

EIS 43

AA057336

Chipping Norton Lake scheme : planning and development
study

NSW DEPT PRIMARY INDUSTRIES



AA057336



Public Works Department

**CHIPPING NORTON LAKE SCHEME
Planning and Development Study**

Prepared by
Department of Environment and Planning

E19
43A

M81/4802



Public Works Department

**CHIPPING NORTON LAKE SCHEME
Planning and Development Study**

Prepared by
Department of Environment and Planning

EIS
43A

All inquiries to the Public Works Department
4th floor, Shell House, 140 Phillip Street, Sydney
Telephone: (02) 231 7100

SEPTEMBER 1980

81/9

ISBN 7240 4540 6

This report was prepared by Kerry Bedford with the assistance of Barbara Stockton (Landscape Specialist) and Zenon Michniewicz (Transportation Specialist) and under the direction of Roger Elliott of the NSW Department of Environment and Planning.

FOREWORD

For many years sand has been extracted from an area of former farmland at Chipping Norton on the Georges River.

Because of concern at the devastation of the area and the possible detrimental effects on the Georges River, the Chipping Norton Lake Authority was formed in 1977 with the express purpose of controlling the sand extraction and developing the area into a recreational lake with associated parkland.

In order to ensure local participation in the development of the Scheme I established an Advisory Committee with representatives of Bankstown, Fairfield and Liverpool City Councils, the Department of Public Works and of Lands, and the then Planning and Environment Commission.

As part of the planning process, the consultants Cox and Corkhill Pty. Ltd. were commissioned to carry out a planning study. The report of this study has already been published.

The Advisory Committee identified the need for detailed planning particularly with respect to the impact of the scheme on the surrounding region and its capacity for recreational activity. To this end the then Planning and Environment Commission was commissioned to carry out this Planning and Development Study. I would like to thank my colleague Mr. Bedford, the Minister for Planning and Environment, for the preparation of this study by his Department.

In order to keep the local community informed on what is proposed and to provide a direct opportunity for it to be involved in the planning of the Scheme, I am pleased to publish this report and invite comment.

JACK FERGUSON
Deputy Premier
and
Minister for Public Works and Ports

Comments should be forwarded to the Secretary, Chipping Norton Lake Authority, 4th Floor, Shell House, 140 Phillip Street, Sydney.

CONTENTS

	<u>Page</u>
<u>FOREWORD</u>	3
<u>SUMMARY</u>	7
<u>INTRODUCTION</u>	9
<u>AIM OF THE STUDY</u>	9
<u>PART ONE</u>	
1. <u>Background and Regional Setting</u>	
The master plan for the Lakes Scheme	10
Population characteristics	10
Regional location and access	11
Existing recreation facilities and use in the upper Georges River	
(a) Water-based recreation	12
(b) Land-based recreation	13
2. <u>Chipping Norton Lakes Development Area</u>	
Land use	16
Landscape assessment	17
Existing zonings	18
Ownership	19
Phasing	20
Local road access	21
3. <u>The Recreation Capacity of the Lakes Scheme</u>	
Rationale	22
Methodology	22
The capacity of the water area	23
Adequacy of boating facilities proposed	28
The capacity of the land area	31
Parking requirements	32
4. <u>The Impacts of the Lakes Scheme</u>	36
5. <u>Management of the Development Area</u>	37
<u>PART TWO</u>	
<u>A Detailed Assessment of the Development Area</u>	
1. Areas immediately available for development	39
2. Medium term development areas	46
3. Areas where phasing undetermined	46
4. Long term availability for development	49
5. Established non-recreational areas	51

	<u>Page</u>
<u>CONCLUSIONS AND RECOMMENDATIONS</u>	53
 <u>APPENDICES</u>	
A. Selected population characteristics of Bankstown, Fairfield and Liverpool Local Government Areas	57
B. Methodology for determining the capacity of the Lakes Scheme	58
C. Comparison of the activities and facilities in NSW State Recreation Areas and the Chipping Norton Lake Scheme	65
 <u>BIBLIOGRAPHY</u>	 67

	<u>Facing Page</u>
<u>MAPS</u>	
1. The master plan	10
2. Regional road access and foreshore recreation areas along the Georges River	12
3. Land use	16
4. Landscape assessment	17
5. Planning scheme zonings	18
6. Land ownership	19
7. Phasing of development	20
8. Capacities of the land area for picnicking	32
9. Car parking and service roads	34

	<u>Page</u>
<u>TABLES</u>	
1. The length of foreshore and extent zoned as open space in Bankstown, Fairfield and Liverpool Local Government Areas	14
2. Capacity of the water area by type of boat	25
3. Adequacy of boat ramps proposed by the master plan	30
4. Parking requirements based on the capacity of the land/water area	33

SUMMARY

This report is presented in two parts: the first is a general outline and assessment of the Lakes Scheme, while the second considers in detail the use of individual sites within the Development Area.

The first section in Part One examines the regional context of the lakes, referring to the master plan for the proposed development, the regional location and access to the Lakes Scheme, the population characteristics of the neighbouring local government areas, and the existing recreation facilities and patterns of use along the Georges River.

The second section considers the Development Area in its immediate surroundings and those factors that will affect the lakes' future use. These include the land uses in and adjacent to the Development Area, an assessment of the landscape features and the recreation potential in landscape terms, and the existing zonings. It also includes the pattern of ownership and the anticipated phasing of development, according to the availability of the land and water area for recreation development and the access from local roads.

The third section examines the capacity of the Scheme for both water and land based recreation. The water-based capacity was assessed for a variety of activities including motor boating, sailing and rowing, and was found to range from 120 to 400 boats at any one time, given favourable water conditions. The critical determinant of the water capacity is the type of boat allowed; in particular, to allow water-skiing or unrestricted motor boating would severely limit the capacity. Consequently, because power boating and water-skiing virtually preclude activities such as swimming, canoeing, rowing and sailing, it is recommended that they be excluded and that swimming be included, provided that enclosed bathing areas are created and that the water quality is monitored.

An assessment of the adequacy of the boat ramp facilities proposed by the master plan follows: the launching facilities proposed would have the capacity to allow over-use of the lakes by motor boats.

The capacity of the land area was determined for only one activity - picnicking. After excluding those areas not available or suitable for picnicking, such as the ovals and areas heavily vegetated, the remaining area was divided into individual sites to allow evaluation of the capacity of each according to a number of considerations. The optimum total capacity of the land area for picnicking is 2,200 picnic groups at any one time.

On the basis of the capacity of the land areas for picnicking and the water areas for boating, the requirements for car and car/trailer parking have been assessed and distributed according to the capacity of each site.

The fourth section considers the impacts that the Lakes Scheme will have on the adjoining areas - in particular, the impact on the residential areas and local roads. Some upgrading of roads will be required, and landscaping and building set-backs to protect the amenity of certain areas are also needed.

The fifth and final section in Part One discusses the potential management of the Development Area, with the possibility of local councils managing certain sites. It also considers the potential for the promotion of a wider area as a "Georges River Park".

Part Two is a detailed assessment of individual sites within the Development Area. It includes the land capacity and optimum level of use of each site and discusses the ease of access, need for further landscaping, and any impacts on the adjoining development. Specific recommendations are also made for each area. Finally, the conclusions and recommendations, both general and specific, included in the body of the report are drawn out and listed for further action.

INTRODUCTION

The Chipping Norton Lake Authority was established by an Act of Parliament in 1977 to rationalise the extraction of sand deposits from the Georges River at Chipping Norton, with a view to creating a lake for public recreation.

The Authority has commissioned a number of studies in order to guide development of the Lake, including a study by Cox & Corkill Pty Ltd which proposed a system of lakes and a master plan for the lakes and adjoining land area. In March 1979 the NSW Department of Public Works, on behalf of the Authority, began construction of the Lakes Scheme on the basis of the Master Plan and detailed engineering studies.

In May 1979 the need for further investigation of the proposed master plan was identified by the Chipping Norton Lake Authority Advisory Committee. The Committee consists of representatives from Bankstown, Fairfield and Liverpool City Councils, the NSW Department of Lands, the NSW Department of Public Works and the NSW Department of Environment and Planning (previously the NSW Planning and Environment Commission).

At that time, the Committee considered there was a need to determine more precisely the capacity of the Scheme for land and water-based recreation, to determine the adequacy of the land area and the measures required to integrate the lakes into the existing land use pattern.

In September 1979 the then NSW Planning and Environment Commission undertook to prepare such a study for the Authority. The results are presented in this report.

Subsequent to the completion of the major part of the report, and following negotiations with the different authorities involved, the Development Area was extended on 6 June 1980 to include further areas of sand extraction at Moorebank. This additional area is not considered in this study and all references in this report to the Lakes Scheme and Development Area refer to the original proposal only.

AIM OF THE STUDY

The aim of the study is twofold:

- . to identify appropriate capacities for the various elements of the Scheme, recognising the constraints on and possibilities for development, including the future management of the Scheme;
- . to establish measures required to integrate the Scheme successfully into the existing pattern of land use and to optimise the recreational opportunities of adjoining areas.

I. BACKGROUND AND REGIONAL SETTING

THE MASTER PLAN FOR THE LAKES SCHEME

The master plan for the development of the Chipping Norton Lakes was put forward in 1977 by Cox and Corkill Pty Ltd, consultants commissioned by the NSW Department of Public Works, in a study entitled the "Chipping Norton Lake Planning Study". The master plan proposed a water area of some 150 hectares for pleasure boating and a land area of 130 hectares for passive recreation. The attractions and facilities proposed included a wildlife island, a fish nursery, an amusement park, ovals, two boat launching ramps, a restaurant, cafes and beaches. Two major activity centres were proposed: one at Chipping Norton and the other at Georges Hall Bay.

Since 1977, the proposed configuration of the lakes has been modified to meet certain engineering requirements, mainly with regard to water circulation so that flushing would be adequate to maintain water quality. The master plan, modified accordingly, is shown on Map 1.

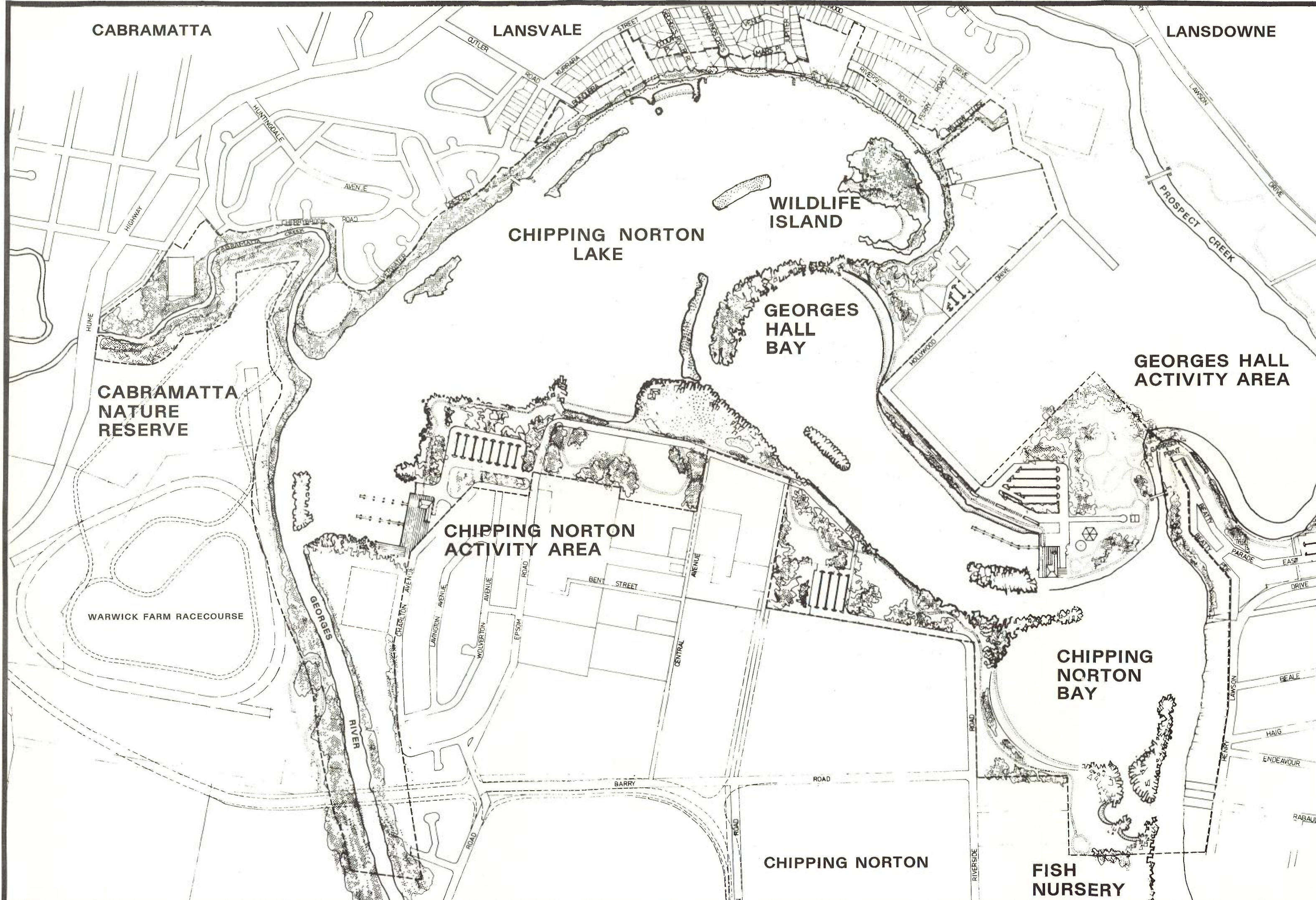
POPULATION CHARACTERISTICS

The population characteristics of the Bankstown, Fairfield and Liverpool Local Government Areas appear in Appendix A.

In brief, the present population of the sub-region is 376,000 (1979 population estimates) and this is expected to increase to 391,000 in 1981 and 461,000 in 2001 (medium population projections). These figures represent 12 per cent of the projected population for the Sydney Region.

The Chipping Norton Lakes will be readily accessible to a large proportion of this sub-regional population and indeed to large numbers of people living further afield, and this population will provide a ready market for the recreation facilities of the lakes.

The age structure of the sub-regional population stresses the need to provide facilities for active recreation. In 1976 the sub-region had a slightly higher proportion of 0-19 year olds than the Sydney Region with a corresponding lower proportion of 65 years old and over. It is anticipated that younger age groups would participate in active leisure pursuits such as sailing small craft, windsurfing, etc. and that family groups would tend to combine activities such as picnicking and pleasure boating. The Chipping Norton Lakes will provide the opportunity for these activities.



LEGEND

 CHIPPING NORTON LAKE DEVELOPMENT AREA

CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

1: THE MASTER PLAN

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North ↑	SCALE Metres 200 100 0 200	Map No. 1
Date JUNE 1980	PLAN NUMBER QUOTE WHEN ORDERING 05099925005	

It is noted also that car ownership in the sub-region is high. At the 1976 Census, the sub-region had a higher proportion of dwellings with one and two cars than the Sydney Region as a whole. The population is therefore highly mobile, but with the present trend of increasing energy costs there is a need to provide good recreation facilities within easy reach of every household. The Lakes Scheme will help to meet this need.

REGIONAL LOCATION AND ACCESS

The Chipping Norton Lakes Scheme is situated on the Georges River approximately 30 kilometres upstream from Botany Bay, and lies within the local government areas of Bankstown, Fairfield and Liverpool. The lakes will be highly accessible by road being located between three major roads - the Hume Highway, Henry Lawson Drive and Newbridge Road. In addition, the completion of the Lord Louis Mountbatten Bridge at Rosetta and Barry Roads over the Georges River, which will create an important by-pass to Liverpool Town Centre (see Map 2), will provide an even higher level of accessibility to the regional road network.

The lakes will not be easily accessible by public transport. Warwick Farm is the closest railway station (1.5 kilometres away) with the only link to Chipping Norton being a private road and footbridge over the river. The Lord Louis Mountbatten Bridge will improve this situation. Furthermore, the addition to the Scheme of the lake at Moorebank will eventually result in the provision of better access from Liverpool railway station and city centre.

It is expected that, apart from local footpaths and bicycle tracks, the access to the Lakes Scheme will be principally car oriented and that public transport will play an insignificant role.

EXISTING RECREATION FACILITIES AND USE IN THE UPPER GEORGES RIVER

The Chipping Norton Lakes form part of the Georges River, which is navigable from Botany Bay through the lakes as far as the Liverpool weir. In order to examine the use of the lakes in a realistic context, both water-based and land-based recreation facilities and uses have been examined in some detail for a considerable length of the river, upstream to Liverpool weir and downstream to the Georges River State Recreation Area. This stretch of the river is referred to in the report as the upper Georges River.

Much of the information in this section has been extracted from various reports and studies by the NSW Department of Public Works (DPW), the NSW State Pollution Control Commission (SPCC), the Boating Industry Association of NSW (BIA) and the Botany Bay Regional Office of the NSW Planning and Environment Commission, now the Department of Environment and Planning.

While these reports generally cover an area larger than the upper Georges River, this information is considered relevant, and therefore has been included.

