POLICY MANUAL

Policy title:	**COMMUNITY SUN PROTECTION STRATEGY POLICY**
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Objective:	**Compliance with policy guidelines recommended by the Australian Institute of Environmental Health, Cancer Council and NSW Health Department.**
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See document attached to this policy.

COMMUNITY SUN PROTECTION STRATEGY

THE COMMUNITY SUN PROTECTION STRATEGY WAS ADOPTED BY:

LISMORE CITY COUNCIL ON JANUARY 28, 1997

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Lismore City Council acknowledges the people of the Bundjalung Nation, traditional custodians of the land on which we work.

Executive Summary

The Community Sun Protection Strategy was adopted by Lismore City Council on the 28th of January 1997.

Skin cancer is a serious health problem. Two out of every three people who spend their childhood or adolescence in Australia, will require treatment for some form of skin cancer in their lifetime. Essential to the prevention of skin cancer are written policies that focus on improving the physical, social and organisational environments of the community.

As a planner and manager of open space, a supporter of local recreation activities, and an organiser of health programs, Lismore City Council has an ideal opportunity to contribute to the prevention of skin cancer. Protecting the community of Lismore City Council from exposure to ultraviolet radiation (UVR) is an issue to which this local government should be committed.

It is the purpose of this Sun Protection Strategy to contribute to the reduction of skin cancer by: reducing exposure to ultraviolet radiation (UVR); and increasing awareness of the harmful effects of UVR.

The Strategy has three (3) stages of development:
(i) provision of shade in public places and sensitive land uses including, child care centres, swimming pool centres, playgrounds and public reserves, general streetscapes, places of work and schools;
(ii) development of complementary sun protection programs; and
(iii) sun safe practices for Council workers.

Recommended shade guidelines have been developed for public places and sensitive land uses. However, due to financial considerations, the preferred amount of shade will not be attained in the short-term. Rather, it is expected that the levels of protective shade needed in the Lismore City area will become long-term goals that will be achieved as the end result of a Sun Protection Strategy.

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1.0 Introduction

Skin cancer is a serious health problem. Two out of every three people who spend their childhood or adolescence in Australia, will require treatment for some form of skin cancer in their lifetime (Australian Institute of Environmental Health Q. div., 1995).

More than one thousand Australians die from skin cancer every year. In 1994 alone, 150 000 Australians received treatment for some form of sun induced damage. This largely preventable disease causes costs in treatment, production time lost from time off work and the possibility of compensation payments. In Australia it is estimated that this cost is over $150 million annually (AIEH Q. div.1995).

Exposure to the ultraviolet component of sunlight is a critical factor in the development of skin cancer. Damage can occur to the cells of unprotected skin and eyes after only ten minutes in the sun and every case of sunburn increases the risk of skin cancer in later life. Less exposure to sunlight in childhood is important in the prevention of skin cancer (AIEH, 1993), and individuals, such as outdoor workers, who are chronically exposed to ultraviolet radiation, are at highest risk of developing skin cancer (AIEH *et.al.* 1992).

In the north coast region, the incidence of melanoma in males in 1995 was the highest in New South Wales (NSW). Added to this, people on holidays in the north coast region have the potential to over expose themselves to ultraviolet radiation if they are unaware of the strength of the sun in this area. Likewise, people on holidays are inclined to spend more time in the sun due to recreational opportunities afforded on the north coast. It is important for vacationers and residents alike to have access to protective shade and to be aware of the harmful effects of ultraviolet radiation.

The Health Promotion Strategic Plan 1995-2000 developed by NSW Health and the Cancer Council identified the provision of adequate shade in community settings and the implementation of comprehensive organisational sun protection policies as being high priorities necessary for the future progress of the prevention of skin cancer. The strategic plan for Sport, Recreation and the Community is detailed in Appendix 1.

As a planner and manager of open space, a supporter of local recreation activities, an employer of outdoor workers and an organiser of health programs, Lismore City Council has an ideal opportunity to contribute to the prevention of skin cancer.

Protecting the community of Lismore City Council from exposure to ultraviolet radiation (UVR) is an issue to which this local government is committed.

2.0 Aim

It is the purpose of a Sun Protection Strategy to contribute to the reduction of skin cancer by:

i. reducing exposure to ultraviolet radiation (UVR)
ii. increasing awareness of the harmful effects of UVR.

This may initially be achieved by encouraging an increase in natural and structural shade around the Lismore area. Future stages of a Sun Protection Strategy include the development and implementation of sun protection programs and a revision of the current Council policy for outdoor workers.

This Strategy has been modelled on policy guidelines recommended by the Australian Institute of Environmental Health (AIEH), Cancer Council and the New South Wales Health Department.

