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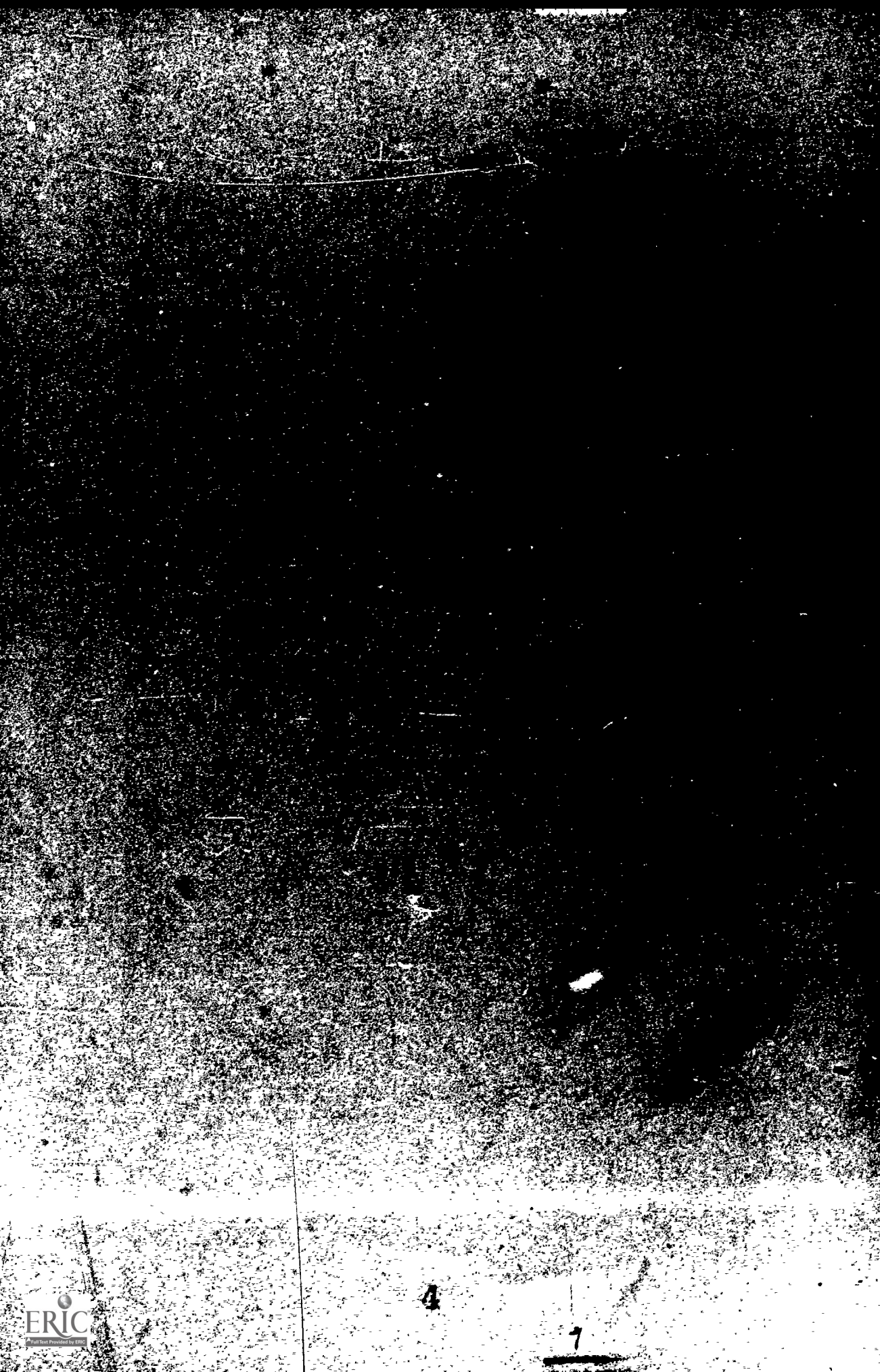
ABSTRACT

This booklet makes suggestions regarding space relationships, location, size, and technical requirements of physical and health education facilities. The facilities may include all or some of the following instructional areas: gymnasium, auxiliary open-space area, indoor area (classroom), ancillary area, and swimming pool. (Author)

Hon. Thomas L. Wells
Minister of Education

Note:
The metric dimensions noted in the text are direct conversions from the imperial measures which are used for those sports operated under Canadian rules. If such sports (eg., basketball) switch to international rules then these dimensions will change accordingly. Some swimming and track and field events already use metres as their standard.



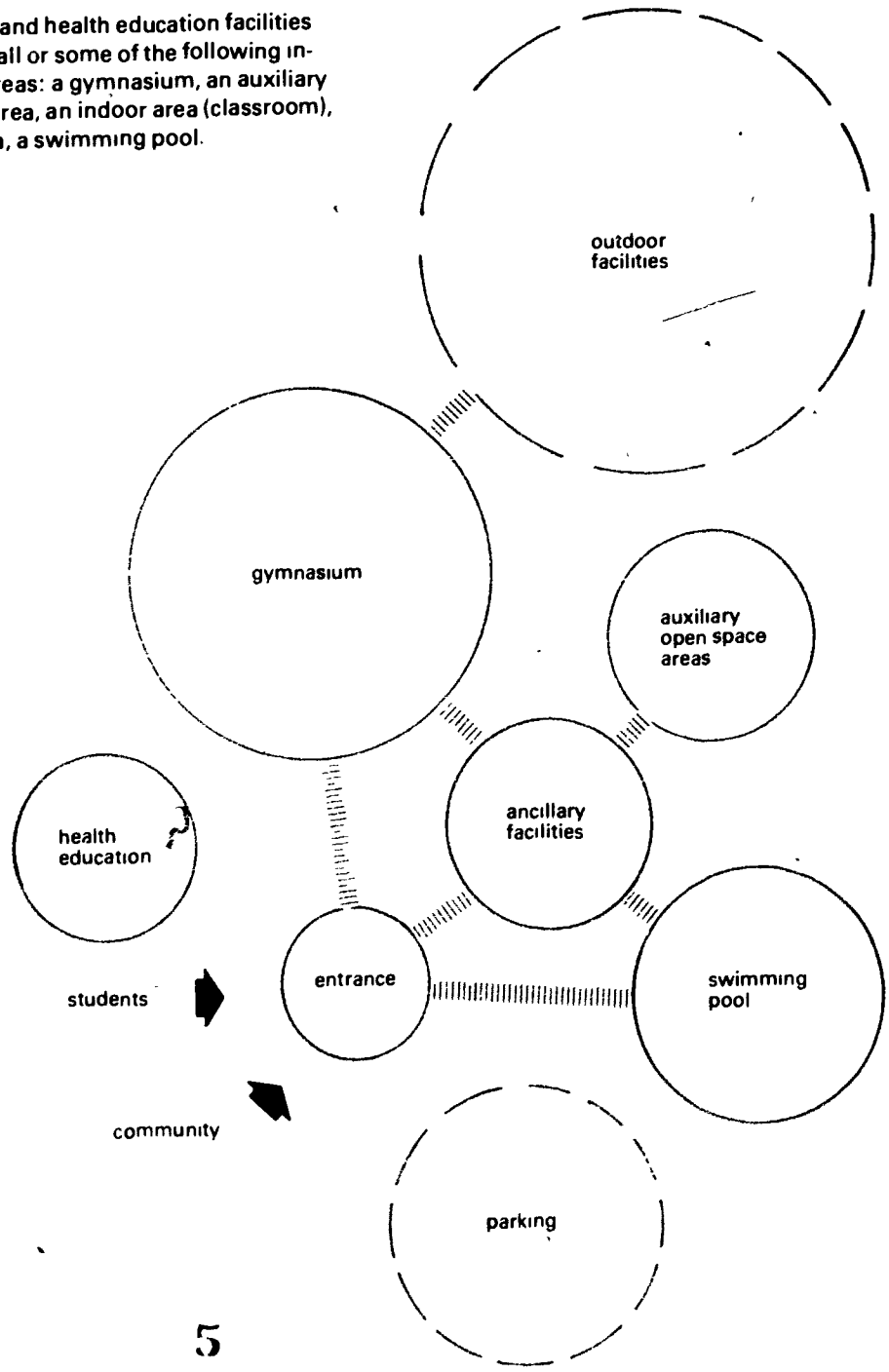
Introduction

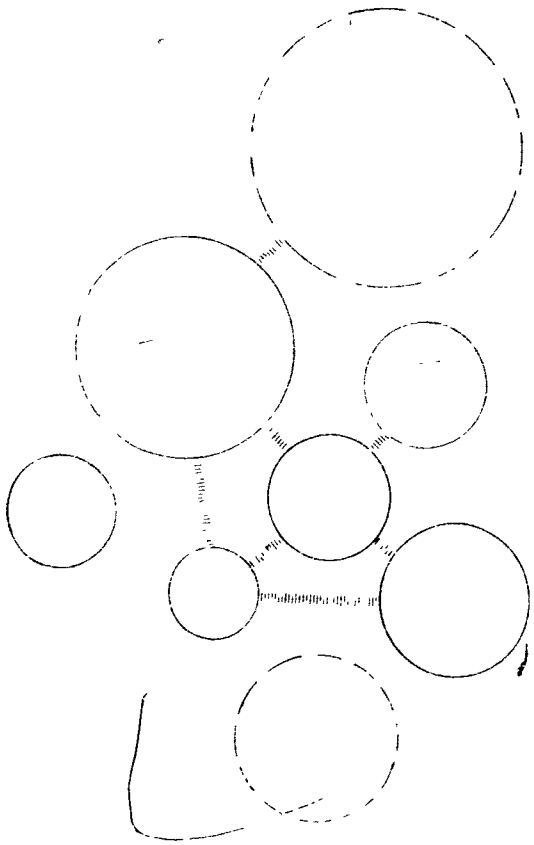
Physical and health education provides a means of facilitating the physical, mental, social and emotional development of students. This booklet makes suggestions regarding space relationships, location, size, and technical requirements of physical and health education facilities. It is hoped that the information will assist those concerned with the planning and operation of such facilities.

It is suggested that the services of the Regional Office of the Ministry of Education be employed early in the planning process, prior to the construction of new or additional facilities.

Not all the suggested areas discussed herein are eligible for legislative grants under the Capital Grant Plan of the Ministry of Education.

The physical and health education facilities may include all or some of the following instructional areas: a gymnasium, an auxiliary open space area, an indoor area (classroom), ancillary area, a swimming pool.



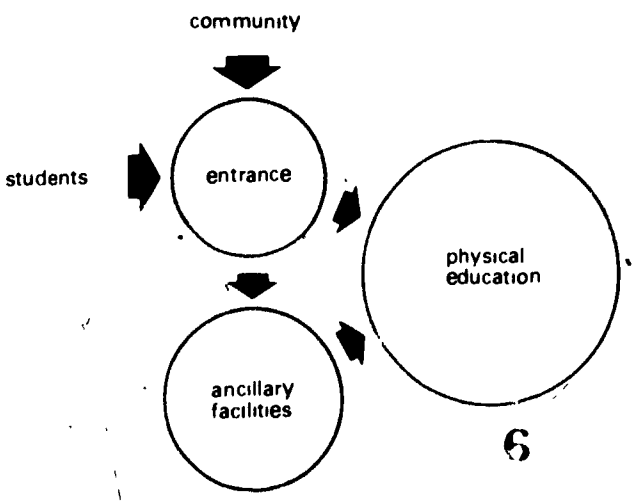


Students deserve the opportunity to develop to their maximum potential as individuals and as members of society.

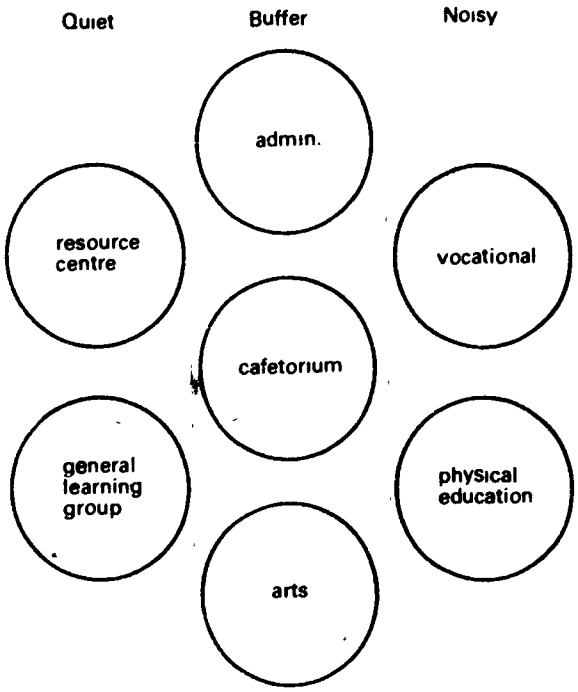
In the planning of facilities to serve this general aim it is necessary to study the physical and health education curriculum guidelines published by the Ministry of Education, as well as the particular school program based on these guidelines. Facility planning must follow and be highly responsive to program planning. Many community needs can also be served by well planned school facilities.

Of prime importance will be the design of facilities for maximum flexibility, and for safe and effective use.