(a) Water-based recreation

(1) Existing facilities along the river (map 2)

The principal facilities existing for water-based recreation are boat launching facilities. In terms of public launching facilities, the Georges River compares favourably with other waterways in the Sydney metropolitan area, there being relatively good facilities at Picnic Point (two double lane boat ramps), Sylvania Waters (three boat ramps) and Oatley Bay (a two lane boat ramp) (SPCC 1979 a:43). Additional boat ramps are proposed by the NSW Department of Public Works to service Botany Bay, but no further facilities are proposed for the Georges River.

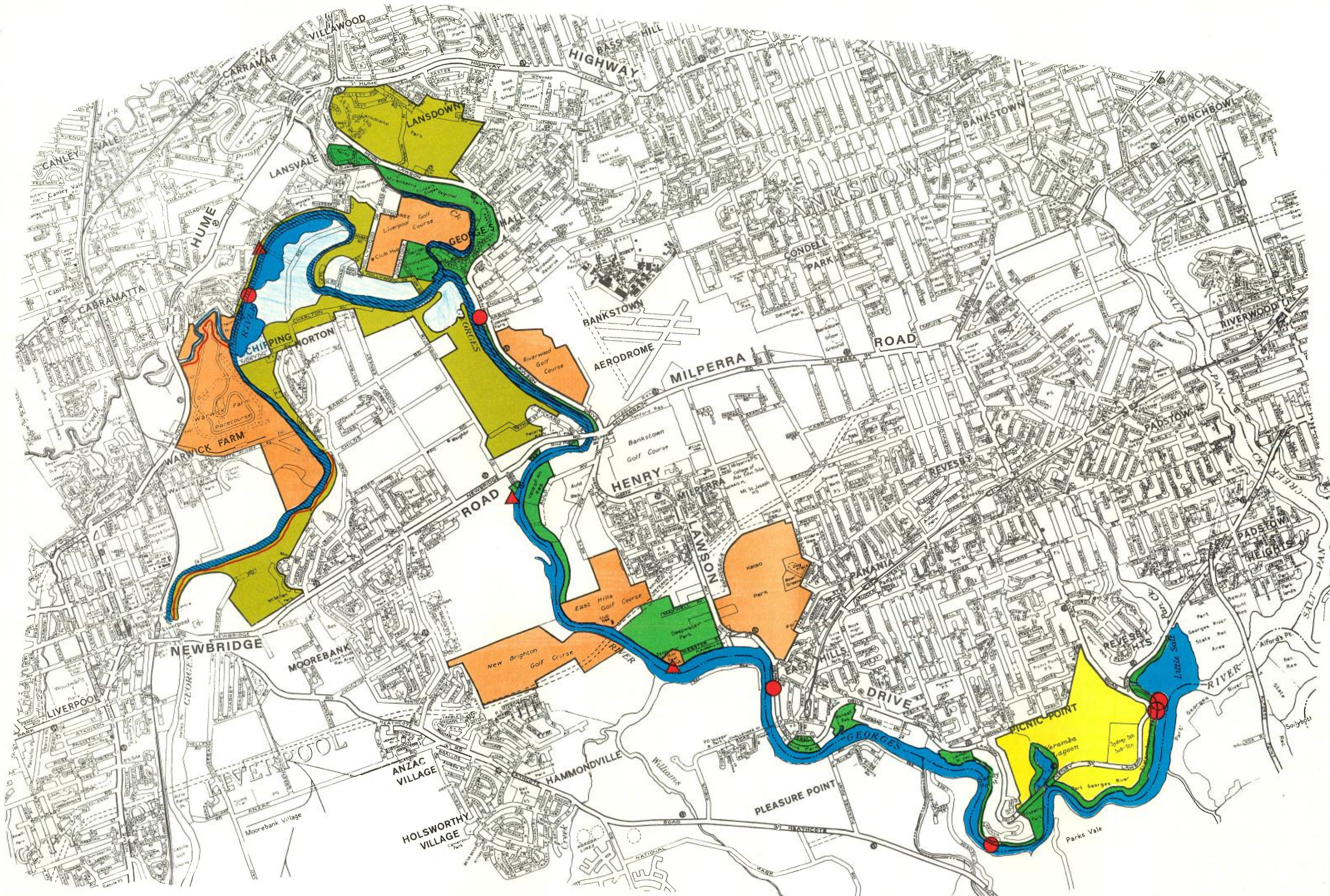
Within the area of the Chipping Norton Lakes there are currently three boat ramps, of which two are available to the general public (single lane ramps off Rabaul Road and Silverwater Crescent), while the third is for the use of Sea Scouts.

Other facilities on the upper Georges River include two boat clubs with launching facilities: the Touring Boat Club and the Deepwater Motor Boat Club at Milperra. There is also a river cruiser, the Mirrabel, operating from East Hills down to Botany Bay.

(2) Existing recreation use along the river

At present small sailing craft concentrate in the lower reaches of the river below the Como bridge while water-skiing is concentrated around East Hills and Picnic Point. Power-boat racing is also popular in this reach, where the two clubs hold regular competition events. Cruising is mainly carried out in the middle reaches, while fishing is popular throughout the Georges River (DPW 1978 a:6). It is noted that to a large extent, the type of boating activity on the river is determined by the speed limits imposed by the NSW Maritime Services Board (see Map 2).

In terms of origin of users, studies have found that ramp users, in particular those from the western suburbs, travel as much as 40 to 60 kilometres to launch their boats. While this partly indicates the paucity of water-based facilities in the western suburbs, it more importantly indicates a pattern of use, in that approximately half of boat ramp users surveyed by the Boating Industry Association bypassed less suitable ramps to reach a preferred ramp. The better the condition of the ramp the more frequently it was used, despite the generally experienced crowding and delays. The average distance travelled to a ramp in this study was found to be 9.6 kilometres (DPW 1978 c:10 and BIA 1976:3).



- LEGEND**
- DEVELOPED PUBLIC PASSIVE RECREATION AREAS (picnicking)
 - PRIVATE RECREATION AREAS AND ACTIVE RECREATION AREAS (organised sports)
 - NATURAL BUSHLAND
 - PROPOSED PASSIVE RECREATION AREAS
 - PUBLIC BOAT RAMP
 - ▲ PRIVATE BOAT RAMP
 - Present* NAVIGABLE WATER AREA
 - ACCESS RESTRICTED BECAUSE OF TIDES OR DEPTH OF WATER
 - 8 KNOT SPEED LIMIT (M.S.B.)

future navigable water area.
CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

2: REGIONAL ROAD ACCESS AND GEORGES RIVER FORESHORE RECREATION AREAS

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North
 SCALE 1/2 KILOMETRES
 0 1/2 1
 Map No **2**

DATE JUNE 1980 PLAN NUMBER QUOTE WHEN ORDERING
 050999251006

In general, ramp users have expressed dissatisfaction with the facilities provided, the extent of delays, and the availability of ramps within the metropolitan area (BIA 1976:4). The Chipping Norton Lakes Scheme with two major launching areas proposed should improve the position, although it is reasonable to expect that the provision of facilities at the lakes will generate further demand for water-based recreation, particularly in that they will provide an attractive protected area for small sailing craft further upstream than areas currently used by these craft.

(3) Existing recreation use of the Lake and Prospect/Cabramatta Creeks

At present the lake is used for canoeing, motor boating, some limited water-skiing, and for amateur and some commercial fishing. The Sea Scouts, located on the northern bank, also hold sailing regattas and regularly use the lake for water sports.

Cabramatta Creek, being shallow and narrow, is used mainly by canoeists

Prospect Creek is wider and deeper than Cabramatta Creek and more open because of the less dense vegetation along the bank. The creek is used for cruising and pleasure boating.

The public ramp on the northern bank near the plateau is already used to capacity on weekends by 30-40 cars and trailers.

(4) Proposed uses

There is currently a proposal for a floating restaurant, seating 80 to 90 people, to cruise the length of the Georges River from Liverpool weir, providing for luncheons as well as night cruises.

Also it is proposed that the existing river cruiser, the Mirrabell, extend its cruise to include a stop at the foreshore of the Lake Gillawarna Reserve.

(b) Land-based recreation

(1) Existing recreation areas (map 2)

There are several open space areas of regional significance along the foreshore of the upper Georges River including the Georges River State Recreation Area (330 hectares), Kelso Park (90 hectares), Landsdowne Park (5 hectares), the Mirambeena Regional Park (105 hectares), and Deepwater Park and Maxwell Avenue Reserve (60 hectares).

Although these large open spaces are adjacent to the river, the area of foreshore available for waterside recreation along the length of the upper Georges River is limited by other uses. Table I shows the proportion of foreshores under planning schemes as open space.

TABLE 1

Length of foreshore and extent zoned as open space in Bankstown, Fairfield and Liverpool Local Government Areas

(Including all golf courses and all publicly owned local, district and regional open space)

LOCAL GOVERNMENT AREA	GEORGES RIVER LENGTH OF FORESHORE (km)	EXTENT AS OPEN SPACE	
		(km)	(%)
Bankstown	27.1	24.46	90.3
Fairfield	8.55	3.95	46.2
Liverpool	29.57	16.01	54.1
TOTAL	64.22	44.42	69.17

Source: NSW Planning and Environment Commission 1975: 32, 33.

While Bankstown has 90 per cent of its foreshore zoned as open space, and Fairfield and Liverpool have 50 per cent, this includes land that is not used for water-based recreation. Seven kilometres of the foreshore between Chipping Norton and East Hills which are zoned as open space are occupied by golf courses, and the Warwick Farm Racecourse occupies a further two kilometres. While these areas are used for recreation, their use is independent of their waterside location and they effectively alienate the foreshore from water-based recreational use.

In this respect, the Chipping Norton Lakes Scheme will provide an almost continuous 20 kilometres of foreshore land available for water based recreation. It is important that the lakes be developed to fully use this opportunity and to complement rather than duplicate existing land-based developments.

(2) Existing use pattern

Information on the levels of use of recreation areas is limited but results of a survey conducted by the Botany Bay Sub-regional Office of the NSW Planning and Environment Commission (PEC) on the recreation use of the foreshores of Botany Bay indicate that the main recreation activities are picnicking and swimming, followed by walking, sightseeing and fishing (PEC 1979:15). These activities are usually combined in a day's outing.

More detailed information on levels of usage has been obtained for only two areas, the Georges River State Recreation Area and the Lake Gillawarna Reserve, but even this limited information does give an indication of the present level of demand for outdoor recreation.

(i) The Georges River State Recreation Area (SRA)

The Georges River SRA includes a narrow strip of land for picnicking and passive recreation along the northern foreshore of the river, which is about 30 ha in area, and which is divided naturally into a number of picnic sites.

Each site has a capacity for between 2,000 and 3,000 users over a weekend (SPCC 1979(a):55). The number of cars entering the SRA per year has increased from 17,000 in 1970 to 60,000 in 1977-78, a level which exceeds the capacity of the facilities (SPCC 1979 a:55). The amount of car parking is presently being increased but it is not uncommon for the gates to be closed by 10 a.m. during the peak periods in summer (Park Ranger, interview January 1980). The high demand for outdoor recreation is also indicated by the fact that the group-picnicking areas (i.e. areas set aside for large picnic groups, providing large shelters and parking space for buses) are booked out by August for the October to December peak period.

(ii) The Lake Gillawarna Reserve

The Lake Gillawarna Reserve is part of the Mirambeena Regional Park being developed by Bankstown City Council. The area has river frontage and a series of walking trails has been provided to complement the picnic areas. Lake Gillawarna is predominantly used by groups engaged in picnicking but other activities include walking, sightseeing, boating and fishing (PEC 1979). The Reserve extends for 90 hectares between Henry Lawson Drive and Prospect Creek but the recreation use is concentrated at the southern end where 200 car spaces have been provided; there are currently only 50 to 60 spaces further north. On weekends, people tend to park along Henry Lawson Drive (estimated at 100 spaces) giving a total of 300 to 400 cars on an average Sunday.

Already Bankstown Council is having problems with maintaining the grass cover because of the over-use of the park, and with cars parking in the neighbouring residential areas. However, further development of the Reserve is proposed by Council, which should ensure increased capacity and a more even distribution of usage.

(3) Proposed recreation areas

On 6 June 1980 the Chipping Norton Lake Development Area was extended to include further areas of sand extraction at Moorebank. This will provide an additional 83 hectares of land and water for public recreation.

There is also a large area of the Georges River foreshore, extending along the western bank from the Development Area opposite Georges Hall almost as far as the Milperra bridge, which is zoned county open space. The NSW Department of Environment and Planning owns a substantial area of this land and its future use should logically be related to the lakes development.

2. THE CHIPPING NORTON LAKES DEVELOPMENT AREA

LAND USE

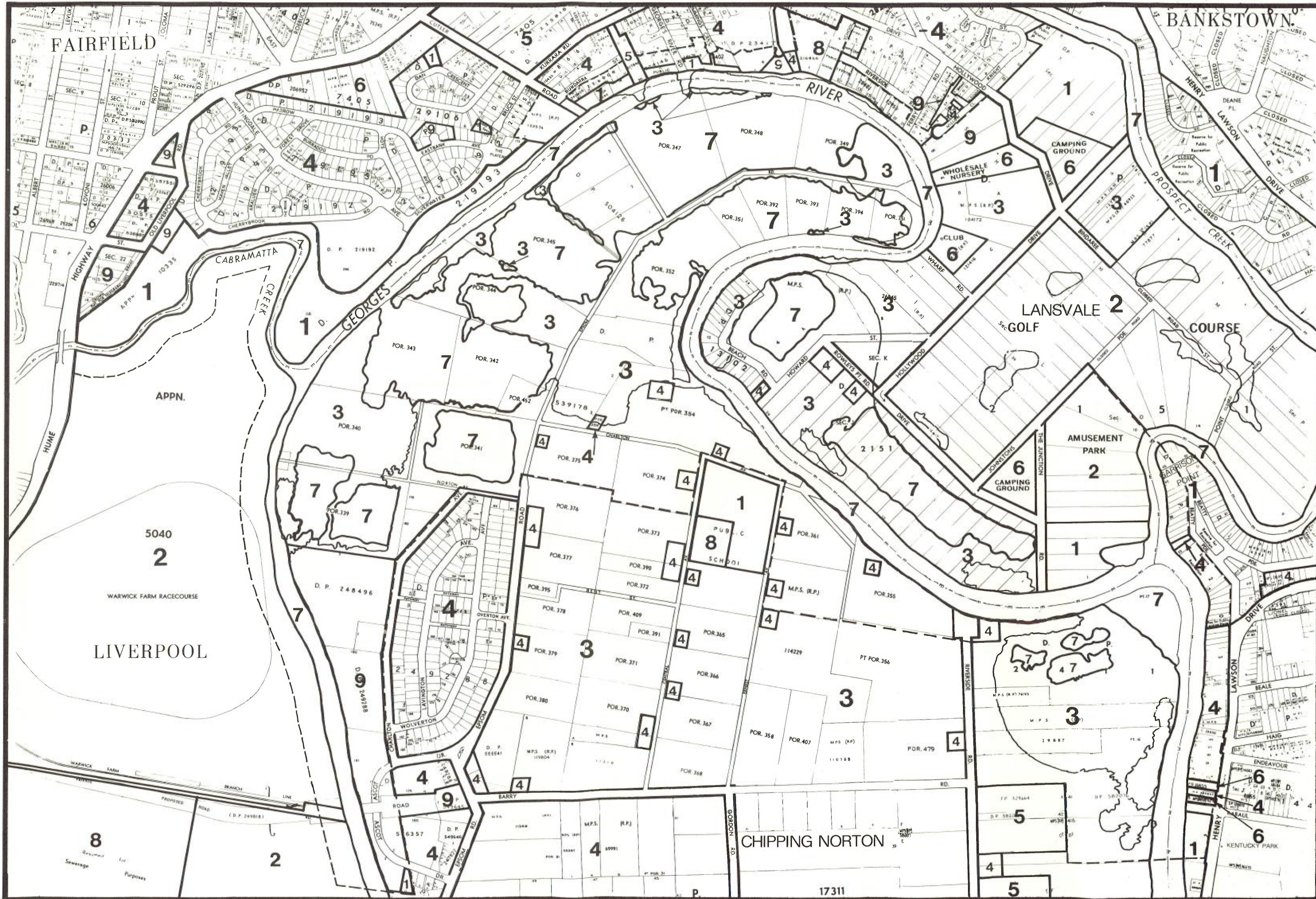
The land uses adjacent to and within the Development Area are shown on Map 3.

The major land use within the Development Area is sand and gravel extraction. As a result of the extraction, a large area of water exists already. However, because of inadequate depths not all of this area is suitable yet for boating. The existing sand extraction contracts will expire in 1983 and 1988, but there is still some land where extraction has not yet commenced and further extraction will be required to make the lakes suitable for boating.

A variety of recreation and open space areas already exist within and around the lakes. As stated in Section 1, Mirambeena Regional Park includes several areas for picnicking and passive recreation; four playing fields, located within the Development Area, provide for organised sporting activities; and although privately owned, two caravan parks, the Fogular Furlan Club, Liverpool Golf Course, Warwick Farm Racecourse and Hollywood Amusement Park, complement the recreational nature of the Lakes Scheme.

