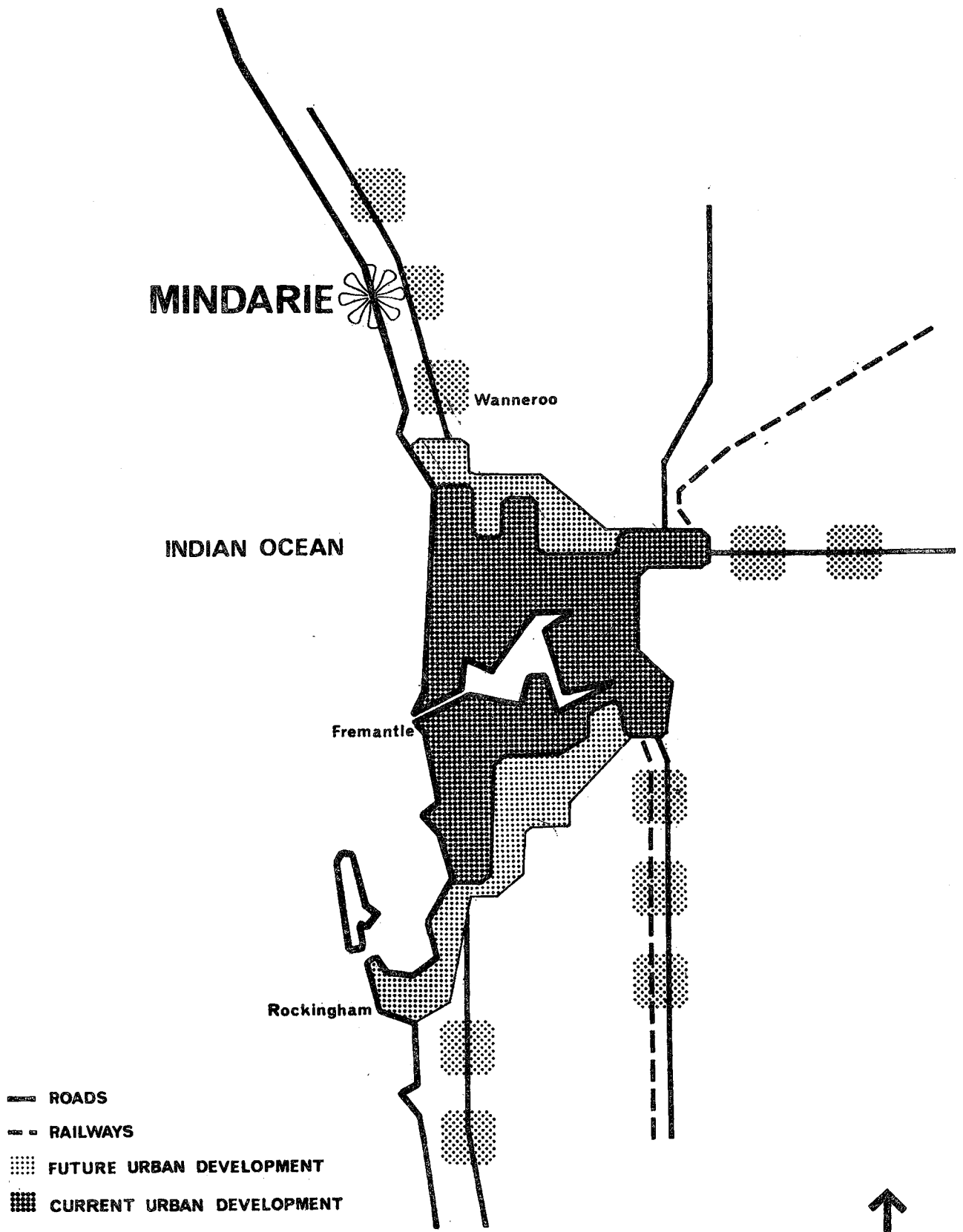


MINDARIE ENVIRONMENTAL CITY

MINDARIE ENVIRONMENTAL CITY





LOCATION OF MINDARIE

MINDARIE ENVIRONMENTAL CITY

INDEX

(1)	INTRODUCTION	Page 1
(2)	BIRTH OF THE CONCEPT	Page 2
(3)	DECIDING THE PLANNING APPROACH	Page 3
(4)	PLANNING THE STUDY	Page 4
(5)	MAKING DECISIONS	Page 6
(6)	IMPLEMENTING THE PLAN	Page 8
(7)	CONCLUSION	Page 10
(8)	APPENDIX	
	SUITABILITY MAP — CONSERVATION	
	SUITABILITY MAP — RECREATION	
	SUITABILITY MAP — URBANIZATION	
	COMPOSITE LAND EVALUATION MAP	
	VISUAL AREA ANALYSIS	
	STRUCTURE PLAN	
	INDICATIVE SUBDIVISION	
	INDICATIVE VILLAGE DEVELOPMENT	

MINDARIE ENVIRONMENTAL CITY

INTRODUCTION

By caring for his world, man cares for himself.

He expresses his caring best by moving in harmony with his environment.

Nowhere is this more vital than in urban environments where most people live.

The Mindarie Environmental City concept described in this short monograph responds to this challenge.

It deals with a proposal to build an environmental city for 100,000 in Perth's Northern Corridor.

The chosen location is 22 miles from the heart of Perth in an area known by the native name Mindarie ("camping ground").

The proposal has been presented to the Government of Western Australia by Development Underwriting Limited.

At Mindarie, for the first time in Australia, an urban plan is being founded on a study in depth of the chosen environment.

A new system of evaluating the complex knowledge gained has clarified the process of deciding how best to use it.

Speed and precision have thereby replaced confusion over how the environmental city ideal can be put into practise.

The evolution of the Mindarie method is therefore a significant advance at a significant time.

Australia is on the threshold of expansion requiring development of more urban settlements more rapidly than at any time in its history.

The Mindarie method is the practical solution — adding essential quality to urban living while avoiding the quicksands of indecision so often associated with environmental concern.

As a major builder of urban environments around Australia, Development Underwriting Limited looks forward to Mindarie and its many successors in the future.