The location of the physical education facilities will be governed by several factors. Those are:

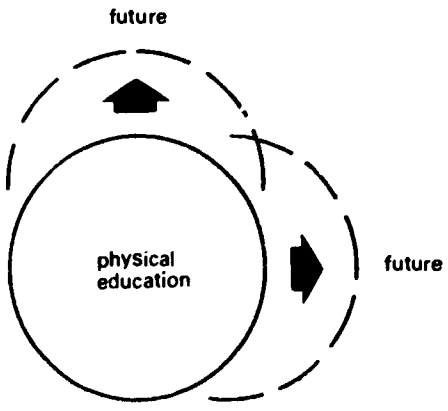


Accessibility
A common access route to the facilities for both students and the community is possible; however, separate access routes may be more desirable. Easy access from the facilities to playing fields, outdoor activity areas and parking is necessary



Relation to Other School Facilities
Increased community use of the school suggests that a location in proximity to such commonly used facilities as an auditorium or cafeteria may be desirable.

Many of the activities generate a high noise level, therefore proximity to other noisy areas such as the vocational shops might be advisable. Separation from teaching and study areas is necessary. Such separation may consist of corridors and service spaces.



Expansion
Possible future expansion of the facilities must be considered in the early planning stage. Such factors as program development, additional activities, and any projected enrolment increase must be borne in mind.

Number of Instructional Areas.
The total number of indoor instructional areas can be roughly calculated by multiplying the number of classes by the physical and health education periods per week, and dividing by the total school periods per week. For example, if there are 40 classes, 4 periods per week of physical and health education, and a total of 40 school periods per week, then:

$$\frac{40 \times 4}{40} = 4 \text{ instructional areas}$$

The type and arrangement of these areas will depend upon the planned program and schedule of activities. Some possible solutions might consist of:

- two double gymnasia;
- one single gymnasium, one double gymnasium, one auxiliary open-space area;
- one double gymnasium and two auxiliary open-space areas.

Size

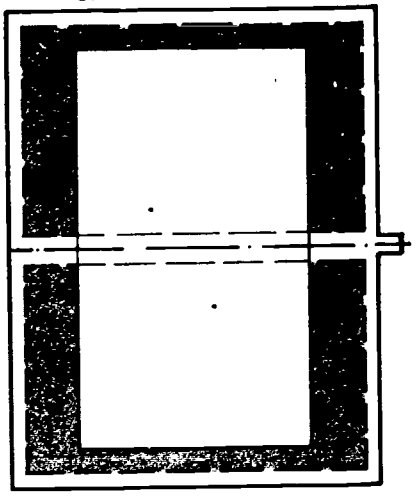
Single Gymnasium
Recommended clear dimensions are 50′ x 80′ (15.24m x 24.38m).

For instructional purposes this area will provide
– one basketball court
– three badminton courts
– two volleyball courts.

single gymnasium

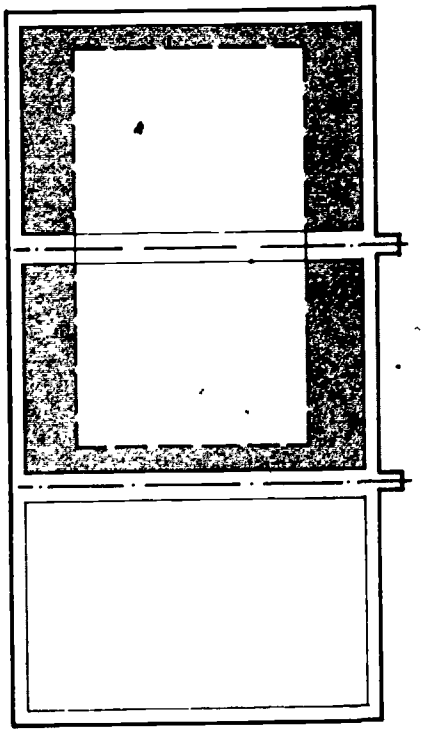
Double Gymnasium
Recommended clear dimensions are 80′ x 100′ (24.38m x 30.48m).
An operable partition between the sections of the gymnasium is a necessary feature. Where spectator accommodation is required, it is suggested that portable folding bleachers be placed on the *long* dimension of the gymnasium.

double gymnasium



Triple Gymnasium
Recommended clear dimensions are 80′ x 150′ (24.38m x 45.72m). Open or closed facilities can be created with the use of operable and/or solid partitions. Selection will depend upon the requirements of the physical education program.

triple gymnasium

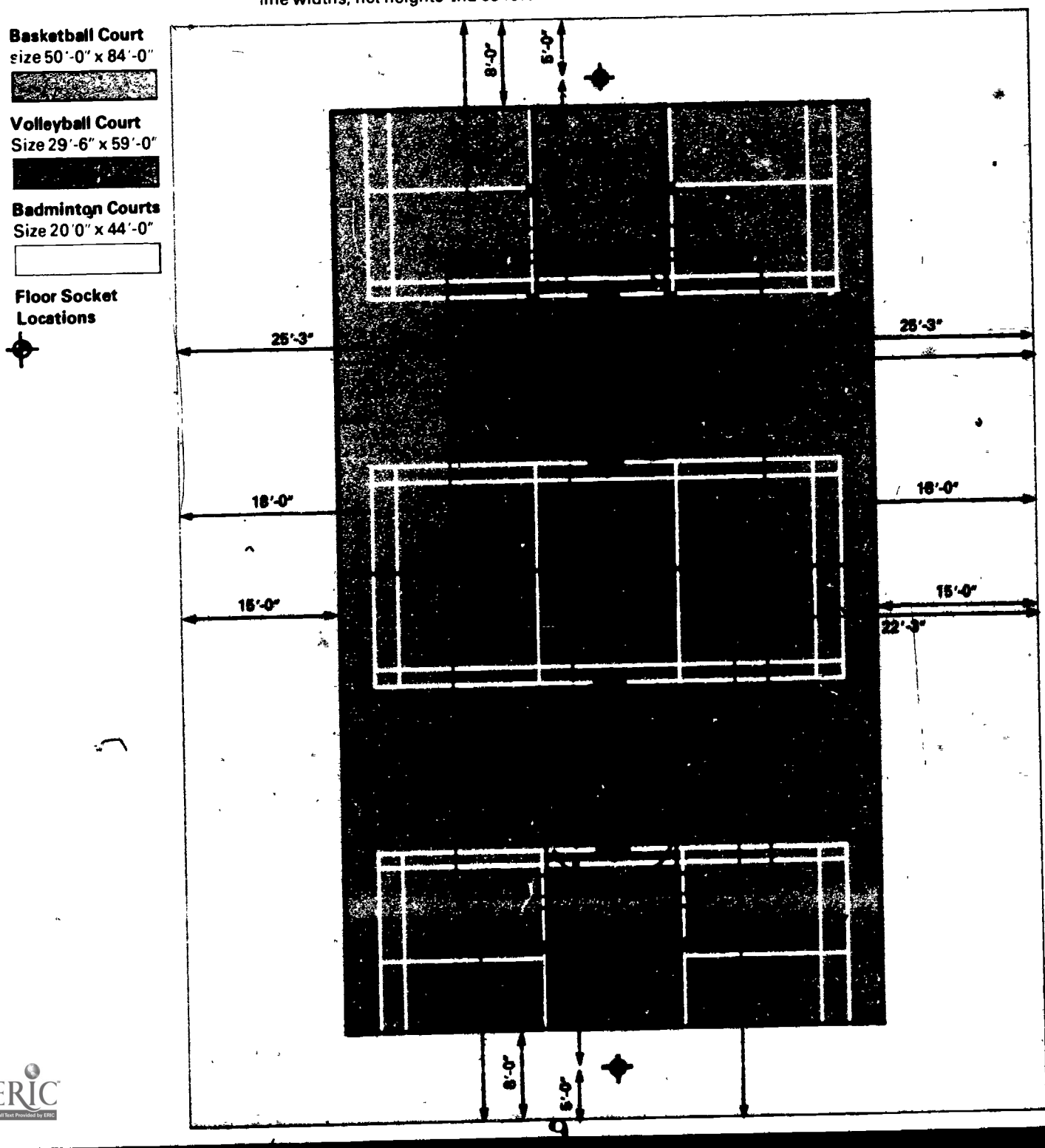


Floor Markings

The court locations indicated on the following diagrams are designed to suit the recommended size of a double gymnasium 80′ x 100′ (24 38m x 30.48m).

Interscholastic Courts
The current official handbooks for high school sports should be consulted for the latest information regarding internal court dimensions, line widths, net heights and so forth. Handbooks can be obtained from the Ontario Federation of School Athletic Associations, Toronto.

An addition to the official markings may prove advantageous: the use of an extra wide line (4"-10 cm) for the perimeter of the regulation basketball court.



Instructional Courts

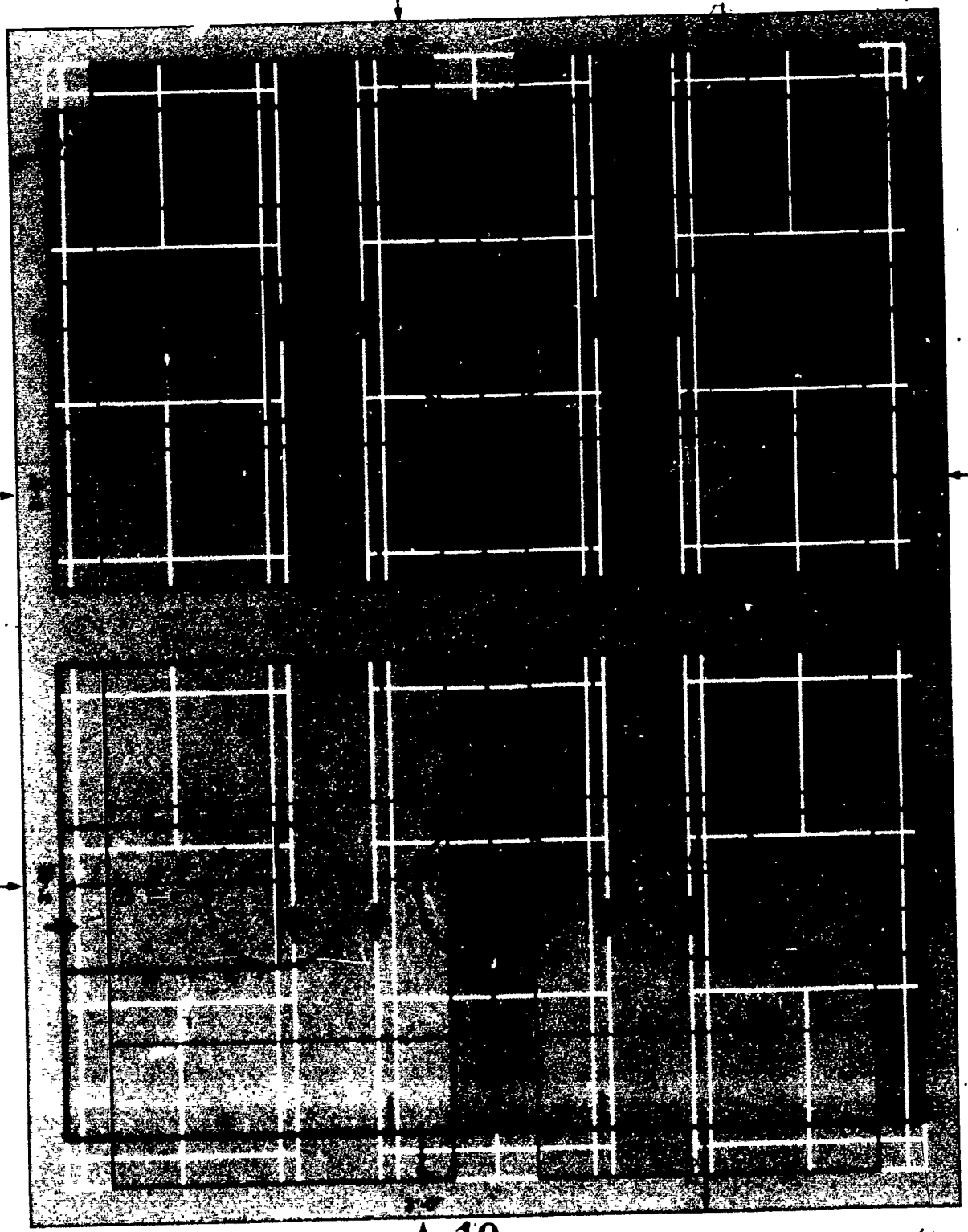
The most frequently used courts are those used for large numbers of students during instructional classes and intramural games. To provide for maximum participation, there is no necessity to have official court measurements.

Basketball Courts
Size 44'-0" x 74'-0"

Volleyball Courts
Size 29'-6" x 44'-0"

Badminton Courts
Size 20'0" x 44'-0"

Floor Socket Locations



Technical Requirements

Floors
The most suitable floors consist of either hardwood or an appropriate synthetic surface. Tile, wood composition, and parquet floors do not have the advantages of hardwood – especially its resilience. Hardwood flooring should be not more than 2" (5 cm) in width and should run parallel to the long dimension of the main court. The floor should be of built-up, well ventilated construction.

