CHIPPING NORTON LAKE PLANNING STUDY

study area number 1

OCTOBER 1978

COX AND CORKILL, PTY. LTD.
Planning and Environmental Analysis

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introduction

GENERAL
REGIONAL LOCATION
OBJECTIVES
GENERAL

The Department of Public Works engaged Cox and Corkill Pty Ltd to undertake detailed development plans for the foreshore areas of four of the Precincts outlined in the 'Master Plan' as proposed in the "Chipping Norton Lake Planning Study", October 1977.

These plans are a set of design guidelines for a possible course of development for the Chipping Norton Lake development area. They should not be construed as inflexible as they will require constant review and updating to meet new conditions in a continuing climate of change.

The precincts are:

- Precinct 1
  Chipping Norton Lake
  (Wildlife Island only)

- Precinct 3
  Lansvale Residential Community

- Precinct 9
  Georges Hall Bay
  (Georges Hall Bay Point only)

- Precinct 10
  Georges Hall Lake Front

Comments on the original Chipping Norton Lake Planning Study have been received from a number of State Government Departments, local authorities and community groups. Where possible the recommendations have been included in these plans for Study Area No. 1.

In preparing the plans the following departments have been consulted:

- Central Landscape Group
  Government Architects Branch
  Department of Public Works

- Soil Conservation Service of New South Wales

- National Parks and Wildlife Service

- New South Wales State Fisheries

This consultation resulted in two significant working reports:

- Vegetative Stabilization
  Chipping Norton Lake Scheme: Stage 1
  Soil Conservation Service of New South Wales

- Vegetation Survey
  Chipping Norton Lake Scheme
  Central Landscape Group
  Department of Public Works
  New South Wales.
OBJECTIVES

This report proposes detailed plans for Study Area No. 1. The specific components of the plans are:

- public access to the lake front from the local streets
- land utilization of the foreshores
- public parking areas and linking path system
- wildlife and preservation areas
- promenade areas and locations for the visual enjoyment of the lake
- landing and launching areas for boats
- a landscape programme to maintain and supplement the existing plant species (including recommendations outlined by the Soil Conservation Service and the Department of Public Works Central Landscape Group)
- a method for stabilizing the existing river bank (using information provided by the Department of Public Works Coastal Engineering Branch)
chipping norton lake

MASTER PLAN
EXISTING CONDITIONS
BANK CONDITIONS
STUDY AREA No. 1

Precinct 1
Chipping Norton Lake
(Wildlife Island only)

Precinct 3
Lansvale Residential Community

Precinct 9
Georges Hall Bay
(Georges Hall Bay Point only)

Precinct 10
Georges Hall Lake Front
MASTER PLAN

The Chipping Norton Lake Authority has adopted the 'Master Plan' which outlines the general parameters to guide the future development for the lake and surrounding land. The following four components are the key aspects of the scheme:

- the ultimate shape or configuration of the lake
- the specific land uses for the land and water area
- the pedestrian path system
- the vehicular access and parking areas

The Chipping Norton Lake Planning Study made the following general and specific recommendations. This report deals with the detail plans required to implement these specific recommendations while carrying out the intent of the general recommendations.

GENERAL

- that the sand extraction agreements should be coordinated to conform to the proposed lake configuration
- that the scheme should be developed in stages so that critical parts of the plan are 'in place' before the end of the 15 year sand extraction period

SPECIFIC

- that there should be acquisition of strategic parcels of land within the Authority's boundary
- that the northern bank adjacent to the 'Lansvale Residential Community' be stabilized to arrest the bank erosion - this could include a public walkway along the foreshore
- that the proposed island in the north east part of the lake be rehabilitated as a wildlife preserve
- that a maintenance programme be organized to keep the lake area free of debris and garbage
- that a landscape programme be organized to maintain the existing habitats and create new ones according to the proposed plans

* As described in the "Chipping Norton Lake Planning Study" October 1977.
EXISTING CONDITIONS

Sand deposits have been extracted from this area for many years, creating a series of water bodies with a total water area of more than 100 hectares. This represents approximately 70% of the final water area of the proposed lake. However, the water area is fragmented (see map 3) due to ineffective controls and lack of coordination. The 'Master Plan' describes the future shape or configuration of the lake which the Chipping Norton Lake Authority can work towards.

There are many spits of land that have been left by the past sand extraction - these need to be 'cleaned' up to make a continuous water area. Except there will be several islands left to provide relief, interest and wildlife habitats.

Two surveys have been made of the study area to establish the existing condition and suggest a vegetative stabilization programme. These studies are reproduced at the end of this report.

Also the Department of Public Works Coastal Engineering Branch will study the water movement in the proposed lake and the consequent type of erosion that can be expected and the mitigating measures necessary to stabilize the banks and islands.
C.N.L. Development Area

EXISTING CONDITIONS

- land area
- water area
- study area number 1

map 3

metres

0 400 800
BANK CONDITIONS

1 Well used existing access lane. Note: Need to formalise path and landscaping.

2 View to Georges Hall Bay Point from Lansvale residential community. Note: Suffering vegetation due to bank erosion.

3 Occasional widening of existing high level path system. Note: Area used by residents of adjacent properties and indiscriminate planting.

4 East of Georges River Road with Lansvale riverside park in the background. Note: Good panoramic view of lake and island.