Here in the West, a significant advance is being made for Australia.

MINDARIE ENVIRONMENTAL CITY

BIRTH OF THE CONCEPT

The Mindarie Environmental City concept originated with Development Underwriting Limited, a major Australian property developer, active in 12 Perth suburban areas.

The Company's Australia wide experience embraces major urban developments, the operation of Hotels, and the building of one of Australia's biggest shopping centres at Maribyrnong, Victoria. Its Perth operations include Burren-dah, in Willetton, where homes for 10,000 are being created on a 700 acre site.

Development Underwriting and its associated companies are experienced also in building and construction, project development, mineral exploration, large scale financing and management.

In 1972, it acquired the 7,441 acre Mindarie property, surrounding Quinns Rocks, responding to the Corridor Plan for the Perth Metropolitan region — then awaiting approval and now officially accepted.

This large acquisition fulfilled a major goal of the Company — to secure an area big enough to enable a new concept of environmental planning to be implemented.

The Company had long recognised a growing public demand for a higher quality of urban environment. It felt that, if it could satisfy this demand, it could produce products of high appeal on the urban land market while making a major contribution to the upgrading of the urban environment.

Looking ahead, however, the Company foresaw that it must rightly satisfy the political market also, in the sense that qualified advisers to Government were looking beyond landscape-oriented planning towards the deeper issues of environmental planning in the public interest.

It would be fair to say also that the attractiveness of the Mindarie environment played some part in inspiring the Company to decide firmly in favour of going all the way.

It therefore engaged the widely experienced Urban Systems Corporation Pty. Ltd. to lay the foundations for a Mindarie City plan based on a total understanding of the environment from the start.

MINDARIE ENVIRONMENTAL CITY

DECIDING THE PLANNING APPROACH

The relationship between developer and planner on the Mindarie project began with a dialogue on the desired goals and how to achieve them.

Development Underwriting emphasised these aspects:

- (1) The Mindarie Project was a response to anticipated market demand — in other words, public preference — in the near and long term future. The Northern Corridor, while largely empty, was growing at a faster rate than any other sector of the Perth Metropolitan Region. Mindarie would meet this demand by responding to public preference for better environments for the average home buyer. It would set out to attract not only residents, but substantial employment-making activities, adding some degree of decentralisation to the Metropolitan Region.
- (2) It would create the best possible environment for urban settlement, providing not only for scenic attractiveness and adequate open space, but also for a satisfying range of recreational and cultural activity.
- (3) It would achieve a notable advance in environmental standards at an acceptable cost. The Company was determined that ways would be found to eliminate waste in time, effort and money in order to keep land costs to the average buyer as reasonable as possible. It was recognised that cost and convenience were significant factors in any total environmental consideration, from a human point of view. This determination required a method of planning whereby sound environmental decisions could be made with confidence and speed.
- (4) Mindarie's relationship with the larger environment around it was to be taken into consideration. One aspect was the provision of easy access to the sea and its beaches right along the Western boundary, to the National parkland right along the eastern boundary, and to possible areas of parkland enclosure to the North and the South — making Mindarie an "urban island", with its own very distinct environmental identity.

The planners proposed a complete environmental study, employing many disciplines, using the method popularized by Ian L. McHarg, in the U.S.A. Under the McHarg system, data on all environmental factors above the surface, on the surface and below the surface of the land is gathered and mapped ("Design with Nature", 1972). Each type of information gathered is classified in accordance with its value for —

- * All forms of urbanisation
- * All forms of recreation
- * All forms of conservation.

A system of evaluation is then applied to enable the complex inputs to be resolved with sufficient clarity for firm decisions on future land use.

MINDARIE ENVIRONMENTAL CITY

PLANNING THE STUDY

The planners engaged capable sub-consultants in the fields of engineering, geography, geology, botany and meteorology.

A summary of the way information was gathered and classified is set out in the table on the following page.

It will be appreciated that the gathering of data was far reaching, taking into account all the physical and biological processes acting on the environment in the area.

For example, such processes as water percolation, wind and wave erosion, sand-dune stabilisation, and various fluvial processes were found to have a dynamic influence on the nature of the area. By identifying and acting in sympathy with these processes, maximum benefits could be gained from the development.

When the base data was gathered the suitability of each factor of the environment for —

- * Conservation
- * Recreations, and
- * Urbanisation

was specifically identified.

Each factor was given a suitability rating in a gradient of three values from high to low.

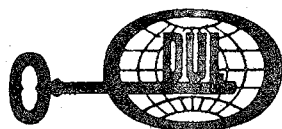
In the initial mapping this suitability rating was represented in tones of grey ranging from dark (most suitable) to light (least suitable).

Interesting comparisons were found. For example, the land most susceptible to erosion was often most suitable for conservation, whereas land least susceptible to erosion was often least in need of conservation. Conversely, land most susceptible to erosion was least suitable for urbanisation, and the land least susceptible to erosion was most suitable for urbanisation. Thus, the erosion factor was mapped twice, according to its use in either conservation or urbanisation assessment.

Three suitability maps were finally prepared — the grey tones being translated into colours:

- * Yellow for Conservation
- * Blue for Recreation
- * Red for Urbanisation.

These maps were laid down on transparent material. As a result it became possible to identify not only the individual suitability factors but to read them together by overlaying one transparent map on the other.