Where the cost of hardwood is excessive in relation to parquet flooring, parquet may be used if sufficient insulation is utilized to overcome the feeling of coldness. Many activities take place that involve body contact with the floor.

Floor Sockets
Care should be taken that sockets are the correct size for the various standards to be used. Consideration must be given to the location of floor sockets to accommodate such apparatus as the high bar, uneven parallel bars, and pommel horse. This may best be determined in consultation with the physical education teacher or program consultant.

All apparatus plates and sockets should be countersunk flush with the finished floor surface and must be set in place before the concrete is poured. The use of a sleeve or screw socket is recommended. Any hook attachments for guy wires will provide greater flexibility if they rotate through 180

Walls
Walls should remain free of any projections up to a height of 14' (4.26m), and a washable protective coating should be applied. It is imperative that as much usable wall space as possible be created for game activities.

Walls should be of smooth, flush masonry construction. Plaster, tile, wood panelling or wallboard walls have proved unsatisfactory. There should be no mid-wall heating apparatus, windows, or special acoustic treatment lower than 16' (4.87m) above the floor level.

All projecting corners should be rounded.

Fixed equipment such as basketball backboard supports should be installed during construction.

Drinking fountains should *not* be installed in the gymnasium.

Ceilings (roof structure)
The roof structure, whether of concrete or steel, must be designed so that it will support loads created by the use of athletic apparatus. Cross beams may be used if the roof is of steel construction. If the structure is poured concrete, then the bolts must be cast in place. If a precast concrete roof structure is used, then the bolts must be cast-in during manufacture.

A suspended flush ceiling is highly susceptible to damage during game activities and is therefore not recommended.

Clear ceiling height in the gymnasium ranges from a minimum of 18' to a maximum of 22' (5 48m to 6 70m)

Windows
In modern physical education facilities window areas have been reduced or eliminated entirely. Windowless gymnasia have definite advantages over those with windows.

Some of the disadvantages arising from the use of a large glazed area are:
- Windows must be located to avoid glare from sunshine in the eyes of the occupants.
- In actual practice the windows are usually covered with drapes which are rarely opened.
- Natural lighting is never adequate.
- Special consideration of heat loss (or heat gain) and condensation is necessary.
- The wall area will be limited as an instructional aid.
- Window sills and valance-boxes must be designed so that such items as badminton birds will not lodge on them.

It is therefore recommended that windows *not* be used in gymnasia.

Artificial Lighting

The quality and intensity of artificial lighting is most important The colour scheme chosen will have a direct bearing on the quality of light in the gymnasium. Generally, bright colours are desirable. Reflection factors for the various surfaces are as follows:

— Ceiling –	85% r.f.
— Upper Wall –	65% r.f.
— Lower Wall –	40-60% r.f.
— Floor –	30-40% r.f.

An absolute minimum of 30 foot-candles (32 dekalux) measured 4' (122 cm) above the floor should be maintained. Light fixtures should be so arranged that they provide uniform illumination of the required standard throughout the gymnasium and eliminate loss of light in the roof space. They should not be installed below the lowest point of the roof structure. Fixtures should be selected for ease of maintenance and resistance to damage from game activities. They should not trap objects such as tennis balls or badminton birds. Exit lights should be installed flush with the wall and protected with wire guards. Emergency lighting must be provided in case of a power failure.

Mercury vapour lighting has proved successful in a number of schools.

Doors

Doors should be located with due regard for traffic flow. Movement across the gymnasium floor in street shoes must be avoided. For safety reasons doors should open outwards Doors located in the centre of end walls will frequently be a hazard; a corner location is preferable. Wherever possible, doors should be set flush with the inside walls and have a minimum number of projections. Door handles, for example, should be inset. All sills should be flush with the gymnasium floor. Glazed doors or panels should be amply protected. Double doors from the gymnasium to the corridors should be provided. The local fire authority should be consulted regarding fire exits

An overhead 7' (2.13m) rollaway lockable door is preferred for the equipment storage room. Conventional doors must be avoided. They reduce the storage space if opening inwards and present a safety hazard if they open into the gymnasium.

Operable Partition

This partition divides a double gymnasium into two separate instructional areas and will have frequent use. It should be electrically operated with provision for manual operation in case of a power failure. A key switch is recommended and should be located at the opposite side of the gymnasium from the pocket enclosure to avoid possible injury. The key switch should be of the type which must be held in order to operate. This assures that the partition cannot operate without a person in direct control.

Furthermore, the partition should be:

— of sound-reducing construction in a smooth, durable material;
— suspended from above (floor tracks are not recommended) with no spaces beneath, above or at the ends;
— completely recessed when in the open position;
— designed to allow for building settlement and/or deflection of the roof structure;
— located, in its folded state, in a pocket enclosure on the exterior side of the gymnasium.

A 3' (0.91 m) door in the partition located near one end and out of the area where activity may take place is recommended for access between the two teaching areas. The door should have a recessed locking device with a key. This is a vital safety precaution.

Electrical Equipment
Special consideration should be given to the location of such items as horns, bells, fire-alarm stations, clock outlets, switches and public address speaker boxes at an early planning stage. They should be grouped together where possible, to avoid complicated runs of conduit.

Locations in or near corners and away from chalkboards, bulletin boards and present or future basketball installations are desirable.

One houselight switch should be near the main entrance door. Where a switch box is provided, all switches should be labelled. Switch box and duplex outlets require metal cover plates.

Extra circuits for future use may be located at the nearest electrical panel. Consideration must also be given to the installation of an electrical score board and the type of wiring required for it.

The public address system should allow for independent operation with a portable amplifier, record player and microphones. The system must be flexible to allow rebroadcast throughout the school or in either section of a double gymnasium.

Acoustics
A very important consideration is the provision of some acoustical treatment. It must not interfere with the use of the wall for instructional purposes but treatment could be applied to the wall at a level above 16' (4.88m).

Heating and Ventilation
Special consideration must be given to the selection of a system for economy of operation and for capacity to provide desirable thermal and atmospheric conditions. System controls should permit temperature regulation independent of the rest of the school.

Since facilities now tend to be used throughout the entire year, circulation of air and ventilation standards should take summer use into account.

The ventilation system should provide for an absolute minimum of 6 air changes per hour. At least 3 of these should be fresh, outside air, with the remainder being recirculated air. The relative humidity should be maintained at the necessary comfort index, normally between 45-55% at 90° F (32° C) and 25-30% at 0° F (-18°C).

There should be more than one thermostat, each individually controlled, screened against damage, and recessed into the wall.

The temperature of the space should be 60-65° F (15-18° C) measured 4' (122 cm) above the floor. Forced air circulation should be buffered if outlets are not located in the ceiling. The ventilation system should provide both dehumidifiers and dust filters. Hot water has not proved to be a successful method of heating gymnasia.

Special acoustic linings may be required to prevent the transmission of sound through ducts or fans. There should be no noticeable noise from air movement or ventilating equipment.

Chalk and Tackboards
Approximately 12 linear feet (3.65m) of combined chalkboard and tackboard is required in each half of a double gymnasium. The chalkboard units should be equipped with a completely recessed chalk tray.

The expansion and diversification of the program to include a large number of activities has created a need for activity areas in addition to the gymnasium facilities

This instructional area may be used for such activities as gymnastics, various forms of dance, weight training, table tennis, archery, paddle ball, and fitness exercises

Location
A suitable location for the activity area may be at the mezzanine level above the ancillary facilities such as changing and shower areas The mezzanine area has not proved to be satisfactory for spectator accommodation Present recommendations advocate movable folding bleachers at the gymnasium floor level.

The use of this space as an activity area would therefore seem reasonable. As much wall space as possible should be made available for game activities, and a safety glass wall overlooking the gymnasium is recommended

Size
An area of 1000-1500 sq.ft (92.9 sq.m. 139.3 sq.m.) would appear suitable for this facility.

Height
A clear ceiling height of at least 12' (3.65m) is recommended. Greater height can be achieved but most likely at additional cost. Naturally, the higher the ceiling, the greater the number of activities that can take place within the space.

Requirements
The requirements are similar to those for the gymnasium except in the following cases:

Floors
Hardwood, parquet or synthetic floors may all be used to advantage

Ceilings
The use of flush acoustic tile ceiling should be considered to create better sound properties. Drop ceiling installations should be avoided.

Walls
A smooth flush masonry surface with a washable protective coating applied to a height of 9' (2.74m) is recommended

Equipment
The location of floor sockets and overhead anchorage points for the various athletic apparatus can best be determined in consultation with the users. The area will require such items as: enclosed mirrors and a footrail approximately 42-48" (105-122cm) above the floor, weight training racks, benches, and carts. Public address speaker outlets and clock outlets are required, in addition to a sufficient number of electrical outlets for plugging in such items as the portable record player, and other audiovisual aids.

Chalkboards and tackboards may be installed in an activity area The need for such items should be determined by the users.

A storage space of approximately 200 sq.ft (18.58 sq.m.) is required for the various kinds of equipment used in the activity area. If possible, the storage area should be located adjacent to the activity area.

Changing Rooms

Location
Changing rooms should be on the same level as the gymnasium. They must have direct access to the drying area, washroom, gymnasium, and school corridor. Immediate access to the instructor's office is unnecessary.

Size
Approximately 550 sq.ft.(51.1 sq.m) in area. A room of this size will accommodate two classes at one time. A square shape will provide a more functional space

Requirements

Floors
These should have non-slip, non-skid surfaces and be of an impervious material. Concrete may not be used unless it can be well sealed. Floor drains are required, including one close to the drying area

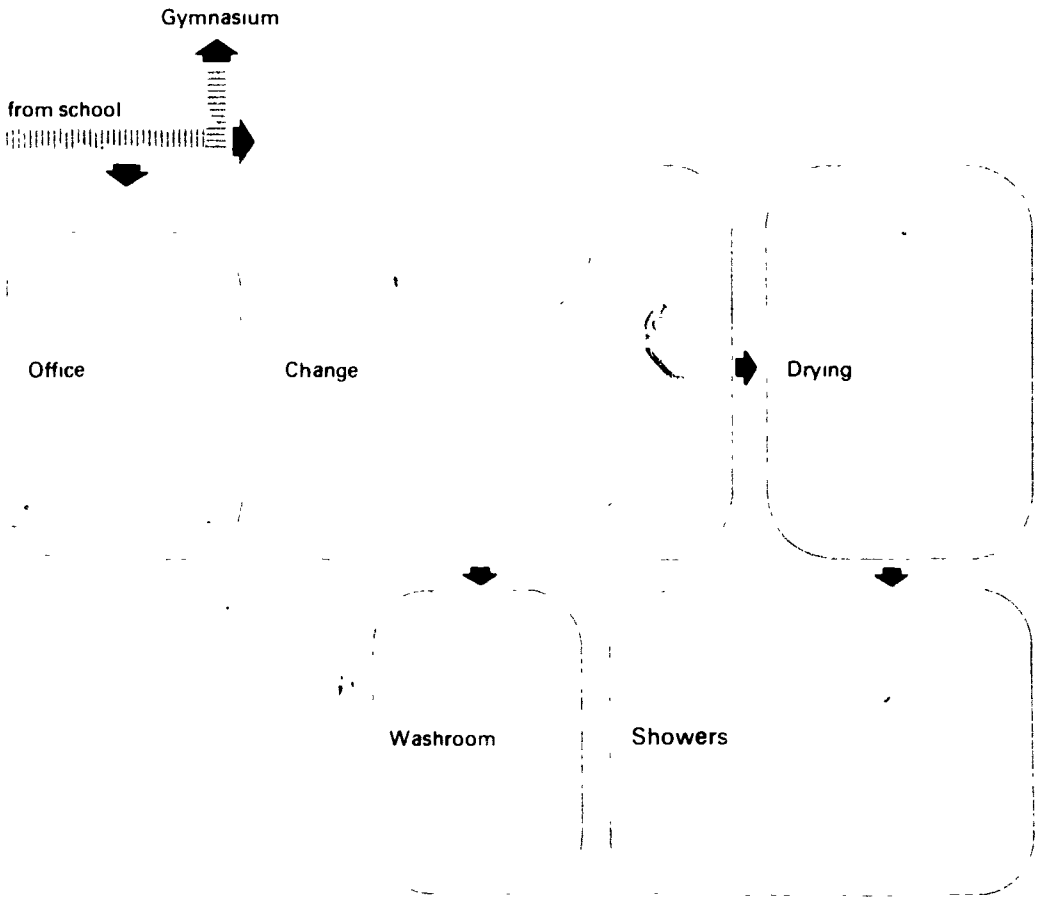
Floors require sloping to drains to facilitate hosing and cleaning. For cleaning purposes a hot water hose connection is a janitorial necessity. Controls should prevent student operation.

Walls
As plaster finishes are highly susceptible to damage, it is recommended that walls should be of smooth flush masonry construction with a moisture-resistant finish. Sharp corners and projections should be avoided

Ceiling
A height of 9' (2.74m) clear ceiling height should be maintained. However, if an activity area is located directly above, the clear ceiling height may be reduced. A moisture-resistant finish is required.

Environment
Recessed lighting fixtures, damage-proof and moisture-proof, are recommended. A lighting level of 20 foot-candles measured at 4' (122 cm) above the floor is recommended.

