

# Leisure Manual

An approach by R.J.Macklin



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## INTRODUCTION

The value of this Manual will be measured, not by the number of times the information and ideas set out in it are used but by the number of new ideas borne from it, the extent of comment and criticism it generates, the pressure exerted from you, the users of the Manual, for extension of its contents to include information on new forms of creative recreation activities which you feel should be more readily available in our communities.

This first edition of "Leisure Manual" covers three aspects only of Leisure: Outdoor Activities, Indoor Activities and Water-based Activities. It identifies some detail which should assist designers in reducing the time spent in search for information on these activities. There is an abundance of recreation and leisure time pursuits still to be documented and I hope that users of the Manual who notice an omission will supply details which can be shared with other practitioners in the same field in a future expanded edition of the Manual.

The preparation of a Manual of this nature has been undertaken with some diffidence since there is a very real danger that the suggestions included will be repeated all over the country without a thorough analysis of the requirements of the particular situation.

The aim of the Manual is to induce Leisure Planners to innovate in facility design, and to deliberately experiment with forms of buildings and spaces designed to encourage enjoyment and fulfilment of the individual at leisure.

Increase in recreation opportunities is a social necessity. The broadening of the meaning of recreation to encompass the creative arts as well as the athletic arts, and the expansion of the understanding of the needs of leisure among those in the responsible position of creating opportunities for enjoyment of the increasing leisure time in the community, is the principal thrust of the Manual.

I hope it can ultimately contribute towards this achievement.

March 1974.

R. J. Macklin



#### ACKNOWLEDGEMENTS

Permission of the Trustees of the Foundation for Technical Advancement of Local Government Engineering in Victoria to use extracts from its publication "Local Government Engineering Overseas Study Tour 1970" is gratefully acknowledged.

Prompt advice and assistance of the Metric Conversion Board has facilitated the production of the Manual in metric units.

Much of the information contained in the Manual has been collated from many sources. The Manual is greatly enhanced by inclusion of ideas from experiences of many people. The value of the contribution of these people is acknowledged.

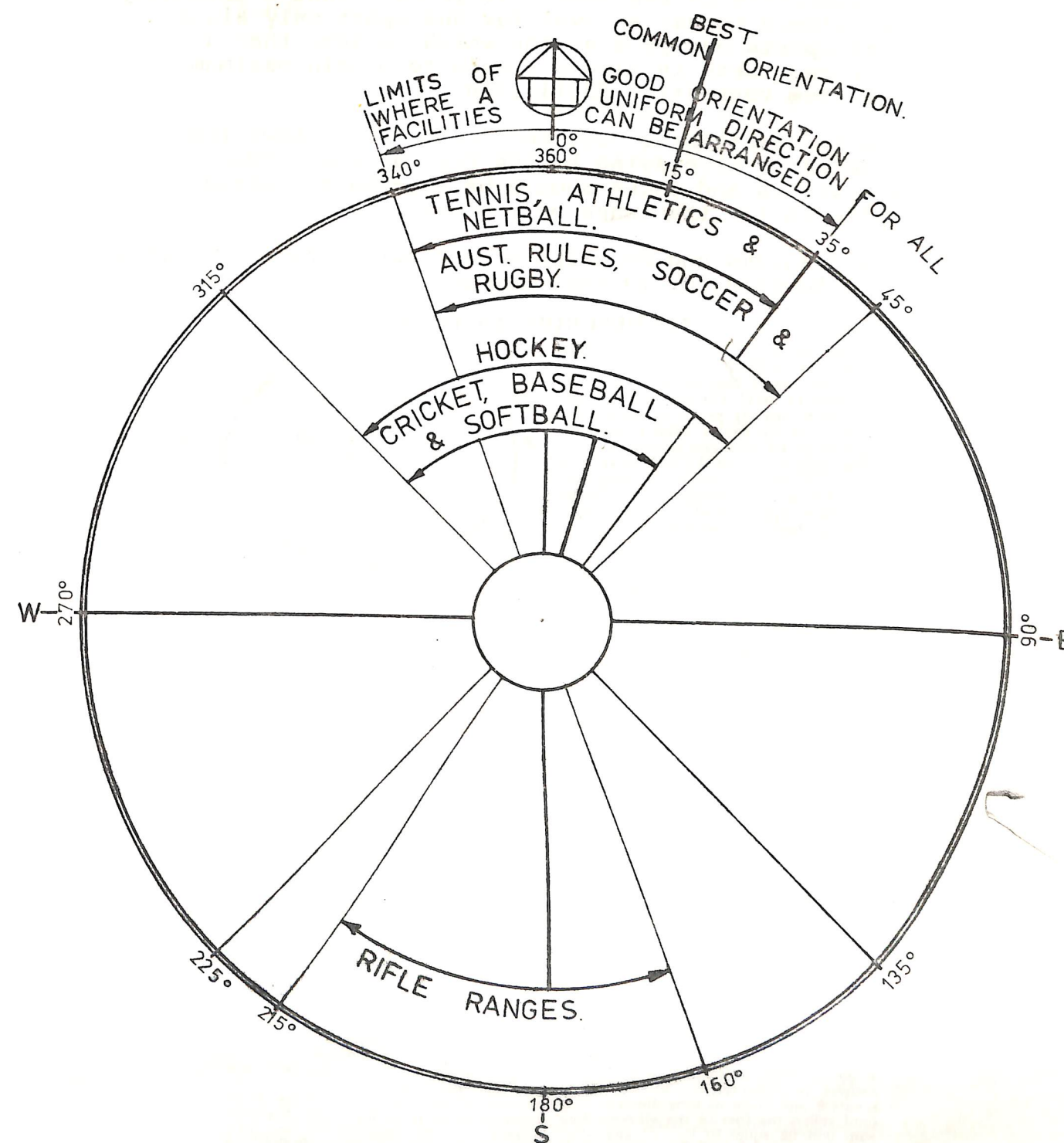


## OUTDOOR ACTIVITIES

### 1.00 SPORTS GROUNDS

#### 1.01 ORIENTATION

Orientation of playing spaces for outdoor activities is an important consideration to overcome the effect which the glare from low sun in the west has on the successful performance of the particular sport. The direction of play depends chiefly upon the time of the year during which the particular game is played and the diagram illustrates the limits for various sports as to the direction of play. Most sports activities require shared time in each direction to share the disadvantages which might exist from a particular orientation of the sports field. Rifle ranges are one exception and these should run so that the direction of shooting is towards the south.



D1. SPORTS GROUND ORIENTATION DIAGRAM.



## 1.02 SETTING OUT AN OVAL

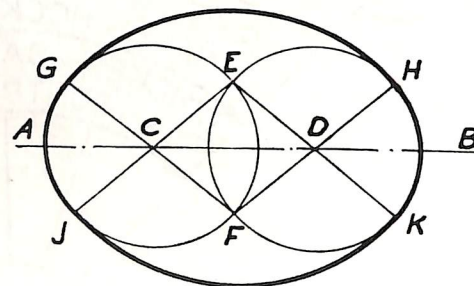
The shape of the sports oval to be selected in any design will depend on the sports which are to be accommodated on the oval. It is rare that a community can afford to use an oval for one sport only since most sports occupy a season which is less than a year and there is always a need to obtain maximum use from recreation facilities.

The information set out in Section 2.00 shows the dimensions of playing fields for various outdoor activities and these should be used as the design criteria for the shape of the oval.

The diagrams and description set out below illustrates the geometry for various shaped ovals.

### TO DESCRIBE AN OVAL

Divide the major axis AB into 3 equal parts at C & D. With C & D as centres describe circles intersecting at E & F. Produce FC to G, FD to H, EC to J, and ED to K meeting points on the circumference of the circles. With F as centre and EJ or EK as radius describe a circle. The perimeter AGHBKJ will be an oval. This gives a good well-conditioned oval, but AB need not necessarily be divided into three equal parts. CD may be greater or less than AC and DB.



If you want a longer oval divide the major axis into 4 parts.

Example. Say major axis is 549', minor axis is 440', and radius of end circles is 200'.  
 $AB = 549 = 274.5 = OB$ .

$OC = OB - CB = 274.5 - 200 = 74.5$

CBE is an equilateral triangle

$\therefore$  all its angles are  $60^\circ$

From Euclid the alternate angles at C are equal, and the 3 angles of any triangle =  $180^\circ$ .

$\therefore$  angle at D in triangle OCD =  $30^\circ$ .

Solve triangle OCD - OC sec  $60^\circ$

$74.5 \times 2 = 149'$

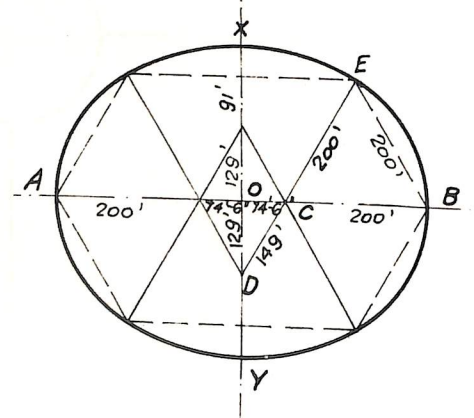
$OD = OC \tan 60^\circ =$

$74.5 \times 1.732 = 129.03'$

$\therefore$  the radius of larger circle DE =

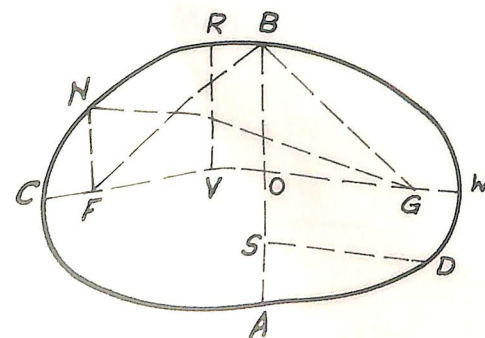
$DC + CE = 149 + 200 = 349'$

or  $DO + OX = 129.03 + 220 = 349.03'$



### THE ELLIPSE

An ellipse is a curve formed by an oblique section of either a cone or a cylinder, passing through its curved surface, without cutting the base. Its nature is such that if two lines as NF and NG in fig. be drawn from any point N in its periphery or circumference, to two certain points F and G, in its long diameter CW (and called the foci of the ellipse), their sum will be equal to that of any other two lines, as BF and BG, drawn from



any other point as B, in the circumference, to the foci F and G; also the sum of any two such lines will be equal to the long diameter CW. The line CW dividing the ellipse into two equal parts lengthwise, is called the major axis, or long diameter; and AB which divides it equally at right angles to CW, is called the minor axis or short diameter. To find the position of the foci of the ellipse, from either end, as B of the short diameter, measure off the distances BF and BG, each equal to OC, or one half the long diameter.

Any line RV or SD, drawn from the circumference, to, and at right angles to, either diameter, is called an ordinate; and the parts CV and VW, and BS and SA, of that diameter, between the ordinate and the circumference, are called abscissae.

To find the length of any ordinate, RV or SD, drawn to either diameter CW or BA, knowing the abscissae, CV or SA, and the two diameters CW and BA:  
 $CW^2 : BA^2 :: CV \times VW : RV^2$   
 $BA^2 : CW^2 :: BS \times SA : SD^2$

It will thus be clear that the oval and the ellipse are different geometrical constructions.

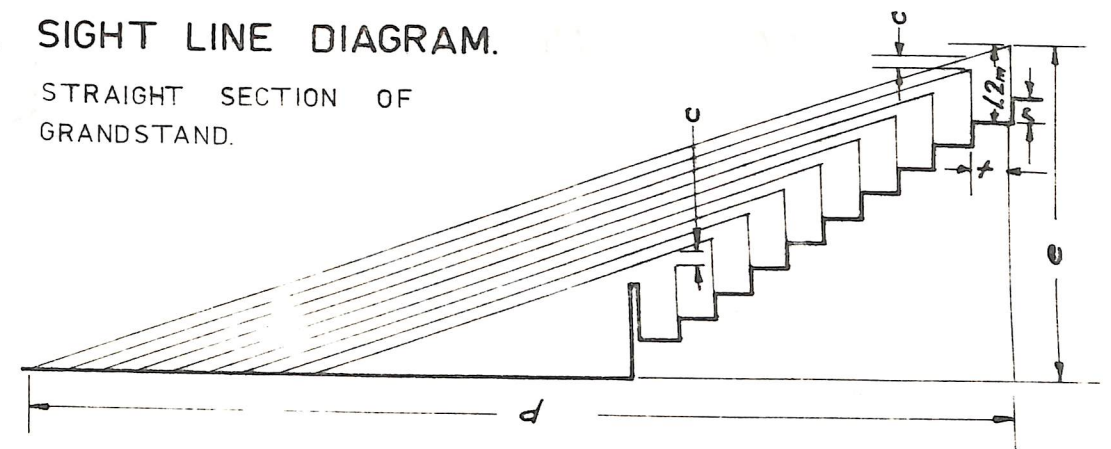
## 1.03 GRANDSTANDS

Grandstands provide a very important adjunct to sports grounds and can be elaborate reinforced concrete structures which are generally related to enclosed sports grounds or can be of a simple type even portable, constructed from steel tubing and timber platts.

For the development of any grandstand project, it is essential that all seats command a satisfactory view of the playing field and to ensure this is so, it is desirable to construct a sight line diagram such as illustrated below.

### D2. SIGHT LINE DIAGRAM.

STRAIGHT SECTION OF GRANDSTAND.



The diagram shows a sight line for a straight section of grandstand with variable focal points. The diagram becomes much more complex where the grandstand is curved around the oval.

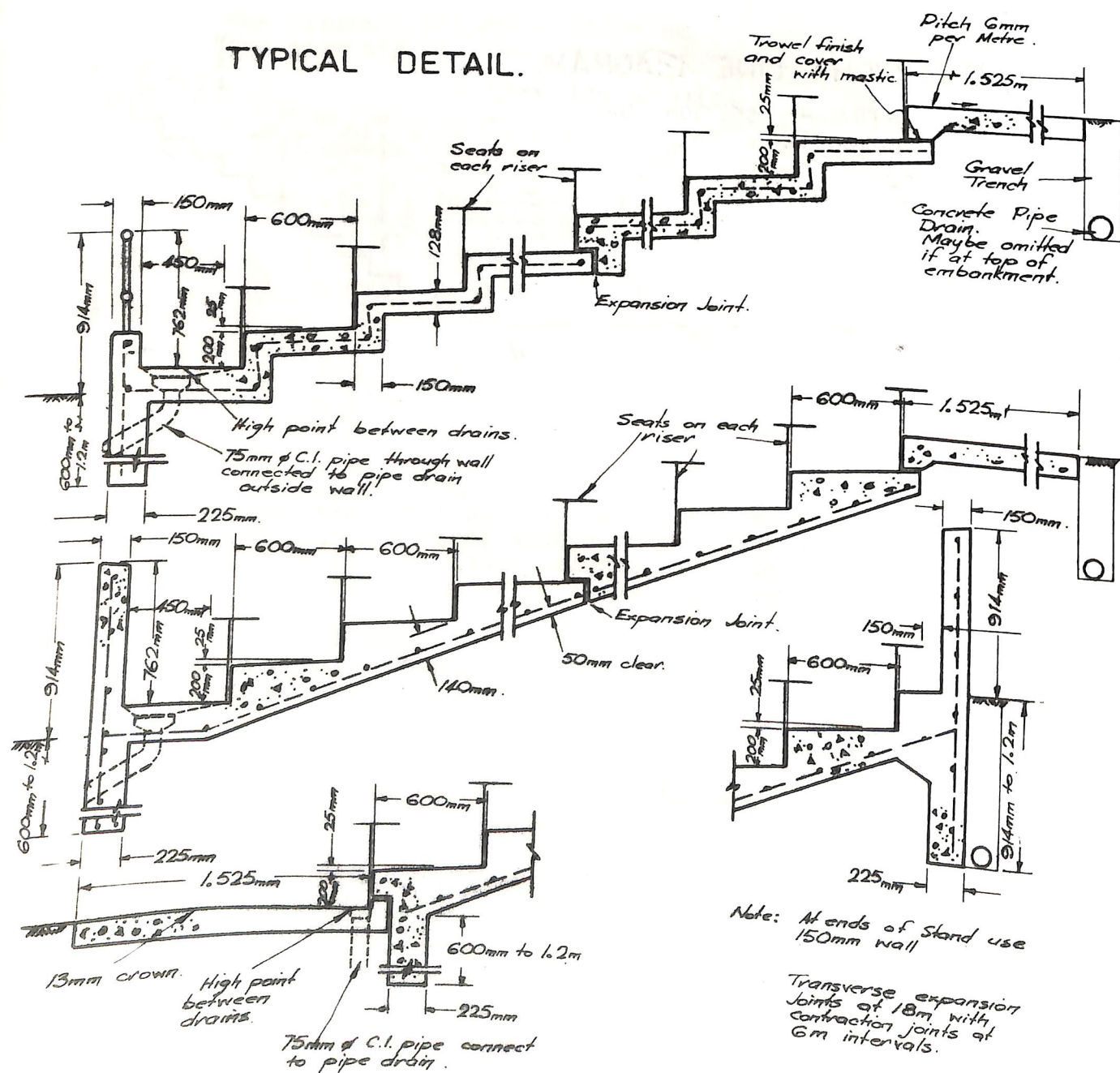
Since with a straight section the top seat has the poorest view, it is necessary to check only this seat in order to determine that all seats are satisfactory. The relationship between distance from the seat to its focal point 'd', height of the eye above the focal point 'e', width of tread 't', height of riser 'r', and clearance 'c', is represented by the simple formula  $\frac{d}{e} = \frac{t}{r} - c$ . The desirable value for 'c' is 150 mm and the minimum value of 'c' is 75 mm.

Construction of a grandstand on an embankment is a simple means of providing this facility at sports grounds and may be developed either by in-situ reinforced concrete or precast concrete platts supported on in-situ stringer beams.



### D3. INSITU REINFORCED CONCRETE GRANDSTAND.

#### TYPICAL DETAIL.

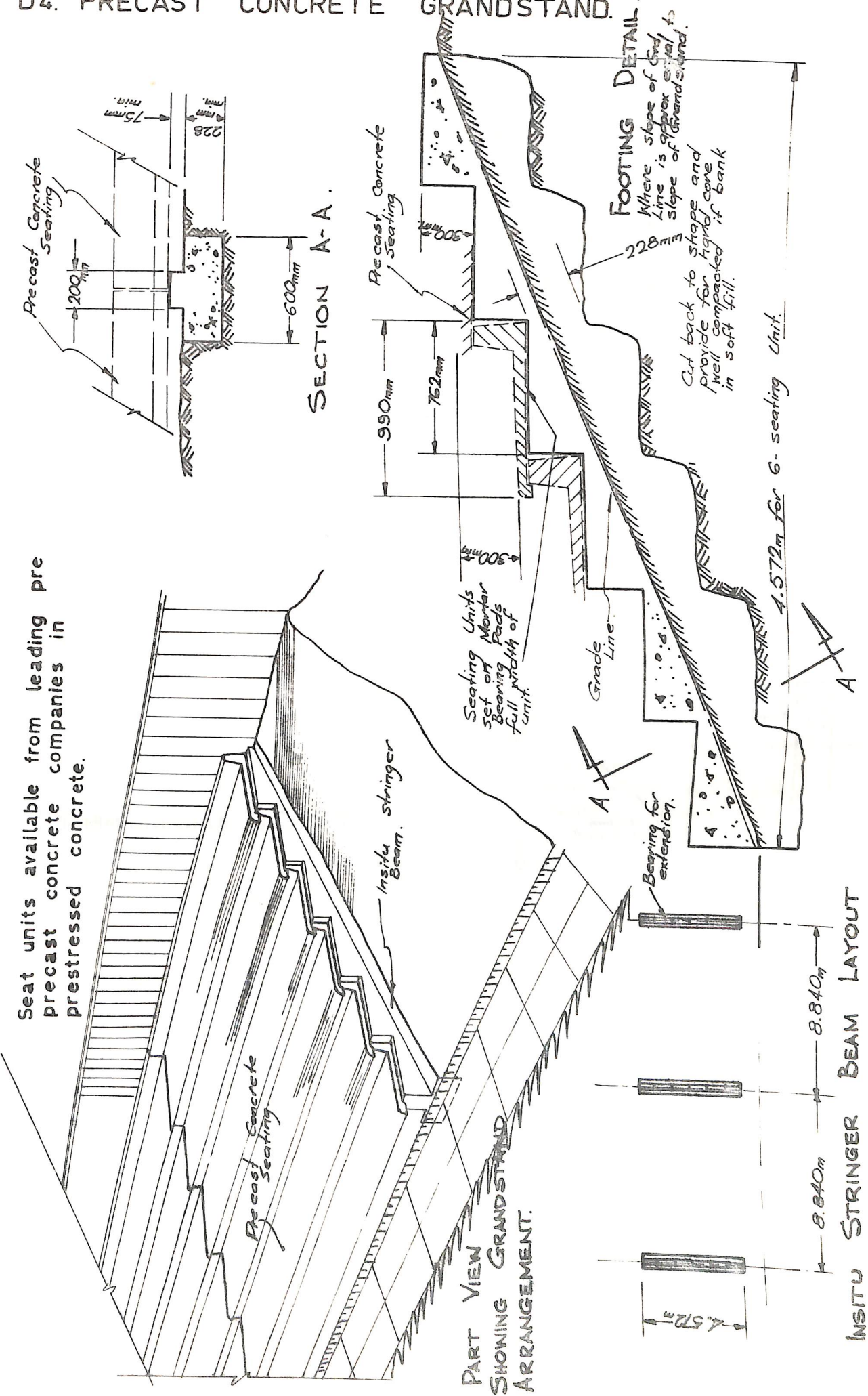


Note: At ends of Stand use 150mm wall

Transverse expansion joints at 18m with contraction joints at 6m intervals.

### D4. PRECAST CONCRETE GRANDSTAND.

Seat units available from leading precast concrete companies in prestressed concrete.



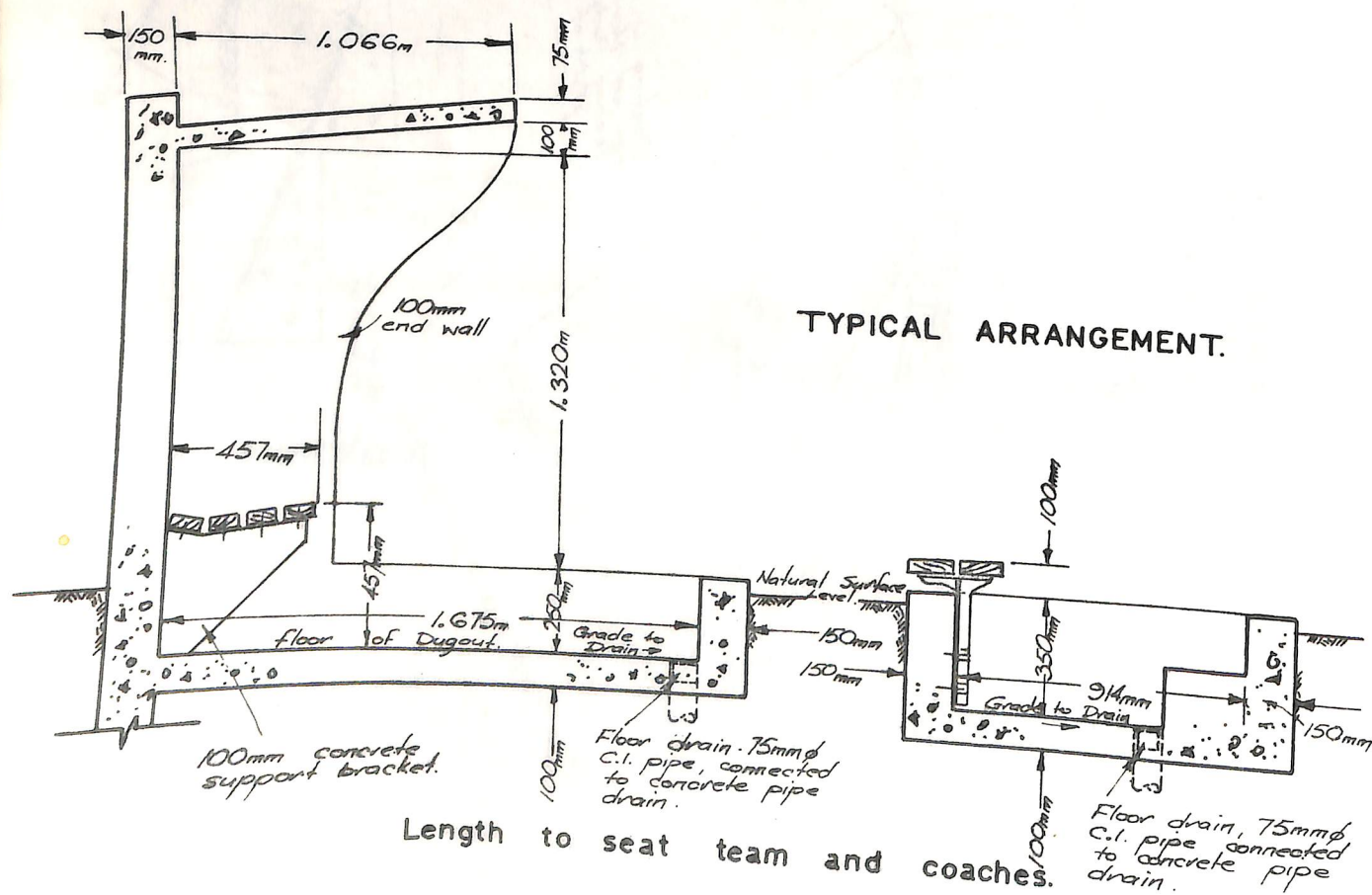


## 1.04 DUG-OUTS

A dug-out is a simple means of providing seating accommodation for players during the game adjacent to the field of play. It is a more satisfactory alternative to the portable bench placed against the fence or the front of the grandstand.

Placing the floor of the dug-out below the ground level reduces the interference with the spectators views. A roof gives additional desirable protection to the players. To give the players a good view of the game the elevation of the floor should be as high as possible without interfering with the spectators view. The dug-out should be long enough to provide seats for the whole squad.

Two suggested cross sections for suitable dug-outs are shown in the sketches below.

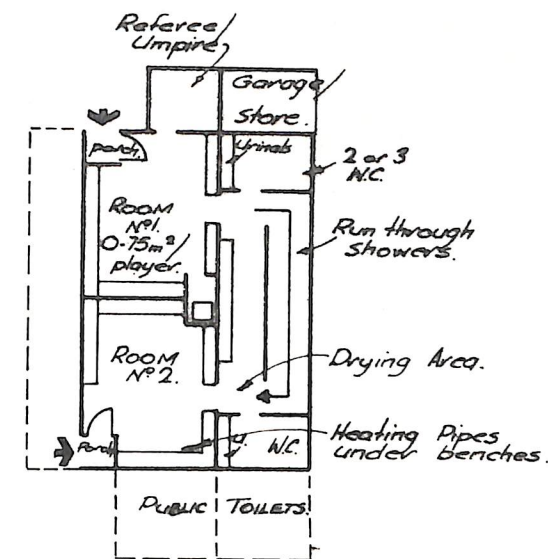


D 5. PLAYERS DUGOUT.

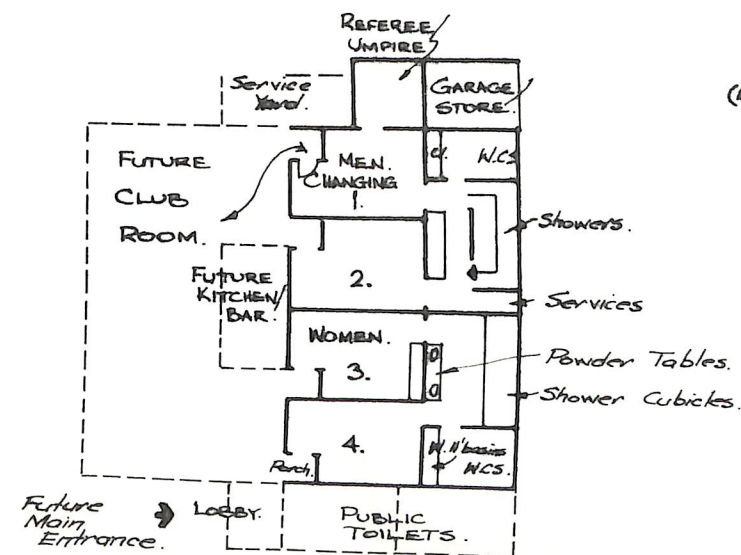
## 1.05 PAVILIONS

Many arrangements of the internal components in a pavilion are possible. The extent of the building is determined by the use which the building will serve and the sketches illustrate some of the alternatives. Much detailed information is available from "Sports Pavilions" published by the National Playing Fields Association - London.

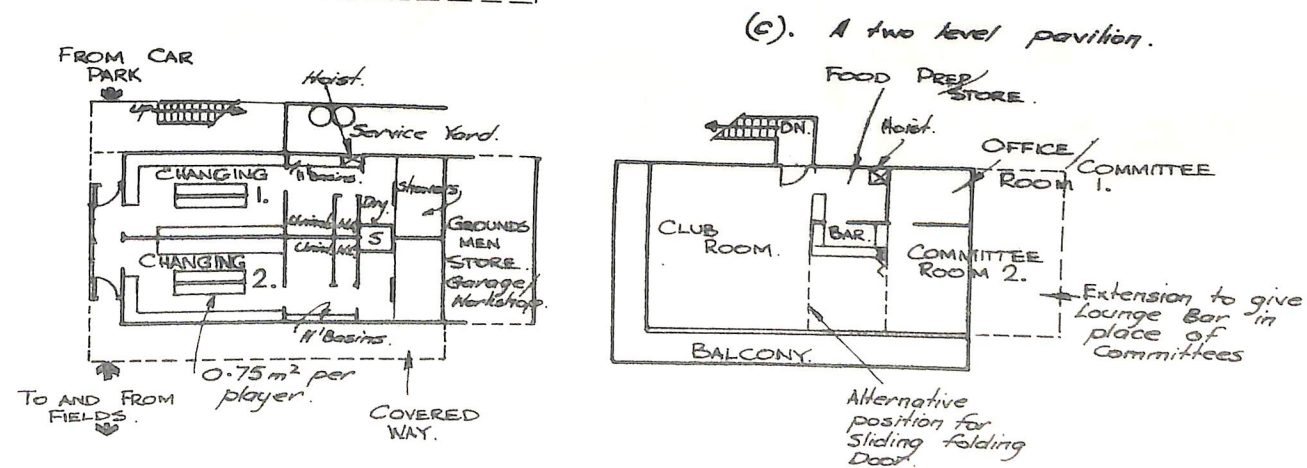
D6. PAVILIONS.— Some alternative arrangements.



(a). Simple arrangement for changerooms where occupation and use allows combined use of shower / toilet facilities.  
Includes ground keepers store.



(b). Separate team or men and women  
changing rooms.  
Suitable stage construction.  
Extensions to provide Club/Social  
Rooms.



(c). A two level pavilion.



## 2.00 PLAYING AREA REQUIREMENTS FOR SPORTS

The space requirements for various outdoor sports are shown diagrammatically in the following sketches. For the sake of uniformity metric dimensions have been used throughout. Not all sports have yet converted their rules and their playing field sizes formally to metric and in these cases, a soft conversion has been made in this Manual of the Imperial units.

