by a skilled craftsman hired by the user or occupant, payments can be monetary or an exchange of services; small contractor unit: where the dwelling unit is totally built by a small organization hired by the user, user, or developer; the dwelling unit is defined by the scale of operations, financially and materialistically; the scale being limited to the construction of single dwelling units or single complexes; large contractor unit: where the dwelling unit is totally built by a large organization hired by a developer; 'large' contractor is defined by the scale of operations, financially and materialistically; the scale reflects a more comprehensive and larger size of operations encompassing the building of large quantities of similar units, or a singularly large complex. (U.S.D.P.)

Drilling Density. The number of dwellings, dwelling units, or families per unit hectare. Drilling density is the density of an overall area (ex. including lots, streets, etc.) divided by the number of selected, discrete portions of an area (ex. including streets, etc.). (U.S.D.P.)

Drilling Developers. Three sectors are considered in the supply of dwellings: PIGGAR SECTOR: the marginal sector with limited or no access to the formal financial, administrative, legal, technical institutions involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Popular Sector generally for "self use" and sometimes for profit. PUBLIC SEC-
GLOSSARY

TOR: the circuit with the voltage dropping to zero twice in A involved in the provision of dwellings. The housing flow process (promotion, financing, construction, operation) is carried out by the Private Sector for profit.

PRIVATE SECTOR: the individuals, groups or societies, who have access to financial means, and who, through their professional activity, are involved in the provision of dwellings. The housing flow process (promotion, financing, construction, operation) is carried out by the Private Sector for profit.

PRIVATE/PUBLIC SECTOR: non-profit or subsidized housing.

SYSTEMS: programs, projects, and the implementation of the various processes involved in the provision of dwellings. The flow process (promotion, financing, construction, operation) is carried out by the Private Sector for profit.

ELECTRICAL WIRING SYSTEMS: may either be single-phase or three-phase. SINGLE-PHASE: 2 hot wires with 1 neutral wire. THREE-PHASE: 2 hot wires with 1 neutral wire. (NESC ST 45-7, 1953)

ELECTRIC TRANSFORMER: a device which changes the magnitude of alternating voltages and currents; generally connected loads). Parallel circuits are fixtures wired in series with the user's equipment, comprising the branch circuits of the electrical system. The branch circuits of the electrical system are connected to the building's electrical system. The branch circuits of the electrical system are connected to the building's electrical system.

EFFECTIVENESS. Efficiency of production, or the capacity of production, is the ability to produce desired results with a minimum expenditure of energy, time, or money.

ELECTRICAL WIRING SYSTEMS: may either be single-phase or three-phase. SINGLE-PHASE: 2 hot wires with 1 neutral wire. THREE-PHASE: 2 hot wires with 1 neutral wire. (NESC ST 45-7, 1953)

HYDRAULICS. That branch of science or engineering which deals with the movement of fluids, and the forces exerted by fluids on solid surfaces.

GRIDIRON BLOCKS. The term for gridiron blocks some lots have indirect access to public streets.

GRID BLOCKS. The term for gridiron blocks some lots have indirect access to public streets.


GRID DEVELOPMENT MODE. Two modes are considered: PROGRESSIVE: the construction of the dwelling and the development of the infrastructure proceed as usual with the subdivision standards by stages, often starting with provisional structures and underdeveloped land. This essentially tracts of land are provisionally purchased by developers and subdivided into lots by deed. The developer is generally given conditions. (Merriam-Webster, 1971)

EMERGENCY. A bank of earth, rock, or other material constructed above the natural ground surface. (Merriam-Webster, 1971)

ENDANGERED SPECIES. An endangered species is any species of fish, wildlife, or plant that is threatened with extinction within the specified area. (Merriam-Webster, 1971)

ENDANGERMENT (of animals of the earth's crust) are preserved and protected by natural agencies including the United States Fish and Wildlife Service, the National Park Service, and other federal, state, and local agencies. (Merriam-Webster, 1971)

INCREMENT (TAX). The increase in the value of property for the purpose of assessing taxes. (Merriam-Webster, 1971)