Extremely good ventilation is essential in this space. An adequate exhaust system is imperative. In this respect, many existing schools are deficient. The space requires a minimum of 6 air changes per hour; of these, 3 should be fresh air and 3 recirculated air. The heating system should provide a room temperature of 75°F (24°C) measured at 5' (152.4 cm) above the floor.



Fittings and Equipment

Fixed-bench seating, measuring 16" (40.6 cm) wide and 18" (45 7 cm) from the floor, with shoe storage below, is the recommended installation The seating should be located at the periphery of the room, attached to the wall or placed on a curb to facilitate cleaning

A shelf 12" (30.5 cm) wide should be installed, above all bench seating, at a height of 6' (1 83m) from the floor. Short clothing hooks should be attached to the wall just below the shelf at 15" (38 cm) centres in sufficient numbers to accommodate the maximum pupil load. A lockable valuables box should also be provided. Provision should be made for tackboard, mirrors, a drinking fountain, a clock, and several electrical outlets. The public address system should be connected to the school system and also allow broadcasting from any separate system planned for the gymnasium

Consideration should be given to providing a chalkboard in the changing room. The space could thus be used for instructional theory sessions and for diagramming game tactics.

In addition to the foregoing, the girls' changing room will require at least 2 full-length mirrors 6' long by 18" wide (1.82 m x 45.72 cm) Consideration should be given to providing a time-metered electric hair-drying unit with twelve outlets.

Many varied opinions exist on the care and handling of a student's personal athletic apparel It is felt, therefore, that the method chosen should be at the discretion of the users.

Drying Area

Location
The drying area must be located between the changing and shower rooms Doors are not required for separation purposes

Size
An area of approximately 150 sq ft. (13 94 sq.m) is recommended

Requirements
The floor must be non-slip and the walls moisture-resistant Lighting fixtures must be proof against damage and moisture A ceiling height of 9' is recommended A lighting level of 20 foot-candles (22 dekalux) measured at 5' (152.4 cm) above the floor should be maintained The space requires good ventilation with at least six air changes per hour. Three of these must be fresh air. The room temperature should be maintained at 75 F (24 C) measured at 5' (152.4 cm) above the floor. No furnishings are required except for short, rust-resistant towel hooks located 5' (152 4 cm) above floor level These are preferable to towel bars A curb 4' (10 16cm) high, or equivalent, should prevent water seepage from the drying area to the changing room The floor should be well drained

Shower Room

Location
The shower room should be accessible only through the drying area

Size
A minimum area of 225 sq ft (21 sq m) is recommended

Requirements
Floors must be of a non-slip material and the walls must be of moisture-resistant material The floor should slope to a perimeter gutter and drains Alternatively, the floor may slope towards the access point between the shower and drying area with a large, slatted, non-ferrous drain to serve both areas Centrally located floor drains are not recommended as they invariably become clogged

Light fixtures must be moisture-proof with the light switch outside the shower room A lighting level of 20 foot-candles (22 dekalux) measured at 4 (122 cm) above the floor should be maintained

The room temperature should be maintained at 75 -80 F (24 -27 C) measured 5 (152 4 cm) above the floor Extremely good ventilation is required The system should provide 6 to 8 air changes per hour A separate exhaust fan for the shower room is most desirable

Water pressure and temperature of showers are best regulated from a master control located in a recessed and lockable panel set in the changing room wall Provision may be made for one or two shower heads to be individually controlled.

Boys
The shape of the boys' shower room will depend on the shower arrangement. Individual shower heads located around the perimeter are generally more efficient than a pillar shower. The shower heads, 10-12 in number, should be located 6' (182.88 cm) above the floor. There should be no exposed pipes in the shower room. Recessed soap holders or recessed liquid soap dispensers are necessary.

Girls
Individual shower cubicles with attached dressing areas are preferred. Each shower should have its own drain with the shower head at 5' (152 4 cm) above the floor. Many arrangements are possible where a shower can serve 2, 3 or 4 separate areas. Each dressing area should contain a fixed seat and a hook for clothes and towels. As a general guideline, one shower cubicle may be provided for every 3 girls.

If an open shower room is chosen, provision must be made for 2 or 3 private shower cubicles.

Washrooms

A washroom accessible only from the changing room is required It is not intended to serve as a general school washroom, however, the number of fixtures may be regarded as part of the total required for the school.

An area of 100 sq.ft.(9 3 sq.m) is sufficient to provide in the boys' washroom, 2 toilets, 4 urinals, and 2 washbasins, and in the girls' 4 toilets and 2 washbasins

Toilet-paper racks and paper -towel racks are required Mirrors are not required in either room but a sanitary dispensing unit is required in the girls' washroom. One or two conveniently located electrical outlets are necessary for cleaning purposes A lighting level of 30 foot-candles (32 dekalux) should be maintained. The room temperature can vary between 72-80 F (22-27 C) depending on the season.

Ideally, the ventilation, with approximately 15 air changes per hour, should have no connection with the changing-room ventilation If it is connected, ensure that it is exhausted in the proper direction, from the changing room to the washroom and then to the outside

Floor, ceiling and wall construction and the interior finishes may be the same as those for the shower room

Team Change Room

A team change room is most desirable for the use of school and visiting sports teams.

Location
This room may be provided with its own showers and washroom. If not, there should be access to the physical-education showers and washrooms without going through the school changing room. There should be ready access to the gymnasium and to the outdoor facilities

Size
An area of 350-400 sq ft. (32.5-37 sq.m) is adequate for this facility.

Requirements
The room should be equipped with benches, mirrors, a combination chalkboard and tackboard, a recessed drinking fountain and hooks for clothing. Environmental criteria are similar to those for the regular changing room.

Storage Rooms

The location and amount of space required for storage needs careful consideration. In most cases consultation between the planners and users is recommended to ascertain actual needs and requirements. Generally, there are six types of storage space required.

1 Gymnastic Apparatus
Such items as balance beams, high bar, vaulting horses, uneven parallel bars, tumbling mats, and the various standards for volleyball and badminton, will be stored in this room.

Location
This room should be located so that it may serve both halves of a double gymnasium. Access from the gymnasium should be gained through overhead roll-a-way or garage type doors. Swinging doors are not recommended.

Size
An area of 500 sq.ft.(46 sq.m) is recommended, with a ceiling height of at least 8' (2.4m)

Requirements
The floor may be concrete, and the walls painted concrete block. Lighting fixtures should be recessed and protected from damage. Standard ventilation requirements should be met.

2 Daily Supplies
Frequently used items such as badminton birds, racquets, basketballs, team sashes and so forth, should be stored in this room.

Location
There should be two of these rooms, each serving and having direct access to half of a double gymnasium.

Size
An area of 120 sq. ft. (11 sq. m) for each of these rooms is recommended.

Requirements
Access doors should open into the storage space rather than into the gymnasium. Doors should be lockable.

Various types of shelving and cupboards will be required. Because of the great variety of small equipment and supplies to be stored in this area, consultation between the planners and users is recommended. As an example of conflicting user requirements, some staff prefer that basketballs be stored in mobile trolley bins, while others prefer to use open shelving with deep lips.

Standard ventilation and lighting requirements should be met.

3 Team Storage
This facility is required mainly for the storage of uniforms used in the various sports. Another function of the space is for drying wet uniforms.

Location
Ideally a location adjacent to the team changing room should be provided with access either from that room or from the school corridor Direct access to the gymnasium is unnecessary.

Size
A square area of approximately 250 sq. ft. (23.25 sq. m) is recommended.

Requirements
Shelving and rods for hanging wet uniforms are required.

Good ventilation is essential in this room. A heavy-duty exhaust fan, operated from a wall switch, is recommended

A lighting level of 15 foot-candles (16 dekalux) and a temperature of 75°F (24°C) should be maintained.

To facilitate the issuing of uniforms and equipment, the installation of a Dutch door should be considered.

4 Dead Storage
This room is most desirable for storing out-of-season uniforms and equipment. Minor repairs and equipment marking may also be carried out in this area.

Location
A location in proximity to the team storage room may prove advantageous. The area does not require direct access to gymnasium facilities but should be located within the physical education complex.

Size
A square area of approximately 250 sq. ft. (23.25 sq. m) is recommended.

Requirements
Shelving and cupboards will be required

To facilitate minor repair work, the installation of a workbench should be considered. Standard lighting, heating and ventilation requirements should be maintained.

5 Community Storage
The trend towards greater use of school facilities by the community, especially for physical education programs, makes provision of a separate storage area for their use a desirable feature.

One advantage to be found in providing such an area is of course the avoidance of mixing school and community equipment.

Location
A location near the main community access to the physical education facilities will prove advantageous.

Size
While actually determined by the amount of community use, an area of approximately 300 sq. ft. (28 sq. m) appears suitable for most needs.

Requirements
Planners should consult with community groups intending to make use of the physical education facilities to determine the kinds of storage units that will best meet their needs.

6 Outside Storage
Track and field equipment, archery targets, blocking dummies, and other apparatus may all be accommodated in this storeroom. This room, however, is not intended for storage of such items as gardening equipment or caretaking supplies

Location
A location near the outdoor facilities is necessary, with access from outside.

Size
An area of 300 sq. ft. (28 sq. m) is recommended.

Requirements
The installation of wall brackets, so that vaulting poles and javelins may be stored horizontally, may be desirable. Wall and ceiling hooks for hanging various items may prove useful. One or two shelving units should be provided.

Some schools find it convenient to store their outside equipment in a field-house adjacent to the playing fields, rather than in the school.

4 Health Education

It is suggested that an enclosed learning area be made available specifically for instruction in health education.

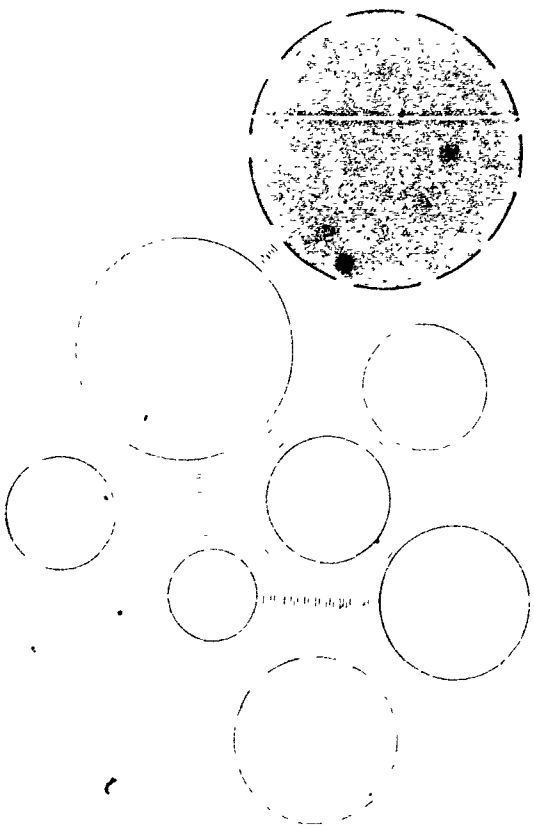
Location
A location near, but not within, the physical education complex is desirable. However, circumstances may dictate a location elsewhere in the school.

Size
One or two learning areas will be required, depending upon the student enrolment. For large groups of students, scheduled use of such facilities as auditorium, lecture or seminar rooms may be better.

Requirements
The usual complement of furnishings and equipment such as desks, chairs, chalkboard, and tackboard will be required.

Conveniently located electrical outlets should be provided for the operation of various kinds of audiovisual aids.

A lighting level of 70 foot-candles (75 dekalux) measured at task level should be maintained. A single row of fluorescent lighting fixtures should be provided over chalkboard surfaces.



The development and excellence of a school's athletic program will largely be determined by the facilities available. These will in a large measure depend on the size and location of the school site.

The use of separate areas for highly specialized activities is recommended in locales where the size of the school site will permit. For example, such activities as shot put and discus throwing require separate areas to avoid any danger to participants in other activities.

On smaller sites, especially in highly urbanized areas, compromises will have to be made in the number and types of activities carried on. Outdoor activities normally require the use of two types of surfacing.

Hard-Surface Area

Activities taking place here may include basketball, volleyball, and tennis. A location adjacent to the physical education complex is most desirable. With the availability of external wall space, rebound activities such as handball and tennis stroke practice may take place. Additional basketball hoops may be attached to the wall for practice purposes.

Soft-Surface Area

Activities taking place here may include such team sports as soccer, football, softball, and field hockey.

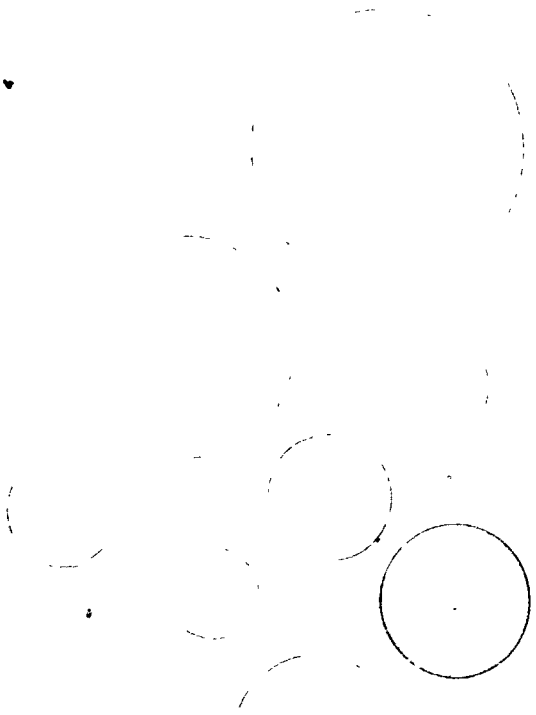
A location away from quiet areas of the school but with easy access to the shower and changing rooms of the physical education complex is desirable.