There are two established residential areas within the Development Area: Lansvale on the northern bank and Georges Hall on the eastern bank. A third residential area, the new subdivision at Chipping Norton on the south bank, will adjoin the Lakes Scheme.

Various other uses exist within and around the area, including industry, market gardening and farming, a plant nursery, schools and the sewage treatment works. There is also an historic site, "The Homestead", at Chipping Norton on the southern foreshore. Most of these uses are compatible with the recreational use of the lakes.



- LEGEND**
- CHIPPING NORTON LAKE DEVELOPMENT AREA
 - 1 EXISTING RECREATION : PUBLIC
 - 2 EXISTING RECREATION : PRIVATE
 - 3 RURAL: includes sand mining vineyards and some grazing
 - 4 RESIDENTIAL
 - 5 INDUSTRIAL
 - 6 COMMERCIAL
 - 7 WATER
 - 8 SPECIAL USE
 - 9 VACANT LAND

CHIPPING NORTON LAKE SCHEME
PLANNING AND DEVELOPMENT STUDY

3: LAND USE

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North
 SCALE
 Metres 200 100 0 200
 Map No. **3**

DATE: JUNE 1980
 PLAN NUMBER QUOTE WHEN ORDERING
05099925007

LANDSCAPE ASSESSMENT

A landscape assessment of the Development Area has been undertaken, and the principal elements are summarised below and illustrated on Map 4.

With the exception of only small pockets, the land within the Scheme is flood liable; most is subject to a 1 in 20 year flood, while the remainder is within a 1 in 50 or 1 in 100 year flood plain. It is likely that the flood plain will be liable to change when sand extraction is completed. The main implication of the flood liability of the land is that particular regard will need to be paid to any engineering works (such as earth mounding) and to the number, siting and detailed design of built structures (such as cafes and restaurants).

Within the Development Area, steep slopes that restrict activity (greater than 10 per cent) and significant vegetation that should be retained are confined to the shoreline. Much of the remaining land is flat and barren of vegetation, with therefore few constraints on its use for recreational purposes (active or passive). However, in order to realise the potential of the area for recreation, extensive tree planting is required to enhance the attractiveness of the land area.

The major viewing points are from the northern bank, behind the Lansvale residential area. This bank is elevated above the water surface and provides panoramic views over the lake to Chipping Norton. Another major viewing point is on the southern bank near the Homestead, where a clear view of the main lake is available.

A generalised assessment of the recreation potential of the Development Area in landscape terms distinguishes between the following features (as shown on Map 4):

- . land that has significant vegetation or is part of the rocky shoreline.
- . land areas that are or will be developed for organised sporting activities.
- . beach foreshores and land areas which have extensive views over the Lakes.
- . land areas that have restricted views to the water.

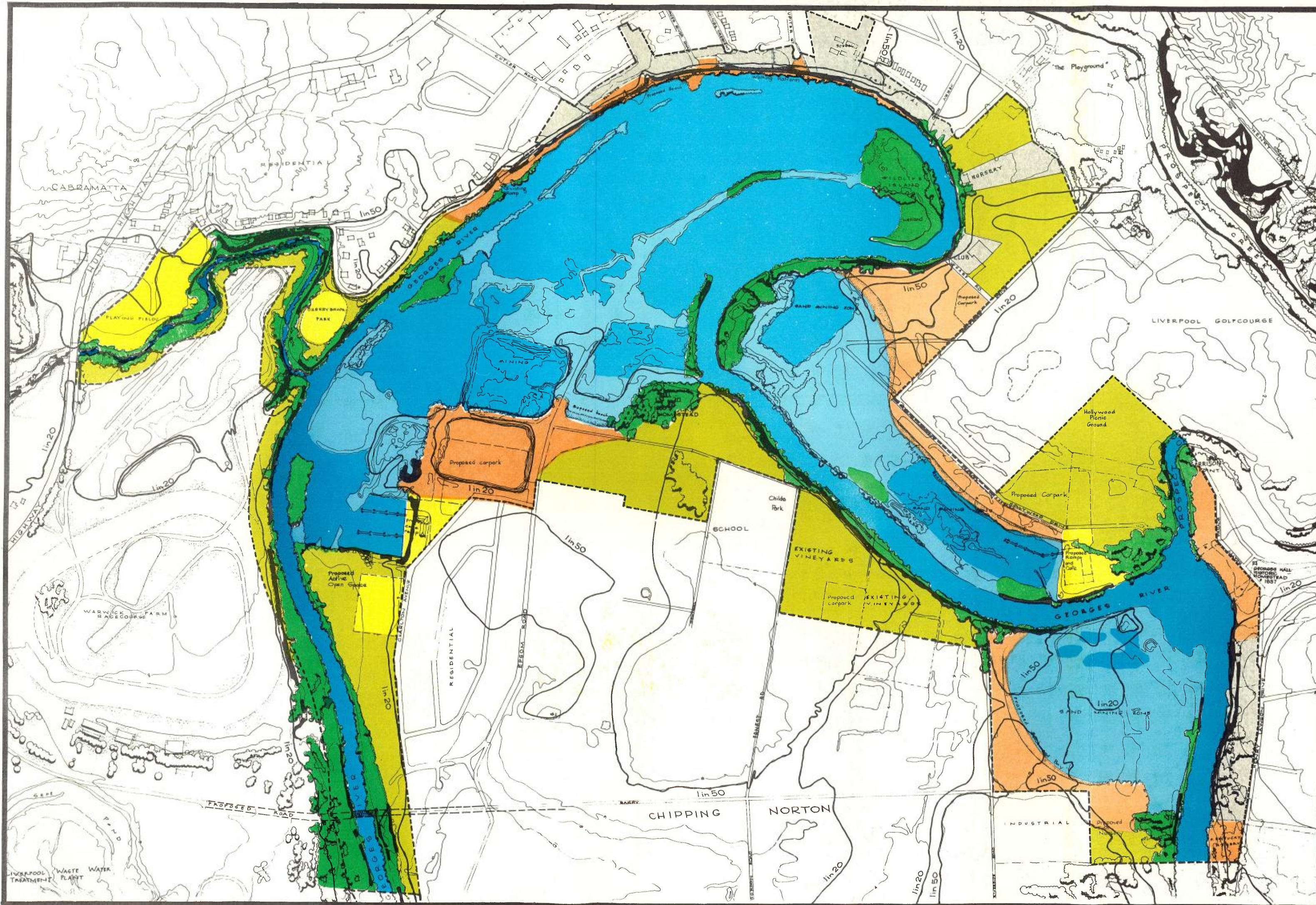
The important feature of Map 4 is that it distinguishes the water-oriented land areas, which can provide for a variety of recreation opportunities including walking, picnicking, swimming and boating. By contrast those areas which extend further from the water and where the vegetation restricts views to the water do not present the same opportunity for water-oriented activities.

This assessment is used for the purposes of determining actual capacity of the land area for recreation in Section 3.

EXISTING ZONINGS

The Chipping Norton Lake Development Area is covered by the deemed environmental planning instruments for Bankstown, Fairfield and Liverpool. Section 10(1) of the Chipping Norton Lake Authority Act further limits development; it provides that any proposed development within the Development Area requires the consent of the Authority.

Apart from some small areas of land zoned for residential use, the Development Area is zoned for either rural or open space purposes (see Map 5). In general, these zones allow for the land to be developed for the recreation use envisaged.



- LEGEND**
- CHIPPING NORTON LAKE DEVELOPMENT AREA
 - EXISTING WATER AREA
 - PROPOSED WATER AREA
 - AREAS OF SIGNIFICANT VEGETATION
 - WATER ORIENTED LAND AREAS:
includes beach foreshores and areas with extensive water views
 - PASSIVE RECREATION AREAS
where water views are restricted
 - AREAS FOR ORGANISED SPORTS AND ACTIVITY AREAS
 - AREAS UNLIKELY TO BECOME AVAILABLE FOR RECREATION DEVELOPMENT
 - EXISTING SIGNIFICANT VEGETATION
 - SLOPES STEEPER THAN 10%
 - FLOOD LIABLE LAND

CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

4: LANDSCAPE ASSESSMENT

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North
↑
Metres 200
100
0
Metres 200
 Map No. **4**

DATE: JUNE 1980 PLAN NUMBER QUOTE WHEN ORDERING: 051099925008

OWNERSHIP

Map 6 shows the ownership of the land and water within the Development Area at June 1980. Almost two-thirds of the proposed land area is in public ownership, i.e. is owned by the Authority, the NSW Planning and Environment Commission (now the Department of Environment and Planning) or a local Council. Of the remaining land in private ownership, it is likely that over one-quarter of the area will not become available for recreation development for general public use. This includes the residential areas, the private club and the existing site of the plant nursery, but does not include Warwick Farm as the fact that it is privately owned need not necessarily preclude its use for recreation by the public.

In terms of the proposed water area, almost two-thirds of this area is owned by the Authority, or will be transferred to the Authority under existing sand extraction agreements. The remainder is in private ownership.

PHASING

The anticipated phasing of development is shown on Map 7. This has been based upon the pattern of ownership, the expected dates for the completion of sand extraction and detail design considerations.

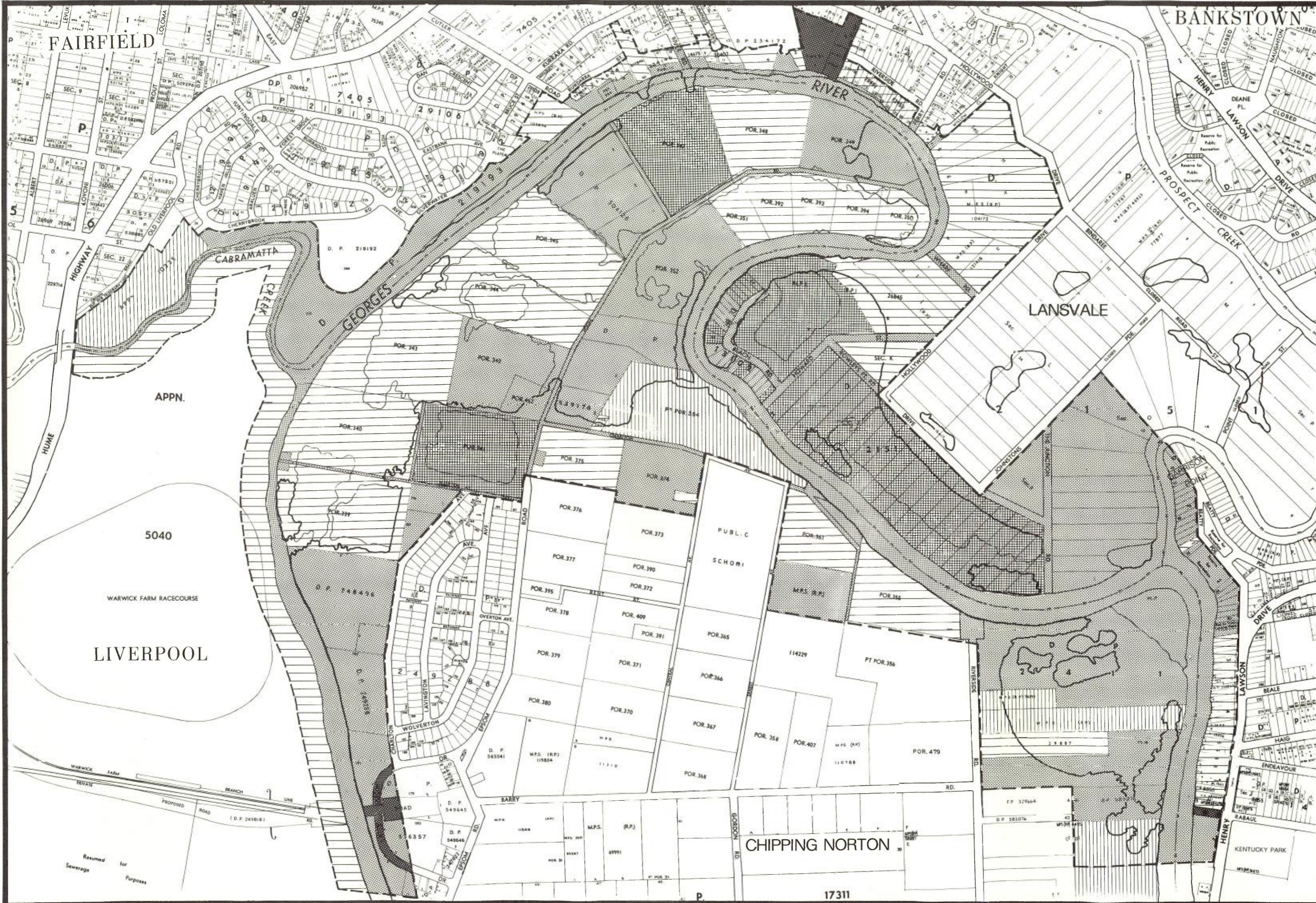
The areas marked "1" are either suitable for recreation use at present or are available for immediate recreation development.

The area marked "2" will become available for recreation development in 1983 when the current extraction lease expires.

In the areas marked "3", it is not possible at present to determine the phasing because this is dependent on acquisition of land and/or on extraction of adjoining areas which has not yet commenced and for which the completion date is not known.

The areas marked "4" will become available for development in 1988 when the current extraction leases expire.

The remaining areas, marked "5", are existing established uses and it is not envisaged that these areas will become available for recreation development. These are the Lansvale and Georges Hall residential areas, the plant nursery and the private club.



- LEGEND**
-  CHIPPING NORTON LAKE DEVELOPMENT AREA
 -  CHIPPING NORTON LAKE AUTHORITY
 -  TO BE TRANSFERRED TO THE AUTHORITY UNDER EXISTING AGREEMENTS
 -  PRIVATE
 -  N.S.W. PLANNING AND ENVIRONMENT COMMISSION
 -  OTHER PUBLIC BODIES (Council, Dept. of Education)


CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

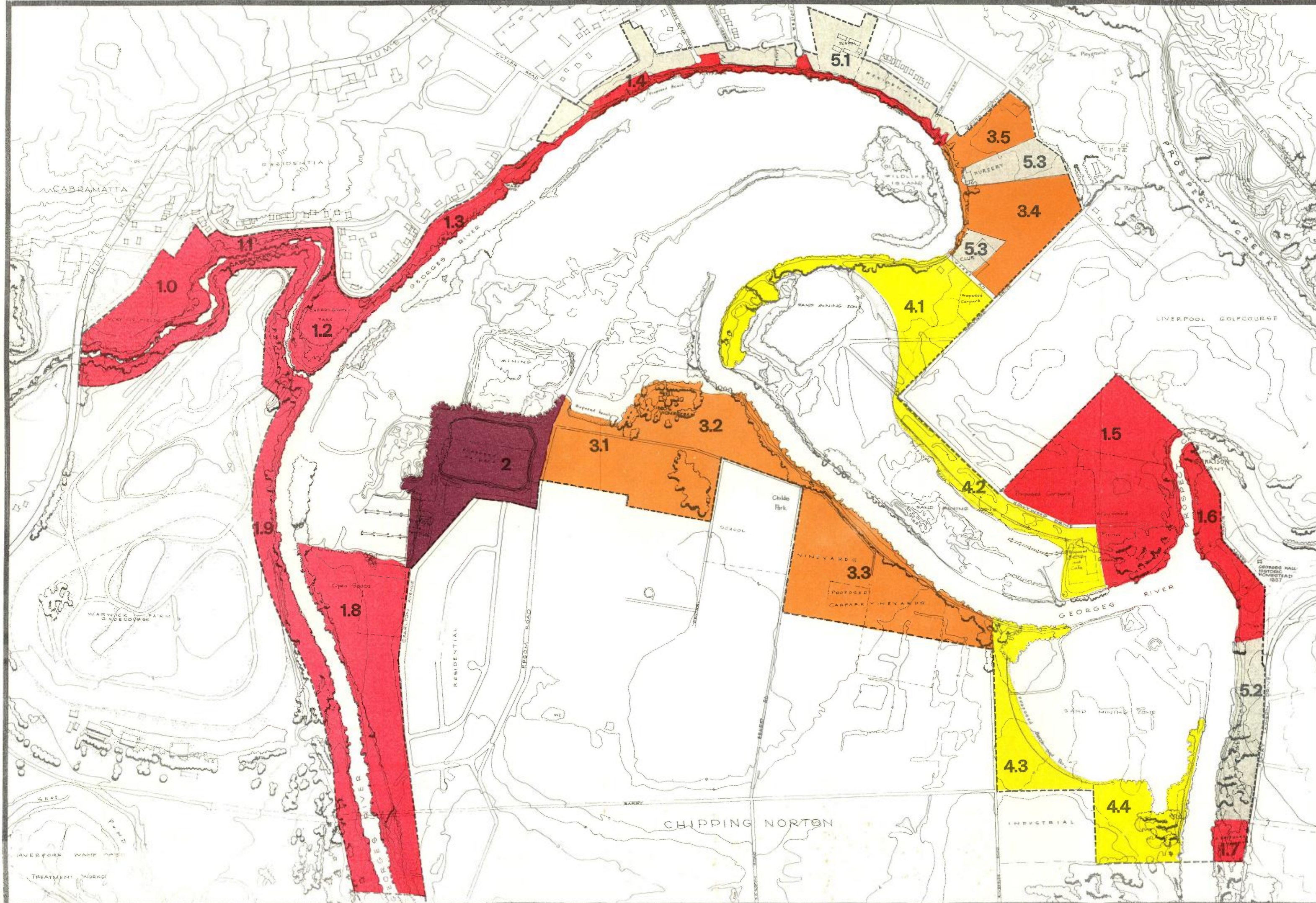
6: OWNERSHIP

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North  SCALE
 Metres 200 100 0 100 200 Metres
 Map No. **6**

DATE: JUNE 1980 PLAN NUMBER QUOTE WHEN ORDERING
05099925010



- LEGEND**
- CHIPPING NORTON LAKE DEVELOPMENT AREA
 - EXISTING RECREATION USE OR AVAILABLE FOR IMMEDIATE RECREATION DEVELOPMENT
 - AVAILABLE FOR DEVELOPMENT IN 1983 WHEN EXTRACTION IS COMPLETED
 - PHASING UNDETERMINED DEPENDENT UPON ACQUISITION AND/OR EXTRACTION
 - AVAILABLE FOR DEVELOPMENT WHEN EXTRACTION IS COMPLETED
 - UNLIKELY TO BECOME AVAILABLE FOR RECREATION DEVELOPMENT

CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

7: PHASING

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North SCALE Metres 200 100 0 200 Map No. 7

Date JUNE 1980 PLAN NUMBER QUOTE WHEN ORDERING 051099925011

LOCAL ROAD ACCESS

In general, it is expected that the regional nature of the Lakes Scheme will attract visitors from the entire metropolitan area, but with a somewhat stronger element coming from the more local west and south-west regions. If exact origin-destination patterns were known then access and parking facilities could be oriented to best meet the demand.

