ALTERNATIVE PROPOSAL: LINKOU TERRACE SOUTH PROJECT

TAIPEI, TAIWAN, REPUBLIC OF CHINA

BY

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by Yao-wen Chan

Submitted to Department of Architecture in partial fulfillment of the requirements for the degree of Master of Architecture in Advanced Studies.

ABSTRACT

Population studies made in Taiwan during recent years indicate that Taipei City will at least have doubled in population by the end of the century. This population explosion will create many problems, particularly a shortage of housing, the shortage of available land for housing and its supporting facilities and a significant increase in the land price. The Taiwan Province Government addressed itself to these problems and as one of its projects decided to build a new town - Linkou Terrace, Taipei Metropolitan Area. This Project has been studied by the "Urban and Housing Development Committee" since 1967.

This study attempts to provide an alternative proposal for the Linkou Terrace Project. The Project has already been designed but not yet built.

This alternative proposal attempts to provide a better environment in which to settle the excess of population in Taipei City within the next 20 years, as well as to house those people who are living in flood-prone areas near Taipei City and Linkou Terrace.

This study is concentrated on the site layout, land use, circulation and land subdivision, following a format developed in the Urban Settlement Design Program.

Thesis Supervisor: Horacio Caminos
Title: Professor of Architecture

June, 1973
ACKNOWLEDGEMENTS

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I would like to thank Mr. W. K. Liang and Mr. C. H. Tsai of the Urban and Housing Development Committee-C.I.E.C.D. and the Taiwan Province Government for their assistance in securing needed information which formed the basis of this study.

Last but not least, many thanks to my friend Miss Jane Wu for both moral support and typing.
INTRODUCTION

The Linkou Terrace Project has been studied and planned since 1967 by the Urban and Housing Development Committee, but has not been built due to the financial problems. This study attempts to provide an alternative proposal for this Project. Since the whole Linkou Terrace Project (450,000 recommended population) is beyond the scope of this preliminary model, only the southern portion of the Terrace (Linkou Terrace South) has been dealt with in detail.

The intent of this proposal is:
- To provide a set/framework of related aspects/determinants for discussion/evaluation/policy decision making.
- To act/serve as a catalyst for the various factors essential to the successful public application of technological resources.

The initial information for this study was collected in the summer of 1972. Additional information was gathered in Taipei during January-February 1973 and included field work as well as site surveys. Final elaboration of the study was carried out in Cambridge.

The data used in this study was primarily from the Taiwan Province Government and the Urban and Housing Development Committee.

Cambridge, Massachusetts June 1973
TAIWAN

GENERAL INFORMATION

- OFFICIAL NAME: Republic of China
- AREA: 35,961 sq km
- POPULATION: 15,500,000
- LANGUAGE: Mandarin
- CURRENCY: NT$ 38 to US$ 1 *
- PER CAPITA INCOME: US$ 329 in 1971
- LITERACY RATE: 95%
- CAPITAL CITY: Taipei (pop. 1.7 mil)
- GOVERNMENT STRUCTURE: Constitutional democracy
- TRADE VOLUME: US$ 4 billion in 1971 (exports US$ 2.1 billion, imports US$ 1.9 billion)
- LEADING CROPS: Rice, sweet potatoes, sugar cane, bananas, pineapple, mushrooms, asparagus, tea.
- MAJOR INDUSTRIES: Textiles, canned food, plastics, electrical apparatus and appliances, petrochemicals, machinery, glass, cement, shipbuilding, automobiles.
- ECONOMIC GROWTH: 10% annually in last decade, 11.4% in 1971.
- LIVING STANDARDS: Among the highest in Asia.
- EDUCATION: Available for about 98% of the younger population at the elementary level, and 75% of the lower school graduates at secondary school.
- PUBLIC HEALTH: Public health facilities were widely distributed in the form of 1095 government-support health stations and clinics. Environment sanitation was improving, and pure water supplies, hitherto restricted to the cities, were being extended to rural areas.