Space limitations usually necessitate locating the running track around the perimeter of the football-soccer field. Field events such as long jump, pole vault and high jump may be located within, or in the immediate vicinity of, the soft-surfaced area. These activities will require some hard-surfacing material for the run-ups. The chart which follows indicates some of the advantages and disadvantages of various surfacing materials.

Surface Material	Advantages	Disadvantages	Activity
Hard			
Asphalt	Long use. Positive footing. Minimum upkeep. Permanency of markings. Imperviousness	Abrasions from falls. Relatively expensive. Special precautions in soil preparation needed to prevent weed growth.	Basketball Volleyball Handball Tennis Badminton
Trap Rock	inexpensive compared to concrete or asphalt. Durable compared to grass. Dries quickly. Long use.	Abrasions from falls Not as good as grass. Markings must be renewed frequently. Requires periodic spraying to prevent weed growth. No tackle sports.	Softball (infield only) Tennis Runways for polevault, long jump, high jump Badminton
Soft			
Grass	Cushioning effect. No abrasions. Attractive appearance.	Continued maintenance. Requires watering. Deteriorates under heavy usage. Slippery when wet. Dries slowly.	Badminton Volleyball Tennis Soccer Football Field hockey
Cinders or Crushed Stone	Very resilient.	Not always available.	Track
Synthetic Surfaces	Very resilient. Long use. Permanency of markings. Positive footing. Minimum upkeep. All-weather.	Initial cost. Produces high temperatures at ground level.	Track and field

The running track may consist of eight 3-foot (1.0m) lanes or six 4-foot (1.2m) lanes. If space and finances permit, a track with eight 4-foot (1.2m) lanes would be ideal.

A mixture of clay and cinder has proved very effective for the top dressing of running tracks. Percentage of cinder to clay will vary depending on materials and location. Consideration might be given to the installation of all-weather tracks. While very expensive, they need practically no maintenance.



The Ontario Ministry of Education has not provided funds for the construction or operation of swimming pools in schools. Today, many municipalities and school boards are cooperating in the provision and administration of swimming pools. For this reason, the following information is included in this document, in order that well informed decisions may be made by committees of school boards in conjunction with community representatives. **The inclusion of this information in this document does *not* indicate a change in the funding policy for swimming pools.**

The Public Health Act, Ontario regulation 129/74 and any subsequent amendments thereto; municipal or any local building by-laws; and The National Building Code of Canada, 1970 edition should be consulted for the various regulations governing the construction and operation of a Class One swimming pool (i e , a public pool or one used for educational purposes)

A swimming pool in conjunction with gymnasia and outdoor facilities can provide students with a well rounded physical education program Water safety should play an important role in the use of this facility.

More extensive use of school facilities by the community has become widespread. Where a pool is available it is the most utilized facility per person, per hour, and per dollar.

The following will require consideration once a decision has been reached to provide pool facilities.

Location

A location close to the other physical education facilities is desirable. Ease of access for both students and the community is essential.

Orientation

To obtain the maximum benefit from sunlight, if the pool has windows, the long axis of the pool should run east and west. Diving board installations should be at the west end.

Shape

To serve the needs of the school program and for multipurpose use, the pool should be rectangular with vertical sides. Other configurations such as L-shape or T-shape may be employed to separate diving activities from other water activities.

Size

The size of the swimming pool should be determined by the school program to be carried out and the requirements of the community. The Canadian Amateur Swimming Association (C.A.S.A.) has standard requirements for pool sizes if competitive records are to be recognized both nationally and internationally.

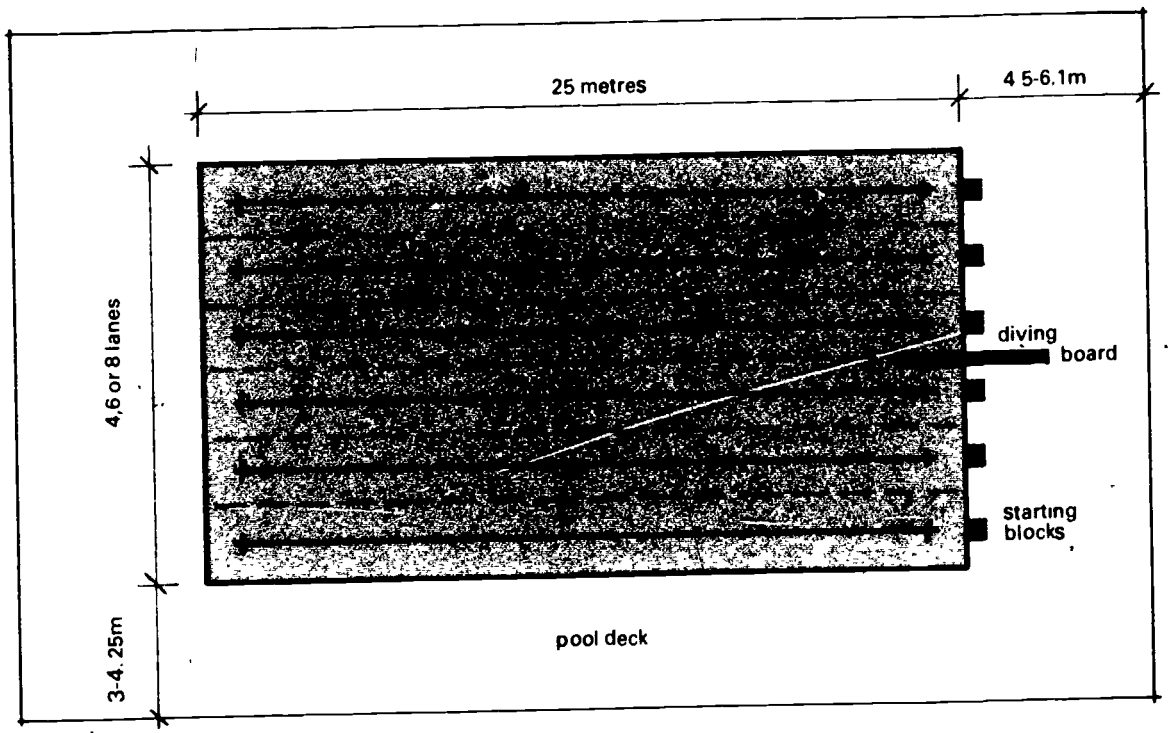
Typical Pool

Such a pool might be 25 metres (82') long with lane widths of 2.1 metres (7'). Eight lanes is considered the optimum for judging purposes. The outside lanes should be 0.3 metres (1') wider than the inside lanes

Some swimming competitions, including those for Olympic recognition, require a pool length of 50 metres (164') and lane widths of 2.5 metres (9')

Where swimming events are run in *yards* the pool can be adjusted to the correct length with the use of temporary end bulkheads.

Typical Pool

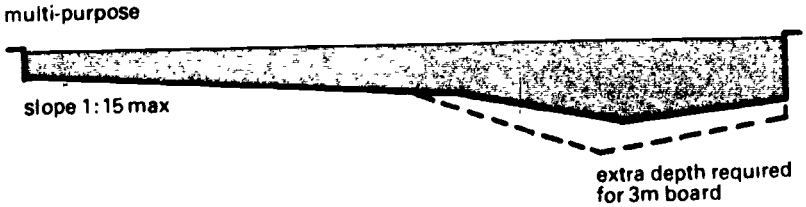


Pool Depths
These will depend upon the program but the following may serve as a guideline for the various activities.

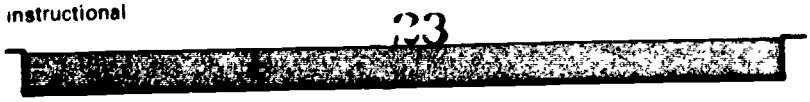
Activity	Water Depth in feet	Water Depth in Metres
Instruction	3′ to 3′-6″	.91 to 1.07
Practice/competition	4′ to 4′-6″	1.22 to 1.37
Synchronized swimming	6′ or more	1.83
Water polo	7′ desirable	2 13
Diving:		
One-metre board	9′	2.74
Three-metre board	11′	3.35

Typical Profiles

multi-purpose



instructional



Side and end walls of general-purpose pools should be vertical with no protruding fixtures to a depth of at least 3' (1 m) below the water surface.

Surface finishes should be smooth, nonabsorbent and slip-resistant. Nonslip ceramic clay or porcelain floor tiles provide a suitable finish. White is the recommended colour as it is the best reflector of light, gives good contrast, and makes safety supervision easier.

Lane markers should be 12-18" (30-45 cm) wide and black in colour. The competitive swimmer swims *over* these lane markers and between the float lines. Anchors should be installed in the pool walls at the time of construction for attachment of the float lines. Float lines are also required at any "break lines" of water depth. Distance marks and depth figures on the edge of pool walls should be 4-6" (10-15 cm) high and dark in colour.

The use of nontoxic paints is required in the pool area.

The pool-edge profile requires careful consideration. The "deck level roll-out" design, in conjunction with a constant level-control device, will permit the water level to be maintained approximately flush with the pool deck nosing. A continuous trough, covered with a flush removable grating of corrosion-resistant metal, collects all overflow, splash and drip water from a perimeter strip which is sloped toward it and returns this water for filtration and recirculation. The perimeter strip should be of limited width, not more than 3'-4' (91-122 cm) The remaining pool deck surfaces should slope away from the perimeter strip, at not less than 1/4" to the foot (6 mm to 30 cm), to separate waste drains not more than 25' (7 1/2 m) apart.

The "deck level roll-out" design is recommended for the following reasons:

1. Swimmers can enter and leave the water easily.

2. Wave action is not reflected or amplified, but absorbed and reduced.

3. It is acceptable for competition use in conjunction with removable starting boxes and, when required, with a temporary end bulkhead.

4. Other pool-edge profiles, such as recessed, sémi-projected, and fully projected are more hazardous for swimmers, not as simple to construct, and not as easy to inspect and keep clean.

The total pool deck surface should be at least 80% of the water surface area. Used for circulation, instruction and control, the deck area should be at least 10-14' (3-4.3 m) wide at the sides of the pool and 15-20' (4.5-6 m) wide at diving board installations and in areas of heavy traffic.

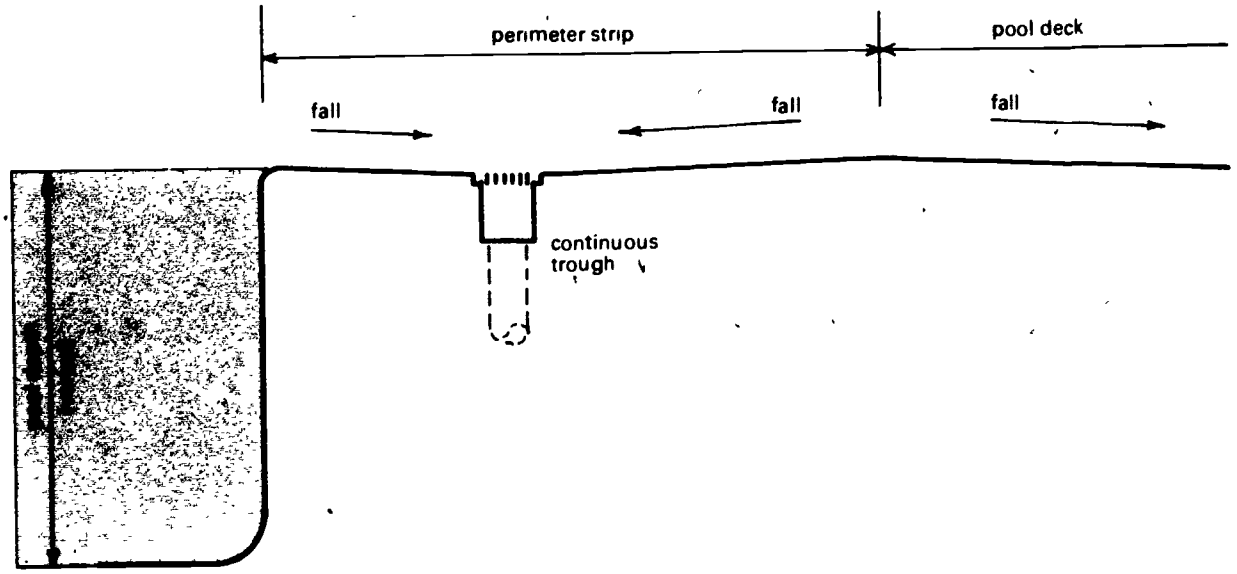
Any underwater windows planned for swimmer observation, coaching or underwater photography, should be at least 20 inches square (13 sq. cm.). The centre of such windows should measure 2 1/2-3 feet (76-90 cm) below the water surface. Heavy plate glass or toughened plate should be used, to the thickness recommended by the manufacturer and sealed into watertight removable frames. Underwater windows should not be located in end walls that may be used for racing turns.

