

# East Orange

## GENERAL PLAN

---

August, 1975

PREPARED FOR  
**East Orange Planning Committee**

James L. Christensen

Brigham Young University property

Mary Jo Elpers,

Foothill Communities Association

James Gable,

County resident

Shirley Grindle,

County Government

James A. Jackman, (Don E. Smith, Alt.)

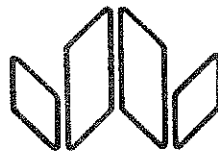
City Government

Tony McCloskey,

Occidental Land Inc.

Larry Sturgeon,

City resident



**J.L. WEBB PLANNING**

DESIGN PLAZA, 220 NEWPORT CENTER DRIVE, SUITE 22  
NEWPORT BEACH, CALIFORNIA 92660 (714) 644-7355

CREDITS

G.A. NICOLL AND ASSOCIATES

GEOLOGY

DR. PHILIP W. RUNDEL AND ASSOCIATES

BIOLOGICAL RESOURCES

WILLIAM G. CHURCH ENGINEERS

ENGINEERING & SERVICE SYSTEMS

HERMAN KIMMEL AND ASSOCIATES

TRAFFIC & CIRCULATION

---

---

SPECIAL APPRECIATION IS EXTENDED TO:

THE CITY OF ORANGE

Especially JERE MURPHY

THE COUNTY OF ORANGE

Especially RICHARD BAILEY

THE RESIDENTS AND LANDOWNERS OF EAST ORANGE

# TABLE OF CONTENTS

	<u>PAGE</u>
I. <u>INTRODUCTION</u>	
II. <u>EXISTING CONDITIONS</u>	
A. <u>PHYSICAL ENVIRONMENT</u> .....	7
1. Climate and Air Quality .....	7
2. Physiography .....	8
3. Geology and Soils .....	14
4. Biological Resources .....	26
5. Cultural/Scientific .....	42
B. <u>SOCIO-ECONOMIC ENVIRONMENT</u> .....	43
1. Population .....	43
2. Housing .....	48
3. Cost/Revenue Analysis .....	50
4. Education .....	52
5. Service Systems .....	53
6. Community Activities .....	58
C. <u>CURRENT PLANNING FACTORS</u> .....	59
1. Existing Land Use .....	59
2. Existing Land Ownership .....	63
3. Image Analysis .....	67
4. Existing Zoning .....	69
5. Existing Circulation .....	73
6. Governmental Jurisdictions .....	76
7. Currently Adopted Plans and Policies .....	77
III. <u>ALTERNATIVE CONCEPT PLANS</u>	
A. <u>ALTERNATIVE LAND USE PLAN DESCRIPTIONS</u> ...	81
B. <u>COMMUNITY INPUT</u> .....	88
C. <u>CIRCULATION ALTERNATIVES AND EVALUATION</u> ..	92
D. <u>SUMMARY OF ALTERNATIVE PLANS</u> .....	103
IV. <u>PROPOSED PLAN</u>	
A. <u>LAND USE</u> .....	107
B. <u>OPEN SPACE</u> .....	110
C. <u>EDUCATION</u> .....	112
D. <u>CIRCULATION</u> .....	114
E. <u>TRAIL SYSTEM</u> .....	117
F. <u>PROPOSED PLAN EVALUATION</u> .....	118
G. <u>GOALS, OBJECTIVES AND POLICIES</u> .....	121
H. <u>IMPLEMENTATION</u> .....	137
V. <u>APPENDIX</u>	

LIST OF EXHIBITS

<u>NO.</u>		<u>PAGE</u>
1.	VICINITY MAP .....	2
2.	GOVERNMENTAL JURISDICTIONS - STUDY AREA BOUNDARY .....	3
3.	PLANNING SECTORS .....	6
4.	LAND FORMS .....	9
5.	SLOPE ANALYSIS .....	11
6.	VIEW ANALYSIS .....	13
7.	GEOLOGY .....	19
8.	VEGETATION .....	28
9.	CENSUS TRACTS .....	44
10.	DRAINAGE .....	57
11.	EXISTING LAND USE .....	60
12.	LAND OWNERSHIP .....	64
13.	IMAGE ANALYSIS .....	68
14.	EXISTING ZONING .....	70
15.	MASTER PLAN OF ARTERIALS .....	75
16.	EXISTING GENERAL PLAN - CITY .....	78
17.	EXISTING GENERAL PLAN - COUNTY .....	79
18.	PROPOSED TRAILS .....	80
19.	ALTERNATIVE "A" .....	82
20.	ALTERNATIVE "B" .....	83
21.	ALTERNATIVE "C" (INCLUDING C') .....	85
22.	ALTERNATIVE "D" .....	87
23.	CIRCULATION NETWORK ALTERNATIVES/PROJECTIONS	
	23 a. ALTERNATIVE 1 .....	96
	23 b. ALTERNATIVE 2 .....	97
	23 c. ALTERNATIVE 3 .....	99
	23 d. TRAFFIC PROJECTION WITHOUT FUTURE DEVELOPMENT .....	102
24.	PROPOSED GENERAL PLAN .....	108
25.	RURAL ROAD SECTIONS .....	116
26.	SUGGESTED LAND USE WEST OF STUDY AREA .....	140



LIST OF TABLES

<u>NO.</u>		<u>PAGE</u>
1.	SLOPE ANALYSIS .....	10
2.	ESTIMATED POPULATION CHARACTERISTICS .....	43
3.	ESTIMATED FAMILY COMPOSITION AND ESTIMATED STUDENT POPULATION CHARACTERISTICS .....	45
4.	HOUSEHOLD INCOME CHARACTERISTICS .....	46
5.	ESTIMATED LABOR FORCE CHARACTERISTICS .....	47
6.	ESTIMATED COST/REVENUE ANALYSIS .....	51
7.	EXISTING LAND USE .....	61
8.	LAND OWNERSHIP AND SUMMARY .....	65
9.	EXISTING ZONING .....	71
10.	POTENTIAL DENSITY UNDER CURRENT ZONING .....	72
11.	ALTERNATIVE CONCEPT PLANS QUANTITATIVE EVALUATION SUMMARY .....	105
12.	ALTERNATIVE CONCEPT PLANS QUALITATIVE EVALUATION .....	106
13.	PROPOSED PLAN - QUANTITATIVE ANALYSIS .....	118
14.	PROPOSED PLAN - QUANTITATIVE EVALUATION SUMMARY .....	119
15.	PROPOSED PLAN - QUALITATIVE EVALUATION .....	120



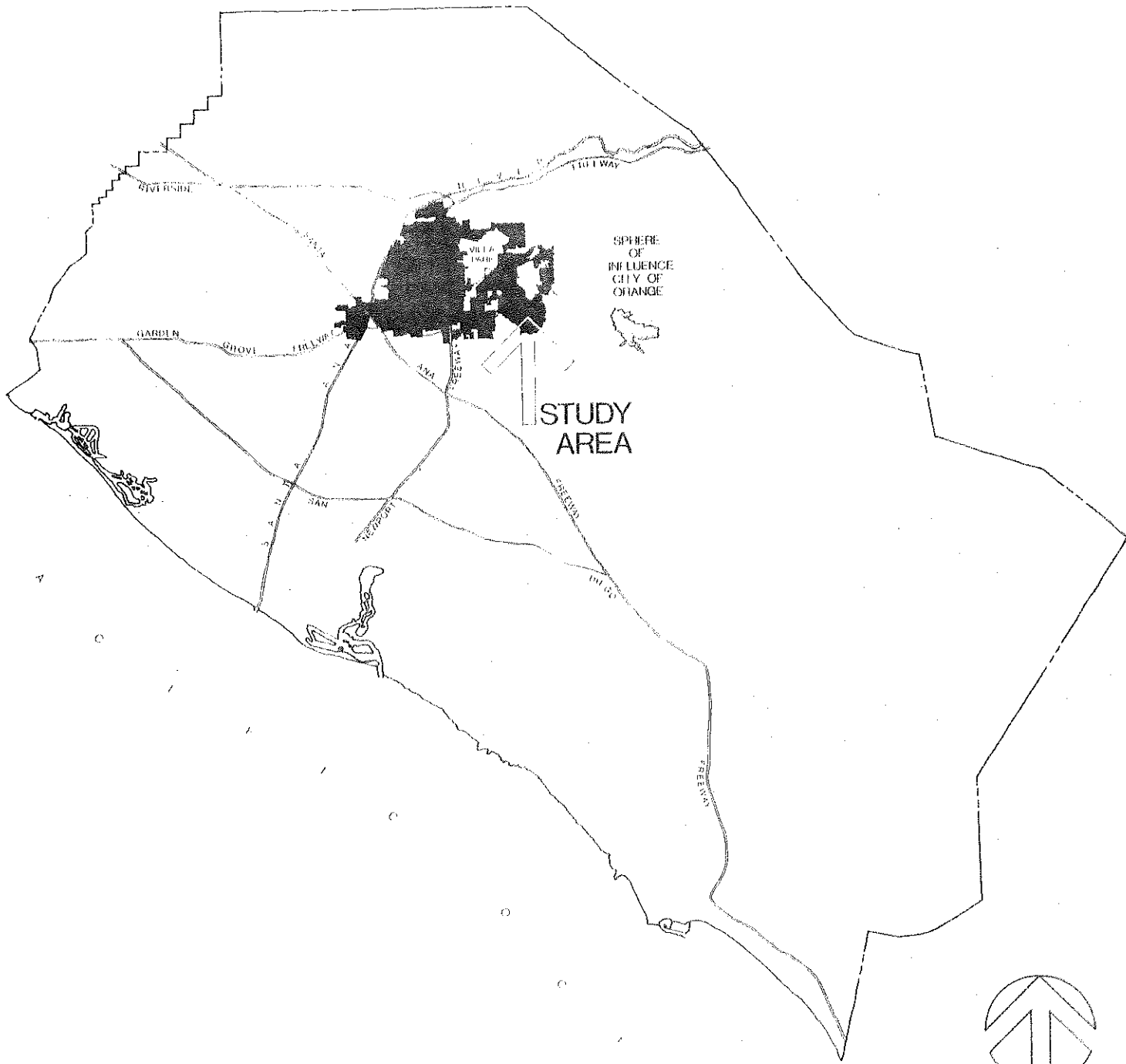
# INTRODUCTION

## LOCATION

The East Orange Study Area consists of approximately 1900 acres of diverse terrain situated at the western periphery of the foothills of the Santa Ana Mountains. East Orange is located south of the Peralta Hills and north of the Tustin Plain. Immediately south of and adjacent to Santiago Creek, the Study Area is approximately two and one-half miles east of the Newport Freeway (see Vicinity Map, Exhibit #1). A portion of the Study Area is within the City of Orange. The majority of the site is in the unincorporated area of the County of Orange as shown in Exhibit #2 (Governmental Jurisdictions). Boundaries for the Study Area were identified by the East Orange Planning Committee and include Santiago Creek to the north, Orange Park Acres to the east, Crawford Canyon and Newport Boulevard to the south and the existing development of El Modena to the west. Specific locations of this boundary are shown also in Exhibit #2.

## BACKGROUND

As a result of concern held by residents, property owners, land developers and government jurisdictions as to the most appropriate future development patterns for the East Orange Area, it was determined that a General Plan of development should be prepared which would identify goals, objectives and recommended land uses. As a result, in September of 1974 the "East Orange Study Planning Committee" was created to oversee the preparation of a General Plan for the area known as East Orange. The Committee comprised of representatives of the City of Orange, the County of Orange, residents, major property owners/developers and representatives of homeowners associations chose to retain the consultant services of J.L. Webb Planning to prepare the "East Orange General Plan".

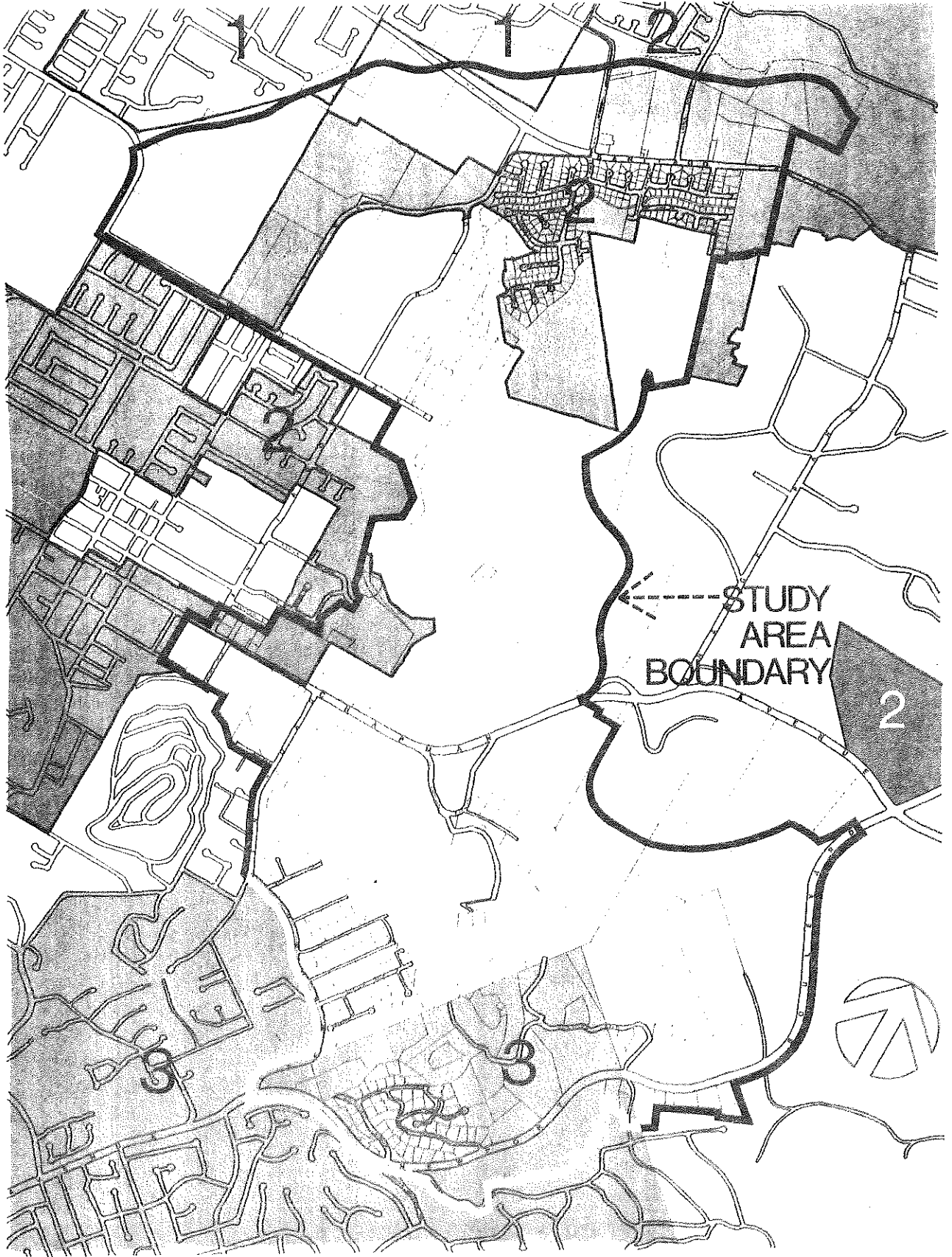


# East Orange

VICINITY MAP



J.I. WEBB PLANNING  
7000' 0" 14000'



# East Orange

## Governmental Jurisdictions

- 1 City of Mill Park
- 2 City of Orange - Orange United School District
- 3 Hudson District School District



## SCOPE

The preparation of a general plan for East Orange involved the investigation, analysis and documentation of the area's physical, social and economic characteristics. Also, identified was the current planning status of the East Orange Area.

The second major phase of the plan preparation process included the formulation of goals and objectives for the Area based upon community input as well as knowledge of the Area gained from the research conducted on existing conditions. The establishment of goals and objectives for the East Orange Area served as a basis for the development of alternative concept plans.

Stage three of the plan preparation process entailed the evaluation of each of the alternative concept plans by local residents and property owners as well as members of the "East Orange Study Planning Committee". Additionally, the alternative concept plans were presented to staff members of the City and County of Orange to obtain their input.

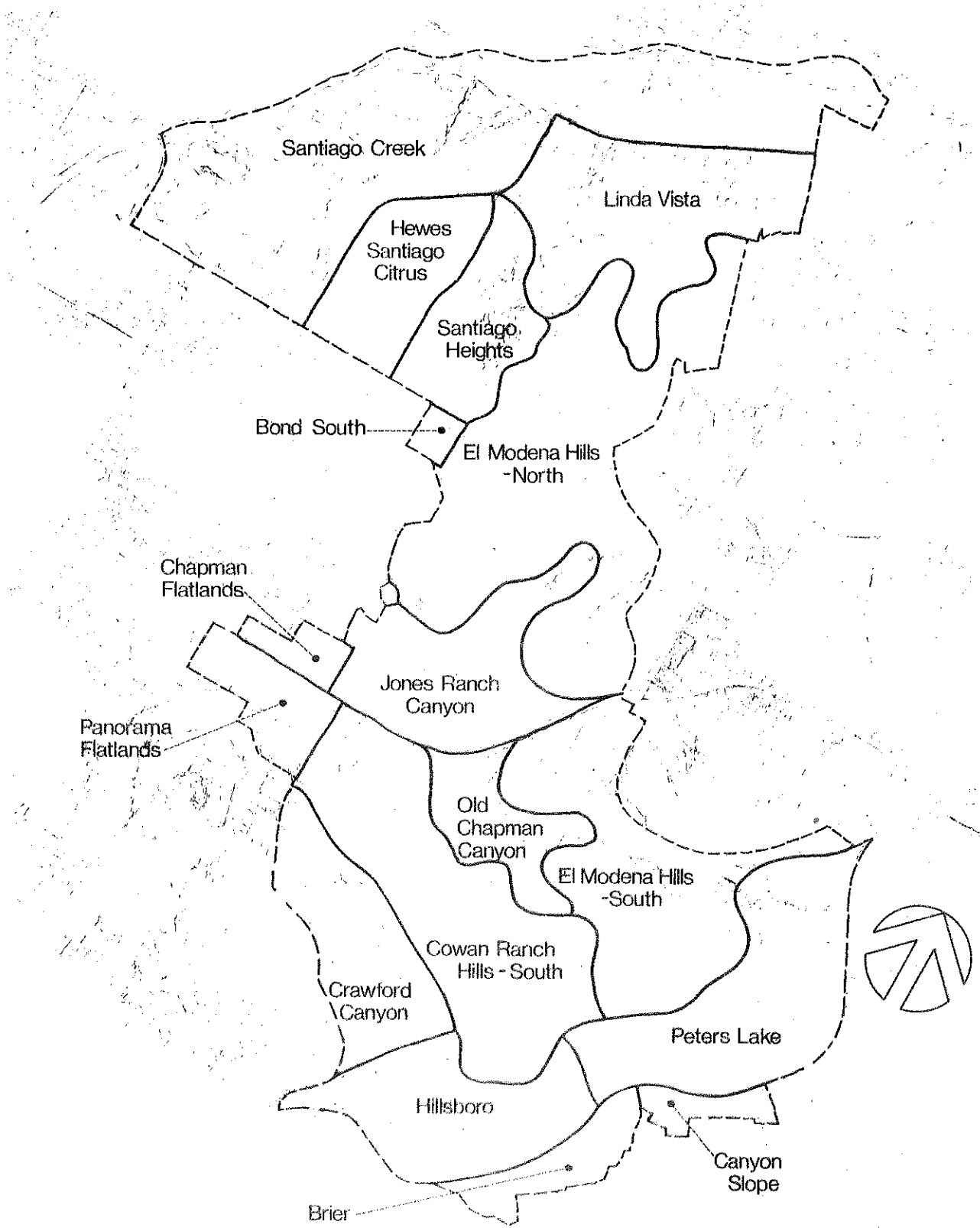
The final major step involved in the plan preparation process was the development of a proposed plan for East Orange. The proposed General Plan includes some of the best qualities of each of the alternatives.

## PLANNING SECTORS

In order to provide for an in-depth planning analysis of the project area, it was deemed appropriate to divide the project area into seventeen planning sectors. The planning sectors were delineated on the basis of a common characteristic such as topography, land use or density level. The Planning Sectors are displayed in Exhibit # 3 (Planning Sectors).

Division of the project area into planning sectors served to identify areas of common opportunities and constraints. Common qualities of the planning sectors provided a basis for the evaluation of alternative land uses for each sector. Additionally, land use proposals for the planning sectors were examined on the basis of their compatibility with existing conditions both within and immediately adjacent to the project area.









# EXISTING CONDITIONS

## PHYSICAL ENVIRONMENT

### CLIMATE AND AIR QUALITY

The East Orange Study Area is situated at the western periphery of the Santa Ana Mountains Thermal Belt Temperature Zone. This temperature zone is characterized by a relatively large seasonal temperature variation with only moderate ocean influence. Summer temperatures may reach 100° with peak averages of about 73°, while winter low temperatures of near 20° have been recorded for the Area. Average precipitation is approximately 15 inches per year. Winds in the area are generally moderate with the most prevalent wind patterns being the light sea-land breeze conditions. Mean hourly wind speed for the area is six (6) mph. The historic Santa Ana wind conditions occur less frequently with much higher velocity and in the opposite direction of the typical breezes. Frost and fog are also typical for this Area within Orange County. Microclimate conditions in East Orange have long been considered desirable for general agricultural production and ideal for citrus cultivation.

Air quality levels for East Orange were identified based upon measurements made at the County of Orange Air Monitoring Station in Anaheim, approximately six miles due west of the Study Area. It is not believed that air quality in East Orange differs significantly from air quality in surrounding, nearby areas of Orange County. Major pollution categories evident within the Project Area include photochemical oxidants, nitrogen oxide and carbon monoxide. All three of these types of pollutants are attributable in large part to vehicle emissions. Two other pollutant categories in East Orange include particulate matter and lead

particulate. Of these two, the former, perhaps, is of more significance in East Orange. A significant correlation has been established between the extraction and processing of minerals and the emission of particulate matter. At present, approximately 15 percent of the land in the East Orange Study Area is devoted to mineral extraction.

The Appendix of this Report contains Federal and State Ambient Air Quality Standards and days exceeded for the 1974 calendar year.

## PHYSIOGRAPHY

### Landforms/Topography

The project area is characterized by three major landforms including the North and South El Modena Hills, the excavated areas of sand and gravel extraction and the peripheral flatland-foothill areas. Local surface features are generally depicted in Exhibit #4 (Landforms).

The North and South El Modena Hills are the most conspicuous landforms in the project area. The North El Modena Hills (north of Chapman Avenue) are oriented to a north-south direction, while the South El Modena Hills (south of Chapman Avenue) follow a northwest-southeast and east-west trend. Prominent from within and outside of the study area, the El Modena Hills exhibit great diversity in surface configuration and elevation. Elevations vary from 300<sup>+</sup> feet to over 900<sup>+</sup> feet.

The second major landform category includes the mineral excavation area immediately adjacent to Santiago Creek. The sand and gravel area, much of which is topographically depressed below the flatland



East  
Orange

Land Forms



4

foothill sections of the project area, stands in sharp contrast to the nearby Northern El Modena Hills. The excavated creek area also differs from other landform categories in the project area because of the extent to which it has been modified by man through mineral extraction resulting in large pit areas along Santiago Creek.

The final category includes those landforms not previously covered and consists of the flatland areas and areas of gentle slope immediately adjacent to the North and South El Modena Hills.

### Slope Analysis

Major slope characteristics are illustrated in Exhibit #5. The following chart indicates the slope categories identified in the Slope Analysis.

TABLE # 1

SLOPE CATEGORY	ACREAGE ESTIMATE	% OF TOTAL AREA
0-10%	850 <sup>±</sup> Acres	45%
10-40%	550 <sup>±</sup> Acres	29%
40 <sup>+</sup> %	500 <sup>±</sup> Acres	26%
TOTAL	1900 <sup>±</sup> Acres	

Areas of smooth terrain features with less than 10 percent slope are found in the periphery of the project Study Area. The areas of very steep slopes of 40 percent-plus include those natural slopes in the El Modena Hills and some near vertical man-made slopes in the sand and gravel excavation area. As can be seen from Table #1, approximately 26 percent of the project area is in the 40 percent or greater slope category. The 40 percent slope is depicted for this area because of the natural break in slope from the surrounding flatter areas to the more abrupt steep slope of 40 percent and greater.



# East Orange

## Slope Analysis

□ Flat    ▨ 1-10%    ■ 10% and Above



### View Analysis

View orientations in East Orange have been grouped into seven basic categories. These include vistas of central Orange County to the west, Villa Park, Santiago Creek and nearby hill and mountain areas to the north, as well as Peters Canyon and the Santa Ana Mountains to the east. Views with the more immediate vicinity as their focus include those oriented to Cowan Heights, the Crawford Canyon Road area and canyons, ridgelines and hills within the project area.

Views from the project area are in many cases impressive not only because of the height of the view location but also because of the sharp difference in elevation of adjacent areas especially those to the west.

Currently, there is one scenic vista point in the project area located immediately north of Chapman Avenue along the El Modena Grade.

The primary view orientation is west along Chapman Avenue to the urbanized portion of the County.

Exhibit #6 (View Analysis) depicts the categories of view along with the general direction of view indicated by the arrows within each area.

# East Orange

## View Analysis

- 1. General City
- 2. Garbancito Cdr. / Mills Park
- 3. Garbancito Cdr. / Ind. Mfg.

- 4. Cozen Heights
- 5. Local City / Del. Villes
- 6. Eastern City
- 7. Long/West/O.C.





## GEOLOGY AND SOILS

### PURPOSE

The purpose of this investigation was to evaluate the general geologic and soil conditions of the site and present development parameters for optimum land use. Specifically, the purpose was to evaluate information as it pertains to the following:

- Future Development Areas
- Geologic Conditions
- Soil Engineering Conditions
- Slope Stability
- Mineral and Water Resources

### SCOPE

The scope of work performed during this investigation included:

1. Review of pertinent published and unpublished geologic maps and reports by the United States Geological Survey and the California Division of Mines and Geology.
2. Examination of aerial photographs, dated June, 1974
3. Geologic site reconnaissance and mapping of some surface exposures.
4. Preparation of a Geologic Map
5. Preparation of Geology Report

### PREVIOUS WORK

The following published reports and maps were reviewed during this investigation:

1. "Geo-Environmental Maps of Orange County, California," 1973: California Division of Mines and Geology, Preliminary Report 15.
2. "Geologic Map of the Northern Santa Ana Mountains, Orange and Riverside Counties, California," 1954: United States Geological Survey Oil and Gas Investigation Map OM 154.

3. Volcanic Rocks of the El Modeno Area, Orange County, California, 1957: United States Geological Survey Professional Paper 274-L.
4. "State of California Preliminary Fault and Geologic Map," 1973, California Division of Mines and Geology Preliminary Report 13.
5. Crustal Strain and Fault Movement Investigation, 1964: California Department of Water Resources Bulletin 116-2.

#### LOCATION AND SITE DESCRIPTION

The East Orange Planning Area encompasses approximately 1900<sup>±</sup> acres in northeastern Orange County. Topographically, the site consists of a central core of moderate to steep hilly terrain surrounded by gently sloping ground. Elevations above sea level range from 310 feet to 930 feet. The physiographic features are best described on the United States Geologic Survey, Orange Quadrangle, topographic map.

Man-made features are largely confined to the perimeter of the study area and are comprised of roads, ranch buildings, residences, citrus groves, reservoirs and accompanying irrigation systems. Santiago Canyon Road crosses the northern portion, Chapman Avenue crosses the central portion of the project area and Newport Boulevard crosses the southern portion, all generally in an east-west direction.

## GEOLOGY

### Regional Setting

#### 1. Geologic History

The project area is located in the low foothills on the western flank of the Santa Ana Mountains near the margin of the Los Angeles Basin. The Santa Ana Mountains lie in the northern portion of the Peninsular Range Geomorphic Province.

The Los Angeles Basin is a broad down-warped area in the earth's crust, which was formed in mid-Miocene time, approximately 20 million years ago. The basin was subsequently filled with sediments deposited in the marine environment. The volcanic rocks exposed in the El Modena area were deposited in the eastern portion of the basin in late Miocene time with sedimentary rocks both underlying and overlying the volcanic sequence.

#### 2. Regional Structure

Subsequent to the deposition of the sedimentary rocks and the volcanic activity, the margins of the Los Angeles basin (including the El Modena Area) was subjected to extensive deformation (faulting and folding).

The dominate structural features of this portion of the Santa Ana Mountains are numerous small fault blocks which have brought sedimentary and volcanic rocks into the areal contact with each other. Folds in this area are not readily discernable due to the extensive faulting.

3. Seismicity

Seismic hazards within the subject project can be attributable to ground shaking as a result of an earthquake epicentered on a nearby fault. Ground rupturing within the site is not considered likely. The Whittier-Elsinore, Newport-Inglewood and the San Andreas Fault Zones have the potential for causing the greatest ground acceleration at the project area. The El Modena Fault which lies to the north of the project area has evidence of quaternary displacement exposed at several Sand and Gravel Extraction sites.

The site lies at the following distances from the major active faults in Southern California (after C.F. Richter):

<u>Faults</u>	<u>Distance</u>
Whittier-Elsinore	8 Miles NE
Newport-Inglewood (offshore projection)	14 Miles SE
San Jacinto	34 Miles NE
San Andreas	38 Miles NE
San Fernando	52 Miles NW

El Modena and the nearby Norwalk Faults are not established as notoriously active, certainly not by surficial geologic affects; in fact, the published record is somewhat weak as to the position and continuity of both faults. Nevertheless, consideration should be given to probable activity along both faults.

The effects of an earthquake at any given point are governed by the magnitude of the earthquake, the distance from the epicenter and the local site conditions. Areas of bedrock generally have considerably less destructive ground shaking than loose, water-saturated fill or alluvium which would be subject to liquefaction or differential compaction.

Anticipated earthquake intensities at the site do not necessitate design for seismic loading except for such critical structures as large dams, high-rise buildings and public facilities.

#### Project Area Geology (See Exhibit # 7)

The planning area is underlain by sedimentary rocks of the Sespe, Vaqueros, Topanga and Puente Formations and volcanic rocks of the El Modena Volcanics. A brief description of the rock units follows:

Sespe/Vaqueros Formation (Tvs)\* - The Sespe/Vaqueros Formation (sedimentary rock) is comprised of brown, massive, partially cemented Sandstone and Conglomerate. In the project area this bedrock unit occurs in the southern end of the planning area.

Topanga Formation (Tt)\* - Brown Sandstone, Siltstone and lime Siltstone, sedimentary rock. Occurrence of this unit within the project area is limited to the extreme southern end of the study area.



# East Orange

## Geology

- Man Made Fill
- Alluvium
- Tertiary Deposition
- Middle Miocene
- Coastal Plain
- Tertiary Formation
- Quaternary Formation
- Fault
- Contact
- Downthrown
- Upthrown



Puente Formation, La Vida Member (Tplv)\*

Siltstone with local lenses of Sandstone and Conglomerate sedimentary rock. This unit is exposed in two areas in the northern portion of the Study area.

El Modena Volcanics (Tem)\* – Volcanic rocks of various compositions including andesite flows, flow breccias, tuff breccias and basalt flows. Fifty percent of the Study area is underlain by these volcanic rocks which are generally located in the central northwest trending core of the planning area.

Terrace Deposits (Qt)\* – Sand, Gravel and Silt. These deposits are exposed on the north, west and east margin of the foothill area within the project boundaries.

Alluvium (Qal)\* – Sand, Gravel and Silt. The distribution of the alluvium as well as the terrace deposits is generally confined to the flood plain limits of Santiago Creek.

\* Map Symbols

The dominate structural feature of this area is that of tilted fault blocks which bring older sedimentary rocks in contact with the younger volcanic rocks. Also, the central core of volcanic rocks are extensively faulted. Folding of the sedimentary bedrock has generally been obliterated by the faulting previously mentioned. Few landslide areas have been mapped within the Topanga Formation in the southern portion of this project. Although faults and fractures were observed on the site, no evidence was found to indicate the presence

of active faults within the Study area. Bedding planes within the bedrock are generally indistinct due to the massive and/or poorly bedded nature of the units.

The static groundwater level is approximately 50 to 200 feet below the surface in the alluvial and stream terrace areas. Surface water generally flows in Santiago Creek and its tributaries during the winter and spring.

### SLOPE STABILITY

The Study area is generally free of ancient landslides with the exception of several locations in the southern portion of the project. A major portion of the hillside area is underlain by volcanic rocks which are very stable and not prone to landsliding. The areas of instability do not appear to preclude development of the entire site, although special consideration will have to be given to the unstable areas during the design stage of future developments.

The major problem within the hillside areas is not instability but one of hard rock which may require blasting if extensive excavations are required. It has been our experience that the volcanic rocks may be excavated to a depth of 15 to 25 feet below the existing ground surface. Excavations which extend below this level will generally require blasting.