SUMMARY OF FACTORS AND RANKING PROCEDURE

FACTORS	RANKING CRITERIA	PHENOMENA			RANKING OF PHENOMENA FOR MAJOR LAND USES (Most to Least)		
		A	B	C	Conser- vation	Recre- ation	Urbaniz- ation
PHYSIOGRAPHY							
Features of unique physiographic value.	Scientific Interest Max to Min	Limestone cliffs	Blowout	—	A, B, C		
Features of unique scenic value	Distinctive Most to Least	Quarries High land Nat. Park	Sand-dunes Ridges	—	A, B, C	A, B, C	
Degree of Slope	Gradient High to Low	Over 1 in 8	Between 1 in 8 1 in 50	Less than 1 in 50		C, B, A	
PEDOLOGY							
Soil Drainage and water storage	Relation to Vegetation growth Best to Worst	Medium Sand	Unconsoli- dated sand	Capstone (Kankar)			A, B, C
CLIMATE							
Wind and wave erosion	Exposure Most to Least	Beach and dunes	Secondary dunes	Inland Areas	A, B, C		C, B, A
VEGETATION							
Vegetation and wildlife habitats	Quality Best to Worst	Banksia Woodland and Heathland	Recently stabilized dunes and heathland	Burnt capstone, grazed land	A, B, C	A, C, B	A, C, B
VIEW POTENTIAL							
Sea Views	Quality Best to Worst	Panoramic Views	Localised View	No View			A, B, C
Land Views	Quality Best to Worst	Panoramic Views	Localised View	No View			A, B, C

(..... Step 1) (..... Step 2) (..... Step 3)

When combined, they gave a composite picture of suitabilities. The four basic maps used are incorporated in the Appendix to this monograph, together with a visual area analysis map developed from a separate parallel study.

The study used has significant advantages:

1. It is rational, since much of the evidence is derived from exact science. Thus it increases the objectivity of evaluation.
2. The information is explicit — a tremendous advantage in making unavoidable value judgments.
3. The information is expressed in such a way that estimates of community values can be drawn from it to an infinite degree — depending on the bases on which the evaluations are to be made.

Generally, once values for the major land uses have been identified, it is possible to demonstrate the degree to which any proposal will enhance or damage the area.

Thus, the system points immediately to those areas that should be conserved and highlights those that are suitable for development. It also shows where uses may co-exist, offering an opportunity to combine such uses in a socially desirable way.

It will be observed that the composite land evaluation map incorporated in the Appendix illustrates with some accuracy the complexities of the environment and the potentiality of the land for various kinds of development.

The accompanying visual analysis map (Appendix E) goes further than the McHarg System by identifying significant physical forms of the land, such as hollows, valleys, ridges, plateaux, hills, groves or lines of trees, or other visually definite aspects of the environment according to principles indicated by Kevin Lynch ("Site Planning", M.I.T. Press, 1961 and 1972).

It will be seen from the visual area analysis map that ridges represent the boundaries of most visual areas. However, in some cases, a sharp change in the nature of the landscape defines the boundary. Other visual boundaries are the result of changes in physiography, as from grazed land to thick natural woodland or changes in gradient (e.g. from steep, irregular dunes to low, rounded hills).

Along most boundaries, one or more natural links to adjacent visual areas exist in the form of shallow valleys or gaps.

In most cases, suitable development precincts have been defined by such boundaries but, where none exist, a choice has been made in order to facilitate selection.

MINDARIE ENVIRONMENTAL CITY

MAKING DECISIONS

With all inputs gathered and mapped, the planners faced the task of making decisions in respect of basic recommendations.

These decisions had to be made on the following basis:

- (1) The data.
- (2) The four key goals of the client company (meet market demand, achieve optimum environmental standard, keep costs reasonable, and relate to the surrounding environment).
- (3) The three McHarg evaluation guidelines related to possible land use (urbanisation, recreation, conservation).
- (4) The natural features creating recognisable precincts.
- (5) The accepted normal planning principles and constraints applicable to any urban development.
- (6) The overall planning guidelines and constraints represented by the requirements of the Metropolitan Region Planning Authority and the Main Roads Department.

A significant constraint or guideline was the corridor plan for the metropolitan region. The relevant aspects of this framework affecting Mindarie are:

- * growth in the northern corridor will follow a linear pattern along the coast;
- * urban growth will develop in units which can acquire individual identity and which are linked by communication networks;
- * development will be facilitated by an adjacent freeway system connecting the area to the Perth C.B.D.;
- * east of Wanneroo Road, the land will have non-urban uses such as forestry reserves and market gardening;
- * urban areas will be separated and identified from each other by wedges of open space.

In accordance with the concept of "intrinsic suitability", general principles adopted for the location of open space in Mindarie were:

- (a) protect and conserve areas of natural flora and fauna as regional parks;
- (b) protect and conserve major physical and topographical features of special interest, rarity or scenic value;
- (c) provide a logical open space pattern by retaining physical features which define urban areas (e.g. ridges, woodlands);
- (d) protect and conserve beach front areas;
- (e) provide both local and regional open space to meet the required demand.

In addition to these general principles, there were unavoidable road and highway linkages which had to be provided for;

- * **Stephenson Freeway** — a high speed through route with only one point of intersection and interchange with Mindarie.
- * **Marmion Avenue** — a main feeder artery collecting and distributing traffic being generated from the suburbs on either side.
- * **The East/West Arterial road** — to provide a link with the freeway for traffic collected and distributed by Marmion Avenue and Wanneroo Road.
- * **The West Coast Highway** — the major route for access to the coast.

It is pleasing to report that it was possible to locate these routes in such a way that they satisfied engineering requirements while conforming to environmental considerations — blending into the landscape with as little visual intrusion as possible, while serving to provide attractive vistas and and other pleasant surroundings for the driver.

Nevertheless, the roadway locations, once adopted, became an added "significant physical form" (on the Kevin Lynch principle) guiding the definition of precinct areas.

The final structure plan was thus evolved from the combination of the following:

- (1) The visual area analysis.
- (2) The composite land evaluation map.
- (3) The application of planning principles.
- (4) The major road network.

Because of the suitability mapping system used, it was possible to apply decision making on a total area basis and on a detailed precinct basis simultaneously with considerable precision.

The structure plan, which finally set out the precincts and use areas, represented an optimum mode of development for Mindarie Environmental City.

A further sophistication of method of analysis also permitted land allocation for urban settlement to be actively graded according to its likely popularity on the market. It will be recognised that this is a vital factor related to the efficient expenditure of development funds. All urban developments require a very large capital outlay before land sales can begin. The quicker the land moves on to the market, the lower the cost of carrying the capital investment and the more competitive the price structure.

As emphasised earlier, total cost is regarded as a vital aspect of all urban environments — effecting the lives of individuals just as significantly as the surroundings.