Temporary end bulkheads or adjustable moving end bulkheads may be furnished to adjust the pool length to the exact number of yards or metres required for competition purposes. It is usual to build all pools 1" (2.5 cm) longer than the official length. Starting boxes and/or end bulkheads can then be adjusted to the exact official measurement without any risk of the pools being disqualified for competition purposes.

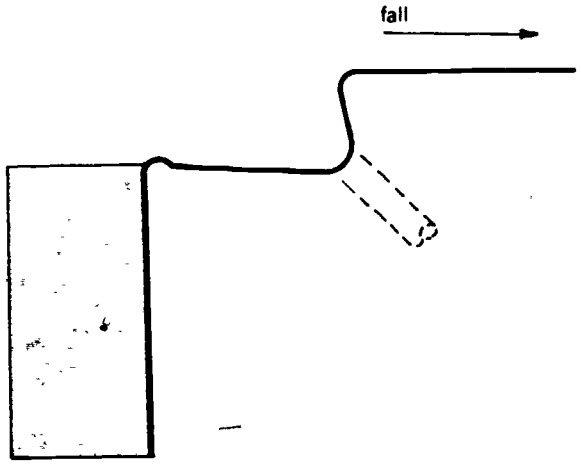
Underwater lighting, supplementary to the general overhead lighting, is recommended. It allows for better supervision of swimmers and also improves the appearance of the pool. Underwater lights of 300 watts should be spaced at 10' (3 m) centres and follow the bottom contour of the pool rather than the surface of the water. Any lights located in the end walls must have separate switches and be turned off during swimming competitions. Fixtures should be flush with the walls – no projections should be permitted and should be moisture-proof and corrosion-resistant.

Gutter Profiles

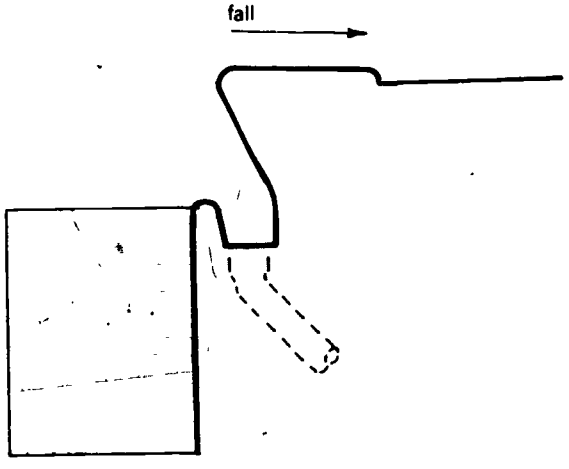
1 deck level roll-out



2 recessed roll-out



3 semi-projected



Note:
As a result of recent fatalities from electrical shock, Ontario Hydro regulations require ground-fault interruption on any electrical sources within 8' (2.4 m) of the pool surface and quite stringent regulations govern grounding of all metallic parts including reinforcing steel in concrete.

Spectator Accommodation

Any accommodation planned for spectators should be designed in such a way that spectators can reach their seats without walking on the pool deck. Bleacher-type seating should be located parallel to the long axis of the pool. Folding bleachers are recommended as they free floor space for other uses such as swimmer instruction and exercise out of the water.

The Pool Enclosure

Height

A clear ceiling height of 15'-20' (4.5m-6.1m) above the board surface is recommended for enclosed multi-use or competitive pools with a 3-metre diving board. For a pool with a 1-metre diving board a clear ceiling height of 15' (4.5 m) above the board surface is recommended.

Construction

The problem of condensation is critical. Care must be taken to prevent it on interior surfaces, and hidden within the walls and roof structure. Interior surface materials should be impervious to damage by condensation. Careful application of water-resistant sealants around door frames, window openings, etc., and the use of expansion joints to reduce the danger of cracks from building settlement, should prevent air penetration, which could carry large quantities of water vapour into the structure. Wall and roof construction should ensure that the interior surface temperature will at all times be above the dew-point temperature in the enclosure. The inclusion of a vapour barrier near the warm side and the use of insulation can achieve this result. Another method requires the use of a heated space, ventilated with low-humidity air, separating the inner and outer skins of the wall and roof construction.

Heating

The air temperature inside the pool enclosure should be maintained between 75-82 F (24-28 C). It should be not less than 2 and not more than 8 (-17 to 13 C) warmer than the water temperature. The air temperature should be thermostatically controlled. Radiant floor or ceiling heating is recommended. Pipes or radiators should not be exposed.

Ventilation

At least 6 air changes per hour should be provided; of these 3 should be fresh outside air and the rest recirculated air. This proportion will normally maintain the relative humidity to comfortable limits, preferably 62-65%. Exhaust fans are required to remove volatile chlorine from the air. Reducing the amount of noise caused by reverberations is necessary, as the facility is an instructional area.

Lighting

General overhead lighting, of 30 foot-candles (32 dekalux) intensity, should be arranged so that light bulbs can be replaced from the deck area. Sealed fixtures must be corrosion-resistant. Provision for emergency lighting in case of power failure is essential. Switches, including those for underwater lights, should be located in the control centre and not accessible to swimmers or spectators.

Windows, while not essential in a strictly indoor pool, are a desirable feature in an indoor-outdoor pool. Several factors must be considered when providing glazed areas:

- Sunlight favours the growth of algae. This can be avoided by using reflective glasses that reduce sunlight penetration.
- Control of air and water temperature is made more difficult by variations in sunlight.
- Surface glare on the water causes swimmers to misjudge turns and creates a problem in readily spotting swimmers who are in need of assistance. An increase in underwater lighting, and careful orientation of windows, can alleviate this problem.
- Condensation on interior glazed surfaces can be reduced by the use of double-glazed window units.

Acoustics

Acoustical treatment should be such that an instructor's voice or a call for help may be clearly understood. Reverberation time within the enclosure should be limited to two or three seconds at most. Most sound-absorbing materials, being porous, should take a high moisture content with no deterioration. A suspended acoustical ceiling with a heated space above is recommended. Domed or vaulted roof shapes cause acoustical problems if the centre of curvature is inside the enclosure.

Equipment

Safety equipment such as life rings and reaching poles must be prominently mounted on well secured racks or hooks on the walls adjacent to the pool deck, but out of the traffic flow.

Elevated control stations should be located to permit an unobstructed view of the pool bottom in the area under surveillance, and restricted to the use of lifeguards and safety assistants. A pool should be equipped with one or more control stations when its area is greater than 1600 sq. ft. (148 sq. m) but not more than 2500 sq. ft. (232 sq. m); and two or more control stations when the pool area is greater than 2500 sq. ft. (232 sq. m).

Pool rules and regulations should be posted in several locations around the pool, legibly printed and protected from moisture or misuse

A 3' x 4' (1 m x 1.3 m) chalkboard should be installed on the pool wall for instructional purposes. A bulletin board, enclosed with glass, is also required

Public address speakers, microphone outlets and a large-face clock should be provided. The clock should have a sweep second hand to facilitate "interval" swimming training

A *direct line* telephone for use in summoning medical aid or assistance in cases of emergency must be provided

Ladders are superfluous in deck-level pools with safety ledges. In other pools they should be recessed into the tile below water level and removable above water level. They should never be placed on walls used for swimming turns in competition

A scoreboard, where required, should be located for easy viewing by both spectators and competitors. It should be large enough to provide space for both records and the posting of point scores

All metal hardware for pool use, including such items as door handles, should be of nonrusting and noncorrosive material and selected for reliable service under heavy use conditions

The pool doors should be keyed alike, but not in the school master-key system. Panic hardware is required on the inside of all exit doors. The number of fire exit doors must conform to local fire regulations

Starting blocks should meet the requirements of the Canadian Amateur Swimming Association, and must provide a slip-resistant surface to stand on, 18-30" (45-76 cm) above water level. Flush hand-grips are required for starting backstroke races

Diving boards or platforms of over 3 metres above the water are not recommended in multipurpose pools. To avoid conflict of use where training and competitive diving are important parts of the program, it is desirable to provide a separate diving pool

Provide a standard 24-unit first aid kit kept filled and readily accessible for emergency use

Sanitary Requirements

The role of the public health department is vitally important, particularly in the planning stages. Its guidance should be sought on the correct methods of operation and monitoring of water quality, in addition to the review of construction plans, code requirements, and so forth

Water quality should conform with rigid bacteriological standards. Health requirements usually demand a quality to or better than that of drinking water. The most effective method of maintaining satisfactory water quality is by continuous recirculation, chlorination and filtration throughout the entire 24 hours of each day while the pool is in use

Ancillary Facilities

The ancillary facilities required are similar to those required for gymnasia. Where possible these facilities should be planned in conjunction with those for gymnasia

Control Centre

This should be designed as a complete unit to be shared by both male and female staff with separate and private changing rooms for each sex. The control centre should have direct access to the pool-deck. The inclusion of an observation window between the control centre and the swimming pool is recommended

Furnishings should include
- a built-in public address system and record player,
- a control panel for pool lights,
- a first-aid cabinet, couch and washbasin;
- instructors' desks, file cabinets, etc
- a telephone

Changing rooms should provide
- a minimum area of 80 sq. ft. (7.5 sq. m) including water closet, washbasin and shower facilities.
- sufficient lockers and seating accommodation for staff.
- access to the student changing rooms;
- baffled entrances;
- a valuables box,
- a mirror,
- a sanitary pad dispenser and swing-top disposal can in the female changing room

Note:
If the pool is planned for community use, a separate shower and toilet is desirable for the lifeguards, who should be in uniform only when on duty

Student/Public Changing Rooms
These should be located to provide access to the pool at the *shallow* end An area of approximately 450 sq ft (42 sq m) for *each sex* is recommended

The following are necessary.
- floors of a smooth, non-slip material with low moisture absorption,
- furnishings of a simple, rugged and rust-resistant construction for easy cleaning,
- a bulletin board;
- a drinking fountain,
- an electric clock;
- a public-address speaker connected to the school system;
- a time-metered electric hair-drying unit with 12 outlets in the female changing room;
- 20 linear feet (6 m) of mirror An additional mirror 6' x 18"(2 m x 45 cm) is required in the female changing room

Drying Area
A drying space located between the changing room and the shower room increases shower capacity and helps maintain dry floors in the changing room. Foot baths require very careful control of solution strength. Floors kept dry and in a sanitary condition will usually prevent or satisfactorily limit the spread of foot infections Floors should be nonskid and drain towards the shower area

Furnishings should include
- a curb 18 (45 cm) high, 6' (15 cm) deep around the perimeter of the room to assist in providing balance while drying the feet,
- a towel rail or hooks sufficient to accommodate 40 towels,
- an electrical outlet for operation of a spin-dry machine

Showers
These should be located adjacent to the swimming pool with only one access door to the pool An area of 200 sq ft (18 5 sq m) is recommended The following should be provided
- a minimum of 12 shower heads preferably wall mounted,
- 2 or 3 private shower stalls for female shower rooms;
- liquid soap dispensers Bar soap is usually wasteful and potentially hazardous when lying on a slippery floor,
- a master control valve located on the dry side of the shower wall, supplying water at a controlled temperature between 90 and 95 F (32 -35 C),
- a single shower head supplied with cold water for those wishing a cold rinse

Note:
It is imperative for health reasons that *all* swimmers take a shower *before* entering the pool

Washrooms
These are intended solely for the use of active participants in swimming and should therefore be located with convenient access from the changing rooms

The female washroom should be equipped with the following:
- one washbasin and two water closets;
- paper towel racks;
- a sanitary pad dispenser and disposal can

It should not be equipped with mirrors

The male washroom should be equipped with the following:
- one washbasin, one water closet and one urinal,
- paper towel racks

It should not be equipped with mirrors

Toilet and washroom accommodations for spectators should be provided separately. Accommodation should meet the requirements of the National Building Code of Canada Where possible, such facilities as an entrance lobby, a ticket booth, rest rooms and public telephone booths should serve the gymnasium facilities as well

Equipment Storage
This room, approximately 120 sq ft.(11 sq m) in area, should be located adjacent to the pool Such furnishings as adjustable shelving, storage bins and wall hooks will be necessary to store the following:
- flutterboards;
- lane-marking floats;
- safety floats,
- starting blocks;
- a canoe

Janitor's Storeroom
This room, approximately 100 sq ft (9 sq.m) in area, should have egress to the pool deck via a wide door It should contain a service sink and storage space sufficient for cleaning supplies and equipment

Community Storage
Where a swimming pool will be used extensively by community groups, storage space for these groups may be required Specific requirements and type of storage can only be determined after consultation with those involved

Note: Some diagrams have been included to indicate the kind of general spaces required

Outdoor Sports
Archery
Baseball
Cricket
Curling
Fieldball
Field Hockey
Flag Football
(Touch)
Football
Hockey—Skating
Horseshoe
Lacrosse
(Field & Box)
Rugby
Soccer
Softball
Speedball played on
football field
Tennis