However, as this information is not available, then parking areas should be distributed to take advantage of the existing access system where possible and to relate to the optimum capacity of the Lakes Scheme for recreation.

At present access to the foreshore is from Henry Lawson Drive, Charlton Avenue off Epsom Road, Riverside Road and Hollywood Drive. In addition, on the northern bank access to the foreshore is via a series of residential culs-de-sac.

Therefore, there is good local road access to most parts of the lakes, although the following constraints are noted:

- . residential streets, in particular culs-de-sac, are not suited to large volumes of recreational traffic nor parking; traffic management measures will be required.
- . Hollywood Drive is unsuited in its present form to carry large volumes of traffic to the Georges Hall activity centre; road improvements will be required.
- . there is not continuous vehicular access to all parts of the foreshore; this could be overcome only by providing additional bridges, which is considered unrealistic.

3. THE RECREATION CAPACITY OF THE LAKES DEVELOPMENT

RATIONALE

This study takes the approach that the Chipping Norton Lakes are a finite resource which has a particular and identifiable capacity for recreation. The study concentrates on the identification of this particular capacity rather than on an analysis of recreation demand. The reason for this appraisal is that there is adequate indication that the demand for the recreation use of Chipping Norton will exceed the supply of facilities and the capacity of this resource. This is indicated by:

- . the current high demand for existing recreation facilities in the area, as outlined in Section 1, namely the current over-use of the Lake Gillawarra Reserve and the high demand for passive recreation in the Georges River State Recreation Area;
- . the relative paucity of water-based recreation areas in the south-western and western suburbs of Sydney, where there is a large and highly mobile population; and
- . a general consensus from published sources of the increasing demand for outdoor recreation.

Therefore, an appraisal has been made of the carrying capacity for recreation of the water area and the land areas, taking into account the need to safeguard the attractiveness of the area in both physical and social terms. The capacity arrived at has then been used to evaluate the master plan.

It must be stressed at the outset that it is not possible to arrive at a single precise figure defining capacity. Rather it is possible only to indicate a range of capacity figures that reflect the operation of a number of known variables. Understanding the effects of changing certain critical variables is considered more important to the management of the lakes than attempting to arrive at a single figure of capacity. Nevertheless, the range of capacity figures arrived at does constitute an adequate basis for assessment of the Lakes Scheme and the master plan.

METHODOLOGY

For the purposes of this report, carrying capacity is considered as a combination of the level of activity an area can support without causing an unacceptable change in the recreation environment and the level of activity which is most acceptable to the participant. That is, capacity is seen to have a social as well as a physical component.

Many factors determine physical and social carrying capacity: some are easily identified and measured; others, such as the skill of the participant, are more difficult to quantify. The methodology adopted by this study was developed by the United States Department of Interior (1977), and takes into consideration only those factors which could be observed and measured easily. An example is set out in Appendix B. This methodology does not deal with the influences of demand, management policies or economic feasibility but it has the advantage of determining a capacity which is relevant to the physical and social characteristics of the site.

THE CAPACITY OF THE WATER AREA

The following activities were identified initially as potential uses for the lakes: canoeing, rowing, sailing, windsurfing, paddle-boating, swimming, fishing, motor boating (defined as any powered boat but with a speed limit of up to 8 knots), high speed power boating,* water-skiing, water-bikes, ferry service and model boating.

Each of these activities has different requirements in terms of the space needed to perform the activity. For example, power boats and water-skiers require a relatively large area of water because of the high speeds involved and in order to manoeuvre. It was therefore necessary to determine the area required for each of these activities. This was evaluated according to:

(a) social capacity considerations

(i) the location of the area, i.e. urban, rural, remote. Recreation participants in urban areas will usually tolerate and accept higher densities of use.

(ii) the amenity of the site : the number and quality of site amenities will affect a person's willingness to tolerate and accept higher levels of use. This would include such physical considerations as the quality of the water.

(iii) the degree of policing : areas that are policed can usually accommodate more boats per unit area than those which are not policed.

(b) physical capacity considerations

(iv) the size of the area available: where there are many recreation participants located over a large area, the cumulative effect is perceived as unfavourable, and therefore smaller areas can usually accommodate more boats per unit area.

(v) the type of boat to be used: rowboats and canoes require less space than sailboats because they are more easily manoeuvrable.

* Note the distinction between motor boating and power boating. The difference is not necessarily boat type but boat speed.

(vi) the multiple use of the water area: certain activities are incompatible with others, requiring a separation and/or a reduction in intensities of use to preserve safety, e.g. swimming and water-skiing.

(vii) the depth of the water: water areas that are shallow would normally accommodate fewer boats per unit area.

(viii) the rate at which the water is circulated through the system: this is a physical measure of the water quality; in terms of preventing excessive water pollution, the faster the water circulates, the more motor boats the water can accommodate.

(ix) the configuration of the shoreline: water areas with irregular shorelines should accommodate fewer boats to preserve safety.

It should be noted that not all of the above considerations are applicable to each activity. An example is outlined in Appendix B.

Certain of the potential activities are incompatible and therefore need to be separated. Consequently, the water area was divided into distinct areas for incompatible uses.* The areas allocated to different activities were varied in order to determine the effect on the capacity of the water to accommodate the different activities. The result was a wide variation in the total capacity of the lakes according to the type of boat using the water area and to the favourability of the water conditions in terms of the above factors (see Table 2).

(I) Water-skiing and power boating

The range of values in Table 2 illustrates clearly the effect on the capacity of the lakes of allowing water-skiing, power boating and unlimited use of the waterway for motor boating. This factor is shown to be a far more critical determinant of water capacity than the favourability of water conditions. More specifically, where the area of water is limited, power boating and water-skiing, because of the high speeds involved and the space required for manoeuvring, virtually preclude activities such as swimming, canoeing, sailing and rowing.

One method of accommodating incompatible activities and adopted in some recreation areas in order to allow power boating and water-skiing is time or space zoning. The size and configuration of the lakes at Chipping Norton would allow spatial zoning in

* Note that certain activities were combined and not considered separately, e.g. windsurfing was not considered separately but included in the non-power boating category. The same applies to water-bikes which are considered to be in the same category as power boats.

TABLE 2

Capacity of the water area by type of boat

Types of boat using the water area*	Capacity - number of boats	
	Most favourable water conditions	Least favourable water conditions
1. Exclude power boating and water-skiing; restrict motor boating to 10% of water area; allow rowing/canoeing and sailing on 90% of water area.	408	242
2. Exclude power boating and water-skiing; restrict rowing/canoeing to 10% of water area; allow motor-boating on 90% of water area.	117	67
3. Exclude power boating; allow water-skiing exclusive use of the main lake; restrict motor boat- ing, sailing, rowing/ canoeing to the smaller lakes.	129	79
4. Exclude water-skiing; allow power boating exclusive use of the main lake; restrict motor boat- ing, sailing, rowing/ canoeing to the smaller lakes.	141	83

* Motor boating is defined as any powered boat, but with an 8 knot speed limit. Power boating is defined as any powered boat, with no speed limit.

that the main lake can be zoned exclusively for water skiing with other activities confined to the two smaller water bodies. However, to do this would result in a two-thirds reduction in the overall capacity of the water area, and this is considered unnecessarily restrictive.

Time zoning is more difficult to enforce; in addition, demand for high speed boating and other forms of boating (sailing, etc.) will peak at the same time during the weekends. It is therefore concluded that because high speed boating limits the capacity of the Scheme to such an extent and would also cause noise nuisance to adjoining residential areas, preference should be given to the more intensive use of the Scheme. Water-skiing and power boating therefore should be excluded as potential uses.

(2) Speed limits

Two different speed limits apply in different areas along the Georges River; a 4 knot and an 8 knot speed limit. At present an 8 knot speed limit applies to the river in the Development Area (see Map 2) and the Cox and Corkill Study recommended the extension of this speed limit on the lakes. If a 4 knot speed limit applied to the Lakes Scheme, the capacity of the water area would be slightly higher than if an 8 knot speed limit applied. This is because the area of water required per boat increases as the speed of the boat increases. However, as the 8 knot speed limit applies at present to the Georges River at Chipping Norton, it was considered that an 8 knot limit would be appropriate for the lakes as well.

(3) Swimming as a potential activity

Swimming is a popular activity in summer and the lakes could provide for the residents of Western Sydney an attractive alternative to the eastern coast. However, under the Cox and Corkill Planning Study, swimming was excluded as a potential activity. This exclusion has been re-examined because it was considered inconsistent to exclude swimming and allow for sailing and boating, both of which may involve contact with the water.

The requirements for allowing swimming are to ensure that the water is safe for body contact and safe from possible attack by sharks.

The Georges River is tidal up to the Liverpool weir and sharks have been sighted in the lake. Either a net should be provided downstream of the Lakes Scheme, or a netted bathing area should be provided off one of the proposed beaches.

In terms of water quality, the Georges River is classified as "Class C - controlled" and Cabramatta and Prospect Creeks as "Class R - restricted" by the NSW State Pollution Control Commission under the Clean Waters Act (1970) and these classifications allow for bathing.

The most recent data available on the water quality of the river is a study undertaken by the NSW State Pollution Control Commission in 1979, which measured the level of faecal coliform in the Georges River. This study came to the following conclusions:

- . health risks cannot be satisfactorily correlated with faecal coliform levels;
- . unless there is visible evidence of contamination, there is little risk associated with swimming in waters which have received sewage;
- . any risks would be greatest during and after periods of wet weather (10mm or more of rain in 24 hours). Generally after a period of three days, the water would be suitable for recreation use and notice boards, similar to those used to indicate fire hazard levels, should be provided to advise the public when a swimming area has been closed.

This report was endorsed by the Health Commission of NSW and by the Georges River Combined Councils Development and Water Pollution Control Committee.

Based upon these results the water quality may be considered adequate for swimming but this quality is subject to substantial fluctuations. It is considered that people will make contact with the water regardless of the "advertised" water quality and that it is the responsibility of State and Local government to ensure that the water quality is safe for body contact.

This study therefore recommends the inclusion of swimming as a potential activity, with constant monitoring of the water quality to ensure safety.

(4) Fishing

The Chipping Norton Lakes are in a biologically very poor area as the water is brackish (intermediate salinity), which quality is associated with only a very limited number of species. However, there are species of fish present that are attractive to both commercial and recreational fishermen. Four species of mullet are of interest to commercial fishermen, but not to anglers. These species are present in large quantities but only at infrequent intervals. Two species of fish, estuarine perch (which cannot be sold commercially) and bream are of interest to anglers. In view of the different interests of commercial and recreation fishermen, conflict between them should be minimal.

(5) Summary of water-based activities for the Scheme

Based on the above considerations, it is recommended that the following water-based activities should be permitted:

- . canoeing
- . motor boating (speed limit 8 knots)
- . rowing (not competitive)
- . paddle-boating
- . sailing
- . fishing
- . swimming
- . windsurfing
- . lake or river cruises/ferry service/paddle steamer
- . model boats

Further, it is recommended that the following water-based activities should be excluded:

- . power boating (speed in excess of 8 knots)
- . water-skiing
- . water-bikes and other high speed boating activities
- . competition rowing (course requirements cannot be met)

ADEQUACY OF BOATING FACILITIES PROPOSED IN THE MASTER PLAN

Having defined those uses that should be accommodated, it is necessary to assess the facilities proposed by the master plan to meet the demand for boating. The facilities required are basically a launching area or boat ramp, and parking for cars and trailers. Two types of facilities are needed:

- (a) For small keel trailer-sailers, catamarans, centre-board boats and other light craft, a sandy beach backed by a flat grassed area is well suited for rigging and launching. There is no need to provide a paved area for the trailer as it can be moved by hand to a grassed area.
- (b) For heavier boats and motor boats, a boat ramp is needed, with a paved surface for parking both car and trailer.

The master plan proposed three boat launching ramps: the existing ramp at the plateau, one at the Chipping Norton activity centre and another at the Georges Hall activity centre. There is also an existing boat ramp at Rabaul Road.

In the literature reviewed, there was a variation in the number of boats using a ramp which ranged from 30 to 75 boats per day, depending upon the quality of the ramp and the season. However,

the NSW Department of Public Works (DPW) recommends that a ramp requires parking for 30 cars and trailers (DPW 1978 c:4). This figure was adopted as a minimum standard and one which might maintain a level of service acceptable to the user. It is recognised however that the number of users of a boat ramp could exceed this figure.

Therefore, assuming that a minimum of 30 boats use the four boat ramps in the Scheme, a total of 120 motor boats could use these ramps for access to the lakes or river on any one day.

To state firmly whether this represents adequacy, over-supply or under-supply of launching facilities is difficult, since the lakes are not a closed body of water but form part of an open system with the Georges River and its tributaries. If all the 120 boats launched spend the entire day on the lakes they would require 170 hectares of water (most favourable water conditions) which exceed the actual area of water in the lakes (150 hectares) and would thus preclude any other boats from using the water. However, this situation is unlikely to occur. If none stay, but use the lakes only for access to the Georges River, then about 11 hectares of water would be used at any one time by motor boats, and the total capacity of the lakes would be approximately 400 boats at any one time. If half stay, they would require 95 hectares of water, and the capacity of the lakes would be approximately 145 boats (Table 3). In practice, it is likely that there will be peaks in the motor boat use during the day, and therefore, an intermediate figure will be applicable. Also, of course, it is likely that boats launched elsewhere on the Georges River will use the lakes, but to what extent it is hard to predict.

The figures in Table 3 indicate that if the existing and proposed ramps are supplied with the suggested minimum number of parking spaces, the ramps will more than adequately cater for the use of the water by motor boats. In fact, it may become necessary to restrict the use of ramps in order to control the potential over-use of the lakes by motor boats which would conflict with use by other craft.

For lighter craft, the two proposed beaches with grassed areas behind at Chipping Norton Bay and Georges Hall Bay will provide adequate opportunity for the rigging and launching of these boats.

Summary of water-based capacity

On the basis of the uses recommended above, the capacity of the lakes is in the range of 120 to 400 boats at any one time, given the most favourable water conditions. The critical factor is the number of motor boats, and it is noted that the launching facilities proposed in the master plan have the capacity for allowing over-use of the lakes by motor boats. In order to permit high levels of activity for sailing, and rowing/canoeing it may become necessary to restrict the provision of ramp facilities.

TABLE 3

Adequacy of the boat ramps proposed by the master plan

Assumptions	Total number of boats on lakes			
	Motor Boats	Sailing	Rowing/ Canoeing	Total
1. All (120) motor boats remain on lakes	120	Nil	Nil	120 (over capacity)
2. Half (60) motor boats remain on lakes, remainder use lakes as access to Georges River (8 knot speed limit)	68	27	50	145
3. No motor boats remain on lakes, but use lakes for access to Georges River (8 knot speed limit)	8	140	260	408

This table was calculated by:

- a) determining the area used by the motor boats that remain on the lakes;
- b) allocating the remaining area of water equally for rowing/ canoeing and sailing;
- c) determining the number of row boats/canoes and sailing boats that could be accommodated on that area (Columns 2 and 3);
- d) totalling the number of boats (Column 4).