5 View from widening end of Jupiter Street towards Warwick Farm river edge. Note: Well used informal walkway and gentle bank slope.

6 River edge view across to Georges Hall Lake front and proposed wildlife island. Note: Good stands of trees along foreshores.

key
BANK CONDITIONS

7 Generous wide high level walkway gently sloping down to river bank.
   Note: Good overall view of lake.

8 Well established top level walkway along river.
   Note: Badly eroded bank and suffering vegetation.

9 Occasionally the walkway system provides closer access to the river edge.
   Note: Well established vegetation on upper side of walkway.

10 Gentle bank slope in sectors of the Lansvale residential community precinct.
   Note: Healthy well settled vegetation.

11 Panoramic view with island in the foreground.
   Note: Badly eroded steep bank.

12 Well used existing walkway along rear of residential community.
   Note: The proximity and height of fences.

key
The proposed Wildlife Island is located in the main lake area. It is the largest and most significant island in the lake which is the central and major attraction of the scheme. The planning components for the island are:

- the existing contours of the island will be reshaped to build it up and establish salt-free topsoil which will encourage and sustain plant growth
- one small section of the island contains important plant species that are not commercially available (e.g., common reed 'Phragmites australis') and could be an important source of seed or propagating material for sowing operations. This area will be maintained in its natural state
- two small bay areas will be developed as wetlands for the habitat of ducks and other water birds
- a well articulated loop path system will be built to enable school children and nature study groups to partake in nature study excursions. Access to the island will be limited to this kind of activity
- a small jetty will be built to provide landing facilities for the study groups
- an intensive planting programme, recommended by the Soil Conservation Service and the Central Landscape Group, will be necessary to 'stabilize' the island

This area has been proposed as a wildlife island preserve because:

- the existing wildlife habitats in this area should be protected
- it is the only large area in the scheme that is free from predators such as domestic dogs and cats
- commercial or recreational use is very difficult as there is no bridge for pedestrian access
- the soil condition is unsuitable for building
- there is an important swamp area which contains an important plant species (common reed 'Phragmites australis')
- it is an ideal location for 'controlled' nature study groups to inspect an island ecological system and wildlife habitat
- this area of land contains deposits of waste material (from the sand extraction) which cannot be reused and must be contained.
- it will visually enhance the lake to have islands which offer relief to the large body of open water
This precinct is located on high ground adjacent to the lake with fine panoramic views over the water and islands. However one of the major problems in the area is the eroded bank which needs immediate attention. The planning components of this precinct are:

- four 'focal points' spaced around the foreshores - located at strategic public access points to the lake and water edge
- a public walkway along the water's edge - this is combined with the placing of rocks at the toe of the slope to stop erosion
- a public walkway between the top of the bank and the private houses - this higher level path system links the focal points meandering along between the trees with impressive panoramic views overlooking the lake
- a series of terraces to stabilize the eroded bank - they will wind around preserving the existing trees and vegetation
- a continuous public easement around the waterfront - this will require acquisition of recreational easements at two locations (part Lot Z, DP 403574 and part Lot 32, DP 517846)

- three residential lots at the ends of Jupiter Street and Willow Close should be acquired by the Authority - to provide public access with limited parking to the focal points around the shore line
- new plantings should be predominantly indigenous to supplement and reinforce the existing native vegetation
- park seating and barbecue areas will be provided at strategic points throughout the park and path system
- the existing property rights of the landowners will be protected except as above.

The planning concept for this area has resulted from the following factors:

- the river bank has received the main planning considerations as it has very serious problems because of erosion
- receives the least attention because of poor vehicular access
- a landscaped buffer zone needs to be created between the residential community and the recreational lake
- continuous public access to the lake should be provided around its perimeter
- the bank erosion should be arrested as it threatens the stability of the private houses around the shore line and decreases the extent of public right-of-way
- the natural vegetation along the shore line is in need of protection and reinforcement
- the separation of public access and path system should be more clearly defined so there is no conflict between private use and public use
The area of this precinct included, is the northern spit or point of land of 'Georges Hall Bay'. It contains good stands of native vegetation which will be maintained in a natural state. The planning components are:

- the spit of land is to protect and visually contain the 'Georges Hall Bay'. The edges will require stabilization with rocks
- a path will be provided to meander out to the end of the spit
- along the spit on the northern edge small rock promontories will be built out into the water to provide sitting and viewing areas
- the spit will also contain some arrangement which will aid the tidal ventilation of the lake area if necessary

The planning concept for this precinct has been determined by the need:

- to create an edge or boundary to the proposed 'Bay' area
- to protect and preserve the natural vegetation along the shore
- to stabilize the shoreline and to protect the bank
- to provide a means to improve and aid the tidal ventilation of the lake
- for a public pathway along the shoreline and out to the end of the proposed spit.
PRECINCT NO. 10
GEORGES HALL LAKE FRONT

This precinct contains several large properties in private ownership. The planning components related to these properties are:

- A strip around the water's edge be reserved as a recreational easement to provide public access to the water's edge and enable a continuous walkway around the lake.

- A strip along Willow Close also be reserved as an easement to provide space for the continuation of the 'Mirambeena-Georges Hall Loop Trail'. This path system links the Mirambeena Regional Park with the Chipping Norton Lake area.