Soil creep is not a major problem within the Study area; although, specific occurrences of deep soil horizons in the hillside areas have been sighted and should be investigated to determine the soils' stability. Zones of soil creep generally occur on the intermediate slopes where soil accumulation is the greatest. All slope areas



greater than 5:1 are susceptible to soil creep and should receive further investigation prior to any development in these areas.

Numerous man-made slopes have been developed along the Santiago Creek as the result of sand and gravel extraction. Some of these slopes have been constructed at a slope ratio of 1 1/2 : 1 (horizontal: vertical) while others have been left near vertical. The stability of these slopes, some of which are 120 feet high, must be considered on an individual basis due to the variable condition of the soil deposits and the depth to the groundwater table.

#### FOUNDATION ENGINEERING CONDITIONS

Expansive soil conditions exist in the soils throughout the Study Area and where these problem areas are present, specialized grading techniques or foundation treatment will be required to control uplift characteristics of these materials. Settlement due to structural loading within areas underlain by compressible materials such as thick topsoil, alluvium and/or terrace deposits is a potential problem within the lower elevations of the project area. This condition should be addressed in a foundation engineering report for specific development plans.

#### NATURAL RESOURCES

Construction materials including sand and gravel are the only known natural resources of the project area. Essentially, all soil and rock deposits are suitable for use as compacted fill. Rip rap is a possible use for the volcanic rock which may be derived from excavations within the hillside areas of the Study Area.

## SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

### General

The soil and geologic conditions of the East Orange Planning Area are similar to other previously developed subdivisions in the foothills of the Santa Ana Mountains. It is the opinion of the geologist that the site will be suitable for the planned community (residential and commercial) use. The following summary of favorable conditions and constraints should be incorporated in future preliminary and design stages of the project development.

### Favorable Conditions:

1. There are no known active faults nor are there major prehistoric faults which would indicate potential ground rupture during the lifetime of the proposed development.
2. There are very few major areas of slope instability which would affect future development.
3. There is no extreme groundwater condition which would preclude development throughout the majority of the site.
4. High bearing capacity bedrock materials are available for foundation support at relatively shallow depths within the hillside areas.
5. Essentially, all site soils (alluvium, terrace deposits and sedimentary rocks) are suitable to serve as compacted fill for earth embankments.

Constraints:

1. Excavating characteristics of the volcanic rocks underlying much of the hillside terrain, within the planning area, may require limiting the amount of grading or the use of blasting techniques to remove the rock materials.
2. Soil compressibility in areas of thick alluvium and shallow slide debris is a potential medium to high cost development item in several areas.

Placement of compacted fill in advance of construction in sufficient time may allow for precompression of the alluvial soils. Many other types of treatment are possible which would alleviate the consequential aspects of soil compressibility.

3. The control of surface and subsurface water is a conventional factor in successful hillside residential development and must be considered throughout the area.

The available information indicates that these conditions are acceptable with respect to their requirements as compared to other areas.

4. The presence of shallow soils subject to creep and shallow slope instability will require individual attention to assure that such potential slope instability does not adversely influence future construction.
5. Problem expansive soil conditions present in some of the soil and rock units throughout the East Orange Planning Area will require local specialized grading techniques or foundation treatment to control the uplift characteristics of these materials.

6. The stability of the slopes associated with the sand and gravel extraction within Santiago Creek should be evaluated on an individual basis. When evaluating the stability of these slopes, consideration should be given to seismic loading as a result of an earthquake on a nearby active fault.

7. Grading of the property will require construction of temporary ponds to control winter storm runoff and precautions for dust control to assure minimum disturbance of existing residents. This can best be achieved by following these general guidelines.

Proper care and design during the grading phase of construction should be used to control erosion. Dust control can be alleviated by irrigation in cut areas, drilling water supply holes in cut areas, water-truck watering of all roads and water-truck spraying of fill areas.

8. When considering specific projects, an engineering geologist and soil engineer should be retained to evaluate conditions which may affect a particular site within the planning area.

## BIOLOGICAL RESOURCES

### REGIONAL SIGNIFICANCE OF BIOTA

The original vegetation of the East Orange area before the advent of western man was clearly dominated by coastal sage scrub communities with riparian vegetation along Santiago Creek. Today, however, much of the original vegetation structure has been altered by human activities, as described later in this section. From a regional standpoint, present biotic communities of East Orange do not represent outstanding habitats in comparison to other areas of Orange County. Nevertheless, the extensive open space and existing biotic community structure provides important wildlife habitats. Limited recreational development of equestrian and hiking trails can occur without endangering these habitats. Extensive urbanization of the area, however, will dramatically alter natural ecological communities.

No rare or endangered species of animals or plants were encountered in the course of this study. The White-tailed kite, an endangered and protected bird, has been observed to rest in the adjacent Orange Park Acres area in the past, however. During the late 1930's and early 1940's these birds were considered on the verge of extinction, but they have become more abundant in recent years. White-tailed kites in Orange County typically nest in orange groves and hunt Microtus californicus (meadow vole) and Mus musculus (house mice) in adjacent grassy fields. It is probable that these birds have used portions of the East Orange area for hunting in the past.

## DESCRIPTION OF BIOTIC COMMUNITIES - PLANT COMMUNITIES

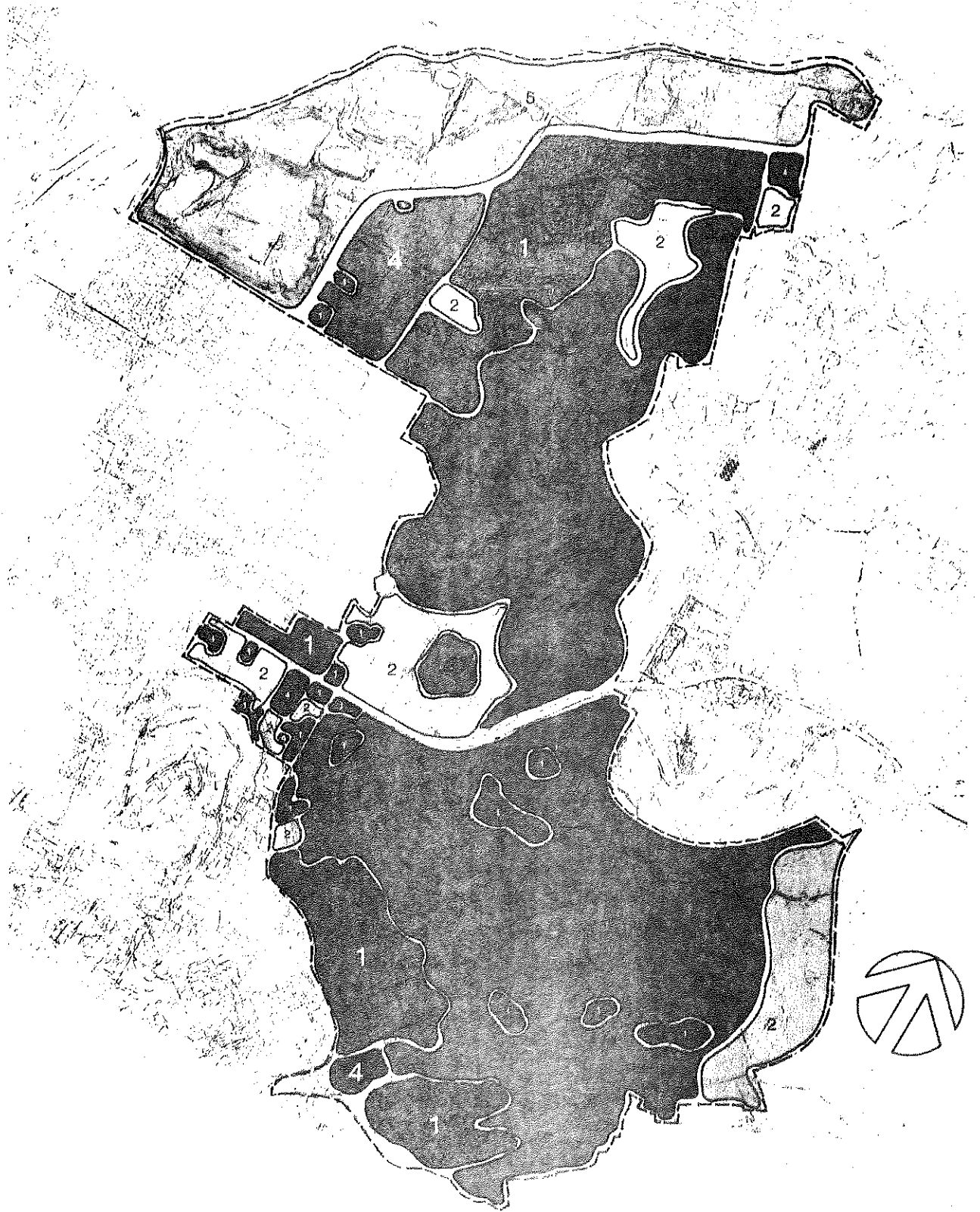
(See Exhibit #8 - Vegetation)

### Coastal Sage Scrub Communities

The vegetation of hillsides in the East Orange area is a mosaic of coastal sage scrub and grassland communities. This mosaic is determined in part by changes in soil substrate from shallow rocky soils to deeper soils. Past grazing and fire history has also been a strong determining factor. Grazing favors the expansion of weedy European annual species of grasses over native species. Although there is no present evidence of significant grazing in the areas examined, grazing activity has clearly taken place in the past. The extensive replacement of woody shrubs by California sagebrush (Artemisia californica) and prickly pear (Opuntia "occidentalis") is indicative of the previous grazing pressure. Both of the species are highly resistant to large herbivore grazing pressure, the former by chemical defense and the latter by morphological defense.






Local evidence of at least small fires can be seen on the hillsides. Biological evidence, however, indicates that there has been no recent geographically extensive fires. Opuntia "occidentalis", a fire intolerant species in its early stages, is rapidly expanding its range on the hillsides with young seedlings common. One relatively recent fire of 1 -- 2 acres in size occurred on the ridgetop above Meads Avenue. This area is recovering rapidly, although the species composition is changing with deciduous low shrubs replacing some of the previously existing evergreen woody shrubs. No significant erosion due to the fire effects has occurred.

The coastal sage scrub communities are dominated by Artemisia



# East Orange

## Vegetation

-  Developed Areas
-  Grassland
-  Coastal Sage Scrub-Grassland Mosaics
-  Citrus
-  Sand & Gravel Area



californica (coastal sagebrush), Eriogonum fasciculatum (wild buckwheat) and scattered large individuals of Rhus laurina (laurel sumac). Slavia mellifera (black sage) and Opuntia "occidentalis" are both common and dominate local areas. Other shrubs frequently present are Sambucus mexicana (elderberry), Encelia californica (California encelia), Galium angustifolium (bedstraw), Salvia apiana (white sage), Diplacus aurianticus (bush monkey-flower), Opuntia prolifera (cholla), Lotus scoparius (deerweed), Heteromeles arbutifolia (toyon) and Rhus integrifolia (lemonadeberry). Two succulents, Dudleya pulverulenta and D. lanceolata are present on exposed rock substrates. All of these shrubs occur in a matrix of annual species, most notably introduced species of grasses of the genera Bromus and Avena and wild mustard, Brassica campestris.

During the spring of 1975, a number of native species of annuals and herbaceous perennials provided good shows of color in the coastal sage scrub communities. Particularly noteworthy are extensive stands of Phacelia hispida (caterpillar phacelia), providing large expanses of lavender flowers. Two smaller purple species of Phacelia are also present. Other showy and common species in this group include Brodiaea pulchella (blue dicks), Bloomeria crocata (golden bloomeria), Allium sp. (wild onion), Sisyrinchium bellum (blue-eyed grass), Cryptantha intermedia, Plagiobothrys sp. (popcorn flower), convolvulus cyclostegius (morning glory), Lupinus spp. (lupines), Orthocarpus purpurescens (owls clover), Castilleja affinis (Indian paint brush) and Eschscholzia californica (California poppy). Other prominent annuals and herbaceous perennials undoubtedly occur earlier or later in the season or during wetter years, but have not been observed in the course of this study.



Although no extensive area of truly pristine coastal sage scrub community was observed in East Orange, several portions of the region do have well-developed community structure. The majority of such sites lie on steep slopes where grazing pressure and other disturbance from human activities has been minimal. These sites can be identified by the low percentage of grasses and other herbaceous species in the communities and by the relatively low dominance of Artemisia californica and Oputia "occidentalis" with respect to other shrub species. Perhaps the best development of existing coastal sage scrub communities occurs on steep south-facing slopes in the undeveloped portions of the Cowan Heights area. Adjacent dry creek channels also support diverse communities along their steep rock margins, as above Daniger Road.

Small stands of good coastal sage scrub communities occur scattered throughout the El Modena Hills, usually restricted to the steeper slopes. Locally, the dominance of individual shrub species may change considerably.

#### Riparian Communities

With the exception of the highly disturbed Santiago Creek, permanent water supplies do not appear to exist in natural drainage channels in the East Orange area. For this reason there is no true development of the type of riparian communities typical of other areas of the County. The lack of such communities has considerable influence on wildlife diversity as described later in this section.

Despite the lack of true riparian communities, a few individual plant species typical of such habitats are present in the area. A small number of Quercus agrifolia (coast live oak) are growing along a dry

creek bed in the central portion of the undeveloped Cowan Heights and other individuals may occur occasionally in other similar sites. Juglans californica (California walnut) an uncommon riparian tree species, has been reported from the area but was not observed in this field work.

Isolated small stands of riparian species can still be seen within the gravel-pit operations along Santiago Creek. These appear to be secondary re-establishment of these species rather than untouched segments of the original communities. Most of these species are notable for vegetative reproduction by resprouting following disturbance. Species observed include: Salix (willow), Baccharis viminea (mule-fat), Artemisia douglasiana (mugwort) and Typha latifolia (cat-tail).

#### Grassy Slopes and Valleys

Grassy areas are overwhelmingly dominated by species of introduced European weeds. Species of Bromus (brome grass) and Brassica (wild mustard) are dominant, but mixtures of a dozen or more other introduced weeds are generally present in any local area. These include Avena (wild oats), Centaureum (star thistle), Picris (bristly oxtongue), Sonchus (sow thistle), Conium (poison hemlock), Marrubium (horehound), Melilotus (yellow melilot) and Cirsium (thistle). Native species evident during the summer months include Hemizonia (spikeweed), Holocarpha (tarweed) and Stephanomeria. The presence of relict individuals of the shrub species described previously for areas of coastal sage scrub indicates that much of this grassland area was once dominated by a shrub community.

The dominance of individual species of grasses and herbaceous plants may vary considerably between years. The pattern of rains in the

late winter and spring of 1975 produced unusual growth of wild mustards with individual plants reaching up to eight feet in height. In other years the grasses on these same slopes would be more dominant. Moister soils of valley bottoms often support almost pure stands of poison hemlock or horehound.

Areas of grassland on the slopes can be expected to slowly follow a successional pattern leading to a coastal sage scrub community if they are kept free of anthropogenic disturbance.

#### Wasteplaces

Roadsides, abandoned agricultural areas and other disturbed sites support open assemblages of weedy species, primarily introduced European annuals. Such habitats are widespread throughout the East Orange area and predominate around the gravel pit operations on Santiago Creek. Few native species are significant.

Important species are typically Bromus spp. (brome grasses), Cynodon dactylon (Bermuda grass), Sonchus spp. (sow thistle), Malva parviflora (cheeseweed), Eremocarpus setigerus (doveweed), Picris echinoides (bristly oxtongue), Salsola kali (Russian thistle), Foeniculum vulgare (fennel), Conium maculatum (poison hemlock), Melilotus indicus (yellow melilot), Brassica spp. (wild mustard) and Erodium spp. (storksbill).

## DESCRIPTION OF BIOTIC COMMUNITIES

### VERTEBRATE POPULATIONS

Intensive field observations of the vertebrate fauna of East Orange were carried out during the daylight hours on three separate days during May, 1975. Emphasis was placed on the present and potential quality of the area for large mammals (mule deer, coyote, bobcat), predatory birds (hawks and owls) and rare or endangered species.

#### Amphibians and Reptiles

No species of amphibians were seen or heard during the field observations. The area appears to contain no good habitats for amphibians, as no permanent water supplies were found and most of the soils are dry and rocky. Three species might be expected to occur, however: Batrochoseps attenuatus (slender salamander), Batrochoseps pacificus (Pacific slender salamander) and Hyla regilla (Pacific tree frog).

Two species of lizards have been observed in the area, the ubiquitous Sceloporus occidentalis (blue-bellied lizard) and Uta stansburiana (side-blotched lizard). Other species that were not observed but presence is expected include Gerrhonotus multicarinatus (foothill alligator lizard), Cnemidophorus tigris (whiptail lizard) and Eumeces skiltonius (western skink). Snakes were not seen but this is not unexpected as intensive field work is generally necessary to properly document the presence of these animals. Snakes that should be present are: Diadophis punctatus (ring-necked snake), Pituophis melanoleucus (gopher snake) and Lampropeltis melanoleucus (common kingsnake). Also likely are occasional Crotalus viridis (western rattlesnake).

## Mammals

The determination of mammal species present or expected is based on direct sighting; the presence of tracks, scats (fecal droppings), trails, burrows or nests and other signs of mammal activity as well as the suitability of the habitat on the property.

The property supports a fairly diverse and locally dense mammalian fauna. Small sized mammals (permanent residents) which are expected include: Thomomys bottae (Botta pocket gopher), Neotoma lepida (desert wood rat), Dipodomys agilis (Pacific kangaroo rat), Perognathus fallax (San Diego pocket mouse), Peromyscus maniculatus (deer mouse), Peromyscus eremicus (cactus mouse), Microtus californicus (California meadow mouse), Reithrodontomys megalotis (western harvest mouse) and Mus musculus (house mouse).

Medium-sized mammals expected (which are generally permanent residents) include: Sylvilagus audubonii (Audubon cottontail), Otospermophilus beecheyi (Beechey ground squirrel), Lepus californicus (black tailed hare), Spilogale putorius (spotted skunk), Mephitis mephitis (striped skunk), Urocyon cinereoargenteus (gray fox) and Mustela frenata (long-tailed weasel).

Didelphis marsupialis (oppossum) should be relatively common living in or near buildings on the property.

Very little evidence was found to indicate that the property is currently utilized by large mammals. Scats of coyote (Canis latrans) were present at fairly low abundance throughout the property indicating some use by this species. No sign of recent activity by mule deer (Odocoileus hemionus) was found and the habitat is not considered suitable for extensive use or permanent residence. Individuals are irregularly

seen on the property, however. Similarly, the area may be visited by bobcat (*Lynx rufus*) but permanent residence or extensive use is unlikely.

### Birds

The majority of bird species seen or expected on the property are typical of open-bush habitat; many are common in suburban residential areas. The area is heavily utilized by mourning doves while California quail, house finches, and brown towhees were most frequently observed. Conditions which are favorable to migratory species such as permanent water, appropriate cover or the availability of fruits and berries are not present on the property. The open weedy fields, however, provide highly desirable habitat for predatory birds such as the marsh hawk and the red-tailed hawk which prey upon small mammals living in these areas.

## DISCUSSION OF VERTEBRATE POPULATIONS

The present vertebrate fauna of the East Orange area is typical of that of mixed coastal sage - disturbed grassland habitats. The habitat is not of special regional significance for vertebrate populations. This is due largely to its present disturbed and isolated condition. The area lacks permanent water and extensive areas of natural vegetation cover necessary to support large mammals. In addition, the property is cut in half by Chapman Avenue and is essentially isolated from other undisturbed habitat by residential developments to the northwest, west and south and open agricultural land to the east. Thus, while the area is capable of supporting sizeable populations of some species of smaller vertebrates, large mammals are expected to utilize the area only to a limited degree. Several species of predatory birds, however, benefit from the open fields which support small mammal prey.

With low density development, a number of changes in vertebrate communities would be expected to occur.

For mammals obvious changes will be minor since the area is not heavily utilized by large or predatory mammals. Virtually all mammal species populations will decrease, as open fields and cactus and other vegetated slopes are cleared and developed. Most obvious decreases will be Audubon cottontail and desert wood rat.

Species which are expected to benefit from development, particularly low density residential development with houses, stables, etc., are the house mouse and opossum.

For birds, development is expected to reduce the utilization of the property (either permanent residency, nesting or foraging) of several groups of species. Hawks, kites and owls will not use the area due to elimination of foraging areas and roosting sites. Important species affected would include the red-tailed hawk, white-tailed kite and great horned owl.

Species which require open areas such as western meadowlark and the generally uncommon loggerhead shrike and those requiring areas of undisturbed cover such as California quail, Roadrunner and cactus wren will be reduced in numbers or eliminated from the area.

A sizeable number of species, however, will either be largely unaffected or will be favored by the development of a residential area assuming low density and landscaping utilizing extensive shrubbery and trees. Typical representatives include: scrub jay, mockingbird, Anna's hummingbird, house sparrow, house finch, white-crowned sparrow and brown towhee.

Landscaping utilizes a high diversity of shrub and tree species providing foliage height diversity, flowering over long periods, berries and parts will be particularly beneficial in encouraging the maintenance of a diverse avian fauna and is recommended.



## RECOMMENDATIONS

### General Recommendations

Ecological values of East Orange can best be maintained through a land use policy of open space preservation and low density development. Moderate to high density housing development with the exception of a few flat areas adjacent to existing development of this type would destroy the rural atmosphere of the area and degrade present wildlife values and biotic community structures.

Although specific recommendations for a land use policy sensitive to ecological values within the East Orange Area are made below, it must be kept in mind that the environment of this area is subject to alterations produced from adjacent parcels of land within the County. It is of particular concern that land use plans for East Orange be complementary to land use plans now developed for Orange Park Acres. Continuity of open space areas will do much to enhance wildlife and recreational values of the region.

### Specific Recommendations

1. Open space Corridors: Both wildlife and recreational values in East Orange can be maintained and even enhanced by the establishment of open space corridors running continuously from Santiago Creek south through the El Modena Hills into the Cowan Heights. Such a corridor, with restricted public motor vehicle access, would provide not only biological and ecological values, but would also serve as a focus of recreational activities for local residents. An ideal corridor might run from Santiago Creek, along the El Modena Hills, across Chapman Avenue and into the undeveloped Cowan

Heights area. Width of the corridor might vary from 100 yards adjacent to developed areas to the full width of the El Modena Hills in areas of steep topography. Serious consideration should be given to a pedestrian underpass on Chapman Avenue as an integral part of an open space corridor. This busy street presently greatly restricts wildlife and recreational interchange between areas to the north and south.

2. Restriction of Moderate to High Density Housing:

New developments of moderate to high density housing should be restricted at most to flats adjacent to similar developments (such as the area just south of Linda Vista School or near the water tanks north of Chapman Avenue). Extensive development of slopes would seriously lower ecological, aesthetic and rural values of the area.

3. Elimination of Off-road Motorcycle Riding:

Off-road motorcycle riding on undeveloped portions of East Orange is causing severe erosional problems. Noise problems are also serious. Such activity is not in keeping with the aesthetic values of a rural atmosphere and is detrimental to ecological systems.

4. Fire Hazards: Proper consideration should be given to potential fire hazards in natural vegetation and eucalyptus rows. Aesthetically planned fire breaks should be maintained between shrub vegetation and homes. Eucalyptus litter should not be allowed to accumulate to dangerous levels.

5. Preservation of Large Native Shrubs:

Where large native shrubs exist in areas planned for development, every effort should be made to protect them. Large individuals of Rhus laurina, Sambucus mexicana, Rhus integrifolia, Heteromeles arbutifolia and Quercus agrifolia are extremely important wildlife habitats and comprise an important component of the natural ecological systems of the area.

6. Maintenance of Eucalyptus Hedge Rows:

Portions of the eucalyptus hedge rows in East Orange are in moderately bad to poor condition. Rows of trees are healthy only where they receive ground water from drainage ditches or adjacent gardens or agricultural lands. Although an introduced species from Australia, the Eucalyptus is today a valuable and well-integrated part of the biotic structure of Orange County. Proper irrigation (roughly an average of one inch per week) is necessary to restore and maintain the Eucalyptus windrows. Fertilization should also be utilized appropriately.

7. Restriction of Gun Use: Hunting of small animals and other gun use in open space areas are inconsistent with ecological and aesthetic values and present significant safety concerns. Such activities were observed during the course of this study.

8. Phasing out of Gravel Pit Operations Along Santiago Creek

Present and past gravel pit operations within and adjacent to East Orange along Santiago Creek are incompatible with

8.-cont.

the preservation of ecological as well as aesthetic values in the area. Riparian communities are an extremely limited, valuable natural resource in Orange County and thus, every effort should be made to preserve such areas. Gravel pit operations along Santiago Creek, however, have regrettably produced an almost sterile biological zone. Heavy equipment operations, dust and indiscriminate dumping of solid and liquid wastes have resulted in a zone with no significant diversity of either plants or animals. This effect can be seen clearly by comparing the creek opposite and below the gravel pits with its appearance to the northeast. The difference is dramatic. Every effort should be made to phase out the gravel pit and restore the natural riparian communities at the earliest possible time. Consideration should be given to experimental plantings of live oak and other appropriate native species.

#### FIRE CONDITIONS

A combination of unique terrain conditions and dry brush in East Orange serve to make the area a high fire risk area. Both the north and south El Modena Hills are covered with native vegetative cover which in the dry, late summer and early autumn seasons pose an especially high fire risk. The hazard from fire is further increased since much of the area is undeveloped, sharply limiting necessary access facilities for fire emergency vehicles.

Currently much of the undeveloped hill portions of the project area have been designated as a high fire hazard area and trespassing is prohibited by County Fire Ordinance.

The same physical features of the area which restrict ease of access to high fire hazard areas serve also to limit the ability of residents in the hill areas to move out of the hill areas in the event of a fire emergency. The limited access conditions are of particular concern to residents of the Hillsboro neighborhood, some of whom have indicated the need for an emergency access thoroughfare to the north which would provide egress to Chapman Avenue.

Since both City of Orange and County of Orange Fire Departments provide emergency services within the Study Area, the future development of the area is of concern to both agencies. And both fire departments have emphasized the need for necessary emergency water supply facilities in the area as well as appropriate consideration for the areas designated as open space in the proposed Plan for East Orange.

#### CULTURAL/SCIENTIFIC RESOURCES

This resource category refers primarily to those sites of historical, archaeological or paleontological significance.

At least one site of historical significance located within the project study area has been identified. This is the site where the Grijalva Adobe was once situated. The Adobe was the location of the first house in Northern Orange County.

To date no sites of archaeological or paleontological significance have been discovered. It has been determined however, that because of the largely undeveloped status of the project area, archaeological and paleontological investigations should precede any major new development.

## SOCIO - ECONOMIC ENVIRONMENT

### POPULATION CHARACTERISTICS

The East Orange Study Area is included within the Bureau of Census Tracts #219.02 and 756.01 as is illustrated in Exhibit #9. Population characteristics for East Orange are generally reflective of demographic features for the two combined census tracts indicated. Estimates of population characteristics for the Study Area are based on updated information from the 1970 Census.

It is estimated that currently, 2017 persons reside within the project area which is equivalent to 1.06 persons per acre. A dwelling unit factor of 3.7 persons per dwelling unit has been identified. Of the 3.7 persons per dwelling unit, it is believed that 1.43 persons are of school age (nursery through high school).

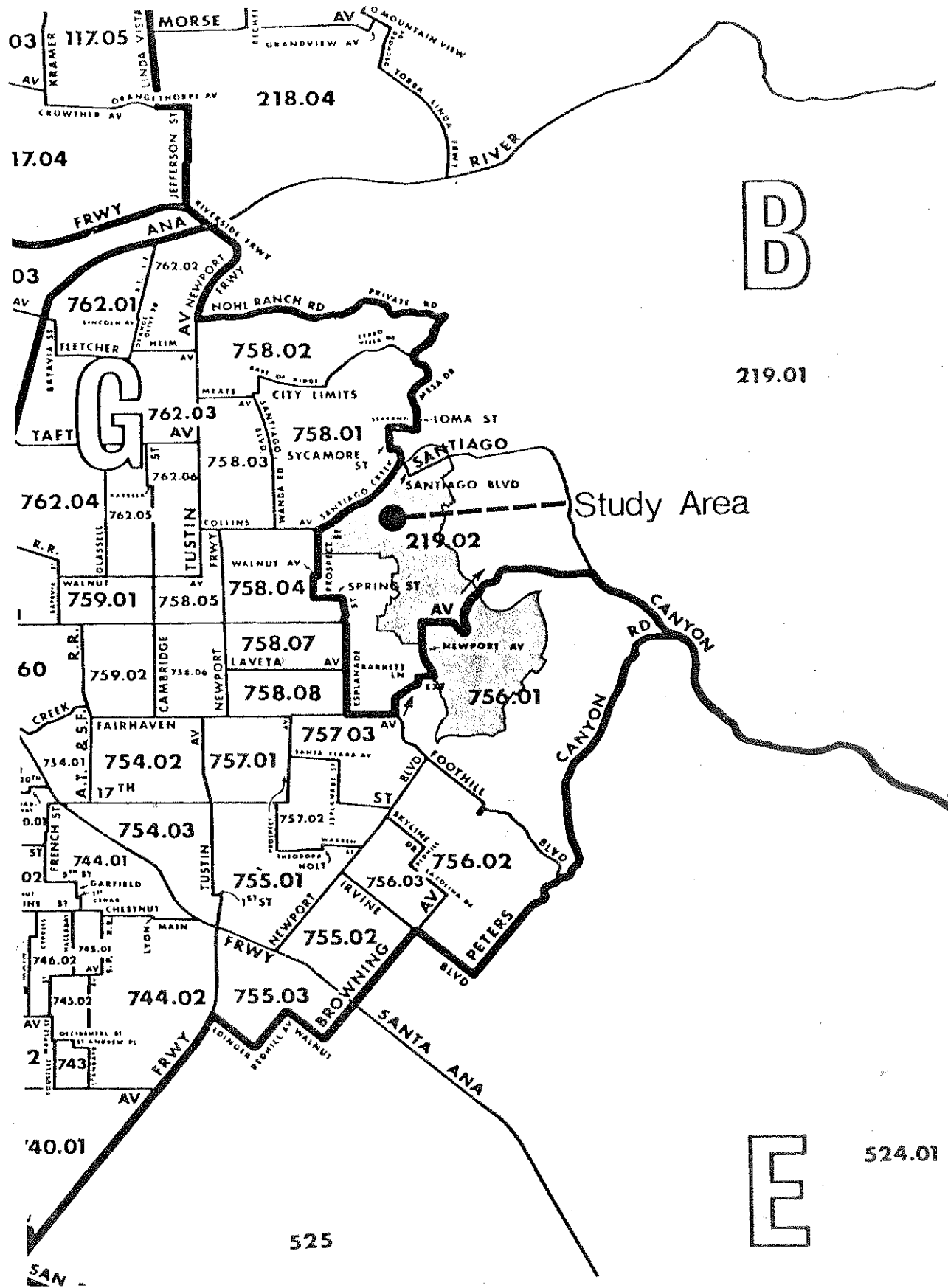
Information on general population characteristics, family composition and student population is presented in Tables # 2 and #3. Additionally, income characteristic and labor force characteristic data is presented in Tables # 4 and # 5, respectively.

#### ESTIMATED POPULATION CHARACTERISTICS

TABLE # 2

	Census Tract 219.02*	Census Tract 756.01	Total
Number of Persons	1305	712	2017
% of Total Population	64.7	35.3	100.0
Male	639	356	995
Female	666	356	1022

\* Includes only those portions of Census Tracts 219.02 & 756.01 within the Study Area



East Orange

Census Tracts



9

ESTIMATED FAMILY COMPOSITION

	Census Tract 219.02*	Census Tract 756.01*
Husband-Wife Families	312	187
Families with other Male Head	7	1
Families with Female Head	30	8
<b>TOTAL</b>	<b>349</b>	<b>196</b>

ESTIMATED STUDENT POPULATION CHARACTERISTICS

	Census Tract 219.02*	Census Tract 756.01*	Total
<u>Nursery (all)</u>	18	16	34
Public	5	2	7
<u>Kindergarten (all)</u>	42	18	60
Public	35	14	49
<u>Elementary (all)</u>	312	167	479
Public	267	148	415
<u>High School (all)</u>	121	84	205
Public	118	79	197
<u>College</u>	42	28	70

STUDENTS BY DWELLING UNIT

Nursery school students/DU	.06
Kindergarten students/DU	.11
Elementary school students/DU	.88
High school students/DU	.38
All students/DU	1.43
All Persons/DU	3.7

\* Includes only those portions of Census Tracts 219.02 and 756.01 within the Study Area.