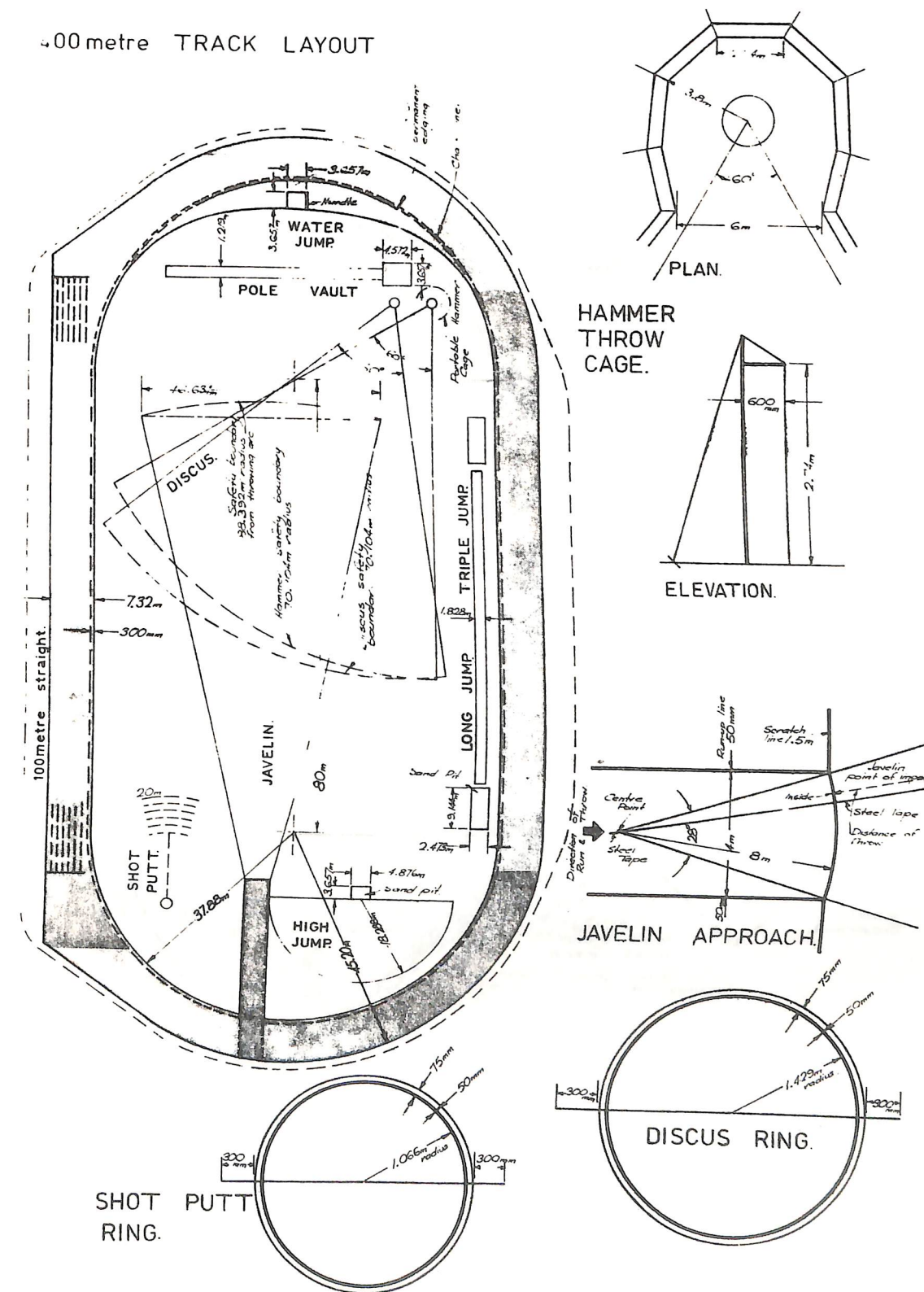
Further detailed information can be obtained from the organising body for the particular sport in each State or from the Australian organisation where this exists.

Some sports are played indoor as well as outdoor, e.g., netball, basketball and volleyball. For details of the space requirements for these, see the particular activity under "Indoor Activities" in this Manual.

## 2.01 ATHLETICS

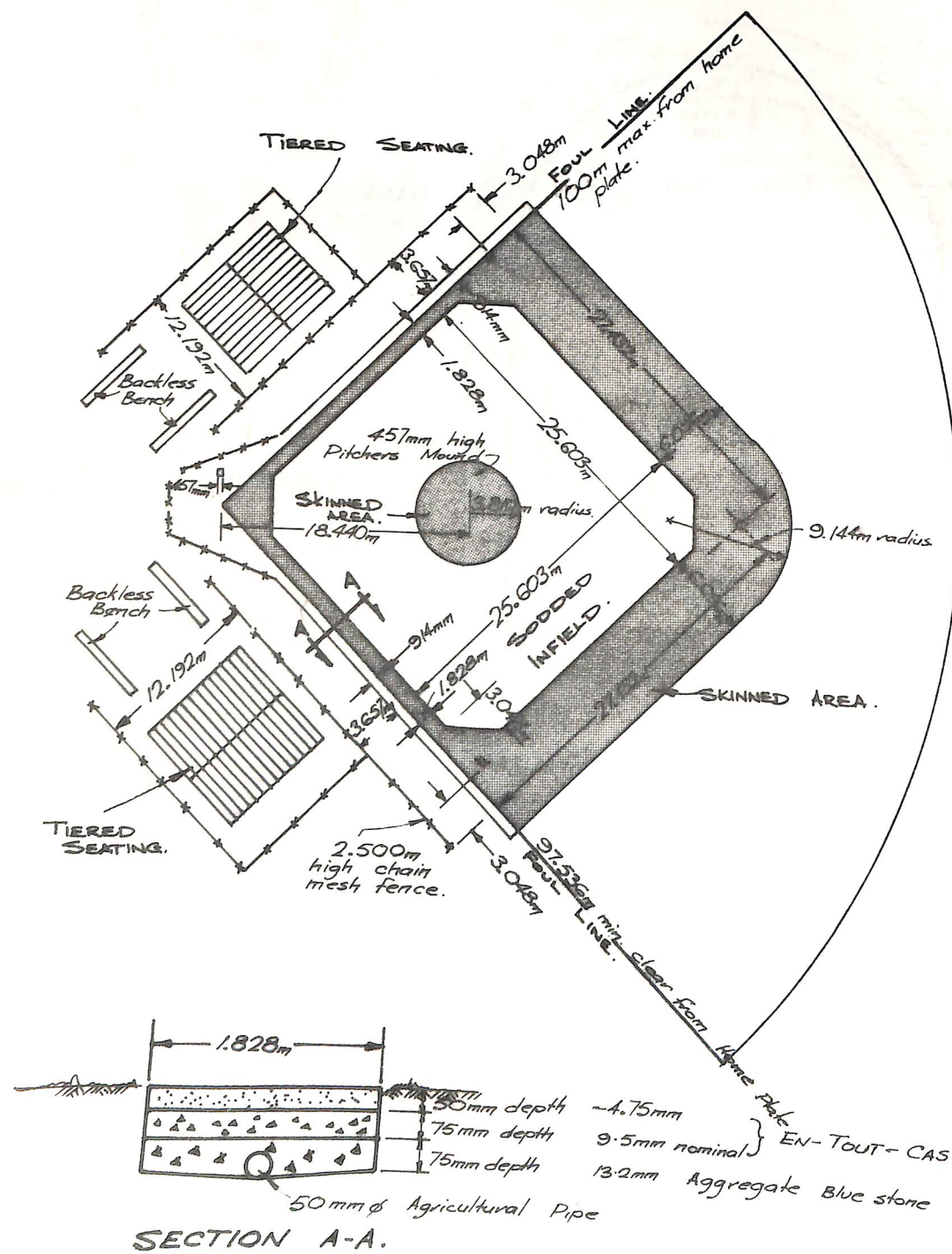
### D7 ATHLETICS.

#### 400 metre TRACK LAYOUT



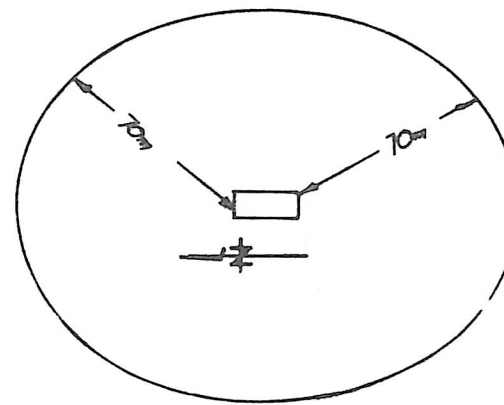


## 2.02 BASEBALL



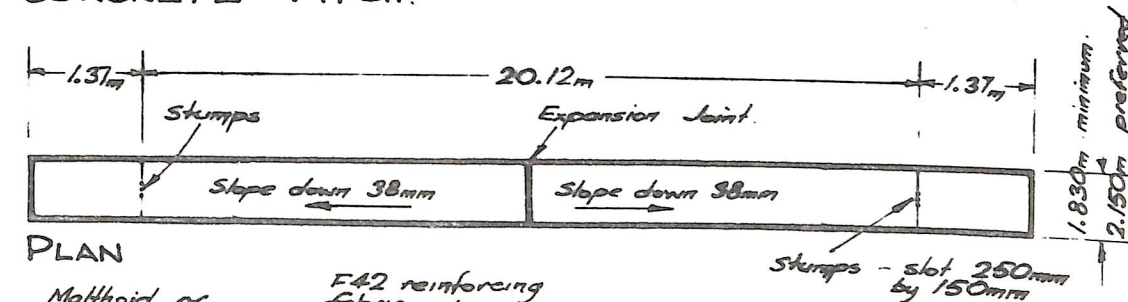
D8. Dimensions of Diamond.

## 2.03 CRICKET

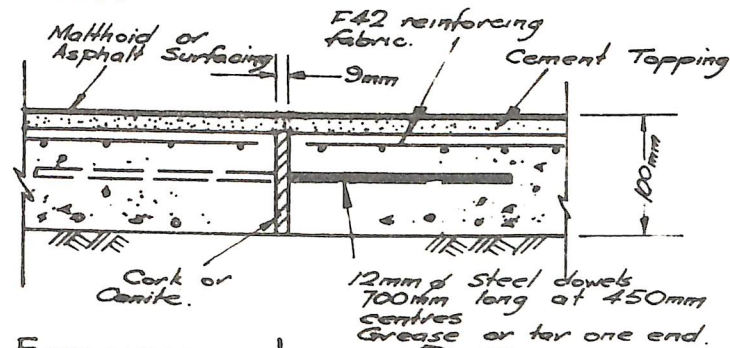


Preferred Cricket Oval 70metres  
to all Boundaries  
Turf Wicket Area at least 24m x  
8m x 150mm deep soil fall from  
centre to edges - 25mm

## CONCRETE PITCH.

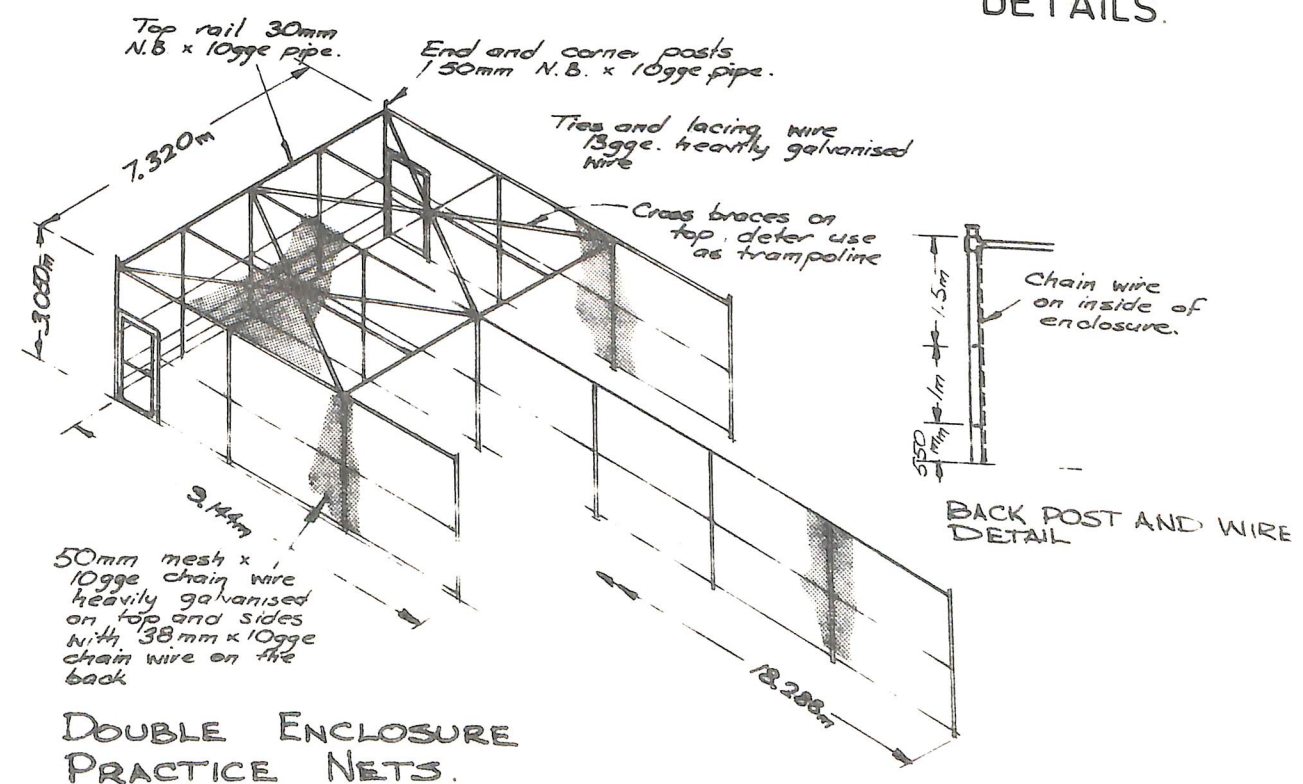


## PLAN



### EXPANSION JOINT <sup>Grease or tar</sup> DETAIL.

D 9. CRICKET PITCH  
DETAILS.



# DOUBLE ENCLOSURE PRACTICE NETS.



S P E C I F I C A T I O N for  
suitable asphalt surface  
for concrete pitch.

CONTENTS

The Mastic itself consists of:

1½ parts by volume L.T.I. bitumen emulsion. (Laycold)  
1 part by volume cement  
3 to 5 parts volume non-plastic fine sand (preferably  
all passing No. 7 B.S. Sieve and not more than 2%  
passing No. 200 B.S. Sieve).

The material is mixed in a concrete mixer with  
water (soft) to a creamy consistency and laid with a hand  
screeder on 37 mm screeding on strips along the pitch or  
hand trowelled (18" trowel if available) 12 mm screeding  
strips across the pitch. The order in which the additions  
are made to mixer should be 1. sand, 2. cement, 3. water  
(½ quantity finally required), 4. L.T.I., 5. water.

The bituminous mastic is finished either in a  
manner similar to a cement mortar, i.e. when drying has  
taken place, the surface is hand trowelled before shrinkage  
cracks develop, or, preferably, rolled (approximately  
equivalent to 1 ton weight tandem roller) as soon as  
practicable.

The wicket should be prepared so that this  
mixture will not be more than 10 mm thick.

When ready to tip from mixer, it should be  
creamy soft mixture, something like ice-cream.

As each barrow is tipped or shovelled onto the  
concrete wicket, the mixture should be plastered to the  
concrete with a steel trowel - up and down - backwards and  
forwards. This provides suction and enables mixture to bind  
onto concrete.

Then screed off level the same as concrete with  
a steel bar 50 mm x 12 mm - 2 m long.

This is done to each barrow load as you move down  
the pitch.

The person plastering and levelling should have  
rubber boots and not leave the pitch until the job is  
completed, otherwise his boots are covered in the mixture  
and he carries dirt and grass and stones, etc, onto the  
clean concrete.

BEFORE MIXING OPERATIONS begin, the concrete  
pitch should be thoroughly clean and then prime coat with  
L.T.I. 48 litres to 16 litres of water, mixed well and  
applied with a hard broom.

Allow to dry sticky.

AFTER the pitch has been wood and steel floated  
and the surface is firm, you apply two (2) coats of  
weatherproof (LAYCOLD WALK TOP) spread evenly with a wide  
(good condition) hair broom.

WHEN dry, cover with hessian and keep wet for  
several days.

At the end of each season, apply one coat  
of Laycold Walktop to seal surface against weather.

THE WEATHER MUST BE FINE AND COOL



## 2.04 CYCLING



2.05 EQUESTRIAN

Equestrian activities of all types are growing in popularity and should not be forgotten in catering for recreation in the community. These activities include:

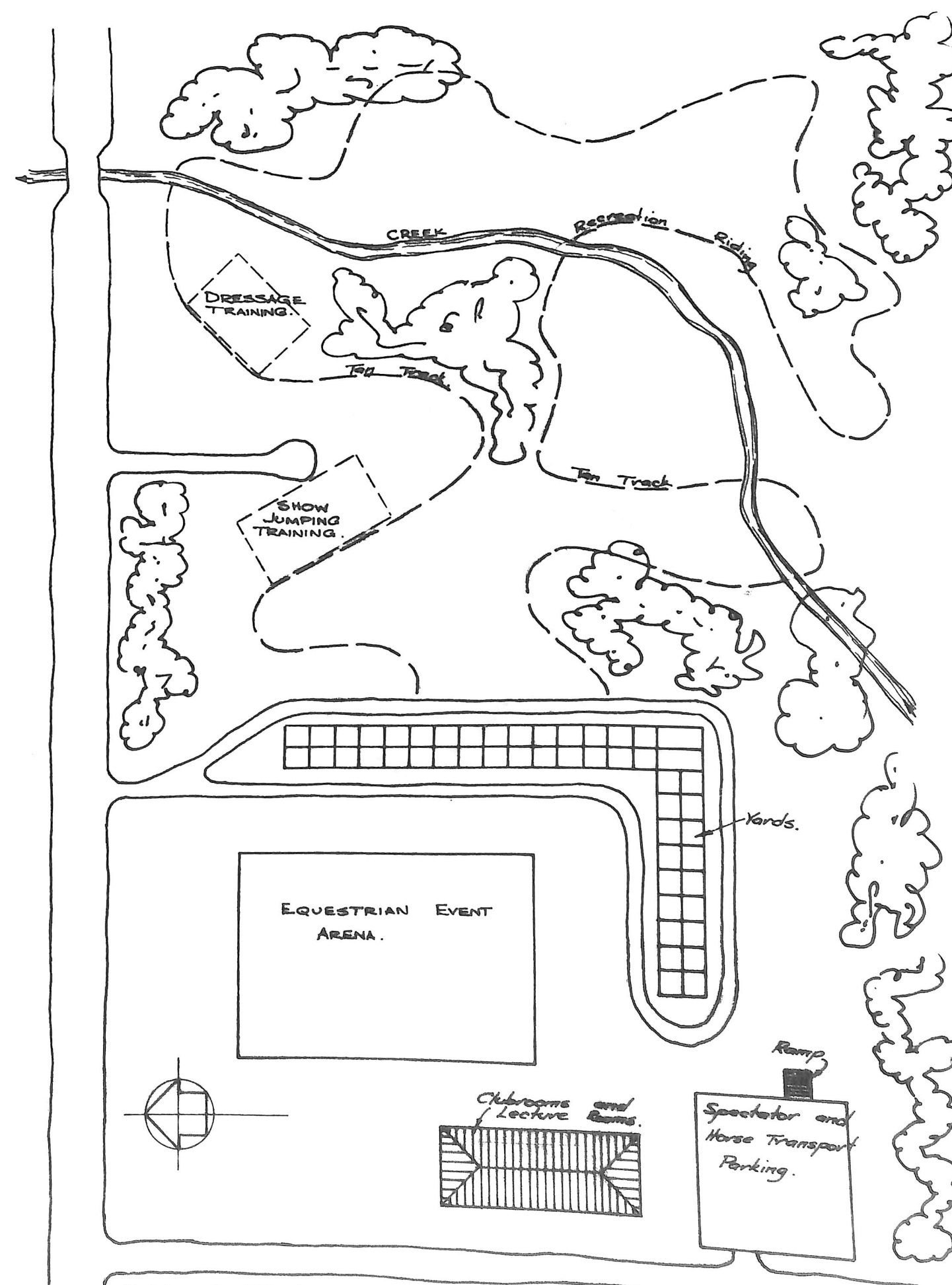
- (i) Pony Club
- (ii) Polo Crosse or Polo
- (iii) Campdrafting
- (iv) Showjumping Contests
- (v) Dressage Contests
- (vi) Training areas for Dressage and Showjumping enthusiasts
- (vii) Informal recreational riding.

Facilities desirable to cater for these activities include:

1. For Pony Club, Dressage and Polo, Campdrafting and the staging of Dressage and Showjumping contests, a common arena about 110m x 75m with a surround of 40m for spectators.  
  
It is desirable that this arena be specifically for horse events as horses hoofs are very severe on playing surfaces.
2. Informal recreational riding is best served by a tan or sand surfaced track laid out on a random or non geographic pattern through out parkland and desirably should be undulating and have minor features such as small streams and fallen tree trunks to cross. A total track length of about 3000 metres is desirable.
3. Small areas for training for dressage and show-jumping are needed, about 45m x 25m each being satisfactory. These might well be beside the tan track, in a rustic atmosphere. The surface of each should be sandy. A small store shed about 6m x 3m in which to store showjumping equipment would be valuable near the showjumping area. It could be in charge of a local showjumping club.
4. Parking facilities for motor trucks and horse trailers, with an unloading ramp for trucks. Horse transport parking would need to be about 0.5 hectare. Spectator parking should also be considered if not available nearby.
5. A lecture room and clubroom 15m x 8m are needed but can be shared with other users.
6. Toilets and showers could be shared with other sections of a complex.



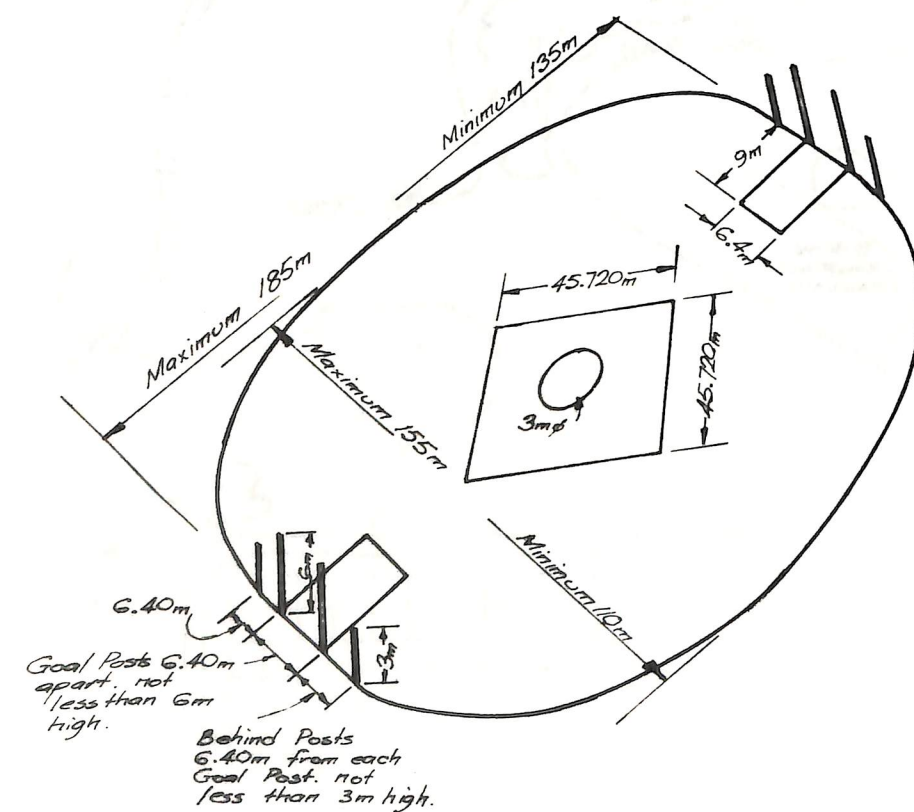
7. Facilities for keeping horses. It is unhygienic to have horses kept on suburban building blocks. While there are usually facilities for keeping horses on the outskirts of most cities, it is desirable to make provision for suburban residents, particularly pony clubs, to keep horses at the centre. Facilities required for each horse in a moderate climate would need to be only a fenced yard about 10m x 10m minimum, with either ample shade and shelter, trees or alternatively a small shelter shed 3m x 2m with one open side away from the prevalent weather in each yard. Water should be laid onto each yard. A rough guide for the scale of provision would be 2 yards for each 1000 population but this will vary with the community.



D 11 A Typical Arrangement for Equestrian Activities.

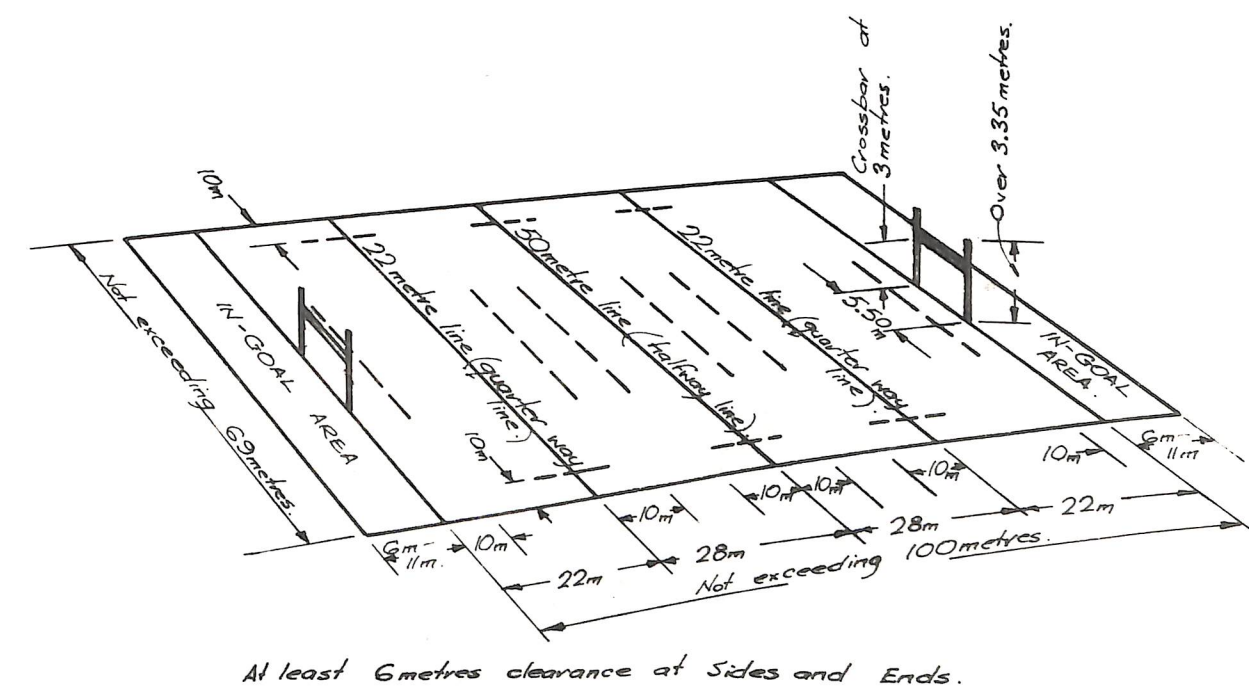


## 2.06 AUSTRALIAN RULES FOOTBALL



D 12. Dimension of Playing Area.

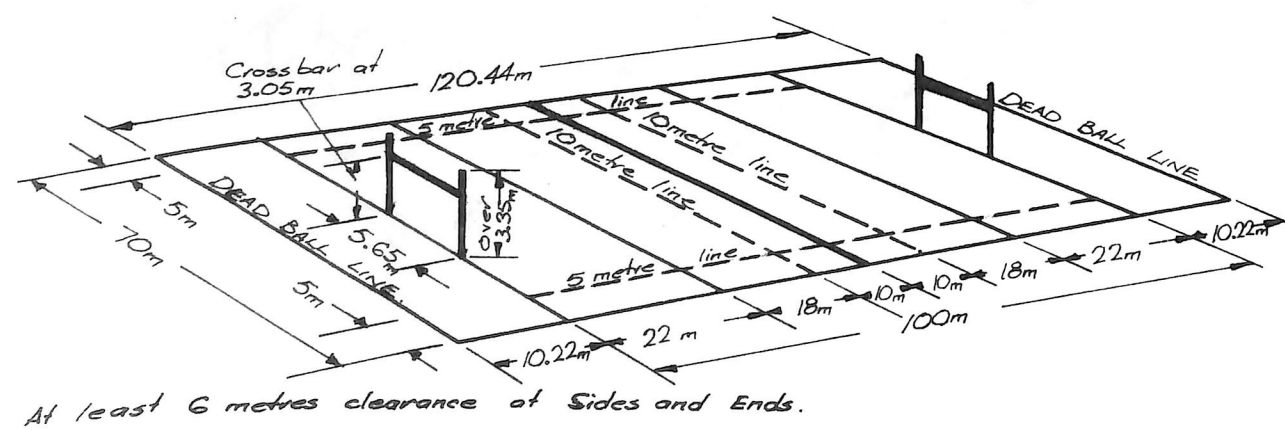
## 2.07 RUGBY LEAGUE



D 13. Dimensions of Rugby League Field.

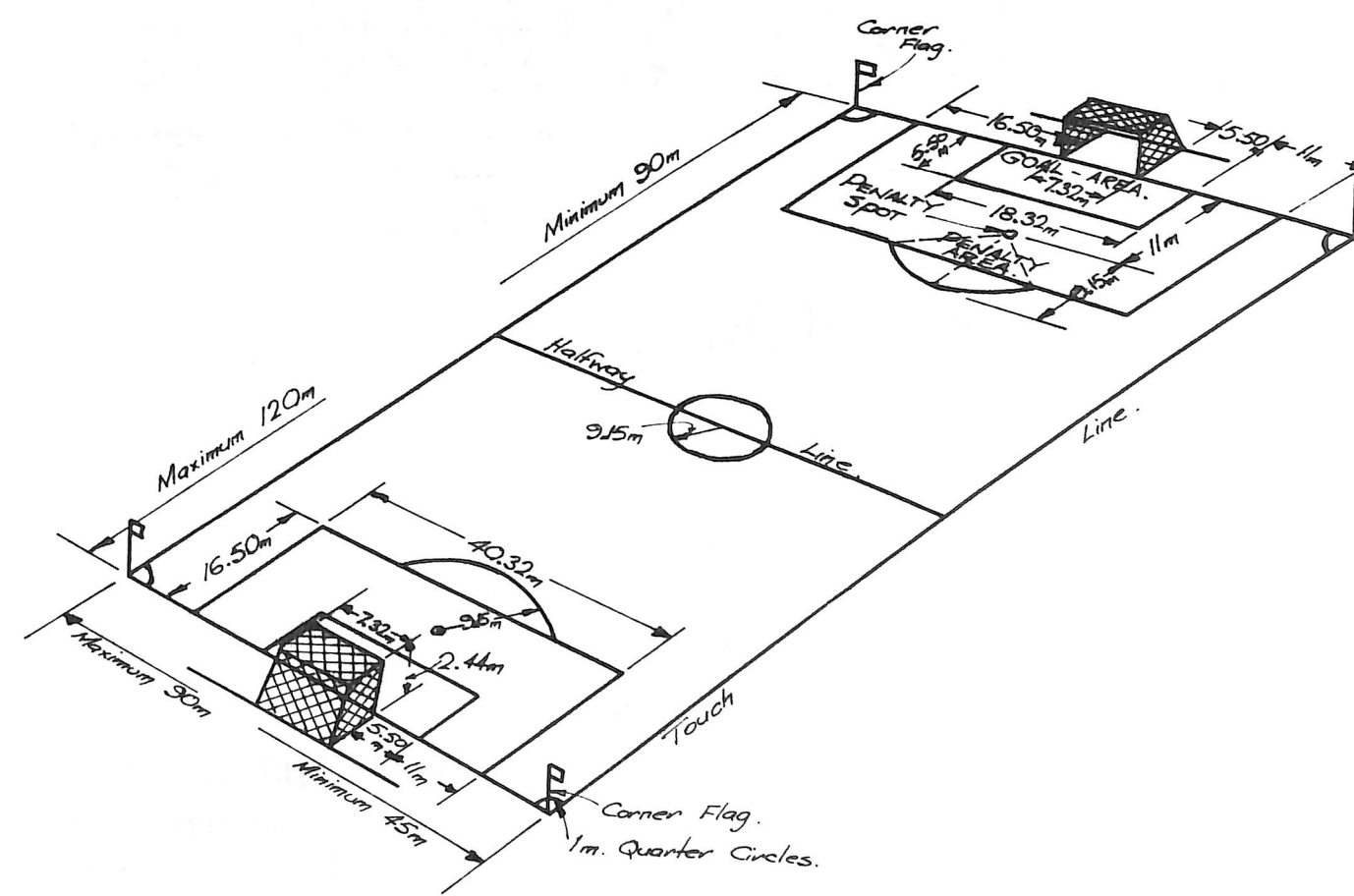


## 2.08 RUGBY UNION



D 14. Dimension of Rugby Union Field.

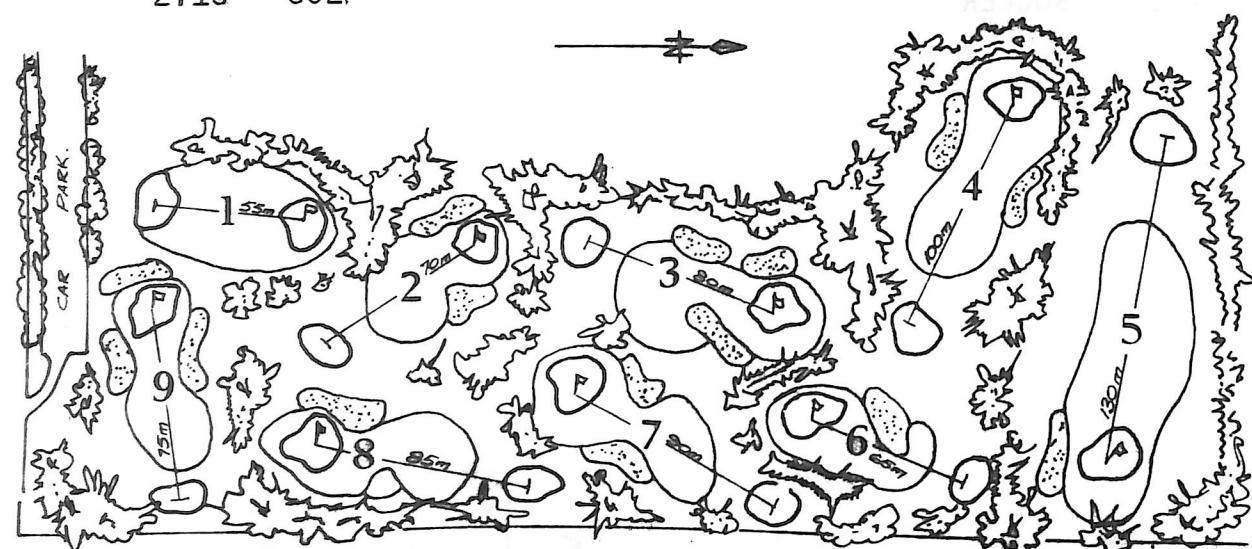
2.09 SOCCER



D 15. Dimension of Soccer Pitch.