INCREMENT (TAX). The increase in the value of property for the purpose of assessing taxes. (Merriam-Webster, 1971)

INCORPORATION. A legal status that gives a group of people the power to conduct business in their own name. (Merriam-Webster, 1971)

INCOME. A device to measure flow of water. (Merriam-Webster, 1971)

INCOME GROUPS. A group of people or families within the same range of incomes. (Merriam-Webster, 1971)

INCREMENT (TAX). A special tax on the increased value of land, which is due to labor/profitability or the added value to the property. (Merriam-Webster, 1971)

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INCREMENT (TAX). A special tax on the increased value of land, which is due to labor/profitability or the added value to the property. (Merriam-Webster, 1971)
or hospital) or enclosure (as in a camp) containing such a receptacle.

INTERVAL. A space of time (or distance) between the recurrences of similar conditions or states. (Merriam-Webster, 1971)

KILOWATT (kw) (1000 watts) A convenient manner of expressing small power consumption. Kilowatt hours (kWh) measure the total quantity of energy consumed in a given time. One kilowatt hour is the use of a kilowatt of electrical energy for a period of one hour, (NCT ST 45-7, 1953)

LAMPHOLE. A vertical pipe or shaft leading from the surface of the ground to a sewer for admitting light for purposes of inspection. (U.S.D.P.)

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 building through the provision of utilities, services, access, etc. (U.S.D.P.)

LAND LEASE. The renting of land for a term of years for the purpose of using or developing the land. A lease of land may run as long as 99 years. (U.S.D.P.)

LAND-MARKET VALUE. Refers to: 1) the present monetary equivalent to replace the land, 2) the present taxable value of the property, 3) the present commercial market value of the land. (U.S.D.P.)

LAND OWNERSHIP. The exclusive right of control and possession which grows out of having the legal title to land. (U.S.D.P.)

LAND SUBDIVISION. The division of the land into blocks, lots and laying out streets. (U.S.D.P.)

LAND TENANCY. The temporary holding or mode of holding a parcel of land of another. (U.S.D.P.)

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, public controls and responsibility. PUBLIC (streets, walkways, open space, parks); controlled residential land uses - Minimum responsibility - public sector. SEMIPUBLIC (open spaces, playgrounds, schools); user - limited group of people; public controls - partial or complete; responsibility - public sector and user. PRIVATE (dwelling, lots); user - owner or tenant or squatter; public controls - complete; responsibility - user. (U.S.D.P.)

LAND UTILIZATION PHYSICAL CONTIGUITY. The physical/ legal/ spatial/ methodological boundaries of directing, regulating, and coordinating the use and maintenance of land by the owners/ users. (U.S.D.P.)

LAND UTILIZATION RESPONSIBILITY. The quality/state of being morally/legally responsible for the use and maintenance of land by the owners/users. (U.S.D.P.)

LATENT WATER. A collector pipe receiving sewage from building connection only. (U.S.D.P.)

LATRINE. A receptacle (as a pit in the earth or a water closet) for use in defecation and urination, or a room (as in a barracks or hospital) or enclosure (as in a camp) such as a receptacle. (Merriam-Webster, 1971)

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

LEVELS OF SERVICE. Two levels are considered: MINIMUM, where all or some facilities for cleaning, maintenance and inspection. (U.S.D.P.)

LIMITED. A collection system component that forces sewage to a higher elevation to avoid deep pipe network. (U.S.D.P.)

LIFT PUMP. A pumping system component that forces sewage to a specified layout and lot. (U.S.D.P.)

LIVESTOCK SEGMENT. A 400 x 400 area taken from and representing the residential character and layout of a lot. (U.S.D.P.)

LOCATION. Situation; the way in which something (the site) is placed relative 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) adjacent, integral with the housing. (DePina, 1971)

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.)

LUMINAIRE. In highway lighting, a complete lighting device consisting of a light source, plus a globe, reflector, mounting and superstructure; for disposal of human excreta. (Merriam-Webster, 1971)

MASS TRANSPORTATION. The transportation of large numbers of people or goods. (U.S.D.P.)