HISTORY

- 1590 was discovered by Portuguese.
- 1624-1646 was under Spanish and Dutch domination. Large scale immigration began. Population was 30,000.
- 1661, Dutch was ousted by Koxinga.
- 1683, Conquered by Manchus and made a prefecture of Fukien.
- 1886 became a Chinese Province.
- 1895 was ceded to Japan at the conclusion of the first Sino-Japanese War. Population was 2,500,000.
- 1945, returned to China as a result of the Cairo Agreement.
- 1949, became the effective territory of the Republic of China. Taipei is the temporary capital.

* NT$ = New Taiwan dollar
PHYSICAL CONTEXT

- LOCATION
  East Longitude : 120°4' - 121°57'
  North Latitude : 21°54' - 25°20'

- TOPOGRAPHY
  a) The central range occupies almost half of the island, forming a ridge of high mountains with length of 270 km from north to south and width of about 80 km near the middle.
  b) Because of the terrain, only a quarter of the land is arable.

- CLIMATE

  Wind

  Temperature (°C)
<table>
<thead>
<tr>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>21</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

  Humidity (%)
  | 100 | 75  | 50  | 25  | 0   |

  Rain (mm)
  | 400 | 300 | 200 | 100 | 0   |

  a) Taiwan is located in the subtropical zone, the summer season is very long.
  b) Taiwan is frequently attacked by typhoons with wind velocities as high as 250 km per hour accompanied by heavy rainfalls between May and October.
TAIPEI METROPOLITAN AREA

- Taipei City is in the north of Taiwan island.

- Taipei became the center of government in 1887 when Taiwan was elevated to the status of a province. The population was 47,000 at that time.

- Taipei became the capital of the Republic of China in 1949. It was the political, economical and cultural center of the nation.

- The population of Taipei was 335,397 people in 1945, 1,221,076 people in 1967, 1,756,000 people in 1972.

- The Taipei Metropolitan Area was the largest urban population growth in Taiwan. The present population in the Metropolitan Area of Taipei City will have doubled in population by the end of the century.

- Taipei City as presently constituted has about 2,100 hectares of flat vacant land. The vacant areas will hardly accommodate at reasonable densities which insure each dwelling the light and air necessary for health, the excess population now crowded into the older sections whose reconstruction is long overdue and the public facilities they need.

- It has been estimated that adjacent suburbs might reasonably be expected to provide housing sites for 282,000 additional persons with the next 20 years. The rest, some 2,122,000, must find sites outside of the adjacent suburbs.

- Finding vacant land on which to build is not enough; the land must be available at a price which will permit the people who need the housing to pay for it.

- The vacant area between Taipei City and Linkou Terrace can not be urbanized because it is a flood-prone area, most of the increased population will have to be settled to the west on the Linkou and Taoyuan Plateaus.

- The Linkou Terrace is the largest vacant area close to Taipei City which can be economically urbanized. It is close enough to Taipei for new industries to continue close contacts with their sub-contractors and suppliers and to continue to draw from the Taipei labor pool. The 3,000 buildable hectares of the Terrace can be developed and marketed so as to effectively combat the present excessive price of prepared building land in the City and Metropolitan Area.
THE GOALS OF THE LINKOU TERRACE PROJECT

PROVISION FOR HOUSING AND EMPLOYMENT OPPORTUNITIES FOR THE METROPOLITAN TAIPEI AREA WITHIN THE NEXT 20 YEARS:
- The population of the Metropolitan Taipei area will increase by 1,937,000 people in the next 20 years.
- Linkou Terrace Project will provide 9,000 to 10,000 housing units. It will settle about 23% of the Metropolitan Taipei Area's population of the next 20 years.

RELOCATION OF INDUSTRIAL PLANTS WHICH ARE IN TAIPEI CITY NOW:
- There are many factories previously built in downtown Taipei City which create many critical problems today.
- Linkou Terrace provides the well-planned industrial areas to relocate those factories.

SETTLEMENT OF PEOPLE WHO ARE LIVING IN FLOOD-PRONE AREAS NEAR LINKOU TERRACE
- There are numerous people living in areas vulnerable to storm flooding.
- The most effective way to stop people living in flood-prone areas is to provide a better living environment for them. This is one of important aims in developing Linkou Terrace.

SETTING AN EXAMPLE FOR OTHER DEVELOPMENT PROJECTS:
- There are more than 30 new communities planned for development in the Metropolitan Taipei Area within the next 20 years.
- Linkou Terrace Project is the first to be developed and would provide a guide for other, similar projects.