THE CAPACITY OF THE LAND AREA

The main activity that will determine the capacity of the land area is likely to be picnicking and capacity has been estimated on that basis. The areas of land within the Development Area that are not available or suitable for picnicking have been excluded from the calculations. These areas include those used for residential and commercial purposes, areas of heavy vegetation and areas where slopes exceed 10 per cent. Also excluded from the areas evaluated were access roads, defined car parking areas, the activity centres and active recreation areas. In determining the number of picnic groups per unit area an allowance was made for the car parking requirements for that group.

The capacity of the land for picnicking was evaluated according to the following factors:

(a) social capacity considerations

- (i) the degree of privacy afforded by the area: areas with dense vegetation offer more privacy than open areas and can usually provide for a higher capacity.
- (ii) the size of the picnic area: where there are many recreation participants located over a large area, the cumulative effect is perceived as unfavourable; therefore, smaller areas can usually accommodate more people per unit area.
- (iii) the shape of the picnic area: linear picnic areas can usually accommodate a higher density than square picnic areas.
- (iv) the amenity of the site and adjoining area: the number and quality of site amenities affect a person's willingness to tolerate and accept higher levels of use; therefore, recreation sites with scenic natural features, views or vistas and pleasant surroundings can usually operate at a higher capacity.
- (v) proximity to other activities and car parking: generally, an area is more attractive if a variety of recreation experiences are available and if access and car parking are convenient.
- (vi) location of the recreation area: participants in urban areas will generally expect, tolerate and accept higher densities of use than participants who travel to remote locations.

(vii) the homogeneity of the user group: in participant surveys in America it was noted that the mix of user groups was an important factor in design capacity. Areas used by similar socio-economic, age and interest groups can generally be developed at higher optimum capacities than areas used by dissimilar groups.

(b) physical capacity considerations

- (i) sensitivity of the site: a site may be sensitive to use because of vegetation which cannot withstand abuse, soil compaction problems, or erosion; it should be developed to a much lower capacity.
- (ii) siting limitations: the type of vegetation and slope characteristics may also affect the ease of locating a picnic table or picnic spot.

Each site suitable for picnicking has been evaluated in the light of these factors, paying particular regard to the elements identified in the landscape assessment (Section 2), and an optimum capacity determined (see Map 8). The total optimum capacity for the Development Area is in the order of 2200 picnic groups at any one time. A picnic group is defined as a group of 2-5 people who would normally travel in one car.

Summary of land-based activities

In addition to picnicking, the other land-based activities identified as appropriate to the Lakes Scheme are:

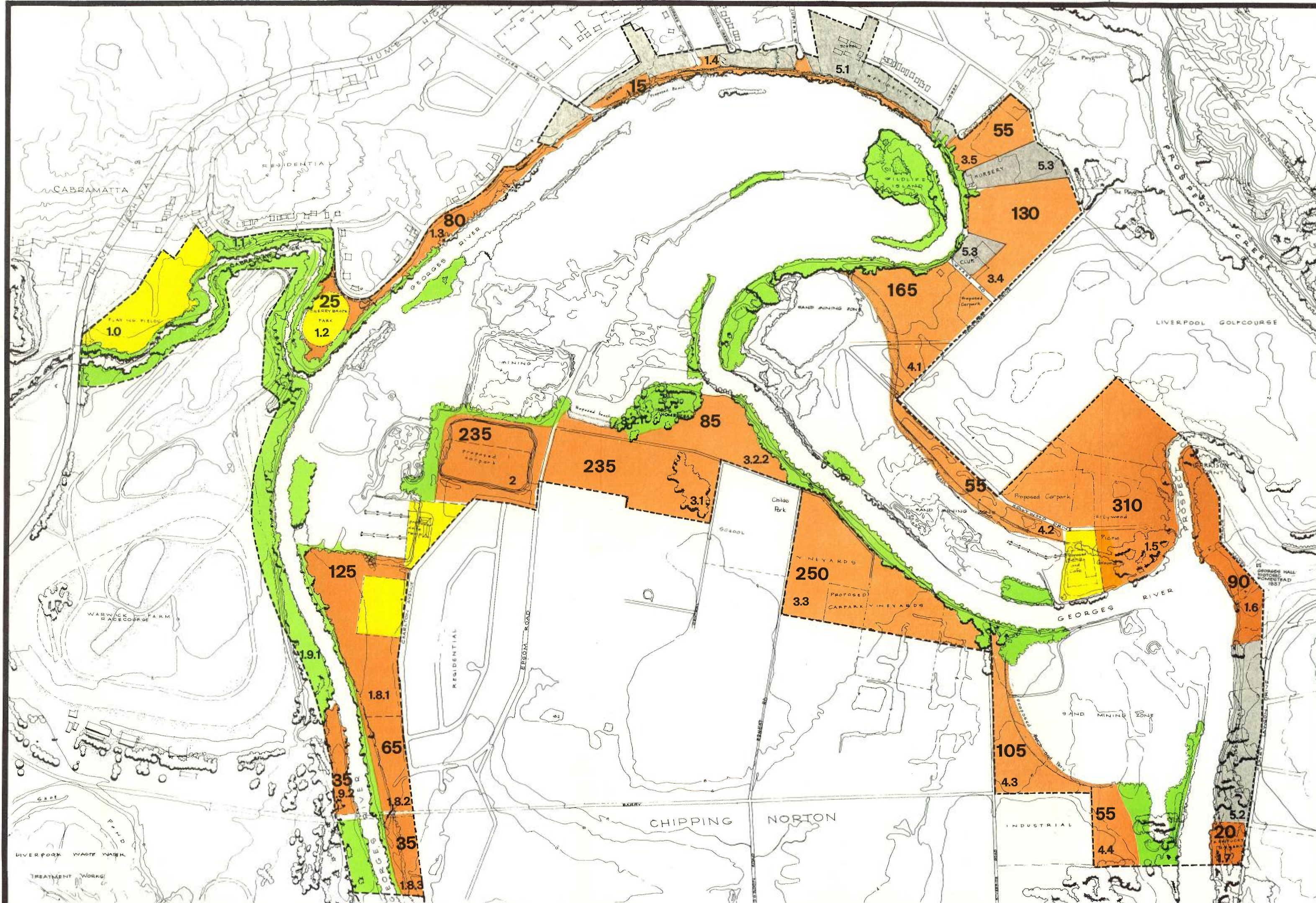
- . camping
- . entertainment, e.g. amusement park
- . eating/refreshments, e.g. kiosks/cafes/restaurants
- . cycling
- . fishing
- . walking
- . field games
- . sightseeing, e.g. the Homestead








Land-based activities specifically excluded are trail motor bike riding and dune buggies as these uses were excluded from the Cox and Corkill Study. These uses would pre-empt passive land-based recreation pursuits such as picnicking and also have a detrimental impact on the foreshore land.

PARKING REQUIREMENTS

In order to obtain a general indication of parking requirements it was assumed that:

- . there will be one car per picnic group (by definition);
- . there will be one car per boat or one car and trailer per boat;
- . a car-and-trailer space is equivalent to two car spaces.



- LEGEND**
-  CHIPPING NORTON LAKE DEVELOPMENT AREA
 -  65 NUMBER OF PICNIC GROUPS
 -  12 KEY TO INDIVIDUAL SITES (part 2)
 -  PASSIVE RECREATION AREAS-NO DEVELOPMENT
 -  AREAS ASSESSED FOR PICNICKING CAPACITY
 -  'ACTIVE' RECREATION AREAS (i.e. for organised sports) AND ACTIVITY CENTRES
 -  AREAS UNLIKELY TO BECOME AVAILABLE FOR DEVELOPMENT

CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

8: LAND CAPACITY PICNICKING

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North  SCALE
 Metres 200 100 0 200 Metres
 Map No **8**

Date JUNE 1980 PLAN NUMBER QUOTE WHEN ORDERING
 05099925012

TABLE 4

Parking requirements based on the capacity of the land/water area

Assumption	Spaces for boating capacity*		Spaces for picnicking capacity		Total spaces		
	cars	boats	cars	cars	boats	all	
SEPARATE BOATING & PICNICKING							
a) All boats hired (i.e. car space only), or	250	-	2200	2450	-	2450	
b) All boats brought (i.e. one car and one trailer space per boat)	250	250	2200	2450	250	2700	
COMBINED BOATING & PICNICKING							
a) All boats hired (i.e. no car spaces needed for boating capacity, or	-	-	2200	2200	-	2200	
b) All boats brought (i.e. needs only trailer space per boat)	-	250	2200	2200	250	2450	

* This figure is the "average" capacity of the water area, i.e. when 50% of the water is used by motor boats and 50% is used by sail boats, row boats and canoes.

As there may be groups of people who participate in more than one activity (in this case, picnicking and boating) two figures were generated for parking. The first assumes that there is no overlap in boating, i.e. no picnicking is associated with boating and vice versa and the second assumes total overlap, i.e. all boating is associated with picnicking. These figures are shown in Table 4.

The parking requirements based on the capacity of the Scheme are therefore in the order of 2,200-2,450 spaces for cars, with up to 250 additional spaces for boat trailers.

Assuming a land area of 30 square metres per space (including allowance for turning, entry-exit, landscaping), the total land area required for car parking is 6-8 hectares.

Other activities which will generate parking requirements include ovals, cafes, restaurants, boat ramps, etc. Certain figures have been calculated separately, and are included in Part 2.

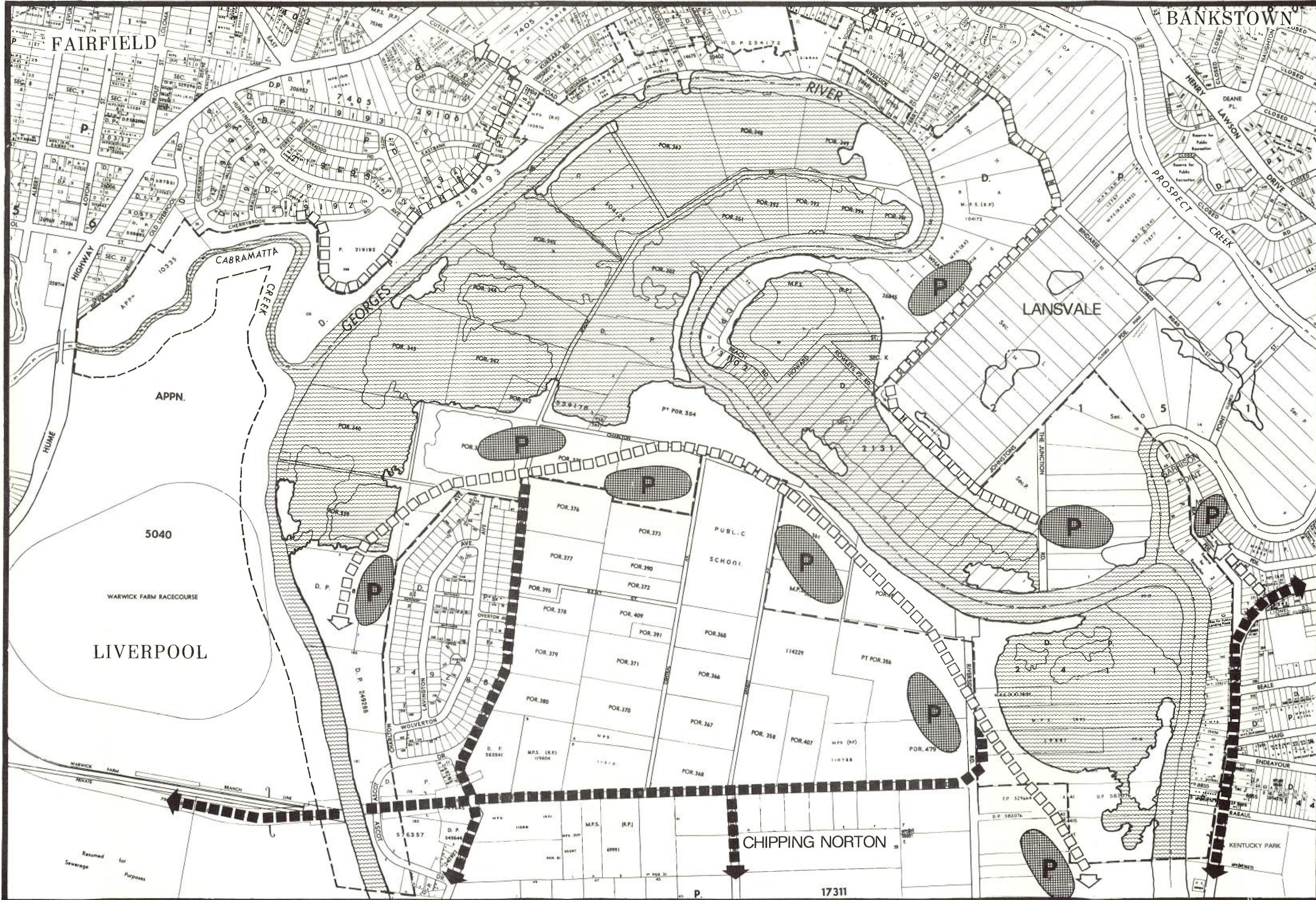
On peak days it is expected that the demand for parking will exceed the above figures and that pressure will be placed on the adjoining areas to accommodate these demands. However, rather than increasing the provision for car parking and thereby risking over-use and a further increase in peak demands, it is considered that measures should be taken to protect the adjoining areas. In particular, there will be a need to protect the amenity of the adjoining residential areas.

Distributing the parking areas

The master plan proposed two large car parking areas, one at the Chipping Norton activity centre, the other at the Hollywood Picnic Area (Georges Hall activity centre). Apart from the proposed parking areas at the ends of the northern bank culs-de-sac, there are only two other parking areas proposed.

Picnickers prefer to park their cars as close as possible to their recreation site. It is considered therefore that the car parking should be dispersed to allow maximum access to and use of the foreshore rather than to rely on two large areas as proposed in the master plan. The principle adopted in accommodating the car parking therefore has been to provide many well-disposed parking areas along the foreshore and linked by a service road. This is shown schematically on Map 9. Ideally, the service road would be continuous and circular, so that at any point of entry to the road, a vehicle could proceed until either a parking space was found or until the vehicle arrived back at the entry point. However, this is not possible in the Lakes Scheme because of the physical characteristics of the river system.

The proposed Lakes, the Georges River, Cabramatta Creek and Prospect Creek divide the site into three distinct areas. Each of these areas, then, must have independent service roads and parking provision. The calculated 2700 (maximum) parking spaces (including trailer spaces) have been distributed to these three



CHIPPING NORTON LAKE SCHEME

PLANNING AND DEVELOPMENT STUDY

9: CAR PARKING AND SERVICE ROADS

DEPARTMENT OF ENVIRONMENT AND PLANNING

LGA/AREA
 BANKSTOWN
 FAIRFIELD
 LIVERPOOL

North  SCALE
 Metres 200 100 0 100 200 Metres
 Map No. **9**

DATE: JUN 1980 PLAN NUMBER: 05099925013 QUOTE WHEN ORDERING

areas as set out below, according to the capacity of each. Except in the case of Hollywood Drive, as noted in the section on local road access, this distribution accords with the capability of the access roads.

a. The southern bank of the Lakes Scheme: a total parking supply in the order of 1,350 spaces is needed, with access from Newbridge Road and the Lord Louis Mountbatten Bridge.

The southern shore of the Scheme has a sufficient area of land to provide many well-disposed parking areas. Access to this side of the lakes is superior to that of the north, having simple and direct connections with Newbridge Road and the Hume Highway. Intrusion on the residential zones could be minimised by restricting access to two points, namely Norton Avenue/Epsom Road and Barry Road/Riverside Road. This would involve closing the residential roads to recreation traffic.

b. The northern bank of the Lakes Scheme: a total parking supply in the order of 1,150 spaces, with access from the Hume Highway via Hollywood Drive.

Access to the northern side of the Lakes Scheme raises two issues. Firstly, Hollywood Drive, which provides access to the Georges Hall Bay areas, will require improvements to its alignment and general standard if it is to cope with the expected increased use. Secondly, residential streets also provide access to the northern bank of the Chipping Norton Lake, and in these streets, the pressure of on-street parking by visitors to the Scheme could create problems for the residents. It is considered that a traffic management study could contribute substantially to traffic planning for this more sensitive area.

c. The eastern bank of Chipping Norton Bay: a total parking supply of 170 spaces (including the existing car park at Kentucky Reserve), with access from Henry Lawson Drive.

The 170 space facility at the eastern end of the Lake will supplement the existing parking of the Lake Gillawarna Reserve. Access from Henry Lawson Drive should be planned in co-ordination with Bankstown City Council, and particular attention should be given to the problems of on-street parking in the adjoining residential areas.

d. Other car parking issues: the shared use of parking facilities at Warwick Farm, the golf club and the industrial sites, should be encouraged. Specifically, the Warwick Farm Racecourse has a large open space area with a potentially large car parking area that could be utilised for the benefit of Lake visitors, particularly at the southern end where the Lord Louis Mountbatten Bridge is being built across the river. In this way, car parking facilities need not be duplicated and in times of peak demand could serve to reduce the impact of car parking on the adjoining residential areas.

4. IMPACTS OF THE LAKES DEVELOPMENT ON THE ADJOINING AREAS

Map 3 shows the land uses of those areas adjoining the Chipping Norton Lakes Scheme. These uses fall into three categories in respect of which impacts can be defined.