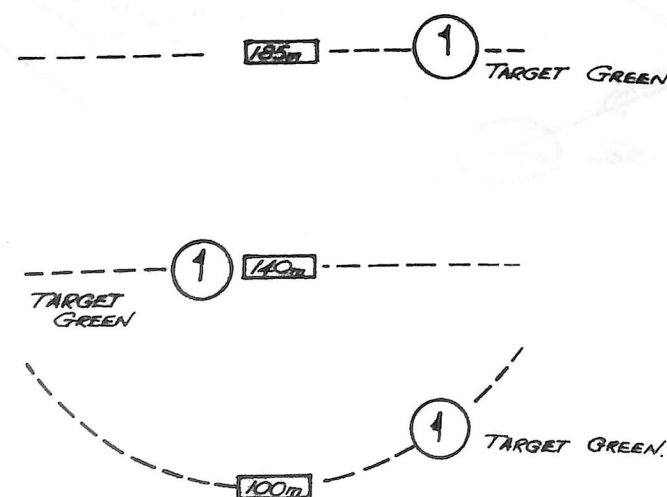


## 2.10 GOLF

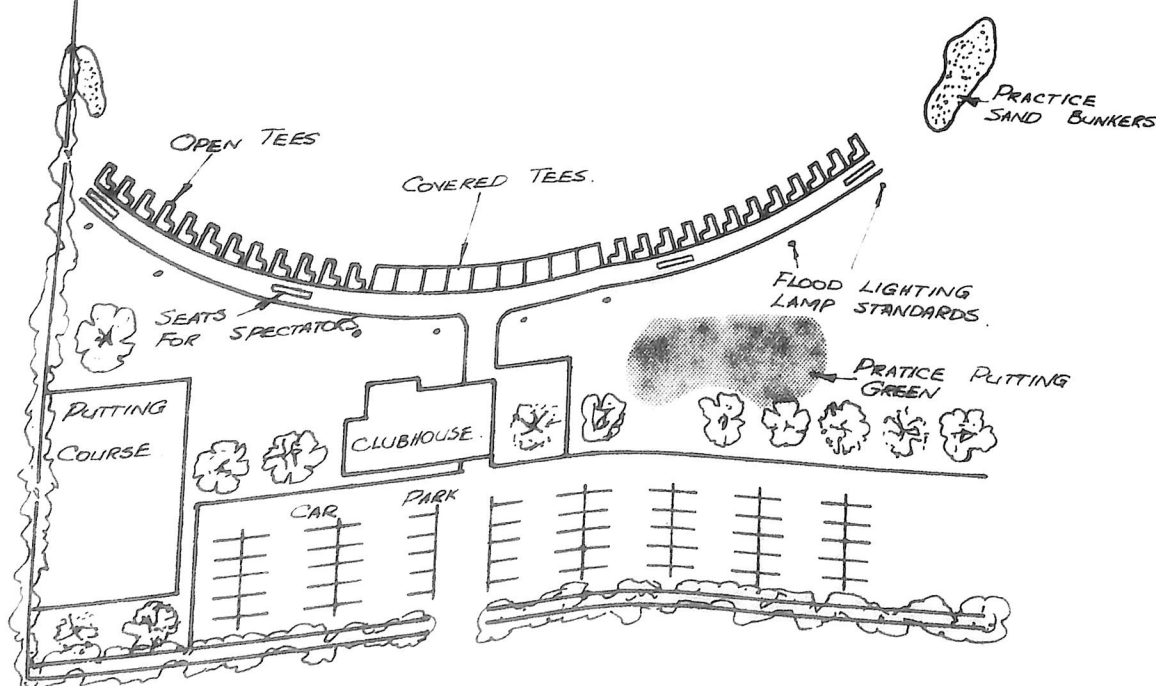


Suitable for 6ha.

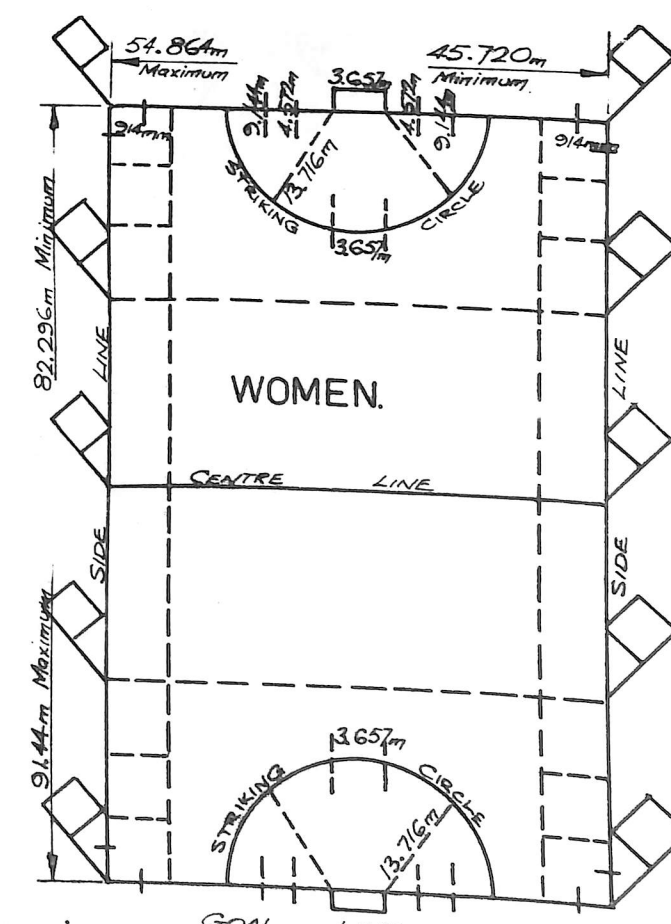
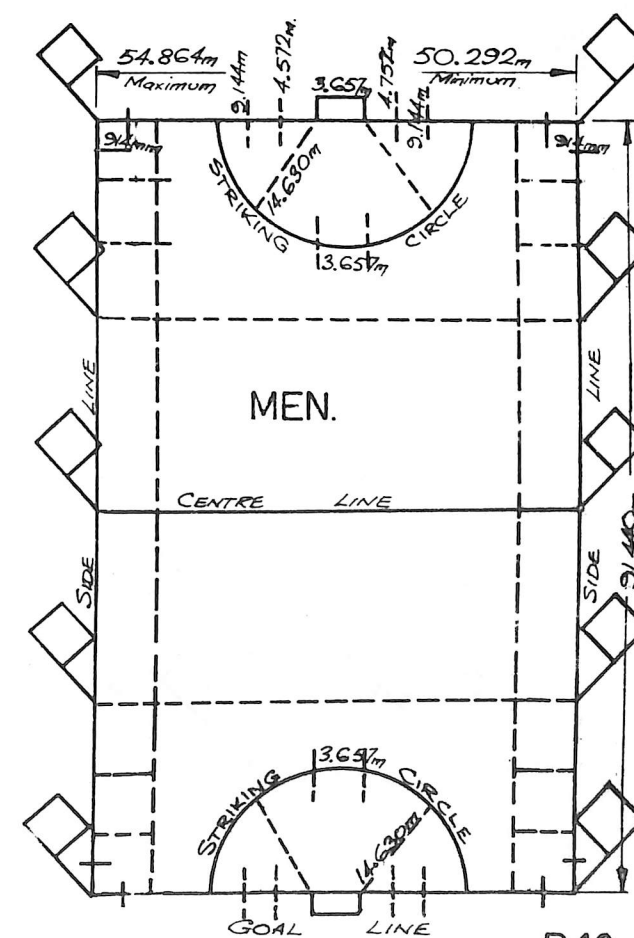
D 16. A possible arrangement for 9 Hole Par 3 Course.



D 17. Typical Arrangement of Driving Range.



## 2.11 HOCKEY



D 18. Dimensions of Hockey Fields.



## 2.12 SOFTBALL

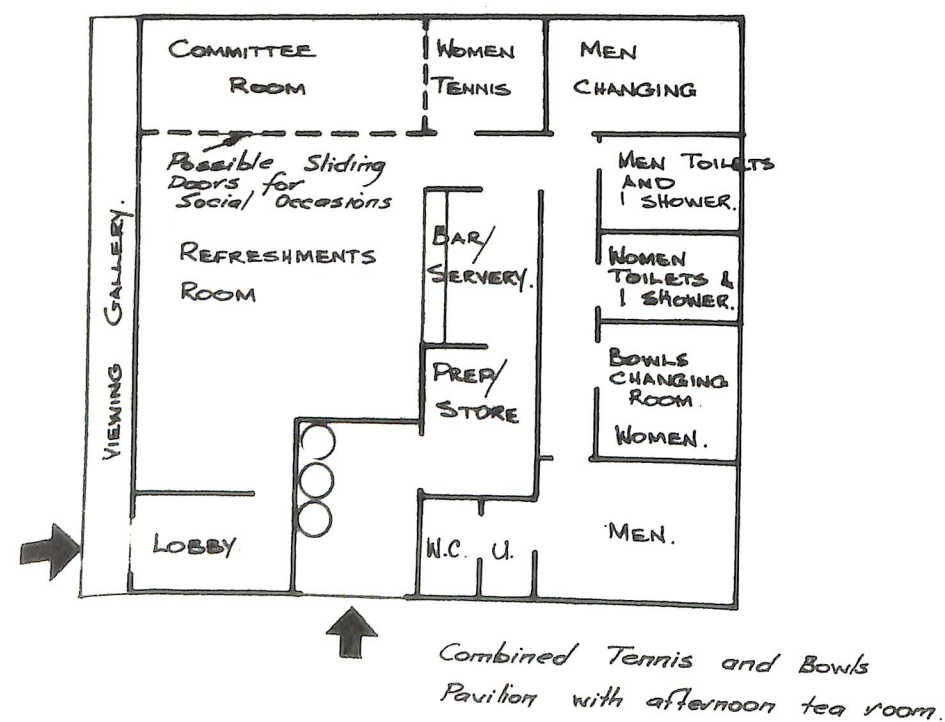
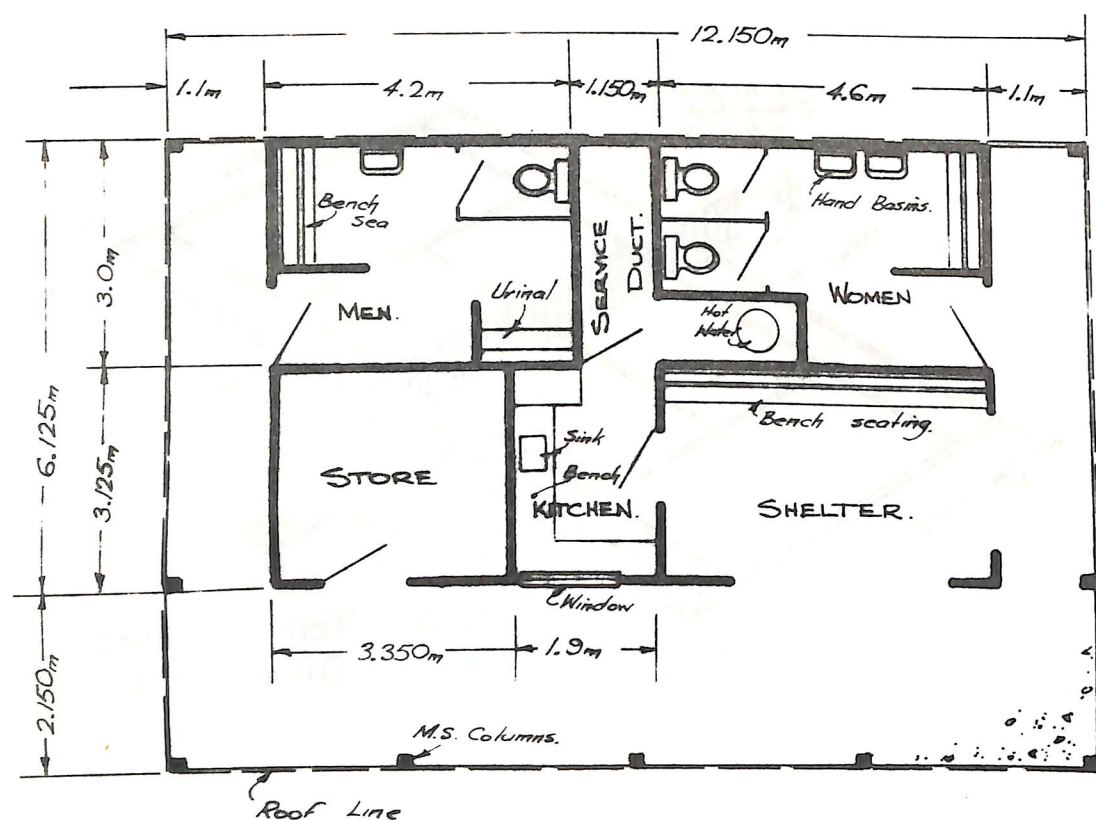


## 2.13 TENNIS



D 21. Arrangement of Tennis Courts in batteries.





## CAMPING AND CARAVANNING

3.00 CARAVAN PARKS

The form and layout of a caravan park should relate to the topography of the site, the purpose for which the park has been established and the type of natural recreation resource being developed

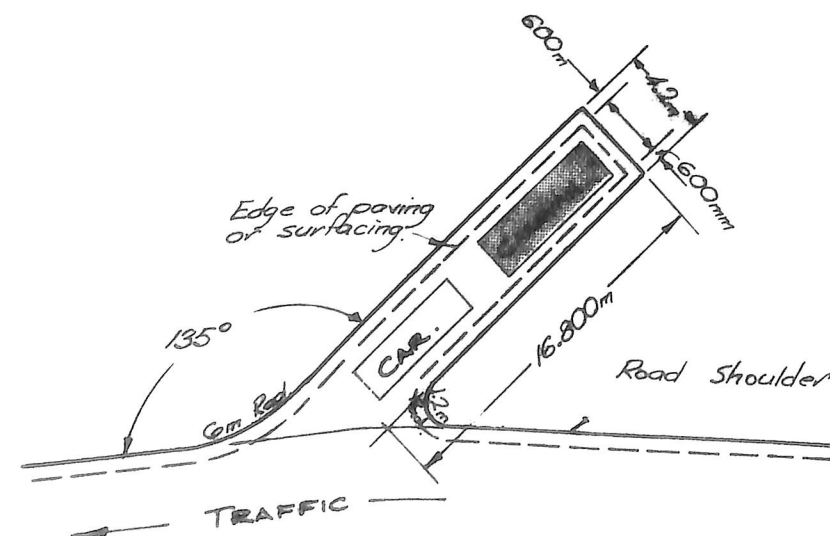
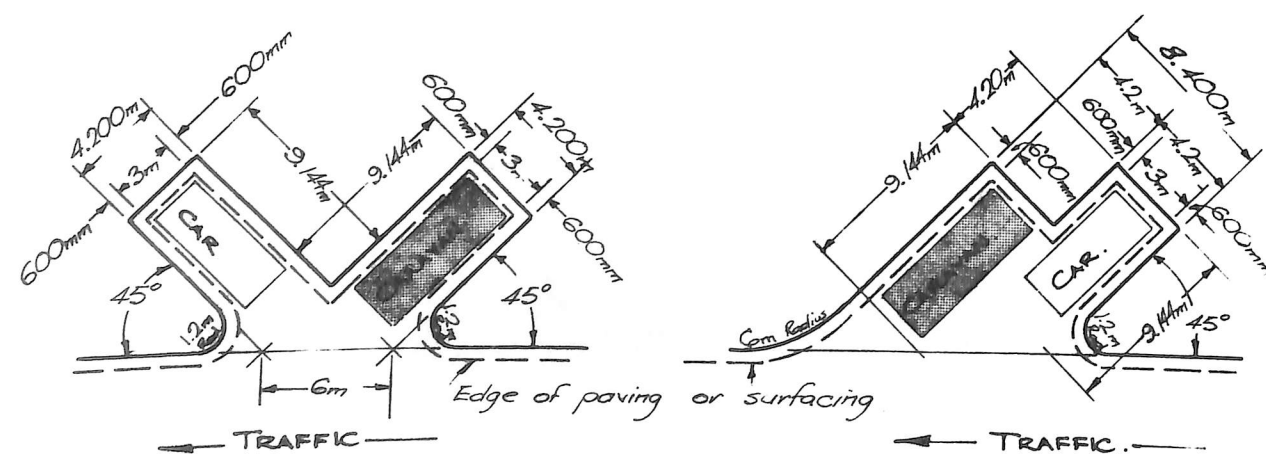
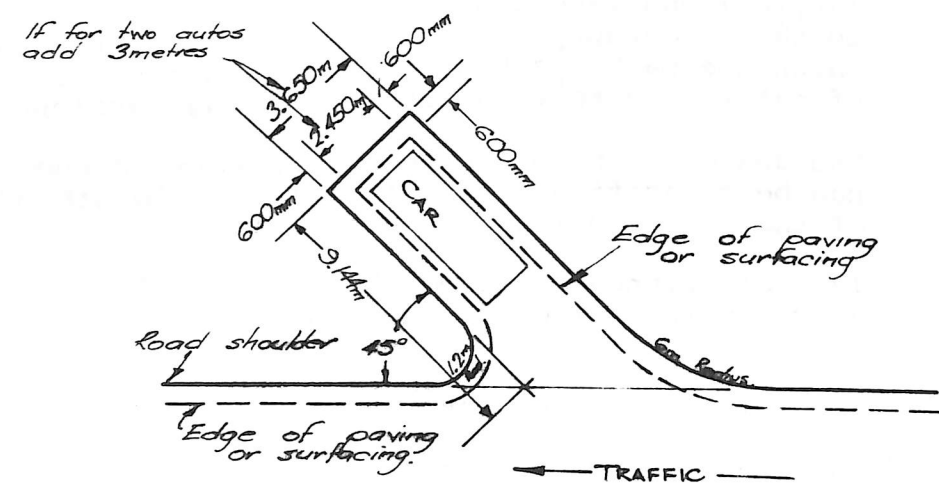
The spaces to be occupied by caravans in the park can be classified by the anticipated length of stay of the people using the park facilities.

Typical arrangements for these types of parks are shown in the following sketches.

### 3.01 SHORT STAY CARAVAN PARK LAYOUT

Where an area of the park is set aside for travellers who intend staying overnight only, drive-through parking should be provided with one-way streets and adequate space to preclude the need to disconnect the car from the caravan.

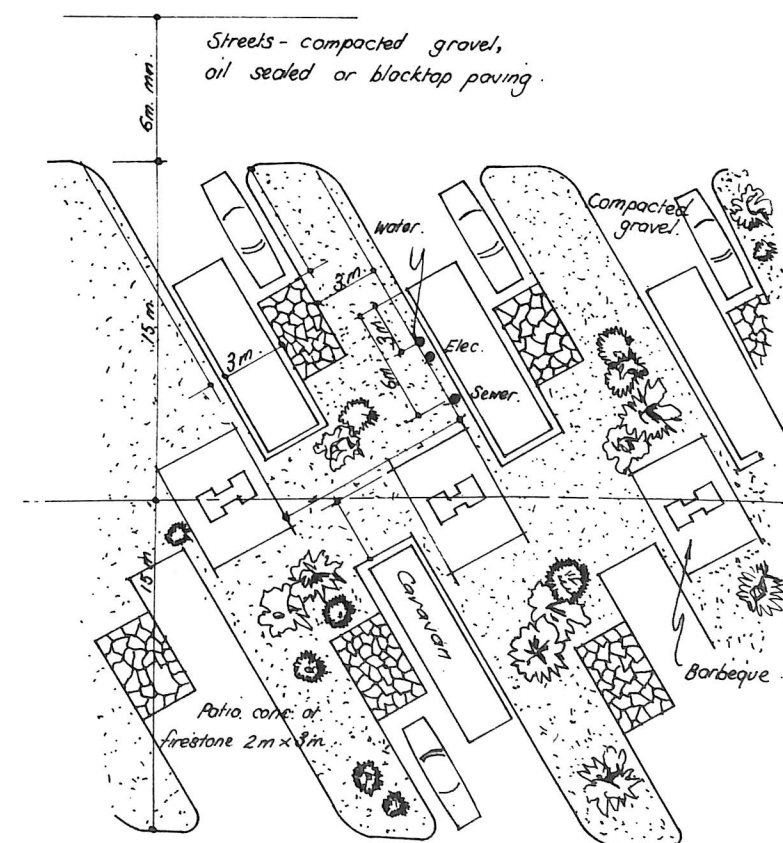




D 24. Dimensions of Car and Caravan Parking Areas.

### 3.02 DESTINATION CARAVAN PARK LAYOUT

Where a longer length of stay is anticipated, separate parking for the car and the caravan should be provided. An increasing number of caravans are being fitted with their own toilets and showers which require individual sewer connections to each caravan.

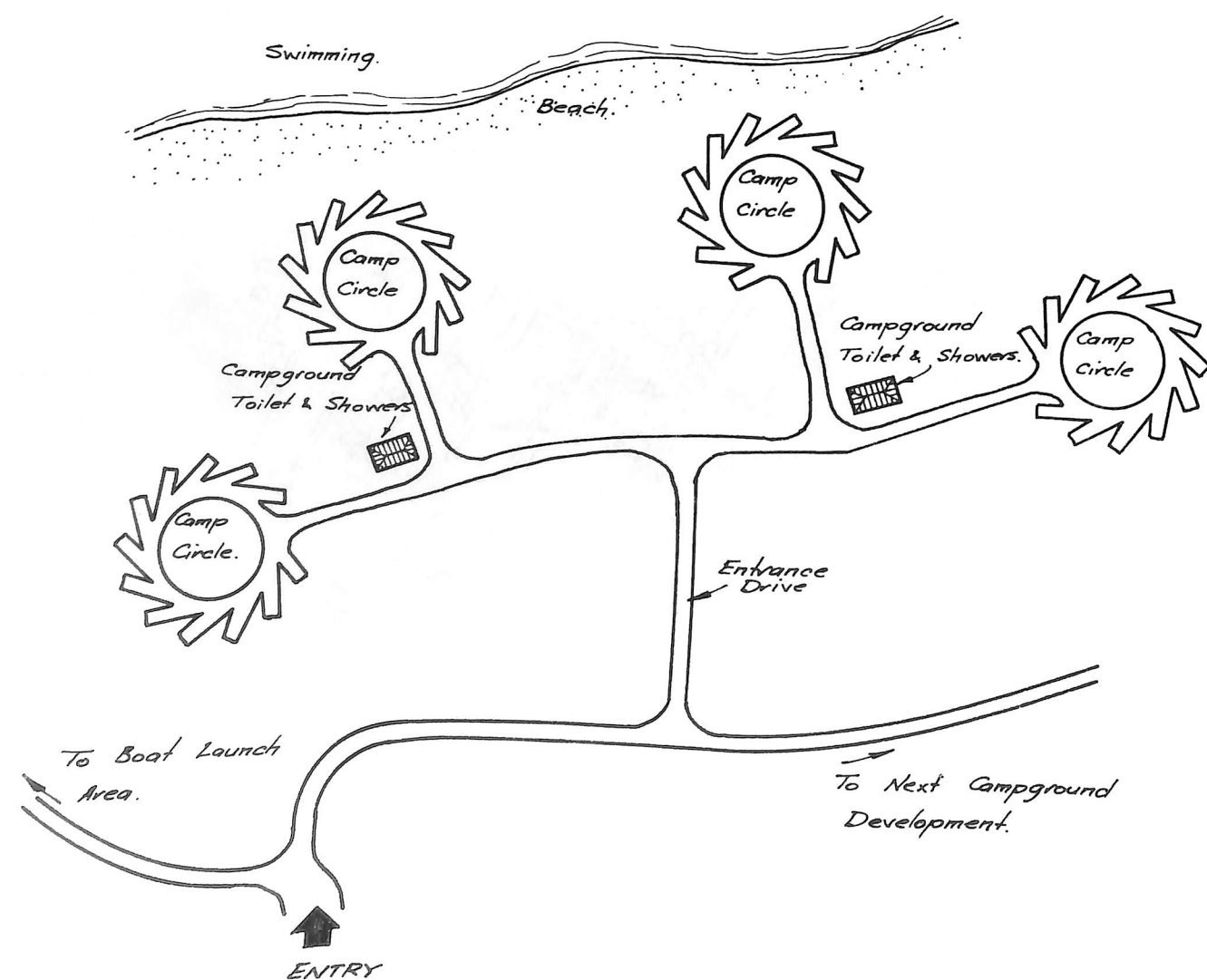


D 25. Typical destination Caravan park.



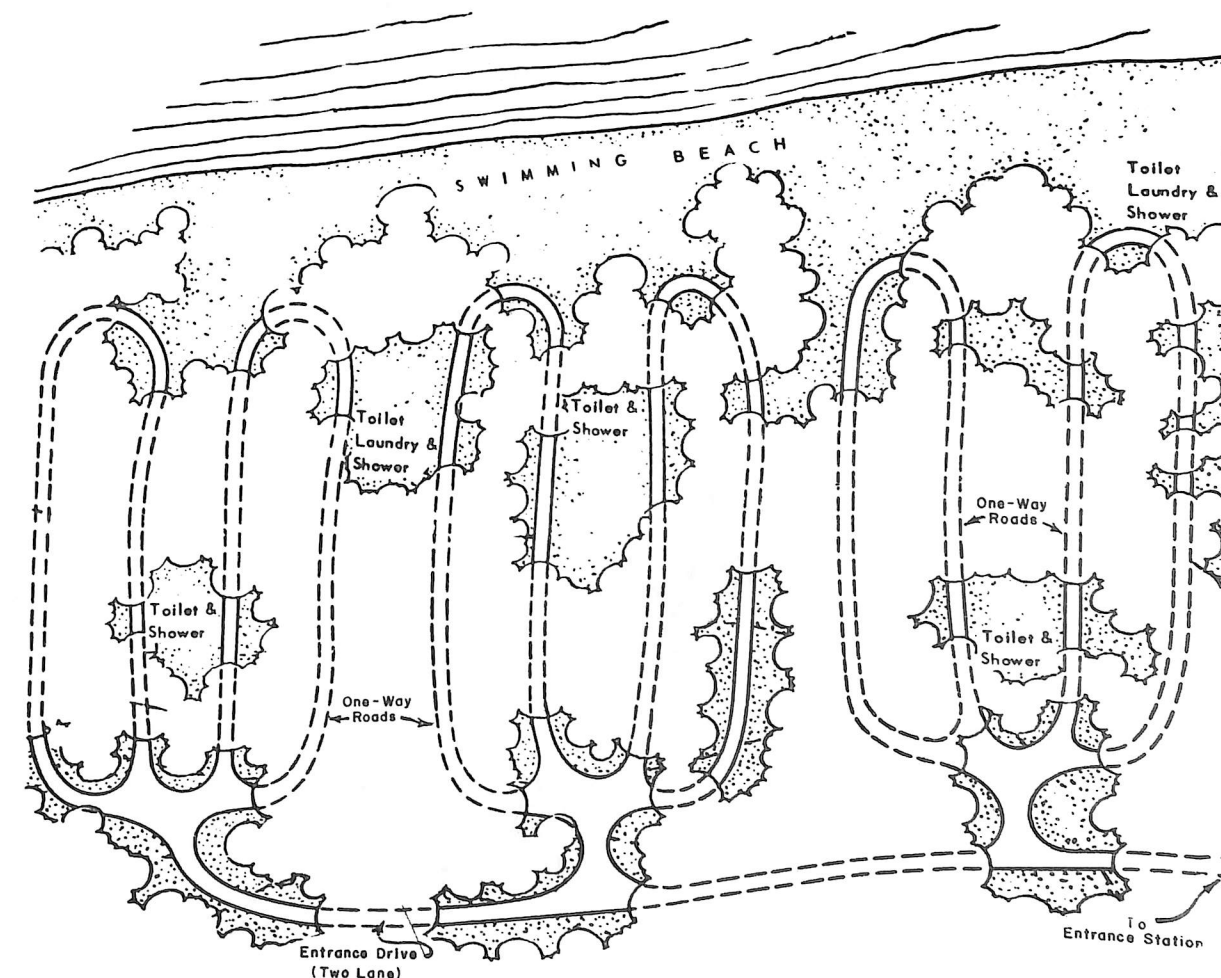
### 3.03 RESOURCE ORIENTED CARAVAN PARK

Where the caravan park is oriented towards a beach or similar resource, the layout can be varied by using loops or cul-de-sacs to reduce the number of roads which must be crossed to reach the beach. Examples of these types of parks are illustrated below.

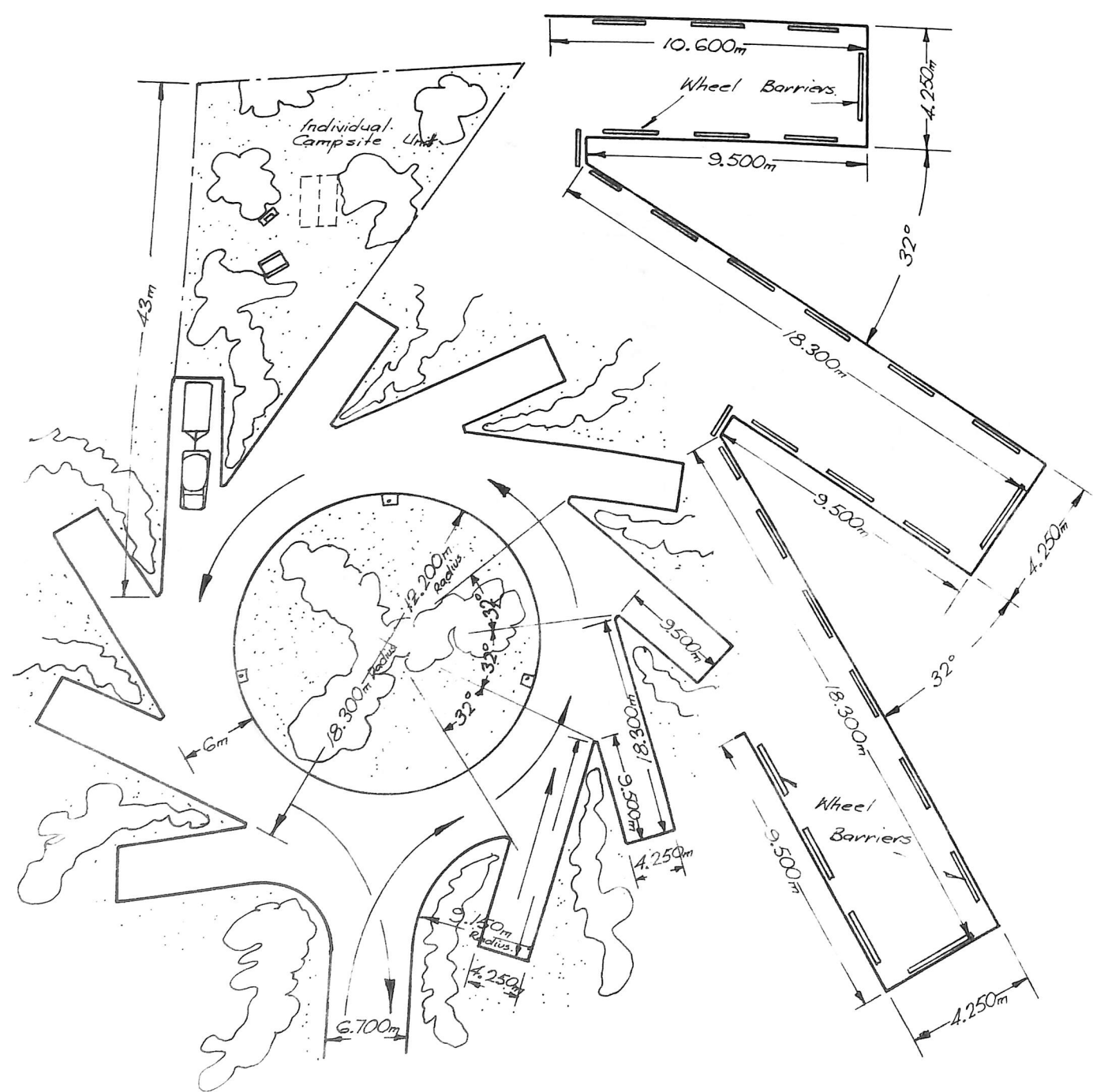


D 26. General Arrangement Cul-de-Sac Layout.