MINDARIE ENVIRONMENTAL CITY

IMPLEMENTING THE PLAN

The Mindarie method has provided a basis for all future planning in that area.

Without doubt the method could be extended beyond that area, or to any area, as a means of ensuring that urban planning is founded on full environmental understanding.

It is recognised, nevertheless, that while a significant step has been taken at Mindarie, it is only the first step.

The next step is to use the environmental planning base as a tool for detailed planning of the area.

In the short term, some individual precincts could be developed to relieve a growing shortage of available serviced land in the Perth metropolitan market.

Concurrently, however, it would be both desirable and possible to advance to the next stage of evaluation, taking into account such important aspects as –

- * social requirements like schools, hospitals, and other basic community facilities
- * sociological aspects like the needs of the various age groups;
- * essential services like water, power, sewerage, drainage and public transport;
- * other community needs for which sites need to be provided in the short term or the long term.

A key cultural, social and commercial requirement is a viable, lively and attractive city centre, for which 100 acres has been provided.

The aim is to produce an environmental city centre – not the standard concrete jungle. In broad terms, these guidelines are visualised:

- * Proper location in relation to major access routes with Mindarie and outside, as well as possible future public transport needs.
- * Ring access to all parts of the city centre circumference.
- * Parking “fingers” reaching in towards the centre, to provide off-street car parking close to the point of need.
- * A generous provision for trees and other natural enhancement for the parking fingers and for sectors of the city centre.
- * Division of the city into recognisable precincts served by streets of human proportion, adding to the excitement and satisfaction of a city centre visit.
- * Special provision for such amenities as sidewalk cafes and open air seating and gathering places for the public.

- * A revival of the old world value of the town square as a focal point and a major amenity for gatherings and entertainment.
- * Provision for upper floor residential accommodation above commercial establishments, to the extent that this is desired by the public — thereby encouraging a "live-in" city centre.
- * Generally — the encouragement of variety in structures and services provided by the city, with special attention to colour, the impact of sunlight, and the excitement of night lighting.

In the design of dormitory areas, every effort will be made to preserve the best of the landscape and infiltrate the development into it.

An indicative initial sub-division (see Appendix F) shows how a golf course set in a minor valley is related to the urban settlement.

Because the settlement lies between the golf course and a major roadway, Marmion Avenue, steps are being taken to shield it from traffic noise.

Where required, Marmion Avenue is to be sunk below the surface of the landscape in order to reflect traffic noise upward rather than outward.

Streets within the indicative sub-division have been planned so that many of them run down towards the golf course valley, providing a very pleasant vista.

A street pattern of loops and culs-de-sac minimises traffic density for most of the homes, and most traffic would be routed around the area rather than through it.

Development Underwriting Limited looks forward to building Australia's first environmental city.

The Company hopes that many others will follow this pattern and that — in competing with each other for public approval, via the market — they will begin a new era in the development of Australian urban environments.

MINDARIE ENVIRONMENTAL CITY

CONCLUSION

The Mindarie Environmental City concept and its associated planning methods can be the basis of a further advance in Australian urban development.

Cities and other urban centres developed by the Mindarie method will contribute most to the inputs required by Government and Local Authority planners for their own decision making processes.

If the Mindarie method can be universally applied, a rational approach to evaluation will have been achieved, and a significant clarification of the decision making processes will have been achieved with it.

The method enables experts and non-experts alike to make significant value judgments in the interests of the community, once the required data has been properly gathered and properly assembled.

Development Underwriting Limited is proud of its Mindarie Environmental City concept and looks forward to its progressive development in the decades ahead.

It is conservatively estimated that the development represents a total input of social capital of not less than \$600 million on present values and continuous creative employment for at least 2,000 people, possibly until the year 2000.