Residential

The traffic associated with the use of the waterway and the picnic areas, especially in the peak season and/or public holidays, will have a detrimental impact on the adjoining residential areas.

At present traffic associated with recreation activity in the area is limited to the Lake Gillawarna Reserve. This traffic is heavily focused on the 200 space car park at the southern end of the reserve, with the vehicle spill-over causing problems in the residential area of Beatty Parade. Although Bankstown Council will be increasing the capacity of the car park, these problems illustrate the need to protect the residential neighbourhoods adjacent to a recreation area.

In addition, the pattern of subdivision around the Lakes Scheme encourages parking in residential streets as access to the foreshore can be gained from the ends of residential culs-de-sac and crescents.

In general, off-street car parking and landscaping will be required to safeguard the character of these residential areas (see Part Two for more detail).

Industrial

An industrial area is proposed under the Liverpool planning scheme for part of the south bank. In this instance, the industrial area could have an adverse impact on the recreation areas, as the existing industrial development along Riverside Road is already an eyesore from the water.

Therefore, landscaping and building setbacks should be included in the development of the industrial areas to preserve the views from the water as well as the land.

Open space and recreation areas

The Lakes Scheme will not have any detrimental impacts on the existing open space, namely, Warwick Farm, Liverpool Golf Course, Lake Gillawarna Reserve and the county open space along Georges River. The lakes and associated picnic areas will complement these existing uses. If car racing events are held at the Warwick Farm Racecourse noise may have a detrimental impact.

Local roads

The existing access roads, namely Epsom Road, Gordon Road, Riverside Road and Henry Lawson Drive, have the capacity to handle the anticipated increase in traffic. Provided the alignment and standard of Hollywood Drive are improved, it also will have sufficient capacity to handle the anticipated increase.

At present there are no signal controls at the intersections of Epsom, Gordon and Riverside Roads with Newbridge Road, but the anticipated increased use of these roads by recreation traffic may necessitate traffic control at one or more of these intersections.

5. MANAGEMENT

Management of the Development Area

The total area of the Chipping Norton Lakes Development Area together with the adjoining county open space, and the Moorebank extension to the Lakes, is approximately 400 hectares. In view of this size, and in order to provide facilities in the separate areas that are complementary rather than duplicating, these areas should be planned and managed as an entity. However, certain sites could be excepted and managed by the individual Councils. These exceptions are:

- . The Fairfield playing fields (Area 1.0). This is an active recreation area with two ovals for organised sports. It is envisaged that its recreation use will be associated with local sporting activities independent of the Lakes Scheme. This area therefore could be managed by Fairfield City Council with an agreement that the Authority will maintain the banks of Cabramatta Creek and associated vegetation.
- . Garrison Point/Beatty Parade (Area 1.6). This area is contiguous with the Lake Gillawarna Reserve and could be managed by Bankstown City Council as part of this reserve rather than the Lakes Scheme.
- . Rabaul Road/Kentucky Reserve (Area 1.7). Similarly, this small area is part of an existing reserve and could be managed as such, also by Bankstown City Council.

The potential for regional promotion

The scale of existing and proposed recreational facilities at Chipping Norton and along the Georges River is such that it is considered that there would be value in promoting the concept of a major regional park. This could include the Chipping Norton Lakes, Liverpool Golf Course, Warwick Farm Racecourse, Mirambeena Regional Park and the Georges River State Recreation Area. While these are separate elements, they are all located along and associated with the Georges River or its creeks and provide a

variety of recreation opportunities. Further, they are or will be closely related with the ferry service and a proposed walking track to run the length of the river. Therefore, the State Government should promote the qualities and attractions of the area in order to encourage optimum use of the facilities. The concept of a Georges River Park could be one way of promoting and managing the recreational use of the area.

By way of comparison Appendix C includes a list of State Recreation Areas with details of size and facilities provided.

PART TWO

A DETAILED ASSESSMENT OF THE DEVELOPMENT AREA

In Part One the general principles of the development and capacity of the Lakes Scheme and of its impact on adjoining areas were discussed and certain conclusions reached. In Part Two these general principles and conclusions are applied in some detail to the Development Area. For this purpose the Development Area has been divided into a number of readily identifiable sites, which then have been grouped according to the probable phasing of recreational development. The groups are arranged in sequence, from those areas where recreational uses are established or where only a minimum of development is required for recreation use, to those areas which will not be available for development until 1988 and those unlikely ever to become available. Each area is identified on Maps 7 and 8 and is discussed separately in this part. The discussion of each area is prefaced by:

- . the land area: this is given in hectares and was used for calculating the capacity of the site. Where specific sites were excluded (such as steep slopes or car parks) they are stated in brackets.
- . the land capacity: this is a measure of the potential intensity of use and was evaluated according to certain criteria such as degree of privacy, views to the water, and proximity to other activities. Areas having all the defined qualities could accommodate a higher number of picnic groups per unit area and therefore have a higher capacity than areas having few of the defined qualities. A low capacity represents up to 30 picnic groups per hectare; a moderate capacity is between 31 and 44 picnic groups per hectare; and a high capacity is 45 or more picnic groups per hectare.
- . the optimum level of use: this figure represents the number of picnic groups that the area can accommodate without causing an unacceptable change in the environment and is obtained by multiplying the two factors above. It is noted that an area might physically accommodate a higher number but continued use at this higher level could lead to a loss of quality in the environment and the recreation experience. It should be noted that the land capacity estimates and optimum level of use have been made only for those areas used for picnicking.

1. Areas immediately available for development

These areas are suitable for recreation use now or are available for immediate recreation development:

1.0 Fairfield playing fields

Land area: 4 ha
Land capacity)
Optimum level of use) not applicable

This area is located between the Hume Highway and Cabramatta Creek. Fairfield Council is developing this area for organised sports with two ovals, amenities block and landscaping to improve the appearance of the area. In order to maintain the natural state of Cabramatta Creek, it is considered that the vegetation along the Banks should be conserved.

THE AUTHORITY SHOULD RETAIN RESPONSIBILITY FOR THE MANAGEMENT OF THE FORESHORE AND ACCESS ACROSS THE PLAYING FIELDS MUST BE SECURED FOR THIS PURPOSE.

1.1 Cabramatta Creek Foreshore: northern bank

Land area: 0.5 ha
Land capacity)
Optimum level of use) not applicable

This is a narrow strip of land between Cabramatta Creek and Cherrybrook Road. A pathway to link the Fairfield ovals to Cherrybrook oval was proposed by the Cox and Corkill Study.

IT IS CONSIDERED THAT THE PATHWAY SHOULD BE LOCATED AWAY FROM THE FORESHORE IN ORDER TO CONSERVE THE VEGETATION ALONG THE BANK.

1.2 Cherrybrook Oval

Land area: 0.7 ha (excluding oval)
Land capacity: moderate
Optimum level of use: 25 picnic groups

Cherrybrook oval is enclosed on three sides by the vegetation along Cabramatta Creek and the Georges River.

As the access to and from the oval is through residential streets, the area should be maintained as a local facility. IT IS CONSIDERED THAT ONLY A MINIMUM OF DEVELOPMENT IS REQUIRED. This would include new toilets and a defined car parking area to service the oval (35-40 spaces), with a few barbecue sites to encourage picnicking and informal use of the oval.

At present the ready vehicular access to the banks of the Creek encourages dumping of rubbish. IN ORDER TO PRESERVE THE VEGETATION ALONG THE BANKS AND THE NATURAL CHARACTER OF THE CREEK, VEHICULAR ACCESS SHOULD BE CONFINED TO A PARKING AREA ON THE NORTHERN SIDE OF THE OVAL.

1.3 The Plateau/Silverwater Crescent

Land area: 2 ha (excluding steep slopes and allowing for boat ramp)

Land capacity: high

Optimum level of use: 80 picnic groups

This is an attractive area for picnicking with an existing single lane boat ramp.

Access to this area is from the Hume Highway along Cutler Road, but through residential streets. At present the foreshore is accessible by car. THERE IS A NEED TO PROVIDE A DEFINED ACCESS ROAD OFF SILVERWATER ROAD FOR THE PICNIC AREA WHICH WILL PREVENT VEHICULAR ACCESS TO THE FORESHORE. This access road could be one-way.

The existing parking area on the "plateau" only accommodates 15 cars and trailers, whereas the NSW Department of Public Works recommend that a ramp requires parking for 30 cars and trailers (1978 c:4). Initially this area will provide the only direct access to the lake until the Chipping Norton and Georges Hall activity centre ramps are constructed.

THEREFORE, THERE IS A NEED TO PROVIDE ADDITIONAL OFF-STREET CAR PARKING TO SERVICE THE BOAT RAMP AND THE PICNIC AREA.

Further, a median strip should be provided to distinguish the Plateau parking area from Silverwater Road.

Barbecue facilities should be provided.

1.4 Northern Bank Promenade

Land area: 0.5 ha (excluding steep slopes and banks)

Land capacity: moderate

Optimum level of use: 15 picnic groups

This is a linear strip of foreshore open space, consisting of a lower platform with rocky foreshore, a steep river bank with remnant vegetation and an upper platform forming a pathway. It is bounded to the north by the Lansvale residential area.

The northern bank is a particularly attractive area because it offers extensive views over the lake. The lower platform is accessible to pedestrians, bicycles and wheelchairs and provides uninterrupted views; on the upper platform, the open spaces at the ends of Jupiter Street and Georges River Road provide the major viewing points for the lake. The area is also attractive for walking, fishing and sitting.

Because of the proximity of the residential area, the potential intensive use of the bank could have detrimental impacts on the adjoining residential area. The existing pattern of subdivision

limits access to the foreshore to a series of residential culs-de-sac. With the exception of one of the culs-de-sac, open space areas equivalent to two residential lots remain vacant at the foreshore end of each road. Therefore there is only a limited area of land to provide for off-street car parking. IT IS CONSIDERED THAT INTENSIVE USE OF THIS AREA SHOULD NOT BE ENCOURAGED AND EXTENSIVE FACILITIES NOT PROVIDED. The development of the open space areas must be limited by the capacity of the streets for off-street parking. In accordance with this principle, it is considered that:

- a) limited off-street car parking can be provided off Willow Close and Cutler Road. A limited number of barbecue sites could be provided at a later date, depending upon the use of the area;
- b) limited (5 spaces) off-street car parking should be provided off Georges River Road and Jupiter Street to service the open space areas;
- c) because of the restricted area of land available, no car parking should be provided off Ferry Road or Cummings Crescent and no facilities other than seating should be provided.

1.5 Hollywood Picnic Ground

Land area: 9 ha (excluding camping ground and amusement park)

Land capacity: moderate

Optimum level of use: 310 picnic groups

The Cox and Corkill Study identified this area for picnic grounds and a large car park, adjacent to the Georges Hall activity centre.

At present the area has a variety of uses: an amusement park, a restaurant/disco, a picnic ground (with some shelters and tables) and a caravan/camping ground with an existing amenities block. These facilities are compatible with the proposed activity centre, but the present condition of the picnic ground, amusement park and restaurant is poor and should be upgraded. Also, there is a major conflict in the detailed design of this area. Cox and Cockill proposed that the car park be located on the site of the existing camping/caravan ground; and the present location of the amusement park effectively alienates a large area of land on the border of the golf links.

CONSIDERATION SHOULD BE GIVEN TO:

- a) UP-GRADING THE CARAVAN/CAMPING AREA AND MAINTAINING ITS LOCATION, BUT ENSURING THAT THE PARK IS NOT USED FOR PERMANENT ACCOMMODATION;

- b) RETAINING THE REMAINING AREA OF THE CAR PARK, (PROPOSED BY COX AND CORKILL) BUT NOT EXTENDING IT;
- c) IMPROVING THE CONDITION OF AND RELOCATING THE AMUSEMENT PARK TO MAXIMISE THE AREA OF LAND AVAILABLE FOR PICNICKING AND PASSIVE RECREATION;
- d) UPGRADING THE EXISTING PICNIC/RESTAURANT FACILITIES.

The area is accessible only to traffic from the north, off the Hume Highway. Further, because of Prospect Creek and the Liverpool Golf Course, Hollywood Drive is the only means of vehicular access to the activity centre.

CONSIDERATION SHOULD BE GIVEN TO PROVIDING A LARGE LOOP ROAD AT THE END OF HOLLYWOOD DRIVE, WITH CAR PARKING AREAS ALONG THE ROAD.

ALSO, TREE PLANTING SHOULD BE PROVIDED TO ENHANCE THE AREA AND ENCOURAGE THE USE OF THE LARGE AREA OF LAND FURTHER FROM THE FORESHORE.

A footbridge across Prospect Creek was proposed by Cox and Cockill to link the activity centre to Garrison Point. This is an attractive proposal as Bankstown Council is proposing that an "historic island" be developed on Garrison Point. The footbridge would serve as an important link to this area.

1.6 Beatty Parade/Garrison Point

Land area: 2.5 ha
Land capacity: moderate
Optimum level of use: 90 picnic groups

Part of this area will have views over Chipping Norton Bay - the remainder has frontage to Prospect Creek and will relate to the adjacent Lake Gillawarna Reserve rather than the Chipping Norton Lakes.

The proposed footbridge across Prospect Creek will be an important link to the Georges Hall activity centre.

Access to the area is from Henry Lawson Drive and Beatty Parade East. The adjoining areas along Beatty Parade are being developed by Bankstown Council as an extension to the Lake Gillawarna Reserve, and therefore access and car parking arrangements should be considered as part of this development and not separately.

IT IS CONSIDERED THAT THE AUTHORITY SHOULD CONSULT WITH BANKSTOWN COUNCIL REGARDING THE INTEGRATION OF THIS AREA AS PART OF THE MIRAMBEENA REGIONAL PARK AND REGARDING THE FOOTBRIDGE TO LINK THE GEORGES HALL ACTIVITY CENTRE.

1.7 Kentucky Reserve

Land area: 0.6 ha (excluding parking area for the boat ramp)

Land capacity: moderate

Optimum level of use: 20 picnic groups

Kentucky Reserve is an existing picnic area with barbecues, seats, tables and toilets. A single lane boat ramp with 20-25 car/trailer parking spaces is located adjacent to the reserve. The existing car park is in a poor condition. A new surface, with lines marked and tree planting would improve this.

APART FROM FURTHER TREE PLANTING TO IMPROVE THE PICNIC AREA, AND THE UPGRADING OF THE PARKING AREA, NO FURTHER DEVELOPMENT IS REQUIRED.

1.8 Charlton Avenue/Ascot Drive

This area has been considered in three sections as there is a decrease in the capacity from the northern edge (near the proposed jetty) to the southern edge.

1.8.1

Land area: 4 ha (excluding oval and rocky foreshore)

Land capacity: moderate

Optimum level of use: 125 picnic groups

This area has a view to the proposed jetty and the lake. An oval is proposed which will provide for organised sports as well as informal games. Tree planting around the oval, creating enclosed picnic areas, would encourage use of the site.

Access to this area is direct but through residential streets. There is an existing parking bay along the western side of Charlton Avenue but it is anticipated that this will not satisfy recreational demand. IT IS CONSIDERED THAT AN ACCESS ROAD SHOULD BE PROVIDED, WITH A CAR PARKING AREA WITHIN THIS SITE. This would more adequately service the picnic areas and would not have as great an impact on the adjoining residential area.

1.8.2

Land area: 3 ha

Land capacity: low

Optimum level of use: 65 picnic groups

This area is further removed from the Chipping Norton activity centre, has restricted views to the water and as the width of the area decreases, is closer to the residential area on Charlton Avenue.

Tree planting would increase the attractiveness of the area, but it should be considered as a local recreation area because of the relatively more attractive areas elsewhere for regional visitors.

As Charlton Avenue provides access to the residential area as well, it is considered that off street car parking should be provided.

1.8.3

Land area: 1.3 ha
Land capacity: low
Optimum level of use: 35 picnic groups

This area is well removed from the Chipping Norton Lakes and has limited views to the river. A pedestrian and vehicular underpass to the Lord Louis Mountbatten Bridge is proposed in this area. While this will ensure that access is good, the proposed road pattern leaves pockets of land which are difficult to develop. Again, this may be considered as a local rather than regional recreation area.

1.9 The foreshore of Warwick Farm Racecourse

Land area: 18 ha
Land capacity)
Optimum level of use) not applicable to all of foreshore

The natural banks of the Warwick Farm Racecourse are well vegetated and form the western foreshores of the Lakes Scheme.

This area has been considered in two sections. Firstly, in order to maintain the natural state of the creek, the Cabramatta Creek foreshore should not be developed; and the foreshore along the Chipping Norton Lake forms a natural backdrop to the formal development of the proposed Chipping Norton activity centre and should remain in its natural state (Area 1.9.1 on Map 8).

Secondly, in relation to the foreshore along the Georges River, when the Lord Louis Mountbatten Bridge opens there will be potential to provide public access to the foreshore here. A picnic area could be provided on either side of the bridge and a footpath provided along the banks. This picnic area (1.6 hectares) would have a moderate land capability and a potential optimum capacity of 55 picnic groups (Area 1.9.2 on Map 8).