### D 27. One-way loop type layout



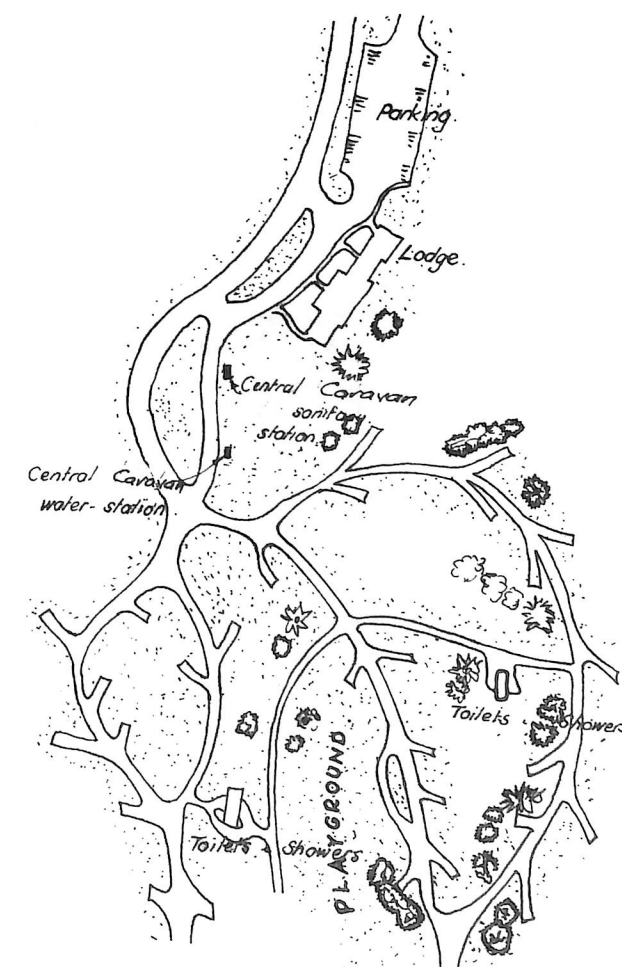




D 28. Detail of Cul-de-Sac Layout.

### 3.04 BUSHLAND OR MOUNTAIN RESORT CARAVAN PARK

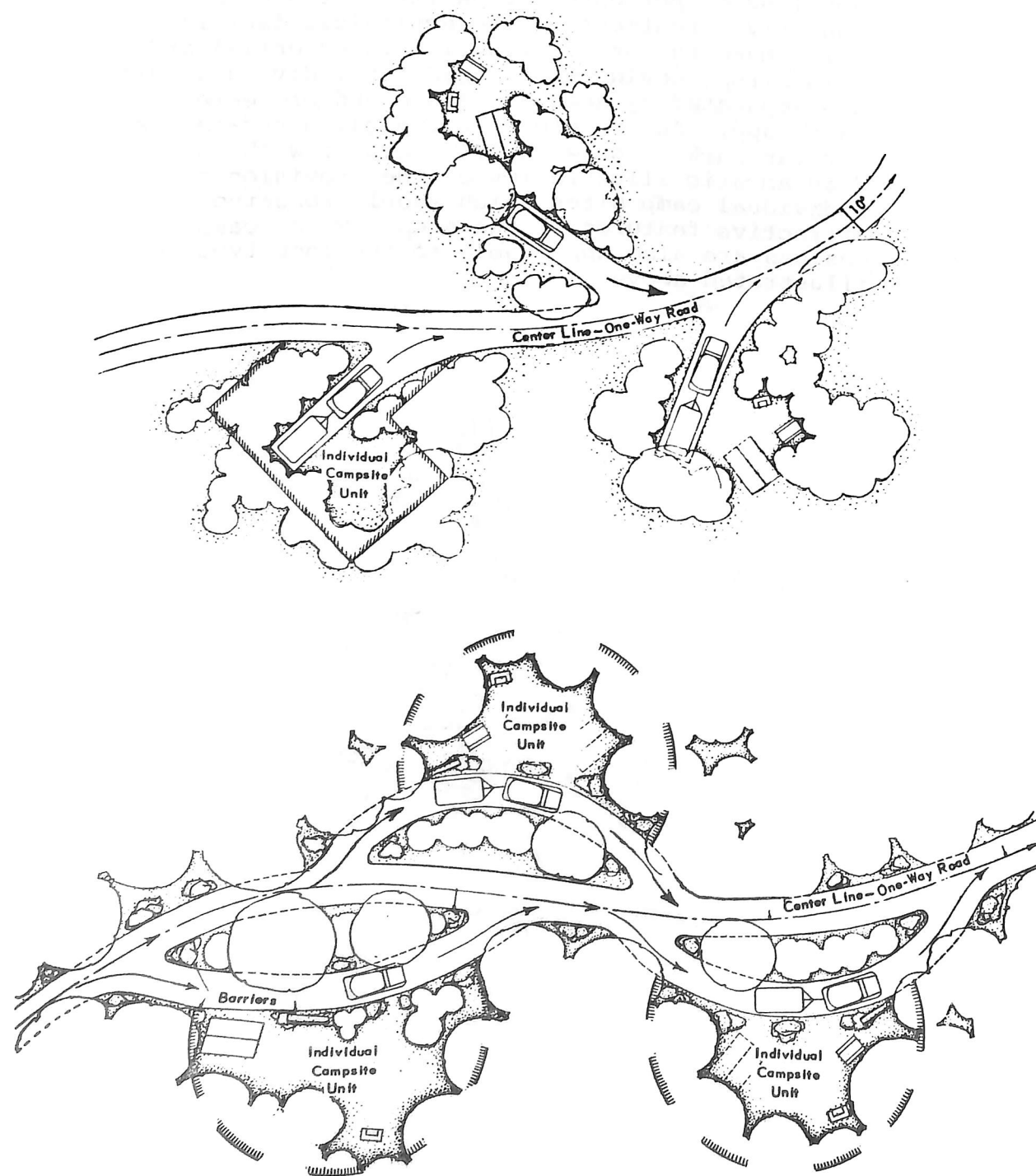
The attraction of mountain resorts is usually their ability to provide the sense of separation without any loss of perceptual capacity in the area. Sensitive treatment of the ecological factors which make the area attractive is essential and camp sites should be designed for individual party use separated by adequate space and protected by landscape. An example of a typical mountain resort caravan park is shown below together with a diagrammatic illustration of the provision of individual camp sites which should conserve attractive features of the area. These camp site designs are also applicable to the loop type layout illustrated above.



D 29. A typical mountain resort Caravan park.

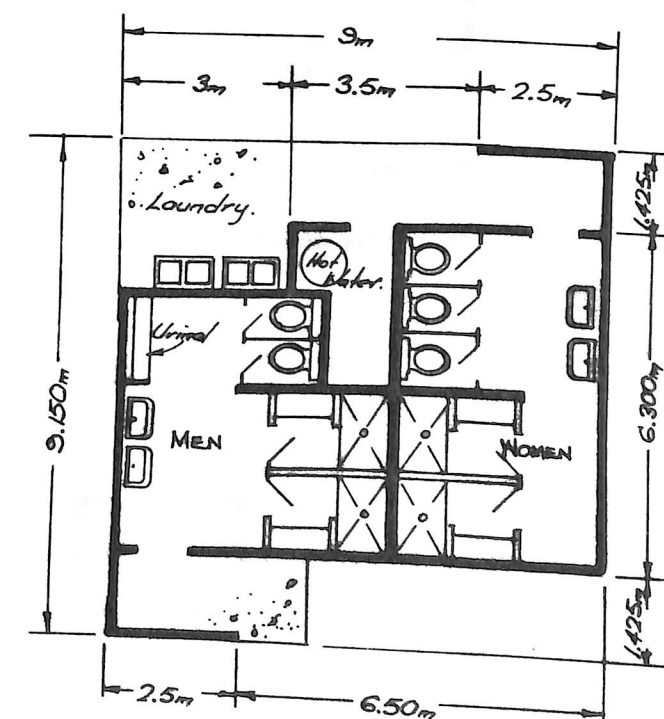


D 30. Campsite Units



4.00 ABLUTION BLOCKS

It is preferable that ablution blocks be kept small and within easy reach of the caravan sites. The sketch below is a combination building which has proved practical in the Californian State Parks. Designed by the Department of Parks and Recreation, it has been built either in concrete block, brick or timber cladding in forested areas. The services duct behind the W.C. is considered essential in public facilities of this type to house the cisterns to reduce vandalism. It also provides a valuable storage area for hot water service and cleaning facilities.

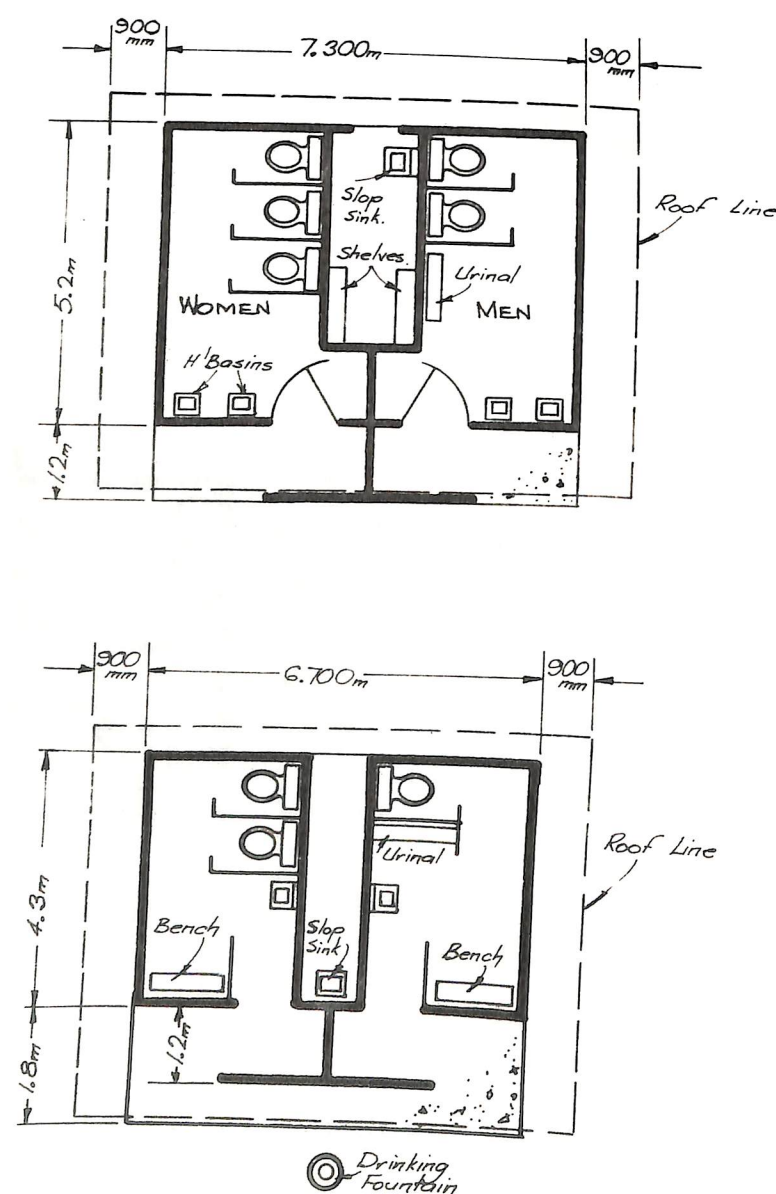


D 31. ABLUTION BLOCK.  
Typical Arrangement.



## 5.00 TOILET BLOCKS

Some examples of various sized toilet blocks are illustrated below. Again the services duct is an essential feature. Open eaves and gable ends are desirable to allow free circulation of air.



D 32. SIMPLE TOILET BLOCKS.

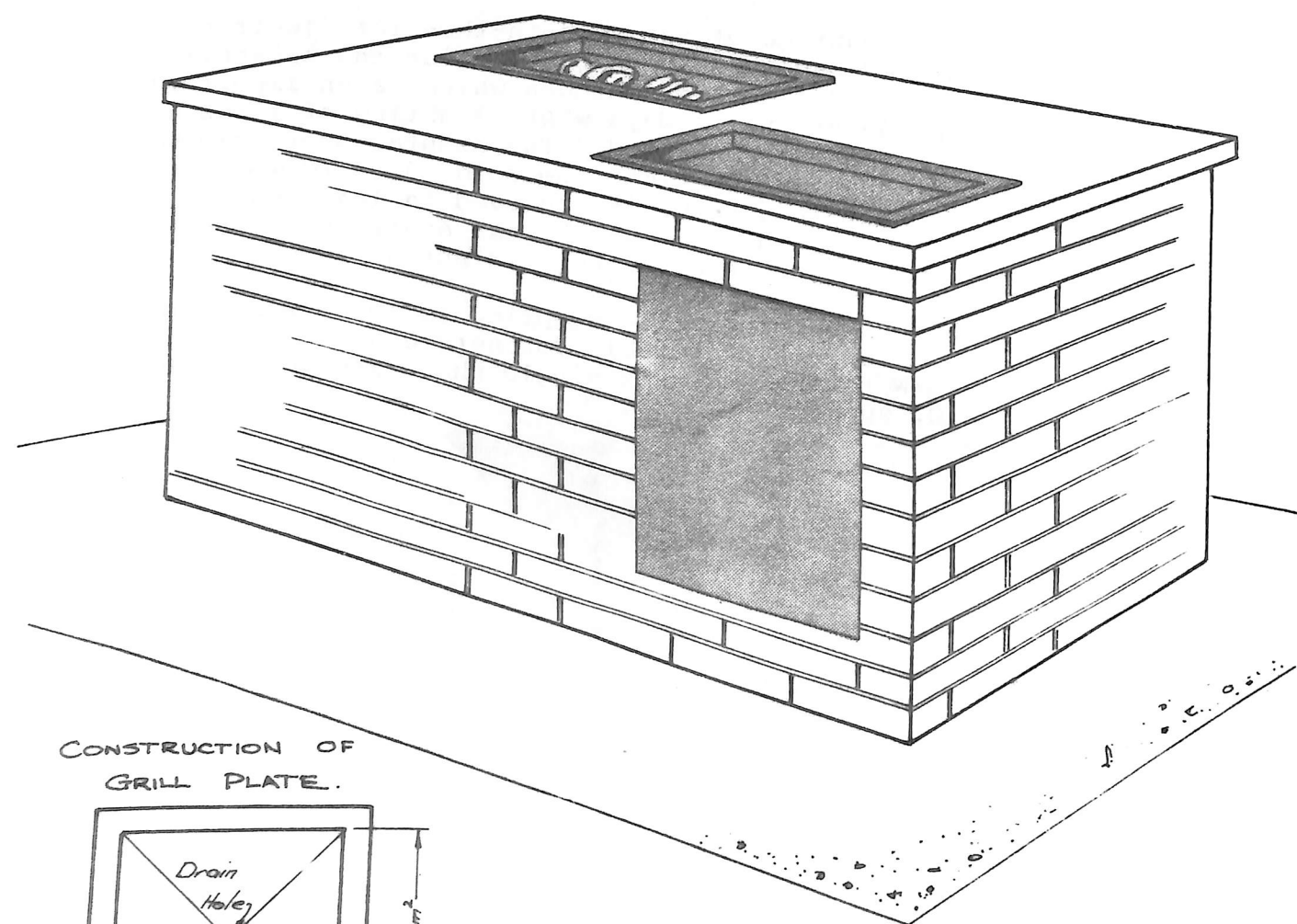
## 6.00 PICNIC AREAS

### 6.01 ELECTRIC BARBECUE

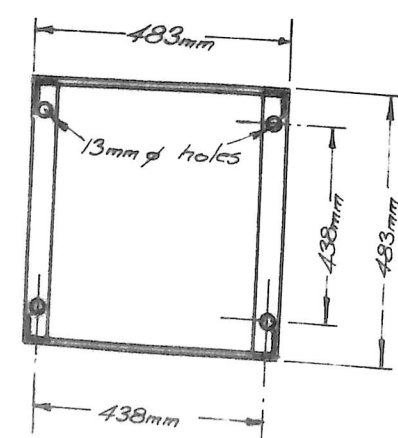
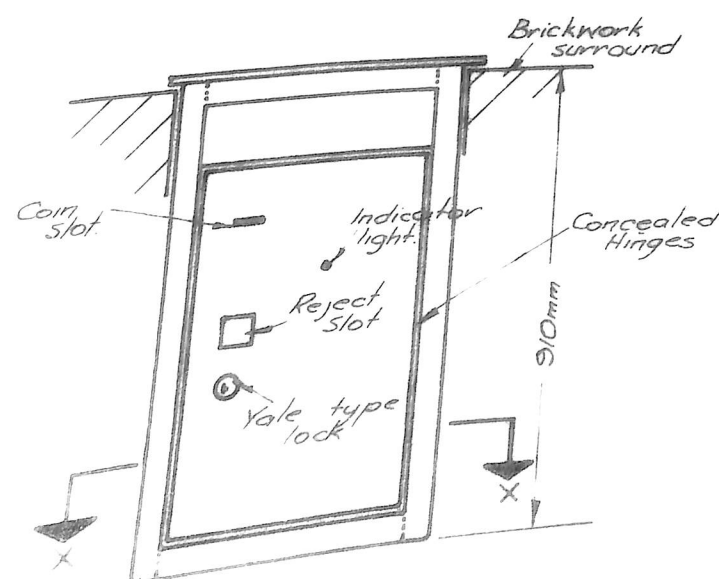
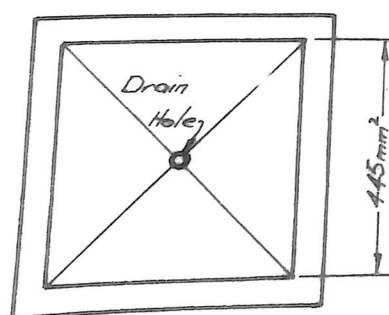
The advantage of the coin-in-the-slot electric powered barbecue is that it avoids the necessity for naked flames or matches which is an important consideration in days where lighting of fires in the open is prohibited. The manufacturers claim that the heat up time from cold (5°C) to working temperature (200°C) is achieved in less than 7 minutes and 12-15 steaks can easily be barbecued to well done in a further 7 minutes.

The plate is normally supplied as 19 mm M.S. plate and should be removable for servicing. The unit has a 6KW rating and uses single phase 240 volt 50 Hz A.C. supply.





CONSTRUCTION OF GRILL PLATE.

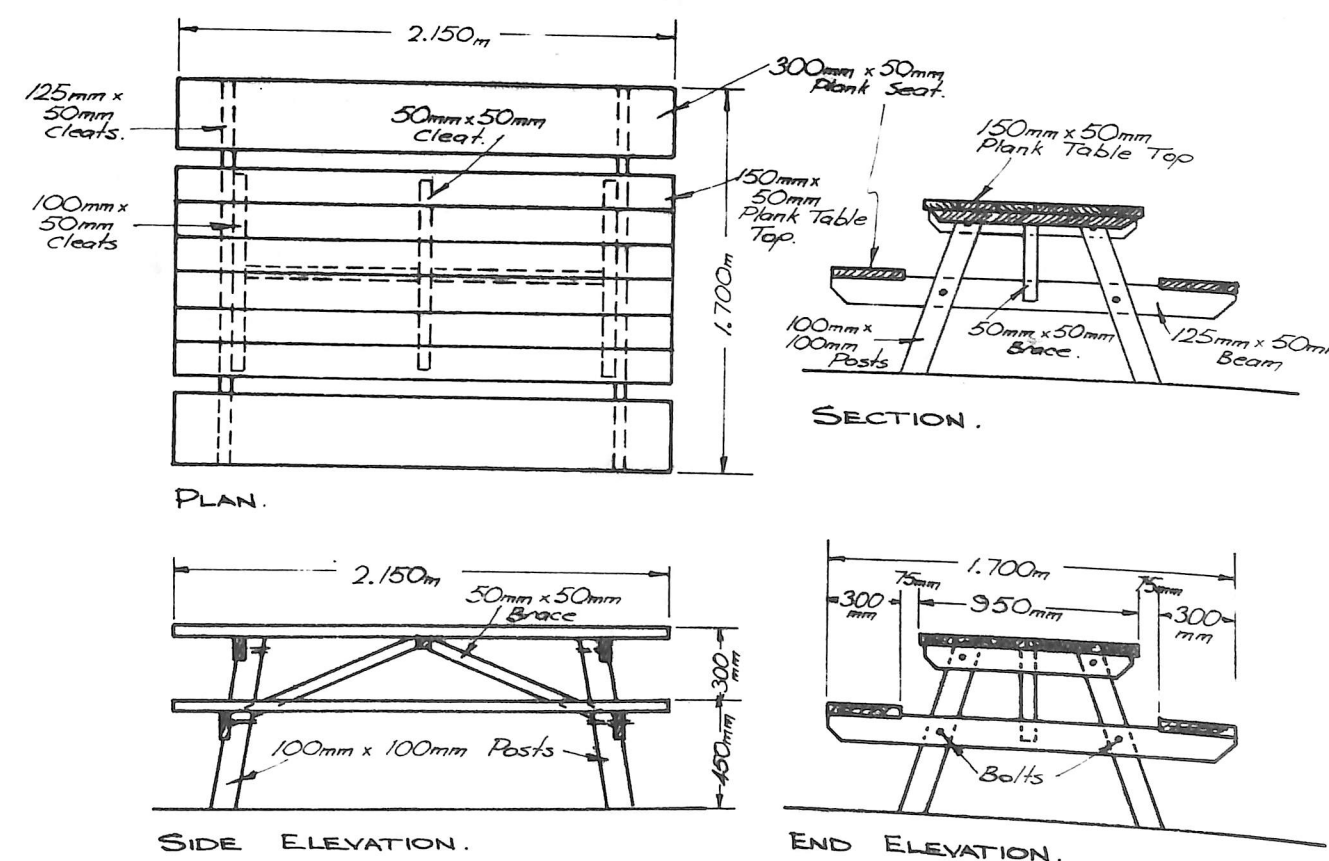


VIEW X-X FOUNDATION DETAILS.

D 33. ELECTRIC BARBECUE.

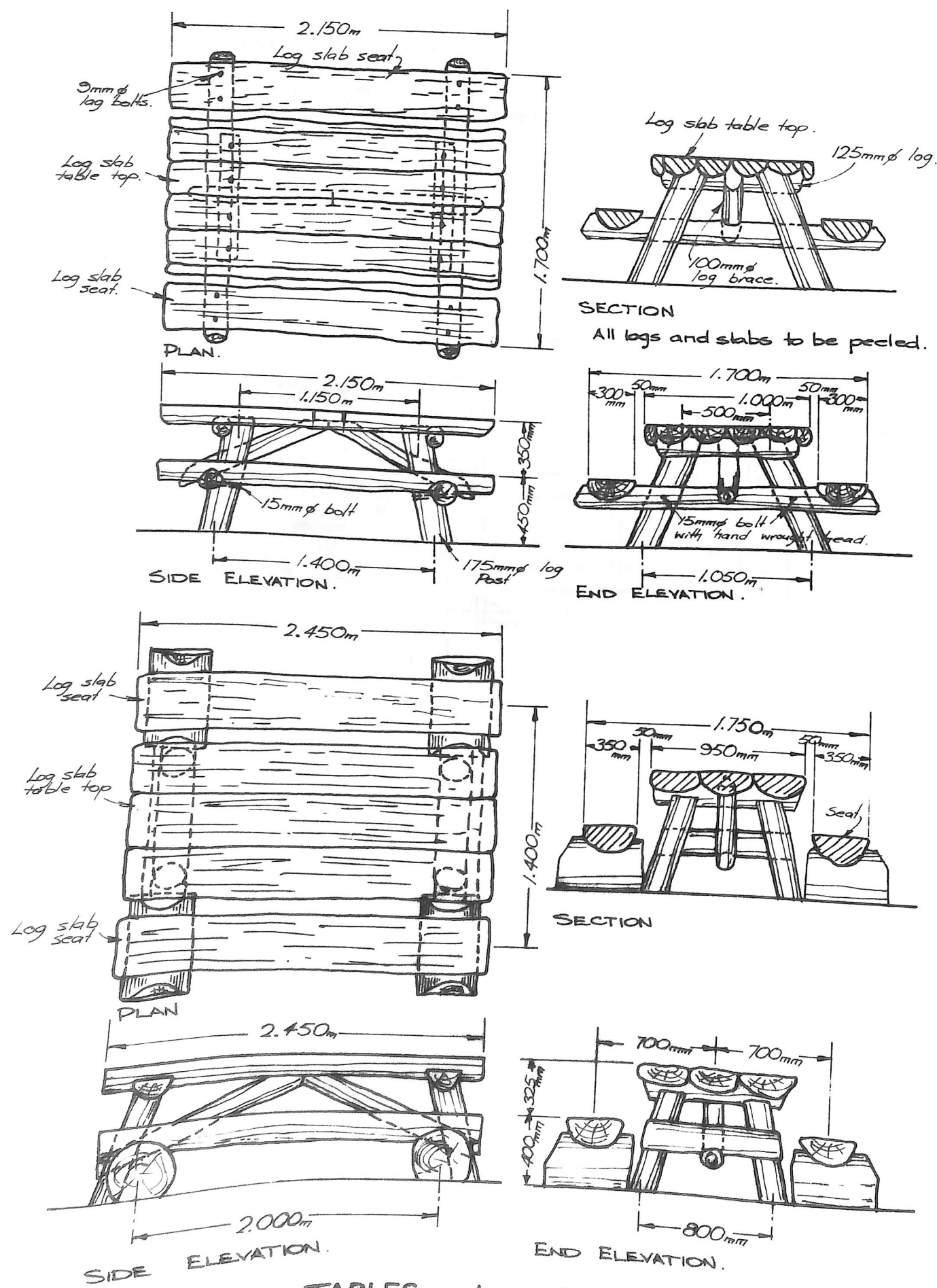
## 6.02 FURNITURE

There are many designs available for picnic tables and benches. The material of construction includes concrete, steel and timber. Some examples are shown of sturdy timber construction both in square sawn timber and in log construction.



D 34. PICNIC TABLE — Sawn Timber.



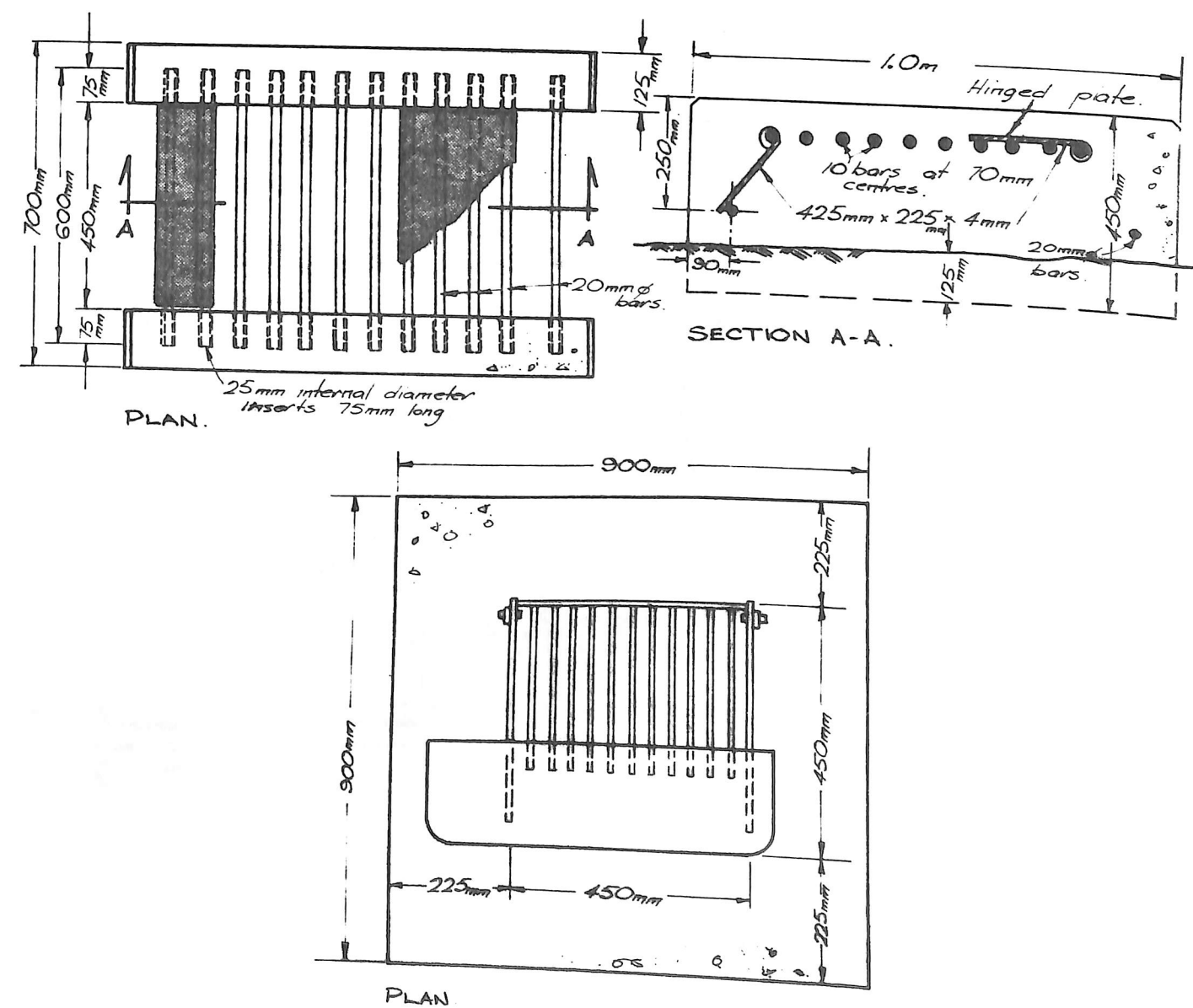


D 35. PICNIC TABLES — Log Construction.

## FIRE PLACES

For outdoor cooking, the open flueless fire provides the most adequate facility. An important factor in the design of the fire place is that a small compact fire should burn out quickly if left unattended.

The two fire places illustrated provide a hinged grating which can be raised for vertical position permitting the use of fire not only for cooking but for recreational purposes or to rake away the ashes.

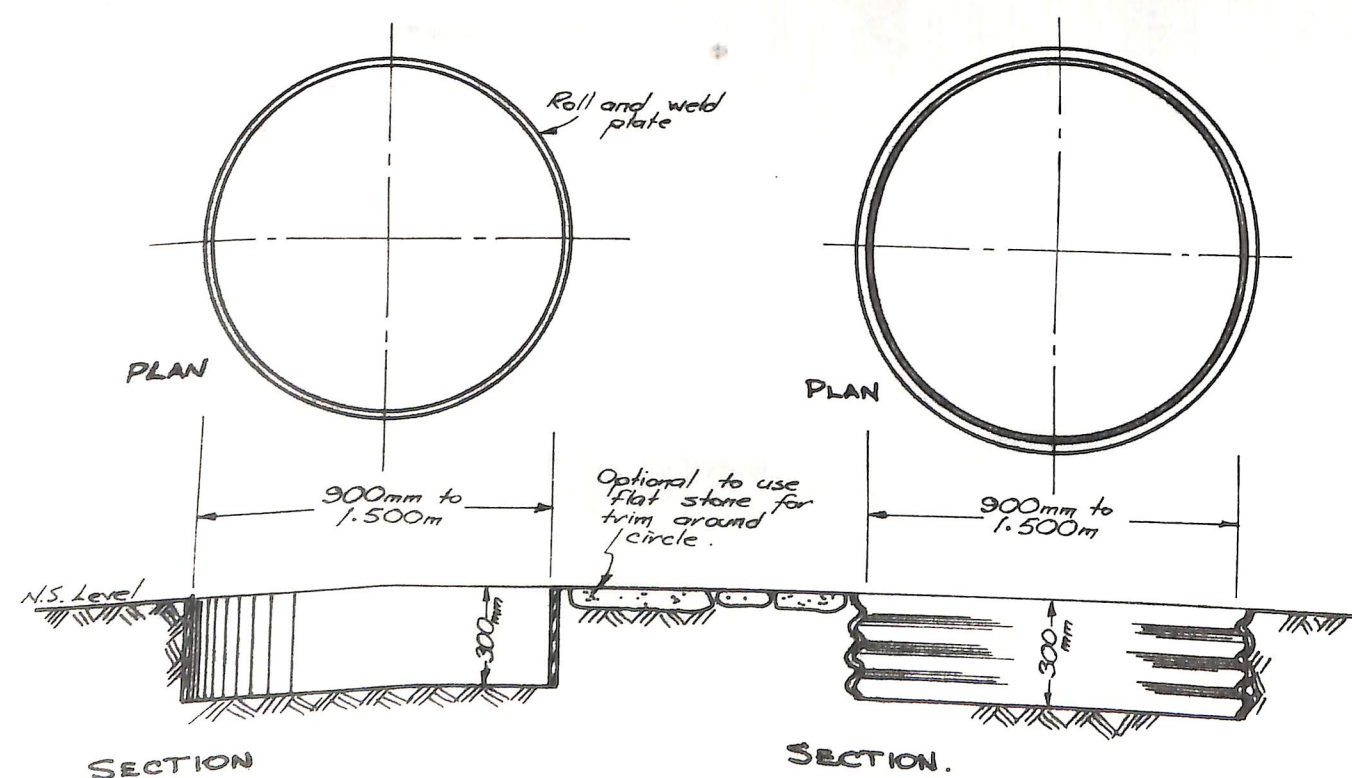


D 36. OPEN FIREPLACES.