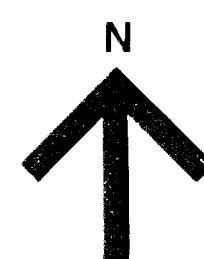


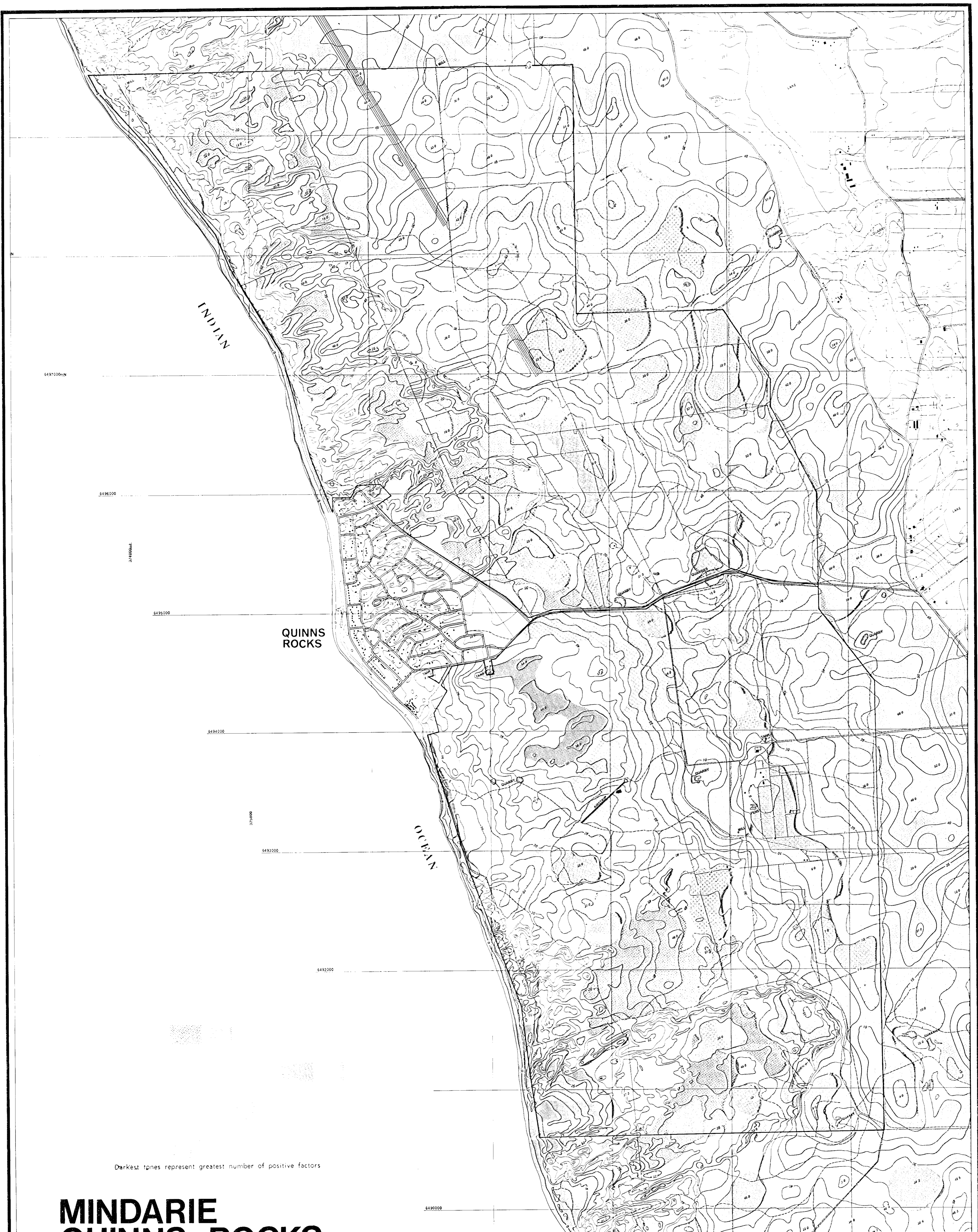
**MINDARIE
QUINNS ROCKS**
**SUITABILITY FOR USE —
CONSERVATION**

SCALE 1:20,000

URBAN SYSTEMS CORPORATION PTY. LTD.

Fig. 3A



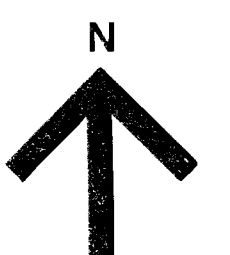


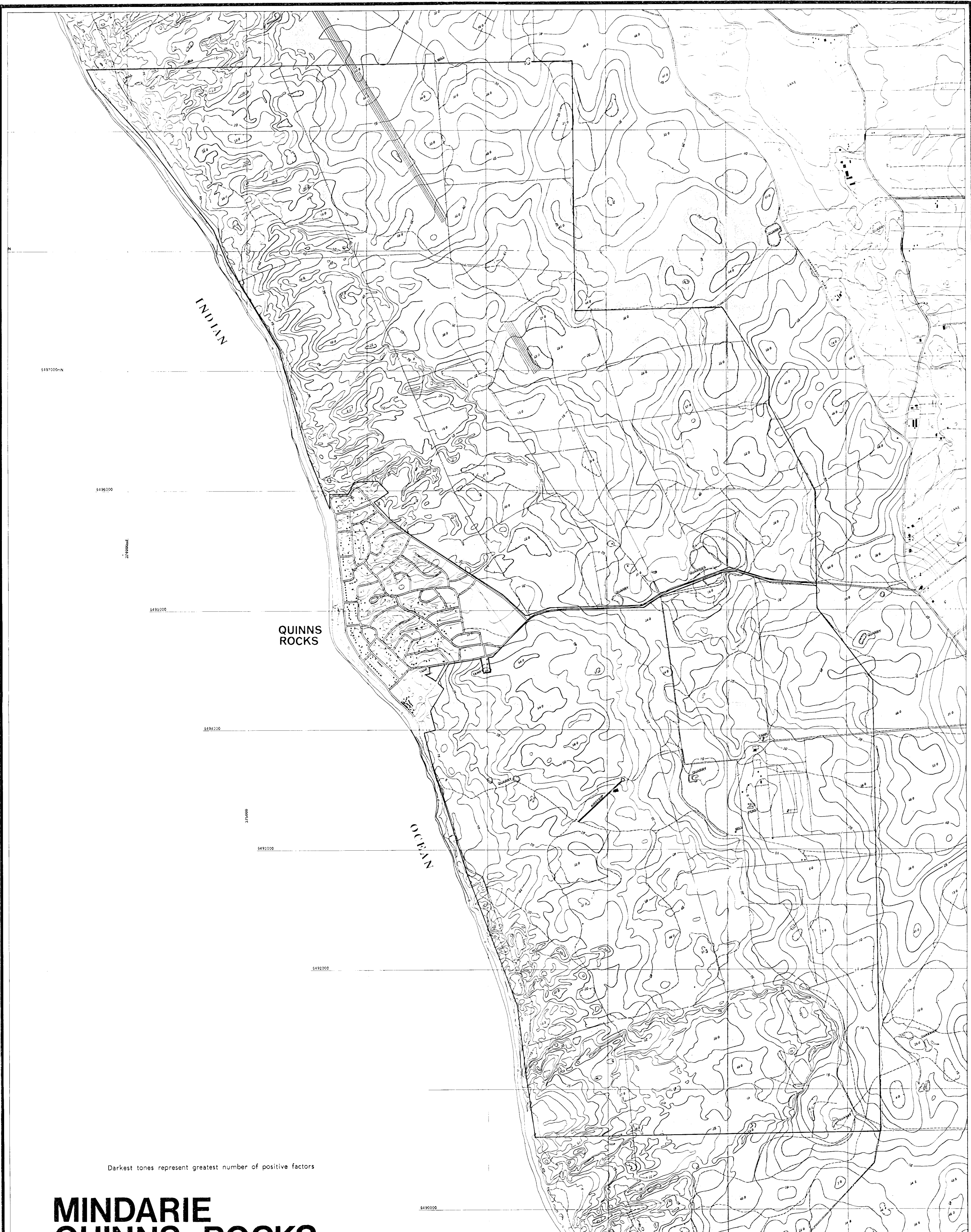
**MINDARIE
QUINNS ROCKS**
**SUITABILITY FOR USE —
RECREATION**

SCALE 1:20,000

URBAN SYSTEMS CORPORATION PTY. LTD.