MARKET. An access hole sized for a man to enter, particularly in sewage and drain systems plumbing systems for cleaning, maintenance and inspection. (U.S.D.P.)

MATRIX (OF BASIC REFERENCE MODELS). A set of models of urban layouts arranged in rows and columns. (U.S.D.P.)

MASTER PLAN. A comprehensive, long range plan intended to guide the growth and development of a city, town or region, expressing official considerations on the course its transportation, housing and community facilities should take, and making proposals for industrial development, etc. (U.S.D.P.)

MEANING OF ELECTRICITY. Ohms - the opposition to electrical flow. (Revised, 1971)

MEDIAN MARGIN. A double-faced guard rail in the median or island dividing two adjacent roadways. (DePina, 1972)

MESHING BOUNDARIES. A process of distributing the land to or over which is built a public road, the land

MODE OF TRAVEL. The power or energy by which one may lawfully use, the strip of land devoted to or over which is built a public road, the land

MORE. A quality of something not to affect the sense of smell. (Merriam-Webster, 1971)

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

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

MUTUAL UNDESIRED SOIL. Soils that have not been disturbed by artificial process. Although natural, they depend greatly on climate, vegetation, etc. (Merriam-Webster, 1971)

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

NEIGHBORHOOD. That portion of the land to the area(s) contained within or adjacent to it. (U.S.D.P.)

NEUTRAL WIRE. Wire carrying no voltage between itself and a ground. (NCT ST 45-7, 1953)

NOISE. Any sound (affecting the site) that is undesired (such as that produced by traffic, airport, industry, etc.). (Merriam-Webster, 1971)

ODOR. A quality of something that affects the sense of smell. (Merriam-Webster, 1971)

ONION (electric). The unit of resistance (ohm) used in electrical systems, the greater the resistance. When resistance is constant, voltage (across and wattage) are in direct proportion to each other. The practical null point of electrical resistance is equal to the resistance of a circuit in which a potential difference of one volt produces a current of one ampere or to the resistance in which one watt of power is expended. (Revised, 1971)

OPF. Organization for Public Facilities (general). The opposition to electrical flow. (Revised, 1971)

OPTION/OPPORTUNITY. To bring to a peak of economic efficiency, speciality by the use of precise analytical methods. (Merriam-Webster, 1971)

ORGANIC SOILS. Soils composed mostly of plant material. (U.S.D.P.)


PERCENT HEMP/MIXTURE. The fraction of income allocated for dwelling rental or dwelling mortgage payments; expressed as a percentage of total family income. (U.S.D.P.)

PET PRIVY/LATRINE. A single hole in the ground, usually hand dug, covered with slab and protective superstructure; for disposal of human excreta. (U.S.D.P.)

PHASE DECONTAMINATION. The process of removing contamination which is in a given area. (U.S.D.P.)

PHASE OF CONSTRUCTION. A method of sewage treatment using action of bacteria and algae to digest/ decompose wastes. (U.S.D.P.)

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

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

POLLUTION PREVENTION. The body of trained men and women entrusted by a government with the maintenance of public health and order, and enforcement of laws, prevention and detection of crime. (Merriam-Webster, 1971)

POPULATION DENSITY. It is the ratio between the population of an area and the number of acres occupied by people per hectare. It can be: GROSS DENSITY: inclusive of human population plus all other uses, terrestrial, human, industrial, etc. (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.)

PRIVATE UTILITIES. The use of land on an enclosed area. (U.S.D.P.)

PUBLIC FACILITIES. Facilities such as schools, play-grounds, parks, other found recreation facilities, members of a community which are owned, controlled, and maintained by public agencies. (U.S.D.P.)

PUBLIC SERVICES AND FACILITIES. Includes: public transportation, police protection, fire protection, refuse collection, health, schools, and playgrounds. (U.S.D.P.)

PUBLIC SYSTEM (general). A system which is owned and controlled by an local governmental authority or by an established public utility company which is controlled and regulated by a governmental authority. (U.S.D.P.)