TABLE # 3



## HOUSEHOLD INCOME CHARACTERISTICS

Estimated Yearly Income	Census Tract 219.02*	Census Tract 756.01*
Less than 1,400	3	4
1,400- 2,799	3	-
2,800- 4,199	9	-
4,200- 5,599	9	1
5,600- 6,999	19	1
7,000- 8,399	6	4
8,400- 9,799	24	1
9,800-11,199	12	1
11,200-12,599	27	4
12,600-13,999	20	3
14,000-16,799	51	9
16,800-20,999	61	16
21,000-34,999	91	60
35,000-69,999	14	67
70,000 +	-	25
TOTALS	349	196

\* Includes only those portions of Census Tracts 219.02 & 756.01 within the Study Area

TABLE # 4

ESTIMATED LABOR FORCE CHARACTERISTICS

	<u>Census Tract 219.02 *</u>	<u>Census Tract 756.01 *</u>
Professional, Technical & Kindred	86	90
Managers & Administrators except Farm	47	49
Sales Workers	53	34
Clerical & Kindred Workers	65	27
Craftsmen, Foremen & Kindred	45	11
Operatives except Transport	45	5
Transport Equipment Operatives	17	1
Laborers except Farm	20	6
Farm Workers	11	3
Service Workers	43	14
Private Household	-	5
<hr/>		
ESTIMATED TOTAL NUMBER IN LABOR FORCE .....	432	245

\* Includes only those portions of Census Tracts 219.02 and 756.01 within the Study Area

TABLE # 5

## HOUSING CHARACTERISTICS

Currently the East Orange Study Area contains 545 dwelling units, of which all but a few are single-family detached homes. For a relatively compact area (approximately 1900 acres), East Orange exhibits a diversity of housing style, size and cost. This may be attributable to the fact that the East Orange Area serves to separate, but includes, portions of various large residential communities such as El Modena, Orange Park Acres, Villa Park and Cowan Heights.

Housing within the project area can be classified into four major neighborhoods. They are the Linda Vista neighborhood, adjacent to Linda Vista Elementary School; Santiago Heights, immediately east of Santiago Boulevard; the Crawford Canyon Road neighborhood, northeast of Crawford Canyon Road and Hillsboro in the southwest section of the project area.

As is indicated in the section on Land Use, the various residential neighborhoods can be distinguished on the basis of architectural style, age of development and parcel configuration.

The Linda Vista area is characterized by three essential development phases which correspond to the installation of the Eichler, Buccola and Linda Vista Terraces Tracts. The Linda Vista neighborhood can be identified by one-level homes (with the exception of the Linda Vista Terraces) and a generally curvilinear street pattern with numerous cul-de-sacs. Parcel configuration is uniform through much of the Linda Vista area.

Santiago Heights immediately south of the Linda Vista Area is distinguished by diversity of architectural style, irregular parcel size and configuration. Another key feature of this area is the various ages of houses within the area. The Santiago Heights neighborhood occupies the northwest slopes of the North El Modena Hills and extends west to Santiago Boulevard. A large number of non-dedicated thoroughfares is evident in the area.

The Crawford Canyon Road neighborhood immediately east of Panorama Heights is situated at the base of the South El Modena Hills and is characterized by custom homes with a diversity of architectural styles, varying development phases and a rectilinear street pattern.

Directly south of the Crawford Canyon Road neighborhood, the Hillsboro area is situated on linear terraced slopes and is characterized by diversity of architectural style, custom homes and a curvilinear street pattern which conforms with local topographic features.

In those neighborhoods where housing age varies, housing cost factors appear to be correspondingly varied. Homes within or immediately adjacent to the Study Area boundaries generally range in value from around \$42,000 to over \$100,000. Housing costs for selected development projects within the vicinity are indicated below:

<p><u>La Linda Homes</u> (Prospect &amp; Palmyra)            S.F.D. 1&amp;2 Story-3, 4&amp;5 bedrooms            \$53,950 - \$64,950</p>	<p><u>Charter Point</u>            (Skyline &amp; Cowan Heights)            S.F.D. 2 Story split level            4 &amp; 5 bedrooms            From \$86,600</p>
<p><u>Santiago Ranchos</u> (Hewes &amp; Santiago)            S.F.D. 1&amp;2 Story - 3, 4&amp;5 bedrooms            From \$41,550</p>	<p><u>Tustin Pines</u> (17th &amp; Newport)            Townhouses 2 &amp; 3 bdrms.            2 Story            \$36,750 - \$43,450</p>
<p><u>Linda Vista Terrace</u> (Linda Vista)            S.F.D. 2 Story, 4 bedrooms            From \$57,950</p>	

## COST/REVENUE ANALYSIS

### Approach

In order to identify the extent to which East Orange generates revenues which balance costs associated with the Area, a cost/revenue analysis of East Orange was performed. Typically, cost/revenue analyses employ one of two basic methodologies which provide for the calculation of costs and revenues on either a per acre or per capita basis. Both approaches have limitations and a desirable technique would hopefully incorporate the more advantageous features of each methodology and allow for the analysis of costs and revenues on a combined per acre-per capita basis. Such a combination of methodologies was the approach utilized in the cost/revenue analysis for East Orange.

### Methodology

The first task undertaken to estimate costs and revenues for the East Orange Area was the calculation of property tax revenues, less exemptions, for the portions of the Study Area in both the City and in the County of Orange. Following the computation of property tax revenues, an identification was made of non-property tax revenues. Non-property tax revenues were calculated on a per capita basis, while property tax revenues were estimated on a per acre basis. All revenues were then totaled and compared to per capita expenditure estimates for the Area. The results of the cost/revenue analysis are illustrated in Table # 6 (Estimated Cost/Revenue Analysis).

### Results

Since surpluses were calculated for both the City and County portions of the East Orange Area, it is believed that the results of the cost/revenue analysis provide a general indication that the East Orange Area returns to the City and County of Orange more in revenues than the Area requires in expenditures.

ESTIMATED COST/REVENUE ANALYSIS

EAST ORANGE

	Property Tax Revenue	Other Revenue	Total Revenue	Total Expenditures	Surplus
City of Orange Area*	\$ 54,074	\$176,363	\$230,437	\$181,698	\$ 48,739
County of Orange Area*	94,810	130,158	224,968	130,158	94,810
	\$148,884	\$306,521	\$455,405	\$311,856	\$143,549

FACTORS

Est. 1974 City of Orange Population 84,600  
 Est. 1974 County of Orange Population 1,500,000

East Orange Area

Population within the City of Orange 1,044  
 Population within the County of Orange 973

Property Tax Rate Per/100 Assessed Value

1974 City of Orange 1.29  
 1974 County of Orange 1.68

Non Property Tax Revenues

1974 Est. City per capita \$168.93  
 1974 Est. County per capita 133.77

TABLE # 6

\* Non-property tax revenue estimates and expenditure estimates were based on the 1973-74 Actual Budgets for both the City of Orange and the County of Orange.

## EDUCATION

The vast majority of the East Orange Study Area is within the Orange Unified School District. A southern portion known as Hillsboro is within the Tustin Unified District ( see Exhibit # 2, Governmental Jurisdictions). Those homes in the Tustin Unified District are served by Arroyo Elementary School for grades K-6, Hewes Intermediate for 7-8 and Foothill High School for grades 9-12. Two elementary schools exist within the Study Area within the Orange Unified School District, Linda Vista and Panorama Elementary for children in grades K-6. Santiago Junior High located at the western boundary serves children in grades 7-9 and El Modena High School (grades 10-12) is located further west along Chapman Avenue. Currently there is an elementary school site immediately south of Santiago Junior High and a junior high and elementary school site in Orange Park Acres along Santiago Canyon Road near Orange Park Boulevard. By 1980 it is estimated by the Orange Unified School District that another high school will be needed in the Anaheim Hills Area which would probably serve East Orange.

The School District estimates the following enrollments for 1974-75 for each of the following schools and expected capacity without extended day or double sessions:

<u>School</u>	<u>74-75 Enrollment</u>	<u>Current Capacity</u>
Panorama Elem.	178	230
Linda Vista	530	570
Santiago Jr. High	916	1000
El Modena High	1780	1850

## SERVICE SYSTEMS

The City of Orange, private companies and a variety of special districts combine to provide services to the East Orange Area.

### Water

The major wholesale distributor of water in the East Orange Area is the East Orange County Water District which obtains its water supply from the Santiago Aqueduct Commission line and the East Orange County feeder Number 2. The EOCWD collects, treats and distributes water to local water retailers in the East Orange Area, including the Orange County Water Works District #8, The California Cities Water Company and The Orange Park Acres Mutual Water Company as well as the City of Orange. It is these local water retailers who in turn provide water for domestic, irrigation, industrial and fire protection purposes directly to the residents and other consumers in East Orange.

Service area boundaries of the local water districts and companies are very irregular within the Study Area. However, it can generally be said that the primary service areas within the Study Area are north of Chapman Avenue for the Orange Park Acres Mutual Water Company and the City of Orange and south of Chapman Avenue for the Orange County Water Works District #8 and the California Cities Water Company.

As the East Orange Area develops, it is anticipated that the City of Orange will continue to be a major retail water distributor in the Area and the City has planned accordingly. Obviously, the steep topography



of the East Orange Area may prove to be a constraint in the provision of water services. The City presently has planned for six pressure zones. Zones One, Two and Three will serve to an elevation of 640 feet. Zone Four will serve to an elevation of 820 feet by using a system other than gravity, such as pumps or pneumatic pressure. Service above an elevation of 820 feet would be difficult but could be done utilizing pumps. However, it would only be economically feasible for a very small, inexpensive system or a very large system spread over a high density development. Fire systems utilizing pumps are acceptable to the Orange Fire Department.

The City of Orange Water Superintendent has stressed the importance of coordinating the type of future development and the phasing of future development with the Water Department in order to minimize the cost of the future improvements in the upper elevation pressure zones. Acreage fees of \$1,056.00 per acre for industrial development, \$924.00 per acre for commercial development and \$792.00 per acre for residential development will be required of future developers. Developers will, also, be required to construct the water system within their own tract. However, the City will construct transmission mains. Exact configuration of new water transmission facilities will be subject to an engineering and service analysis of the area based upon specific development patterns.

#### Sanitation Service

Sanitation services are provided to existing developments in East Orange by both the City of Orange and County Sanitation District #7. Both agencies operate and maintain systems of sanitary sewers. However, the primary function of the City system is the operation of feeder

lines, while Sanitation District #7 provides for the major trunk lines in the Area.

Currently, City of Orange facilities serve much of East Orange north of Chapman Avenue, although the City also provides some services south of Chapman Avenue, north of Panorama Heights. All of East Orange is currently within the service range of County Sanitation District #7 which includes all of the City of Orange area south of Santiago Creek. The City of Orange has indicated that their downstream lines are sized to accommodate development within East Orange and the inclusion of the Study Area within the City's sanitation service system would be a logical extension of the City's service capability.

It can be anticipated that as the area develops, both the City of Orange and Sanitation District #7 will provide appropriate sanitation services. However, the precise location of new facilities will be subject to topographic and development considerations.

#### Irvine Ranch Water District

In addition to other water and sanitation districts of the Area, the Irvine Ranch Water District provides water for domestic, industrial and municipal services, maintains a sewerage system and provides for the collection and treatment of sewage. The IRWD operates primarily in the southeast section of the project area.

#### County Service Area #5

A portion of the East Orange Area is situated within and serviced by the North Tustin County Service Area No. 5. The district's purpose is to allow for the provision of municipal type services to the unincorporated sections of East Orange and surrounding areas. Currently,

Service Area #5 provides for professional fire protection and landscape maintenance services.

Locations within the Study Area which are currently served by Service Area #5 include the Sunrise home area, the Hillsboro area and the Crawford Canyon Road neighborhoods immediately adjacent to Panorama Elementary School.

#### Carpenter Irrigation District

One of two irrigation districts in Orange County, the Carpenter Irrigation District provides irrigation services to the El Modena Area and may serve the East Orange Study Area as development takes place. Additionally, the District maintains some sand and gravel leases in the Santiago Creek Area.

#### Flood Control

The El Modena-Irvine Area Master Plan of Drainage outlines the bulk of the East Orange Area. Flood Control facilities have been planned for this area. Additional local drainage systems would be required. These systems would be storm drains which would generally follow the original valley bottoms. Development of this Plan will require further work with the Orange County Flood Control District as development is planned and constructed within the Area. Exhibit # 10 depicts the Flood Plain as shown by the Corps of Engineers and is centered along Santiago Creek.

#### Electrical



Southern California Edison Company will serve the area. Extension and additional lines will be required with future development.

Gas - Southern California Gas Company will serve the Area.

Telephone - Pacific Telephone will serve the Area.

# East Orange

## Drainage

 WATER SHED AREA BOUNDARY  
 FLOOD PLAIN AREA



J. L. WEBB PLANNING  
4005 O' 4007 1805

# 10

## COMMUNITY ACTIVITIES

There are three homeowners associations in and around the area: to the south the Foothill Communities Homeowners Association, to the north the Santiago Heights Property Owners Association and Fair Hills Homeowners Association.

The Villa Park Volunteer Fire Department is also a gathering place and focal point for parts of the community. It also provides some recreational facilities and the meeting room is used by the community. Activities of note within and around the area include equestrian interests (there are several stables in and around the area) and tennis ( a private club exists just to the east of the area along Santiago Canyon Road). There is a 4-H facility along Newport Boulevard with a riding ring and equestrian trails. In addition, several equestrian and hiking trails exist throughout the El Modena Hills and canyons. Some off-road motorcycle activity has also been noted along with the use of firearms, both of which are not recommended to continue because of the hazards and conflicts with this type of area.

The use of school grounds for outdoor activities is also evident within the Area. Since the area is made up of families with children, the need for activities and programs for young people is important for the Area.

## CURRENT PLANNING FACTORS

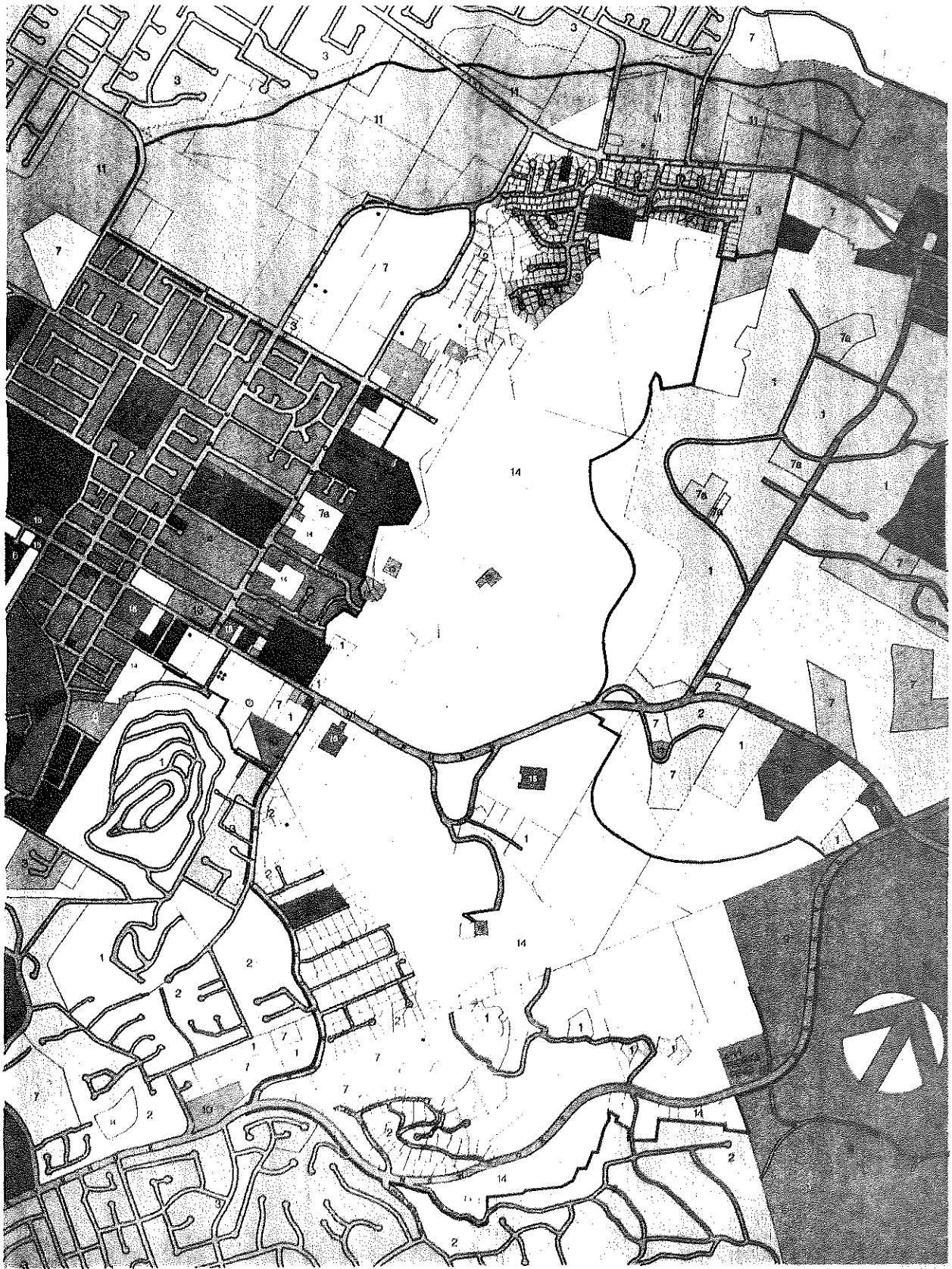
### EXISTING LAND USE

East Orange is an area of varied land use. It is a significant and desirable residential location, an area of mineral extraction, an area where limited agricultural production exists and yet, most of the area, nearly 55 percent is currently undeveloped. The project area serves to separate the rural foothill areas in the east from the more urbanized sections of the County to the west. Differences in land use within and around the project area become even more important when the compactness of the area (1898.30 acres) is considered.

Land use within the project area has been grouped into seven general categories including residential, commercial, resource extraction, public/quasi-public, agriculture, vacant and utility uses. Land uses within the project area are depicted by acreage and percent of project area in Table # 7 and displayed by geographic configuration in Exhibit # 11. Land use within the project area has been identified by parcel according to the primary use.

Of the seven general land uses within the project area, three are significant in terms of the overall acreage which they involve. As Table # 7 reveals, the use category involving the largest area is the vacant or undeveloped portion of the project area comprised essentially of the northern and southern El Modena Hills and a few parcels located at the periphery of the foothill areas.

The project area is characterized by two other major land use categories, including the sand and gravel and residential land use classifications. The sand and gravel extraction area located immediately



# East Orange

## Land Use

RESIDENTIAL		AGRICULTURE		COMMERCIAL	
1 ESTATE	MEDIUM	7 CITRUS	STABLES	13 UTILITIES	15 COMMERCIAL
2 LOW	MEDIUM	7a POULTRY	11 SAND & GRAVEL	14 VACANT	
3 LOW	HIGH	NURSERY	AG. PRE-SERVE	PUBLIC/QUASI-PUBLIC	

• Residential dwellings in areas where other land use dominates



EXISTING LAND USE

	ACRES	PERCENT OF PROJECT AREA
RESIDENTIAL .....	275.93	14.5
AGRICULTURE .....		
CITRUS .....	79.66	4.2
NURSERIES .....	9.74	.5
AGRICULTURAL PRESERVE...	65.08	3.4
SAND AND GRAVEL EXTRACTION ..	283.59	15.00
PUBLIC/QUASI-PUBLIC .....	17.06	.95
VACANT .....	1,031.92	54.4
UTILITY .....	6.37	.3
COMMERCIAL .....	6.45	.3
PUBLIC THOROUGHFARES .....	122.5	6.45
-----		
TOTAL .....	* 1,898.30	100 %

\* Includes only those areas within Project boundaries

TABLE # 7



north and south of the Santiago Creek is significant not only because of the acreage which it involves within the project area, but also due to the intensity of use to which it is devoted. Resource extraction in the sand and gravel area has been extensive, the resultant effect being that local landforms have undergone major modifications. The modification of landforms in and adjacent to the Santiago Creek area has placed serious limitations on the type of use to which the creek area may ultimately be devoted.

The residential land use classification is a general category which incorporates the following residential density categories:

Estate .....	0-1	DU/Ac
Low .....	1-2	DU/Ac
Med-low .....	2-3.5	DU/Ac
Medium .....	3.5-6.5	DU/Ac
Med-high .....	6.5-15	DU/Ac
High .....	15-24	DU/Ac

At present there are 545 residences in the project area nearly all of which are single family detached dwelling units. Two exceptions are duplex units located immediately east of Solana Drive.

Residential areas may be divided into four major neighborhoods which are distinguishable by location, age of dwelling unit, parcel size, parcel configuration, architectural style and local street patterns. Distinctive neighborhood locations include the Hillsboro area just north of Newport Boulevard and the Crawford Canyon Road neighborhoods located both north and south of Panorama Heights Elementary School. The two other large residential concentrations occur north of Chapman Avenue. They are Santiago Heights which extends east from Santiago Boulevard into the Northern El Modena Hills and the Linda Vista area which centers around Linda Vista Elementary School. Additional residential areas of limited size exist throughout the project area usually in areas of level terrain.

Other land use classifications while not constituting a large percent of the total project area, are important when considered from the standpoint of the acreage which they involve. Of particular interest is the classification of agriculture which includes nurseries, citrus and agricultural preserve areas. These agricultural areas hold nearly the same potential for development as do vacant lands. Currently 155<sup>+</sup> acres are devoted to agricultural usage.

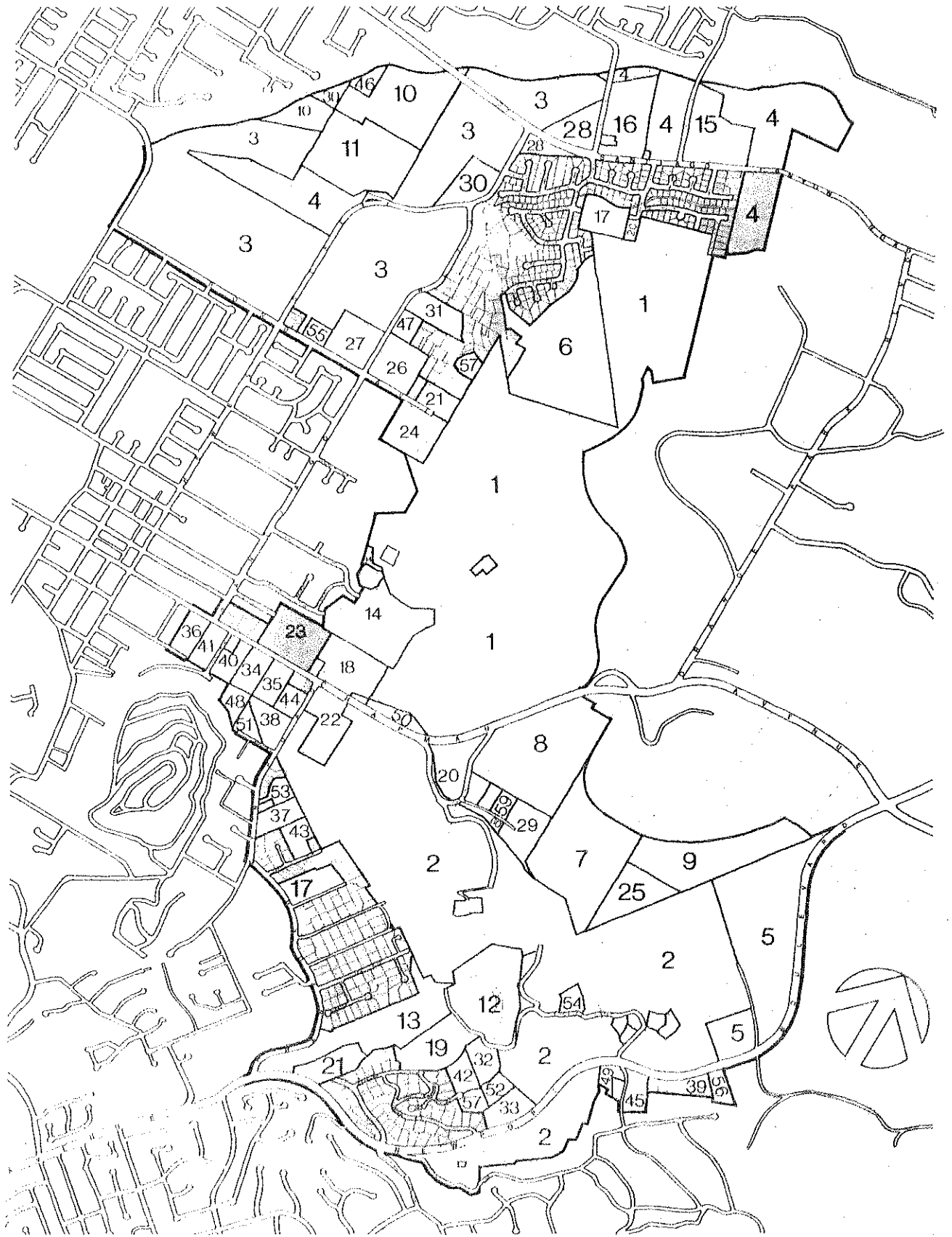
Although commercial, public/quasi-public and utility uses are very visible, they constitute only a very small percent of the overall project area.

#### EXISTING LAND OWNERSHIPS

An ownership list which reveals project area acreage by property owner is contained in Table # 8 (Land Ownership & Summary). The list identifies land owners by amount of area owned in descending order. Exhibit #12 (Land Ownership) corresponds with Table # 8 and depicts parcels by owner and location within the project area.

The ownership list serves to reveal those portions of the project area which have potential for future subdivision under existing zoning and General Plans for the area. In addition to those properties which have development potential, the ownership list displays some properties such as those owned by local public agencies which do not have residential development value but have been taken into consideration because of their recreational value for future area development.

Table # 8 also indicates property owners by groups according to amount of acreage owned and percent of project area involved. The major land ownerships, those in Group I, correspond essentially with the yet undeveloped hill areas and also land currently devoted to sand and gravel extraction. ( Also see summary of land ownership in Table # 8 )



# East Orange

## Land Ownership

- 99 Parcels indicate ownership ranked by parcel size (OVER 2 Acres)
- Parcels too small to further subdivide with existing Zoning and General Plan



LAND OWNERSHIP

	<u>ACRES</u>
<u>GROUP I</u>	
1. Occidental Land .....	340.84
2. Church of Jesus Christ of The Latter Day Saints .....	328.61
3. Consolidated Rock .....	195.32
<u>GROUP II</u>	
4. Sully - Miller .....	71.18
5. The Irvine Company .....	65.08
6. Van Nuys Savings .....	45.38
7. Renacer .....	43.96
8. MacPherson .....	41.76
9. Chandler Joint Venture .....	31.29
10. Sussdorf .....	30.34
11. Mac Mullan .....	28.86
12. Yale .....	23.35
13. Gimeno .....	23.21
14. Jones .....	22.00
15. County of Orange Real Property Services Dept. ....	15.67
16. Hurwitz .....	15.30
17. Orange Unified School District .....	14.97
18. Fluegge .....	10.97
19. Strand .....	10.90
20. Jones .....	10.51
21. Usab .....	10.39
22. Hilltop Investment Co. ....	10.20
23. Sowerby .....	10.13
24. Frederick .....	10.00
25. Haynes .....	10.00
<u>GROUP III</u>	
26. Ishida .....	9.54
27. Evans .....	9.18
28. Reeve .....	8.69
29. Hanson .....	8.06
30. Flintkote .....	7.81
31. Anderson .....	6.66

LAND OWNERSHIP - CONTINUED

<u>GROUP I - Cont.</u>	<u>ACRES</u>
32. Mark .....	4.92
33. Reilly .....	4.82
34. Groot .....	4.77
35. Korsmier .....	4.77
36. Peterson .....	4.77
37. Smith .....	4.74
38. O. Stoller .....	4.60
39. Gatti .....	4.25
40. Bidlingmaier .....	4.14
41. Arlin .....	4.10
42. Mac Lachlan .....	3.95
43. Prewitt .....	3.94
44. Delta Contractors .....	3.15
45. Kevorkian .....	2.85
46. Warren .....	2.70
47. Miller .....	2.63
48. Dargatz .....	2.58
49. Skinner .....	2.52
50. Clark .....	2.49
51. M. Stoller .....	2.48
52. Kelly .....	2.46
53. Fletcher .....	2.43
54. Borchardt .....	2.35
55. John Miller .....	2.31
56. Gillman .....	2.20
57. Kempf .....	2.18
58. Abraham .....	2.16
59. Naylor .....	2.08
60. Wallace .....	2.07

LAND OWNERSHIP SUMMARY

	CATEGORY	ACRES	% of TOTAL	NO. OF LAND OWNERS	% of TOTAL
<u>GROUP I</u>	100+ ac.	804.77	55.24	3	5
<u>GROUP II</u>	10 - 99.99 ac.	555.44	35.48	22	37
<u>GROUP III</u>	2 - 9.99 ac.	145.35	9.28	35	58
	<b>TOTAL</b>	<b>1,505.56</b>	<b>100.00</b>	<b>60</b>	<b>100</b>

## IMAGE ANALYSIS

An important aspect of the General Plan preparation process in East Orange was the development of an analysis of the image of the Area. As can be observed from Exhibit #13 (Image Analysis), the image of the East Orange Area is comprised of those features, both natural and man-made, which tend to give the Area a distinctive form and unique visual character. From the Image Analysis it may be anticipated how each of the alternative plans might have altered the existing physical form of the Area and the way in which this would change the perceptions of those who view the Area.

Elements of the "image" of the East Orange Area are displayed in Exhibit #13. The Image Analysis is based upon the evaluation of six characteristics identified below:

Landmark(s) - objects which individually or collectively have significant visual impact: examples in East Orange would be the hilltops, the Orange Hill and Orange County Mining Company Restaurants, as well as the derricks and graders in the sand and gravel areas.

Node(s) - locations which serve as focal points for activity: examples would include Linda Vista and Panorama Elementary Schools, the 4-H Center just north of Newport Boulevard and local stables.

Path(s) - routes of movement, usually streets and highways: examples would be Chapman Avenue, Santiago Boulevard and Loma Avenue.

Edge(s) - Barriers or boundaries which tend to separate areas of common character: examples would include Santiago Creek, the base of the foothills and Handy Creek.

District(s) - areas of common and distinctive character: examples include the Santiago Heights District, the Cowan Heights District and the Excavation and Processing Districts.

Portal(s) - entry points into the project area: examples include the entryway at Crawford Canyon Road and Newport Boulevard and entry points along Santiago Canyon Road.

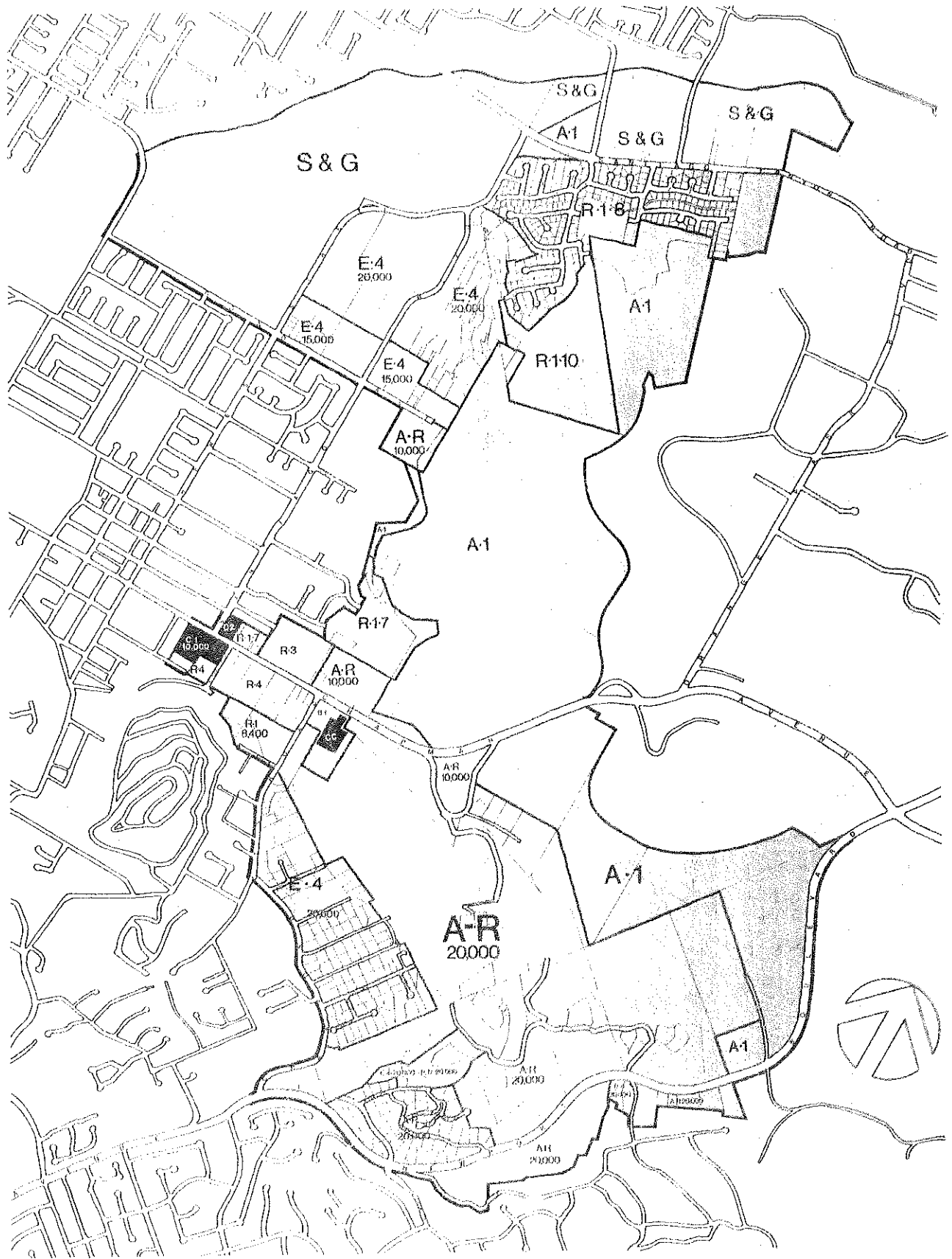


## EXISTING ZONING

Zoning patterns within the project area correspond very closely with land use. Table #9 illustrates the various zoning districts into which the area is classified by jurisdiction. Exhibit #14 (Existing Zoning) displays zoning classifications by district. In addition to the zones depicted in Table #9, there are two additional overlay zoning districts in the project area. These include the "Sign-Restriction" (S-R) Zone and the "Floodplain" (FP-2) Zone. Both the S-R Zone and the FP-2 Zone set forth standards to be complied with which are in addition to other zone district requirements.