Track & Field
Broad Jump
(Running & Standing)
Discus
Hammer Throw
High Jump
Hurdles
Javelin
Pole Vault
Shot Put
Triple Jump
440 Track

Out of School Athletics
Bicycle Racing
Canoeing
Cross Country
Curling
Flying
Golf
Gun Club
Kayaking
Mountain Climbing
Parachute & Skydiving
Rowing
Sailing
Scuba Diving
Skiing
Spelunking

Indoor Sports
Archery
Badminton
Bowling
Boxing
Broomball
Continental Handball
Dancing
Fencing
Floor Hockey
Goal Hi
Golf
Handball 1 wall
Handball 4 wall
Indoor Track
—on floor
—above
Isometric-Isotonic
Exercise Apparatus
Judo
Karate
Paddle Tennis
Shuffleboard
Some Track
Squash
Table Tennis
Tennis
Volleyball
Weightlifting
Weighttraining
Wrestling

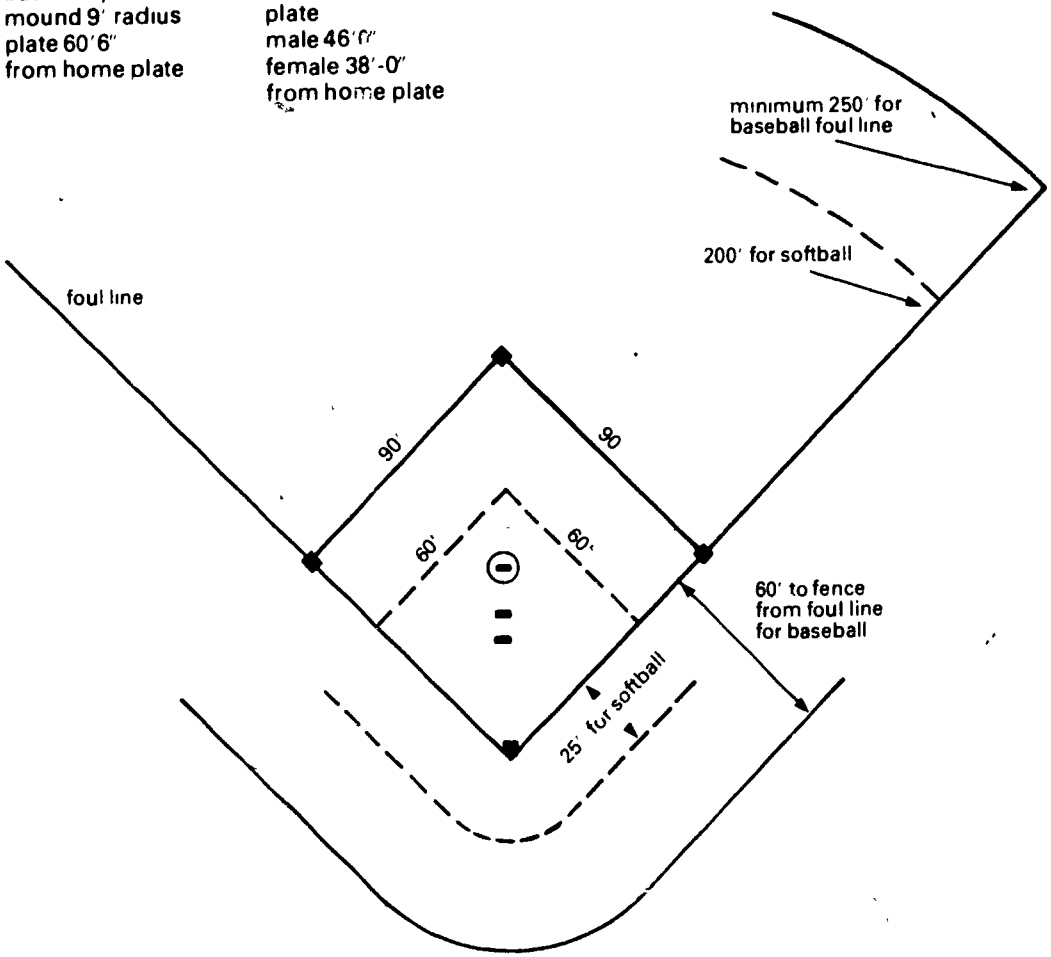
Gymnastics
Box Horse
High Bars
Horizontal Bars
Mat Games
Parallel Bar
Rings (Still)
Rope Climbing
Side Horse
Spring Board
Trampoline

Pool Sports
Diving
Racing Board
Skin & Scuba Diving
Swimming
Synchronized swimming
Water Polo

Baseball and Softball

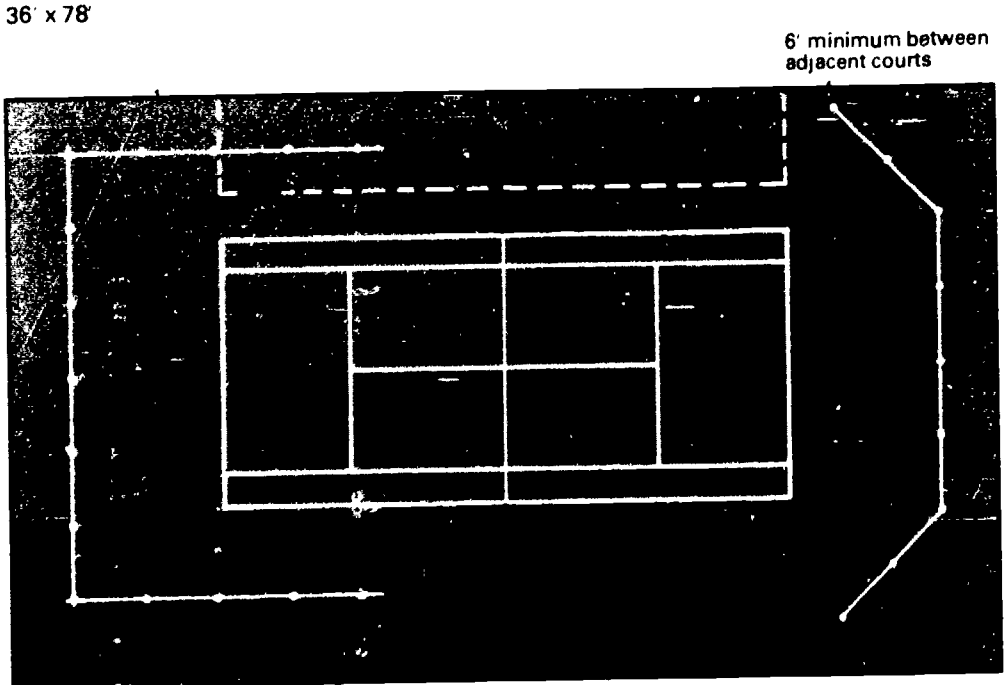
baseball pitchers
mound 9' radius
plate 60'6"
from home plate

softball pitchers
plate
male 46'0"
female 38'-0"
from home plate

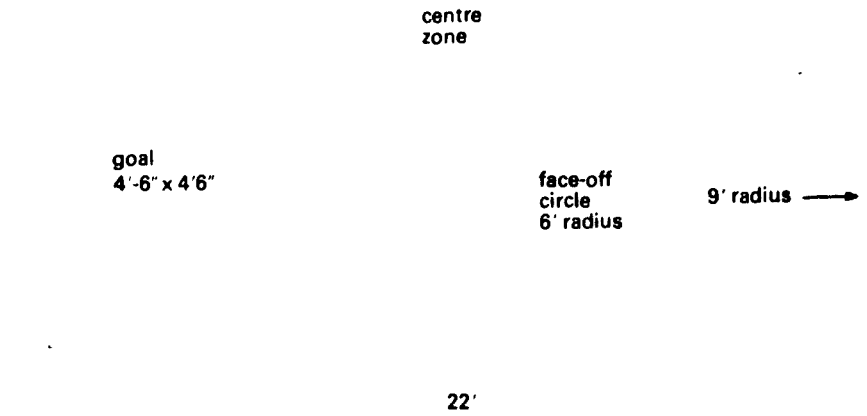


Tennis

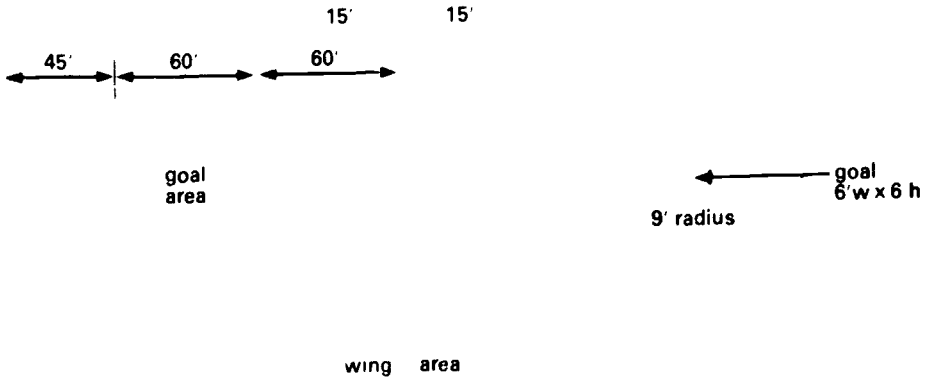
overall court size
36' x 78'



Box Lacrosse
normally played on ice hockey rink
elsewhere:
outdoor size: 90' x 200'; indoors 60 x 160'.



Field Lacrosse
size: 180-210' x 330'
white lines: 2"
centre line: 4"

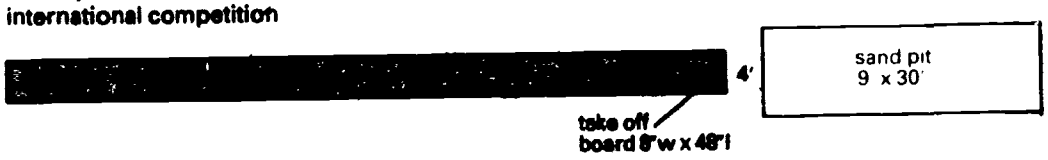


Field Hockey
size: 150-180' x 270-300'
white lines: 2"

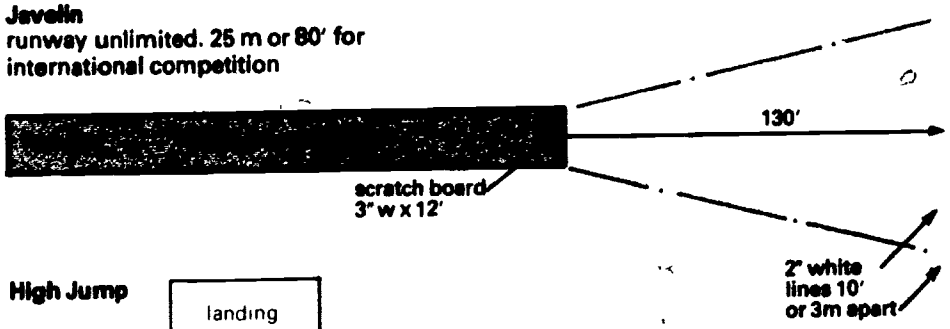
5 yard alley

Pole Vault
runway unlimited, 40m or 126' for international competition

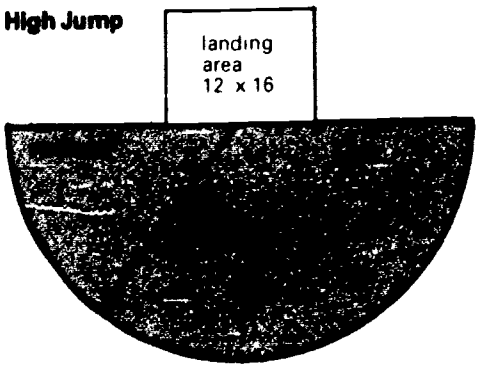
Long Jump
runway unlimited. 40m or 126' for international competition



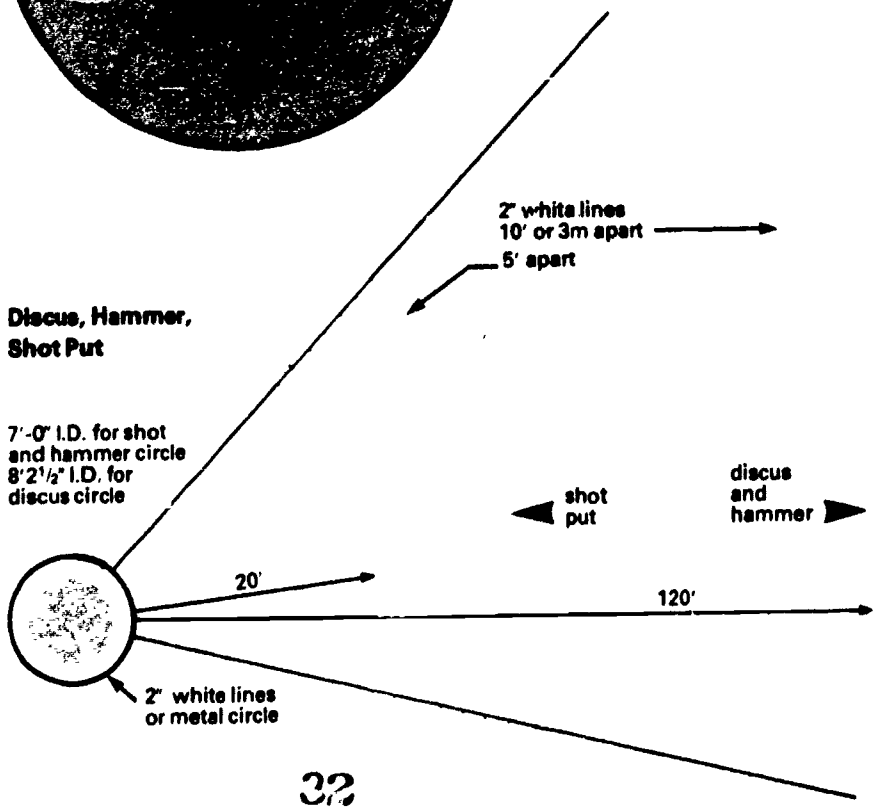
Javelin
runway unlimited. 25 m or 80' for international competition