## FIRE RINGS

Inexpensive and thoroughly practical fire rings limit the size of the camp fires and permit an orderly space for better control of private camp fire activity. Two styles are shown in the sketch below: one made of steel plate and the other from corrugated metal culvert. For safety, the upper edge should be positioned at or below surface level. Flat stones placed around the outside would help ensure this. The bottom of the fire ring should be gravel with an agricultural pipe drain to carry away rain water. It is essential that the area around the fire place should be entirely free of potential fire hazards.

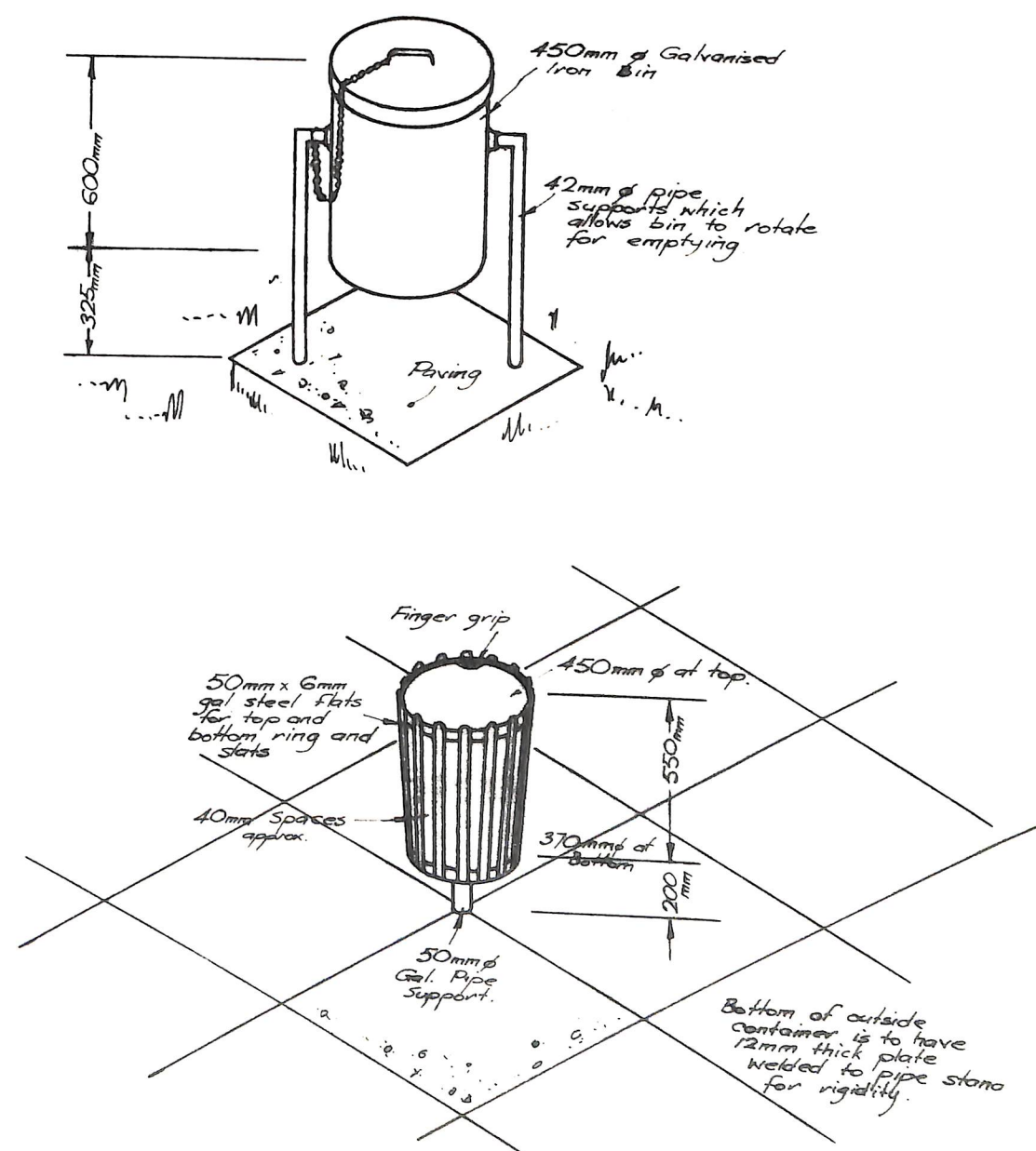


D 37. FIRE RINGS.

## LITTER BINS

Litter bins are an essential piece of furniture around camping grounds and caravan parks and should be designed to provide ease of emptying. Where less frequent than daily servicing is available, bins should have lids.

Two illustrations are shown of suitable types of litter bins but there are many other designs which are equally adequate.



D 38. LITTER BINS.



## PLAYGROUNDS

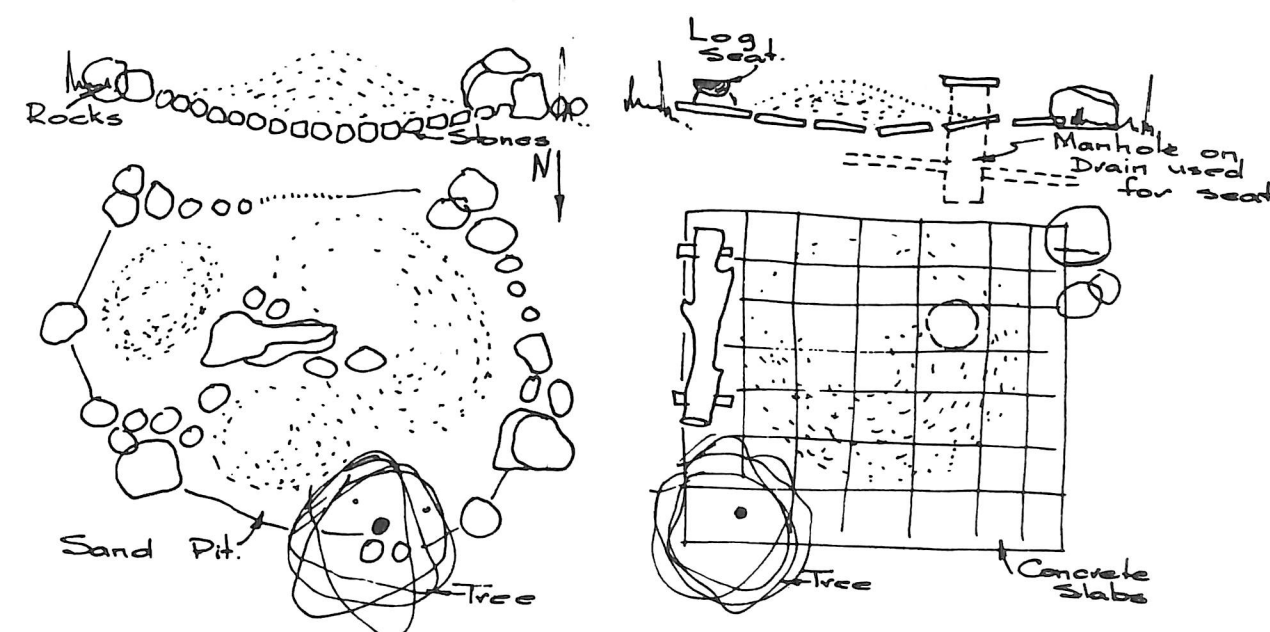
### 7.00 COMPONENTS

#### 7.01 SAND AND WATER

These are two components which are extremely attractive to children and opportunities should be provided in the playground for children to play with both of these elements. Proper maintenance is essential to remove any suggestion of the sandpit or the water feature becoming a health hazard.

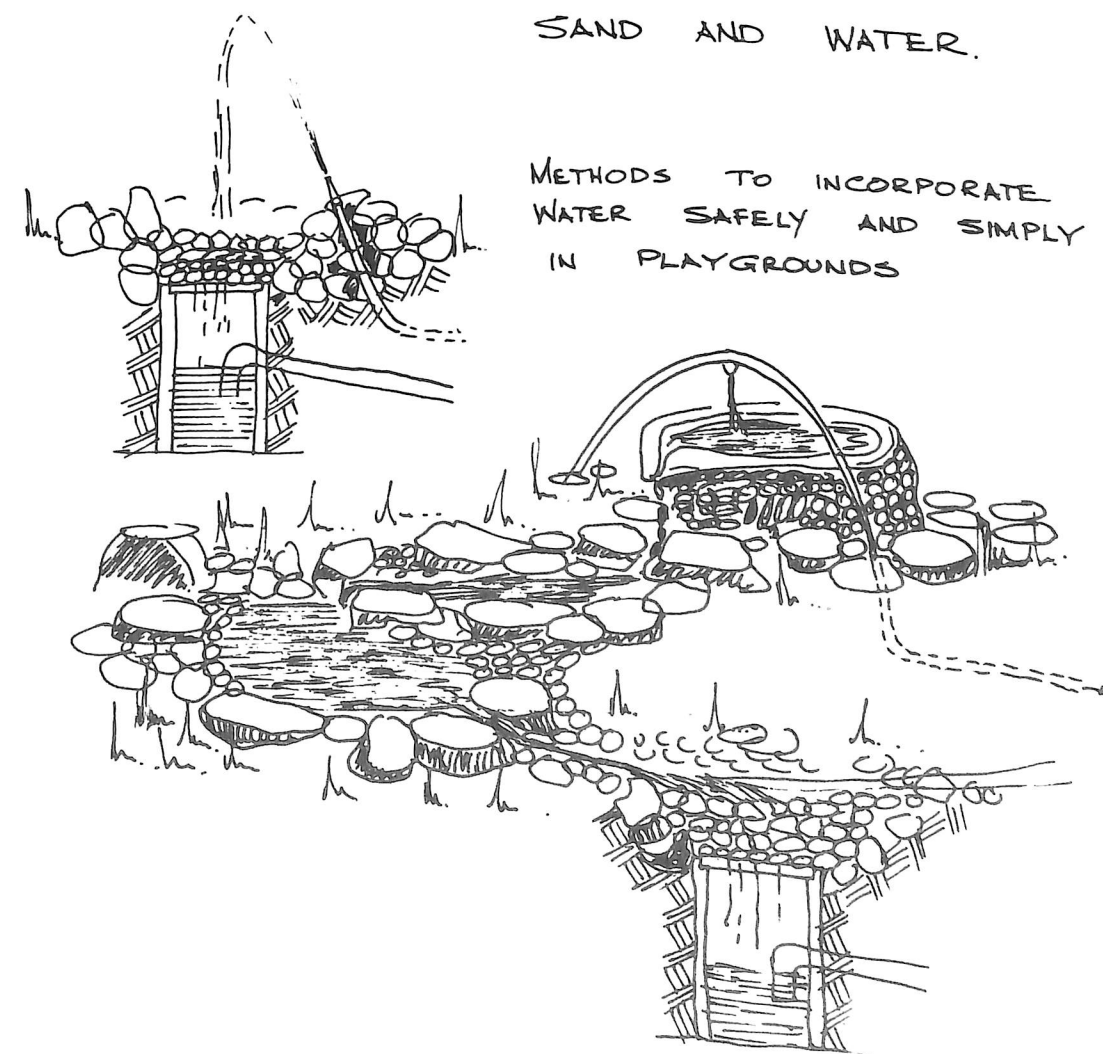
The sketches below illustrate some interesting ways of incorporating sand and water safely and simply in playgrounds.

### D 39. Methods to incorporate water safely and simply in playgrounds



SAND AND WATER.

### METHODS TO INCORPORATE WATER SAFELY AND SIMPLY IN PLAYGROUNDS





## 7.02 CONTOURING

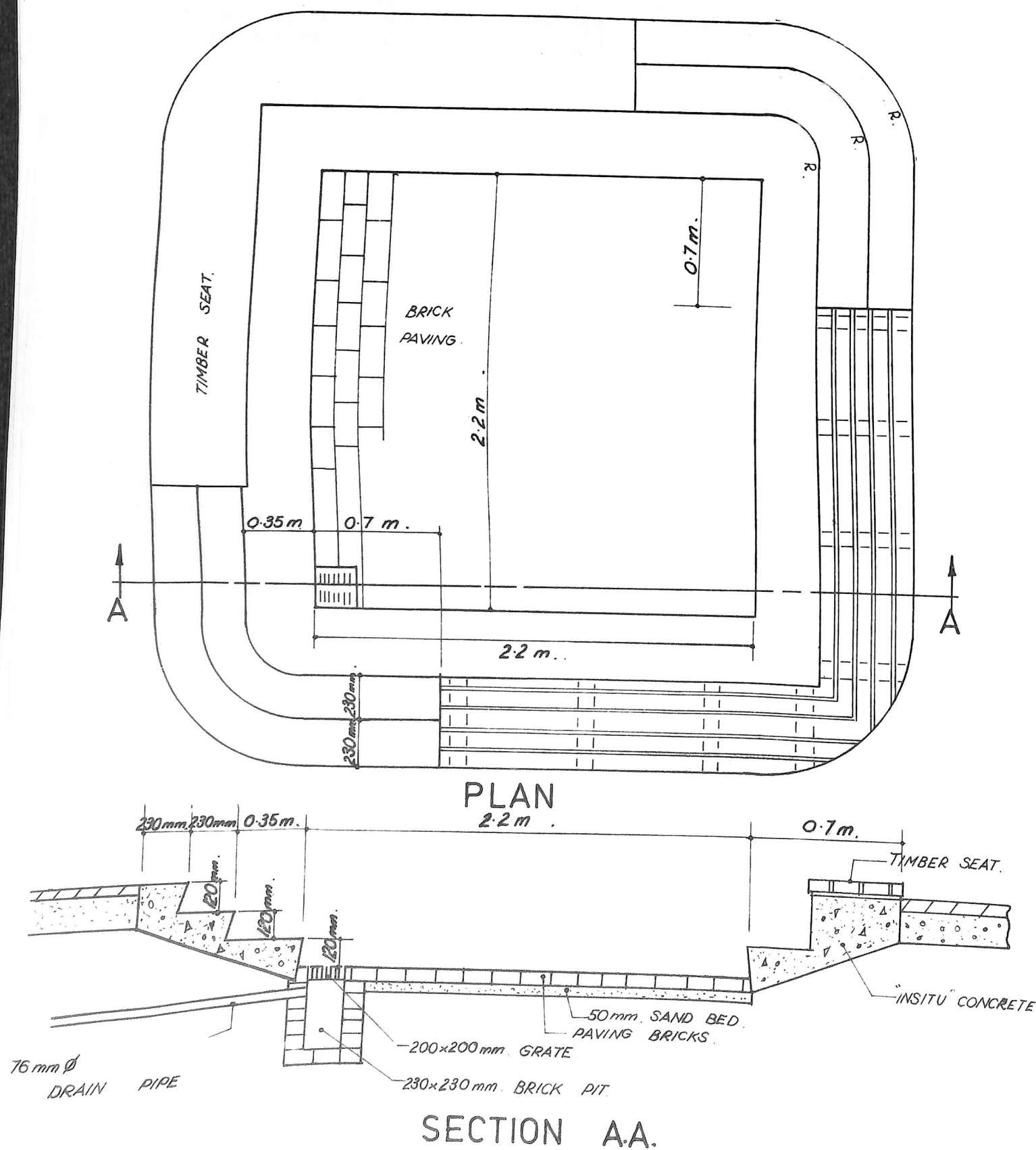
Earth mounds and hills greatly increase the excitement of a playground and can also act as sound barriers and treated properly become items of playground equipment in themselves besides being suitable areas for the mounting of various kinds of playground equipment. The siting and size of the mound should be carefully related to the equipment and to the size of the playground. Incorporation of mounding into playgrounds can be seen from the illustrations provided under Section 8.00 - Composition of Playgrounds.

## 7.03 SUNPIT

The sunpit is a playground facility which can extend the imagination of the children in the playground. It can be used for active games and can be used also for a quiet sitting area or for a miniature outdoor theatre.

Typical construction details of a sunpit are illustrated overleaf.

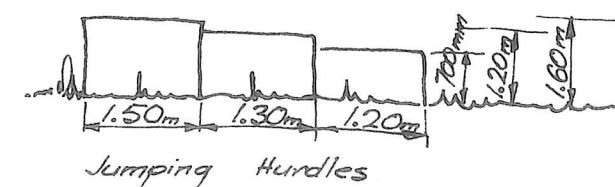
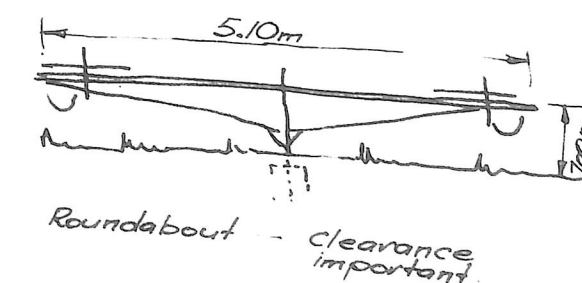
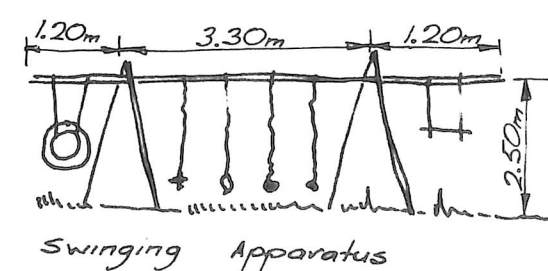
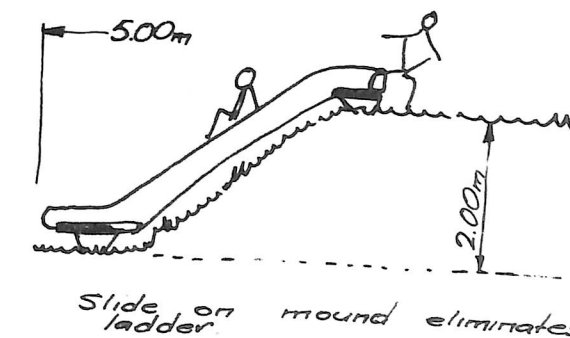
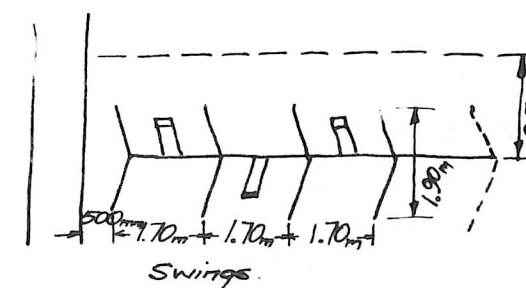
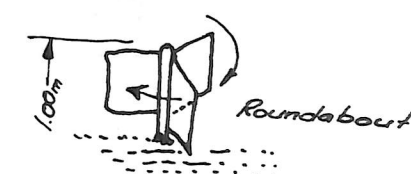
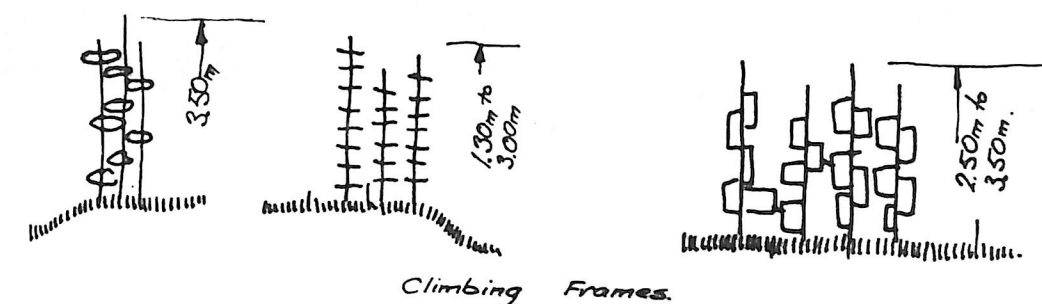




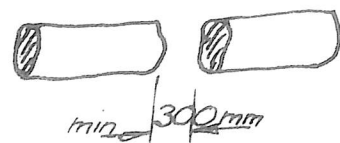
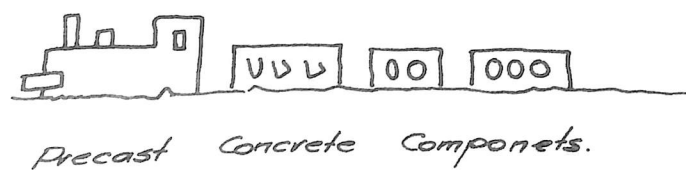
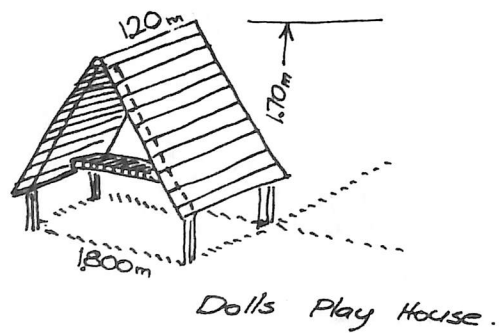
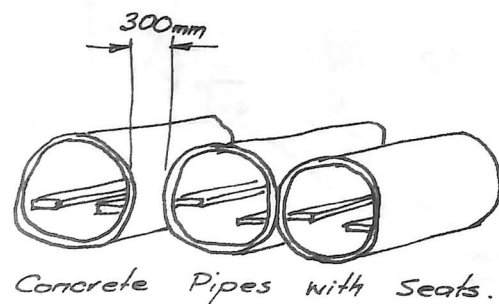
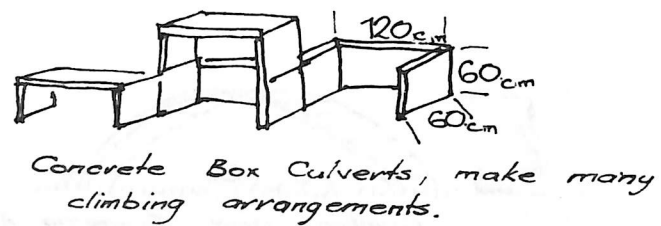
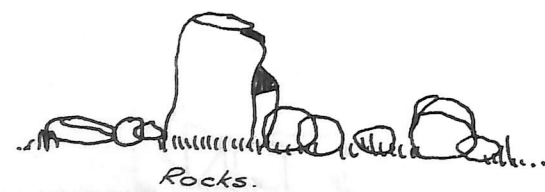
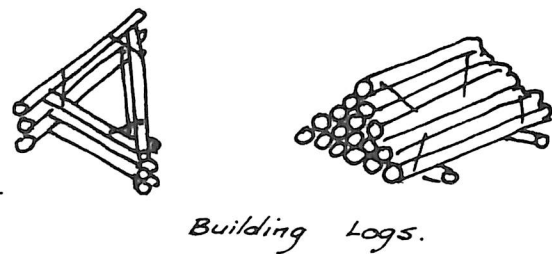
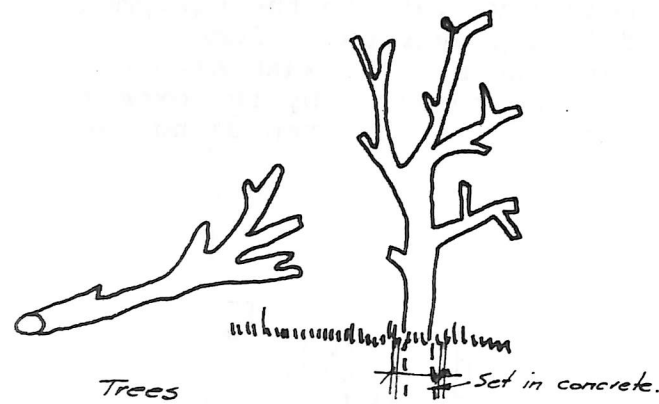
D 40. SUN PIT.

## 7.04 PLAYGROUND EQUIPMENT

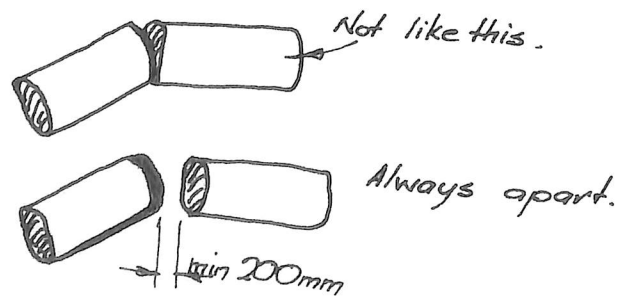
There is an almost endless variety to the equipment which can be provided in a playground. Some diagrammatic examples are shown. The success of playground equipment can be measured by the extent to which the imagination of the children using the playground is developed.



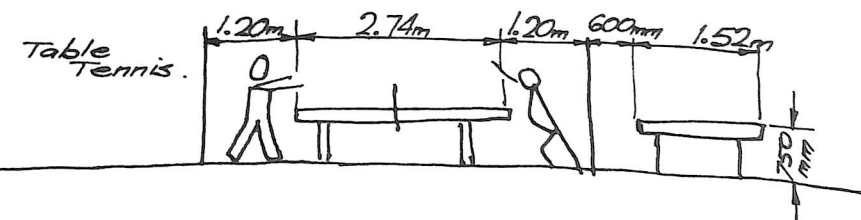
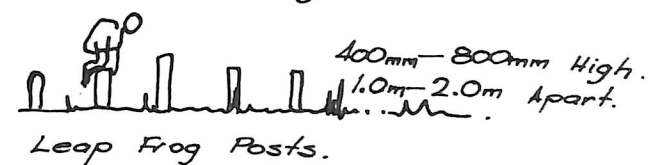
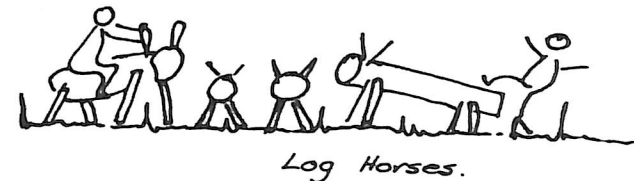
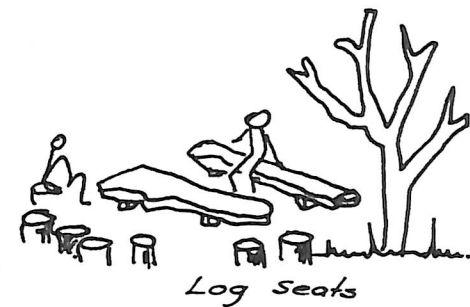
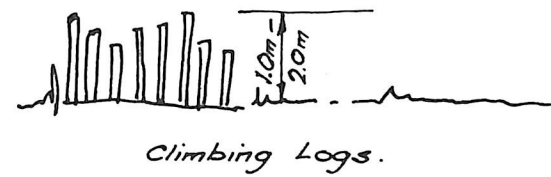
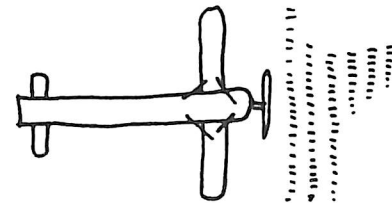




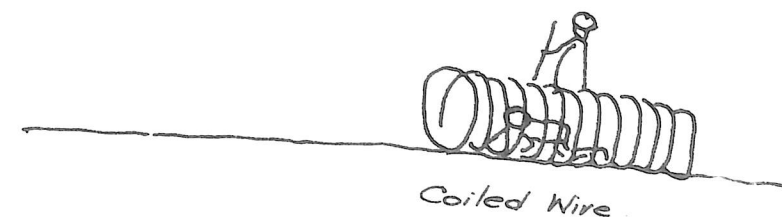
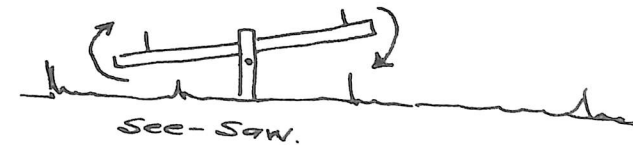
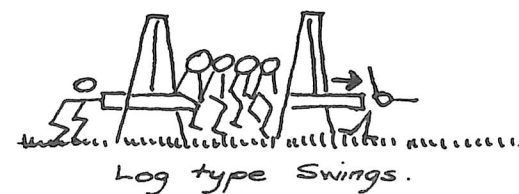
Crawling Spaces.



Aeroplane.



SOME ITEMS NOT RECOMMENDED AND HAZARDOUS.



D41. Some Illustrated Suggestions for Playgrounds.

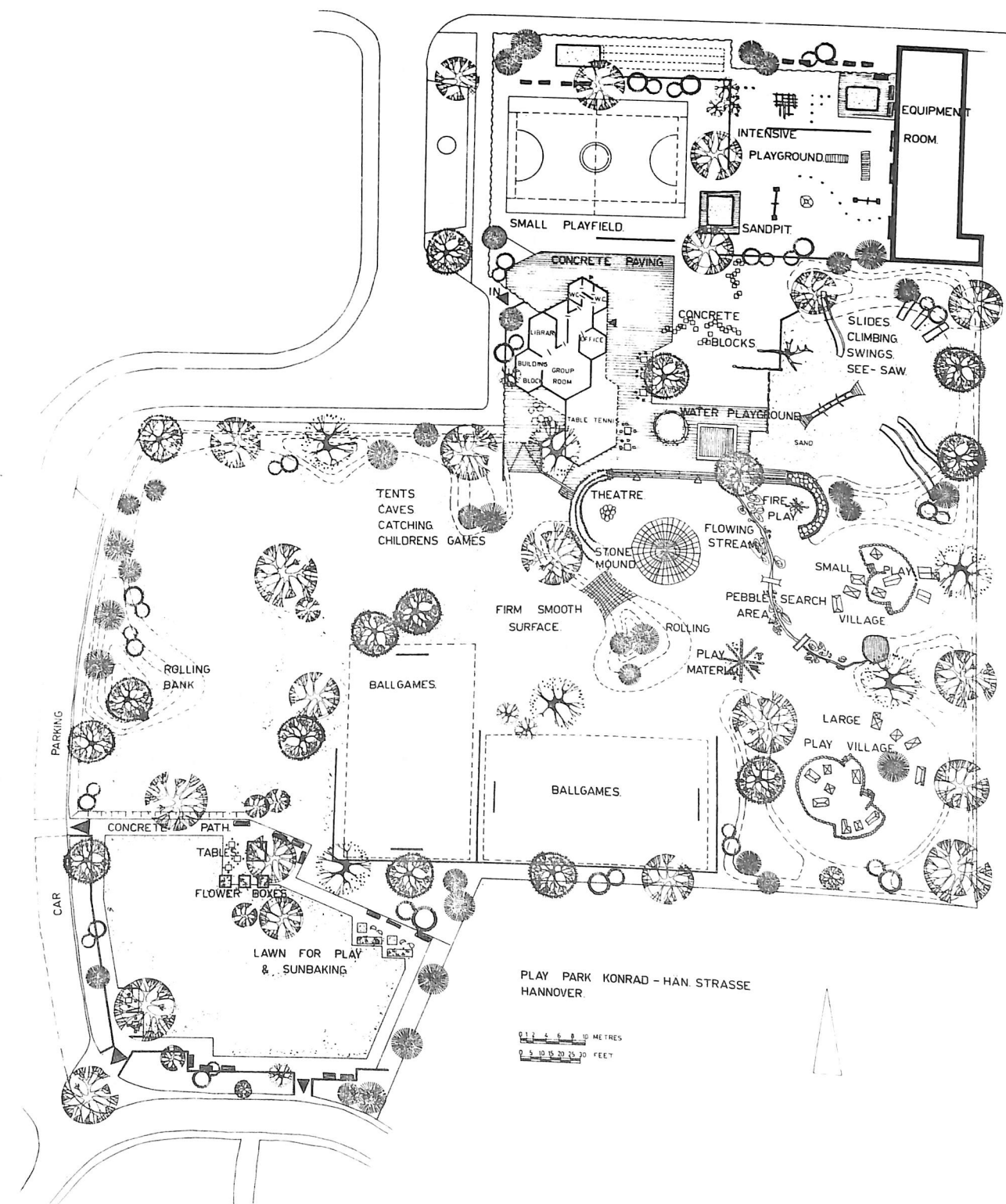


## 8.00 COMPOSITION OF PLAYGROUNDS

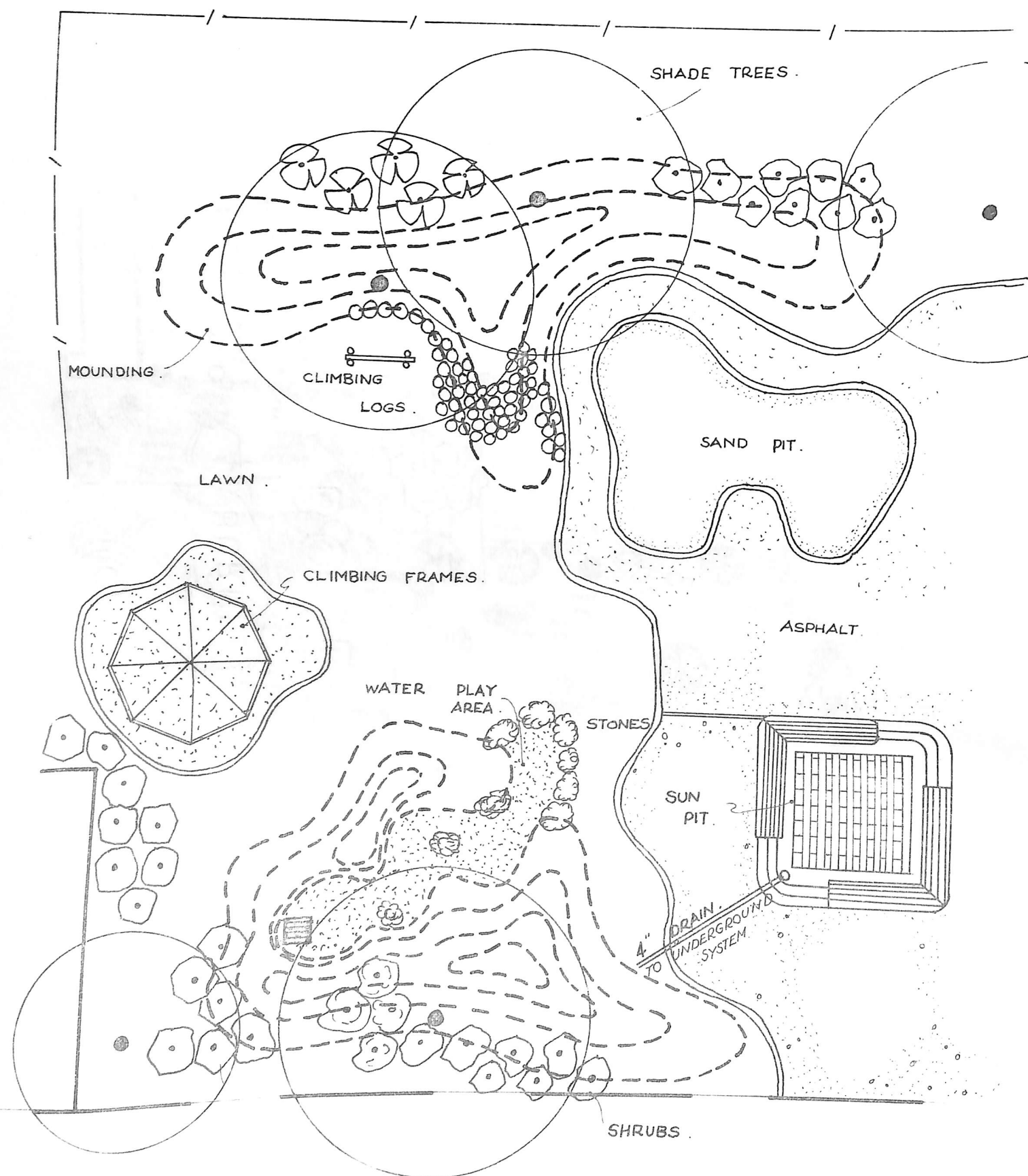
Two illustrations are provided which show the composition of playgrounds which combine many of the design features discussed earlier in this Manual.