With three exceptions, all uses in the project area are compatible with the zone in which they are located. These include both residential and commercial uses located in districts for which they are not zoned. Table #10 indicates the maximum gross residential density achievable if the project area were developed fully under the existing zoning. As Table #10 reveals under current zoning standards, the project area, if developed totally, would still have a low overall gross density of 1.29 dwelling units per acre.





# East Orange

## Existing Zoning

■ A-1  
 ■ A-R  
 ■ AH  
 ■ E-4  
 ■ R-1  
 ■ R-3  
 ■ R-4  
 ■ R-10  
 ■ R-110  
 ■ R-17  
 ■ S&G



EXISTING ZONING

SECTION OF THE PROJECT AREA IN THE CITY OF ORANGE

ZONE - DISTRICT	DESIGNATION	ACRES	% OF PROJECT AREA
General Business	C-2	1.47	.08
Single Family Residential	R-1-7	30.83	1.62
Single Family Residential	R-1-8	82.35	4.34
Single Family Residential	R-1-10	45.98	2.42
Multiple Family Residential	R-3	10.13	.53
Sand and Gravel	S-G	159.62	8.41
Subtotal City of Orange Territory		330.38	17.40

SECTION OF THE PROJECT AREA IN UNINCORPORATED TERRITORY (COUNTY)

ZONE - DISTRICT	DESIGNATION	ACRES	% OF PROJECT AREA
General Agricultural	A-1	529.05	27.86
Agricultural Residential	A-R-10,000	34.81	1.8
Agricultural Residential	A-R-20,000	444.26	23.5
Buffer	B-1	7.8	.4
Community Commercial	C-C	2.4	.1
Local Business	C-1-10,000	5.60	.3
Small Estate	E-4-15,000	32.72	1.7
Small Estate	E-4-20,000	220.17	11.6
Small Estate - Planned Dev.	E-4-20,000	12.49	.66
	PD-20,000		
Single Family Residential	R-1-8400	10.37	.55
Suburban Residential	R-4	21.78	1.15
Sand & Gravel Extraction	S-G	115.80	6.1
Subtotal - County Territory		1,437.25	75.72

Project Area Acreage Devoted to Dedicated Thoroughfares	122.5	6.45
---	-------	------

Section of Project Area in City of Villa Park	8.17	.43
---	------	-----

GRAND TOTAL	1,898.30 Acres	100.00 %
-------------	----------------	----------

POTENTIAL DENSITY UNDER CURRENT ZONING

ZONE - DISTRICT	DWELLING UNITS		RES. DENSITY		
	EXISTING	MAXIMUM	EXIST. DU/AC	MAX. DU/AC	
<u>CITY OF ORANGE</u>					
S-F Res.	R-1-7	5	163	.16	5.20
S-F Res.	R-1-8	276	337	3.34	4.09
S-F Res.	R-1-10	0	170	0.0	3.70
Mult.-F Res.	R-3	1	53	.10	5.20
<u>COUNTY OF ORANGE</u>					
Gen. Agricultural	A-1	0	112	0.00	.21
Agricultural Res.	A-R-10,000	2	128	.06	3.70
Agricultural Res.	A-R-20,000	17	822	.04	1.94
Small Estate	E-4-15,000	8	81	.24	2.46
Small Estate	E-4-20,000	223	407	1.00	1.85
Small Estate-PD	E-4-20,000				
	PD-20,000	0	23	0.00	1.85
S-F Res.	R-1-8400	3	46	.29	4.41
Suburban Res.	R-4	8	112	.37	5.14
Non-residential Zones		2			
<b>TOTAL</b>		<b>545</b>	<b>2,454</b>	<b>.29</b>	<b>1.29*</b>

\* Gross Density

TABLE # 10

## EXISTING CIRCULATION CONDITIONS

### Land Use

The area designated for development is now mostly unoccupied open land. The surrounding area is composed mostly of low and very low density residential developments with large pockets and corridors of open space running throughout the Area. To the west of Santiago Boulevard, along both sides of Chapman Avenue, are most of the small businesses that serve the East Orange Area. No large commercial or industrial centers are located in the immediate vicinity of the development site. To the east is Irvine Regional Park (625 acres), Cleveland National Forest recreational areas and Irvine Company agricultural lands.

### Roadways

All roadways in the vicinity of the development area are now operating well below their capacities. Some traffic congestion does occur in the area due to weekend and recreational trips. However, most of this traffic is due to recreational developments of a temporary nature; such as Saddleback Park near Mojeska Canyon and Escape Country located in Trabuco Canyon. In both cases, area land use plans make no provision for this type of recreational land use in the ultimate condition. It is probable these developments will either be relocated or will become recreation oriented residential communities. In addition, as the roads are developed to their ultimate configurations and widths, weekday traffic volumes will surpass those of weekends.

### Transit, Bikeways, Hiking and Equestrian Trails

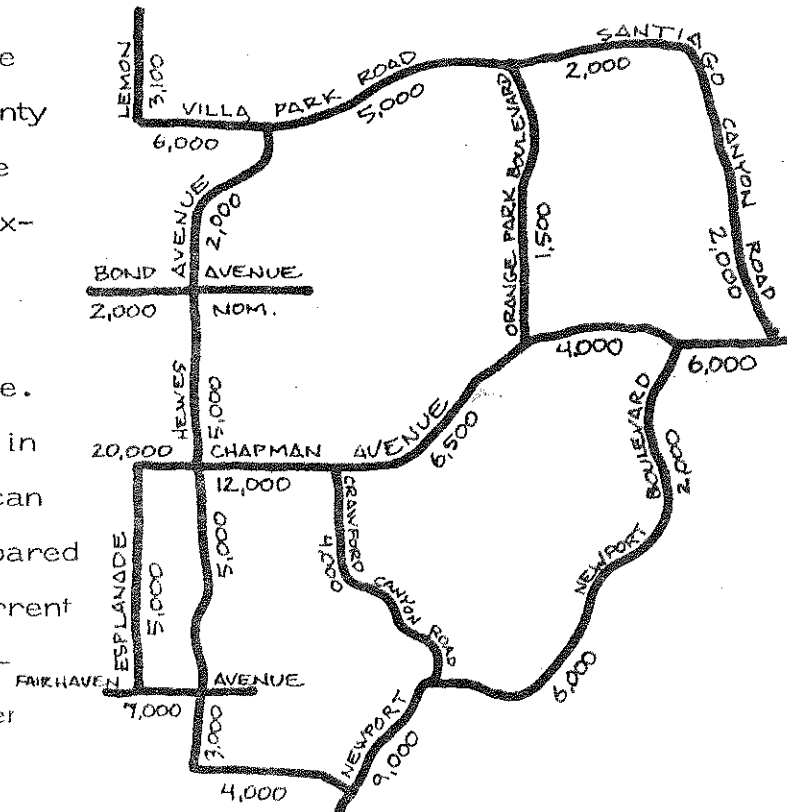
Presently, one bus route of the Orange County Transit District serves

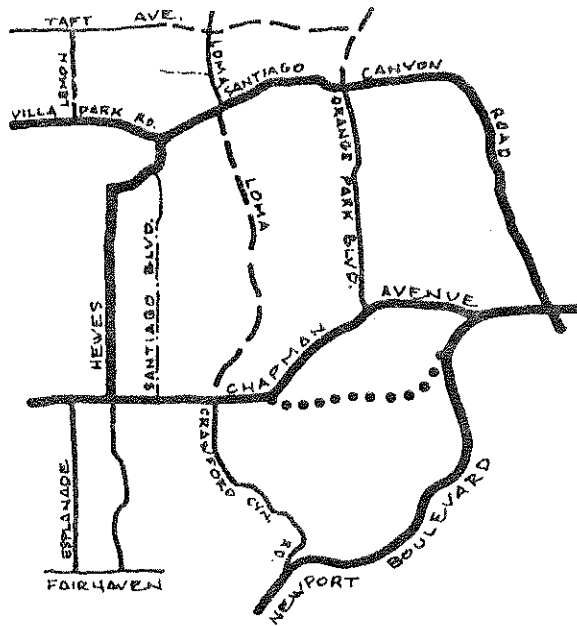
the fringe of the East Orange Area. This route is relatively new and operates on an hourly schedule along Chapman Avenue easterly to Hewes Street. At this time, the effect of available transit on major trip making behavior to and from the East Orange area is nominal.

Equines and to some extent bicycles are already somewhat popular for recreation in East Orange. However, because of the area's isolation and because of the relative scarcity of any well-marked and designated trails, and/or bike routes, it would be difficult to demonstrate that these modes presently have any significant affect on trip making behavior in East Orange. Ultimately, with development of the series of trails proposed for the Area, some of these personal transport modes may become significant as alternate means of making short distance and recreational type trips.

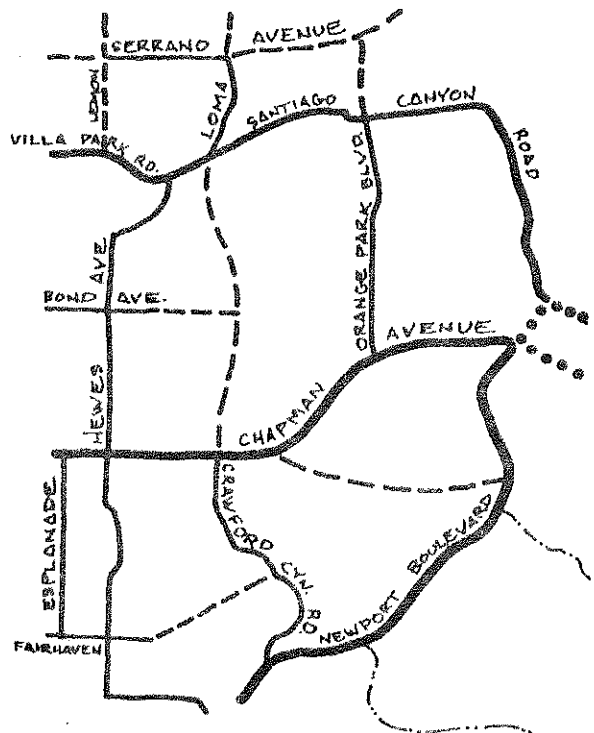
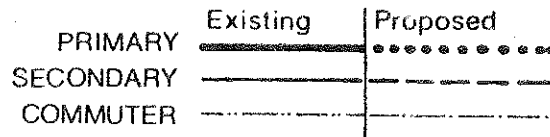
Master Plan of Arterial Highways

As shown in Exhibit #15, there are some differences between the County and City Plans. For example, the City does not show Bond Avenue extension to the east which is topographically and geologically extremely difficult, if not impossible. Also, there are some differences in classification and alignment that can be seen as the two plans are compared. The adjoining diagram depicts current traffic volumes on the existing arterial network. (Numbers represent average daily traffic)

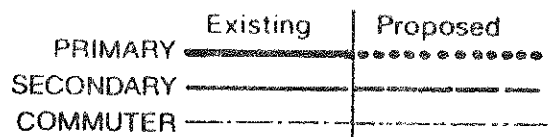




City



County



# East Orange

## MASTER PLAN OF ARTERIALS

## GOVERNMENTAL JURISDICTIONS

The jurisdictional boundaries are depicted in Exhibit #2. The City of Orange, Villa Park and the unincorporated County of Orange, along with the two school districts are within this Planning Area.

The project area lies entirely within the City of Orange Sphere of Influence (see Exhibit #1) as approved by the Local Agency Formation Commission. The East Orange Area is included within the Planning Area Boundary of the City of Orange. Sphere of Influence criteria is typically based upon social and economic interdependence and interaction, topography and logical service areas.

Other jurisdictional boundaries within which the East Orange Area is situated include the Fourth Supervisorian District, the Central Orange County Judicial District, the Thirty-ninth Congressional District, the Seventieth Assembly District and the Thirty-fifth State Senatorial District.

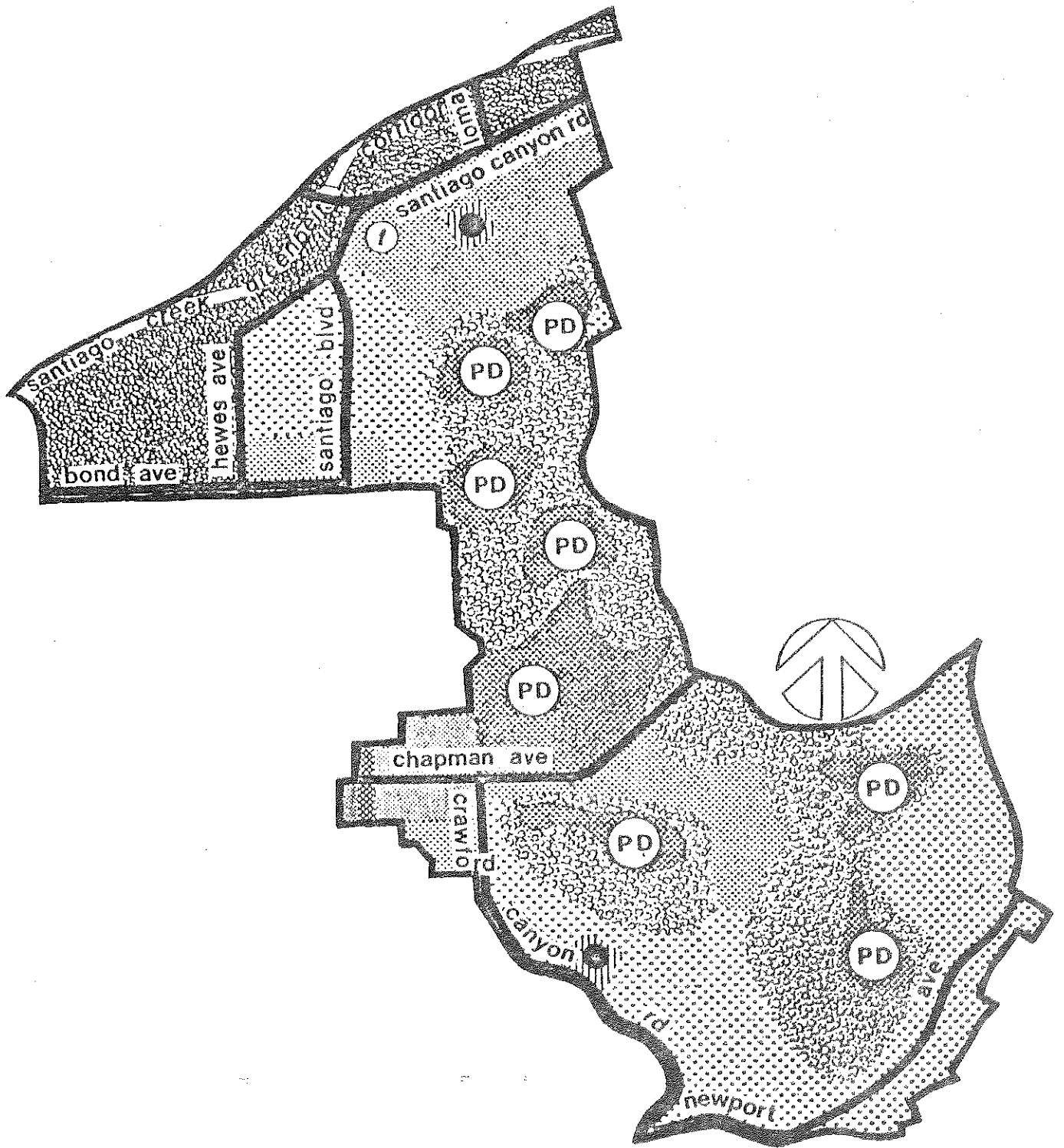
## CURRENTLY ADOPTED PLANS AND POLICIES

The following two Exhibits # 16 and #17 depict the General Plans currently in effect within the County and City of Orange. The purpose of this Plan will be to revise those Land Use Elements of the County and City to create a consistent plan for both the City and the County. The Master Plan of Arterial Highways has been depicted in the previous section. Other Plans and Policies which have been reviewed in the preparation of this Plan include the Housing Elements, Conservation and Open Space Elements for both the City and County, Scenic Highways, Regional Parks, Riding and Hiking Trails, Bicycle Trails and a list of adopted Policies from various General Plan Elements provided by the Staff of the County of Orange.

The Santiago Creek Greenbelt is undergoing further study and is currently underway since there has been adoption of this area as a priority area within the Conservation and Open Space Element. The County of Orange is currently undertaking the purchase of a regional park site between Hewes and Santiago Boulevard north of Bond.

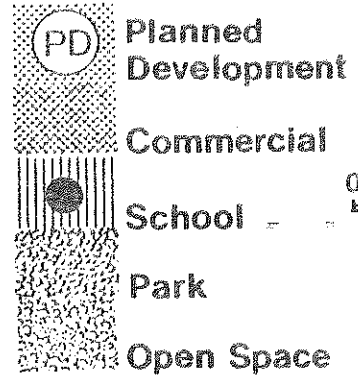
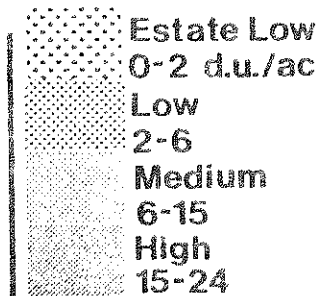
Although many of the adopted policies have some conflict with each other, this Plan has attempted to incorporate the spirit of each of the adopted Plans and Policies to provide for a General Plan which will reinforce the County and City Plans and Policies. The specific expression of Goals, Objectives and Policies for this Plan may be seen in the Proposed Plan Section of this Report.





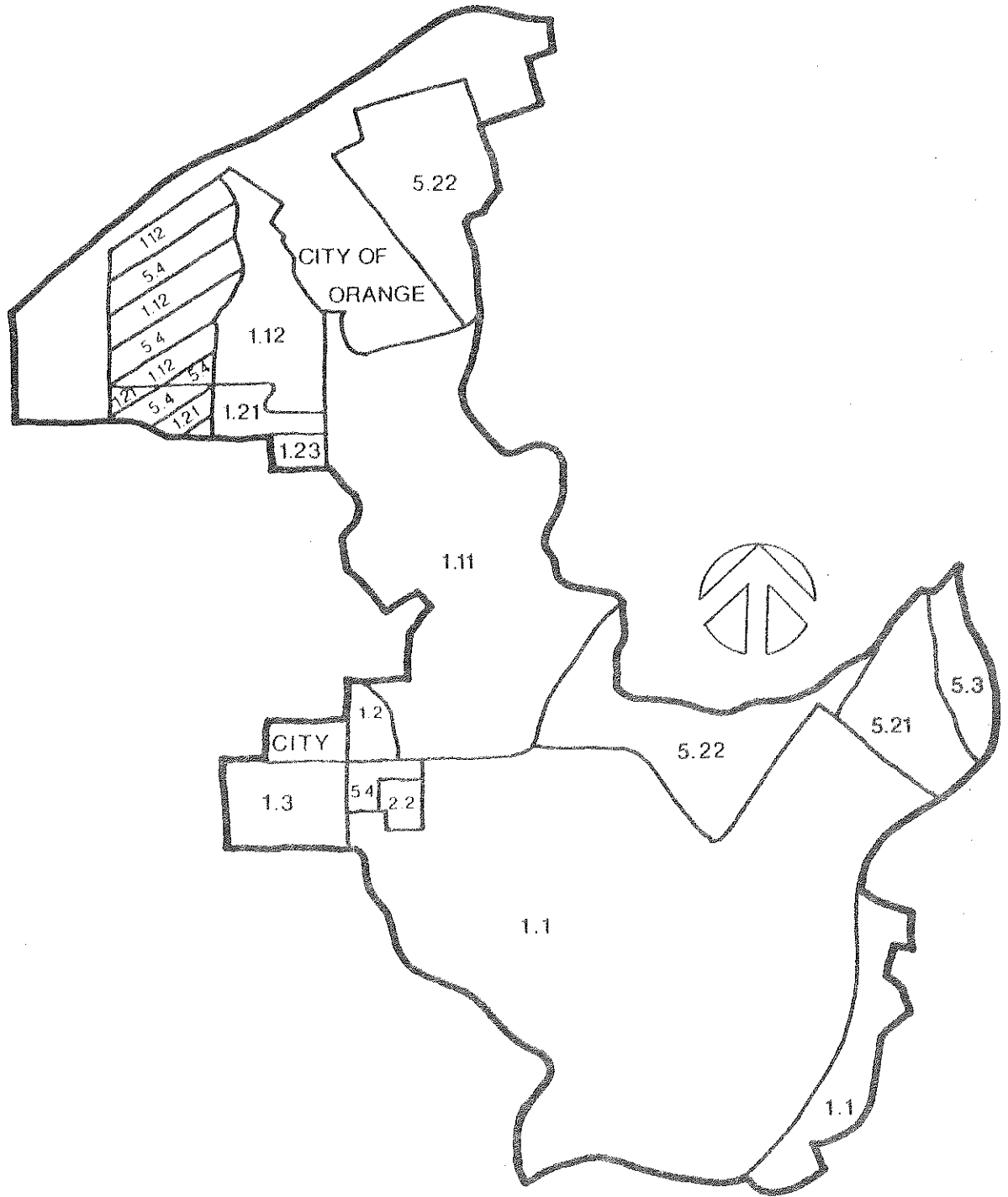
GENERAL PLAN—LAND USE

-City-



East  
Orange

16

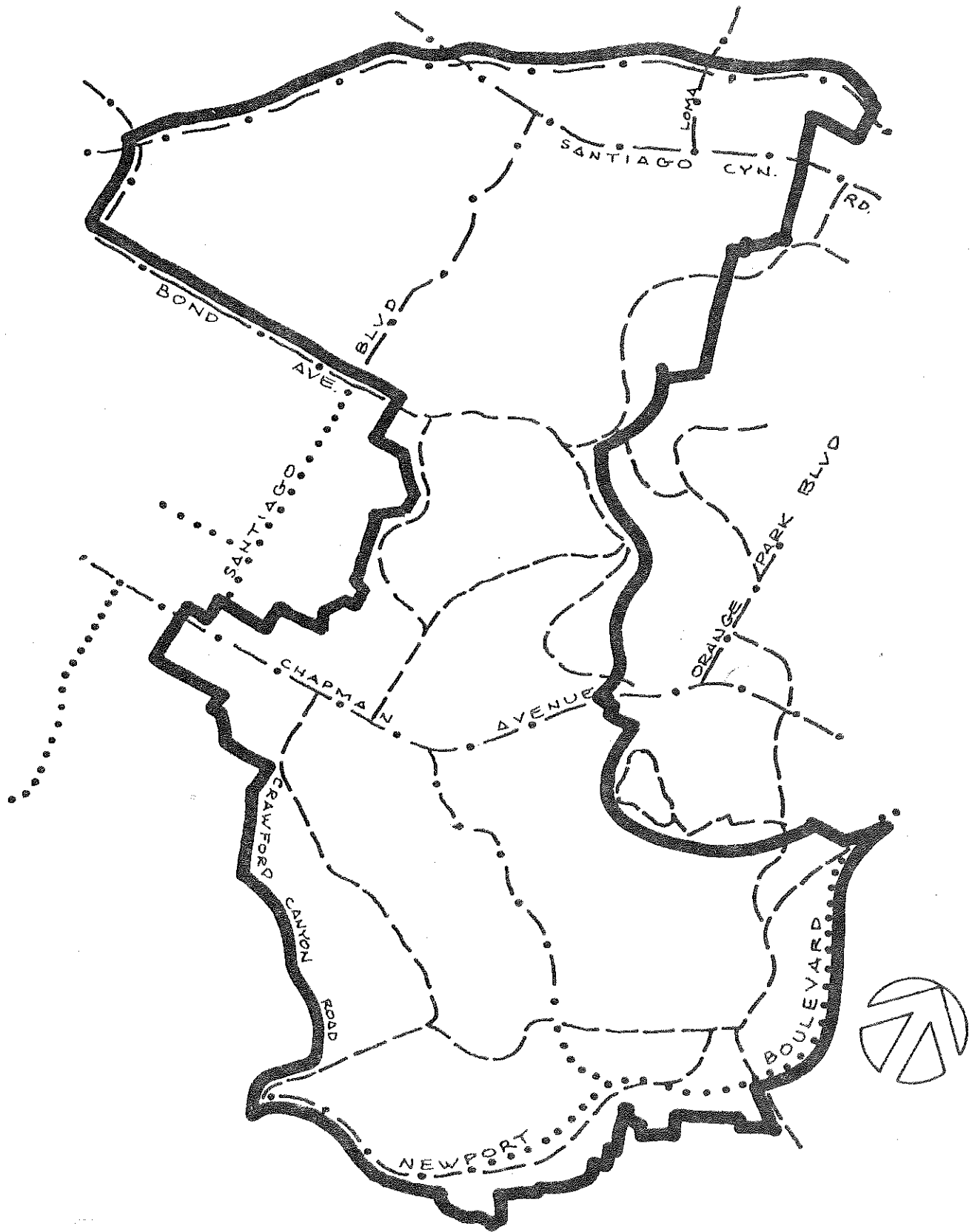


GENERAL PLAN – LAND USE  
-County-

East  
Orange

1.1	LOW, 0-2 du./ac	5.21	Exclusive Agriculture
1.12	LOW, 1-2	5.22	General Agriculture
1.21	MED-LO, 2-2.5	5.3	Recreation
1.23	MED-LO, 3-3.5	5.4	Other Open Space
1.3	MEDIUM, 3.5-6.5		
2.2	Community Commercial		

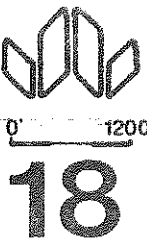




# East Orange

## Proposed Trails

-  Equestrian-Hiking
-  Bicycle
-  Combined





# ALTERNATIVE CONCEPT PLANS

## ALTERNATIVE LAND USE PLAN DESCRIPTIONS

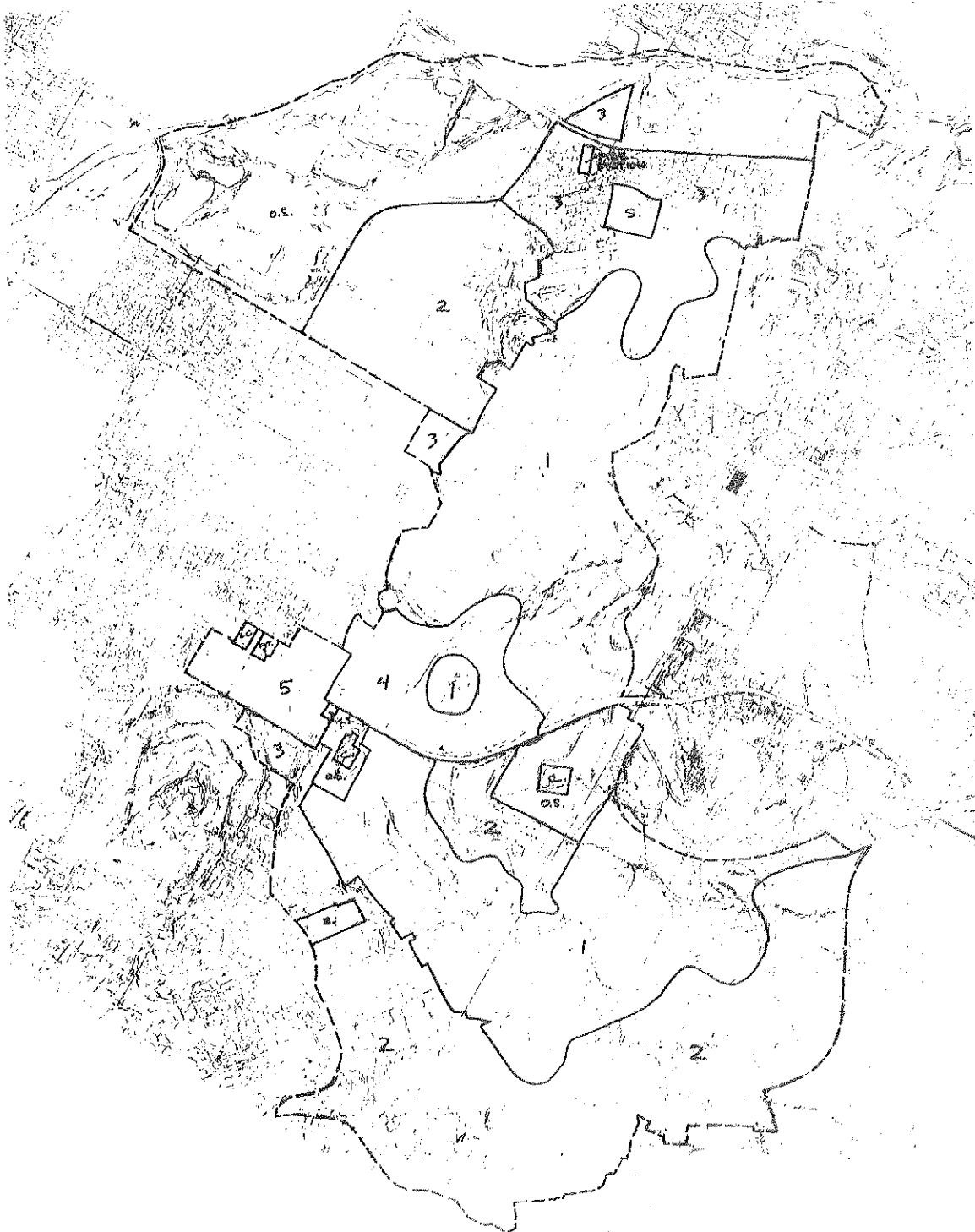
The information contained in Section II, "Existing Conditions", provided a basis for the preparation of alternative land use and circulation plans for the East Orange Area which are included in this section. Additionally, this section includes information on community input which was also used as a basis to formulate alternative concept plans.

### ALTERNATIVE "A" - CURRENT DEVELOPMENT TREND

Alternative "A" reflects what might be the ultimate land use pattern of the project area if the trends of current development continue. Although Alternative "A" provides for complete residential development of the currently vacant hill areas, residential densities which would occur would be at the very limited estate range. A central feature of Alternative "A" is the extent to which it provides for development densities which closely approximate and which are compatible with those of surrounding areas. In addition to the estate densities provided for in the hill areas, areas of level terrain are depicted as ultimately being developed in the medium and medium-high residential range. While not a plan, the "Current Development Trend" is a definite alternative.

### ALTERNATIVE "B" - HILLSIDE/OPEN SPACE CONCEPT

Alternative "B" preserves the hillsides and hilltops in a natural condition. New residential development would occur in the canyon and valley areas in the medium-low density range. New residential development in the medium-high range would occur on areas of very level terrain immediately north and south of Chapman Avenue. By concentrating residential development and utilizing the medium-high density range, the "Hillside/Open Space Concept" would provide for the largest total number of dwelling units while affording for the largest amount of open space. Alternative "B" would also allow new residential development near existing neighborhoods at a density range compatible with those currently in existence.