- A public path (part of the Loop Trail) will be constructed along the water's edge meandering between the trees and existing natural vegetation.

- Rock promontories could be built out into the water to provide sitting and viewing spots along this densely treed area.

- The bank will be protected with rocks which will be placed along the edge.

The Fogolar Furlan Club will be encouraged to remain in its present location

- Andreasen's Nursery will also be encouraged to remain and expand as it would become a significant attraction in the area.

- The planning concept for this precinct has been determined by the need:

  - for a public access and public walkway around the edge of the lake
  - for a pedestrian path link to the Mirambeena Regional Park
  - to stabilize the shoreline to protect the bank and natural vegetation
  - to protect the private property holdings and the desirable existing uses of the Fogolar Furlan Club and Andreasen's Nursery
  - to provide sitting, viewing and other passive recreational areas along the shore line for the general public.
study area number 1

MASTER PLAN COMPONENTS
Focal Points
Edge Stabilization
Bank Stabilization
Path System
Promontories
The area defined as the Study Area in this report consists of the north east and south foreshores of the proposed Chipping Norton Lake. This area is, except for a few sand spits and the remnants of Epsom Road, in the shape of the final lake configuration. Therefore detail plans can be prepared and implemented.

The Study Area Master Plan is illustrated on map 5. It is a cohesive area with a number of elements in the plan that reinforce, define and link it together. The major elements are:

- **FOCAL POINTS**
- **EDGE STABILIZATION**
- **BANK STABILIZATION**
- **PATH SYSTEM**
  - high level path
  - water level walkway
- **PROMONTORIES**
FOCAL POINTS

Within the Study Area there are five access points to the lake foreshore and lakeside pathway system that have been defined as Focal Points.

The five points have been given the names of:

- The Plateau Focal Point
- Georges River Road Focal Point
- Jupiter Street Focal Point
- Willow Close Focal Point
- Wharf Road Focal Point

These focal points are located at strategic places at the ends of the cul-de-sacs which are adjacent to the lake. A limited number of parking spaces are provided for short term visits - long term and overnight parking will be restricted.

These areas contain a series of terraces stepping down to the water and the proposed water level walkway which at this point has a small jetty for fishing or mooring small boats. The terraces have been designed as promenade areas with seats, paving and landscaping.

These areas will be for passive recreation - sitting and walking and enjoying the view overlooking the lake and islands. The top terrace and parking area is approximately 7 metres above high water level which enables fine panoramic views over the lake.

Visually these focal points establish the interest areas along the northern lake shore and on the link between water and land.

A detailed drawing of the Jupiter Street Focal Point is illustrated on Map 6.
**EDGE STABILIZATION**

Rocks will be placed at the toe of the slope to stabilize the bottom section of the bank. This will protect the bank from wave action and erosion, it will also provide a water level walkway which will run continuously around the foreshore.

The profile of the bank is relatively steep requiring careful placement of the rocks. The rock sizes will be determined by this steepness and the method employed for dumping.

Also the edge rocks will be suitably placed to form seating and fishing spots.

At the focal points adjacent to the access points small timber jetties will be provided for fishing and boat mooring.

The edge line should be varied to form an irregular shape. This will have several beneficial aspects, they are:

- provides a maximum shore length for fish habitats
- provides a visual relief to the continuous edge line.
BANK STABILIZATION

The bank is eroded and extremely steep. It needs immediate attention before more areas collapse and therefore affect the adjacent houses.

The foreshore will be stabilized by placing rocks at the water's edge (to stop the wave action) and terracing the bank (to stop the erosion).

The gabions would sit on the 'placed' rock at the water's edge and be terraced up the bank therefore stabilizing the public access and the private property at the top of the bank. The bank is about 7 metres high and the number of terraces created by the gabions will depend on the location and quantity of the existing trees. The gabions will require careful placement to preserve the existing trees.

Casuarina glauca is the dominant tree on the river bank with a mixing of Casuarinas and Eucalypts on the bank ridge. New plantings on the terraces and top should supplement and reinforce existing vegetation by use of plant species indigenous to the area.

Access down the bank at the 'Focal Points' will be by a series of steps which link each terrace. The steps will be constructed of natural materials and designed to fit with the 'soft' character of the terraces and walkways.
UNSTABLE BANK
EXISTING PATH
LANDSCAPED TERRACE
WATER LEVEL WALKWAY

TYPICAL CONDITIONS
existing

THE SECTION SHOWN IS CHARACTERISTIC OF MOST OF THE LANSVALE RESIDENTIAL COMMUNITY LAKE FRONT WITH VARIATIONS IN BANK STEEPNESS AND HEIGHT.

IN GENERAL, IT FEATURES AN EXISTING NATURAL PATH AND A MIXTURE OF INDIGENOUS VEGETATION, THE BADLY ERODED BANK BEING THE MAIN PROBLEM AREA.

proposed

THE MAIN OBJECTIVES WITHIN THE PROPOSAL INCLUDE:

- UPGRADING NATURAL PATH
- MAINTAINING EXISTING VEGETATION AND REINFORCING NATURAL INDIGENOUS VEGETATION
- BANK STABILIZATION WITH GABIONS OR ROCKS
- STABILIZATION OF WATERS EDGE WITH ROCKS TO MAKE WATER-LEVEL WALKWAY POSSIBLE

metres

0 2 4 6
There are two continuous path systems running around the foreshore of the Study Area:

- **High Level Path**
  There is an existing path running along the top of the bank. It is proposed that this path be upgraded but left as a 'natural' path, winding between the trees. New plantings will reinforce the natural indigenous vegetation so creating a nature pathway with views and vistas over the lake.