The map (opposite page) shows: a) The location of the SITE of Linkou Terrace Project (approximately 15 km west of the city center). b) The relationship between flood-prone areas and Taipei City, Linkou Terrace.
TAIPEI HOUSING PROGRAM: in Taipei City, a typical walk-up apartment. They were developed and built by private investor.
TAIPEI HOUSING PROGRAM: in Taipei Metropolitan Area, a typical public housing for low income group. They are for both rent and sale.
LINKOU TERRACE AREA

- The site is in the southern portion of Linkou Terrace which will be developed over the next 20 years.
- Since the site is an integral part of both the topography and development program of Linkou Terrace, it is necessary to study the whole Terrace in order to define the site.

LAND FEATURES:
- Steep slope area (more than 15 %) surround the Terrace and define the boundaries of the Linkou Terrace Project.
- The surface of the Terrace consists of rectangular, relatively flat (0 - 4 %) land which is well-suited for residential development.

LAND USE:
Existing:
- Most areas of the Terrace are cultivated with tea, a low-income producing crop and therefore not advantageous to local people.
- Brick-making industrial areas are the second most important land use in the Terrace.
- Military reserved areas are scattered widely throughout the area.
- There are some small shops and stores in the existing small Linkou Town.
Projected:
- Residential: grouped in the area between Proposed Road A and Proposed Road B; the area east of Proposed Road B will be developed in the last stage as a lower density housing program.
- Commercial: grouped in the area along proposed Main Commercial Avenue.
- Industry: grouped in the area west of Proposed Road A in order to take advantage of convenient access and to reduce disturbance to the residential area.
- Military reserved: grouped in the south-west region of the Terrace as required.

The main forces acting on the area are presented schematically on the following maps: Land Features, Land Use, Circulation. They provide a framework for the future developments; They also help to define the site more specifically.
CIRCULATION

Existing
- Accesses: existing North-South Highway from south; North Sea-Shore Road from north; Pei-Lin Road from east.
- The condition of most of the existing circulation networks is too poor to remain when the Terrace is developed.

Projected
- Accesses: The Taiwan North-South Freeway which passes through the center of the Terrace and is under construction is the main access to the Linkou Terrace New Town.
- Two longitudinal roads and several transverse roads are proposed as the basic circulation networks.

DEVELOPMENT

- The early development stages will be the areas which are closer to the North-South Freeway.
- The first stage should be relatively independent in development. It can be an independent community if the whole Linkou Terrace Project changes or stops developing as the political or economical situation requires.
- The early development stages should create only minimal disturbance to the existing Linkou Town.
- A development in terms of stages, time, population to be settled is presented schematically in the chart and in the following page:

<table>
<thead>
<tr>
<th>STAGE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA (Ha)</td>
<td>890.0</td>
<td>642.1</td>
<td>743.0</td>
<td>645.0</td>
<td>2911.0</td>
</tr>
<tr>
<td>POPULATION (persons)</td>
<td>110,000</td>
<td>97,500</td>
<td>93,200</td>
<td>72,700</td>
<td>373,400</td>
</tr>
<tr>
<td>YEARS</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>
PLANNING POLICIES/GOALS

PRIMARY USE: DEVELOPMENT OF A RESIDENTIAL COMMUNITY.
- The primary use of the site will be residential.
- Residential use implies that the necessary supporting land uses will be included: schools, playgrounds, parks, commercial facilities, industries, institutional requirements.
- The site will allow the development of a large regional commercial center. Incremental planning will allow the commercial center to re-adjust its size to the required area.
- The area adjacent to the military reserved will be developed for industries and light industries area offering more sources of employment in this new community.
- The area at the east end of the site is reserved for a nursery and a cemetery for the whole Linkou Terrace.