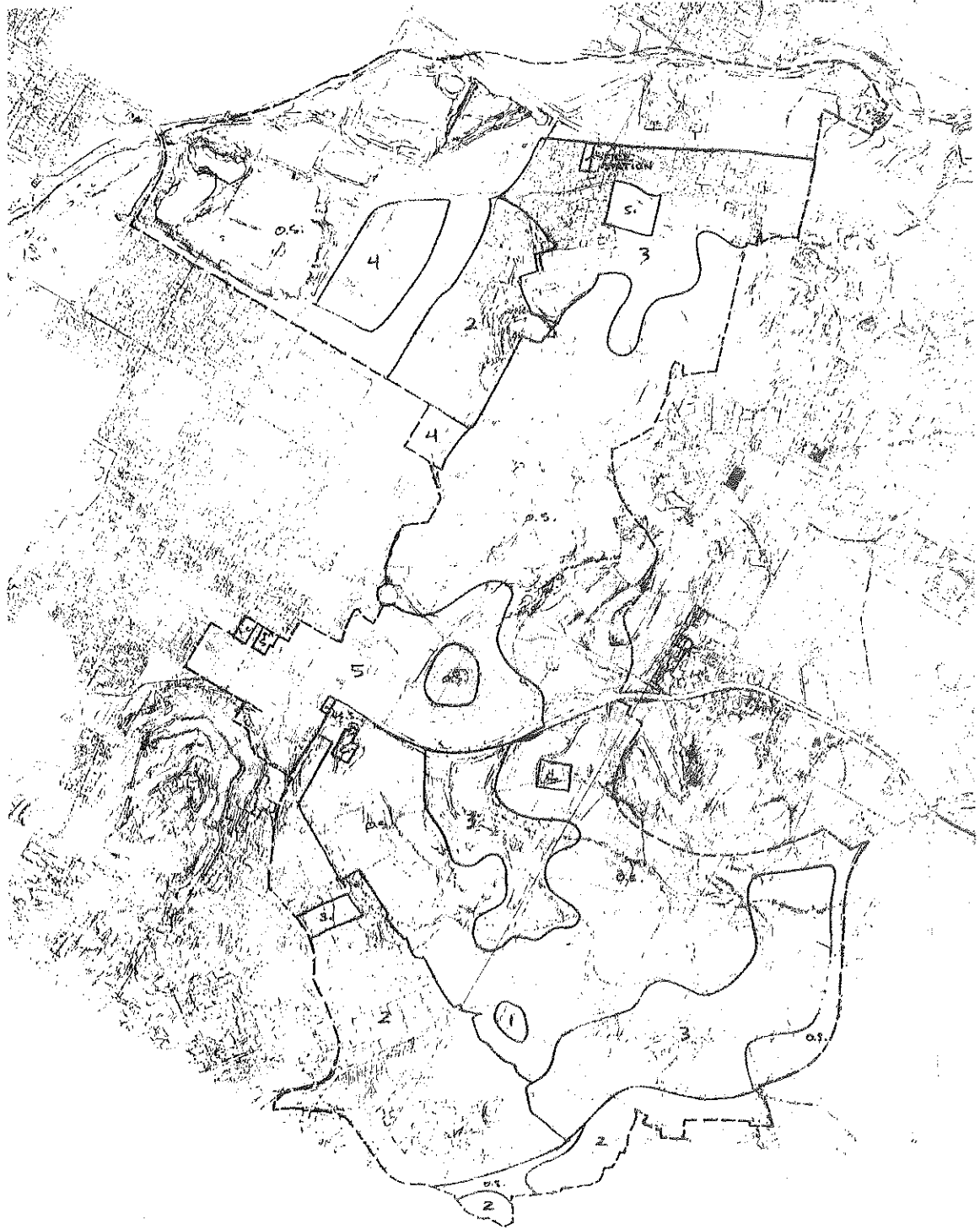
# East Orange

## ALTERNATIVE - A

RESIDENTIAL	PUBLIC/QUASI-PUBLIC
1 ESTATE 0-1 DU/AC	O.S. OPEN SPACE
2 LOW 1-2 "	LP LOCAL PARKS
3 MED-LO 2-35 "	RP REGIONAL PARKS
4 MED 35-65 "	S SCHOOLS (ELEM.)
5 MED-HI 65-15 "	
6 HIGH 15-24 "	
COMMERCIAL	
R EXIST'G RESTAURANTS	
LC LOCAL COMMERCIAL	
SS SERVICE STATION	







# East Orange

## ALTERNATIVE - B

RESIDENTIAL		PUBLIC/QUASI-PUBLIC	
1	ESTATE 0-1 DU/AC	OS	OPEN SPACE
2	LOW 1-2 "	LP	LOCAL PARKS
3	MED-LO 2-3.5 "	RP	REGIONAL PARKS
4	MED 3.5-6.5 "	S	SCHOOLS (ELEM.)
5	MED-HI 6.5-15 "		
6	HIGH 15-24 "		
COMMERCIAL			
C	EXIST'G RESTAURANTS		
LS	LOCAL COMMERCIAL		
SS	SERVICE STATION		



## ALTERNATIVE "C"

### STEEP SLOPE OPEN SPACE CONCEPT

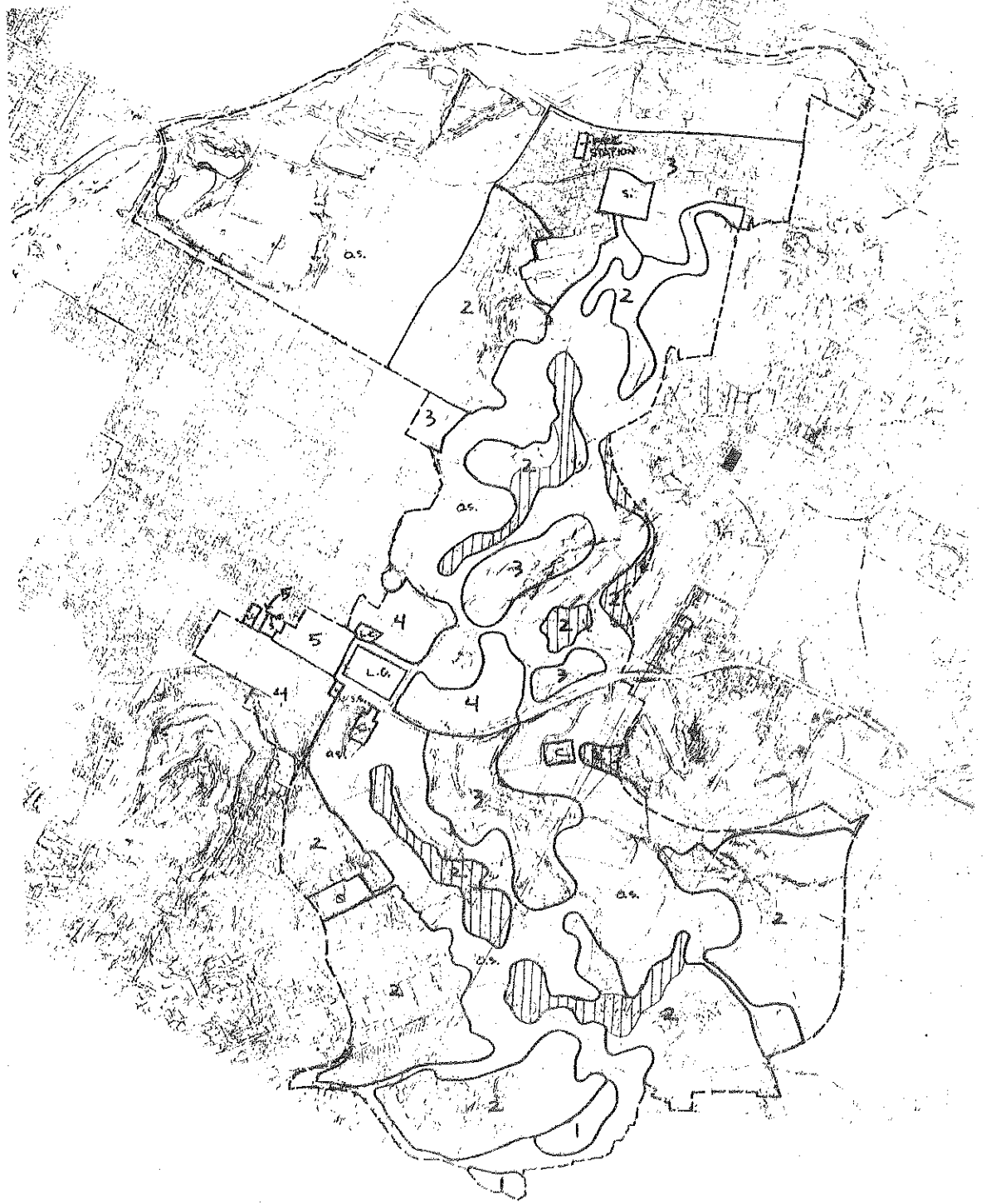
The "Steep Slope Open Space Concept" allows for residential development in only those locations where topography would lend itself to such development. If Alternative "C" were implemented, those areas of over 40 percent slope would be retained as permanent open space. By restricting residential development to areas of less than 40 percent slope, a continuous band of permanent open space and greenbelts would connect the open space hill areas and buffer the residential areas. Although residential development would occur on ridgelines and hilltops, such development would occur at low densities. Residential development at higher densities would occur at the medium-low and medium densities where topography permitted in the canyon and valley areas. In addition to residential, development Alternative "C" provides for a community commercial center north of Chapman Avenue.

## ALTERNATIVE "C'"

### STEEP SLOPE OPEN SPACE CONCEPT (Higher Densities on Ridge Development)

Conceptually identical to Alternative "C", Alternative "C'" with higher densities on ridgelines and hilltops would provide for a greater overall total number of dwelling units. Larger overall dwelling unit totals would be attained by designating as areas of medium density residential development several of the ridgeline and hilltop areas. Alternative "C'" might require a different type of dwelling unit than Alternative "C" would provide for. Another difference, although minor, is that Alternative "C'" might necessitate a somewhat different





# East Orange

## ALTERNATIVE · C

- RESIDENTIAL**
- 1 ESTATE 0-10.0/AC
  - 2 LOW 1-2 "
  - 3 MED-LO 2-3.5 "
  - 4 MED 3.5-6.5 "
  - 5 MED-HI 6.5-15 "
  - 6 HIGH 15-24 "
- COMMERCIAL**
- C EXIST'G RESTAURANTS
  - LC LOCAL COMMERCIAL
  - ES SERVICE STATION

- PUBLIC/QUASI-PUBLIC**
- OS OPEN SPACE
  - LP LOCAL PARKS
  - RP REGIONAL PARKS
  - S SCHOOLS (ELEM)



THIS CATEGORY EQUALS CATEGORY FOUR (4) IN C



J.L. WEBB PLANNING  
405 1/2 4051 BOY

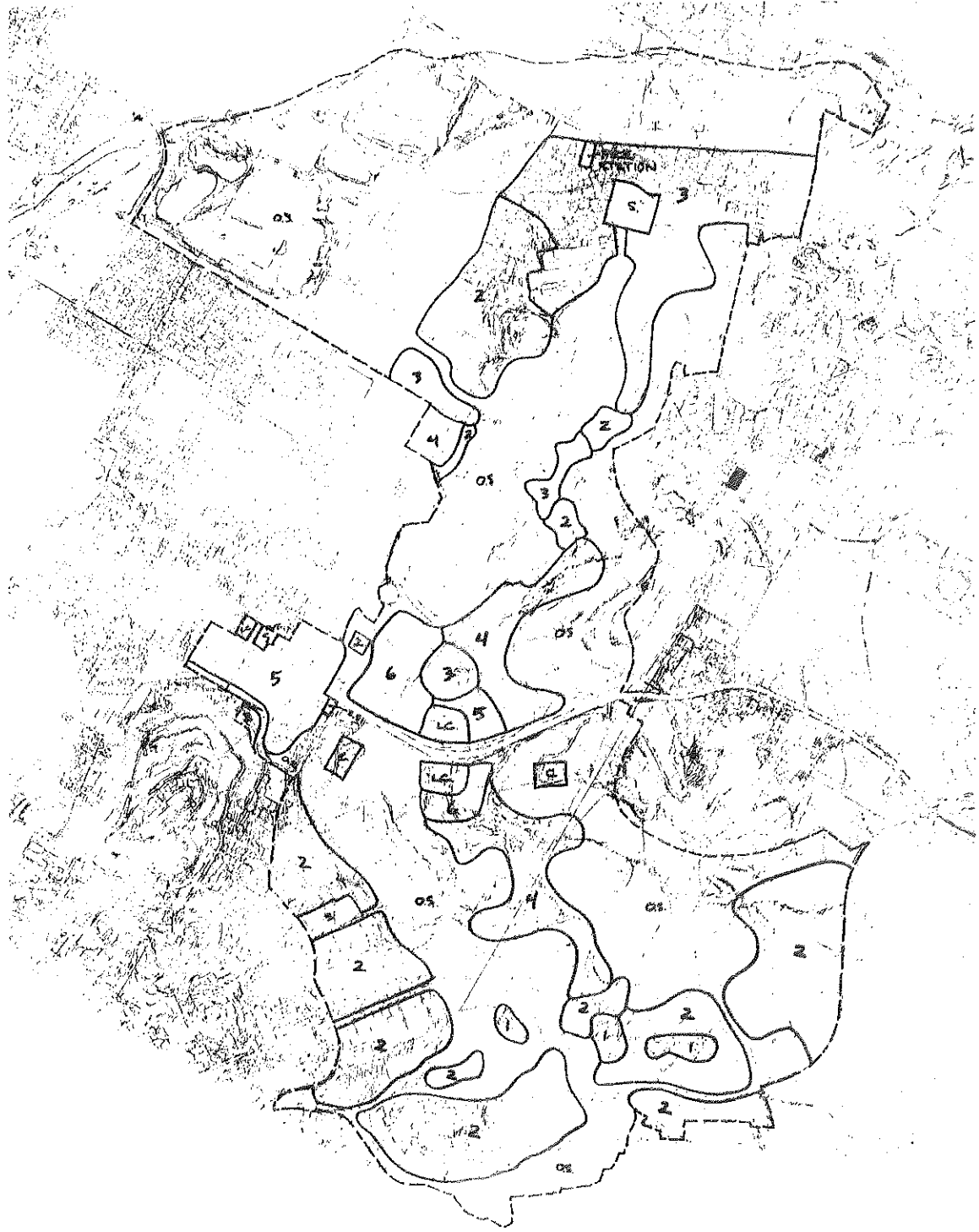
roadway configuration than Alternative "C" so as to provide access to the medium density developments on the ridgelines and hilltops.

#### ALTERNATIVE "D"

#### VILLAGE CORRIDOR CONCEPT

A village corridor consisting of residential development of varying densities with theme commercial centers, both north and south of Chapman Avenue, is the key feature of Alternative "D".

Alternative "D" is the only plan option which provides for the high density residential category (15-24 DU/Ac.). These high density residential areas as proposed under Alternative "D" would be an integral part of the commercial/residential village center connected at Chapman Avenue by an overpass. The village area would be designed so as to retain the rustic atmosphere of the East Orange Area. However, it is also anticipated that the village corridor would emphasize the transition between the urban El Modena Area on the west and the rural Orange Park Acres Area to the east.



# East Orange

## ALTERNATIVE - D

- RESIDENTIAL**
- 1 ESTATE 0-1 DU/AC
  - 2 LOW 1-2 "
  - 3 MED-LO 2-3.5 "
  - 4 MED 3.5-6.5 "
  - 5 MED-HI 6.5-15 "
  - 6 HIGH 15-24 "
- COMMERCIAL**
- R EXIST'G RESTAURANTS
  - LC LOCAL COMMERCIAL
  - ES SERVICE STATION

- PUBLIC/QUASI-PUBLIC**
- O.S. OPEN SPACE
  - LP LOCAL PARKS
  - RP REGIONAL PARKS
  - S SCHOOLS (ELEM.)



## COMMUNITY INPUT

In an effort to involve members of the community in the preparation of the East Orange General Plan, the consultant utilized a series of techniques designed to provide for the incorporation of public attitudes, opinions and interests into the Plan. In the early phases of the Plan preparation process, the consultant conducted a mailout to all property owners in the area inviting input on the Plan preparation. Also, during the course of the Study, the consultant conducted a series of meetings with property owners, area residents, land developers, homeowners associations and other individuals and groups with a concern for future development in the Area.

The letter contained in the mailout is displayed in the Appendix of this Report. A total of 597 letters were sent to property owners and residents in the project area. The letter distributed during the course of the mailout requested questions, comments on any issue and suggestions concerning any phase of the Study. In this way it was felt that residents and property owners would be given an opportunity to indicate by written response any problems which they felt to be relevant to the preparation of the East Orange General Plan. The background letter was designed to be open ended and to elicit a wide range of responses. The consultants received eighteen (18) letters (3 percent of the total) in response to the mailout.

Although the responses varied, many of them reflected the concerns of specific property owners as related to the proposed development regarding their properties. In addition to soliciting the input and suggestions of the public regarding the proposed Plan of development, the letter also served to notify the public of the Town Hall Meeting

held July 14, 1975 at Santiago Junior High School.

The Town Hall Meeting was organized to provide an opportunity for the general public to be apprised of the progress of the Plan preparation through July 14, 1975. Further, the public in attendance at the Town Hall Meeting was requested to evaluate the alternative concept Plans which had been developed by the consultant. An example of the of the results is depicted below. Although it is estimated that between 175 and 200 persons attended the Town Hall Meeting, only 91 persons elected to participate in the Plan evaluation process by selecting a Plan alternative which they felt satisfied the future interests of the Area. Additionally, those persons responding to the Plan evaluation process were afforded the opportunity to indicate factors which they considered to be most important in making their decisions. Moreover, respondents were given an opportunity to identify both positive and negative aspects of each of the alternative concept Plans. As with the letter contained in the mailout, the intent of the evaluation process of the Town Hall Meeting was, insofar as possible, to obtain a breadth of comments or suggestions regarding the alternative plans.

The results of the evaluation process which took place during the Town Hall Meeting are illustrated below by order of vote.

<u>*Alternative</u>	<u>No. Favoring Plan</u>	<u>Percentage</u>
D	26	29
B	24	26
C	17	19
A	13	14
C'	11	12
<hr/>		
	91	100
<hr/>		

\*The Alternatives may be referred to in Section III

In addition to the results prepared on the alternative concept Plans, results were tabulated for each of the factors which the public indicated was significant in making their choice on a Plan alternate. These factors are indicated below by relative importance.

<u>Plan Characteristic</u>	<u>Number of Responses</u>	<u>%</u>
Provides for compatibility with surrounding land uses and life-styles	54	27
Allows development with the least disruption to existing land forms, geology, vegetation and wildlife.	51	25
Preserves the positive balance of open space and recreation areas to developed areas.	43	21
Affords maximum economic benefit while providing for a variety of housing types	24	11
Creates the most positive image of the Area while preserving best views from the site.	20	10
Incorporates the most desirable circulation, trails and traffic patterns.	11	6
TOTAL	203	100%

Beyond the input supplied by the public response to the mailout and Town Hall meeting, the consultant received further suggestions, and recommendations and was advised as to significant issues in the Area by the "East Orange Planning Committee".

The Plan alternatives as selected by the Committee are indicated below in order of preference:

Alternative

- D
- B
- C & C'
- A

In addition to selecting the plan alternative which they felt to be most appropriate, members of the Committee were asked to identify the features of each alternative which they felt to be of significance. Generally, the Committee believed that the following factors were most important in the plan which they selected:

- Compatibility with topography
- Fit with geology
- Compatibility with existing and proposed circulation
- Opportunities for recreation and open space
- Most positive plan

In addition to the evaluation process carried out by the public and members of the East Orange Study Planning Committee, the alternatives were presented to Staff members of the City and County of Orange in order to obtain their input and evaluation.

## CIRCULATION ALTERNATIVES AND EVALUATION

Herman Kimmel and Associates have completed an analysis of traffic conditions for the East Orange Area. This analysis includes examination of the existing conditions and of three alternate highway circulation systems to service projected development. Their Report is included in the following text of this Report. In addition to the development and use of computer simulations of vehicular traffic in the East Orange Area, various alternative and supplemental modes of transport have been examined for their impact on trip making behavior. These modes include: regular transit, as represented by the Orange County Transit District, bike trails, hiking trails and equestrian trails.

### Future Conditions

#### Land Use

It was assumed that when fully developed, the Study Area will remain primarily residential with an increase in overall density and total number of dwelling units with a corresponding decrease in open space. The Irvine Company property to the east was assumed to be developed as enclave type housing projects with some community support facilities, at an overall residential density of one to two dwelling units per acre (Irvine Company General Plan). The land northerly of the site (Anaheim Hills) is planned for development as low and medium density residential communities with actual construction being phased through the year 2010 (Santa Ana Canyon/Santiago Creek Cost-Benefit Study).

Land use for the site in the Study represents the most intensive development plan under consideration; and was used to test and evaluate different circulation alternates.



<u>Land Use</u>	<u>Acreage</u>	<u>No. of DU's</u>
Single Family (6 DU/Ac or less)		2304
Multiple Family (6.5-15 DU/Ac)		1926
Neighborhood Commercial	10 Ac.	
<b>TOTAL</b>	10 Acres	4230

The proposed commercial area indicated above will be located on the north side of Chapman Avenue and east of the Chapman Avenue/ Crawford Road "T" intersection. Primary access will be onto Chapman Avenue with possible access to Loma Road.

Land Use data through traffic volumes for the Area, constituting the sphere of influence of the Study Area, was taken from the Herman Kimmel and Associates Central-South Orange County Transportation Model and from 1990 land use projections of the Los Angeles Regional Transportation Study.

#### Roadways

Three alternate systems of circulation were evaluated. The basis of all of these systems was the Orange County Master Plan of Arterial Highways with the following modifications:

##### Alternate 1

- Deletion of the extension of Loma Road between Santiago Canyon Road and Chapman Avenue.
- Deletion of Bond Avenue as a through highway east of Santiago Boulevard.
- Deletion of the northerly extension of Orange Park Boulevard between Serrano Avenue and Santiago Canyon Road.

### Alternate 2

- Inclusion of the extension of Loma Road between Santiago Canyon Road and Chapman Avenue.
- Deletion of Bond Avenue as a thru highway east of Santiago Boulevard.
- Inclusion of the northerly extension of Orange Park Boulevard between Serrano Avenue and Santiago Canyon Road.
- The southern end of the Loma Road extension is aligned to cross Chapman Avenue at Crawford Canyon Road.

### Alternate 3

- Inclusion of the extension of Loma Road between Santiago Canyon Road and Chapman Avenue.
- The southern end of the Loma Road extension is aligned to cross the planned secondary highway that approximately bisects the area outlined by Crawford Canyon Road, Chapman Avenue and Newport Boulevard.
- Deletion of Bond Avenue as a thru highway east of Santiago Boulevard.
- Deletion of the northerly extension of Orange Park Boulevard between Serrano Avenue and Santiago Canyon Road.

Each of these alternates was examined using a computer simulation model of travel behavior. The mathematical models used within the overall simulation model calculate values for all variables included in the trip making process. The models used attempt to approximate trip generation, desirability of different destinations, and the desirability of choosing different routes to arrive at a destination. A more technical treatment of the simulation model is given in the Appendix of this Report. By changing the definition of the circulation system in the model while holding land use and system user characteristics constant, it was possible to effectively examine the impact of each of the three circulation alternates on the traffic volumes carried by the roadways in East Orange-El Modena Area.

It should be mentioned that no attempts were made to account for diversion of person trips due to transit, car pooling or other alternate

modes. The vehicle trip generation rates used reflect the averages of available research counts done on similar land use categories with unknown trip diversion factors.

#### Analysis of Circulation Alternates

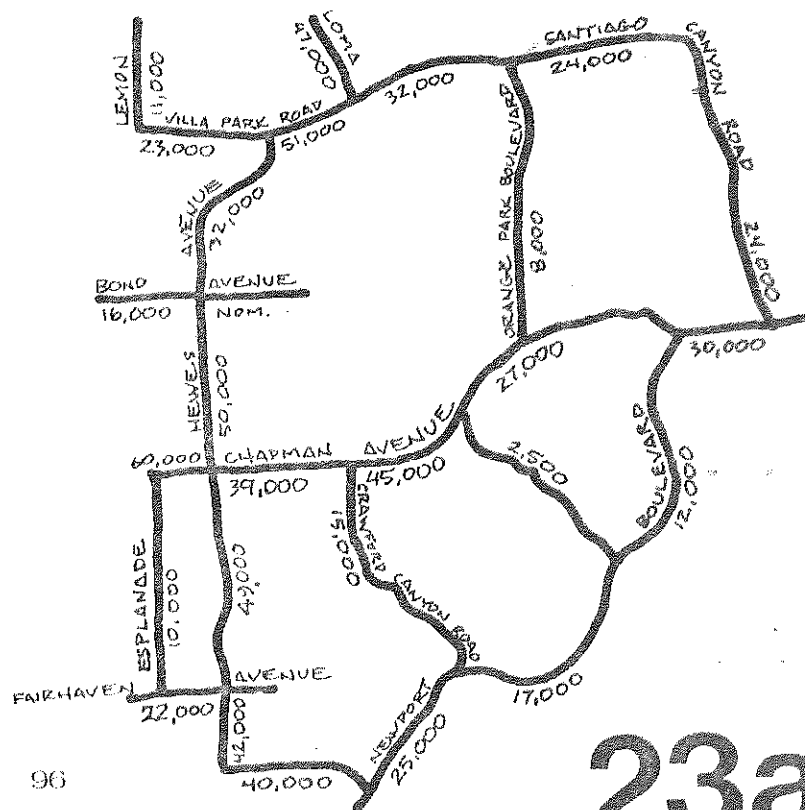
Using the results of computer simulation, two major travel corridors can be identified. The first of these runs west to east (and east to west) from urban Orange and the Newport Freeway east toward Irvine Park and the Santiago Canyon area of the Irvine Ranch. Though a significant amount of thru traffic utilizes this route, the parallel roadways that comprise this corridor, Villa Park Road, Santiago Canyon Road and Chapman Avenue seem able to marginally carry this traffic thru the East Orange area. Though higher volumes are shown for all alternates on Santiago Canyon Road between Hewes Avenue and Loma Road, examination of the links of this road to the west of Hewes Avenue and the one to the east of Loma Road indicates these volumes are due to north-south travel attempting to make the connection between Loma Road and Hewes Avenue. This conclusion is further supported by the fact that in both alternates 2 and 3, where an alternative to the Loma to Hewes movement exists, volumes on Villa Park Road west of Loma drop significantly. A similar type of problem exists for Chapman Avenue just east of Crawford Canyon Boulevard. The two alternates that include the extension of Loma Road thru the planning area, both show increases in traffic volumes on Chapman Avenue east of Crawford Canyon Road. The first seems to be due to desirability of the traffic movement from Orange Park Boulevard (in this alternate Orange Park Boulevard is a thru route north to Serrano Avenue and is carrying a substantial volume of thru traffic) across Chapman Avenue to Crawford Canyon Road. In the second alternate this movement is

combined with the one from Loma to Crawford Canyon and because of this offset shows a still further increase in traffic volumes.

The primary contributor to the high volumes shown in alternate 1, on Chapman Avenue between Crawford Canyon Road and the unnamed secondary arterial to the northeast, is the 10 acre neighborhood commercial center planned for this area. The center causes a locally intense impact on Chapman Avenue.

The second identified corridor runs from the north to the southwest. From Anaheim Hills, the Riverside Freeway, and major employment centers north of the freeway southwest toward Tustin, employment centers in west Irvine and in Santa Ana and to the beach cities. This is the corridor that presents the greatest problems of providing adequate service to vehicular traffic using it. Because the changes in the highway system that were examined primarily impact this corridor, each alternate will be analyzed separately.

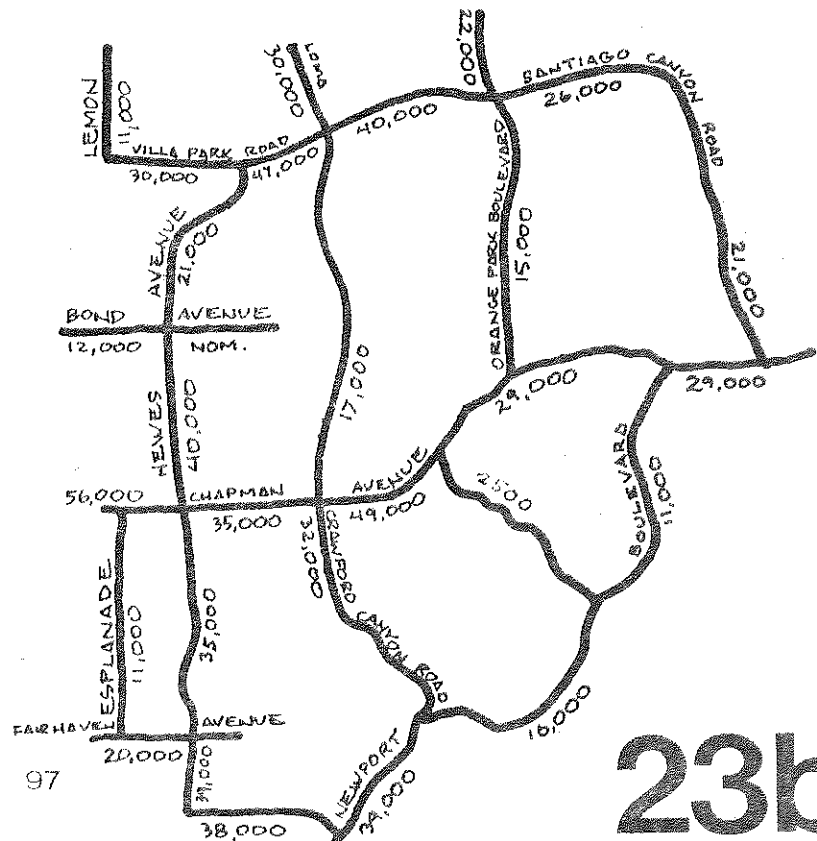
Alternate 1



Traffic volumes on Loma north of Santiago Canyon Road indicate the need for a major highway (six lane divided) to adequately serve traffic using this facility since Loma Road is the only arterial east of Santiago Boulevard and west of Weir Canyon Road extending from the Riverside Freeway thru the Anaheim Hills region to Santiago Canyon Road and because in this alternate Orange Park Boulevard does not go thru to Serrano Avenue. High volumes on Villa Park-Santiago Canyon Road and on Hewes Avenue are also the result of this strong north-south movement. Hewes Avenue is the only practical route for north-south thru traffic.

Volumes on most of the links in the East Orange north-south corridor, including Hewes Avenue and Loma Road would require reclassification and redesign of these roadways. In addition, special measures would have to be adopted to assure reasonable flow at affected intersections. (See diagram- Alt. 1, page 96)

Alternate 2

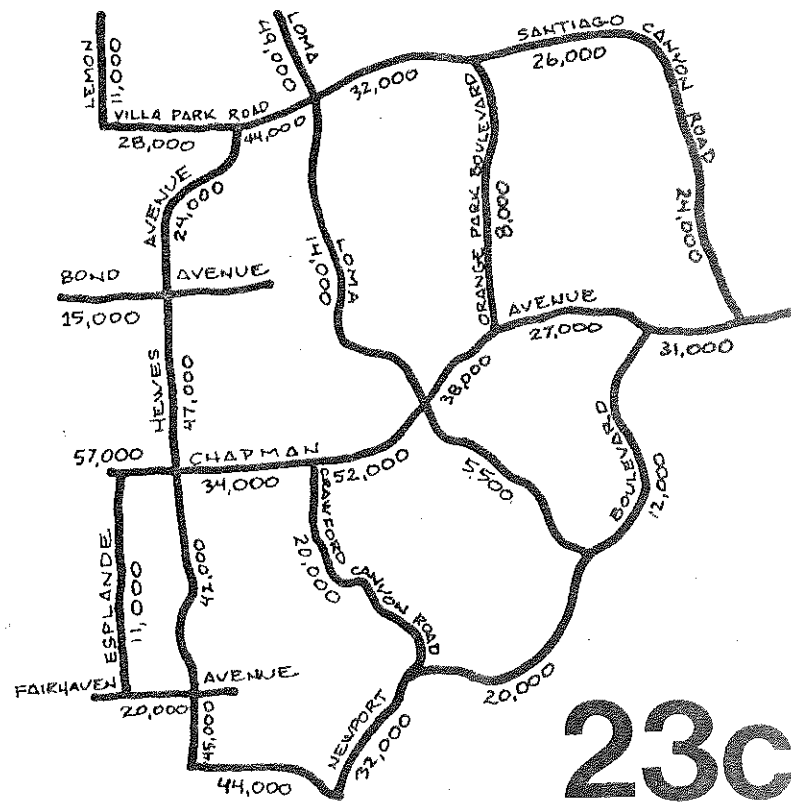


The extension of Orange Park Boulevard from Santiago Canyon Road to Serrano Avenue provides an alternative north-south route thru to Chapman Avenue. This has the affect of shifting a significant portion of the traffic to the most easterly link (Orange Park Boulevard). In this alternate, Loma was extended south to Chapman Avenue providing another alternative route besides Orange Park Boulevard for Hewes Avenue as far south as Chapman Avenue. Hewes, because of its western alignment, and the lack of good thru routes as far west as the Newport Freeway, still carries the highest volume of traffic. (See diagram- Alt. 2)

South of Chapman Avenue, traffic is more equally distributed between Hewes Avenue and Crawford Canyon Road. As the southerly extension of Loma Road, Crawford Canyon provides a good alternate thru route equal to Hewes. It is also a desirable route for traffic utilizing Orange Park Boulevard as a southerly thru route. Traffic on Santiago Canyon Road east of Loma shows increases due to increased travel both north and south on Orange Park Boulevard.