THEREFORE IT IS CONSIDERED THAT THE FORESHORE OF WARWICK FARM RACECOURSE SHOULD BE AVAILABLE FOR PUBLIC USE; VEHICULAR ACCESS SHOULD BE PROVIDED TO A PICNIC AREA CLOSE TO THE LORD LOUIS MOUNTBATTEN BRIDGE AND PEDESTRIAN ACCESS PROVIDED ALONG THE LENGTH OF THE BANK. EXCEPT IN THE DEVELOPED PICNIC AREA, THE VEGETATION SHOULD BE PRESERVED.

2. Medium term development areas

Only one area is included in this group, namely where the existing sand extraction contracts will expire in 1983.

Land associated with the Chipping Norton activity centre

Area: 6.5 ha (excluding the activity centre and rocky foreshore)

Land capacity: moderate

Optimum level of use: 235 picnic groups

The activity centre consisting of a restaurant, boat ramp and jetty, with a picnic area along the foreshore is proposed on a flat derelict site. The spur of land to the west of the proposed jetty forms a high quality wildlife habitat and the proposed channel, creating an island, would be beneficial for the area.

Much of the land area associated with the "activity centre" is proposed under the master plan for a large car parking area. The site is an existing sludge lagoon which, when filled, will form part of the lake foreshore. This car park would then be visually exposed over a large expanse of water and would require an extensive landscaping program to reduce this impact, unless the pond is filled to a level lower than the surrounding land.

Further, the size of the car park is questioned. In Section 3 it was stated that the car parking should be more evenly distributed to reduce the visual impact and to provide better access generally, as people tend to picnic or carry out other activities in relatively close proximity to their cars.

The land associated with the activity centre has a high capacity as a picnic area (over 200 groups). It has extensive views over the lake, and is in close proximity to the boat ramp/jetty area; it is considered that it would be better developed for picnicking than as a car park as proposed under the master plan.

The car parking displaced can be redistributed to service the restaurant and boat ramp, and landscaping should be provided.

THEREFORE IT IS CONSIDERED THAT THE PROPOSED CAR PARKING AREA SHOULD BE REDUCED IN SIZE, AND POSSIBLY BE LEFT AS A DEPRESSION TO HIDE THE CAR PARK FROM VIEW.

3. Areas where phasing undetermined

It is not possible at present to determine the phasing of these areas because this is dependent on acquisition of land and/or extraction of adjoining areas which has not yet commenced.

3.1 Picnic area off Charlton and Epsom Road

Land area: 7 ha (excluding the beach)

Land capacity: moderate

Optimum level of use: 235 picnic groups

This is a deep area of land with only partial views to the water, and the present alignment of Charlton Avenue effectively cuts off the picnic area from the foreshore. IT IS CONSIDERED THAT CHARLTON AVENUE SHOULD BE REALIGNED TO CREATE A GREATER AREA OF LAND ON THE FORESHORE.

Access to this area is good but there should be parking provided off the access road. Further tree planting would encourage the use of this area.

In the adjoining residential area to the south, the proposed pattern of subdivision (under the approved development control plan) will result in a row of back fences bordering the picnic area. IT IS CONSIDERED THAT THE ADJOINING RESIDENTIAL DEVELOPMENT SHOULD BE SCREENED OR RE-ORIENTED, AND VISUAL AND PEDESTRIAN LINKS PROVIDED.

3.2 The Homestead and surrounding picnic area

3.2.1. Chipping Norton Homestead

The Homestead and associated trees form an important visual element of the lake foreshore and should remain as a single unit, with a separate identity to surrounding areas.

The Homestead provides a unique opportunity for public use. It could be used for a museum, art gallery, exhibition area, information centre or tea room.

3.2.2 East of historic site, on Georges Hall Bay

Land area: 2.6 ha (excluding vegetated foreshore)

Land capacity: moderate

Optimum level of use: 85 picnic groups

This is an attractive area with a good relationship to the Homestead but the heavy vegetation along the foreshore restricts views to the water. Additional tree planting would enhance the areas further removed from the foreshore.

No car parking for this area was proposed under the master plan. IT IS CONSIDERED THAT CAR PARKING SHOULD BE PROVIDED IN THE FORM OF PARALLEL PARKING ON A GRASSED AREA BESIDE THE ROAD.

3.3 Georges Hall Bay: southern bank

Land area: 9 ha (excluding vegetated foreshore)

Land capacity: low

Optimum level of use: 250 picnic groups

This is one of the few areas in the Lakes Scheme that does not have direct interaction with other activities. The views to Georges Hall Lake are restricted by the vegetation along the bank, but with the tree planting proposed the area will be attractive as a picnic area.

The foreshore parking area, proposed by Cox and Corkill, would be located in an area of steep slopes and dense, high quality bank vegetation.

IT IS CONSIDERED THAT THE FORESHORE PARKING AREA SHOULD BE ABANDONED AND THE PROPOSED ACCESS ROAD BE RELOCATED AWAY FROM THE BANK TO ALLOW ADDITIONAL OPEN SPACE ALONG THE FORESHORE.

FURTHER IT IS CONSIDERED THAT CHARLTON AVENUE SHOULD BE EXTENDED TO LINK WITH RIVERSIDE ROAD TO MAINTAIN THE CONTINUITY OF THE SERVICE ROAD.

Industrial development will adjoin this area to the south. As the approved development control plan does not show a proposed pattern of subdivision, there is scope to minimise the impact of this development on the recreation area.

IT IS CONSIDERED THAT THE DETAILED DESIGN OF THE ADJOINING INDUSTRIAL AREA SHOULD ENSURE THAT INDUSTRIAL DEVELOPMENT IS SUITABLY ORIENTED AND LANDSCAPED AND THAT VISUAL AND PEDESTRIAN LINKS ARE PROVIDED.

3.4 Wharf Road

Land area: 4.8 ha (includes some existing private uses e.g. tennis court)

Land capacity: low

Optimum level of use: 130 picnic groups

The area lies between Wharf Road, the private club and the plant nursery. The master plan proposed that only a foreshore strip of land be developed in this area, as an extension to the northern bank promenade.

At present the land has a tennis court, a soccer field and some netball courts (private ownership).

It is considered that these uses could be relocated away from their present foreshore location, and that the land could be developed in association with these uses for large organised picnic groups. There is an adequate area for a bus parking area and for large picnic shelters and tables. As the area is located behind the wildlife island, there are no extensive views of the lake, but the foreshore pathways provide a 10-15 minute walk to the northern bank promenade or to Georges Hall Bay.

IT IS CONSIDERED THAT THIS AREA SHOULD BE DEVELOPED AS A GROUP PICNIC SITE AND LANDSCAPING PROVIDED TO SCREEN THE PRIVATE USES.

3.5 Willow Close

Land area: 2 ha (excluding foreshore)
Land capacity: low
Optimum level of use: 55 picnic groups

This area lies between the existing site of the plant nursery and Willow Close. It would also be suitable as a group picnicking site, being deep and being within easy walking distance of the northern bank promenade.

4. Long term availability for development

This group includes areas where the current sand extraction contracts expire in 1988, although limited development of the land areas could proceed before this time.

4.1 Georges Hall Bay

Land area: 4.1 ha (excluding beach and allowing for boat parking)
Land capacity: high
Optimum level of use: 165 picnic groups

The proposed beach and the extensive views over the bay will make this area attractive for picnicking, swimming and boating. Access is direct, along Hollywood Drive, and a car park is proposed off Wharf Road.

The proposed beach, backed by a flat, grassed area, is ideal for the rigging and launching of centre-board boats, catamarans and other light craft. As these types of boats do not require the boat ramp and jetty of the proposed "activity centre" on the bay, it is reasonable to expect that they will concentrate around the beach area.

IT IS CONSIDERED THAT THE USE OF THIS AREA FOR THE LAUNCHING OF LIGHT BOATING CRAFT WOULD FULLY REALISE THE POTENTIAL OF THE SITE AND THIS SHOULD BE ENCOURAGED BY PROVIDING HIRE FACILITIES HERE.

The beach is also attractive for a swimming area and IT IS CONSIDERED THAT A NETTED BATHING AREA SHOULD BE PROVIDED.

Tree planting in the sections of this area furthest removed from the foreshore would encourage its use.

4.2 Georges Hall Bay foreshore and activity centre

Land area: 1.1 ha (excluding beach and activity centre and allowing for boat parking)
Land capacity: high
Optimum level of use: 55 picnic groups

This is a 40 metres wide strip of land between Hollywood Drive and Georges Hall Bay. A beach is proposed along the foreshore and because of the proximity of the car park, this area is ideal for launching light boating craft as well as for picnicking.

It is considered that the proposed linear car park is acceptable in this area because it provides for people to enjoy the view from the comfort of their car. However, a median strip with entry/exit points marked, should be provided to minimise the disruption of traffic along Hollywood Drive.

Further, it is considered that the parking area should provide for cars only i.e. trailers can be parked on grassed areas behind the beach. This is an accepted practice and minimises the paved area required for parking. In order to facilitate the launching of boats, an area should be left for cars to pull into and detach the trailer.

THEREFORE, IT IS CONSIDERED THAT THE PROPOSED PARKING AREA SHOULD PROVIDE FOR CARS ONLY AND THAT A MEDIAN STRIP BE PROVIDED TO MINIMISE THE DISRUPTION OF TRAFFIC ALONG HOLLYWOOD DRIVE.

4.3 Chipping Norton Bay beach area

Land area: 2.6 ha (excluding beach and allowing for boat parking)

Land capacity: high

Optimum level of use: 105 picnic groups

This area is particularly attractive because of the amenity of the proposed beach and the extensive views over the Chipping Norton Bay. However, the adjoining industrial uses have a detrimental visual impact on the site.

THE EXISTING STAND OF PINE TREES ALONG RIVERSIDE ROAD SHOULD BE CONSERVED AS THEY REDUCE THE VISUAL IMPACT OF THE INDUSTRIAL USES. FURTHER, THE AUTHORITY SHOULD TAKE MEASURES NOW TO PLANT LARGE TREES ALONG THE DRAINAGE CHANNEL TO REDUCE THE VISUAL IMPACT OF THE ADJOINING SCRAP METAL SITE. RELOCATION OF THE SCRAP METAL SITE SHOULD ALSO BE INVESTIGATED.

The proposed beach will be attractive for swimming and the launching of small sailing craft as well as for picnicking. However, there is no car parking proposed by the master plan to service such activities and the area of land is restricted given the potential intensive use of the area. THEREFORE IT IS CONSIDERED THAT THE AUTHORITY SHOULD INCORPORATE A LARGER AREA OF LAND BY REDUCING THE EXTENT OF SAND EXTRACTION. It would then be possible to fully realise the potential of this area with the possibility of providing boat hire facilities here.

FURTHER, IT IS CONSIDERED THAT A NETTED BATHING AREA SHOULD BE PROVIDED OFF THE BEACH AND THAT A CAR PARKING AREA SHOULD BE LOCATED OFF RIVERSIDE ROAD.

ALSO, CONSIDERATION SHOULD BE GIVEN TO RETAINING THE HOUSE AND SURROUNDING VEGETATION AT THE FORESHORE END OF RIVERSIDE ROAD FOR RECREATIONAL USE ASSOCIATED WITH THE BEACH.

4.4 Land associated with the proposed fish nursery

Land area: 2 ha (excluding rocky foreshore)

Land capacity: low

Optimum level of use: 55 picnic groups

This area is well removed from the proposed activity centres and major picnic areas in the Development Area and is connected to the Chipping Norton Bay beach area by only a narrow strip of land. However, it adjoins land zoned for county open space, which extends along the Georges River to Milperra Bridge.

At present there is no vehicular access to the site and none is proposed by the master plan. IT IS CONSIDERED THAT BECAUSE OF THE PROXIMITY OF THE PROPOSED BEACH AND THE COUNTY OPEN SPACE, ACCESS AND CAR PARKING SHOULD BE PROVIDED TO SERVICE THIS AREA.

FURTHER, THE ADJOINING COUNTY OPEN SPACE SHOULD BE DEVELOPED IN RELATION TO THIS AREA.

This area includes a proposed fish nursery. Preliminary investigations indicate that a more viable approach to providing for marine life would be to create a variety of "fish habitats" in as many different locations as possible throughout the lakes. Such "fish habitats" would consist of shallows with some vegetation cover, including mangroves, reeds and overhanging trees and would encourage the presence of fish in the lakes. IT IS CONSIDERED THAT THE NSW DEPARTMENT OF FISHERIES SHOULD BE CONSULTED, FORMALLY, ON THE VIABILITY OF A "FISH NURSERY" AS PROPOSED, AND THE POSSIBLE SITES WITHIN THE LAKES FOR "FISH HABITATS".

An existing scrap metal industry adjoins this area. LANDSCAPING IS NEEDED TO REDUCE THE IMPACT OF THIS SITE ON THE RECREATION AREA.

5. Established non-recreational areas

This group comprises those areas within the development area which have established uses and are unlikely to become available for recreation development.

5.1 Lansvale residential area

Land area: 6 ha.

This is an established residential neighbourhood with a public school and an industrial site. A narrow strip of public reserve separates most of the houses from the foreshore, so that there are no private jetties or boat ramps.

This area was included in the Development Area because of its close proximity to the foreshore. However, it is unlikely that any redevelopment for public use will take place because of the established private uses. Therefore, on the northern bank, where there are extensive views over the main lake, the recreation area is limited to a narrow strip of foreshore land.

In view of this, and to maximise the land available for public recreation, the Authority should:

- ACQUIRE A FORESHORE STRIP OF LAND FROM THOSE LOTS WHICH DO HAVE WATER FRONTAGE, TO MAINTAIN THE CONTINUITY OF PUBLIC ACCESS TO THE FORESHORE;
- INVESTIGATE ACQUISITION OF LOT Z D.P. 403574, CUTLER ROAD, A LARGE AND RELATIVELY UNIMPROVED ALLOTMENT ON THE NORTHERN BANK;
- ACQUIRE ANY OTHER LAND WHICH BECOMES AVAILABLE IN THIS AREA;
- EXPLORE THE POTENTIAL MULTIPLE USE OF EXISTING FACILITIES SUCH AS THE FORESHORE GROUNDS IN THE SCHOOL.

5.2 The Georges Hall residential area

Land area: 3 ha

This is an established residential area, with some commercial uses. As all of the lots have water frontage, some with private jetties and ramps, the foreshore is effectively alienated from public use.

IT IS CONSIDERED THAT THE AUTHORITY SHOULD ACQUIRE ANY LAND THAT BECOMES AVAILABLE IN THIS AREA. FURTHER, IN ORDER TO ALLOW PUBLIC ACCESS TO THE WATER AND PROVIDE CONTINUOUS ACCESS FROM THE LAKES SCHEME TO THE LOWER GEORGES RIVER, A FORESHORE STRIP OR RIGHT-OF-WAY SHOULD BE ACQUIRED.

5.3 The Fogular Furlan Club and the plant nursery

Land area: 1 ha and 1.5 ha respectively

The club and the nursery are established private uses and both have frontage to the Georges River. IT IS CONSIDERED THAT THE AUTHORITY SHOULD ACQUIRE A FORESHORE STRIP OF LAND OR RIGHT-OF-WAY TO MAINTAIN THE CONTINUITY OF PUBLIC ACCESS TO THE FORESHORE.

CONCLUSIONS AND RECOMMENDATIONS

1. General conclusions

The two basic aims of the study, expressed simply, are to identify the recreational capacity of the Chipping Norton Lakes Scheme, and to examine the need for integrating the Scheme with the surrounding land uses.

In relation to capacity it is concluded that there is no one figure defining capacity. Rather, it is more meaningful to indicate a range of capacity figures which reflect variables that are known and open to influence. Based on this assumption, it is estimated that the capacity of the water area for recreation is in the order of 120 to 400 boats at any one time, dependent on the number of motor boats using the lakes. A more realistic figure is 150 to 200 boats, taking into account the capacity of existing and proposed launching ramps suitable for motor boats. High speed power boating, water-skiing, water-biking and competition rowing should be excluded from the lakes, and an 8 knot speed limit imposed.

The land area included in the Lakes Scheme is more than adequate to support the water-oriented activities. Moreover, when developed the area could accommodate up to 2,200 picnic groups in addition to providing for activities such as field games, cycling, fishing, walking and camping as well as incorporating the existing amusement park.

The Lakes Scheme will undoubtedly have an impact on adjoining areas, but specific action is recommended where necessary in order to ameliorate any possible adverse impacts. In relation to adjoining recreational areas it is concluded that there would be advantage in overall planning and/or management in developing the concept of a "Georges River Park" in order to ensure the provision of complementary facilities and to promote the optimum recreational use of regional-scale facilities.

2. Recommendations

Recommendations, both general and specific, are drawn out of the text and set out below.

General recommendations

The objectives for the development of the Lakes and associated land area should be that the Scheme:

1. be completely available for general public use;

Private uses within the Development Area other than servicing and ancillary activities should be actively discouraged to allow maximum public use of and access to the foreshore.

2. be developed giving priority to water-oriented recreation;

The Chipping Norton Lakes should complement rather than duplicate the extensive areas of land for passive recreation in the adjoining Mirambeena Regional Park.