TARGET INCOME GROUPS: BALANCED INCOME SECTORS
- The site will be developed for low-income sectors at the beginning but it will become a balanced community at the saturated stage:

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Income Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-income</td>
<td>NT$ below 3,250 pm</td>
<td>51%</td>
</tr>
<tr>
<td>Medium income</td>
<td>NT$ 3,250 - 5,250 pm</td>
<td>37%</td>
</tr>
<tr>
<td>High income</td>
<td>NT$ above 5,250 pm</td>
<td>12%</td>
</tr>
</tbody>
</table>

INTENSITIES OF LAND USE: HIGH AND MEDIUM DENSITIES
- The following densities will be planned for:

<table>
<thead>
<tr>
<th>Density</th>
<th>Persons/Ha</th>
<th>Units/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>270</td>
<td>59</td>
</tr>
<tr>
<td>High</td>
<td>350</td>
<td>76</td>
</tr>
</tbody>
</table>

- Higher densities will be achieved through different programs, building types such as high rise/commercial buildings (11 stories), walk-ups (4 to 5 stories), cluster condominiums, and combinations of the three.
- Approximate population at saturation: 19,500 to 24,000 units with 90,000 to 110,000 persons. This is approximately quarter of the whole Linkou Terrace Project population and is 3.7% of the Metropolitan Taipei area.

FORMS OF TENURE: PRIVATE OWNERSHIP, CONDOMINIUM OWNERSHIP, LONG TERM LEASE AND RENTAL
- The development will offer a variety of tenure options: rental and long term lease.

FINANCING GROUPS: PUBLIC
- The magnitude of the proposed development precludes funding from public agencies only.
CIRCULATION: EXTERNAL/INTERNAL COORDINATION
- The circulation network will provide a basic framework for the development of the site.
- The external network as follows:
  a) To proposed Road A. One of main access to North-South Freeway and to future development areas of Linkou Terrace as well as to existing north Sea-Shore Road.
  b) To proposed Road B. Another main access to North-South Freeway and to future development areas of Linkou Terrace as well as to National Park.

UTILITIES: CONNECTION TO PLANNED NETWORKS
- All utility systems will be interconnected into the planned Linkou Terrace networks.
- All utility systems: sewer, electricity, water, storm drainage; will be developed to take maximum advantage of the topography.

DEVELOPMENT MODE
- The site will be developed incrementally.
- Two periods are considered:
  I PRELIMINARY: Initial studies and promotion.
  II IMPLEMENTATION: Construction, habitation, evaluation, and revision.
- The implementation will be staged in the following cycle:
  1) Planning, design
  2) Construction, allocation of lots
  3) Habitation
  4) Evaluation
  5) Revision of policies
- This cycle will be repeated till saturation of the site is achieved.
THE SITE: LINKOU TERRACE SOUTH

AREA:
Gross area of the site: 850 Ha.
Land taken by the North-South Freeway: 25 Ha.
Available land for development: 825 Ha.

BOUNDARIES:
Site is defined by topography and man made features:
West: Reserved by military
East: Steep slope (15% - 45%)
South: Steep slope (15% - 45%)
North: Under construction Taiwan North-South Freeway

ACCESS:
Existing North-South Highway from south.
Under construction North-South Freeway from north.

LOCATION:
South of North-South Freeway in Linkou Terrace.
Relatively far away from any sources of employment.

TRANSPORTATION:
Convenient public transportation to Taipei City and Metropolitan area.

TOPOGRAPHY/SOIL CONDITION:
Flat in center (0-4%), steep slopes on boundaries in east and south (15%-45%).
Laterite soil and gravel.

LAND OWNERSHIP:
Public agency (Taiwan New Town Development Agency) is going to own the whole site.

LAND COSTS:
Relatively inexpensive for development.

UTILITIES:
Sewer, electricity and water connects to planned networks of whole Linkou Terrace New Town Project.

EXISTING STRUCTURE, AGRICULTURE AREA:
They are going to be abandoned.

OTHER FACTORS:
Views: Site has good views surrounding, especially to south and east.
Flooding: Site well drained.
Airport: The new planned international airport has been located about 18 km west of the site.

The map of the site (opposite page) shows:
a) Boundaries; b) The area of steep slopes above 15%, that restricts the use of land for construction; c) The relatively flat area, 0 - 4% slope, that is the most appropriate for immediate development.
North-South Freeway

Military Reserved

0 - 4 per cent slope
5 - 15
16 +
ponds

LAND FEATURES

0 1km
LAND USE PLAN

Gross area of the site: 850 Ha
Land taken by North-South Freeway: 25 Ha
AVAILABLE LAND FOR DEVELOPMENT: 825 Ha 100.0%

PUBLIC LAND
- circulation (total length 44,100m): 120 Ha 14.6%
- schools, playgrounds, open spaces, parks, recreation, public/community facilities: 272 Ha 32.7%
- reserved (cemetery, nursery), existing ponds: 48 Ha 5.8%

PRIVATE LAND
- residential, commercial: 297 Ha 36.0%
- industries, light industries: 90 Ha 10.9%

The site is a part of the total Linkou Terrace Project, therefore it should be strongly planned to relate to the whole Linkou Terrace area.