The two highways in the north-south corridor adversely affected in this alternate are Hewes Avenue and Crawford Canyon Road. Despite significant diversion to Loma Road and to Orange Park Boulevard, Hewes could still not function adequately under its present master plan classification as a secondary arterial highway. In this alternate the increased attractiveness of using Crawford Canyon Road as a thru southerly route has caused it to exceed the practical operating capacity of its present arterial classification, a secondary highway.

Alternate 3



Alternate 3 (see diagram above) is very similar to alternate 2 except for the more easterly alignment of the Loma Road extension and the deletion of Orange Park Boulevard north as an alternative route to Loma Road across Santiago Creek to Serrano Avenue. This deletion again causes very heavy loading on the north segment of Loma Road and serious difficulties with left turns off Santiago Canyon Road onto Loma Road. Less diversion of thru traffic from Hewes to Loma occurs because of longer travel distances involved using realigned Loma Road.

The main goal for suggesting this alternate highway alignment was to divert a significant volume of traffic from Crawford Canyon Road to the parallel secondary arterial northeast of it. Less

traffic was diverted than might have been because of less travel time in use of Crawford Canyon Road as a thru southerly route. The desirability of Crawford Canyon also causes a heavy traffic movement between it and Loma Road, resulting in a section of Chapman Avenue carrying very high volumes. Some diversion to this alternate causes an increase in volume on Newport Boulevard just north of Crawford Road.

The volumes shown in this alternate would require the upgrading of a number of streets in East Orange. Hewes Avenue would have to become a major arterial south of Bond Avenue. Sections of both Santiago Canyon Road and Chapman Avenue would have to be upgraded to major highway standards to carry the heavy traffic resulting from the two intersection offsets in the north-south corridor. Special intersection designs would have to be considered to handle turning movements at the four intersections affected. It is possible that favorable road and intersection design could increase the diversion from Crawford Canyon Road to the easterly arterial.

#### Transit, Bikeways, Hiking and Equestrian Trails

Some form of local transit and regional transit could have an impact on the traffic situation in the East Orange Area. A shopping shuttle (already suggested by the planner) could reduce the number of vehicles entering and leaving the 10 acre\* commercial center thus reducing local volumes on Chapman Avenue.

Orange County Transit District has a policy of expanding their bus route system and service on the basis of demand for that service.

\* Circulation analysis was based on 10 acre commercial area as included in Alternatives "C", "C'" & "D".



As such demand develops, it is assumed service will be provided in the East Orange Area. The City of Orange currently has a dial-a-ride system. If the East Orange Area were annexed by Orange, this system may be available to residents.

Bikeways, hiking trails and equestrian trails will probably continue to serve recreational traffic almost exclusively. There is an extensive system of bikeways and trails planned for East Orange but the isolation from major commercial and employment centers and a hilly terrain will probably keep both of these from ever being a significant mode of transport for other than recreation and local (intra-community) trips.

#### Results of Circulation Analysis

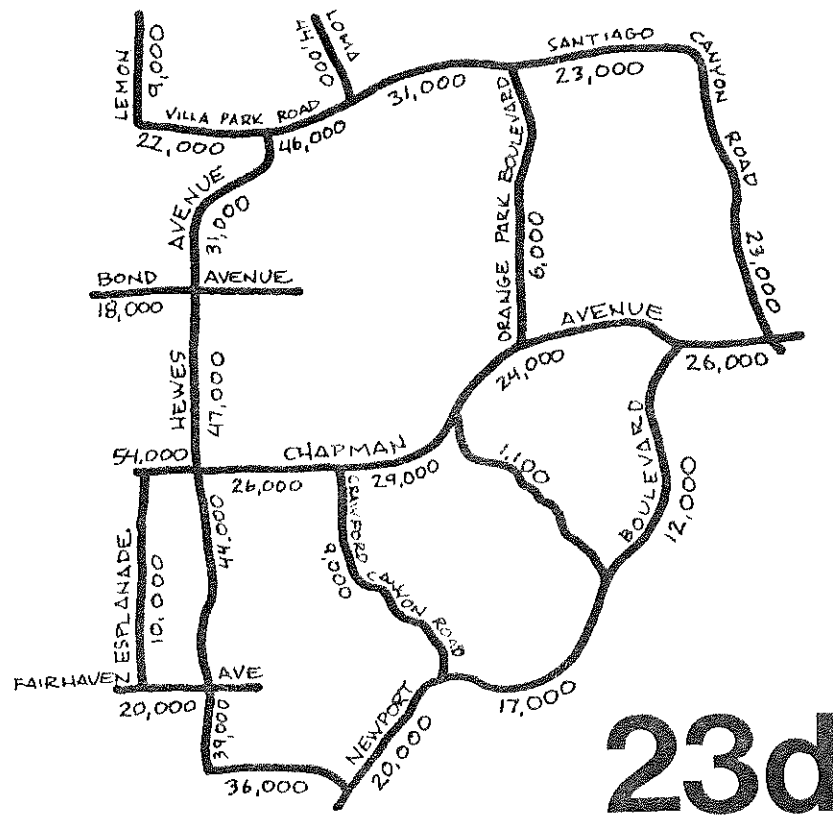
Each of the circulation alternates that have been examined would require highway improvements and master plan reclassification to carry the estimated traffic volumes. Intersection offsets of thru north-south routes would require special intersection design to handle turning movements in the corridor. East-west traffic could probably be dealt with less drastic measures than arterial reclassification and widening.

A thorough analysis and possible modification of land uses in and around East Orange, such as Irvine Ranch and Anaheim Hills, in conjunction with circulation system modification, are necessary to develop compatible plans.

It should be noted that the Traffic Study utilized the worst case as far as projected numbers of dwelling units for East Orange since this Study was completed during the development of a proposed plan and represents

about twenty-three (23) percent increase over what is proposed in this Plan.

In addition, to further assess the impact of East Orange traffic on the arterial road system, a projection of traffic without any development in the East Orange Area was made ( shown on the following diagram)



This shows that without any development in East Orange, there are still problems with the circulation network regarding the north-south travel demand. This stems primarily from the Anaheim Hills development, North Tustin and the Irvine Ranch development areas.

Since the traffic analysis has pointed out a regional problem, it is in the interest of East Orange, Tustin, El Modena and surrounding

communities to support a regional traffic study which will address itself to the issues of finding ways to lessen traffic on the existing arterials and determine the need for proposed arterials such as the Loma extension to Crawford Canyon Road.

When considering solely the East Orange Area, the Loma extension is not needed or desired to serve the East Orange Area and would cause a significant environmental disturbance and an increase in traffic on Crawford Canyon Road if connected to Crawford Canyon Road. Since this is a land use Plan, it is not proposing that Loma be eliminated at this time even though it would be desirable. But rather, it is necessary that the problem be dealt with at the appropriate scale which is a regional level. This Study should ask what steps may be taken to eliminate the regional need for a Loma extension and what can be done to lessen the impact on the arterial systems such as Hewes Avenue.

#### SUMMARY OF ALTERNATIVE PLANS

The preparation of the proposed General Plan for the East Orange Area was based on the results of the evaluation of the alternative plans for the Area as well as the recommendations of the consultants on geology, biological resources, engineering and circulation. An attempt was made to incorporate key features of each of the alternative plans identified during the plan evaluation process. Additionally, it was believed that the plan should reflect desirable characteristics for East Orange which had not previously been considered but which were brought to light during the plan evaluation process.

The most desirable features of Alternative "A", "The Current Development Trend", which have been incorporated into the proposed

Plan include density range, housing type and price range compatibility for almost all locations within and immediately adjacent to the project area. From the "Hillside/Open Space Concept" (Alternative "B") is taken the idea of the preservation of the open space hill areas almost in their entirety. This concept has been applied to the area immediately north of Chapman Avenue. South of Chapman Avenue, in the South El Modena Hills, topographic constraints and development requirements necessitated a somewhat different approach and is essentially that contained in the "Steep Slope Open Space Concept" (Alternative "C" & "C'"). Development will be permitted at various elevations, where such development would exist generally on areas of less than forty (40) percent slope. The idea of a village center with a western/rural theme was one of the characteristic qualities of the "Village Corridor Concept" (Alternative "D") which has been included in the proposed General Plan. Additionally, it is believed that the proposed General Plan will emphasize the transition between the rural Orange Park Acres Area on the east and the urbanized El Modena Area to the west.

In addition to unique features of each of the alternatives, the proposed General Plan will incorporate many of the characteristics of the alternatives which were common to more than one of the plans. For example, the Santiago Creek Greenbelt and proposed County Regional Park as well as a residential/commercial center which will provide for the creation of fifty apartment type dwelling units above the commercial center contained in Alternatives "C", "C'" and "D" have been included in the proposed General Plan.

Tables # 11 and # 12, which follow, include quantitative and qualitative evaluations of each of the alternative plans which were prepared.

ALTERNATIVE CONCEPT PLAN  
QUANTITATIVE EVALUATION SUMMARY

MINIMUM DENSITY RANGE

	"A"	"B"	"C"	"C'"	"D"
Residential Acreage	1473	801	861	710	
Projected Population	5693	7215	5496	6754	6708
Projected DU's	1584	2116	1498	1838	2043
Residential Density	1.07	2.64	1.73	2.13	2.88
Gross Density	.83	1.11	.79	.97	1.08
Percent Open Space Recreation	14%	50%	46%	46%	54%
Market Value *	109.8	128.8	113.8	129.6	118.3

MAXIMUM DENSITY RANGE

Residential Acreage	1473	801	861	861	710
Projected Population	11,780	12,978	8519	10,059	10,709
Projected DU/s	3277	3877	2319	2735	3289
Residential Density	2.22	4.84	2.69	3.18	4.60
Gross Density	1.73	2.04	1.22	1.44	1.73
Percent Open Space Recreation	14%	50%	46%	46%	54%
Market Value*	243.8	227.7	172.8	188.4	191

\* Numbers shown indicate millions of dollars

TABLE # 11

ALTERNATIVE CONCEPT PLANS  
QUALITATIVE EVALUATION

Level of Compatibility

- + = Positive
- = Negative
- o = Moderate

Desired Characteristic	PLAN ALTERNATIVE				
	"A"	"B"	"C"	"C'"	"D"
1. Provides for compatibility with topography & landforms	-	+	+	+	+
2. Maintains compatibility with geology	-	+	o	o	o
3. Provides sensitivity to vegetation and wildlife	-	+	o	o	+
4. Affords maximum potential for view from the site	o	-	o	+	-
5. Retains rural character of the Area	+	o	+	o	o
6. Fits with proposed trail systems	-	+	+	+	+
7. Furnishes a diversity of housing types to meet the needs of a variety of income levels	-	-	+	+	+
8. Provides for the greatest amount of open space	-	+	o	o	+
9. Promotes an increase in land values	+	+	-	o	o
10. Provides for compatibility in existing lifestyles	+	o	+	o	+
11. Requires least modification to existing visual image	-	+	-	-	o
12. Is compatible with existing and proposed circulation	o	+	+	o	+
13. Is economically feasible	+	+	o	+	+
14. Is socially feasible	o	o	+	o	+

TABLE # 12



# PROPOSED PLAN

## PROPOSED PLAN

The proposed General Plan for East Orange is a design for the Area which incorporates the best features of several alternative plans developed for the Area during the course of the Study. The Plan is based on the assumption that an environmentally sound, socially desirable and economically feasible plan for the East Orange Area could be constructed as the result of the combined efforts of residents, property owners, developers and planners.

The central theme of the proposed General Plan is the provision of needed residential development in the Area while simultaneously providing for the protection of the environmental assets of the Area. Key features of the Plan include a proposed eight acre theme commercial center, a variety of housing types and an extensive open space-greenbelt network. (See Exhibit # 24, Proposed General Plan-Land Use)

### LAND USE

The proposed General Plan calls for the largest category of land use to be in the residential classification. The anticipated range of residential densities by acreage is indicated below:

Estate	0-1 DU/Ac.	20.11 Acres
Low	1-2 DU/Ac.	176.66 Acres
Medium low	2-3.5 DU/Ac.	130.26 Acres
Medium	3.5-6.5 DU/Ac.	182.76 Acres
Medium high	6.5-15 DU/Ac.	70.18 Acres





The higher residential densities as proposed in the General Plan occur primarily in those areas of relatively level terrain immediately adjacent to Chapman Avenue. The medium range is designated for some canyon areas and occurs in the hill areas on slopes of less than forty (40) percent. Additional residential density categories at the medium-low, low and estate ranges are scheduled for development where such categories would be compatible with existing densities. For example, in the Hillsboro and Santiago Heights areas where the low density range currently exists, only 1-2 dwelling units per acre would be permitted.

It is believed that by designing, where possible, new developments to be compatible with existing residential densities, that appropriate continuity of architectural style, house size and price range may be maintained.

One of the more unique features of the proposed Concept Plan is the eight acre commercial village which would include fifty residential units located above the commercial complex. Both the residential and commercial units will incorporate a rural/western theme emphasizing distinctive architecture, landscape treatment and building colors. It is anticipated that the commercial center would serve as a focal point for social as well as trade activity in East Orange. In addition to the theme orientation and style of the commercial center, specialty shops offering equestrian and western goods are planned in addition to shops providing standard goods and services.

Since the commercial village has been designed to serve residents within and immediately adjacent to East Orange, attention was devoted to the provision of appropriate pedestrian and equestrian trail systems

as well as vehicle access to the commercial center. The theme commercial village represents the only large new commercial area planned for East Orange. Other new commercial uses would occur as extensions of existing commercial facilities. For example, extension of commercial property for the area immediately east of the Orange Hill Restaurant directly south of Chapman Avenue is planned. Also, the enlargement of the area presently used for the Orange County Mining Company is a possibility.

### OPEN SPACE

At that point when the proposed Concept Plan is fully implemented, East Orange will contain an assortment of open space categories. At the small scale, existing local school facilities will continue to be important recreation/open space uses and will be augmented by trails and paths connecting them to other larger open space areas. A second category of open space areas will include the two local parks planned for the Area, one immediately east of Santiago Junior High School and another on the site of the existing 4-H facility north of Newport Boulevard. Both locations were planned as local parks because they afford ease of access and have relatively smooth topographic features. As alternatives to local parks for those sites adjacent to Santiago Junior High School and along Newport Boulevard, encourage the use of 4-H facilities, Girl Scout and Boy Scout facilities, community recreation facilities, etc. to provide for quasi-public use of these areas compatible with the existing and proposed environment. Variations of the local parks are the wilderness parks planned for the South El Modena Hill areas which serve to connect the residential uses in the South El Modena Hills. It is intended that the wilderness parks be retained, insofar as is possible, in a natural state.

At another and much larger scale would be the Santiago Creek Greenbelt designated for the area currently used for sand and gravel extraction, as well as the County Regional Park immediately north of Bond Avenue and east of Hewes Avenue. Through the use of small trail connections, it is intended that users of trail systems in the Area will be able to move from the regional park directly to the open space hill areas. It is the large open space areas in the North and South El Modena Hills which will form the backbone of the open space network in East Orange. Not only have large amounts of the open space hill areas been preserved, but it is felt that the hilltops and ridgelines with the most significant visual impact have been preserved.

## EDUCATION

The proposed Plan for East Orange will generate between 1990 and 3260 students in grades K-12 at ultimate development approximately ten years from now. Since only about 250 students in grades K-12 at a maximum are expected to be served by the Tustin Unified School District, the discussion will center on the impact of the students on the Orange Unified School District. Of the approximately 3000 students about 500 are projected to be in grades K-6, 800 in grades 7-9 and 700 in grades 10-12. Approximately 400 K-6 students are estimated to currently exist in the East Orange Area. Therefore, 660 could be taken by the new elementary school which would be required next to Santiago Junior High, leaving approximately 440 students. Linda Vista could take up to 130 additional K-6 students if another one and one-half acres of land is provided as proposed in this Plan. Panorama Elementary could house an additional 50 K-6 students which leaves a need for approximately 220 students to attend the Orange Park Acres Elementary School.

For junior high school needs, assuming  $100^+$  students attend Santiago Junior High, there will be a need to house an additional 700 K-9 students at the Orange Park Acres site.

In terms of high school needs, there would be pressure on El Modena High School for any generation of high school students exceeding 70 in number. Therefore, until the new high school in Anaheim Hills is constructed around 1980 to carry 630 students from this Area, the El Modena High School would be impacted with these students. It appears that the development in East Orange and other areas to the

east and north will bring about pressure to move up the date for construction of a high school in the Anaheim Hills Area.

The projection figures used are based on an overall dwelling unit factor suggested by the Orange Unified School District. It should be emphasized that there is not an accounting for students from areas outside of East Orange which will need to use these same schools. However, there has not been an accounting for the fact that extended day schools can increase the enrollment capacity. Also, the use of portable classrooms can relieve much of the pressure on schools. It should also be stressed that the projections are for the maximum number of dwelling units for this Plan.

In summary, without any provisions of additional school sites within the East Orange Area, it is felt that the student needs can be met. There will, however, be pressure on the high school and, depending upon building programs by the District, impact on junior high and elementary schools of the Area.

## CIRCULATION

In view of the fact that there are currently several unresolved problems with respect to the north-south traffic corridor within which East Orange is situated, the proposed Concept Plan supported by the East Orange Study Planning Committee and the consultants recommend that a regional transportation study be conducted. It was determined by both the Committee and the consultants that the resolution of regional transportation problems is beyond the scope of a General Plan for a 1900<sup>+</sup> acre area. While not making recommendations on the appropriate configuration of arterial highways, the Concept Plan by its design implies desirable features of local access roadways.

One of the suggestions for the local circulation system is that loop, curvilinear and cul-de-sac roadways be utilized where possible. In this way it is anticipated that local access roadways would not serve to conduct traffic through residential neighborhoods.

Although the design of the Plan limits vehicular access between residential areas, it emphasizes pedestrian and equestrian movement between East Orange neighborhoods. The Concept Plan has, additionally, been designed in a way that will allow for the ultimate implementation of a local travel system which will utilize battery/electric powered carts or a similar conveyance. Such a travel system, it is believed, could be incorporated with proposed trails by modifying the right-of-way of equestrian, bicycle or pedestrian trails where a modal conflict might occur.

Such a travel system for cart-type vehicles would not utilize dedicated thoroughfares. However, it is believed that the travel system would

provide for needed movement to facilities within the project area. Also, since the travel system would have as one of its primary destination points the commercial village complex, a grade separation at Chapman Avenue would be necessary to provide a continuous north-south connection.

It is recommended that rural road standards be adopted as a guide with this Plan for roads with less than 3000 ADT and include the following criteria:

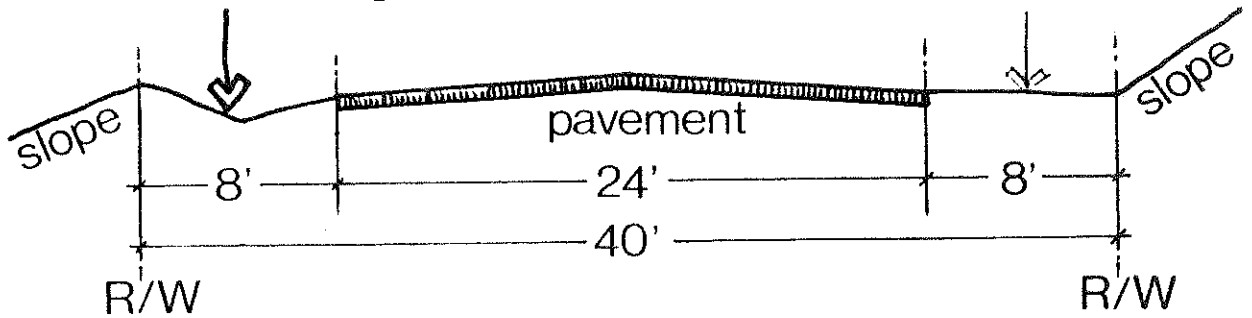
1. Grade = Maximum of 12%
2. Maximum length of cul-de-sac = 600 feet
3. Minimum of 35 feet cul-de-sac radius
4. Radius of roads without superelevation:
  - 30 MPH = 375feet
  - 25 MPH = 275 feet
5. Road Sections as shown on Exhibit #25  
Where minimum sections are used,  
provide turn-out for emergency parking  
every 600 feet.
6. Permit use of rolled curbs.
7. Incorporate rural streetlight standards.



## Typical Section:

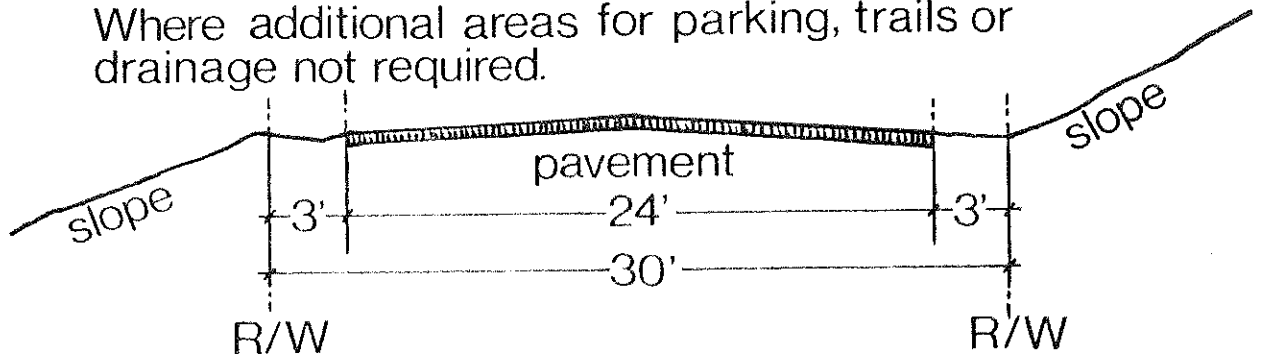
Emergency parking, equestrian & bicycle trails – Drainage & signing as required.

Alternate use of paved shoulder for emergency parking & bicycles



## Minimum Section with no Direct Access:

Where additional areas for parking, trails or drainage not required.



## TRAIL SYSTEM

The trail system designed for the East Orange Area includes equestrian/hiking trails and bicycle trails. The former category has been planned in a way which reflects both the actual and desirable use of the local trails as indicated by equestrian groups in East Orange. Although the primary orientation of the equestrian/hiking trails is to serve the recreational needs of the East Orange Area, it is anticipated that equestrian/hiking trails may furnish an alternative to the automobile, at least for some travel within the Study Area.

If installed as proposed, the equestrian/hiking trailways will furnish access to other local and regional trail networks in surrounding areas. Also, the trail system has been fashioned in a way which provides for access to destination points situated within and immediately adjacent to the project area, such as local stables, the proposed commercial village center and the proposed County regional park.

Although the general layout of the proposed trail network is indicated in Exhibit #24, the specific configuration of the proposed system will depend upon topographic and development constraints.

Bicycle trails planned for the East Orange Area tend to parallel existing roadways and utilize the rights-of-way of dedicated thoroughfares. The primary emphasis of the bicycle trail system planned for East Orange will be to tie to the currently adopted Plan for bicycle trails. The system shown is anticipated to be the backbone system and as development occurs within the various areas of East Orange, bicycle routes within the neighborhoods should tie to this proposed system.

PROPOSED PLAN EVALUATION

A quantitative analysis of the proposed General Plan for the East Orange Area appears below in Table # 11. The quantitative analysis reveals that the dwelling unit and population projections calculated for the East Orange Area are in the range of those estimated for Alternative Concept Plans "A", "B" and "D". Moreover, current estimates for the Area indicate that revenues substantially in excess of projected costs would be provided by the Area. A quantitative evaluation summary is shown on Table #14 followed by a qualitative evaluation in Table #15.

PROPOSED GENERAL PLAN

QUANTITATIVE ANALYSIS \*\*

---

Population	12,047
Dwelling units	3,472
DU/AC	* 1.83
Property Tax Revenue	\$ 688,917
Other Revenue	\$2,035,100
Total Revenue	\$2,724,017
Total Expenditure	\$2,096,660
Surplus Revenue	\$ 627,357

---

---

TABLE # 13

- \* Gross density for 1900 acres
- \* \* Figures represent proposed maximum development of General Plan

PROPOSED GENERAL PLAN  
QUANTITATIVE EVALUATION SUMMARY

	Minimum Density Range	Maximum Density Range
Residential Acreage	841	841
Projected Population	7,103	12,047
Projected Dwelling Units	2,095	3,472
Residential Density	2.48	4.12
Gross Density	1.10	1.83
Percent Open Space- Recreation	47%	47%
Market Value *	135.6	213.6

\* Numbers shown indicate millions of dollars

TABLE # 14

## QUALITATIVE EVALUATION

### Key

Level of Compatibility:

+ = Positive

- = Negative

o = Moderate

<u>Desired Characteristic</u>	<u>PROPOSED PLAN</u>
1. Provides for compatibility with topography and landforms	+
2. Maintains compatibility with geology	+
3. Provides sensitivity to vegetation and wildlife	+
4. Affords maximum potential for view from the site	o
5. Retains rural character of the Area	o
6. Fits with proposed Trail System	+
7. Furnishes a diversity of housing types to meet the needs of a variety of income levels	+
8. Provides for the greatest amount of open space	+
9. Promotes an increase in land values	+
10. Provides for compatibility in existing lifestyles	+
11. Requires least modification to the existing visual image	o
12. Is compatible with existing and proposed circulation system	o
13. Is economically feasible	+
14. Is socially feasible	+

TABLE # 15

# GOALS, OBJECTIVES AND POLICIES

## REGIONAL

### REGIONAL GOAL

INTEGRATE THE PROPOSED LAND USE AND CIRCULATION OF EAST ORANGE WITH THE REGION WHILE MAINTAINING A POSITIVE VISUAL IMAGE AND DISTINCTIVE IDENTITY OF THE AREA

### REGIONAL OBJECTIVES

1. Promote policies and plans which will not overload the arterial highways in the Area or constrict the free and safe flow of traffic.
2. Provide for housing densities, housing types and price ranges compatible with development in surrounding areas.
3. Provide for an open space network which can be connected to regional or other community trail systems, recreation areas, greenbelts and open spaces to provide appropriate continuity.
4. Promote appropriate scale commercial goods and services to serve the East Orange Area which are compatible with the development objectives of the Area.
5. Search out means to provide access to employment areas which aid in reducing traffic on the arterial road system and minimize the use of the arterial roads for circulation within the community.
6. Promote public and quasi-public facilities and services to provide a full complement of needed elements within convenient access to the Area.

## REGIONAL POLICIES

1. Monitor any adjustment or change in the surrounding Land Use or revision to the Master Plan of Arterial Highways which could create traffic problems within or around the East Orange Area.
2. Support Federal, State, County or City housing projects compatible with the General Plan for East Orange which promote lower income housing.
3. Connect trail systems to the Santiago Creek Greenbelt, the proposed Regional Park area between Hewes and Santiago Boulevard, the proposed Peter's Canyon Regional Park and other adopted equestrian, bicycle or hiking trails adjacent to this project.
4. Encourage the development of local commercial establishments approximately one (1) mile from the existing Alpha Beta Center to the West to provide convenience goods and services on a daily and weekly basis.
5. Promote further exploration of the use of organized bussing programs and car pools to provide access to regional employment centers from the area and commercial centers used by residents of this area. Also encourage expansion of bus routes to serve the area as further community needs dictate.
6. Promote review of fire protection standards required by City and County Fire Departments in the area to insure protection of life and property from wildland and other types of fires.
7. Insure a positive treatment of development visible from surrounding areas and regions so as to blend in a positive way with natural landforms in East Orange.
8. Support the Master Plan of the Orange Unified School District and Policies of the Tustin Unified School District to promote adequate provision of facilities and services.

## REGIONAL POLICIES - continued

9. Promote a "village" concept for the East Orange Area which will identify and distinguish it within the region utilizing theme architecture, site planning and landscaping.
10. Provide for identification, appropriate investigation and where possible, preservation of historical and cultural/scientific sites.
11. Maintain compatibility with currently adopted Plans and Policies.

## ENVIRONMENTAL

### ENVIRONMENTAL GOAL

CREATE A POSITIVE ENVIRONMENT WHICH ENHANCES THE NATURAL FEATURES AND PHYSICAL ATTRIBUTES OF THE AREA.

### ENVIRONMENTAL OBJECTIVES

1. Maintain the natural amenities of the East Orange Area such as distinctive geologic features, unique vegetation and mature trees throughout the Area.
2. Provide for sensitive grading of hillsides to blend with surrounding topography and vegetation.
3. Preserve natural drainage courses where possible and avoid use of concrete-lined channels.
4. Identify and preserve scenic vistas and corridors from the arterial roads within the East Orange Area.
5. Incorporate adequate fire protection for life and property and provide for a positive aesthetic treatment of any area used for fire protection blending these areas with the natural vegetation and landscapes of surrounding development.



## ENVIRONMENTAL OBJECTIVES - continued

6. To the maximum extent possible, design housing compatible with the natural setting and topography of the Area.
7. Adopt rural road standards to allow sensitive adaptation of roads to hillside areas while providing for safety and drainage requirements.
8. Restrict development within designated flood plains as depicted by the Corps of Engineers.
9. Restrict development within geologically hazardous areas.
10. Promote the phasing out of natural resource extraction and the creation of a natural riparian area along Santiago Creek along with proposed greenbelts, trails, recreation and open space areas.
11. Promote natural open space corridors to encourage retention of natural vegetation and wildlife along compatible equestrian and hiking trails.

## ENVIRONMENTAL POLICIES

1. Support the creation of a landscaping treatment program for utility sites which will allow them to be blended with new development and the natural setting.
2. Provide for a trail connection along Bond which would link the Santiago Creek trails and the new proposed regional park with the El Modena Hills and proposed residential development.
3. Provide for the protection and permanent preservation of the natural visual amenities of the area, such as the rock outcrops, Oak trees and ridgelines in the El Modena Hills.
4. Encourage in the design of new residential developments the incorporation of small internal greenbelts, open areas and

## ENVIRONMENTAL POLICIES – continued

paths which would link directly with the major open spaces in the hill areas. Also provide for a continuous open space system throughout the project area which would link with other local and regional open space networks.

5. Promote the further development of joint school/community use of school playgrounds, recreation areas and other school facilities.
6. Provide to the extent possible, open space, greenbelt and trail access from school recreational areas (playfields) and local parks to residential areas.
7. Discourage use of block walls or opaque fencing facing arterial highways or collector roads. Encourage use of alternative treatments including landscaped buffer areas, earth mounding with landscaping, use of frontage roads to face positive views of homes to collector and arterial roads.
8. Allow only development of a similar or compatible character to be developed in the Hillsboro Area and Santiago Heights. Consider size of lots, variety of architecture, landscaping and informal blending of housing to this hillside area.
9. Encourage use of individually-built homes on custom lots to the maximum extent possible for Santiago Heights low-density areas. Tracts approved for the Santiago Heights Area should be reviewed in light of their being compatible with the type of home and its fit with the hillsides.
10. Provide for specific site plan and elevation review of proposed hilltop housing to insure that a positive view of the site from surrounding areas will be retained. Include requirements for architecture, landscaping and site plan review to accomplish this end.
11. Prohibit all residential and commercial development in open space areas and provide that any development in steep slope areas (over 40%) must demonstrate an ability to blend with the surrounding natural environment or development is to be restricted.

ENVIRONMENTAL POLICIES - continued

12. In those areas where school sites border directly with the open space areas, discourage the use of fencing or barriers between the school areas and major open space areas.
13. Encourage replanting efforts utilizing fire resistant native plants on those slopes which have been scarred by fire or vehicles and provide for the preservation of and rehabilitation of existing stands of Eucalyptus trees, large Oak or other large native trees.
14. In the residential development proposed along Chapman Avenue, provide for the development of a village "design element" incorporating a western or rural theme to provide a positive view from Chapman Avenue. This element would include architectural control, site plan requirements, landscaping standards, signing requirements, proposals for type, color and materials of street furniture including streetlights, etc.
15. Promote landscaping to help shield massive cut slopes along Chapman and screen any cut or fill areas which expose only dirt or rock and are unsightly.
16. Recommend that appropriate architectural and color standards be employed by both residential and commercial developers in the construction and development of new homes and commercial centers to aid in establishing a village, western or rural theme.
17. Provide for a compatible treatment of housing next to roads in order to create a positive visual setting and a desirable environment. Incorporate restrictions of continuous block walls backing up to roads. Promote positive landscape treatment between fencing or housing and the roads and encourage deep setbacks for residential developments with appropriate landscape buffers.
18. Support the recommendations identified in the Ecological Survey and Geology Report within this General Plan.
19. Provide that utilities or water reservoirs be screened or blended into the existing and natural environment. Support

## ENVIRONMENTAL POLICIES – continued

where practical, the use of water reservoirs below grade with recreational uses over the tank which would be landscaped and planned to be compatible with the area and proposed theme.