The first is a playground developed in Hanover, the second is the design by Graham Shaw, Denton and Corker, Architects, Melbourne for the outdoor play area of a Pre-School Centre.

D 42. Play Park, Hannover







D 43. Playground Layout — Pre School Centre.

## 9.00 COUNTRYSIDE CENTRE

### 9.01 GENERAL DESCRIPTION

The Countryside Centre is known in the United States as a Nature Park and is a recent development to provide the opportunity for people in large urban areas to enjoy the elements of the countryside.

The purpose of a Countryside Centre is to bring to the knowledge of everyone the vital role which is played by soil, water, plants and air in maintaining a healthy balanced environment. Education and interpretation are major goals of the Countryside Centre. The Centre can provide pleasure, knowledge and recreation in many of the passive pastimes.

It need not necessarily be confined to nature study but can be combined with enjoyable activities such as sailing, fishing, horse riding, and could include sports fields. It can be associated with farm land and offer opportunity to individuals or groups to learn and practise:

- Propagation of plants
- Wildlife food growth
- Stream regeneration
- Building of bird nestboxes and hides for observation
- Forest management
- Land management
- Development of nature trails, photography, painting in nature
- Annual management - domestic and wild
- Horticulture



## 9.02 CENTRE COMPOSITION

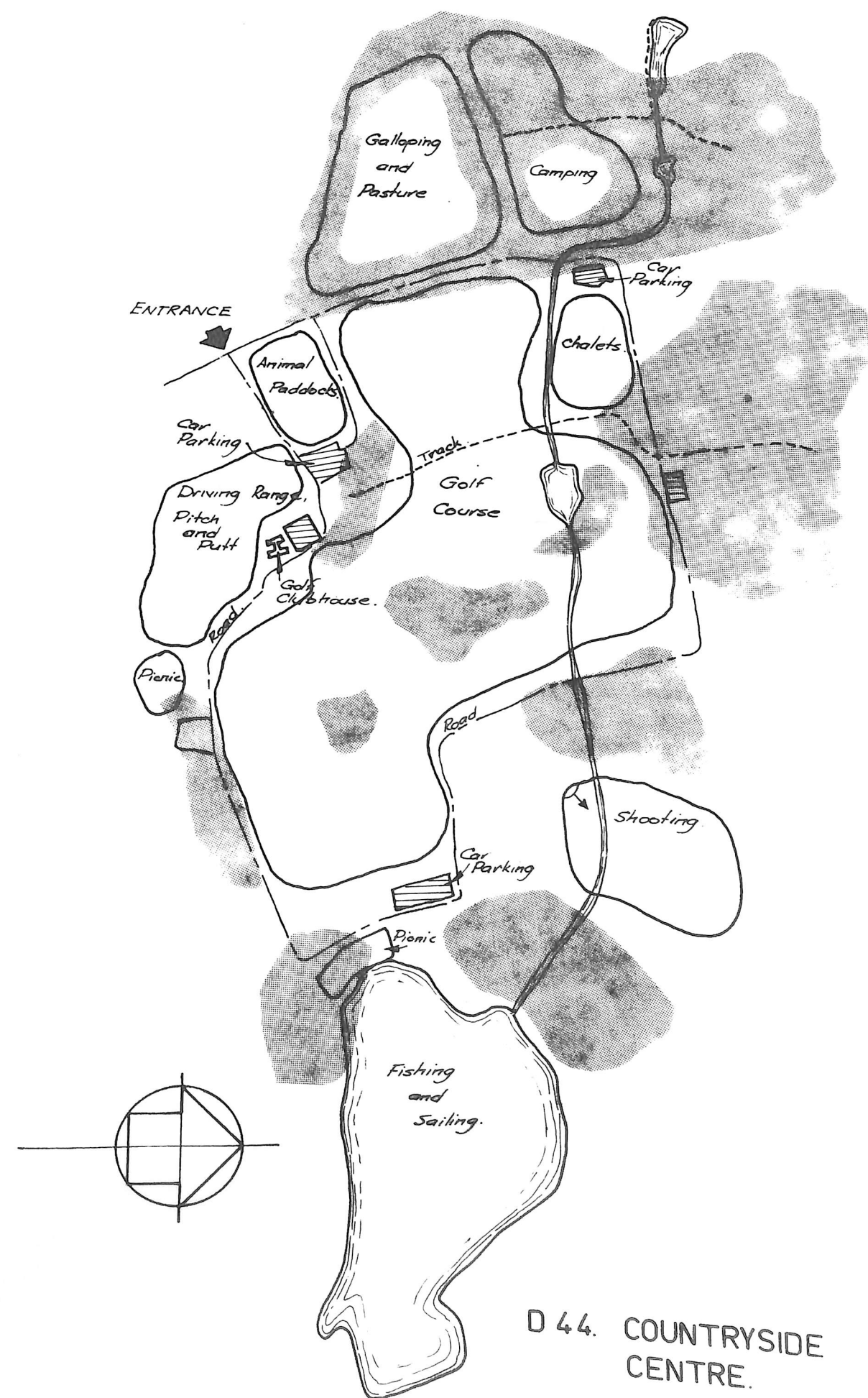
The Countryside Centre has three main elements - land, buildings and people.

The land needs to contain the variety of characteristics to include various habitats, streams, ponds, swamps, forest, open pasture, and farmland with a good selection of mature plants and animals.

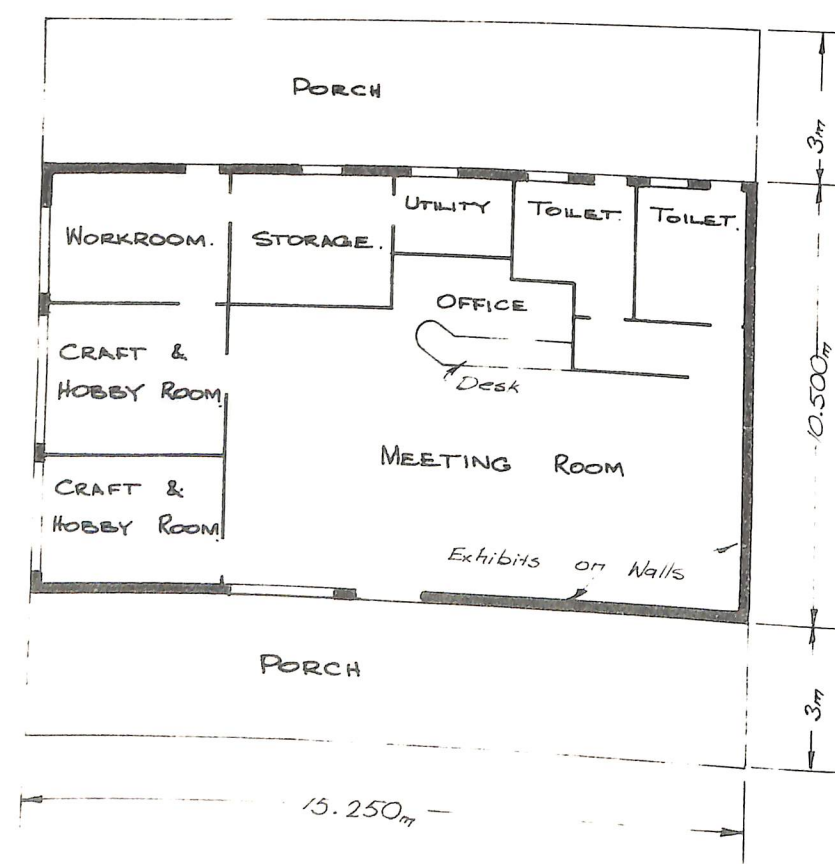
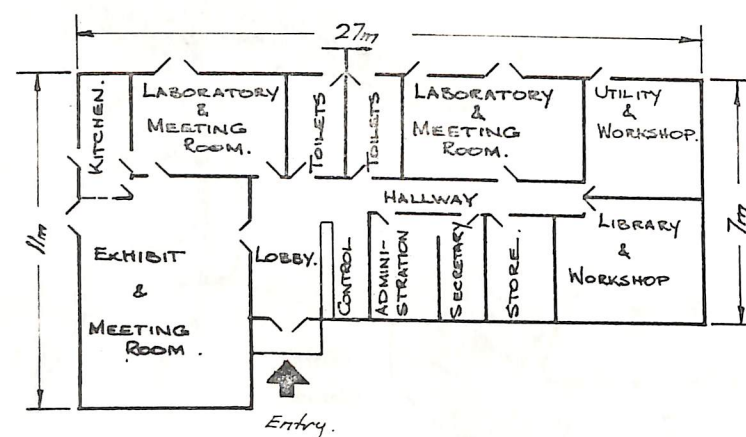
Buildings are used to educate people in the interpretation of the land. Some examples are shown in D.45 of suitable buildings and the drawing illustrates the components desirable.

People fall into two groups - staff and visitors. The principal staff member is the Director (teacher/naturalist). Visitors would include people of all ages, coming to learn, to assist and to enjoy.

Composition of the Countryside Centre is very much a matter of the site and function. A possible Centre is shown in D.44 which illustrates some of the components.







D 45. Typical Buildings at Countryside Centre.

## INDOOR ACTIVITIES

### SPORTS HALLS

#### 11.00 BUILDING SIZES

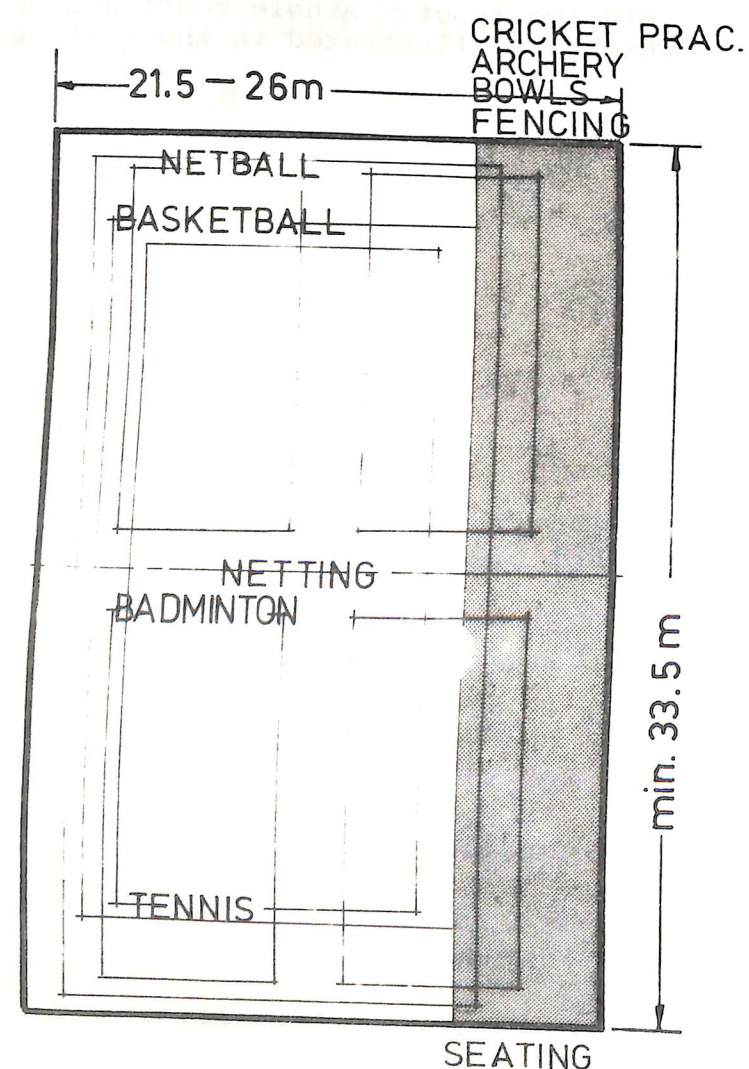
Size and shape of sports halls are determined by the physical requirements of the major indoor games to be conducted to tournament standard within the hall. Indoor sports normally requiring accommodation in Australian communities are basketball, netball, badminton and volleyball. The number of courts accommodated within the building will depend on the size of the community which the building is to serve and in general terms, these can be divided into two types - single court and double court which are illustrated in the next two sections.



# 11.01 SINGLE COURT

The minimum dimensions for single court sports halls is 33.5 metres long and between 21.5 metres and 26 metres wide. The variation in width will enable accommodation to be provided for seating along one side of the court if required and a building of this size can accommodate two practice size basketball courts (minimum dimensions 24 metres long) across the hall.

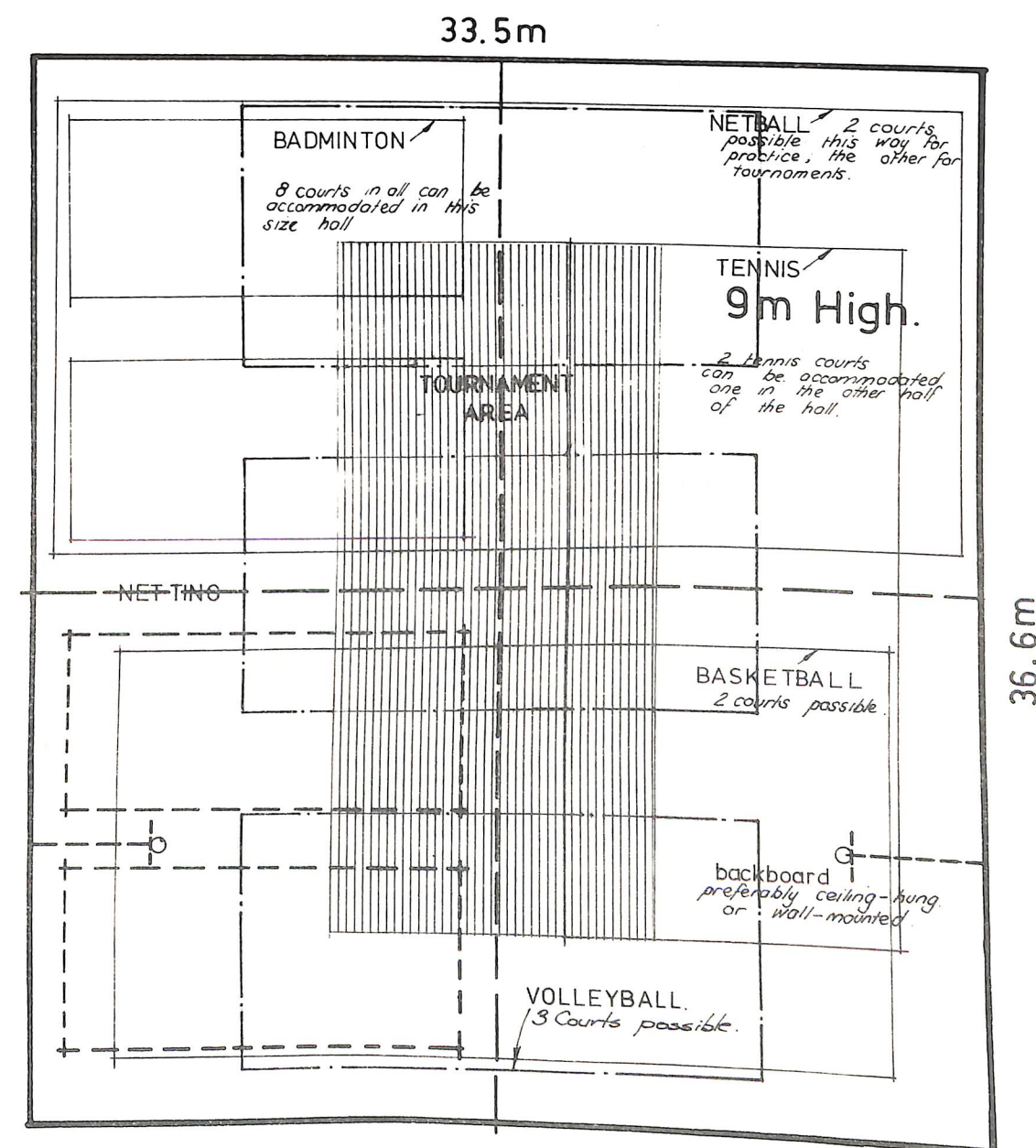
The desirable clearance in the building is 8 metres to 9 metres.



D 46. SINGLE COURT LAYOUT.

# 11.02 DOUBLE COURT

A most economic size of a two court sports hall is 36.6 metres by 33.5 metres. The two court hall accommodates two basketball or two netball courts or three volleyball courts or eight badminton courts. Desirable clearance from floor should be 8-9 metres.



D 47. DOUBLE COURT LAYOUT.



### 11.03 COMPOSITION OF FACILITIES

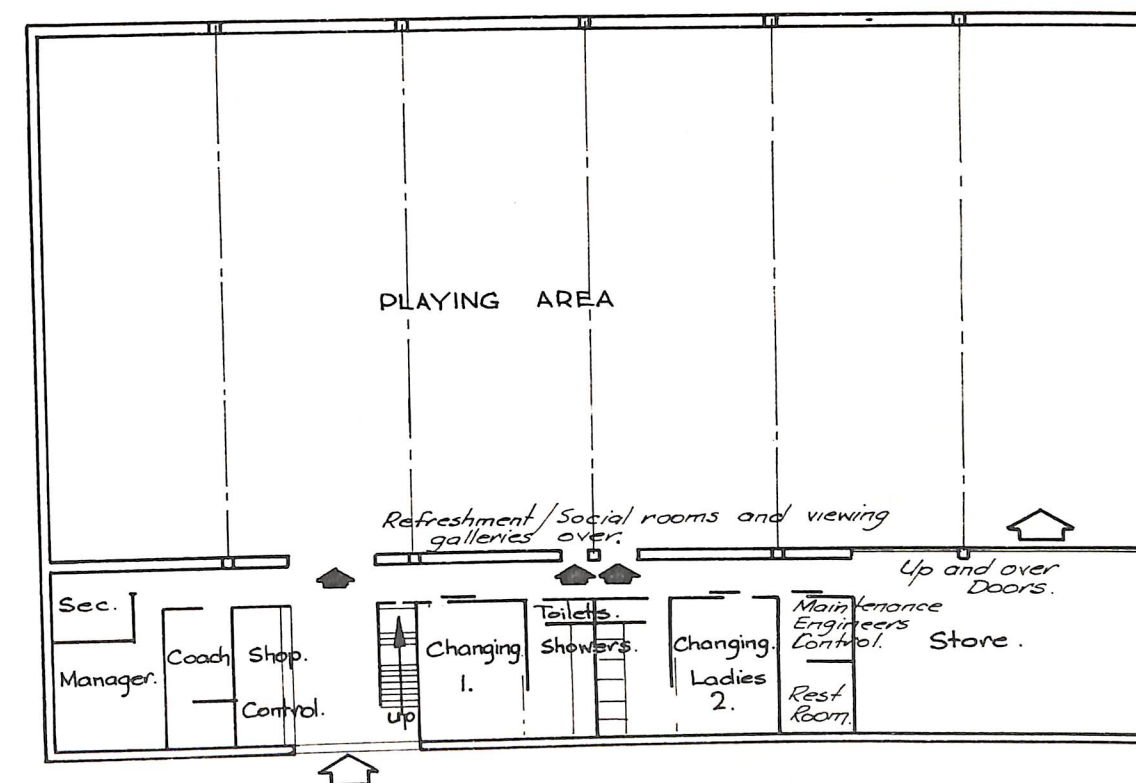
A community sports hall must have ancillary accommodation with the actual games playing space and this should be provided in the form of changing rooms, refreshment areas and administrative suite, adequate storage facilities, first aid room, staff rooms and a certain amount of unallocated space to permit unstructured activities to develop within the community centre.

Other accommodation may include squash courts, sauna, club rooms for adult use activities, lounge rooms, press and television and broadcasting rooms.

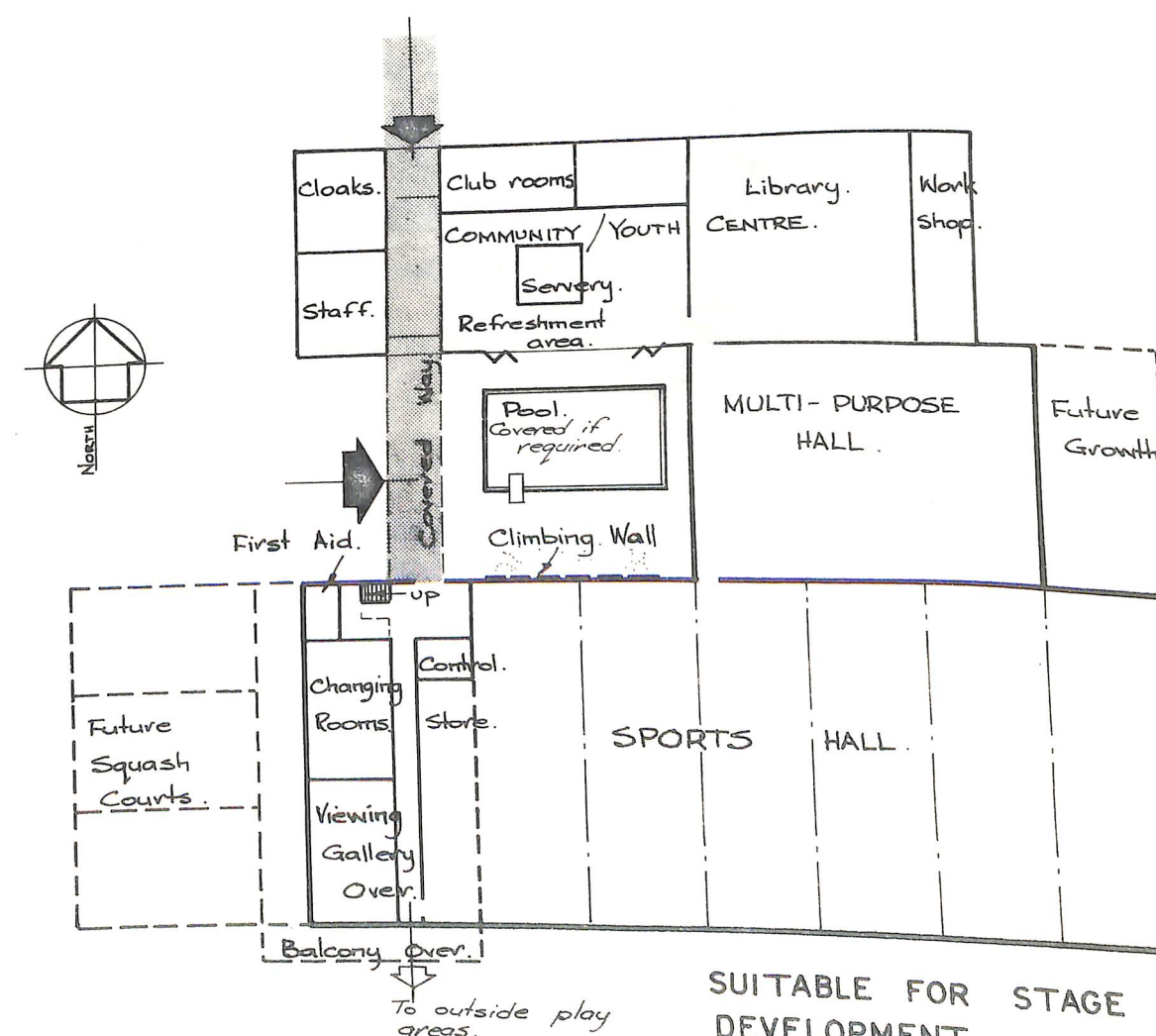
Playing spaces should be kept as flexible as possible to allow for maximum multi-purpose use and flexibility is increased by using portable seating and netting or curtains for partitioning when it is necessary to segregate activities.

Natural lighting to the buildings should preferably be obtained from the south and artificial lighting should be of a high quality. Specialist advice in this regard is worthwhile.

The composition of these facilities into an indoor sports centre or community leisure time centre is illustrated in the two floor plans in the following diagrams.



D 48. SPORTS HALL.



D 49. COMMUNITY CENTRE.

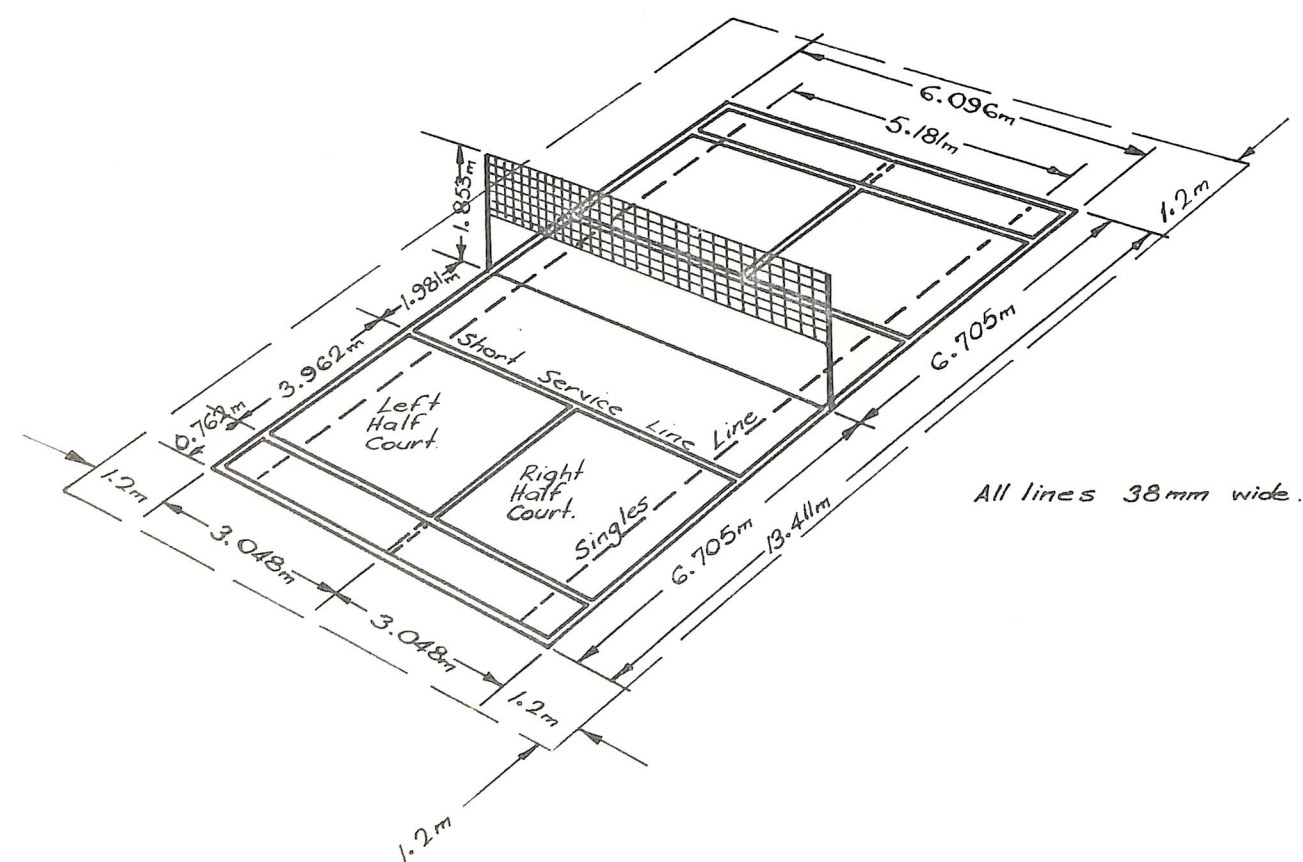
SUITABLE FOR STAGE DEVELOPMENT.



## 12.00 SPACE REQUIREMENTS

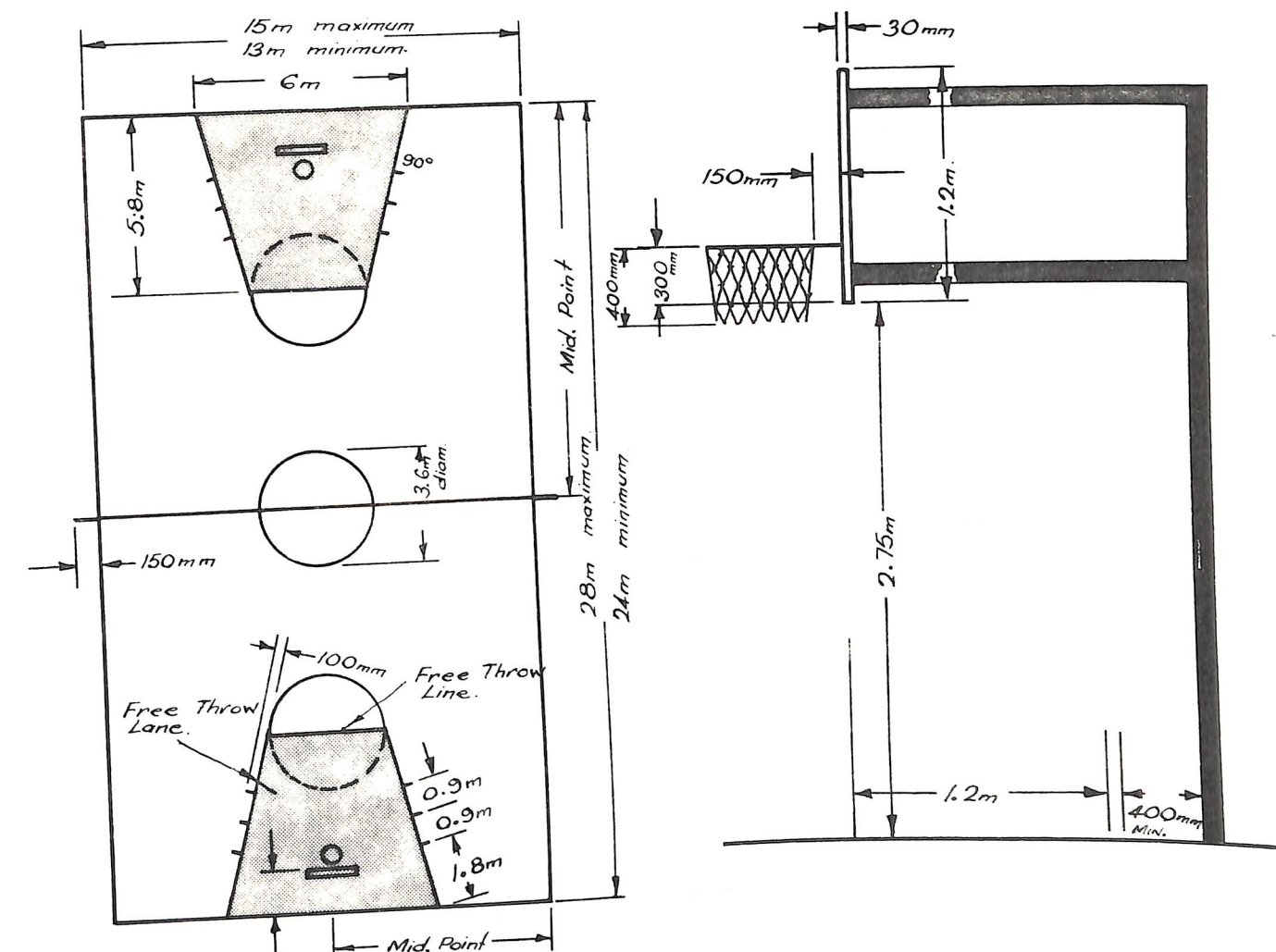
Sizes of the courts for various games which are played indoors in sports halls are shown in the diagrams which follow. The diagrams are self-explanatory.