  The pathway links the focal points at the top of the bank. It also collects the minor access routes from the residential streets.

  The success of this higher level walkway will depend on a good bank stabilization programme. At present the bank is unstable and activity on top of the bank will tend to cause bank collapse.

- **Water Level Walkway**
  The water level walkway will be formed on top of the rocks that are placed at the toe of the bank to stop the erosion caused by wave action.

  This walkway will provide continuous access to the water's edge for passing recreational activity - fishing, walking, sitting and viewing. It also links the Focal Points which are the access location from the residential streets.
PROMONTORIES

Rock promontories will be constructed out into the water to provide a relief to the path that meanders through the trees.

This area of the shoreline is densely treed and the proposed path should not be close to the water's edge as it will endanger the vegetation and bank conditions. It is therefore necessary to provide points which project out into the water for sitting, fishing and viewing of the lake.

These promontories are proposed at five spots around the shore and on the "Georges Hall Bay Point."

The path, linking the promontories, is part of the proposed "Mirambeena-Georges Hall Loop Trail".
| SECTOR 1 | The Plateau |
| SECTOR 2 | Georges River Road |
| SECTOR 3 | Jupiter Street |
| SECTOR 4 | Willow Close |
| SECTOR 5 | Wildlife Island |
| SECTOR 6 | Wharf Road |
| SECTOR 7 | Spillway |
| SECTOR 8 | Georges Hall Bay Point |
SECTOR 1
THE PLATEAU

This sector extends from the Plateau and Lansvale Riverside Park to Cutler Road (see map 8).

The proposed components are:

- boat launching ramp and associated parking for boat trailers and car parking. These facilities are existing but in need of upgrading particularly the access road to the boat ramp and the parking area. It is recommended that this upgrading proceed immediately

- a small jetty to be built in association with the boat launching ramp. It will also serve for fishing and general enjoyment

- the banks need protection and it is recommended that the toe of the slope be stabilized by placing sandstone rocks along the edge

- a picnic and barbecue area will be developed on the large flat grassed area directly east of the boat launching ramp

- the water level walkway begins at the jetty and extends east around the shore line. It will be constructed on the rocks that have been placed at the toe for bank protection

- the eroded banks will be terraced with gabions or rock protecting the existing native vegetation and providing flat areas for additional planting

- a limited number of parking spaces will be provided at the end of Cutler Road

- a high level path system will commence at the plateau and extend along the top of the terraced bank and around the shore line adjacent to the private houses and Lansvale East Public School

- the residential streets - Cutler Road, Kurran Street and the Plateau - need to be planted with street trees
SECTOR 1
THE PLATEAU

RECREATIONAL EASEMENT
THE PLATEAU FOCAL POINT
PICNIC AREA
PARKING
BANK STABILIZED WITH GABIONS, ROCKS ETC.
WATER LEVEL WALKWAY
BOAT TRAILER PARKING
ROCK EDGE STABILIZATION
BOAT RAMP
JETTY

map 8
metres
0 25 50
TYPICAL SECTIONS.

section 1

Representative of the plateau focal point area where the bank is at its minimum height, the water edge is accessible by following the gentle slope of the bank. At this point, the bank, although low, needs stabilization thus avoiding continuous erosion of good park area.

section 2

Ocurs at the picnic area accessible from both Cutler Road and the plateau. In this sector, two relatively low banks are formed. Bank stabilization is also needed on the top bank which shows some evidence of surface soil erosion.
SECTOR 2
GEORGES RIVER ROAD

This sector starts at the First Lansvale Venture Unit and extends around to Cummings Crescent (see map 9).

The proposed components are:

- the First Lansvale Venture Unit occupies an existing facility on the foreshore. It is considered that this is a compatible use and should be encouraged to expand with the development of a jetty and boat launching facilities that would be advantageous for the Unit's future operation.

- the water level walkway, the edge stabilization, the terraced bank and the higher level path system are a continuation of the same elements described in the Plateau Sector.

- the significant part of this sector is the 'Georges River Road Focal Point'. This is an area that provides parking, path access promenade, terraces and steps down to the water level walkway.

- a small jetty will be provided at the foot of the focal point for fishing and mooring of small boats.

- seats will be provided throughout the area, generally making it a passive recreation area.

- the existing access path from Cummings Crescent will be maintained, however it requires planting and paving to make it a desirable path to the lake shore.

- the adjacent residential streets - Bundurra Street, Coolah Place, Georges River Road, Cummings Crescent - require planting with suitable street trees.
private property

chipping norton lake development area

TERRACES
BANK STABILIZED WITH GABIONS, ROCKS ETC.

JETTY
WATER LEVEL WALKWAY

RECREATIONAL EASEMENT

SECTOR 2
GEORGES RIVER RD

GEORGES RIVER ROAD
FOCAL POINT
NATURAL LANDSCAPED TERRACE
ACCESS PATH
TERRACES
BANK STABILIZED WITH GABIONS, ROCKS ETC.
JETTY
WATER LEVEL WALKWAY
ROCK EDGE STABILIZATION
RECREATIONAL EASEMENT
SECTOR 3
JUPITER STREET

This sector runs from Cummings Crescent to the access path from Riverside Road (see map 10).