The site should be planned as a relatively independent community in order to be able to survive even if the remaining Linkou Terrace Project changes or stops developing when the economical or political situation changes.

The site has a potential population of 90,000 to 110,000 people at the saturation stage. This represents 20% to 25% of the whole Linkou Terrace Project, 6% to 7.3% of the present population of Taipei City.

The site would be planned in terms of the following options as well as in terms of community services:

- DIFFERENT INCOME GROUPS
- DIFFERENT CHOICES IN LAND TENURE
- DIFFERENT HOUSING PROGRAMS

The land use plan (opposite page) shows:
- OPEN AREAS, PARKS: located in the periphery of the site along east and south boundaries where the steep slope land is not suitable for construction but adequate for open areas; located around existing ponds where provides good landscape; located along North-South Freeway and proposed Road A and B as buffer open areas. The parks and open spaces will be interconnected for continuous pedestrian access.
- SCHOOLS: adjacent to open areas, playfields and parks.
- PUBLIC FACILITIES: located in the center of the site where steep slope (7% to 15%) land is unsuitable for housing cluster but good enough for public facilities; also can be located in open areas where schools are located if required.
- RESIDENTIAL AREAS: higher density residential and high rise vicinal commercial uses are in the center and along the main commercial avenue, medium density residential and local commercial uses are in the rest area of the site except in the east area of proposed Road B, lower density residential uses are located in the east area of proposed Road B.
- INDUSTRIES: located in the vicinity of the site having convenient access from highway. Industrial areas are adjacent to military reserved area. Medium industries and light industries are recommended.
CIRCULATION

The circulation network provides the primary framework in the developed site. It provides the utility spine in the site as well as circulation.

The land which is utilized by the circulation grid is considered to be under public ownership providing for paths of movement of both pedestrian and vehicular access.

The CIRCULATION layout is based upon:

a) It provides a main through avenue axis from north to south with local transverse streets.

b) The most direct/immediate access is from North-South Freeway.

CIRCULATION MODES:

1. PEDESTRIAN ONLY: exclusive use by pedestrian. Example: pedestrian walkways.

2. PEDESTRIANS AND VEHICLES MIXED: pedestrians dominate over vehicles; control of traffic frequency, character, and speed are mainly established by the street layout and use. Example: local street loops on residential areas.

3. VEHICLES AND PEDESTRIANS MIXED: vehicles dominate but do not control circulation; controls are established for the protection of pedestrians: crosswalks, traffic light, rails. Example: transverse through streets.

4. VEHICLES AND PEDESTRIANS: vehicles and pedestrians are equal, no one dominates over the other one. Example: the main commercial avenue.

5. VEHICLES ONLY: exclusive use by vehicles; relatively high speed, with large volume of traffic flow. Example: limited access North-South Freeway, proposed Road A and B.

EXTERIOR ACCESS

- North-South Freeway access to Metropolitan Taipei and to south Taiwan. Proposed Road A access to existing North-South Highway.
- Proposed Road A and proposed Road B access to four directions: Pa-Li Town, Sou-Pa Town, and national park.

INTERIOR NETWORK

- Through streets: primary through traffic (mode 3 and 4 type of circulation):
  1. main commercial avenue, longitudinal connections.
  2. transverse connectors: east/west, residential/industries connections.
  3. connector between two proposed roads.
- Local streets: residential traffic (mode 2 type of circulation).
- Pedestrian walkways: interconnected walkway (mode 1 type of circulation).
Area to be developed in the future

Note: only "Through Streets" are shown in the plan
COMMERCIAL AREA

- Commercial areas are of private ownership.
- Commercial areas will be developed along the main circulation networks.
- Flexibility is size and location will be developed in order to allow commercial use to respond the future demand.