### 12.01 BADMINTON

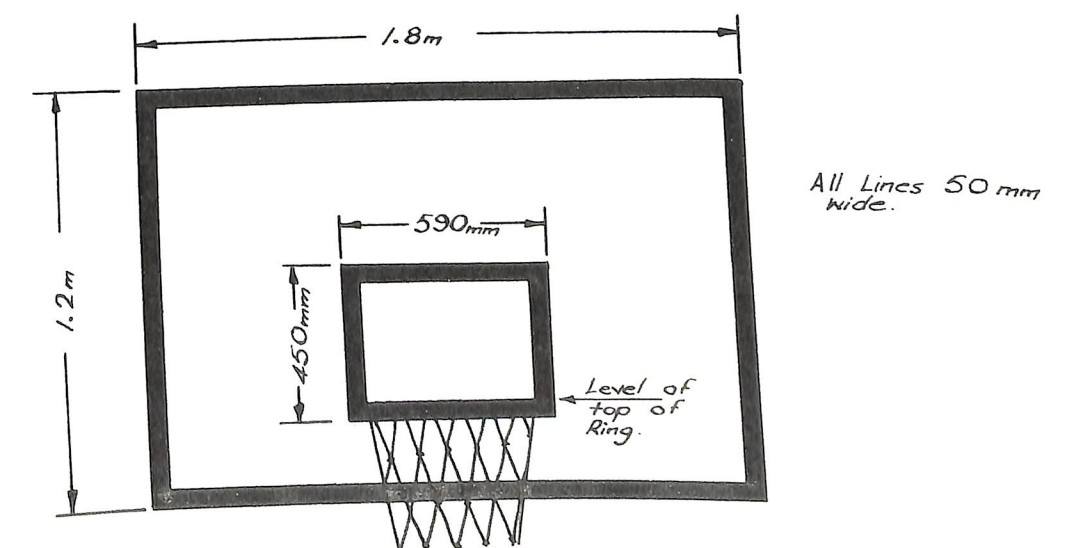


D 50. Dimension of Court.

### 12.02 BASKETBALL



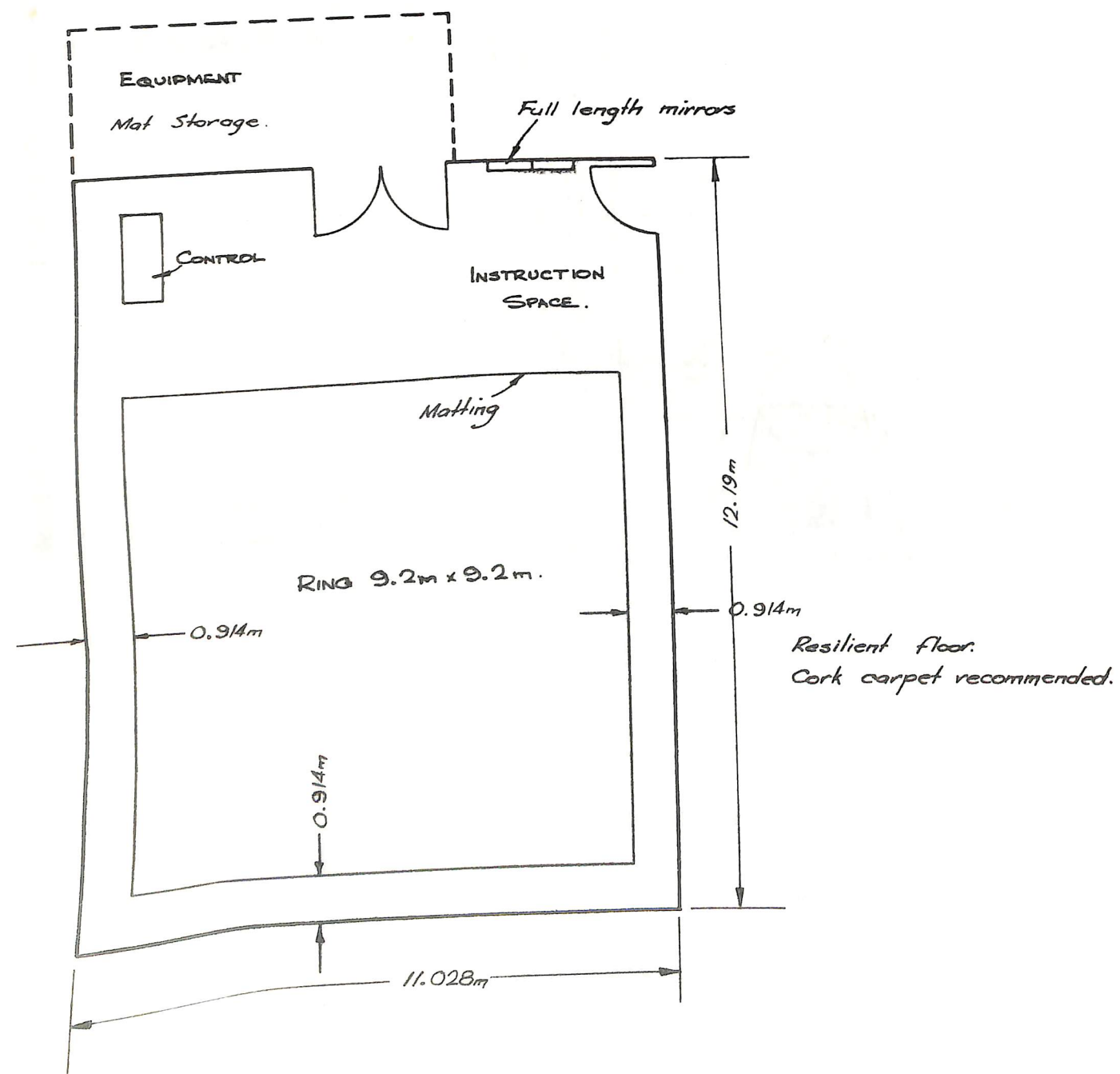
D 51. Dimension of Court.



D 52. Dimension of Backboard and Basket.

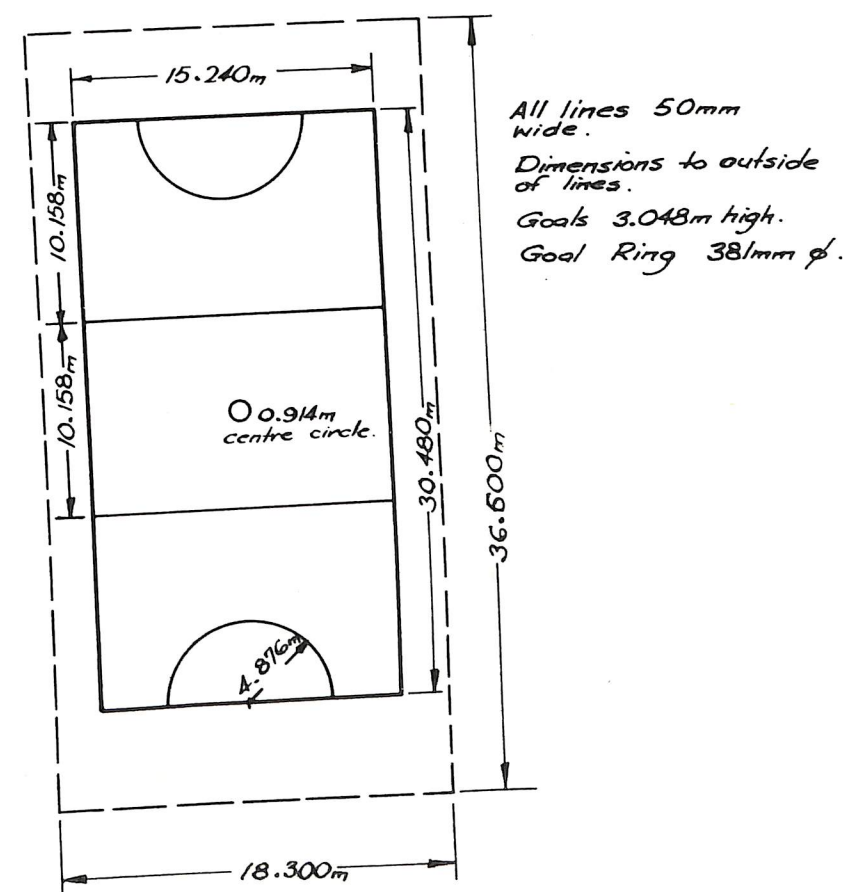


12.03 JUDO



D 53. Room Dimensions.

12.04 NETBALL



D 54. Dimension of Court.



Condition	Number of subjects
DL	4
A3	2
B4	2
A4	4
B5	4



SECTION.





Group	Number of Subjects
DL	8
A3	2
B4	4
A4	6
B5	8



## 13.01 PLANNING THE POOL

(a) The smaller the community, the greater the percentage that will use the pool.

- ### Capacity

- Length

- Width

- (a) Official racing requires lanes of at least 2.5m, width preferably 0.5m margin for outside lanes.



- (b) Most frequently met sizes are 12.8m, 15.8m, 19.8m and 21m.
- (c) Diving board standards vary from 2.4m to 4.3m between wall and board and board and board.
- (d) Pools more than 13.7 wide are more difficult to clean and supervise.
- (e) There is a tendency for bathers to avoid the centre of pools above 13.7m wide.

#### Depth

- (a) Minimum depth for racing is set at 1.2m.
- (b) Class teaching of swimming is most convenient in 0.9m.
- (c) The average child of 7 can stand in 0.9m of water.
- (d) Maximum recommended grade to depth of 1.5m is 1 in 15.
- (e) Diving pool depths for safety purposes are:
- |               |   |                        |
|---------------|---|------------------------|
| 1 metre board | - | at least 2.6m of water |
| 3 metre board | - | 3.5m of water          |
| 5 metre board | - | over 4.4m in depth     |
- (f) Life saving examinations require 2.2m for diving test for bronze medallion (minimum age 12 years) but examiners are allowed discretion as to depth used.
- (g) 85% to 90% of those using pool remain in less than 1.5m of water.

#### Wading Pools

- (a) Water 0.2 - 0.4m deep with a step on all sides of pool.
- (b) Sufficient space between wading pool and main pool to prevent accidents.

#### Shapes

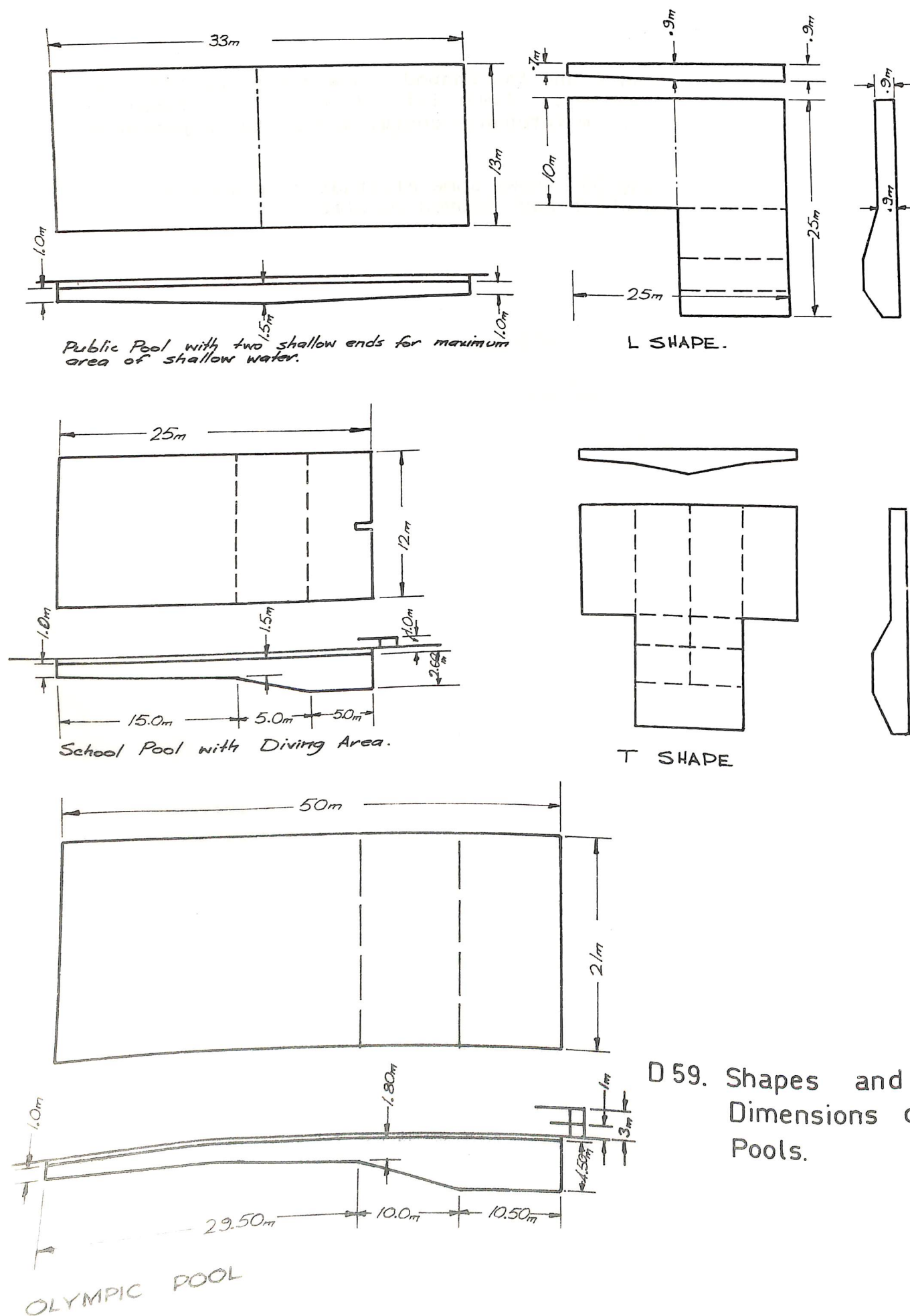
- (a) Most medium and large sized pools are rectangular. This shape is generally the cheapest to build but if bathing and diving are combined, it can become the most expensive and least effective shape.
- (b) Generally pools slope from shallow end to a deep end with or without a modified 'spoon' shape at the deep end. Often a more effective pool would be obtained if both ends were shallow and sloped to a central deep portion.

#### Shapes

- (c) L, F and Fan shaped pools can often offer more capacity, lower initial cost, lower running and maintenance costs, and better appearance.

Drawing D59 shows some alternative shapes of pools which have proved popular.





D 59. Shapes and Dimensions of Pools.

### 13.02 COMPETITION SWIMMING REQUIREMENTS

The following is an extract from "The Handbook of the Amateur Swimming Union of Australia" which sets out the dimensions of pools for the conduct of championships under the auspices of the Amateur Swimming Union.

"36. F.I.N.A. "Specifications for Swimming Pools to be used for the conduct of Olympic Games and World Championships".

- (1) Length - 50.00 metres, Width - 21 metres (minimum). Actual length when touch panels of electronic timing apparatus are removable 50.01 metres. 50.00 metres when touch panels are built in permanently.
- (2) Dimensional tolerances. Against the nominal length of 50.00 metres, a tolerance of plus 0.03metres; 0.3 metre above and 0.8 metre below the surface of the water. This applies to both end walls. These measurements should be certified correct by a surveyor or other qualified official appointed or approved by the governing body of the country.
- (3) Width - 21.0 metres (minimum).
- (4) Walls
  - (a) Shall be parallel and vertical to 1.8 metres below the water surface. End walls shall form right angles with the surface of the water and shall be constructed of solid material, with a non slip surface, extending 0.8 metre below the water surface, so as to enable the competitor to touch and push off in turning without hazard
  - (b) Electronic touch panels must not exceed 0.01 metre in thickness over the entire area, covering the whole finish wall of each lane extending 0.3 metre above and 0.3 metre below the water surface. The electronic equipment for each lane must be connected independently, so that they may be controlled individually. The surface of the touch panels must be of a bright colour and must bear the line markings approved for the end walls.
  - (c) Rest ledges along the pool walls are permitted. They must be no less than 1.2 metres below the water surface, and may be 0.1 to 0.15 metre wide.
  - (d) Gutters - may be placed on all four walls of the pool. End wall gutters if installed must allow for attachment of touch panels to the required 0.3 metre above the water surface. They must be covered with a suitable grill or screen.



- Gutters should be equipped with adjustable shut-off valves so that the water may be kept at a constant level.
- (5) Number of lanes - 8.
- (6) Width of lanes - 2.5 metres each, with 2 spaces each of 50 centimetres (0.5 metres) width outside of lanes 1 and 8. There must be a lane rope separating these spaces from lanes 1 and 8 respectively.
- (7) Lane Ropes - shall extend the full length of the course, secured to each end wall to anchor brackets recessed into the end walls. Each lane rope will consist of floats palced end to end having diameter of 0.05 metre to 0.10 metre. The colour of the floats extending for a distance of 5.0 metres from each end of the pool shall be distinct from the rest of the floats.
- (8) Starting Platforms - The height of the platform above the water surface may be from 0.5 metre to 0.75 metre.  
The surface area - minimum 0.5 metre x 0.5 metre.  
Surface to be covered with non slip material.  
Maximum slope - not more than 10 degrees.  
Handgrips for backstroke starts - must be placed within 0.3 metre to 0.6 metre above the water surface horizontally and vertically. They must be parallel to the surface of the end wall and must not protrude beyond the end wall.  
Numbering - Each starting block must be distinctly numbered on all four sides, clearly visible to the judges, No. 1 being on the right hand side when facing down the course (pool).
- (9) Backstroke turn indicators. Flagged ropes suspended across the pool 1.8 metres above the water surface from fixed supports or stands, shall be set 5.0 metres from each end wall.
- (10) False start rope - shall be suspended across the pool from fixed standards placed 15.0 metres in front of the starting end. It shall be attached to the standards by a quick release mechanism.
- (11) Water - Fresh or salt.  
Temperature - plus 23° to 25° Centigrade.  
plus 74.4° to 78.0 Fahrenheit.  
Level - During competition the water in the pool must be kept at a constant level with no appreciable movement.  
Note: In order to observe health regulations in force in most countries, inflow and outflow of water is permissible as long as no appreciable current or turbulence is created.
- (12) Lighting - Light intensity over starting platforms and turning ends must not be less than 100 foot candles.

- (13) Lane Markings - Shall be of a dark contrasty colour placed on the floor of the pool in the centre of each lane.  
WIDTH - Minimum 0.20 metre; Maximum 0.31 metre.  
LENGTH - 46.0 metres.  
Each lane line shall end 2.0 metres from the end walls of the pool with a distinctive cross line 1.0 metre long and of the same width as the lane line.  
The distance between the centre points of each lane line shall be 2.50 metres.  
Target lines must be placed on the end walls or on the electronic timing pads, in the centres of each lane, of the same widths as the lane lines. They shall extend without interruption from the deck edge (curb), to the floor of the pool. A cross line 0.5 metre long shall be placed 0.6 metre below the water surface, measured to the centre point of the cross line.
- (14) Distance separating swimming pool from diving well - minimum - 5.0 metres.



### 13.03 COMPETITION DIVING REQUIREMENTS

This extract from "The Handbook of the Amateur Swimming Union of Australia" provides the dimensions of diving pools for the conduct of diving championships under the auspices of the A.S.U.A.

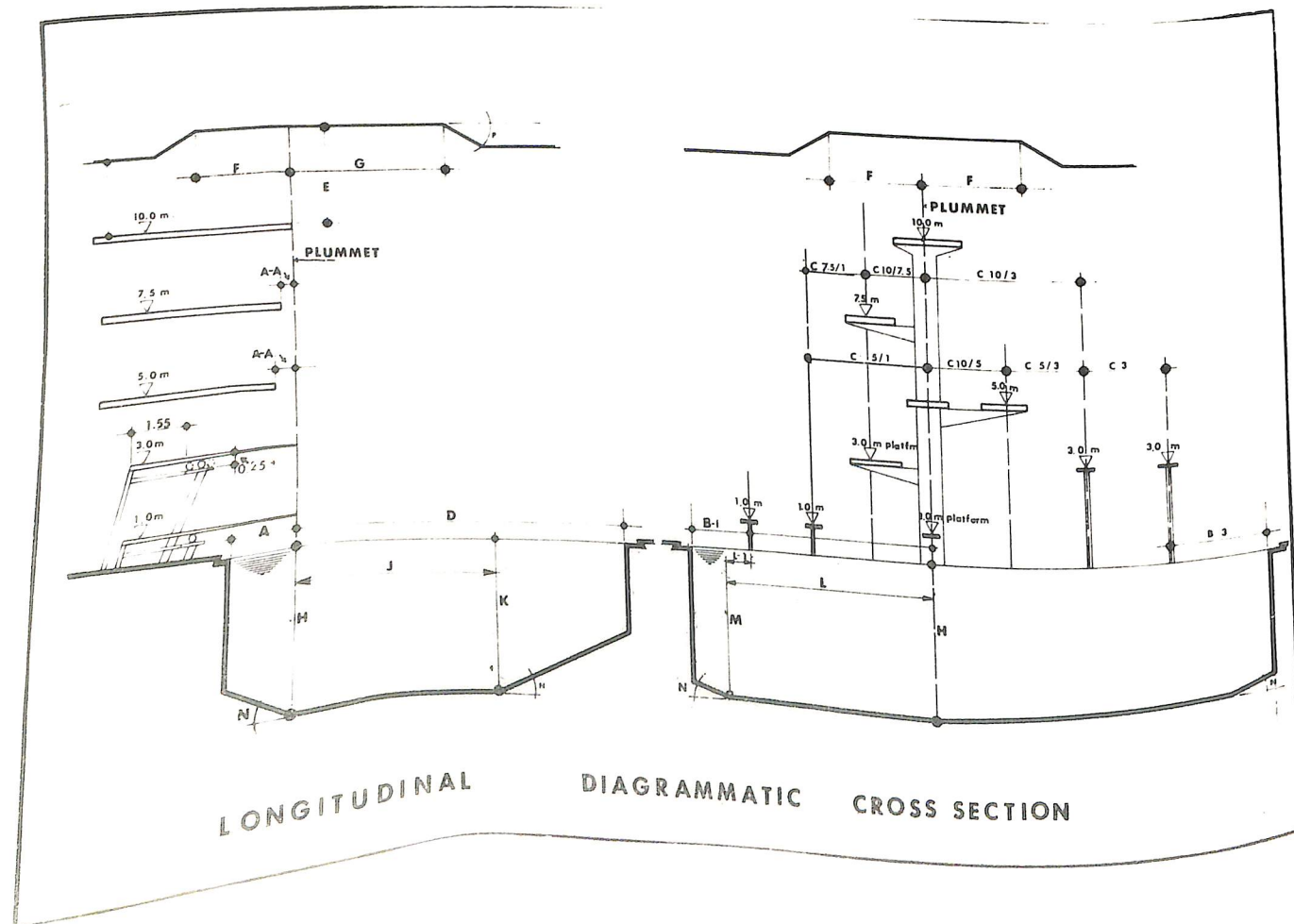
the A.S.U.A.

# FINA International Swim and Diving Fed. (Amateur) DIMENSIONS FOR DIVING FACILITIES

Revised to:

1 May 1969

		1 METER Springboard	3 METER Springboard	1 m 1.3m Platform	5 METER Platform	7.5 METER Platform	10 METER Platform	
	Length	5.0	5.0	4.5	5.0	6.0	6.0	
	Width	0.5	0.5	0.4	0.8	1.5	1.5	
	Height	1.0	3.0	1.0	2.0	5.0	7.5	
	DISTANCE	DEPTH						
A	FROM PLUMMET BACK TO POOL WALL	Designat. A-1 Minimum Dimensions Preferred	A-3 1.50 1.80	A-1 (pl) 1.25 1.25	A-5 1.25 1.50	A-7.5 1.50 AA 7.5/3	A-10 1.50 AA 10/5	
AA	FROM PLUMMET BACK TO PLATFORM BELOW	Dist. Min. Preferred	B-1 2.50 3.00	B-3 3.50 2.30	B-5 4.25 2.90	B-7.5 4.50 4.25	B-10 5.25 2.75	
B	FROM PLUMMET TO POOL WALL AT SIDE	Dist. Min. Preferred	C-1 1.90 2.40	C-3 1.90 2.40	C-3/1 1.90 2.4/3.0	C-5/3 2.10 2.10	C-5/1 2.50 2.75	C-7.5 2.75 2.75
C	FROM PLUMMET TO ADJACENT PLUMMET	Dist. Min. Preferred	D-1 9.00 10.25	D-3 10.25 8.00	D-1 (pl) 8.00 9.50	D-3 (pl) 9.50 10.25	D-5 11.00 11.00	D-7.5 13.50 13.50
D	FROM PLUMMET TO POOL WALL AHEAD	Dist. Min. Preferred	E-1 5.00 5.00	E-3 5.00 5.00	E-1 (pl) 3.00 3.00	E-3 (pl) 3.00 3.00	E-5 3.00 3.40	E-7.5 3.20 3.40
E	ON PLUMMET, FROM BOARD TO CEILING OVERHEAD	Dist. Min. Preferred	F-1 2.50 5.00	F-3 2.50 5.00	F-1 (pl) 2.75 5.00	F-3 (pl) 2.75 5.00	F-5 3.00 3.40	F-7.5 3.20 3.40
F	CLEAR OVERHEAD, BEHIND AND EACH SIDE OF PLUMMET	Dist. Min. Preferred	G-1 5.00 5.00	G-3 5.00 5.00	G-1 (pl) 5.00 5.00	G-3 (pl) 5.00 5.00	G-5 3.00 3.40	G-7.5 3.20 3.40
G	CLEAR OVERHEAD, AHEAD OF PLUMMET	Dist. Min. Preferred	H-1 3.40 3.80	H-3 3.40 4.00	H-1 (pl) 3.40 3.80	H-3 (pl) 3.40 3.80	H-5 3.80 4.00	H-7.5 4.10 4.50
H	DEPTH OF WATER AT PLUMMET	Dist. Min. Preferred	J-1 6.00 3.70	J-3 6.00 3.90	J-1 (pl) 6.0/3.30 3.70	J-3 (pl) 6.0/3.30 3.70	J-5 3.70 3.90	J-7.5 4.00 4.40
J-K	DISTANCE AND DEPTH, AHEAD OF PLUMMET	Dist. Min. Preferred	K-1 2.50 3.70	K-3 3.25 3.70	K-1 (pl) 2.05/3.30 3.70	K-3 (pl) 2.65/3.30 3.70	L-5 4.25 3.90	L-7.5 4.50 4.40
L-M	DISTANCE AND DEPTH, EACH SIDE OF PLUMMET	Dist. Min. Preferred	M-1 2.50 3.70	M-3 3.25 3.70	M-1 (pl) 2.05/3.30 3.70	M-3 (pl) 2.65/3.30 3.70	L-5 4.25 3.90	L-7.5 4.50 4.40
N	MAXIMUM ANGLE OF SLOPE TO REDUCE DIMENSIONS	POOL BOTTOM	30 DEGREES	APPROXIMATE	1:2	If platform wider than minimum, then add to required dimension 1/5 of the extra width (or width) of the platform (or platform)		
P	BEYOND FULL REQUIREMENTS	CEILING HEIGHT	30 DEGREES	APPROX.	1:2			



### 13.04 TEACHING OR LEARNER POOLS

The principal feature of this type of pool is that it must be absolutely safe for non-swimmers. It is rectangular on plan, with an almost flat bottom, the depth generally varies from 0.80m to 1.0m. The maximum depth should never exceed 1.20m, a minimum length of 12.0m and a minimum width of 7.0m is recommended. A useful feature for teaching pools is for the walkway around the pool to be lower than the deck level, so that the instructor can carry out his duties without having to bend down.

While the actual dimensions of learner pools are not critical in the same way as for pools used for competitions, there is an advantage for practising if the length or width is a fraction of 100m. Another feature which is useful in a wide pool is the provision of wide shallow steps for the full length of the pool; this enables mothers to take even very small children into the pool with them.

The following table sets out some useful dimensions and capacities of learner pools.

Length m	Width m	Depth m	Capacity litres
12.5	7.0	0.75 - 0.90	72,000
16.67	8.0	0.75 - 0.90	108,000
20.0	10.0	0.75 - 0.90	165,000
20.0	12.0	0.75 - 0.90	210,000
25.0	16.67	0.75 - 0.90	340,000



### 13.05 HEATED SWIMMING POOLS

To obtain greater all-round use of a swimming pool, many authorities are now considering the advantages of heating the pool. The heated swimming pool gives the advantage to a community of providing a swimming facility all the year round and makes greater use of a substantial community investment. It also provides opportunities for competitive swimmers to continue year round training.

Some outdoor pools have been heated but these are not able to be used full time and extend the swimming season by about six weeks on each end of summer.

The indoor heated swimming pool is much more suitable but costs are substantial. The common size for an indoor swimming pool is 25 metres long by 8.5 metres wide ranging in depth from 1 metre to 2 metres. This size pool would require a building approximately 35 metres by 23.5 metres by 5.5 metres high clear of the water. It is essential to remember not only the water must be heated in an indoor swimming pool but the air in the pool hall also must be kept at a temperature approximately 1°C higher than the water to avoid condensation.

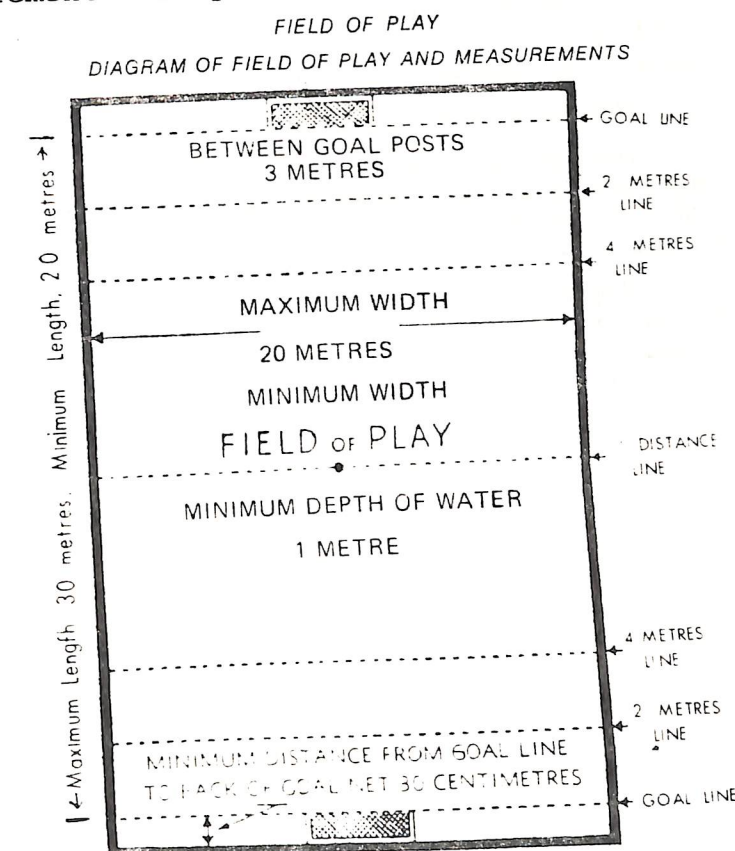
It is doubtful whether, in the Australian summer, the indoor pool will achieve very great popularity. For this reason, greater attention might be given to the use of inflatable or tension structures which could be used for temporary cover over the outdoor pool or the learner pool in a complex during the winter months. The cost would be substantially reduced but the development might satisfy the need for heated swimming facilities.