20. Provide for an underpass at Chapman and the proposed local commercial to permit safe equestrian, bicycle, automobile and pedestrian crossing of Chapman Avenue.
21. Where possible, place equestrian, pedestrian and bicycle crossings at marked intersections rather than in the center of the block.
22. Investigate possible use of Sunrise Lane overpass at Newport Boulevard as an equestrian, bicycle and pedestrian crossing.
23. Provide for the development and installation of a sign system for the proposed equestrian trails in the open space hill areas.
24. All cut and fill banks shall be finished to harmonize with the existing topography and geology. This includes maintaining a percentage slope of cut and fill similar to the areas within which the slope occurs if geologically stable. Abrupt changes of graded areas are to be avoided, rounding all edges into the natural topography and planting with compatible vegetation.
25. All cut and fill banks shall be planted with appropriate erosion retardant cover where geological and soil conditions permit. Also native fire resistant plants should be used near structures or along firebreak areas where appropriate.
26. The extent of cut or fill should be based on good engineering practices and the recommendations of a geologist and foundation engineer, avoiding the conditions which would leave cut or fill scars which would not blend with development or the natural surroundings.
27. Roads should be located and sized to minimize the amount of grading required following the natural contours where possible and the use of rural road standards as identified in this Plan should be promoted.

ENVIRONMENTAL POLICIES - continued

28. Encourage the incorporation of split-level design to soften the effect of pad-grading, to lessen the amount of grading required and to help development blend with the natural setting. In those existing developments where one-story residences are predominant, require height compatibility in new adjacent developments.
29. Specify that property designated as open space on the East Orange General Plan, if developed, be utilized only for an open space, recreational or related use.
30. Provide for a minimum setback of seventy-five (75) feet from all existing housing within and immediately adjacent to the Peters Lake Planning Sector (Exhibit #3) to help provide for compatibility with the existing development of this area. This requirement may be amended only with written approval of the existing property owner affected.

## ECONOMIC

### ECONOMIC GOAL

PRODUCE A PLAN WHICH POSITIVELY SUPPORTS THE ECONOMIC VALUE AND STABILITY OF THE AREA.

### ECONOMIC OBJECTIVES

1. Provide for commercial services commensurate with the needs and ability of the residents to economically support those services.
2. Promote an increase in the value of homes and land.
3. Promote housing for the variety of incomes within the market area commensurate with the amenities and current cost in the Area.
4. Propose housing types and costs viable within the current market climate.
5. Support phasing of housing and development appropriate to the support facilities' ability to accommodate growth.
6. Promote provisions for amenities, facilities, goods and services which increase the value of land and homes beyond the cost for such elements.
7. Promote provision of service districts where appropriate to provide for community support of needed or desired facilities, amenities or services.

### ECONOMIC POLICIES

1. In the development planned for the area north of Chapman Avenue, incorporate a mixture of residential and commercial uses into a total village concept promoting use of apartments or similar dwellings over commercial shops to aid in providing a range of housing types.

## ECONOMIC POLICIES - continued

2. Design the proposed commercial center in a manner which will allow it to incorporate the rural/equestrian theme but which will retain the village orientation with the local community as the primary service area. Specifically orient the local commercial center to equestrian and bicycle users as well as the automobile traffic and connect to those trail systems in the Area.
3. Encourage the dedication of land for expansion of schools by those property owners who will be generating the impact on the schools (e.g., 1 1/2 acres of Occidental Land Property to allow expansion of Linda Vista).
4. Work with the School Districts to insure that housing development is in phase with the ability of the Districts to provide the best quality education and facilities possible.
5. Encourage incorporation of recreational facilities and programs which may expand and build upon activities now possible within the vicinity.
6. Investigate and determine the feasibility of developing a mini-bus system. Perhaps this system could utilize electric carts on separate trails to give access to recreational areas, parks, schools, commercial areas, community centers, various residential areas and vista points. This would also aid in reducing traffic within the East Orange Area and would provide a positive amenity for residents of the Area.
7. Provide, wherever possible, dual or multiple use of public and quasi-public facilities, grounds or parking to provide more effective use of land and buildings.
8. Support purchase by the County of Orange of a Regional Park site of 68.32 acres between Hewes and Santiago Boulevard. (See Appendix, page 2, property owner #3)
9. Support overall policies that will promote economically and environmentally viable residential construction.
10. Encourage the dedication of permanent open space areas to the appropriate public agency.
11. Allow for the grading and/or removal of the hill known as "Tom Thumb" hill north of Chapman Avenue across from the Old Chapman Road intersection to provide for necessary balance of grading operations compatible with the proposals of this Plan.

## SOCIAL

### SOCIAL GOAL

PROVIDE FOR THE SOCIAL NEEDS OF THE PEOPLE

### SOCIAL OBJECTIVES

1. Promote a wide range of recreational opportunities linked by trail systems throughout East Orange.
2. Encourage incorporation of community centers within development areas to provide recreation and meeting places for the community.
3. Support the School District's Plan for provision of schools and promote convenient, safe access to those schools in the vicinity.
4. Provide, wherever possible, dual or multiple use of public and quasi-public facilities to share parking and use of facilities.
5. Provide for convenience goods and services required on a daily and weekly basis appropriate to the market support of the community and in an architectural character compatible with the community.
6. Provide residents with physical, visual and emotional relief from the congestion of urban surroundings.
7. Promote lifestyles compatible with existing and proposed neighborhoods within East Orange.
8. Provide for an integrated transportation system utilizing a blend of modes which meet the needs of the people emphasizing pedestrian, bicycle and equestrian linkages throughout the community.
9. Promote public transportation routes which are efficient, convenient, economical, safe and comfortable.
10. Minimize conflicts between local traffic and activities and through traffic.



## SOCIAL OBJECTIVES - continued

11. Create a balanced community relating goods, services and facilities to the type of residential development of the Area.
12. Provide a choice of residential neighborhoods and allow for a variety of housing types reflecting the variety of physical conditions and the different family types attracted to the amenities of the Area.
13. Promote preservation and maintenance of sites and structures deemed to be of historical or cultural significance.
14. Develop a "community" theme element including criteria for signing, grading, streetscape, landscape and architecture to enhance the physical amenities of the Area.
15. Provide for effective implementation of the proposed Plan according to the current and future needs of the Area.
16. Where possible, local access and collector roads should be designed so that they do not transect residential neighborhoods.

## SOCIAL POLICIES

1. Encourage the incorporation of a rustic theme in the development of residential styles for new neighborhoods.
2. Provide for facility of movement on equestrian trails within the project area so as to connect stables and other equestrian centers and activity areas.
3. Where feasible, design equestrian trails to border rather than transect new residential developments
4. Promote the installation of theme park benches, trash containers and other appropriate facilities at the proposed rest stops along the equestrian and walking trails.
5. Support preservation of the Jones Ranch Home as a part of the History of the Area.

SOCIAL POLICIES -- continued

6. Provide for equestrian, bicycle and pedestrian access to proposed commercial centers from the open space, hill areas and residential areas.
7. Allow for the development of a grade separation along Chapman Avenue in the form, perhaps, of an underpass which would provide for automobile, equestrian, pedestrian and emergency vehicle access traffic.
8. Promote the organization of neighborhood clean-up and maintenance campaigns to provide for the elimination of rubbish from the open space hill areas.
9. Install a historical sign marker or monument to indicate the former location of the Grijalve Adobe.
10. Monitor phasing of new residential development to assure that public facilities are available when required, especially school facilities to avoid double sessions and overcrowding of schools.
11. Promote inclusion of community centers for use as recreational facilities and meeting places for individual neighborhoods within the Area to provide a focal point for the community.
12. Support community programs sponsored by the City and County which may aid in Police and Fire protection and provide additional recreation programs for the people of the Area.
13. Crawford Canyon Road should be maintained as a local collector street.
14. The Eichler/Buccola Tract should not be bisected by any arterial highways.
15. When adjacent to residential areas, equestrian trails should be designed to follow the bottom rather than the top of slopes to eliminate abrupt grade separation between trails and residential areas. In those areas where it is impossible to prevent grade separation, a landscaped buffer screen should be provided.

SOCIAL POLICIES - continued

16. Incorporate recommendations in the Implementation portion of the proposed Plan in order to assure communication with the East Orange Planning Committee and effective application of this Plan and the stated objectives to future development.
17. Promote public and quasi-public uses for the local park areas shown east of Santiago Junior High and adjacent to Newport Boulevard as an alternative to a local park. Include such possibilities as expansion of school facilities, Girl Scout or Boy Scout facilities, 4-H facilities, community centers, recreation facilities, etc. An alternative to the one and one-half acre expansion of Linda Vista School may also include a local park site or the above listed uses or those of a similar type if the area is not needed for schools.
18. For the vacant parcel east of Santiago Boulevard between Avenida Palmar and Ryals permit a higher residential density use to provide for Federal or Government supported housing which may allow for lower income housing for retired persons, senior citizens or handicapped, etc.

## HEALTH AND SAFETY

### HEALTH AND SAFETY GOAL

PROMOTE THE HEALTH AND SAFETY OF THE PEOPLE

### HEALTH AND SAFETY OBJECTIVES

1. Restrict residential development from areas subject to natural or man-made hazards.
2. Promote safe and convenient access to schools, parks, recreational areas and local convenience goods and services.
3. Promote adherence to Health Department standards for water, sewerage, waste disposal, air quality and drainage.
4. Promote adherence to HUD Guidelines for protection from noise impact within and around the Area from automobile traffic and industrial uses.
5. Maintain clear sightlines at busy intersections with low shrubs or ground cover and high trees compatible with the Area.
6. Promote development which aids patrol and surveillance by the Police and Sheriff's Department serving the Area.
7. Encourage review of development proposals and structures by Police and Fire Departments affected, in order to obtain recommendations to mitigate potential problems in these areas.
8. Promote proper protection from fire hazards in the East Orange Area through the medium of facilities which provide for proper access, clearance, water pressure and volume.
9. Adhere to restriction of development in floodplain areas as determined by the Corps of Engineers.
10. Promote guidelines for use and treatment of natural open space areas and other recreational trails to insure protection from hazards of fire and accidents.

## HEALTH AND SAFETY POLICIES

1. Promote safe pedestrian and bicycle access to Santiago Junior High and Linda Vista and Panorama Elementary Schools. Investigate the need of additional paths to give access to schools.
2. Provide for an emergency access road to the north for residential development in the Hillsboro and Sunrise Lane Areas.
3. Encourage the use of fire retardant vegetation on the hillsides and emphasize use of fire retardant construction techniques and materials in new developments in the Area, especially in roofing materials and siding.
4. Prohibit the use of firearms in the open space areas.
5. Prohibit the use of off-road vehicles in the hills to reduce scarring and erosion of vegetative cover.
6. Provide that all roads in the area allow convenient access for public safety vehicles.
7. Promote specific geological investigation to depict problem areas and those areas of expansive soil conditions as development is proposed and require appropriate mitigation measures.
8. Restrict direct access from single residences onto arterials and promote a hierarchy of roads to serve the needs of the area.
9. Assure that phasing of development occurs in a manner which provides for the installation of appropriate service systems (roads, sewers and water systems).
10. Design park sites, landscaping and improvements in a way that will facilitate surveillance by Police patrol cars.
11. Expansive soils are a definite problem within the Area and every site should be investigated to determine if any problems of this type exist. Recommendations shall be made and mitigation measures strictly employed for all those sites with expansive soil problems. A registered engineer shall verify that appropriate measures are recommended and adhered to for all development within the Study Area.

## IMPLEMENTATION

1. In order to define the specific village design for the area proposed for residential and commercial development along Chapman Avenue, a work program should be established for the appropriate City and County Staff to work together with the landowners, homeowners associations and residents of the Area to establish the specific village theme. This theme would include such items as streetlighting, street furniture, signing, fencing, architecture, landscaping, precise trail locations and treatments, conceptual site plan criteria, etc. In the case where development proposals may precede completion of the village design element, the appropriate City and County Staff should work out those elements which will provide a positive initiation of a village design theme which may be incorporated into other developments and will support the final plan for village designs. (This village design element should cover the following Planning Sectors shown on Exhibit # 3- Chapman Flatlands, Panoramian Flatlands, Jones Ranch Canyon, Old Chapman Canyon, El Modena Hills - South and Cowan Ranch Hills - South) This group shall also provide recommendations for Newport Boulevard and Chapman Avenue Streetscapes.
  
2. At least one representative from each of the following neighborhoods within the East Orange Area shall be appointed by the residents of that neighborhood to coordinate and interpret appropriate design criteria and application of this General Plan as development proposals are submitted to the City or County. These representatives shall work together as one group to accomplish the review and insure compatibility with this proposed

Plan, the village design element and the streetscape proposals to be developed in #1 above. As new neighborhoods develop, additional members to this group shall be added to provide representation for each of the neighborhoods within the East Orange Area. It is recommended that two additional members from developments north of Chapman and two additional members from south of Chapman Avenue be utilized to complete a total of nine (9) members for the East Orange Planning Committee when added to representatives suggested from neighborhoods listed below. This group should be called the "East Orange Planning Committee".

Another function of this group shall be to act as a liaison between the residents, the homeowners associations and the City or County and the developers on any planning matters which may affect the neighborhood. These neighborhoods currently include (as shown on Exhibit #3) Planning Sectors: (1) Linda Vista, (2) Santiago Heights, (3) Crawford Canyon, (4) Hillsboro and (5) Peters Lake. The balance of the areas which may receive development are expected to have development proposals reviewed by residents or homeowners associations affected as determined by the City or County Staff. The objective of this approach is to aid in bringing about development which is compatible with the existing neighborhoods and which is sensitive to the natural features of the Area.

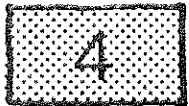
3. A regional traffic and circulation study shall be completed as recommended in this Plan to promote the compatibility of the circulation network and its effect on the residents of the Area.

4. The maximum number of dwelling units for each land use category shall be allowed in order to provide for the proposed open space for permanent open space provisions. The maximum dwelling units indicated in "Projected Dwelling Units - Property Owner" (see Appendix) shall be incorporated within the approval of this Plan along with the recommendations as to minimum lot size criteria by property owner. Minimum lot size criteria alone shall not serve to reduce the permitted maximum number of dwelling units.
  
5. The suggested land use west of the Study Area (Exhibit #26) shall be adopted as a policy guide for this Area.



**LEGEND\***

 Public/  
Quasi-Public

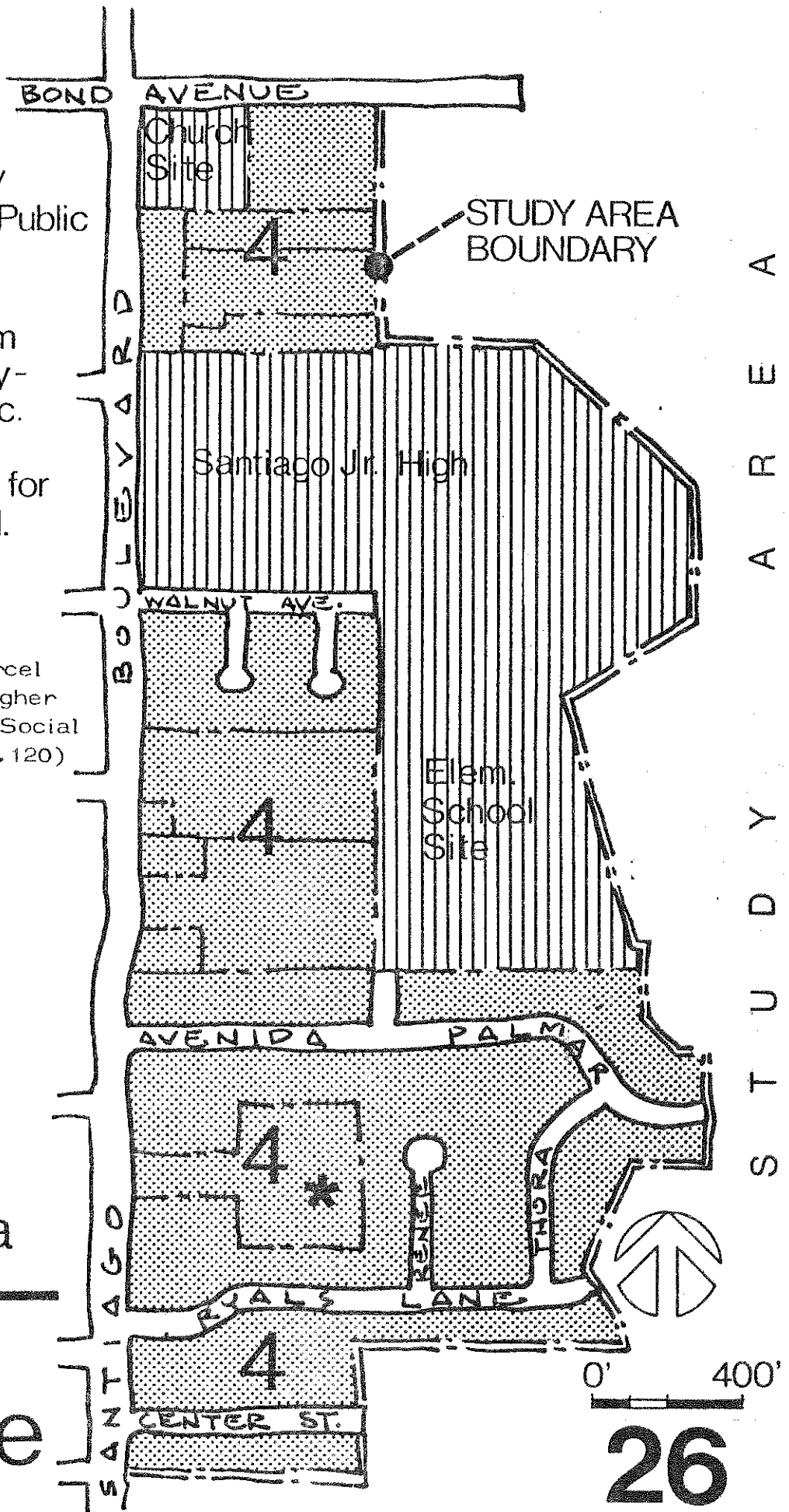
 4 Medium  
Density-  
3.5 to 6.5 d.u./Ac.

\*See Exhibit 24 for  
complete legend.

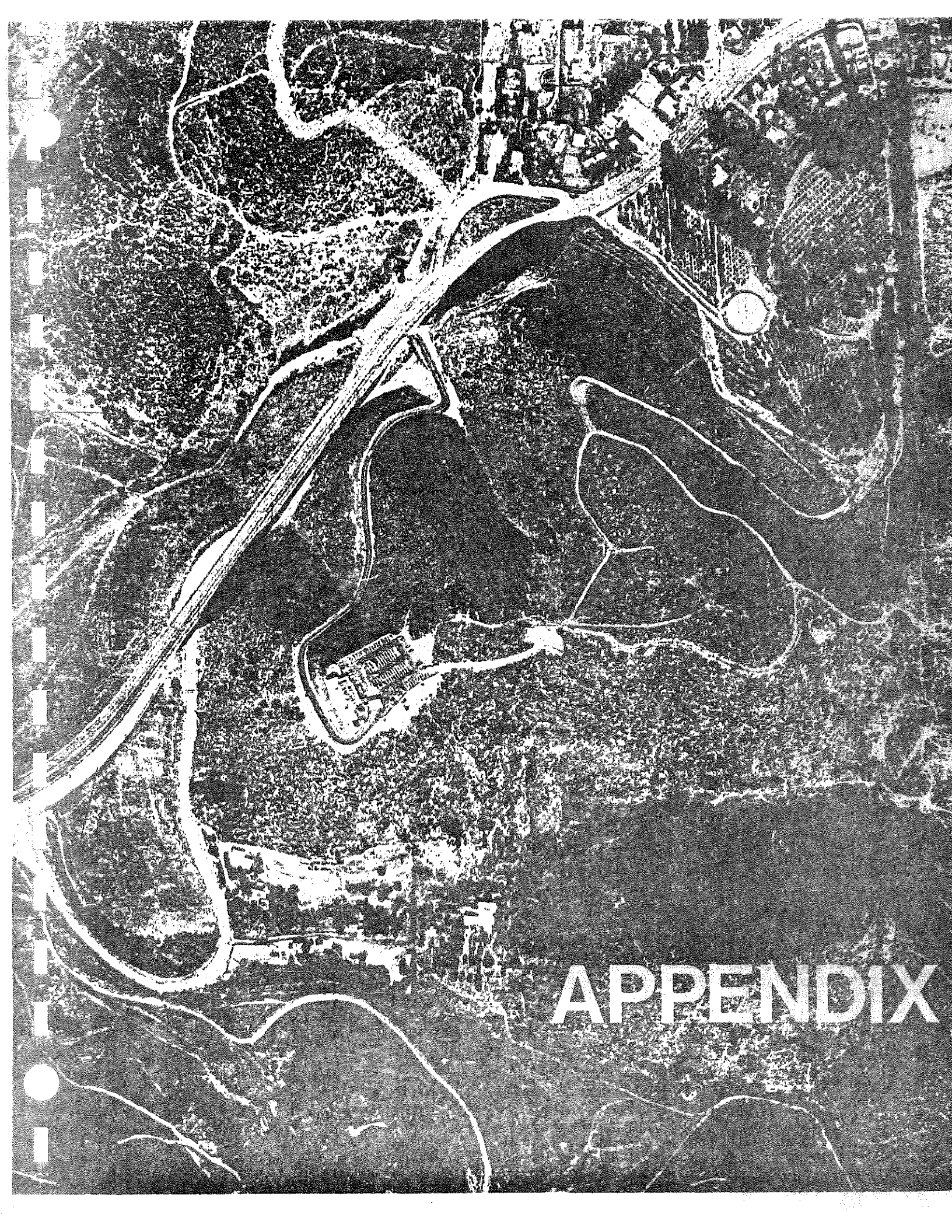
\* This vacant parcel  
may receive higher  
density. (See Social  
Policy # 18, p.120)

Suggested  
Land Use  
West of  
Study Area

East  
Orange



A  
R  
E  
A  
  
S  
T  
U  
D  
Y



# APPENDIX

APPENDIX

TABLE OF CONTENTS

	<u>PAGE</u>
I. Proposed Dwelling Units/Property Owner .....	( 1)
II. Air Quality - California Standards .....	(10)
III. Air Quality - Federal Standards .....	(11)
IV. Checklist of Vascular Plants .....	(12)
V. Diversity of Native Shrubs in Selected Areas of Orange County .....	(18)
VI. Birds Expected or Observed .....	(19)
VII. Biological Resources - References .....	(22)
VIII. East Orange Circulation Study Appendix .....	(23)
IX. Map and Letter to East Orange Residents and Property Owners .....	(31)
X. Bibliography .....	(33)

PROPOSED DWELLING UNITS/PROPERTY OWNER

(See Exhibit #12, Page 63 in Report  
for Location of Property Owners)

Except as noted below, the following density ranges apply for the residential categories:

Estate	0-1 DU/Ac.
Low	1-2 DU/Ac.
Med-low	2-3.5 Du/Ac.
Medium	3.5-6.5 DU/Ac.
Med-high	6.5-15 DU/Ac.

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
<u>#1</u> *	7.0	Med-low	25	99.70	912
	32.67	Medium	212		
	20.5	Medium	82**		
	39.53	Med-high	593		
					+ 50
					<u>962***</u>
* Includes 8 acre local commercial with 50 DU's over stores and 1.5 acre expansion area for Linda Vista Elementary School.					
** The 20.5 acres of medium density next to Linda Vista is proposed for 4 DU/ac. maximum density with a minimum 8000 sq.ft. size. If the school site addition of 1 1/2 acres is not dedicated at the time of development, the area is to revert to medium-low density with a maximum of 3.5 DU/ac. (The 1 1/2 ac. area scheduled for dedication is not included in the 20.5 ac. of medium density indicated above) There are no other minimum lot size requirements for this ownership.					
*** This density figure includes and has accounted for the elimination of a maximum of 72 DU's in the Orange Park Acres Study, east of this Study Area Boundary within the same ownership.					
<u>#2</u>	16.11	Estate	16	146.74	600
	58.63	Low	117		
	22.40	Med-low	78		
	41.46	Medium	267		
	8.14	Med-high	122		

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#3*	(Regional Park & Sand/Gravel Area)				
* If Regional Park is not purchased, 400 <sup>+</sup> feet greenbelt and park area along Santiago is required with a maximum of 38 acres of development and a maximum of 247 DU's for this area between Hewes and Santiago Boulevard.					
#4	12.48	Med-low	42*	12.48	42*
* G.L. Lewis units currently under construction south of Santiago Canyon Road.					
#5*	50	Med-low	175	50	175*
* A maximum of 130 DU's on 65 acres is to be permitted if 15 <sup>+</sup> acres of park & greenbelt along Newport are not included in proposed plan for development. 5 acres along Newport Blvd. is proposed for use as a local park with the alternative use of such quasi-public uses as 4-H facilities, Girl Scout & Boy Scout facilities, community recreation facilities or similar type use.					
#6	1.5 5.4	Low Med-low	3 19	6.9	22
#7	2.38	Medium	15	2.38	15
#8*	1.1	Medium	7**	1.1	7
* 6.5 <sup>+</sup> acres restaurant site (includes expansion area in addition to existing restaurant)					
** Flatter portion in canyon bottom					
#9	5.65	Med-low	20	5.65	20
#10	(Sand/Gravel Zone)				
#11	(Sand/Gravel Zone)				

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#12	4	Estate	4	4	4
#13	21.21	Low	42	21.21	42
#14	21.49	Medium	140	21.49	140
#15	(Sand/Gravel Zone)				
#16	(Sand/Gravel Zone)				
#17	(School District)				
#18	10.97	Medium	71	10.97	71
#19	5.6	Low	19	9.6	19
#20	1 9.51	Med-low Medium	4 62	10.51	66
#21	6.39 4.0	Low Med-low	13 11*	10.39	24
* Minimum of 15,000 Sq.ft. lots required for 4 acres next to Bond.					

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#22	(Restaurant/Commercial) Any expansion on existing flat areas shall be directly related to the restaurant use of this land.				
#23	10.13	Med-high	89*	10.13	89*
* Mobilehome park currently under construction.					
#24	8.36	Medium	40*	8.36	40*
* Maximum of 4 DU/Ac. on 10 acres gross. 1 1/2 acres of steep slope area to remain in permanent open space.					
#25	1.7	Med-low	6	1.7	6
#26	9.54	Med-low	28*	9.54	28*
* Minimum of 15,000 Sq. Ft. lots required for this parcel.					
#27	(Regional Park) *				
* If regional park is not purchased, a minimum of 15,000 sq.ft. lots shall be required for residential development of this parcel.					

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#28	(Local Park serving Linda Vista area and recreational facilities related to Santiago Greenbelt.				
#29	6.96	Medium	45	6.96	45
#30	(In Santiago Greenbelt Area)				
#31	6.66	Low	13	6.66	13
#32	3.7	Low	7	3.7	7
#33	4.62	Low	10	4.62	10
#34	4.77	Medium	31	4.77	31
#35	4.77	Medium	31	4.77	31
#36	4.77	Med-high	72	4.77	72
#37	4.74	Low	9	4.74	9
#38	4.60	Med-low	16	4.60	16
#39	4.25	Low	9	4.25	9

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#40	4.14	Medium	27	4.14	27
#41	4.10	Med-high	62	4.10	62
#42	3.94	Low	8	3.94	8
#43	3.94	Low	8	3.94	8
#44	3.15	Medium	20	3.15	20
#45	2.85	Low	6	2.85	6
#46	(In Santiago Greenbelt Area)				
#47	2.63	Low	5	2.63	5
#48	2.58	Med-low	9	2.58	9
#49	2.52	Low	5	2.52	5
#50	2.49	Med-high	37	2.49	37
#51	2.48	Med-low	9	2.48	9



PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

Property Owner	Acres	Category	Max. No. DU's	Acres Subtotal	DU Subtotal
#52	2.46	Low	5	2.46	5
#53	2.43	Low	5	2.43	5
#54	2.35	Low	5	2.35	5
#55	(Regional Park) *				
* If Regional Park is not purchased, a minimum of 15,000 sq. ft. lots shall be required for residential development of this parcel.					
#56	2.20	Low	4	2.20	4
#57	2.18	Low	4	2.18	4
#58	2.16	Low	4	2.16	4
#59	2.08	Medium	14	2.08	14
#60	2.07	Medium	13	2.07	13

PROPOSED DWELLING UNITS/PROPERTY OWNER - Continued

PARCELS WITHOUT NUMBERS

Parcels	Category	Acres Subtotal	DU Subtotal
<u>5 Parcels off of Sunrise Lane</u>	Low	5.5 ±	11
<u>Vacant Parcels in Hillsboro</u>	Low	8 ±	16
<u>Vacant Parcels in Crawford Canyon</u>	Low	2 ±	4
<u>Small Vacant Parcels S. of Chapman</u>	Medium	2 ±	13
<u>2 Small Parcels off of Old Chapman</u>	Medium	3.26	21
<u>3 Small Parcels N. of Chapman (West of Property #23)</u> * Maximum of 9 DU/Ac.	Med-high	1.02*	9*
<u>2 Small Parcels N. of Chapman (East of Property #23)</u>	Medium	1.2	8
<u>Parcels at corner of Hewes &amp; Bond</u>	Med-low	1.43	5
<u>Vacant Parcels in Santiago Heights</u>	Low	10 ±	20
<b>TOTALS</b>		<b>579.97</b>	<b>2972**</b>

\*\* Includes 50 DU's over local commercial



PROPOSED DWELLING UNITS/PROPERTY OWNER - SUMMARY

Category	Acreage	Max. No. of Dwelling Units	Estimated Population by Res. Category
Estate	20.11	20	74
Low	176.66	352	1302
Med-low	130.26	447	1654
Medium	182.76	1119	4140
Med-high	70.18	984	2952
	579.97	2922	10,122
Units over local commercial		50	75
Existing units not included in above total	261.47	500	1850
<b>GRAND TOTAL</b>	<b>841.44 Acres</b>	<b>3472</b>	<b>12,047</b>

AIR QUALITY  
CALIFORNIA STANDARDS

Pollutant	CA		*Anaheim		Data Format
	Air Quality Standards	Monitoring Station	Air	Monitoring Station	
Oxidant (Ozone)	0.10 ppm	61 days			Days
	1 hr avg.	.31 ppm			Max.
Nitrogen Dioxide (NO <sub>2</sub> )	0.25 ppm	12 days			Days
	1 hr avg.	.37 ppm			Max.
Carbon Monoxide (CO)	10 ppm	3 days			Days
	12 hr avg.	12 ppm			
	40 ppm	0 days			
1 hr avg.	17 ppm			Max.	
Sulfur Dioxide (SO <sub>2</sub> )	0.10 ppm	0 days			Days
	1 hr avg.	.04 ppm			
	0.50 ppm	0 days			
1 hr avg.	.08 ppm			Max.	
Suspended Particulate Matter	60 ug/m <sup>3</sup>	94			AGM <sup>3</sup>
	100 ug/m <sup>3</sup>	46%			% over
	24 hr avg.	223			Max.
Lead (Particulate)	1.5 ug/m <sup>3</sup>	11 mo.			Months
	30 day avg.	3.76			Max.

1. Days - Number of days standard equalled or exceeded
2. Max. - Highest value over averaging time
3. AGM - Annual Geometric Mean
4. % over - Percent of samples over criterion
5. Months - Number of months standard equalled or exceeded

\* Air Quality Monitoring Station used for the East Orange Study Area

AIR QUALITY  
FEDERAL STANDARDS

Pollutant	*Anaheim		Data Format
	Federal Air Quality Standards	Monitoring Station	
Oxidant (Ozone)	0.08 ppm	73 days	Days
	1 hr avg.	.31 ppm	Max.
Nitrogen Dioxide (NO <sub>2</sub> )	0.05 ppm	-	annual avg.
	annual avg.		
Carbon Monoxide (CO)	9 ppm	8 days	Days
	8 hr avg.	14 ppm	
	35 ppm	0 days	
1 hr avg.	17 ppm	Max.	
Sulfur Dioxide (SO <sub>2</sub> )	0.14 ppm	0 days	Days
	24 hr avg.	.04 ppm	
	0.03 ppm	-	
annual avg.		Annual Avg.	
Suspended Particulate Matter	75 ug/m <sup>3</sup>	94	AGM <sup>3</sup>
	AGM <sup>3</sup>		
	260 ug/m <sup>3</sup>	0%	% over
24 hr avg.	223		Max.
Hydrocarbons (Corrected for Methane)	0.24 ppm	(9mo.)	Days
	3 hr avg.	176 days	
	(6-9 a.m.)	4 ppm	

1. Days - Number of days standard exceeded
2. Max. - Highest value over averaging time
3. AGM - Annual Geometric Mean
4. % over - Percent of samples over criterion

DICOTYLEDONS

APPENDIX

Checklist of Vascular Plants

The following list includes 113 species of vascular plants observed within the boundaries of East Orange. Of these, 63 species (56%) are native. The remaining 44% of the vascular plant species are introduced weeds or escapees from cultivation. Field studies for this report were carried out in May, 1975. Observations in early spring and mid-summer would undoubtedly add considerable numbers of herbaceous species. With more detailed sampling over an annual cycle, the total number of species present would probably approach 150.