3.0 Objectives
Essential to the prevention of skin cancer are written policies that focus on improving the physical, social and organisational environments of the community. Structural change, such as increased shade and policies that stipulate the wearing of hats, will help to shift the emphasis from individual behaviour change to the provision of supportive community environments.

3.1 Shade in Public Places and Sensitive Areas
- Include provisions for shade in planning instruments
- Consider shade provision when assessing building and development applications.
- Conduct shade audits to identify the need for shade in public areas and assess the suitability of existing shaded areas.
- Identify and prioritise public places in terms of their requirements for shade provision.
- As part of an on-going, long term plan, provide shade in public areas beginning with sites considered 'high priority`.
- Inform developers that they will be required to address the issue of sun protection and encourage them to conform to the standards identified in this Sun Protection Strategy.
- Consult with the community and determine their considerations for the provision of shade and decide how this can be achieved in the most practical way for the local area.

3.2 Sun Protection Programs
Sun protection programs aim to compliment the provision of shade in public places and sensitive areas by forming guidelines for organisations and sporting bodies addressing the issue of exposure to ultraviolet radiation.

- Develop sun protection awareness programs to compliment the provision of shade in public places and sensitive land uses.
- Form guidelines for organisations and sporting bodies that utilise council facilities and venues to help promote positive attitudes and behaviour towards sun protection.
- Develop a closer working relationship with community health services specifically, the State Health Department - Public Health Unit, Richmond Health Services and Cancer Council in order to formulate uniform policies.
- Raise awareness within the community about the potential danger of exposure to the sun and the need to develop and implement a sun protection strategy.

3.3 Sun Safe Work Practices
These objectives relate specifically to occupational exposure of Lismore Council workers to ultraviolet radiation.

- Review the existing sun protection guidelines in place for council employees who are exposed to ultraviolet radiation.
- Conduct an Exposure Assessment for each workplace and occupational group as outlined in Sun Protection Policy Guidelines for Local Government.
- Provide recommendations if it is seen that the current guidelines in place for sun protection could be improved.

4.0 Focus For Objectives
The Sun Protection Strategy will be centred primarily around the health of the local community. Accordingly, the Strategy will be developed in three separate stages:

1. It is envisaged that stage one will be the provision of shade in public places and sensitive land uses (objective 3.1);

2. Stage two will be the development and implementation of sun protection programs (objective 3.2); and
3. SunSafe work practices (objective 3.3) will be the third stage of this Strategy. In September of 1995, Council's Occupational Health and Safety Committee reviewed the existing policy for protective clothing and equipment for council workers. This led to a number of recommendations relating to sun protection, which are seen to be adequate at the present time. Exposure to ultraviolet radiation in the work place is not included in this document.

5.0 Shade in Open Spaces

5.1 Why Provide Shade?

Sun protection need not be entirely a personal responsibility. Streets, parks and other public places need to include areas where people can carry out day to day activities and enjoy the outdoors in conditions which are protective from over exposure to ultraviolet radiation. Provision of the type of shade which screens ultraviolet radiation needs to become an integral part of the design of outdoor places in the community.

5.2 Ultraviolet Radiation

Solar radiation which strikes the surface of the earth is comprised of a series of bands of energy of varying wavelengths. The more harmful effects of solar radiation exposure on human beings are caused by ultraviolet radiation (UVR) - the short wavelength, high energy range of the solar spectrum (AIEH *et.al.*., 1992).

Ultraviolet radiation is commonly divided into three bands according to wavelength:

- UVA and UVB radiation which consists of wavelengths between 280 and 400 nanometers; and
- UVC radiation which consists of energy of wavelengths between 100 and 280 nanometers.

It is generally accepted that the range of ultraviolet radiation that strikes the earth's surface consists of UVA and UVB bands. UVC radiation is screened out by particles in the upper atmosphere (AIEH Q. div., 1995).

5.3 Protective Shade

For the purposes of this report, protective shade is defined as that level at which ultraviolet radiation of wavelengths between 280 and 400 nanometers is screened. Only materials which screen that range of the spectrum will be regarded as suitable for use in the provision of protective shade (AIEH et.al., 1992).

At any given site, ultraviolet radiation will come from a variety of sources including direct radiation from the sun, reflected radiation from particles in the atmosphere, and from surfaces such as walls, pavements and water. Exposure to reflected UVR is still possible in areas shaded from direct sunlight. For this reason it is not practically possible to provide shade which completely excludes harmful UVR. Surfaces that reflect UVR are tabled in Appendix 2.

Therefore, a protective quantity of shade for any given site is defined as a sufficient amount to allow the opportunity for activities that would normally occur outdoors at such a site to be carried out in a protective environment with the additional provision of protective clothing and equipment to provide maximum protection (AIEH *et.al.,* 1992).