Fig. 3B





Darkest tones represent greatest number of positive factors

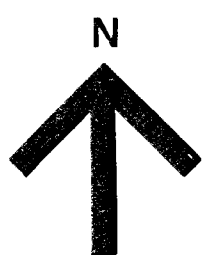
MINDARIE QUINNS ROCKS

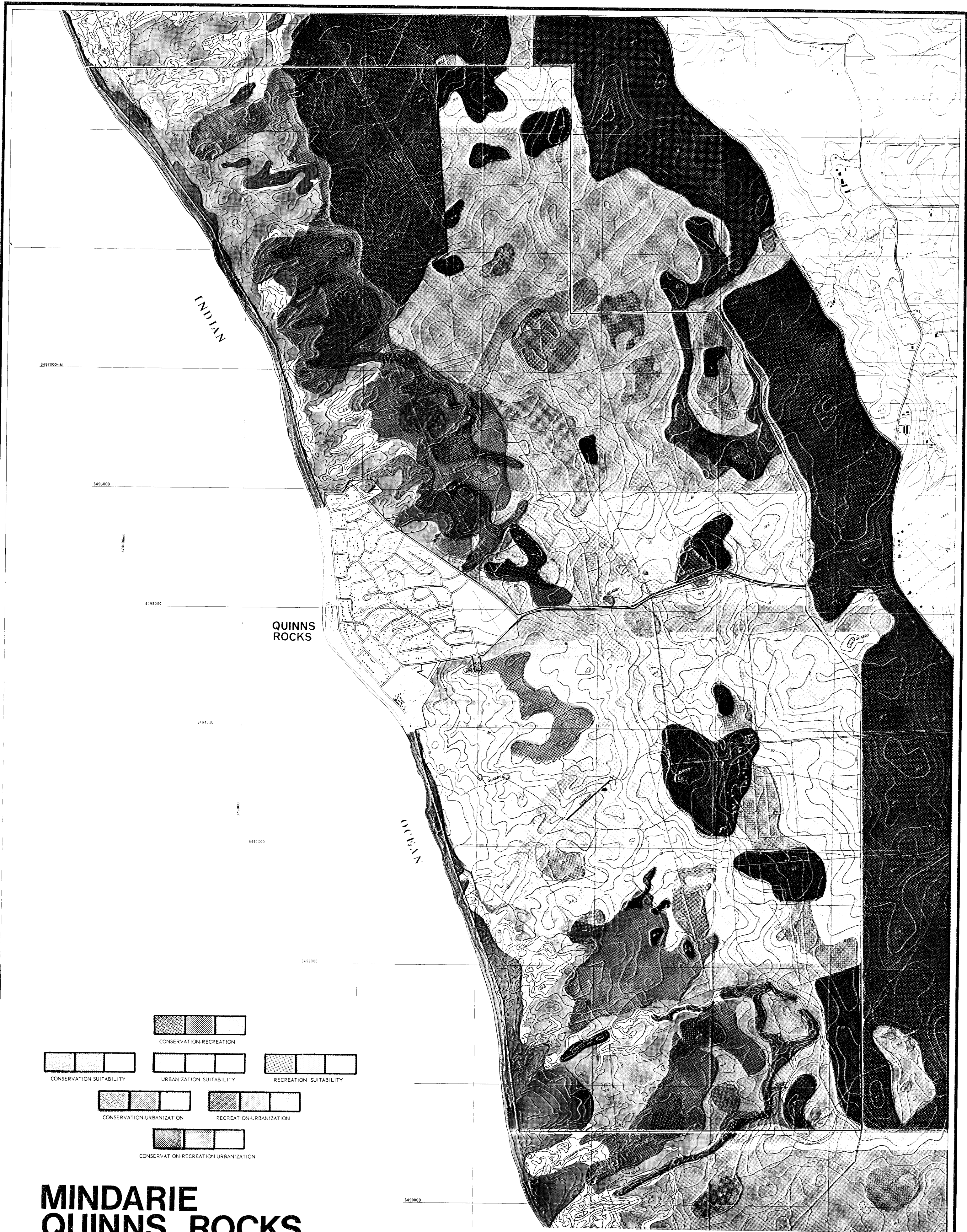
SUITABILITY FOR USE — URBANISATION

SCALE 1: 20,000

URBAN SYSTEMS CORPORATION PTY. LTD.

Fig. 3C





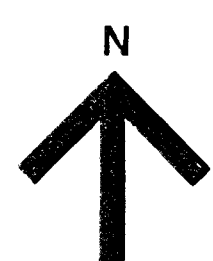
MINDARIE QUINNS ROCKS

COMPOSITE LAND VALUE MAP

SCALE 1: 20,000

URBAN SYSTEMS CORPORATION PTY. LTD.

Fig. 3D





- CLEARLY DEFINED BOUNDARIES
- - - INDISTINCT BOUNDARIES
- ▨ ATTRACTIVE VEGETATION
- ▤ VISUAL AREAS
- ↔ VISUAL & NATURAL LINKS