The proposed components are:

- the water level walkway, the edge stabilization, the terraced bank and the high level path system are a continuation of the same elements described in the Plateau and Georges River Road Sectors.

- also the Jupiter Street Focal Point has the same type of elements described in the last sector under the Georges River Road Focal Point. It contains access paths, parking, promenade terraces, and steps down to the water level walkway and jetty.

- the access paths from Mars Place and Riverside Road are basically the same as the Cummings Crescent access path and are in need of landscaping and paving.

- the path and bank system pass in front of the Lansvale East Public School. It is recommended that the school fence along this section be removed and a suitable planting programme be implemented to take its place.

- the adjacent residential streets of Mars Place, Jupiter Street, Venus Place - require planting with suitable street trees.
SECTOR 3
JUPITER STREET

- Jupiter Street
- Focal Point
- Parking
- Terraces
- Jetty
- Bank stabilized with gabions, rocks etc.
- Water level walkway
- Natural landscaped terraces
- Rock edge stabilization
- Access path

Map 10

Key map

Metres

0
25
50
SECTOR 4
WILLOW CLOSE

This sector runs from the Riverside Road access path to the Willow Close Focal Point (see map 11).

The proposed components are:

- the water level walkway, the edge stabilization and the terraced bank are still a continuation of the same elements described in the Plateau, Georges River Road and Jupiter Street Sectors.

- also the Willow Close Focal Point has the same elements described in the Georges River Road Sector. It contains access paths, parking, promenade terraces and steps down to the water level walkway and jetty.

- the water level walkway will end at the Willow Close Focal Point. From this point south the path system will continue on the top of the bank within the acquired recreational easement.

- the adjacent residential streets - Riverside Road, Ferry Road, Willow Close - require planting with suitable street trees.

- the high level path system is not continuous through this sector as several private properties extend to the bank edge. However the bank needs stabilization with the edge rocks and gabion terraces.

- along Willow Close and along the shore line in front of Andreasen's Nursery the Authority will require a recreational easement of approximately 20 metres which will enable continuous public access to the lake front. It will also provide an easement (along Willow Close) for a continuation of the "Mirambeena-Georges Hall Loop Trail"
SECTOR 5
WILDLIFE ISLAND

The area of land at the end of the remnants of Epsom Road will be developed into a wildlife island and restricted to use by school children and nature study groups (see map 12).

The proposed components are:

- the island will be reformed to specified contours while maintaining its basic configuration
- the north and east edge (the old Georges River bank) needs to be stabilized with rocks at waters edge
- the two bay areas on the western side will be developed with a shallow beach profile and made into a 'wetland' with the planting of suitable reed and vegetation that will encourage and sustain water fowl
- the 'points' and land spits on the western side will be stabilized with rock placements
- a small jetty will be constructed on the western shore for the landing of the groups of school children
- a well defined path will be constructed around the island to guide the groups to the most interesting nature study areas. Access will be restricted to this path system. It is designed as a loop, which will pass through all the different types of environment, the tidal zone and the flood prone zone. It would also include a 'board walk' bridge traversing an interesting wetland area.
- topsoil (as recommended in the Soil Conservation Service report) will be used to remould the contours and enable suitable species to be planted.
WILDLIFE ISLAND PLANTING

The following plant species have been recommended by the Soil Conservation Service and the Department of Public Works Central Landscape Group. Refer to map 12 - 'Wildlife Island' for the numbered location of species.

The basic concept is to intensely plant the total area of the island with the three major tree species (certain areas would have a dominant species).

The path system would be left unplanted to enable nature study groups to enjoy the island.

TREES

All three species would be planted in each specified area. The indicated species would be the dominant species in the specified area.

1. Casuarina Glauca (Swamp Oak)
2. Eucaliptus Botryoides (Bangalay)
3. Acacia Glaucescens (Coast Myall)

SHRUBS

These species would be located throughout the treed areas.

- Acacia Floribunda (White Sally)
- Leptospermum Flavescens (Common Tea Tree)

WETLAND

4. Phragmites Australis (Common Reed)
5. Aegiceras Corniculatum (River Mangrove)

GROUND COVERS

These two species would be located throughout the specified areas.

6. Cynodon Dactylon (Couch)
7. Pteridium Esculentum (Bracken)
SECTOR 6
WHARF ROAD

This sector runs from Willow Close Focal Point to Wharf Road Focal Point (see map 13)

The proposed components are:

- the path system continues within the proposed recreational easement which runs around the shore in front of a series of large privately owned properties. It is recommended that this easement be acquired.

- the path will meander through the existing vegetation which is in good condition and only needs supplemental planting of native species and good maintenance.

- west of Wharf Road the path system will continue into the proposed park system and picnic area.

- the adjacent residential streets - Wharf Road, Hollywood Drive - require planting with suitable street trees.

- Andreasen's Nursery and the Fogolar Furlan Club will be encouraged to expand and become an integral part of the lake planning scheme.

- at two points around the shore it is proposed that rock promontories be constructed out into the water. These promontories will provide sitting and viewing areas and act as a relief for walkers and bike riders.