PUBLIC UTILIZATION. Includes: water supply, sanitary sewerage, storm drainage, electricity, street lighting, telephone, circulation networks. (U.S.D.P.)

PUMP. A device or machine that raises, transfers, or conveys fluids or gases by mechanical energy, usually by suction or pressure or both. (Merriam-Webster, 1971)

PROFESSION. The service for collection and disposal of all the solid wastes from a community. (U.S.D.P.)

RESERVOIR. Large-scale storage of water; also function to control fluctuations in supply and pressure. (U.S.D.P.)

RESIDENTIAL AREA. An area containing the basic residential requirements for housing, activity, housing, education, recreation, shopping, work. (U.S.D.P.)

RESISTANCE. The opposition to electrical flow. (Revised, 1971)

RESISTANCE DECREASES AND INCREASES as the width of wires is increased and decreases as the area of cross-sectional area of wires is increased). (NCT ST 45-7, 1953)

RIGHT-OF-WAY. A legal right of passage over another person's ground (land), the area or way over which a right-of-way exists such as a path or thoroughfare which one may lawfully use, the strip of land devoted to or over which is built a public road, the land

RISER. A pipe or pipe section used to support the floor, roof, or wall. (Merriam-Webster, 1971)
GLOSSARY

by a public AND SERVICES. The subdivision of urban land and a grant by utility. Rights-of-way may be shared (as streets; transit routes; subways, railroads, etc.) (Merriam-Webster, 1971; U.S.D.P.)

A grant by the state (as for water supply, waste water removal, electricity, etc.) in the public interest. (U.S.D.P.)

VALVE. A water supply distribution component which interrupts the supply for maintenance purposes. (U.S.D.P.)

VIBRATION. A quivering or trembling motion (such as that produced by: heavy traffic, industry, aircraft, etc.) (Merriam-Webster, 1971)

VIEW. That which is revealed to the vision or can be seen. (ROTC ST 45-7, 1953)

WASTE PIPES. A set of pipes with different amperages cannot be connected to carry water wastes except sewage (excluding curbs) (Merriam-Webster, 1971)

WATER Supply. Source, means, or process of supplying water, (as for a community) usually involving reservoirs, pipelines, and the treatment of the water so that it is wholesome (U.S.D.P.)

WEBER. That which is revealed to the vision or can be seen. (7th Collegiate Webster, 1971)

WEIGHT. The instrument (as a scale) that constitutes a measure of the quantity of matter. (U.S.D.P.)

WINDWARD. The catchment area or drainage basin from which the waters of a stream or stream system are drawn. (Merriam-Webster, 1971)

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

WASTE. Water from yard, or street. (Merriam-Webster, 1971)

WEIGHT. A rank in the economic scale. Rights-of-way may be shared (as streets; transit routes; subways, railroads, etc.) (Merriam-Webster, 1971; Abrams, 1966)

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.)

VALUE. A water supply distribution component which interrupts the supply for maintenance purposes. (U.S.D.P.)

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QUALITY OF INFORMATION

The quality of information given in drawings, charts and descriptions has been qualified in the following manner:

Approximate: when deduced from different and/or not completely reliable sources.

Accurate: when taken from reliable or actual sources.

EQUIVALENTS

Linear Measures

1 centimeter = 0.3937 inches

1 meter = 39.37 inches or

1 foot = 3.28 feet

1 kilometer = 0,3937 miles

1 inch = 2.54 centimeters

1 foot = 0.3048 meters

1 mile = 1.60935 kilometers

Square Measures

1 square meter = 1.550 square inches or 0.0929 square feet

1 square foot = 0.0929 square meters

1 cuerda = 3,929.78 square meters

1 acre = 0.4048 hectares

1 hectare = 2.4771 acres

1 square mile = 258.999 hectares

NOTES ON THE SOURCES:

CRUV: Corporacion de Renovacion Urbana y Vivienda

DTPC: Departamento de Transportacion y Obras Publicas

DOLLAR VALUES

Puerto Rico's currency is the U.S. Dollar. Where costs or income have been used they should be used mainly for comparative purposes.