Aizoaceae

\*Mesembryanthemum crystallinum (jewel plant) -- waste places

Amaranthaceae

Amaranthus retroflexus (rough pigweed) --- waste places

Anacardiaceae

Rhus diversiloba (poison oak) -- disturbed sites and riparian habitats  
R. intertrifolia (lemonadeberry) -- shrub on slopes

R. laurina (laurel sumac) -- shrub on slopes

\*Schinus molle (pepper tree) -- escapee from cultivation

Boraginaceae

Amsinckia sp. (fiddle head) -- grassy slopes and valleys

Cryptantha intermedia -- grassy slopes and hillsides

Heliotropium curassavicum (heliotrope) -- disturbed sites

Plagiobothrys sp. (popcorn flower) -- grassy slopes and hillsides

Cactaceae

Opuntia "occidentalis" (prickly pear) -- slopes

O. prolifera (cholla) -- slopes

Caprifoliaceae

Sambucus mexicana (elderberry) -- lower slopes, valley bottoms

Chenopodiaceae

\*Atriplex serotena - waste places

\*A. semibaccata - waste places

\*Bassia hypsipifolia - waste places

\*Chenopodium album (lamb's quarters) -- waste places

C. ambrosioides (mexican tea) -- grassy slopes

\*Salsola kali (Russian thistle) -- waste places

Compositae

Agoseris sp. -- slopes

Artemisia californica (coastal sagebrush) -- slopes and valley margins

A. douglasiana (mugwort) -- riparian

Eaccharis douglasiana -- waste places

\* Introduced Species

*E. viminea* (mulefat) -- riparian, valley bottoms  
 \**Centaurea melitensis* (star thistle) -- grassy slopes and valleys  
*Cirsium californicum* (thistle) -- grassy slopes and valleys  
 \**Conyza canadensis* (horseweed) -- waste places  
 \**Cynara cardunculus* (wild artichoke) -- grassy slopes  
*Eclipta alba* -- grassy slopes  
*Encelia californica* (encelia) -- slopes and valley margins  
*Graphalium* sp. -- slopes  
*Haplopappus* sp. -- slopes  
*Hemizonia australis* (spikeweed) -- grassy slopes  
*H. pungens* (spikeweed) -- grassy slopes  
 \**Heterotheca grandifolia* (telegraph weed) -- waste places  
*Holocarpha virgata* (tarweed) -- waste places  
 \**Picris echinoides* (bristly ox tongue) -- waste places  
 \**Senecio vulgaris* (groundweed) -- waste places  
 \**Sonchus asper* (sow thistle) -- waste places  
 \**S. oleraceus* (sow thistle) -- waste places  
*Stephanomeria virgata* -- slopes  
 \**Xanthium strumarium* var. *canadense* (cocklebur) -- waste places, riparian

#### Convolvulaceae

\**Convolvulus arvensis* -- waste places  
*C. cyclostegius* -- slopes

#### Crassulaceae

*Dudleya lanceolata* -- slopes  
*D. pulverulenta* (stonecrop) -- slopes

#### Cruciferae

\**Brassica campestris* (field mustard) -- grassy slopes and valleys  
 \**Brassica nigra* (black mustard) -- waste places  
 \**Raphanus sativus* (wild radish) -- waste places  
*Sisymbrium* sp. -- grassy slopes

#### Cucurbitaceae

*Marah macrocarpus* (wild cucumber) -- vine on shrubs

#### Cuscutaceae

*Cuscuta* sp. (dodder) -- parasitic vine on shrubs

#### Euphorbiaceae

*Eremocarpus setigerus* (doveweed) -- waste places  
*Euphorbia polycarpa* (spurge) -- waste places, fire successional  
 \**Ricinus communis* (castor bean) -- waste places, riparian

#### Fagaceae

*Quercus agrifolia* (coast live oak) -- valley bottom, semi-riparian  
*Q. dumosa* (scrub oak) -- shrub on slopes

(14)

#### Geraniaceae

\**Erodium botrys* (storksbill) -- waste places  
 \**E. cicutarium* (storksbill) -- waste places  
 \**E. moschatum* (storksbill) -- waste places

#### Hydrophyllaceae

*Eriodictyon crassifolium* (yerba santa)  
*Phacelia cicutaria* var. *hispida* (caterpillar phacelia) -- slopes  
*Phacelia grandiflora* -- slopes  
*Phacelia patryi* -- slopes

#### Labiatae

\**Marrubium vulgare* (horehound) -- grassy valleys  
*Salvia apiana* (white sage) -- slopes  
*S. mellifera* (black sage) -- slopes

#### Leguminosae

*Lotus* -- slopes  
*L. scoparius* (deerveed) -- slopes  
*Lupinus* spp. (lupines) -- slopes  
 \**Melilotus albus* (white melilot) -- riparian  
 \**M. indicus* (yellow melilot) -- grassy slopes and valleys  
 \**Trifolium* spp. (clovers) -- waste places

#### Malvaceae

*Malacothamnus fasciculatus* (bush mallow) -- slopes  
 \**Malva parviflora* (cheeseveed) -- waste places

#### Myrtaceae

\**Eucalyptus globulus* (blue gum) -- cultivated

#### Papaveraceae

*Eschscholzia californica* (California poppy) -- slopes

#### Platanaceae

*Platanus racemosa* (sycamore) -- riparian

#### Plumbaginaceae

\**Plantago* sp. (plantain) -- waste places

#### Polygonaceae

*Eriogonum fasciculatum* (wild buckwheat) -- slopes  
 \**Rumex acetosella* (sheep sorrel) -- valleys, riparian  
 \**Rumex* sp. (dock) -- waste places

(15)

Portulacaceae

\*Portulaca oleracea (purslane) -- waste places

Primulaceae

\*Anagallis arvensis (scarlet pimpernel) -- waste places

Rosaceae

\*Cotoneaster sp. -- escape from cultivation  
Heteromeles arbutifolia (toyon)  
Rubus ursinus (?) (wild blackberry)

Rubiaceae

Galium angustifolium (bedstraw)

Salicaceae

Salix sp. (willow) -- riparian

Scrophulariaceae

Castilleja affinis (Indian paintbrush) -- slopes  
Dipacus aurantiacus (bush monkey flower) -- slopes  
Orthocarpus purpureus (owls clover) -- grassy slopes  
Verbascum thapsus (common mullein) -- waste places

Solanaceae

\*Nicotiana glauca (tree tobacco) -- valleys, riparian  
Solanum douglasii (night shade) -- slopes  
S. xanthii (night shade) -- slopes

Umbelliferae

\*Conium maculatum (poison hemlock) -- waste places, riparian  
\*Foeniculum vulgare (fennel) -- waste places

MONOCOTYLEDONS

Agavaceae

\*Agave americana -- escape from cultivation

Amoryllidaceae

Allium sp. (wild onion) -- slopes  
Bloomeria crocea (golden bloomeria) -- slopes  
Brodiaea pulchella (blue dicks) -- slopes

Gramineae

\*Arundo donax (giant reed) -- riparian  
\*Avena fatua (wild oats) -- grassy slopes and valleys  
\*Bromus rubens (red brome) -- grassy slopes and valleys  
\*Bromus spp. -- grassy slopes and valleys  
\*Cynodon dactylon (Bermuda grass) -- waste places  
\*Holcus halimensis (Johnston grass) -- grassy slopes and valleys  
\*Hordeum sp. (barley) -- grassy slopes and valleys  
\*Lamarckia aurea (goldentop) -- grassy slopes and valleys  
\*Lolium sp. (rye grass) -- grassy slopes and valleys  
\*Setaria spp. (foxtail) -- grassy slopes and valleys  
Stipa pulchra (needle grass) -- slopes

Iridaceae

Sisyrinchium bellum (blue-eyed grass) -- slopes

Typhaceae

Typha latifolia (cat-tail) -- riparian

BIRDS EXPECTED OR OBSERVED

<u>Species</u>	<u>Abundance</u>	<u>Habitats &amp; Notes</u>
Carhartes aura (turkey vulture)	Average	Soaring overhead
Accipiter cooperii (Cooper's hawk)	Possible	
Accipiter striatus (sharp skinned hawk)	Possible	
Circus cyaneus (marsh hawk)	E	
Buteo lineatus (red-shouldered hawk)	Possible	
Buteo jamaicensis (red-tailed hawk)	Low	Soaring overhead
Aquila chrysaetos (golden eagle)	Low	Overhead
Elanus leucurus (white-tailed kite)	E	Fully protected by Calif. Fish & Game Code
Falco sparverius (sparrow hawk)	Average	Eucalyptus trees, grassy fields
Lophortyx californicus (California quail)	High	Grassy fields, natural and disturbed vegetation of hillsides
Alectoris graeca (chukar)	Low	Rock outcrop on hill-top
Phasianus colchicus (ring-necked pheasant)	Possible	
Falica americana (American coot)	Low	Ponds
Columba livia (domestic pigeon)	Average	Residential areas
Zenaidura Macroura (mourning dove)	High	Ubiquitous
Acococcyx californianus (roadrunner)	Low	Natural vegetation of hillsides
Otus asio (screech owl)	E	
Bubo virginianus (great horned owl)	Low	Eucalyptus trees
Tyto alba (barn owl)	E	
Asio flammeus (short eared owl)	Possible	
Speotyto cunicularia (burrowing owl)	Possible	

DIVERSITY OF NATIVE SHRUBS IN SELECTED AREAS OF ORANGE COUNTY

<u>Habitats Included *</u>	<u>Native Species of Wood Shrubs &amp; Trees</u> (including succulents)	<u>Naturalized Species</u>	<u>% of Flora</u>	<u>Acres</u>
<u>Whiting Ranch</u>	W, R, CSS, CH, LOW	31	23%	2700
<u>Rancho Los Alisos</u>	W, R, CSS, LOW	34	37%	
<u>Orange Park Acres</u>	W, R, CSS	22	48%	1500
<u>Niquet Hill Property</u>	W, CSS	36	17%	215
<u>East Orange</u>	W, CSS	24	44%	1800

- W\* - disturbed areas and waste places
- R - riparian
- CSS - coastal sage scrub
- CH - chaparral
- LOW - live oak woodland

<u>Species</u>	<u>Abundance</u>	<u>Habitats &amp; Notes</u>	<u>Species</u>	<u>Abundance</u>	<u>Habitats &amp; Notes</u>
<i>Calypte anna</i> (Anna's hummingbird)	Low	Natural vegetation of hillsides	<i>Vireo gilvus</i> (warbling vireo)	E	
<i>Archilochus alexandri</i> (black-chinned hummingbird)	Average	Riparian	<i>Dendroica auduboni</i> (Audubon's warbler)	E	
<i>Selasphorus rufous</i> (rufous hummingbird)	E		<i>Vermivora celata</i> (orange-crowned warbler)	Low	Lake shore
<i>Selasphorus sasin</i> (Allen's hummingbird)	E		<i>Wilsonia pusilla</i> (Wilson's warbler)	Low	Lake shore
<i>Colaptes cafer</i> (red shafted flicker)	E		<i>Passer domesticus</i> (house sparrow)	Average	Open fields, and residential areas
<i>Melanerpes formicivorus</i> (acorn woodpecker)	Low	Eucalyptus rows, riparian	<i>Carpodacus mexicanus</i> (house finch)	High	Ubiquitous
<i>Dendrocopos nuttallii</i> (Nuttall's woodpecker)	Possible		<i>Sturnella neglecta</i> (meadowlark)	Low	Grassy fields
<i>Tyrannus verticalis</i> (western kingbird)	E	Possible	<i>Phaethicus cyanocephalus</i> (Brewer's blackbird)	Low	Flying overhead
<i>Myiarchus cinerascens</i> (ash-throated flycatcher)	Low	Vegetation on hills	<i>Campylorhynchus brunneicapillarum</i> (cactus wren)	Average	Natural vegetation on hills
<i>Sayornis nigricans</i> (black phoebe)	Average	Lake shore	<i>Spinus tristis</i> (American goldfinch)	E	
<i>Sayornis saya</i> (Say's phoebe)	E		<i>Spinus psaltria</i> (lesser goldfinch)	E	
<i>Empidonax difficilis</i> (western flycatcher)	Average	Lake shore	<i>Pipilo fuscus</i> (brown towhee)	High	Hillside vegetation
<i>Contopus sordidulus</i> (wood peewee)	Low	Lake shore	<i>Pipilo erythrophthalmus</i> (rufous sided towhee)	Low	Near houses
<i>Eremophila alpestris</i> (horned lark)	Average	High weeds and grass	<i>Passerculus sandwichensis</i> (savannah sparrow)	E	
<i>Petrochelidon pyrrhonata</i> (cliff swallow)	Average	Soaring overhead	<i>Poocetes gramineus</i> (vesper sparrow)	E	
<i>Apelocoma coerulescens</i> (scrub jay)	Average	Eucalyptus stands	<i>Melospiza melodia</i> (song sparrow)	E	
<i>Corvus corax</i> (common raven)	Average	Eucalyptus stands, flying overhead	<i>Zonotrichia leucophrys</i> (white-crowned sparrow)	E	
<i>Corvus brachyrhynchos</i> (common crow)	E		<i>Chamaea fasciata</i> (wren-tit)	Average	Riparian
<i>Psaltriparus minimus</i> (bushtit)	E		<i>Thryomanes bewickii</i> (Bewick's wren)	E	
<i>Mimus polyglottos</i> (mockingbird)	Average	Natural vegetation on hills near houses	<i>Vireo bellii</i> (Bell's vireo)	Average	Inactive groves
<i>Lanius ludovicianus</i> (loggerhead shrike)	Low	Natural vegetation on hills	<i>Icterus bullockii</i> (Bullock's oriole)	Low	Flying over hills
<i>Sturnus vulgaris</i> (starling)	High	Telephone poles			

## REFERENCES

- Boughey, A. S. 1968. A checklist of Orange County Flowering Plants. Mus. Syst. Biol. Res. Series No. 1, University of California, Irvine.
- Burt, W. H. and R. P. Grossenheider. 1964. A Field Guide to the Mammals. Houghton Mifflin Co., Boston.
- Horton, J. S. 1949. Trees and Shrubs for Erosion Control in Southern California mountains. Calif. For. & Range Exp. Sta., U. S. Forest Service.
- Ingles, L. G. 1965. Mammals of the Pacific States. Stanford University Press, Stanford.
- Munz, P. A. 1959. A California Flora. University of California Press, Berkeley.
- Murie, O. J. 1954. A Field Guide to Animal Tracks. Houghton Mifflin Co., Boston.
- Peterson, R. T. 1961. A Field Guide to the Western Birds. Houghton Mifflin Co., Boston.
- Stebbins, R. C. 1966. A Field Guide to the Western Reptiles and Amphibians. Houghton Mifflin Co., Boston.
- UCI Project 21 Study Team. 1970. Open Space in Orange County, Analysis and Recommendations. University of California Extension, Irvine.



## APPENDIX

### TRIP GENERATION

Following compilation of the land use input for a transportation study, the next phase in the planning process pertains to trip generation. Generally, trip generation is defined as the total number of trips which depart from and arrive at an area of land during a specified time period. This time period may be one hour, normally the morning and/or evening peak hour, or twenty-four hours, called average daily traffic. Usually, the capacity of a street is analyzed on the basis of volume of traffic it can handle during a peak hour. This is the reason for dealing in trip generation for a one hour time period. However, many studies have shown a relatively consistent relationship between traffic volumes for peak hours and for average daily traffic. Additionally, non-technical persons are better able to grasp the concept of the number of vehicles per day on a roadway rather than vehicles per hour. As a result, most transportation studies report their findings in terms of average daily traffic (ADT).

For the purpose of this study, a "trip" is defined as a non-direction, one-way movement between an "origin" and a "destination", i.e., a trip between a home and an office may be either a trip from the home to the office or a trip from the office to the home. The important concept is that this "trip" would have two trip ends (T.E.), one at the home and one at the office.

Trip generation is measured in two ways:

- Home interview survey
- Research cordon count

#### Home Interview Survey:

In this method, a statistical sample of households in the area of the study is requested to record all trips made during a specified day. These households are then interviewed to obtain socio-economic data to correlate with trip habits. From such statistical analyses, future travel demand characteristics of the population within the study area may be extrapolated. This is the method used in most metropolitan-wide transportation studies. While this procedure would appear to lead to very accurate predictions of trip generation, and travel patterns, it does have some disadvantages. First, it is expensive and time consuming; involving analyzing volumes of statistical data; the number of short trips has a tendency to be under-reported due to confusion as to what constitutes a trip; it is questionable whether the socio-economic conditions for an area will remain unchanged in the future; or due to lack of development there are too few or no households to interview.

#### Research Cordon Count:

In this method, an area of land use that can be isolated from say through traffic must be located. The vehicles entering and exiting this area are counted. In many instances, where non-residential land use is involved, a limited interview is conducted to obtain economic data to use as parameters to be related to traffic generation. Traffic generation from residential land uses is normally related to parameters easily obtained from maps, i.e., number of dwelling units, acreage, etc.

A research cordon count alone does not provide enough information to be used in the majority of the modern transportation planning battery of computer programs. It is necessary to have some means of dividing the trip end generation rates obtained from the cordon counts into "production and "attractions", i.e., the trips that begin in an area and the trips that end in an area. There have been a number of home interview surveys in several metropolitan areas from which this information can readily be obtained.

The ratio between trip productions and trip attractions is a function of 1) the desirability of an area as a trip destination and; 2) the number of trips leaving an area during the specified time period of the study. For the total area defined in a transportation study, it is assumed that one-half all trip ends generated for the study are productions; one-half are attractions.

In the determination of the total number of productions and attractions for an area of land, productions are generated directly as trips leaving an area. An attraction factor is calculated on the basis of known determinants of the attractiveness of destination. In the LARTS 1957 Home Interview Study, the significant variables were found to be population and employment, more specifically, retail employment. The relative effect of each one of these variables is approximated in an equation that describes the relationship between the variables and trip attraction as determined from home interview information. The value of this equation for each area gives that area's attraction factor relative to all other areas. To determine the number of attracted trips for each area, the total number of produced trips is subtracted from the total number of trip ends to get the number of attracted trips for the study area. This is allocated among the areas in the study on the basis of the ratio between the area attraction factor and the sum of all attraction factors. This ratio multiplied by the total number of attracted trips in the study yields the quantity of attracted trips for each area.

Traffic from commercial and industrial land uses is generated by re-allocating trips. In the LARTS model, all initial traffic is generated from residential areas. A percentage of this traffic is redistributed to other

land uses, mainly commercial and industrial areas, on the basis of employment and retail employment. Like attracted trips, the total number of trips to be redistributed is multiplied by the weight of each area reallocation factor. This is the percentage of the total reallocation factor for the study represented by each area. These trips are then subtracted from the number of trips for the residential areas where they originate, and added as productions for commercial and industrial areas. This provides the necessary input for the trip distribution purpose.

#### Residential

The traffic generation rate of residential development is dependent on several variables, namely: average family income, auto ownership, population, dwelling unit value, and dwelling unit density. In areas of existing development, these variables are usually obtainable.

Usually, sufficient accuracy can be maintained by extrapolating existing socio-economic values to cover the projected developments. Using this input and information obtained by LARTS in their origin-destination studies, trip generation values can be determined.

#### Commercial and Industrial

Using the LARTS theory, traffic is not generated directly from any land use other than residential. However, generated trips are distributed from residential areas to other land use categories using a series of formulae based on retail employment, total employment and population.

#### TRIP DISTRIBUTION

Trip distribution is the process of determining specific trip destinations. To provide this, certain assumptions are made relative to the travel behavior of persons living in the study area. These assumptions are summarized in models which are used to distribute trips from each zone to all other zones in the study area.

#### Fratar Distribution

One of the simplest models developed for this purpose is the Fratar or growth model. This model combines a base year trip table with origin and destination growth factors for each zone. The growth factors are based on changes in

land use for a zone and calculation of constants representing the net change in zone activity. The constants results from relating the desired number of trips leaving the origin zone, desired total number of trips arriving at the destination zone, the total number of trips leaving the origin zone for the base year, and the total number of trips arriving at the destination zone for the base year. Mathematically, these relationships can be expressed as follows:

$$f_j = \frac{T_j}{\sum_{i=1}^n T_{ij}}, \quad F_i = \frac{T_i}{\sum_{j=1}^n t_{ij} F_j}$$

where:

$t_{ij}$  = base year trips from zone i to zone j

$F_j$  = destination factor

$F_i$  = origin factor

$T_j$  = desired destination total

$T_i$  = desired origin total

$n$  = number of zones

From these formulae, the total number of trips traveling from zone i to zone j for projected year conditions can be derived:

$$T_{ij} = t_{ij} F_j F_i$$

where:

$T_{ij}$  = total trips traveling from zone i to zone j for the projected year

Fratar modeling fails to account for zones with zero activity in the base year. Because of this and other limitations of flexibility, it is most often used to generate traffic that is either entering or passing thru a study area from external points.

#### Intervening Opportunities Model

This is the most recent of the traffic distribution models to be developed. The intervening opportunities model (IOM) distributes trips on the basis that the number of trip interchanges between an origin zone and a destination zone ( $T_{ij}$ ) is a function of the probability that a trip produced in the origin zone ( $o_i$ ) will find an acceptable destination in the destination zone  $P(D_j)$  or:

$$T_{ij} = o_i P(D_j) \quad (26)$$

The model assumes this probability is a function of two characteristics of the zonal relationship. The first of these is the number of possible destinations for the trip in zone j. The second is the relative travel impedance between zones i and j. This impedance is expressed as a ranking comparing zone j to all other zones that are closer to origin zone i. The final form of the IOM model equation is:

$$T_{ij} = \alpha_i \left( e^{-LB} - e^{-LA} \right)$$

where:

$e^{-LB}$  = the natural logarithm taken to the power of -L, the density function or the probability of destination acceptance per destination times B, the sum of all destinations for zones between zones i and j (travel impedance for some zone is less than the travel impedance of zone j for trips originating in zone i)

and:

$e^{-LA}$  = e taken to the power of the density function times A, the sum of all destinations between zones i and j, including j (travel impedance of some zone is less than or equal to that of zone j).

The intervening opportunities model has the advantage, over some of the models in that not all trip productions must be utilized if no acceptable destination is available. The main shortcoming of the model is the lack of extensive field testing or documentation to prove that the model faithfully duplicates real travel behavior.

#### Gravity Model

The basic concept of this model is that the number of trips between any two zones is directly proportional to the traffic activity in each zone and inversely proportional to travel impedance. Zone activity in the origin zone is defined as number of trips produced, while zone activity in the destination zone is defined as number of trips attracted by that zone. Travel impedance is the reciprocal of travel time between zones modified by a factor representing the perceived desirability of making a trip of that duration times a second factor representing any effect of defined socio-economic linkages between the two zones. In mathematical terms this becomes:

$$T_{(i,j)} = \frac{P_i A_j F_{(i,j)} K_{(i,j)}}{\sum_{x=1}^n A_x F_{(i,x)} K_{(i,x)}}$$

where:

$T_{(i,j)}$  = trips produced in zone i and attracted to zone j (analogous to gravitational force)

$P_i$  = trips produced in zone i (analogous to mass of body i)

$A_j$  = trips attracted to zone j (analogous to mass of body j)

$(t_{i,j})$  = travel time in minutes between zone i and zone j (analogous to separation between bodies i and j).

$F(t_{i,j})$  = empirically derived travel time factor that expresses the average area-wide effect of spatial separation on trip interchange between zones that are  $(t_{i,j})$  apart.

$K_{(i,j)}$  = specific zone-to-zone adjustment factor to allow for the incorporation of the effect on travel patterns of defined social or economic linkages not otherwise accounted for in the gravity model formulation.

This model was that used for the pursuit of the study.

#### TRAFFIC ASSIGNMENT

The final phase of the transportation modelling process is assigning the distributed trips to the network, i.e., finding acceptable routes between the origin zone and destination zone for each trip table entry. A number of techniques exist to perform this function. The simplest of these is "all or nothing", or minimum path assignment, which utilizes the route with the shortest travel time between zones and assigns all traffic between those zones to that route. Other variations attempt to account for limiting factors such as roadway capacities or the probability that different travellers will utilize the same route.

An "all or nothing" assignment is normally the first technique utilized in loading traffic on the network. This allows a transportation planner to develop an overall picture of how accessibility and land use planning effect travel desire lines. Significant travel corridors and areas of high traffic activity can be identified.

Once these initial travel characteristics are identified, successive loadings can be used to determine what affect design capacities of both existing and proposed transportation facilities will have on link traffic volumes. Capacity restraint is a mathematical model for determining this effect.

Capacity restraint theory is an attempt to mathematically approximate the diminishing desirability of using a network link as the volume/capacity ratio increases. This is done by increasing travel times of highway links with high volume/capacity ratios by some function of the ratio. The function is an expression of the system user's willingness to take an alternative route to the minimum path. The user's willingness is assumed to be determined by decreased speeds because of increased loadings and by discomfort caused by increased vehicle densities.

The major problem with the capacity restraint model is its total dependency on the previously generated trip tables. Despite the fact that the desirability of travelling to a certain destination might be adversely affected by network conditions, or even the desirability of travelling at all, there is no mechanism to incorporate these user alternatives into the model. Work is currently underway by this firm to develop a reflective gravity model that will modify trip table entries on the basis of the status of the network. This model in conjunction with the intervening opportunities model will provide a more accurate representation of a system user's possible choices.

#### SUMMARY

The tools of the transportation planner allow plans for future land and transportation system development to be evaluated in a statistically significant manner. Though the models are, at best, highly simplified representations of complex human behavior, their effectiveness in predicting the significant demands made on the transportation system by the area it serves has been proven through extensive field testing. Methods of calibration and sub-area analysis provide ways of increasing model sensitivity and, thereby, refining their results.

#### Analysis of Results

One of the most important parts of any traffic study is condensing the volumes of computer output into a manageable body of generalized concepts regarding demands made upon and resulting needs for change in either existing or planned transportation system configuration. Of the tasks faces by the transportation planner, this is the task least subject to a rigorous mathematical rationale. No models and few guidelines exist to help him in interpreting the results of the model.

Vital to analysis is an understanding of how the model actually works. Only by knowing the mathematical relationships incorporated in the model can be critically examine the results for distortions caused by shortcomings of modelling techniques, not by the land use and networks established for the

study. This type of error analysis is vital to any study that is to produce significant results, because of the error proneness of the process of illustrating and coding the network. Network speeds must also be analyzed at this point to bring link traffic volumes into reasonable ranges to be expected for future conditions.

It should be pointed out that an important aspect of the analysis is to bring the traffic flows of the system into reasonable limits to be expected for future conditions without so constraining the model that no information can be gained. The transportation planner must define his criteria of reasonability loosely enough, that it is still possible for the model to generate significantly different scenarios of travel behavior.

Once the model is deemed to be an effective one, the job becomes one of identifying significant patterns of travel behavior. This includes locating multi-facility corridors through an area and identifying their use. This also includes finding zones or zone groups with high levels of production and attraction and determining their effect on travel behavior in the surrounding area. The results of the analytical process is not just a picture of future traffic as street volumes, but a set of conceptual theories regarding how the condition of the transportation system has been generated. Out of this develops a set of land and system development alternatives that can interact to produce a plan for a balanced, functional environment.



May 23, 1975

Dear East Orange Resident or Property Owner,

The County of Orange, the City of Orange and residents and landowners of the area known as East Orange are sponsoring a General Plan Study of the East Orange Area shown on the attached map.

In September of 1974 the "East Orange Study Planning Committee" was created to oversee this Study. The Committee comprised of representatives of the County of Orange, the City of Orange, residents of the area, major landowners and developers retained J.L. Webb Planning and affiliated consultants to prepare the East Orange General Plan.

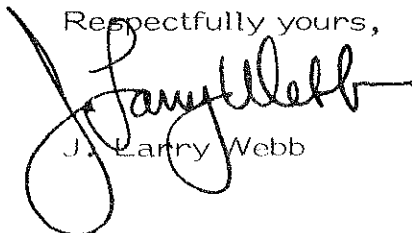
This Study is currently underway and as a resident and/or property owner living in or near the Study project area, your interest and input to the project is invited. You may write a letter to:

Mr. Larry Webb  
J.L. Webb Planning  
220 Newport Center Drive Suite #22  
Newport Beach, CA 92660

Include in this letter any issues, input or questions concerning land use that you wish to have covered within the General Plan Study. The project is scheduled to be completed by the end of July. Therefore, it would be most beneficial if your written input could be received within the next two weeks in order that your concerns may be given appropriate consideration.

An open public meeting is scheduled for July 14, 1975 at 7:30 pm at Santiago Junior High, 515 N. Santiago, Orange. The purpose of this meeting will be to review background information, evaluate a range of alternative plans and to receive your additional input prior to the final selection of a proposed Plan. We encourage you to attend this meeting and will look forward to seeing you there.

Respectfully yours,



J. Larry Webb

BIBLIOGRAPHY

1. Assessor's Roll Books and Map Book, East Orange Area, Orange County Assessor's Office, 1974.
2. Bicycle Trails, Orange County General Planning Program, April, 1972.
3. City of Orange Budget for Fiscal Year 1973-74, City of Orange, May, 1973.
4. City of Orange Budget for Fiscal Year 1974-75, City of Orange, May, 1974.
5. City of Orange Budget for Fiscal Year 1975-76, City of Orange, May, 1975.
6. City of Orange General Plan, Quinton Budlong Planning Research Corporation, 1972.
7. City of Orange Housing Element of the General Plan, Preliminary Draft, Havorth/Andersory/Leifer, May, 1974.
9. City of Orange Zoning Ordinance, City of Orange Department of Community Development, 1973.
9. County of Orange Proposed Budget 1973-74, County of Orange Auditor-Controller, June, 1973.
10. County of Orange Final Budget 1973-75, County of Orange Auditor-Controller, August, 1974.
11. County Zoning Code, County of Orange, 1967.
12. The Dollars and Cents of Shopping Centers: 1972, A Study of Receipts and Expenses, Urban Land Institute, 1972.
13. Environmental Management System, Land Use Element, The General Plan, City of Orange, August, 1974.
14. Financial Report, Orange County Department of Education, December, 1974.
15. Floodplain Information, Lower Santiago Creek, Orange County, California, U.S. Army Corps of Engineers, June, 1973.
16. The 1969 Floods in Orange County, Orange County Flood Control District, December, 1972.

BIBLIOGRAPHY - continued

17. Foothill Corridor Policy Plan, J. L. Webb Planning, October, 1974.
18. Historical Landmarks, Orange County, Orange County Planning Department, 1969.
19. Inventory of Special Districts, Local Agency Formation Commission of Orange County, 1972.
20. 1983 Land Use Element of The Orange County General Plan, Orange County General Planning Program, March, 1975.
21. Local Park Code, County of Orange, 1973.
22. Master Plan - Orange Unified School District, Westinghouse Learning Corporation, June, 1973.
23. The Master Plan of Regional Parks, Amendment No. 3, County of Orange, July, 1972.
24. Oasis Report - Suggested General Plan Orange Community Area, Orange Chamber of Commerce, November, 1959.
25. Open Space Element of the Orange County General Plan, Orange County General Planning Program, 1973.
26. Open Space In Orange County, Report of the U.C.I. Project 21 Open Space Team on Preserving Open Space in Orange County, University of California Extension, 1970.
27. Orange County Progress Report 1974, Volume 11, County of Orange Forecast and Analysis Center, October, 1974.
28. Orange Park Acres Specific Plan, J. L. Webb Planning, 1973.
29. People, Policy and Growth A New Direction?, County of Orange Planning Program, December, 1972.
30. The Physical Environment of Orange County, Orange County General Planning Program, June, 1972.
31. Recreation 70 A General Planning Program Report, Orange County Planning Department, 1970.
32. Report on the State of The County 1973, Working Document No. 1, County of Orange Forecast and Analysis Center, December, 1973.

BIBLIOGRAPHY - continued

33. Report on The State of The County 1974, Working Document No. 1, County of Orange Forecast and Analysis Center, December, 1974.
34. Santa Ana River, Santiago Creek Greenbelt Plan, Orange County General Planning Program, July, 1972.
35. The Scenic Highways Element of The General Plan, Orange County General Planning Program, 1973.
36. Southern California Regional Development Guide, Classification of Land Use, Southern California Association of Governments, 1972.
37. Subdivision Activity Report, Title Insurance and Trust, March, 1974.
38. Tax Rates, County of Orange, Auditor-Controller, 1974-75.
39. Three Year Master Plan, Orange Unified School District, 1975.
40. Traffic Flow, City of Orange, 1974.
41. Trails for the Orange Park Acres, Cowan Heights and the El Modena Area, County of Orange, 1974.
42. Water District Organization In Orange County, Orange County Flood Control District, 1967.



STAFF

Project Director ..... J. Larry Webb  
Research & Planning ..... Gary Gleason  
Graphic Design ..... Jeffrey Frisch  
Project Assistant ..... Gayla Webb



Project Director

J. Larry Webb