- the Wharf Road Focal Point contains a limited number of parking spaces, promenade terrace, and steps down to a rock promontory.
SECTOR 6
WHARF ROAD

- WHARF ROAD FOCAL POINT
- RECREATIONAL EASEMENT
- NATURAL BANK
- PROMONTORY
- ROCK EDGE STABILIZATION
- TERRACES
- PARKING
- PATH

map 13

KEY MAP

metres

0 25 50
section 3

Fairly typical of the whole sector from Cutler Road to the Lansvale East Public School Area with variations in steepness and height of the bank. Both top level and waters edge walkway are a consistent feature.

section 4

The relatively low bank profile of the area north of Wharf Road focal point concentrates activity on the top walkway system which in this case is made possible by a recreational easement.

Access to the waters edge is provided by promontories built from the main rock edge stabilization system.
SECTOR 7
SPILLWAY

This sector covers the spillway part of the Georges Hall Bay Point (see map 14)

The proposed components are:

- the spillway system will be designed to enable a flow of water between the main lake area and Georges Hall Bay. The Department of Public Works Coastal Engineering Branch will determine the most suitable method for achieving proper tidal ventilation of the bay

- a path will be constructed across the spillway to provide access to the Georges Hall Bay Point

- rock promontories similar to the Wharf Road sector will be constructed on either side of the point

- the edges of the point will need to be stabilized with rock as described in the other sectors

- the path and picnic areas will be located to fit with existing vegetation, however supplemental planting will be required to strengthen the proposed open area and treed area
SECTOR 8
GEORGES HALL BAY POINT

This sector extends from the spillway along to the end of the point (see map 15)

The proposed components are:

- the point contains good stands of natural vegetation which will be preserved and protected by stabilizing the edge in the same way as described earlier

- a path will be constructed along the point as a continuation of the path system described in the preceding sector

- rock promontories similar to the ones in the Wharf Road and the spillway sector will be constructed on the lake side of the point
SECTOR 8
GEORGES HALL BAY POINT

- ROCK EDGE STABILIZATION
- PATH
- PROMONTORY

map 15

metres
0  25  50
appendix

REPORT 1
Soil Conservation Service of NSW

Vegetative Stabilization January 1978
Chipping Norton Lake Scheme Stage 1

REPORT 2
Central Landscape Group
Department of Public Works of NSW

Vegetation Survey January 1978
Chipping Norton Lake Scheme
REPORT 1

VEGETATIVE STABILIZATION
CHIPPING NORTON LAKE SCHEME
STAGE 1

23RD JANUARY 1978

SOIL CONSERVATION SERVICE OF NEW SOUTH WALES
INTRODUCTION

This report examines briefly the vegetative stabilization requirements of the first stage of the Chipping Norton Lake Scheme.

The area of concern is divided into two zones:

- River Bank
  (i) Flood Prone Zone
  (ii) Flood Free Zone

- Island
  (i) Tidal Zone
  (ii) Flood Prone Zone

The principal limitations to the establishment of vegetation, a list of recommended species, and special requirements for successful establishment are given for each zone.

The density and location of tree and shrub plantings have not been considered and are left to the discretion of the developing authorities.
RECOMMENDATIONS

River Bank:

(i) Flood Prone Zone

Limitations
This zone is prone to slumping when the vegetation is removed, and in places is naturally unstable. The major limiting factors are the extremely steep slopes and heavy clay soil. These two factors are especially important along the northernmost bank of the proposed lake.

Recommended Species
The recommended tree, shrub and ground cover species, with comments where appropriate, are given in Appendix 1.

Requirements
Success in establishing a protective vegetative cover in this zone cannot be expected unless excessively steep slopes are reduced to a stable configuration (on some of these slumping has recently occurred) and the toes of the slopes are adequately protected against the erosive action of both the tide and waves generated by wind or river craft.

Topsoil should be applied where the clay subsoil is exposed, especially where ground cover species are to be sown or planted. Approximately 3-5 cm of topsoil will greatly improve the chances of establishing ground cover species.

All areas sown to or sodded with grass should receive an annual dressing of a complete (N:P:K) fertiliser at 250 kg/ha rate for the first three years.

A surface mulch should be applied after all sowing operations on areas of steep slopes, and the mulch be tied to the surface with twine and pegs. The type of mulch and method of location will depend on the situation and the facilities available. If grass sod is used, mulch protection is unnecessary.

Because of the unstable nature of these steep slopes and the difficulties likely to be experienced with revegetation, it is essential that the existing vegetation be disturbed as little as possible.
(ii) Flood Free Zone

Limitations
There are few limitations to establishing vegetation in this zone, other than the quality of the soil material.

Recommended Species
The recommended tree, shrub and ground cover species are given in Appendix II.

Requirements
Topsoiling will be necessary where the clayey subsoil has been exposed. At least five centimetres of topsoil are necessary.

An initial dressing of a complete (N:P:K) fertilizer at 250 kg/ha rate should be made to all areas sown to grass. Thereafter, annual dressings of complete fertilizer at 125 kg/ha rate should be made for the following three years.

Island:

(i) Tidal Zone

Limitations
This zone is subject to tidal action, salt water and the erosive action of waves generated by wind or river craft.