5.4 Human Comfort

The success of any strategy to provide protective shade in the environment is measured by the extent to which the shaded environment is used. Shade environments which are uninviting due to poor design or to undesirable factors such as exposure to wind, pollution or noise will not contribute to a reduction in UVR because they will not be used. Similarly, environments which are screened from light and warmth as well as ultraviolet radiation cannot be expected to be used effectively in the winter months, although protection from UVR is required during these times under Australian conditions (AIEH *et.al.,* 1992).

In response to this, there are two forms of protective shade to be provided in local government areas in NSW:

5.4.1 Summer Protective Shade
Shade which reduces identified dangerous levels of UVR as well as sufficient levels of infrared and visible radiation to produce comfortable summer environments.

5.4.2 Winter Protective Shade
Shade which reduces the identified dangerous levels of UVR while allowing the sufficient levels of infrared and visible radiation to produce comfortable winter environments

Appendix 3 describes the materials suitable for protective winter and summer shade.

5.5 Devices for Protective Shade
The two main devices for providing protective shade in public places are vegetation and built structures. Guidelines for planning and designing for protective shade are contained in Appendix 4.

5.5.1 Trees
Trees in a community constitute an important resource for a great number of reasons. The planting of trees as devices for protective shade is a long term measure, as usable shade will only be achieved as the plants begin to reach mature dimensions (AIEH et.al., 1992).

5.5.2 Structures
Built structures can be used to achieve protective shade for summer and winter conditions. Unlike trees, built structures will produce immediate shade, the dimensions of which can be predicted reasonably accurately. Upfront costs will, however be greater than is the case with tree planting. Structures can be used where immediate protective shade is required.

6.0 Assessing the Need for Shade in the Lismore City Council Area
It is acknowledged that the requirements necessary for protective shade could not generally be achieved in the short-term for *existing* public places and sensitive land uses. Rather, it is expected that the levels of protective shade recommended will become long term goals to be achieved as the end result of a Sun Protection Strategy. *New* developments will be required to address the issue of sun protection, with the view of adopting the levels of protective shade recommended in this Strategy.

As suggested by the Australian Institute of Environmental Health, it will be necessary to conduct a shade audit on public lands and sensitive land uses for both new and existing developments. The shade audit will be carried out to provide baseline data on the current level of compliance of a particular site with the requirements for shade provision outlined in the Strategy.

The purpose of a shade audit is to determine (i) approximately how much UVR will be reflected from existing surfaces within a site (ii) how much shade exists at a site and (iii) what action may be taken to improve the shade at the site (AIEH Q. div., 1995). Guidelines for carrying out a shade audit are provided in Appendix 5.

This data can then be used as a basis for the development of an individual policy for protective shade provision at a public place. Each public place or precinct will have many and varied characteristics and the shade requirements will be many and varied accordingly. Therefore the audit will have to be carried out by field observation at each individual site.

The information provided by the shade audits can be used in conjunction with a priority scoring system. This system is useful to prioritise areas where action for shade provision is required. Facilities will receive a score that will be dependent on the level of UVR exposure at the site which is dependent on the level of use the site will experience. Therefore, areas that are used regularly

throughout the year that currently have low levels of protective shade will be considered top priority for shade provision. An example of a priority scoring system can be seen in Appendix 6.

Public places and sensitive areas will be provided with adequate shade, depending on their priority, as part of an ongoing, long-term process of shade provision.

7.0 Recommended Requirements for Protective Shade in Public Places and Sensitive Land Uses

As outlined in Section 5, effective provision of protective shade is dependent on three factors:-

1. *access* to shade which can be considered protective for the purposes of public health;
2. identification of *quantities* of shade required to ensure protective environments for specific places; and
3. an appreciation of the principles of design and of levels of *human comfort* required to ensure that protective shade is attractive for use.

This section describes the minimum and preferred requirements for protective shade and the recommended goals and actions for individual public places and sensitive land uses, including: child care centres; public swimming pools; playgrounds/public reserves; playing fields; tennis/netball courts; the general streetscape; schools; and places of work. Schools and places of work are included even though they are not under the direct control of local government as an opportunity exists for local council to indirectly influence the provision of shade in these areas. These recommendations are based on guidelines provided by AIEH, Cancer Council and NSW Health (1992), and AIEH [Q. div.](1995).

7.1 Child Care Centres

Child care centres are generally in use all day and at all times of the year, and have a user group which is highly vulnerable to UVR exposure. Evidence suggests that childhood sun exposure increases the risk of both melanoma and non-melanocytic skin cancer. In addition, most children in child care are likely to spend the whole day at the centre, and therefore, opportunities exist to create an environment in which daily UVR exposure can be minimised (AIEH *et.al*., 1992).