3. be developed for intensive use;

A larger proportion of the population will be catered for, and this will be consistent with the Lakes' urban location.

4. provide a variety of passive and active recreation opportunities;

One activity should not dominate to the exclusion of others; as many recreation opportunities as possible should be provided.

5. be developed and promoted in conjunction with other nearby recreational facilities as a "Georges River Park";

The area as a whole is of metropolitan significance in terms of recreational potential.

Specific recommendations

These recommendations are listed in a suggested order of priority.

1. The Lake Authority should acquire the following land at the earliest opportunity:
 - . a foreshore strip on all those lots on the northern bank which have water frontage (to maintain the continuity of the northern bank);
 - . all the remaining land within the Development Area apart from the established residential and commercial uses;

- . any residential or commercial land which becomes available; in particular the availability of a large relatively unimproved parcel at Cutler Road should be investigated.
2. Extensive tree planting should take place to increase the attractiveness of the area.
 3. An 8 knot speed limit should be imposed over the water area to ensure that the Lakes may be used by all types of boats.
 4. High speed boating such as water-skiing, water-bikes and power boating should be prohibited.
 5. Swimming should be allowed; this will require provision of netted bathing areas, monitoring of water quality and the erection of water quality indicator signs.
 6. The amenity of adjoining residential areas should be preserved by:
 - . discouraging recreational traffic from residential streets where possible; and
 - . landscaping parking areas and recreation areas.
 7. No intensive or commercial development should be permitted on the northern bank.
 8. Parking areas should be provided in various locations linked along a service road (to encourage maximum use of the entire land area).
 9. The Homestead should be opened to the general public as a museum, information centre, exhibition area, tea room or similar.
 10. The county open space to the south of the Development Area should be developed in conjunction with the Lakes Scheme.
 11. Launching facilities for heavier boats should be provided by ramps, and the use of the beaches for launching light craft encouraged.
 12. The provision of commercial facilities should be confined to the two activity centres and the major beaches at Georges Hall and Chipping Norton Bays.
 13. Boat hire facilities should be encouraged: light craft from the beaches, and light craft and/or motor boats from the activity centres.
 14. Kiosk or similar facilities should be provided near the beach areas as well as the activity centres.

15. The caravan/camping ground should be retained in its present location, but its condition upgraded.
16. The amusement park should be relocated to allow public recreational use of the land between the golf course and the present location of the park.
17. Bankstown City Council should be consulted about the footbridge from the proposed Georges Hall activity centre to Garrison Point.
18. Barbecue facilities should be provided in the picnic areas.
19. Relocation of the scrap metal site from Riverside Road should be investigated.
20. Wherever possible, use should be made of existing buildings and multiple use of existing facilities be encouraged; in particular this could include the use of the school grounds and the use of the southern section of Warwick Farm for parking and/or picnicking.
21. The house and surrounding vegetation at the foreshore end of Riverside Road should be retained for recreation usage associated with the beach.
22. Both recreational and commercial fishing (as at present) should be allowed.

APPENDIX A

SELECTED POPULATION CHARACTERISTICS OF BANKSTOWN, FAIRFIELD AND
LIVERPOOL LOCAL GOVERNMENT AREAS

	BANKSTOWN	FAIRFIELD	LIVERPOOL	TOTAL OF 3 LGAs	SYDNEY REGION
1976 Population (census)	155,843	114,603	89,683	360,129	3,021,982
1979 Population (estimates)	159,500	120,850	95,950	376,300	3,193,300
1981 Population (med projection)	158,500	136,500	96,000	391,000	3,230,000
2001 Population (med projection)	172,000	177,000	112,000	461,000	3,675,000
Age structure: %					
0-14 years	25	30	33	29	25
15-19	10	10	12	10	9
20-34	21	25	24	23	24
35-64	37	30	27	33	33
Over 65	7	5	4	5	9
Cars parked at private dwellings: % of total occupied dwellings					
0 cars	16	17	16	16	20
1	49	52	52	51	47
2	25	22	23	24	22
3 or more	7	6	5	6	6
Not stated	3	3	4	3	5

APPENDIX B

METHODOLOGY FOR DETERMINING THE CAPACITY OF THE LAKES SCHEME

A literature review was undertaken to identify the methodology best suited to determining the capacity of the Chipping Norton Lakes Scheme.

The most common method for determining the capacity of a recreation area is to use a standard which usually suggests the number of facilities to provide per unit area. In the literature reviewed, there was a wide variation in the standards used between different recreation areas. As the derivation of the standard was not always explained, it was difficult to choose a standard to apply to Chipping Norton.

However, one source suggested a method for selecting a standard to apply to a given area, according to the peculiarities of that area itself. This methodology was developed by the United States Department of Interior, Bureau of Outdoor Recreation and is set out in detail in "Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity" (1977).

The methodology was used to assess the capacity of both the land and water area. To illustrate the principles of the methodology, two examples are provided here; one for determining the water capacity, the other for determining the capacity of one picnic site.

EXAMPLE 1: DETERMINING THE CAPACITY OF THE WATER AREA

Activity : NON-POWER FLAT WATER BOATING

Definition : This includes rowboats, canoes and small sailboats using water bodies of still or low current speed.

Factors Affecting the Capacity :

1. the location of the area
2. the size of the recreation area
3. the quality of the site amenities
4. the type of boat (sailboats require a larger area for manoeuvring than canoes).

Effect of the Factors on Capacity :

By determining the effect that these factors will have on the capacity (i.e. a negative, neutral or positive effect which is explained in more detail in the following example) the following ranges were obtained:

for canoeing/rowing, 0.2 to 0.37 hectares per boat is required, depending upon the water conditions; for sailing, 0.37 to 0.53 hectares per boat is required, dependent upon the water conditions. This procedure was carried out for all other boating activities (e.g. water-skiing, motor boating, etc.).

EXAMPLE 2: DETERMINING THE CAPACITY OF A PICNIC SITE.

PICNIC SITE: 4.1 Georges Hall Bay Picnic Area.
(see map 7 or 8)

STEP ONE : determine the factors which will influence the capacity of this site for picnicking.

The site is located on the Georges Hall Bay foreshore, opposite the golf course. The capacity of this site will be affected by:

1. the amount of privacy available : open areas that offer no screening whatsoever usually accommodate a smaller number of people than areas which offer some degree of privacy.

This factor could be assessed in terms of tree cover. If a site is moderately wooded, then the effect on the capacity will be positive, thus:

moderately wooded	+ effect
sparsely wooded	o effect
open, no forest	- effect

2. the sensitivity of the site : areas sensitive to recreation use should not be developed for intensive use to safeguard the quality of the site:

vulnerable to excessive use only	+ effect
vulnerable to moderate use	o effect
vulnerable to any use	- effect

vulnerability here is assessed in terms of soil compaction/erosion problems and vegetation cover.

3. the homogeneity of the user groups : people who share a site with people of the same class, age or ethnic group will usually tolerate higher densities than if the site is used by mixed groups. This can be evaluated as:

homogeneous groups; + effect
heterogeneous groups; - effect

4. the location of the recreation area : people who travel to urban recreation areas usually expect and tolerate a higher density of people than participants who travel to rural or remote locations, thus:

urban location + effect
rural location o effect
remote location - effect

5. any siting limitations : any physical limitations to locating a picnic spot will affect the overall capacity of the site. This can be evaluated by:

(a) slope:

no slope + effect
moderate slope o effect
steep slopes (10% and over) - effect

(b) vegetation type:

grassland/open forest + effect
moderately wooded forest o effect
dense forest/scrub - effect

6. the size of the recreation area : when there are many people located over a large area, the cumulative effect is usually perceived as unfavourable. Smaller areas therefore can usually accommodate more people per unit area than larger areas.

The U.S. Department of Interior suggested the following:

areas less than 1 ha (small) + effect
areas 1 ha. or greater but
less than 4 ha (medium) o effect
area 4 ha. or greater (large) - effect

7. the shape of the site : people tend to choose areas along the boundaries of a site rather than the centre of a site; therefore, the shape will affect the capacity:

narrow, linear strip	+ effect
moderately deep	o effect
deep (tending to a square)	- effect

8. the quality of the site amenities : where areas have outstanding views or natural features, people will tend to tolerate a higher density of use than in areas lacking these qualities.

The evaluation of this factor is twofold:

(a) quality of adjoining land area:

adjacent to land recreation areas (good)	+ effect
adjacent to recreation or mixed (moderate)	o effect
adjacent to industry (poor)	- effect

(b) views to the water:

panoramic/extensive	+ effect
partial views	o effect
no view or restricted	- effect

9. the proximity to other activities : same as item 8 but relating to the variety of recreation experiences available. The evaluation is based on the area being near

two or more activities	+ effect
one other activity	o effect
no other activities	- effect

These activities include boating, a beach area, launching area, oval etc.

10. the proximity to access : picnicking is generally car-oriented with people tending to picnic in close proximity to their cars. The relative ease of reaching a picnic spot will affect the overall capacity of a site:

direct, easy access and car park	+ effect
access provided, no car park	o effect
restricted access, no car park	- effect

These factors were modelled on the guidelines set out by the U.S. Department of Interior.

STEP TWO: to observe the condition of the site and evaluate the effect this will have on the capacity of the site, as set out in the following table (example, Area 4.1 on Map 8).

PRIMARY FACTOR INFLUENCING THE CAPACITY OF A SITE	OBSERVED CONDITION OF THE SITE	EFFECT OF OBSERVED CONDITION ON THE DENSITY OF USE	CUMULATIVE TOTAL
1. the degree of privacy	open, no tree cover	-	-1
2. the vulnerability of the site	no compaction or erosion problems	+	0
3. the user group	likely to be mixed	-	-1
4. the location	urban	+	0
5. siting limitations			
a. slope	flat	+	+1
b. vegetation	grassed/no tree cover	+	+2
6. size of the site	large	-	+1
7. shape of the site	tending to square	-	0
8. amenities			
a. views	views to bay	+	+1
b. adjacent area	recreation areas	+	+2
9. proximity to			
a. other activities	sailing, swimming (beach)	+	+3
b. access	good but not direct	0	+3
		NET EFFECT	+3

STEP THREE refer to the suggested optimum capacity range and decide whether the base figure is acceptable.

Example of Capacity Range

picnic groups/ hectare	Low 10	Base 32	High 86
---------------------------	-----------	------------	------------

!-----!
18 m. between groups
if equally spaced

32 m between
groups if
equally spaced

11 m between
groups if
equally spaced

In some of the literature reviewed the following standards were given:

- The U.S. Soil Conservation Service (1964) recommended 20 to 25 picnic groups per hectare.
- The Cleveland Regional Planning Commission (1960) recommended 30 picnic groups per hectare; and
- The California Public Outdoor Recreation Plan (1960) recommends 40 picnic groups per hectare.

The average of 22.5, 30 and 40 groups per hectare is about 31 picnic groups per hectare.

It was decided to adopt the suggested capacity base as it did not deviate greatly from the other data available.

STEP FOUR: use the "base capacity figure" (step 4) and the "net effect figure" (step 3) to select the optimum capacity figure. The net effect figure (in this case +3) is used to select the point on the capacity range which represents the site in question.

	OPTIMUM CAPACITY RANGE												(12 primary factors influencing capacity)										
	PICNIC GROUPS/HA																						
LOW																							
10																							
	12	14	16	17	19	21	23	25	27	28	30	32	37	41	46	50	55	60	64	69	73	78	82

-4 -3 -2 -1 0 +1 +2 +3 +4

SELECTED OPTIMUM CAPACITY (+ 3)

i.e. 46 picnic groups per hectare

Note that this capacity range is for picnic sites where 12 factors affect the capacity of the site (as in Chipping Norton).

The numbers are calculated by taking the difference from the high and the base (or the base and the low), dividing this by the number of factors affecting the capacity (in this case 12) and using this figure as the distance between each number on the scale.

Therefore, the optimum carrying capacity for Area 4.1 Georges Hall Bay Picnic Area, for picnicking is 46 picnic groups per hectare.

The benefits of this methodology

This methodology provides flexibility in the application of a standard. The physical characteristics of the site and, to a degree, the social characteristics of the likely users determine the selection of the capacity. The standard therefore is relevant to a particular site and small and large variations can be taken into consideration.

The limitations of the methodology

The factors affecting capacity are limited to those which are easily observable and easily quantified. Other factors such as the skill of the participant or the mood of the participant also will affect capacity, but because they are not readily measured, these factors are excluded.

In addition, each recreation activity is considered independently of others. The possible combination and compatibilities of different activities must be considered separately.

APPENDIX C:

COMPARISON OF ACTIVITIES AND FACILITIES IN NSW STATE RECREATION
AREAS AND THE CHIPPING NORTON LAKES SCHEME

S.R.A.	AREA	ACTIVITIES		FACILITIES
1 Copeton	950 ha	fishing water- skiing boating sailing swimming	bush walking wildlife fossicking	
2 Keepit	590 ha	fishing water- skiing boating sailing swimming	bush walking picnicking camping	boating clubs boat ramp
3 Arakoon	330 ha	fishing swimming surfing	bush walking picnicking camping	
4 Glenbawn	205 ha	fishing water- skiing boating sailing	walking picnicking fossicking camping cabins	boat hire aquatic club boat ramp
5 Booti Booti	800 ha	fishing boating sailing swimming	bush walking picnicking camping	being developed
6 Munmorah	1,000 ha	fishing water- skiing sailing swimming	walking picnicking camping	
7 Lane Cove River	300 ha	boating swimming	bush walking picnicking	boat/canoe hire, zoo, paddle wheeler
8 Davidson	1,135 ha	fishing boating	bush walking picnicking	
9 Georges River	230 ha	water- skiing boating	walking picnicking	boat ramp boat hire

S.R.A.	AREA	ACTIVITIES		FACILITIES
10 Burrendong	580 ha	fishing water- skiing sailing swimming	walking picnicking	boat ramp caravan park
11 Mookerawa	630 ha	water- skiing boating sailing	horse riding fossicking picnicking walking camping	
12 Wyangala	215 ha	water- skiing power boating sailing swimming	picnicking fossicking walking camping	boat ramp
13 Grabine	650 ha	fishing boating swimming	picnicking camping	boat ramp
14 Illawarra	1,600 ha		picnicking walking	
15 Bungonia	580 ha		caving walking picnicking	
16 Burrinjuck	195 ha	water- skiing boating sailing swimming	bush walking picnicking tennis caving camping	boat hire
17 Bournda	1,055 ha	fishing water- skiing boating swimming surfing	bush walking picnicking camping	
Chipping Norton including Moorebank Lakes and adjoining County Open Space	400 ha	fishing boating sailing swimming	walking picnicking camping	boat hire boat ramps amusement park

BIBLIOGRAPHY

PREVIOUS PUBLICATIONS ON CHIPPING NORTON

- THE GEORGES RIVER EXTRACTIVE INDUSTRIES COMMITTEE. 1967. Report to the Minister for Public Works and Local Government and Highways.
- NSW DEPARTMENT OF PUBLIC WORKS. 1975. Georges River - Chipping Norton Sand Extraction. Soros, Longworth & McKenzie Consulting Engineers.
1977. Chipping Norton Lake Planning Study. Cox and Corkill Pty Ltd.
1978. Chipping Norton Lake Planning Study: Study Area No. 1. Cox and Corkill Pty Ltd.

OTHER PUBLICATIONS

- BOATING INDUSTRY ASSOCIATION OF NSW. 1976. Boating Facilities in the Sydney Metropolitan Area: Existing Facilities and Future Requirements.
- NSW DEPARTMENT OF PUBLIC WORKS.
- 1977 a. Sydney Recreational Boating Facilities: Western Region.
- 1977 b. Hawkesbury River: Report on Water-Skiing and Water Oriented Recreation. NSW Interdepartmental Committee.
- 1978 a. Sydney Recreational Boating Facilities: Botany Bay, Georges River and Port Hacking.
- 1978 b. Sydney Recreational Boating Facilities: Pittwater and Lower Hawkesbury.
- 1978 c. Sydney Recreational Boating Facilities: Survey of Ramp Users.
1979. Sydney Recreational Boating Facilities: Eastern and Northern Sydney Harbour.
- NSW PLANNING AND ENVIRONMENT COMMISSION.
1975. Sydney Region Open Space Survey Research Study No. 1.
1979. Analysis of Recreation Users Survey; Port Hacking /Georges River/Kurnell Area. Unpublished paper, Botany Bay Regional Office.

NSW STATE POLLUTION CONTROL COMMISSION. Environmental Control Study of Botany Bay.

1978 a. Recreational Use in Botany Bay.

1978 b. The Study and the Region.

1979 a. Recreational Resources of Botany Bay and its Tidal Waters.

1979 b. Health Aspects of Faecal Contamination.

U.S. DEPARTMENT OF INTERIOR, Bureau of Outdoor Recreation.

1967. Outdoor Recreation Space Standards. U.S.G.P. Wash. D.C.

1977. Guidelines for Determining and Understanding Optimum Recreation Carrying Capacity. Bethlehem, Pennsylvania.

NEW SOUTH WALES DEPARTMENT OF

EIS

Chipping Norton lake scheme :
planning and development study

43A