Recommended Species
Depending on exposure, steep bare batters may require some form of mechanical stabilization, such as gabions, prior to planting.

(ii) Flood Prone Zone

Limitations
Artificially prepared sites may have a high salt content (up to 14 mS/cm at 25°C) if river sludge has been used. Such levels of salt will severely restrict the establishment and survival of salt sensitive plants, and may even affect the establishment and growth of salt tolerant plants.
The following is a guide to the effects of various salt concentrations in the soil:

<table>
<thead>
<tr>
<th>Ms/cm (25°C)</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 2</td>
<td>Salinity effects usually negligible</td>
</tr>
<tr>
<td>2 - 4</td>
<td>Yield of very salt sensitive plants restricted</td>
</tr>
<tr>
<td>4 - 8</td>
<td>Yield of salt sensitive plants restricted</td>
</tr>
<tr>
<td>8 - 16</td>
<td>Only salt tolerant plants yield satisfactorily</td>
</tr>
<tr>
<td>16</td>
<td>Only a few salt tolerant crops yield satisfactorily</td>
</tr>
</tbody>
</table>

Good quality topsoil, free of salt or other contaminants, of a loamy sand to sandy loam texture should be used.

---

### Recommended Species

The recommended species are given in Appendix I.

### Requirements

Topsoiling will be necessary where the soil material contains high levels of salt. The depth of topsoil required will depend on the species to be sown, e.g. 10-20 cm depth for ground cover species, 50-100 cm depth for canopy species.

Where topsoiling is not practical, salt tolerant species only should be planted.

As the salt-affected island fill is relatively coarse-textured, movement of water down through the profile will leach excess salts to lower levels. Consequently, topsoiling should be delayed until just prior to sowing thereby allowing the rainfall to leach the salt from the surface layers.

All areas sown to grass should receive an annual dressing of a complete (N:P:K) fertilizer at 250 kg/ha rate for the first three years. Areas sown to native trees and shrubs should receive an initial dressing of a slow release complete fertilizer at a rate of 250 kg/ha.
SPECIAL CONSIDERATIONS

A number of stable areas with good vegetative cover are contained within the first stage of the Lake Scheme.

Because of their stable condition, their importance as a source of seed for the colonization of disturbed areas, the difficulty in revegetating areas of steep slopes and clayey or salty soils, and the time required to achieve a mature vegetative cover, these vegetated areas should be disturbed as little as possible. Their continued existence is important as it will ensure a continuing supply of seed for the natural regeneration and colonization of disturbed areas.

Any development or landscaping should be designed around these areas.

One such important area occurs on a proposed island at the end of Epsom Road. This area contains a number of species that are not commercially available e.g. common reed (Phragmites australis) and could be an important source of seed or propagating material for sowing operations.

ACKNOWLEDGEMENT

Grateful acknowledgement is made to Mr D Benson, Royal Botanic Gardens, for his assistance in identifying the local flora.
## APPENDIX I - RECOMMENDED SPECIES

### RIVER BANK - FLOOD PRONE ZONE

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SALT TOLERANT</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dominant Species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Swamp oak (Caucaurina glauca)</td>
<td>Yes</td>
<td>This is frequently the dominant tree species between high tide and maximum flood levels and, therefore, should be the principal canopy species planted.</td>
</tr>
<tr>
<td><strong>Major Associated Species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Bangalay (Eucalyptus botryoides)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>* Coast myall (Acacia glaucescens)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minor Associated Species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backhousia myrtifolia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyscias sambucifolius</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Yellow tea-tree (Leptospermum flavescens)</td>
<td>Yes</td>
<td>For cool moist situations</td>
</tr>
<tr>
<td>* White sally (Acacia floribunda)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acacia parramattensis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hop bush (Dodonaea triqueta)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumbungi (Typha orientalis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ground Covers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clematis aristata</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Kennedia rubicunda</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Couch grass (Cynodon dactylon)</td>
<td>Yes</td>
<td>For general sowing, or sod including tidal zone. Both species are ideal for recreation areas provided they are mown regularly. Establishment by sod is normal for buffalo and sod or seed of Kikuyu can be used.</td>
</tr>
<tr>
<td>* Buffalo grass (Stenotaphrum secundatum)</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

* Species available from New South Wales Forestry Commission Tree Nurseries or commercial seed firms.

** Seed may be available from native plant nurseries.
## APPENDIX II - RECOMMENDED SPECIES

### RIVER BANK - FLOOD FREE ZONE

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rough-barked apply (Angophora floribunda)</td>
<td></td>
</tr>
<tr>
<td>Forest red gum (Eucalyptus tereticornis)</td>
<td></td>
</tr>
<tr>
<td>Broad-leafed ironbark (E. fibrosa)</td>
<td></td>
</tr>
<tr>
<td>Grey box (E. moluccana)</td>
<td></td>
</tr>
<tr>
<td>Coast myall (Acacia glaucescens)</td>
<td></td>
</tr>
<tr>
<td>White sally (A. floribunda)</td>
<td></td>
</tr>
<tr>
<td><strong>Ground Covers</strong></td>
<td></td>
</tr>
<tr>
<td>Couch grass (Cynodon dactylon)</td>
<td>Sod or seed.</td>
</tr>
<tr>
<td>Buffalo (Stenotaphrum secundatum)</td>
<td>Mowing is advisable if these species are sown in recreation areas.</td>
</tr>
<tr>
<td>Kikuyu (Pennisetum cladestinum)</td>
<td>Buffalo establishes by sod, kikuyu can be established by either sod or seed.</td>
</tr>
</tbody>
</table>

**NOTE:** All these species are available from New South Wales Forestry Commission Tree Nurseries or commercial seed firms.