MINDARIE QUINNS ROCKS

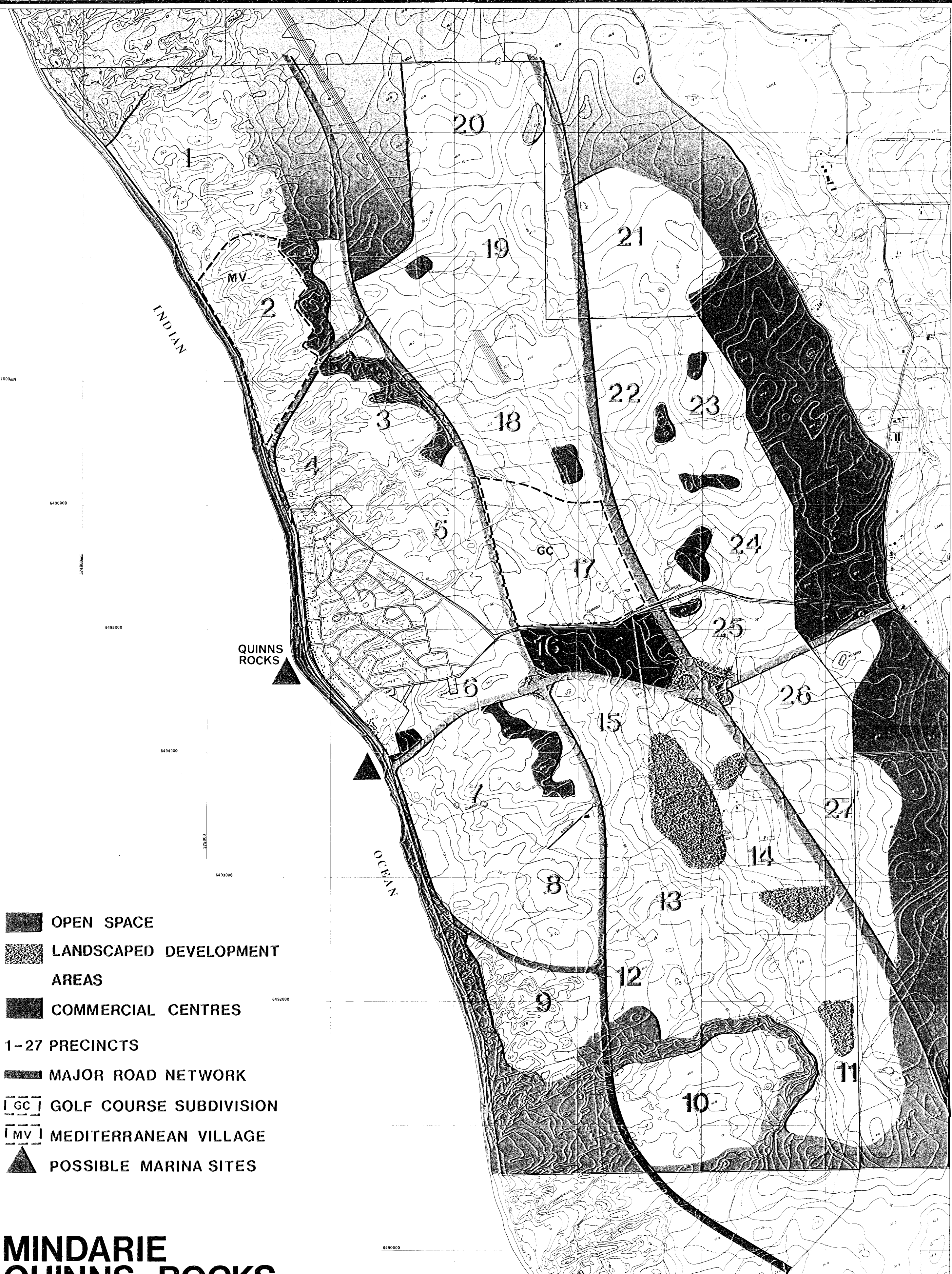
VISUAL AREA ANALYSIS

SCALE 1:40,000

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Fig. 2





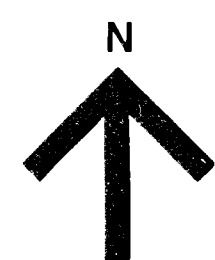
MINDARIE QUINNS ROCKS

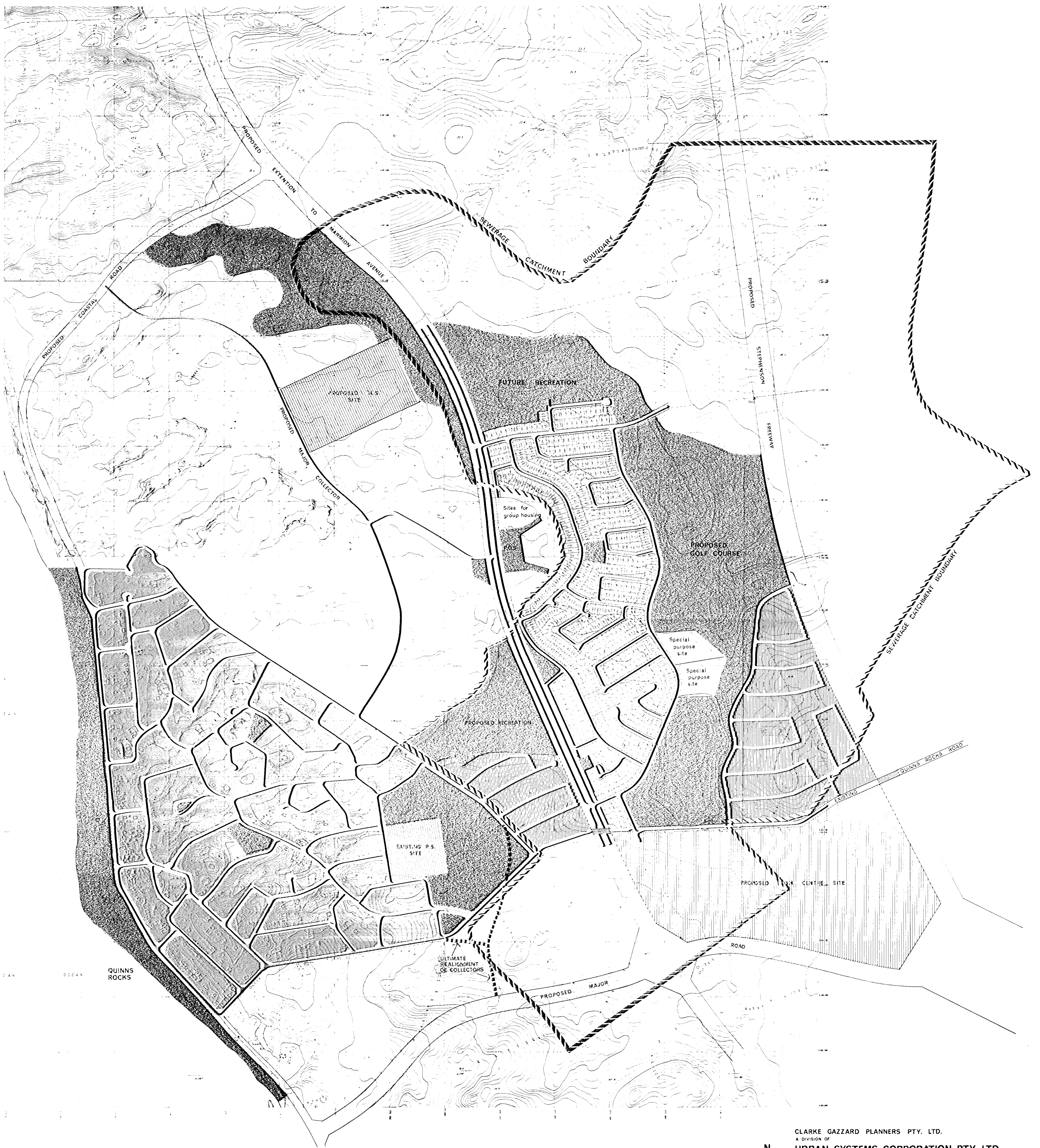
STRUCTURE PLAN

SCALE 1: 20,000

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Fig. 6





OUTLINE PLAN

AUGUST 1973

CONTOUR INTERVAL: 1M.
PLAN No 7392/2



CLARKE GAZZARD PLANNERS PTY. LTD.
A DIVISION OF
URBAN SYSTEMS CORPORATION PTY. LTD.
56 KINGS PARK ROAD, WEST PERTH, W.A. 6005