High Jump



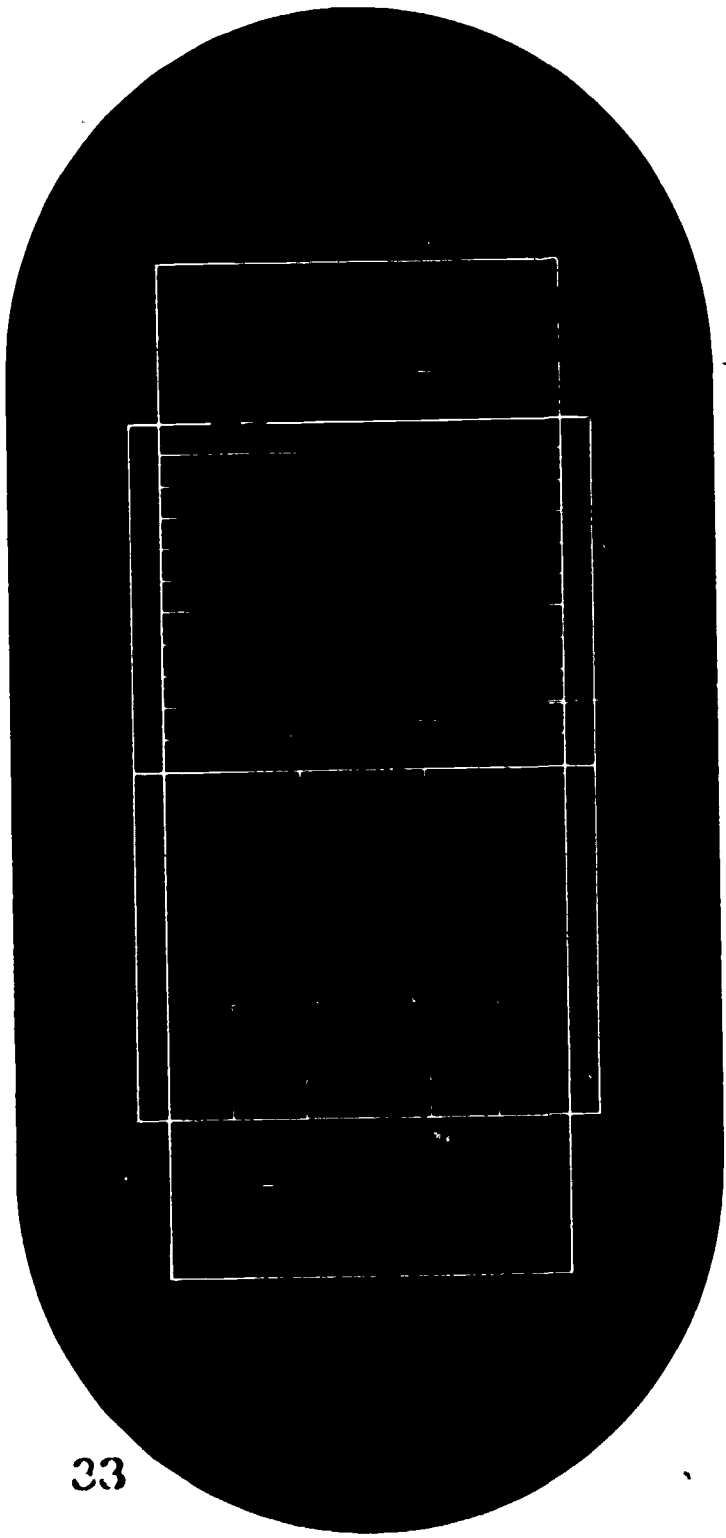
Discus, Hammer, Shot Put



500 Metre Track
115m straightaways
135m curves

Football Field
size: 65 yds x 160 yds

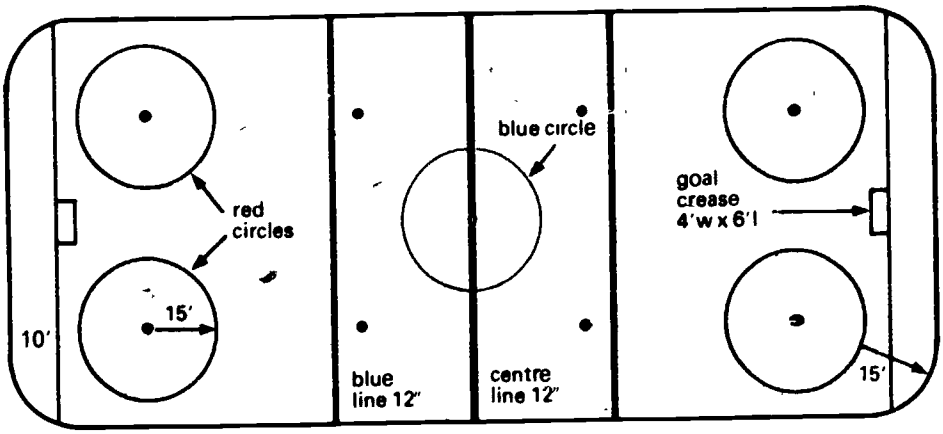
Soccer Pitch
size: 75 yds x 100 yds
max: 100 yds x 130 yds



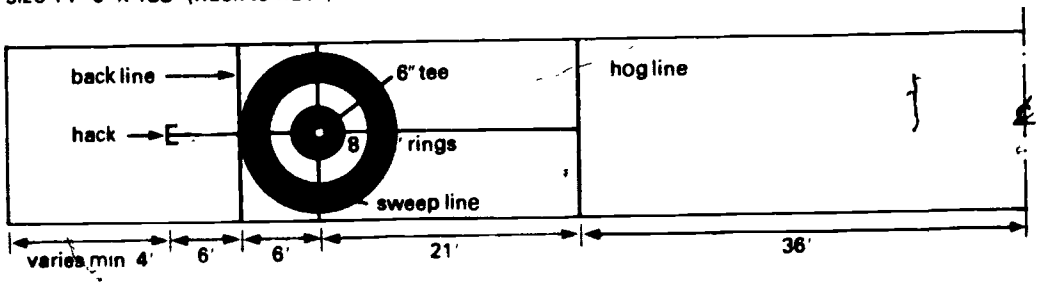
Football goals shall be 20' high and 18'-6" wide with a crossbar 10' above the ground Soccer goals shall be 8' high and 8 yards wide.

The track shall be measured along an imaginary line 12" from the curb.
Track distances for all other lanes shall be measured 8" from the inside edge of the lane.
Lanes should be 4' wide.

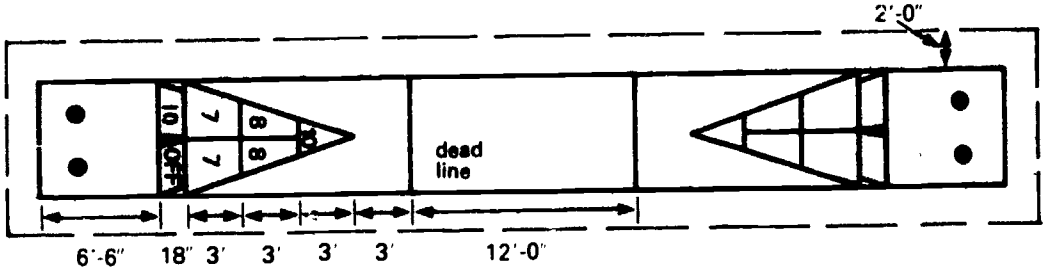
Ice Hockey
size: 85′ x 200′
goal: 6′w x 4′h
red lines: 2″



Curling
size 14′-0″ x 138′ (hack to hack)



Shuffleboard
size 6′ x 52′



Archery
maximum length: 100 yards
minimum length: 30 yards
indoor length. 10 yards
target sizes: 6″ to 48″

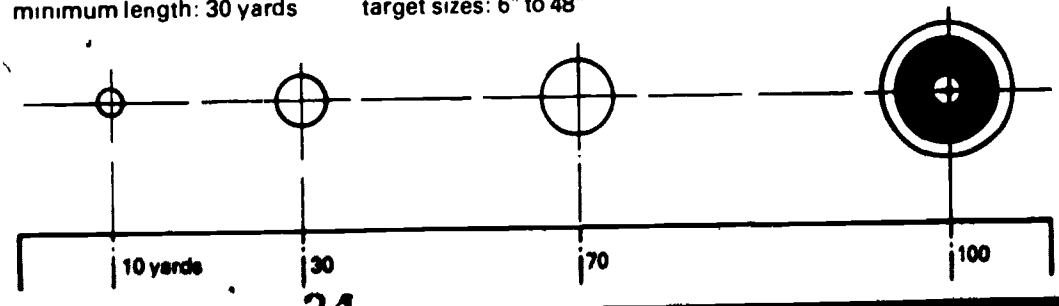
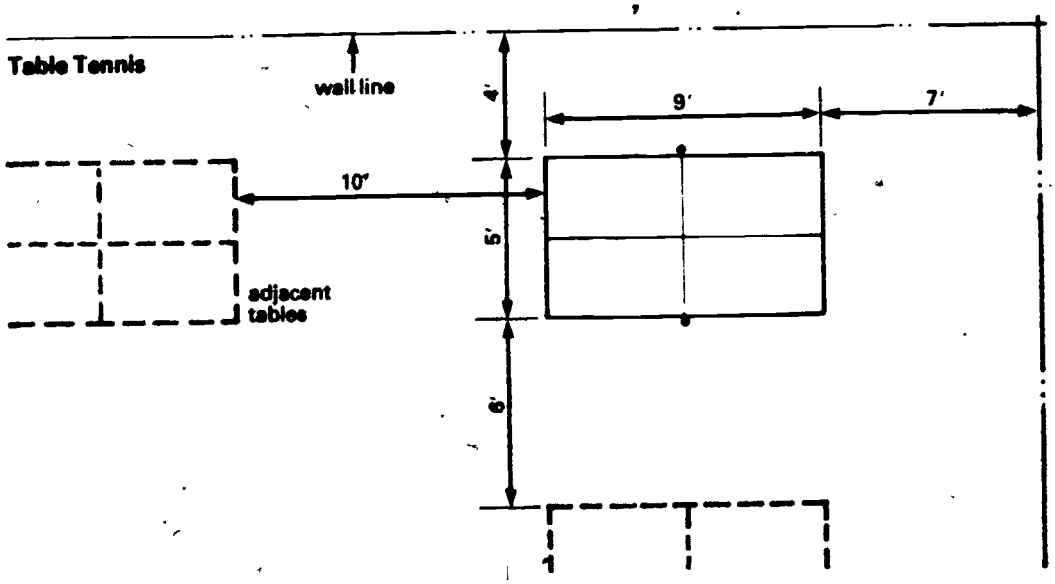
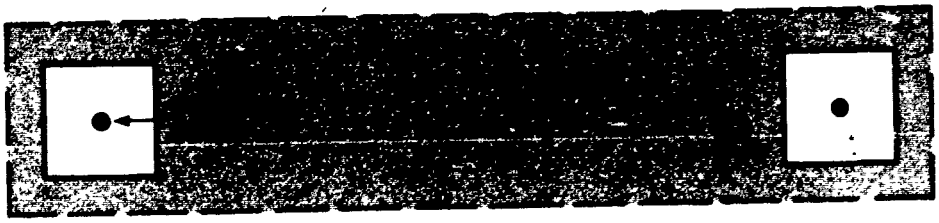


Table Tennis

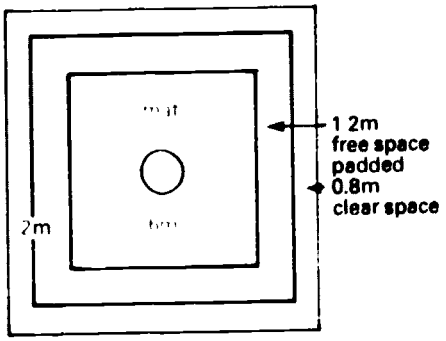


Fencing
lengths: foil 12m, sabre 14m, epee 24 m
white lines: 2"

Horseshoes
size overall: 10' x 50' stake to stake: 30'; 40' adults



Wrestling
matsize:
6m x 6m x 10cms
platform size:
10m x 10m



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