Research has been carried out by the Commonwealth Scientific and Industrial Research Organisation into the technique of solar heating and pool designers should not overlook this efficient method of heating swimming pools. The initial cost might be greater than using the more common gas, oil or electrical heating equipment but the operating costs are much less.

### 14.00 WATER POLO

#### 14.01 SPACE REQUIREMENTS

This extract from "The Handbook of the Amateur Swimming Union of Australia" sets out the requirements for playing Water Polo.



The uniform distance between the respective goal lines must not exceed 30 metres nor be less than 20 metres. The uniform width must not exceed 20 metres nor be less than 8 metres.

For matches played by women, the maximum measurements are 25 metres by 17 metres.

Distinctive marks must be provided on both sides of the field of play to denote the goal line, two metres and four metres from that line, and half distance between the goal lines. These markings must be clearly visible throughout the game. The boundary of the field of play at both ends is 0.30 metre behind the goal line.

The dimensions shall be as extensive as possible, subject to the above measurements. Sufficient space must be provided to enable the referee to have free way from end to end of the field of play. Space must also be provided at the goal lines for the goal judges.

The depth of water must not be less than 1 metre. For International Matches, it is strongly recommended that, where possible, the field of play shall be of maximum dimensions and that the depth of the water shall be at least 1.80 metres.



DL A3 B4 A4 B5

#### Goals

The Goal posts and crossbar must be of wood or metal, with rectangular sections of 0.075 metre, square with the goal line and painted white. The goal posts must be fixed rigid and perpendicular at each end of the playing space, equal distances from the sides and at least 0.30 metre in front of the ends of the field of play or of any obstruction. Any standing or resting place for the goal-keeper, other than the floor of the bath, is not permitted.

The inner side of the goal posts must be 3 metres apart.

The underside of the crossbar must be 0.90 metre above water surface when the water is 1.50 metres or more in depth, and 2.40 metres from the bottom of the bath when the depth of the water is less than 1.50 metres.

Limp nets must be attached to the goal fixtures to enclose the entire goal space, securely fastened to the goal posts and crossbar and allowing not less than 0.30 metre clear space behind the goal line everywhere within the goal area.

## FACILITIES

### 15.00 INNOVATIONS IN POOLS

#### 15.01 HYDRAULICALLY OPERATED WALLS AND FLOORS

A feature which should be considered in the planning of new swimming pools is the hydraulically operated separating wall. This can be used in conjunction with a movable floor as shown in the sketch opposite or on its own to divide a large pool into two distinct areas, one for swimmers with a depth of say 1.50m and over, and the other for the more timid swimmers and non-swimmers. The great advantage of such a wall is that it provides a completely safe barrier between the shallow and deep sections of the pool. The wall can be reinforced concrete finished in ceramic tiles (which is undoubtedly the best), or aluminium or steel suitably protected and decorated.

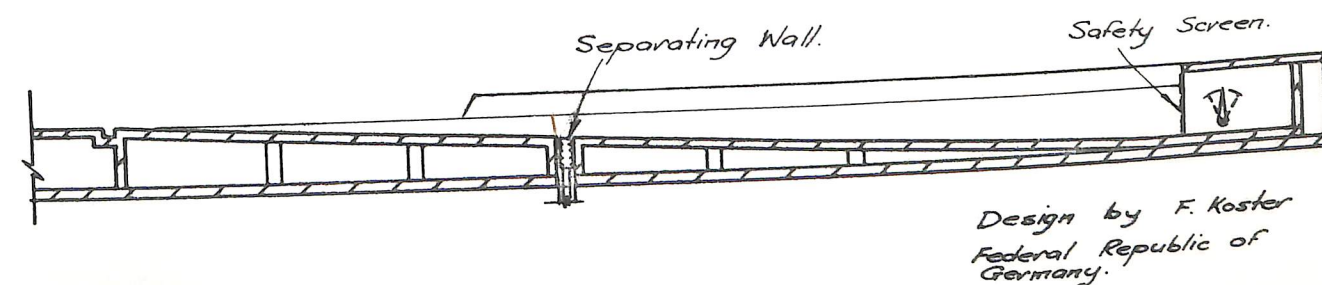
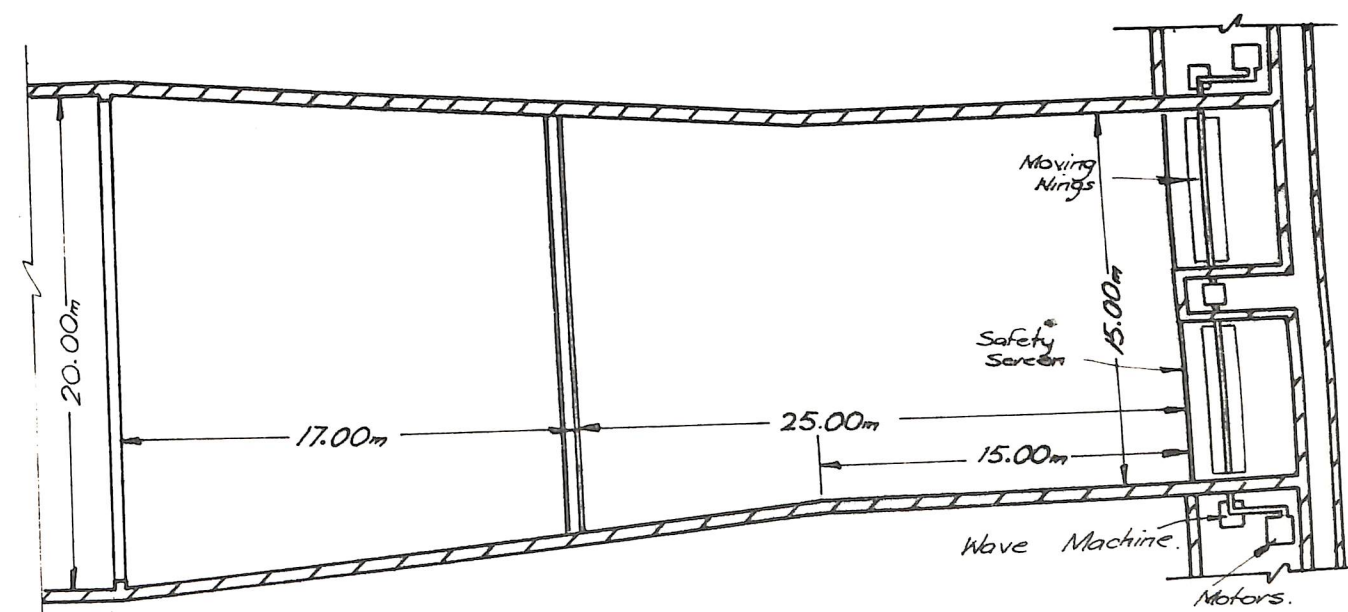


## 15.02 WAVE MAKING EQUIPMENT

Certain hydraulic characteristics, such as the height of the waves and the point at which they break and the amount of backwash and cross current created are of the utmost importance to the success of the pool and careful hydraulic design is necessary, usually involving a model.

The principal features of the pool shown in the D60 are:

- The pool is divided into two sections, one is 25.0m long x 15.0m wide with a depth of 1.30m to 2.10m which can be used for competitions. The other section is 17.0m long and widens from 15.0m to 20.0m; the depth decreasing uniformly from 1.30m to zero.
- The trapezoidal shape and the uniformly sloping floor create the effect of a shelving beach with the waves breaking naturally. Another reason for the trapezoidal shape is to provide the maximum area at the shallow end for non-swimmers.
- At the 25.0 metre line, there is an hydraulically operated submerged wall which can be raised during competitions or for any other reason, such as forming a separate area of pool which is only 1.30m deep.
- In the deep section of the pool (for a distance of about 32.0m from the deep end) the edge of the pool is raised.
- The wave making equipment consists of two swing-wings (known in German as "Schwingflügel") which operate together but not in complete unison; one moves at 17.5 oscillations per minute and the other at 18.0. A total of 80 brake horse power is required (i.e. 40 hp per wing).
- A safety screen is provided in front of the swinging wings.

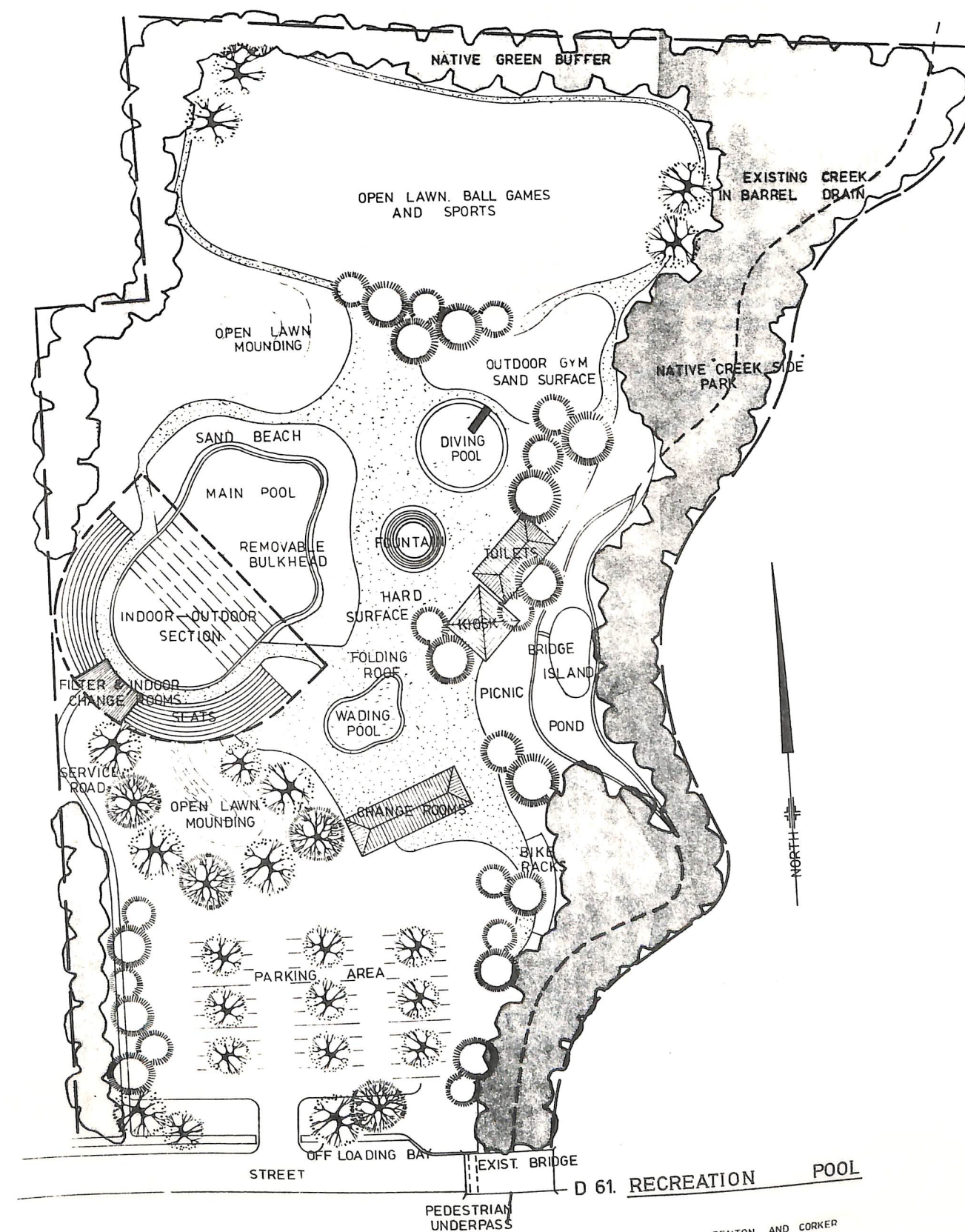


D 60. Pool with wave making machine.



# 15.03 RECREATION POOL

Not all pools are required for competition and consideration should be given to using free forms and shapes to give extra length of edge to shallow water. The illustration shows one concept of a pool complex concerned principally for enjoyment but with a 25 metre straight for school competition activity. The proposal includes a number of interesting possibilities.





## 16.00 BOATING

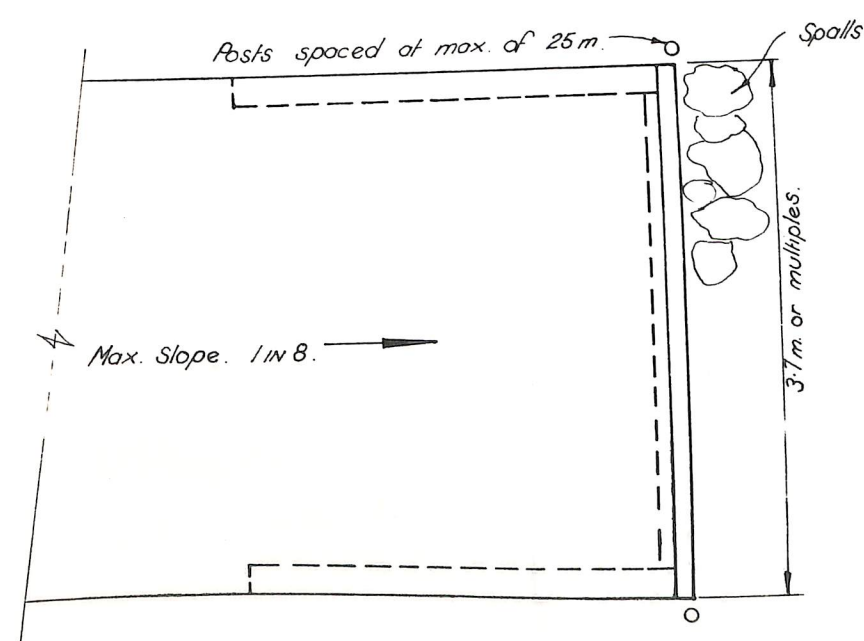
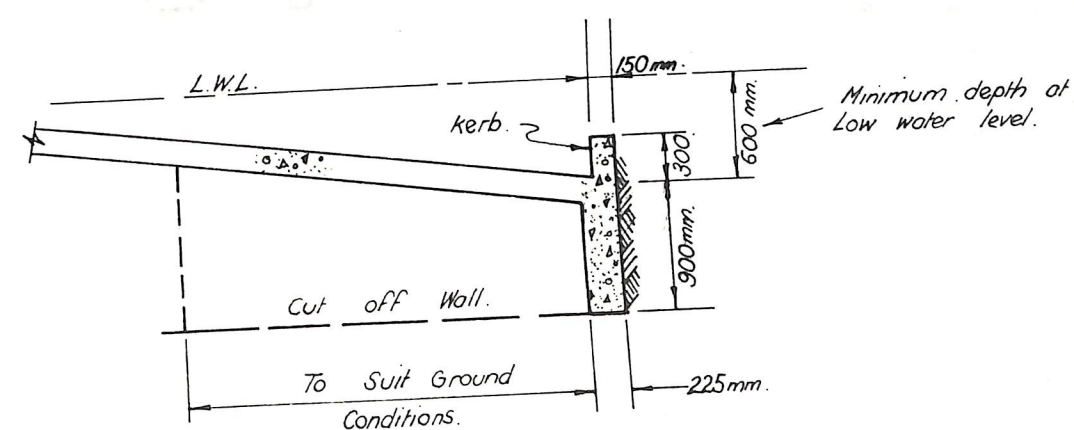
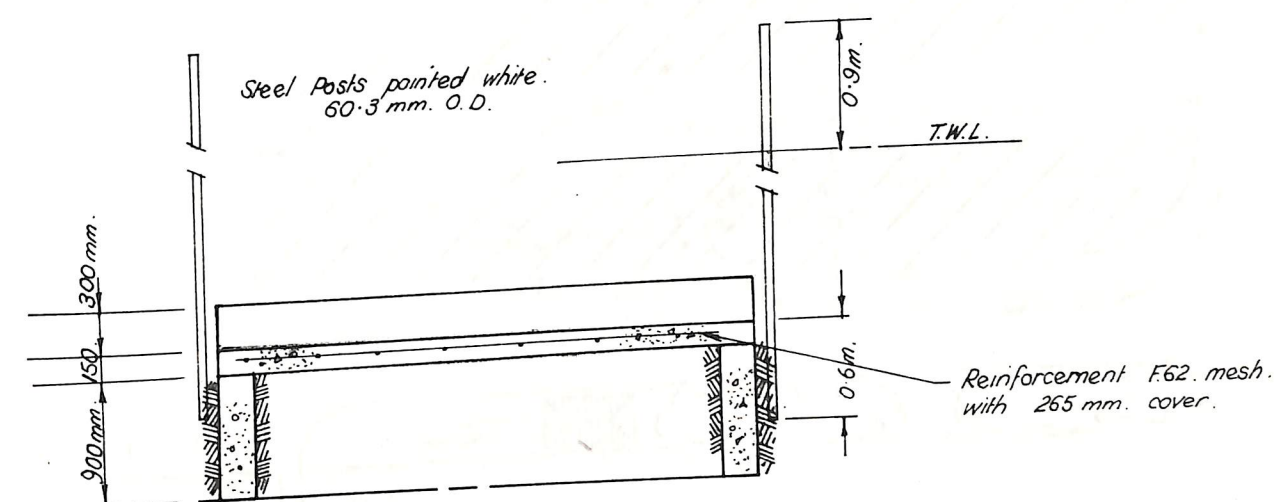
A popular and growing activity, it covers many forms - sailing, water skiing, fishing, pleasure.

The following information is applicable to all classes of boats.

## 16.01 BOAT RAMPS

The drawing shows leading dimensions and important details of reinforced concrete boat ramps. The concrete should attain a minimum compressive strength of 30 mPa at 28 days and should have a water/cement ratio of not greater than 0.50.

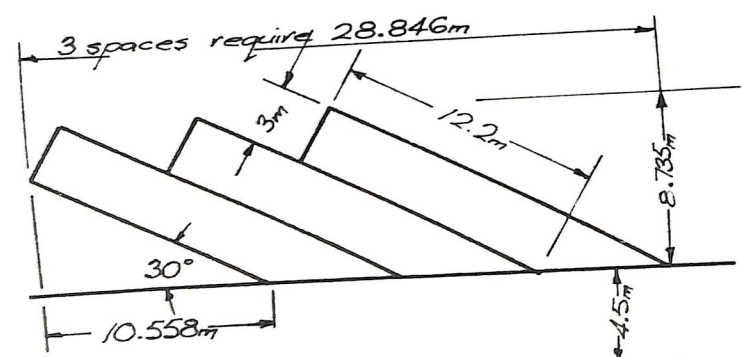
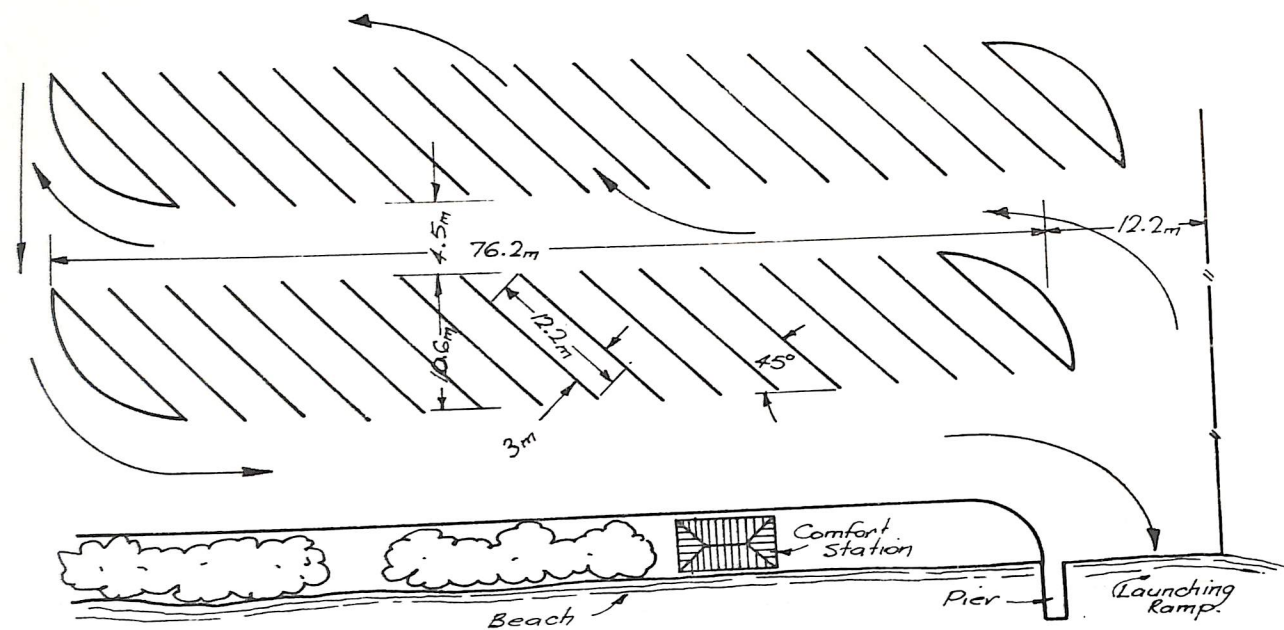
The surface should be finished to a rough broomed texture.



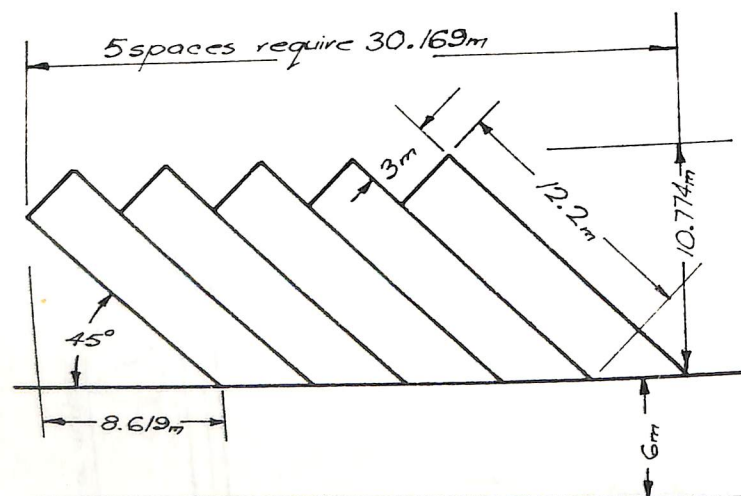
CONCRETE COMPRESSIVE STRENGTH.  
30 m Pa. at 28 days.

D 62. BOAT RAMP  
CONSTRUCTION DETAILS.

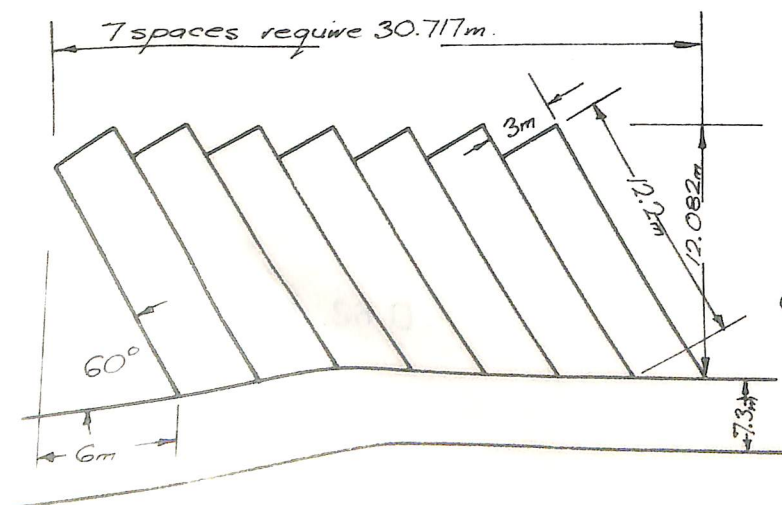




30° PARKING.



45° PARKING.



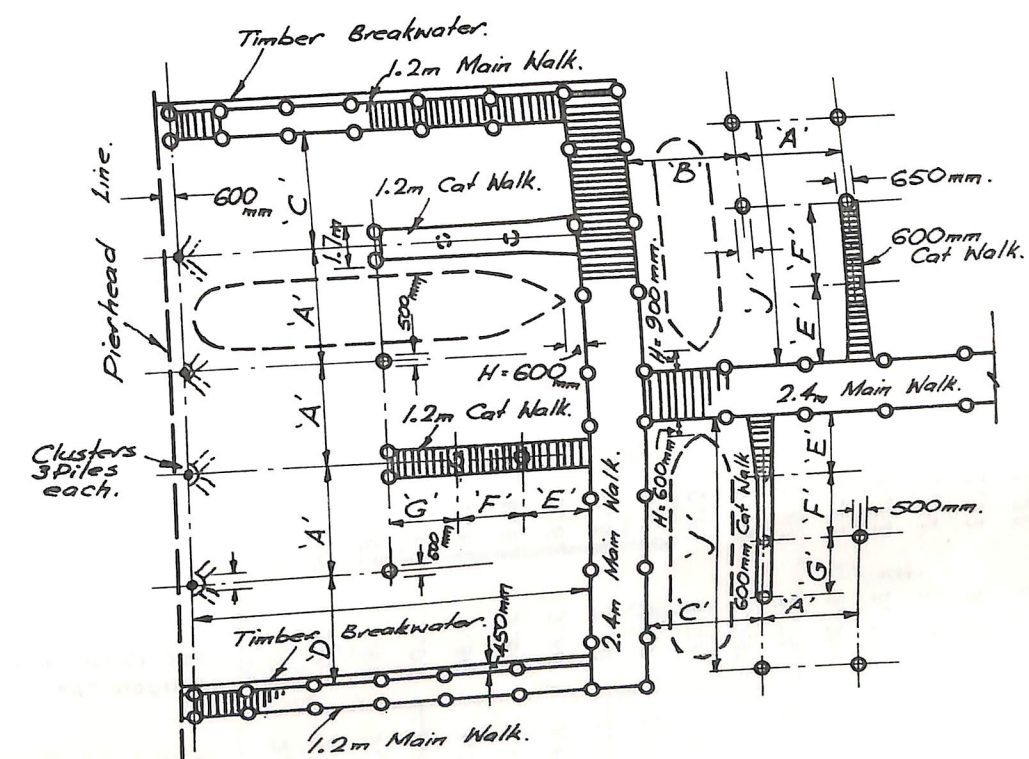
60° PARKING.

D 63. Parking at Boat Ramps.

## 16.02 MARINAS

The boat docking facilities are one facility only at a marina which usually includes boat launching ramps, boat service areas for both commercial and private boat owners to carry out maintenance and repairs, snack bar and perhaps club room facilities.

The details shown below provide the typical dimensions for adequate boat mooring slips and catwalks.

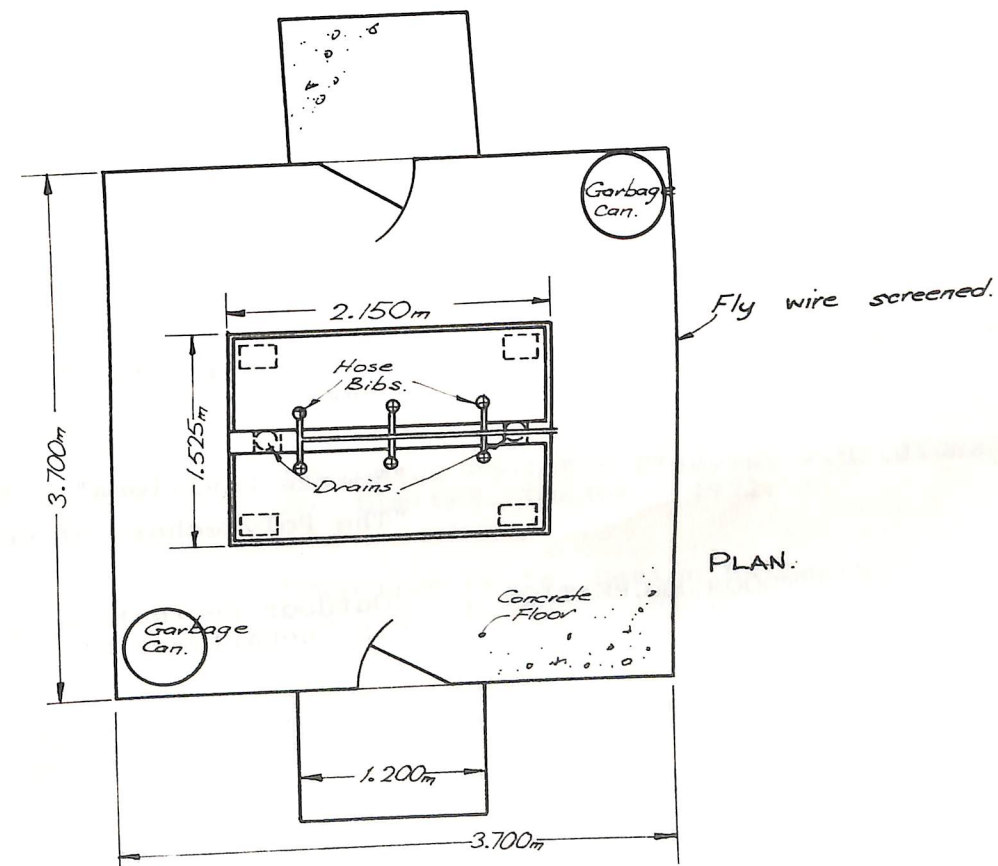


D 64. Diagram of Slips and Cat Walks.



# 16.03 FISH CLEANING FACILITY

An innovation at recreation areas which are heavily used and where good fishing success is either proven or predicted, is the provision of a fish cleaning facility near the points of egress from the fishing area. The facility consists of a sink constructed of galvanised iron to general camp table dimensions but with a rim height of 0.91m - 0.97m. It should have a rim 100 mm to 150 mm above the sink bottom. The sink should drain into a sump which can be pumped out or cleaned. A horizontal pipe may be installed about 300 mm above the centre of the sink with a minimum of two spring loaded, self-closing, hose taps each with a 1m length of hose. Access to both sides of the sink would allow use by four fishermen at once.



D65. Fish Cleaning Facility.

TABLE OF DIMENSIONS FOR SLIPS AND CATWALKS (REFER D64)

Length Group for Yachts	Beam to be provided for	Minimum clearance for beam	Minimum clearance width of slip	Allow. for half anchor pile	Allow. for half catwalk	Gross slip width Type "A"	Gross slip width Type "B"	Gross slip width Type "C"	Gross slip width Type "D"	Usable width catwalk	1st Catwalk span Length "E"	2nd Catwalk span Length "F"	3rd Catwalk span Length "G"	Total length of Catwalk	Dist. "J" to Anchor pile
7.6	2.3	0.9	3.2	0.25	0.33	3.78	3.71	3.78	-	0.61	3.05	2.44	-	5.49	8.5
9.1	2.6	0.9	3.5	0.25	0.33	4.08	4.01	4.08	-	0.61	3.05	2.44	-	5.49	8.5
10.6	2.9	0.9	3.8	0.25	0.33	4.38	4.32	4.38	-	0.61	3.05	3.05	-	6.10	10.1
12.2	2.9	0.9	3.5	0.25	0.33	4.08	4.01	4.08	-	0.61	3.66	3.05	-	6.71	11.6
13.7	2.6	0.9	4.4	0.25	0.33	4.98	4.93	4.98	-	0.61	3.66	3.66	-	7.32	12.8
15.2	2.9	1.1	4.0	0.25	0.33	4.58	4.47	4.58	-	0.61	3.66	3.66	-	7.32	12.8
16.7	2.9	1.1	4.7	0.25	0.33	5.28	5.23	5.28	-	0.61	3.66	3.66	-	7.93	14.3
18.3	3.7	1.1	4.1	0.25	0.33	4.65	4.62	4.65	-	0.61	4.27	3.66	-	7.93	14.3
21.3	2.9	1.2	5.0	0.25	0.33	5.88	5.84	5.88	-	0.61	2.74	2.74	-	8.53	15.8
24.4	3.8	1.2	4.4	0.25	0.33	6.64	6.68	6.64	-	0.61	3.35	3.35	-	10.36	18.6
	4.1	1.5	5.3	0.48	0.86	7.34	7.14	7.52	-	1.22	3.35	3.35	-	10.36	21.9
	4.4	1.5	5.9	0.48	0.86	7.74	7.60	7.98	-	1.22	3.35	3.35	-	10.36	21.9
	4.9	1.5	6.4	0.48	0.86	8.84	8.60	8.98	-	1.22	3.35	3.35	-	10.36	25.0
	5.0	1.5	6.6	0.48	0.86	9.94	9.60	9.98	-	1.22	3.35	3.35	-	10.36	25.0



## BIBLIOGRAPHY - OUTDOOR ACTIVITIES

The National Playing Fields Association - London has published a wide variety of journals, articles, papers, reports and studies which are relevant to this subject and a list of publications available is available from the Association at Playfield House, 57B Catherine Place, London. S.W.1.

Other useful references include :

- |                                     |  |
|-------------------------------------|--|
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