MINDARIE ENVIRONMENTAL CITY
A PROJECT BY
DEVELOPMENT UNDERWRITING LIMITED.

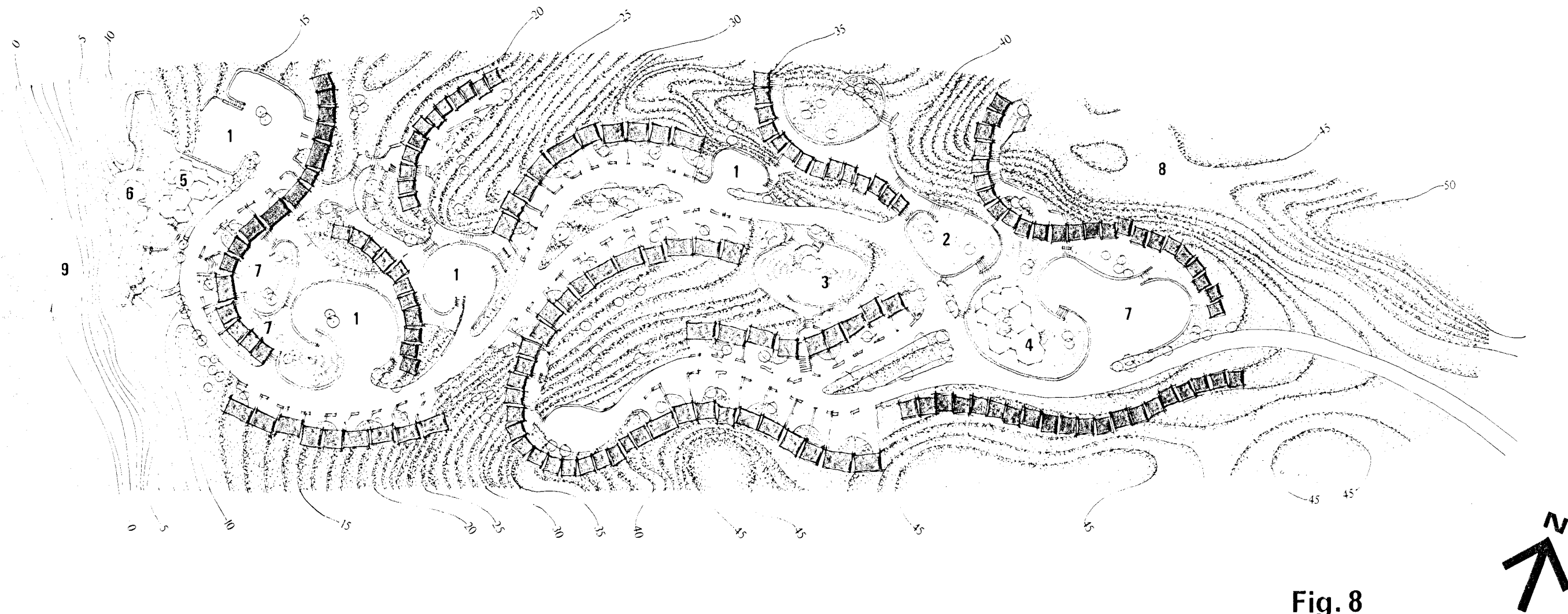
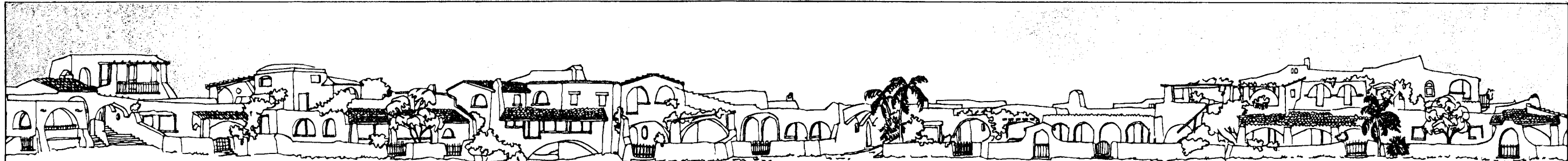


Fig. 8

LEGEND;

- 1 Parking
- 2 Look Out
- 3 Playground
- 4 Community & Shopping Centre
- 5 Restaurant & Night Club
- 6 Swimming Pool
- 7 Cafe-Bar & Shops
- 8 Tennis Courts Area
- 9 Beach

MINDARIE DEVELOPMENT
1&2 STOREY TOWNHOUSES SCHEME

URBAN SYSTEMS CORPORATION PTY LTD
May 1973

One storey dw/unit number 60 = 240 people
Two storey dw/unit number 100 = 400 people
total 160 = 640 people

0m 50m 100m 150m 200m