TYPES OF COMMERCIAL AREAS PROVIDED:

LOCAL
- size: small, corner store
- location: scattered in residential areas
- parking: not available
- clientele: pedestrian within walking distance

VICINAL
- size: large and small
- location: along main street
- parking: public and private
- clientele: pedestrian predominately but auto accessible

REGIONAL
- size: large shopping centers
- location: on main commercial avenue
- parking: generous private parking
- clientele: pedestrian and automobile

The Plan (opposite page) shows the proposed local, vicinal and regional commercial areas. They will be expanded and adjusted as demanded.
PUBLIC AREAS: PARKS, SCHOOLS, OTHER USES

Types of parks:

LOCAL PARKS:
  a) Use: primarily used for pre-school children and women during the day.
  b) Location: within residential blocks, within cluster housing, and near local shops and stores.
  c) Access: small protected area away from through streets for pedestrian access.

NEIGHBORHOOD PARKS:
  a) Use: for school age children and young adults, for active outdoor sports during the day.
  b) Location: within the schools play areas for maximum space utilization.
  c) Access: pedestrian neighborhood access.

AREA PARKS:
  a) Use: primarily used for young adults and adults during the day and night.
  b) Location: in vicinal commercial/high density residential areas.
  c) Access: by shoppers, pedestrians and with automobiles.

REGIONAL PARKS:
  a) Use: by all ages; active and passive activities.
  b) Location: not primarily connected with residential areas.
  c) Access: by automobiles and pedestrians.

BUFFER AREAS:
  The areas adjacents to the Freeway and proposed Road A and proposed Road B are used to provide a visual and sound barrier to vehicular traffic.

ELEMENTARY AND SECONDARY SCHOOLS:
  - The plan allows for 15 to 16 elementary schools for 18,000 to 19,200 students (16% of population, 1,200 students/school).
  - The plan allows for 4 to 5 secondary schools for 7,200 to 9,000 students (8% of population, 1,800 students/school).

HIGH SCHOOLS AND VOCATIONAL SCHOOLS:
  - The plan allows for 2 high schools for 2,500 to 3,000 students (1.8% of population, 1,350 students/school).
  - The plan allows for 2 vocational schools for 2,500 to 3,000 students (1.8% of population, 1,350 students/school).

OTHER COMMUNITY FACILITIES:
  Community centers, libraries and a health center for the region are included.

The Plan (opposite page) shows: a) the neighborhood parks, area malls, regional parks, but not local parks. b) the relationship between schools and those open areas.
PARKS, OPEN SPACES

- Neighborhood park
- Area mall
- Regional park/buffer area
- Pond
- School
- Playfield
- Nursery
- Cemetery

[Diagram of urban area with various symbols for different types of spaces and areas]
LAND SUBDIVISION

The land subdivision proposed in this section is based upon:

MINIMIZATION OF:
- public ownership of land.
- lengths of infrastructure per area served.
- government services.

MAXIMIZATION OF:
- private ownership of land.
- private responsibility.

The above policy leads to a type of land subdivision called "horizontal condominiums" or "cluster" where lots are grouped around a common court. This common court serves as an access space and as a semipublic open space. This court is owned in condominium by the lots' occupants which control, share the use of, and share responsibility for the maintenance of the court.

Therefore, the blocks contain the following categories of lots:

EXTERIOR LOTS: access to public streets only.
INTERIOR LOTS: access to the semipublic court of lot cluster.
EXTERIOR-INTERIOR LOTS: access to both; the public streets as well as the semipublic court of the lot cluster.

The layout proposed in this section permits:

a) FLEXIBILITY IN LAND USES
   - residential
   - residential/commercial
   - lightindustries/industries
   - schools, playgrounds, parks

b) FLEXIBILITY IN RESIDENTIAL DENSITIES AND DWELLING TYPES WITHIN THE SAME LOT STRUCTURE
   - medium and high densities
   - detached, row, walkups, and high rise combinations

c) DIFFERENT TYPES OF CONDOMINIUMS
   - high rise and walkups: dwelling units are private ownership, with land in semiprivate ownership.
   - row and cluster: dwelling units and lot are private ownership; playground, access is semi-private.
Proposed Road A

- Proposed Road A
- Buffer area
- Main commercial avenue

SEGMENT LAYOUT

- C: Commercial
- S: School
- H: High Rise
- W: Walk-Up
- P: Neighborhood Park
HIGH RISE APARTMENTS AND COMMERCIAL
Number of stories : 15 - 20
Total dwelling units : 336
Number of parking spaces : 56 *
Land use:
- Semipublic area Ha %
  (dwelling/commercial/open area) : 3.08 81.0
- Street : 0.72 19.0
TOTAL BLOCK AREA : 3.80 100.0
Density: Number of units/block : 89 units/Ha
* 13 cars/1000 persons middle income group.
  22 cars/1000 persons high income group.