## APPENDIX III - RECOMMENDED SPECIES

### ISLAND - TIDAL ZONE

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Couch grass (Cynodon dactylon)</td>
<td>Sod or seed.</td>
</tr>
<tr>
<td>* Buffalo (Stenotaphrum secundatum)</td>
<td>Mowing is advisable if this sod species is used in recreation areas.</td>
</tr>
<tr>
<td>Common reed (Phragmites australia)</td>
<td>Amphibious, providing an excellent habitat for wildlife and acting as a buffer to potentially erosive wave action.</td>
</tr>
<tr>
<td>River mangrove (Aegiceras corniculatum)</td>
<td></td>
</tr>
</tbody>
</table>

* Species available from commercial seed firms
REPORT II

VEGETATION SURVEY
CHIPPING NORTON LAKE SCHEME

9TH JANUARY 1978

CENTRAL LANDSCAPE GROUP
DEPARTMENT OF PUBLIC WORKS
OF NEW SOUTH WALES
INTRODUCTION

This report has been prepared by the Central Landscape Group, Government Architects Branch, who were commissioned as consultants by W J Kerle (Principal Engineer), per V E Zvirbulis (Project Engineer, Chipping Norton Lakes Authority) from the Coastal Engineering Branch, Civil Engineering Division.

A vegetation survey has been completed of the Northern Area, North-East Area, and the Island Area of the proposed Chipping Norton Lake (Figure 1). In this report a general description of the vegetation types is given; how these vegetation types relate to each of the above areas; and a detailed list of the plants growing in each area.

VEGETATION TYPES

A general sequence of vegetation types occurs; proceeding from the lake, inland, the sequence is:

- River Bank Vegetation - is dominated by Casuarina glauca with a ground cover of exotic grasses
- Bank Ridge Vegetation - has a mixture of trees including Casurina glauca, Eucalypts, Angophoras and Acacias with a shrub layer and a ground cover of exotic grasses
- Hinterland Vegetation - most of the natural vegetation has been removed, however, a number of original Eucalypts remain with mown grass below.

All these three vegetation types do not occur continuously but rather occur in different combinations. There are three different areas. These are:

- Northern Area
- North-East Area
- Island Area
NORTHERN AREA

The Northern Area is located on the north bank of the lake along Silverwater Crescent. There are two vegetation types present - river bank vegetation and hinterland vegetation - (Figure 2).

Plant species include:

Trees -
- Casuarina glauca (Swamp Oak)
- Eucalyptus botryoides (Bangalay)
- Eucalyptus bauerana (Blue Box)
- Acacia glaucescens (Coast Myall)
- Acacia decurrens (Green Wattle)

Shrubs
- Acacia floribunda

Ground Covers -
- Lomandra longifolia
- Phebalium squamulosum
- Cynodon dactylon (Couch)
NORTH-EAST AREA

North East Area extends east along the lake from Cutler Road to Wharf Road. The area consists of a steep river bank with the associated vegetation and Bank Ridge Vegetation (Figure 3).

Casuarina glauca is the cominant tree on the river bank with a mixing of Casuarinas and Eucalypts on the bank ridge. A number of introduced trees exist in the area which have escaped from the surrounding gardens. Exotic grasses also grow which in some patches have become the main ground cover.

Plant species include:

Trees -
- Casuarina glauca (Swamp Oak)
- Angophora subvelutina (Broad-leaved Apple)
- Acacia glaucescens (Coast Myall)
- Eucalyptus tereticornis (Forest Red Gum)
- Pittosporum undalatum (Pittosporum)

Introduced Trees -
- Ligustrum sinense (small-leafed Privet)
- Populus alba (White Poplar)
- Erythrina indica (Coral Tree)
- Cinnamomum camphora (Camphor Laurel)
- Opuntia bergeriana (Prickly Pear)

Shrubs -
- Exocarpus cupressiformis (Native Cherry)
- Phebalium squamulosum
- Melaleuca decora
- Melaleuca styphelioides (Prickly-leafed Tea Tree)

Ground Cover -
- Cynodon dactylon (Couch)
- Pennisetum clandestinum (Kikuyu Grass)
- Tradescantia albiflora
ISLAND AREA

The proposed island in the northeast corner of the lake forms the third area. The vegetation is of the River Bank type (Figure 4), and is restricted to a strip along the eastern side. The dominant tree is Casuarina glauca with a few Eucalypts of the higher ground.

CONCLUSION

The retention of the existing native vegetation will prove vital for success in the design of the overall scheme.

New plantings should supplement and reinforce existing vegetation by use of plant species indigenous to the area.

Plant species include:

Trees -
- Casuarina glauca (Swamp Oak)
- Eucalyptus botryoides (Bangalay)
- Acacia glaucescens (Coast Myall)

Shrubs -
- Acacia floribunda
- Leptospermum flavescens

Ground Covers -
- Cynodon dactylon (Couch)
- Pteridium esculentum (Bracken)