HIGH RISE/WALK-UP APARTMENTS AND COMMERCIAL
Number of stories : 15-20 or 4
Total dwelling units : 330
Number of parking spaces : 10
Land use:
- Semipublic area Ha %
  (dwelling/commercial/open area) : 2.87 83.2
- Street : 0.58 16.8
TOTAL BLOCK AREA : 3.45 100.0
Density: Number of units/block : 95 units/Ha
WALK-UP APARTMENT

Number of stories : 4
Total dwelling units : 292
Number of parking spaces : 24

Land use:
- Semipublic area (dwelling/open area) : 2.98 Ha (84.4 %)
- Street : 0.55 Ha (15.6 %)

TOTAL BLOCK AREA : 3.53 Ha (100.0 %)

Density: Number of units/block : 83 units/Ha

LOT CLUSTER

Types of housing: 1-2 stories detached/row housing
Total lots : 156

Land Use:
- Private area (lots) : 2.39 Ha (67.6 %)
- Semipublic area (condominium) : 0.58 Ha (16.4 %)
- Access/Street : 0.56 Ha (16.0 %)

TOTAL BLOCK AREA : 3.53 Ha (100.0 %)

Average Lot Area:
- Private area/No. of lot = 29700m²/156 = 190m²/lot

Density:
- Number of lots/Block : 44 lot/Ha
HOUSING

The following HOUSING UNITS systems are derived from studies of existing systems and demands (socio-economic characteristics of users, physical).

1 SERVICED LOT UNITS
   - Location: in lot clusters.
   - Provided: lot with services (water, sewage, electricity) to lot.
   - Tenure: for ownership/lease, users develop/build dwelling.
   - Dwelling uses anticipated/planned: a) family, b) family and subleting - residential and/or commercial/ small industries, c) multi-family with shared facilities.

2 TENEMENT DWELLING UNITS
   - Location: in LOTS.
   - Provided: lot with rental rooms, communal facilities (toilets, showers, cooking).
   - Tenure: for rental/lease in condominium.
   - Dwelling uses anticipated/planned: a) individuals or families subleting rooms, b) commercial/small industries, c) transient lodging.

3 SHOP/STALL DWELLING UNITS
   - Location: in LOT CLUSTERS.
   - Provided: a) lot with facilities for shops, small industries and dwellings for occupants, b) markets cluster stalls with dwellings for occupants.
   - Tenure: for ownership/rental/lease.
   - Shop uses anticipated/planned: a) markets, b) family/commercial, small industries, transient lodging, c) multi-family/commercial, small industries, transient lodging.

4 SERVICED LOT CLUSTER UNITS
   - Location: IN LOT CLUSTERS leased/bought by private developers from Linkou Terrace New Town Development Agency.
   - Administered: private developers. Lot cluster will be developed by private developers or commercial companies with options (1), (2), (3) or other options subject to approval by the Agency.
   - Provided: lot clusters with services (water, sewage, electricity) to lot cluster.
   - Tenure: for ownership/rental/lease/or other forms of tenure.
   - Dwelling uses anticipated/planned: same as (1), (2), (3).
## ALTERNATIVE HOUSING OPTIONS

<table>
<thead>
<tr>
<th>PROPOSED NUMBER OF</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWELLINGS (thousands)</td>
<td>± 40%</td>
<td>± 20%</td>
<td>± 15%</td>
<td>± 25%</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>36 - 44</td>
<td>18 - 22</td>
<td>13.5 - 16.5</td>
<td>22.5 - 27.5</td>
</tr>
</tbody>
</table>

### INCOME GROUP/TENURE OPTION

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>TENURE O=Ownership R=Rental, L=Lease</td>
<td>ORL ORL ORL</td>
<td>RL RL RL</td>
<td>R R R</td>
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</table>

### INFRASTRUCTURE PROVIDED

<table>
<thead>
<tr>
<th>FACILITIES</th>
<th>6 WATER</th>
<th>7 SEWAGE</th>
<th>8 ELECTRICITY</th>
<th>9 ACCESS</th>
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</thead>
<tbody>
<tr>
<td>PROVIDED</td>
<td>TS OS</td>
<td>TS OS</td>
<td>TS OS</td>
<td>TS OS</td>
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</table>

### PROPOSED BUILDING TYPE

<table>
<thead>
<tr>
<th>PROPOSED</th>
<th>14 DETACHED AV</th>
<th>15 ROW AV</th>
<th>16 WALK-UP AV AV</th>
<th>17 HIGH RISE AV</th>
</tr>
</thead>
</table>

### DEVELOPMENT

<table>
<thead>
<tr>
<th>DEVELOPMENT</th>
<th>18 DEVELOPED PUB</th>
<th>19 MANAGED PUB</th>
</tr>
</thead>
</table>
DEVELOPMENT PLANS

- Land use, circulation development are unable to separated.

- Maximum flexibility should be provided to facilitate the continuous process of construction, habitation, evaluation and revision.

INITIAL DEVELOPMENT
The initial developed area should be located in an area of the site that permits:
- Easiest/direct access from North-South Freeway.
- Close industrial area for convenient access to work.
- Convenient pedestrian access to public transportation or extension of public transportation.
- Maximum advantage of existing/available infrastructure and services.

The initial development should include the following:
- Land use: residential, commercial, industrial, public facilities, open areas.
- Circulation: pedestrian walkways, local streets, through streets.
- Infrastructure: primary networks.

SUBSEQUENT DEVELOPMENT
The growth is incremental towards east and south of the site.

THE PLANS:
- permits a natural progressive accretion of the different land uses, circulation, infrastructure;
- enforces/facilitates a compact development instead of a scattered development;
- maintains at any stage the consistency between land use/densities/commercial potential and intensity of circulation/activities.

STAGE I: up to 3 years
POPULATION: 28,700 to 35,200 people
CHARACTERISTIC: takes advantage of existing infrastructure and services.
CIRCULATION: proposed Road A and B are the main accesses to the developed area.
HOUSING: partial lot development with cluster, walk-up and high rise residential/commercial condominiums.
COMMERCIAL: stories, shops of adjacent areas are used.
INDUSTRIES: partial development to provide sources of employment.
PUBLIC SERVICES: 3 to 4 elementary schools (children attend nearby schools); local parks and playgrounds.
STAGE II: 4 to 6 years
POPULATION: 71,500 to 88,000 people.
CHARACTERISTIC: consolidation of areas developed in stage I and start of new.
CIRCULATION: Completion of transverse through streets and main commercial avenue which provides an utility spine and community focus.
HOUSING: completion of initial lot developments; starting of new lot developments.
COMMERCIAL: reinforcement of local and vicinal commercial.
INDUSTRIES: completion of developments to provide more sources of employment.
PUBLIC SERVICES: 5 to 6 elementary schools, 3 secondary schools, 2 high schools and one vocational school; local and public parks, playgrounds.

STAGE III: 7 to 8 years
POPULATION: 90,000 to 110,000 people.
CHARACTERISTIC: completion of development of whole site; the site is saturated and new cycle to transformation with the renovation of some areas is initiated.
CIRCULATION: completion of development of the whole networks in the site.
HOUSING: completion of the housing units in whole site.
COMMERCIAL: adjustment to demand; the main commercial avenue is expanded as required.
INDUSTRIES: no substantial changes.
PUBLIC SERVICES: 4 to 5 elementary schools, one secondary school, one vocational school; consolidation of public park system.
REFERENCES


"Linkou Special District Planning Report", Taiwan Province Linkou Special District Development Agency. Taichung, Taiwan, June 1971.


"Site Criteria and dwelling Units in Taiwan", China Urban Design Center, Taipei, April 1972.


- Linkou Terrace
- Several housing projects in Taipei City.

* C.I.E.C.D.= Council for International Economic Cooperation and Development