- **Shade Requirements - Quality**

The issue of human comfort is particularly critical when designing for protective shade in child care centres. Learning and play cannot occur successfully in an uncomfortable physical environment. Consequently, child care centres will require adequate levels of protective summer and winter shade in order to provide a safe, comfortable outdoor environment year round.

- **Shade Requirements - Quantity**

Current sun protection policy in most child care centres confines outdoor activities to the safe period of the day, before 9am and after 3pm (EST) and in daylight savings between 10am and after 4pm. This practice would seem to be restrictive to the full enjoyment of the centre environment and to early childhood education. The basis of the recommendations for shade provision in child care centres made in the AIEH guidelines is that outdoor activities should not be restricted by the danger of exposure to ultraviolet radiation during summer or winter.

Recommendations have been made by identifying specific activities and sites within a typical child care centre and suggesting requirements for protective shade.

a. Active Play Areas

Most child care centres will have areas set aside for boisterous, active play. These areas may simply be open spaces to allow for running around or they could contain active play equipment such as swings.

It is generally accepted that 30% to 50% of the total outdoor playground space within a child care centre should be dedicated to open play. As activity in these areas is likely to involve a lot of movement around and through the space rather than prolonged activity in one spot, it is not

necessary to provide shade for the entire area. For the same reason it is not required to provide winter shade in these areas. It is recommended that protective summer shade be provided to not less than 50% of the total area within a child care which is dedicated to active play.

It is recommended that all play equipment be at least partially located in protective shade. The shade may be created external to the play equipment by the use of shade structures or vegetation or it may be thrown by the equipment itself.

b. Quiet Play Areas

Design guidelines for early childhood playgrounds call for areas of quiet, less physically active play over one third to one quarter of the total playground area. Play in these areas will involve relatively high risks of sun exposure as activities may occur for extended periods in one location. Specific features for quiet play areas and shade recommendations are listed below:

- Sandpits: the sandpit is likely to be the centre of activity in any playground and will probably be in use throughout the year. It is recommended that sandpits be provided with full protective shade all year round. Permanent or demountable shade structures are recommended for use over sand pits.

- Outdoor teaching areas should also be provided with year round protective shade to maximise use.

- Outdoor eating areas are also recommended to have year round protective shade, particularly as they are likely to be in use during the most hazardous periods of the day for UVR exposure.

Table 7.1: Summary of minimum and preferred shade requirements for child care centres

Quantity	Location	Type	Considerations
Minimum	Outdoor Play 50% total area dedicated to outdoor play. 30% of the total outdoor area.	summer shade	As activity in these active play areas is likely to involve a lot of movement around and through the space rather than prolonged activity in one spot, it is not necessary to provide shade for the entire area. For the same reason it is not required to provide winter shade in these areas. Quiet play areas will involve relatively high risks of sun exposure as activities may occur for extended periods in one location.
	Quiet Play Full protective shade	summer and winter shade	
Preferred	Outdoor Play 70% total outdoor area	summer shade	
	Quiet Play Full protective shade	summer and winter shade	

The following goals and actions are recommended for shade provision in child care centres:

Goals

- Protective shade should be provided for all existing child care centres under Lismore City Council control.

- Protective shade (as outlined in Table 7.1) should be included in specifications for construction of new child care centres with shade provision being costed in the proposal.

- Protective shade should be provided to not less than 50% of the total area within a child care centre which is set aside for active play.
- All play equipment should have at least partial shade protection.
- Shade for high use elements in child care centres should be provided via structural devices.
- Structural shade should be supplemented with trees and shrubs, positioned to screen the midday sun from general outdoor areas.
- Existing shade sources both within and exterior to the site should be conserved.
- Outdoor teaching and eating areas and sandpits should be provided with year round protective shade.

Action Plan

1. A shade audit will be carried out at each child care centre. The centres will then be ranked according to their requirements for shade provision.
2. A strategy will be developed for shade provision (based on the recommended shade requirements in Table 7.1) at each child care centre beginning with those of the highest priority.
3. Shade may be created for the play equipment or thrown by the equipment itself.
4. Council staff will work together with the child care staff to develop complimentary sun protection programs (see: section 8.1).

7.2 Public Swimming Pool Centres

Evidence suggests that there is a strong association between recreational sun exposure and sunburn and the risk of melanoma. Sun exposure delivered intermittently increases the risk of melanoma more than the same amount delivered continuously. People using public swimming pool centres are particularly susceptible to this type of UVR exposure. In addition, the user group is predominantly young and the pool is in use during the high risk period of the year. Users usually have minimal protection in the form of clothing and are often exposed to the sun for extended periods of time. There is an urgent need for provision of protective shade in public swimming pool centres.

- **Shade Requirements - Quality**

Comfort and good design will play a major role in the success of shade provision for public swimming pool centres and shade must be carefully cited to attract maximum use. Summer shade which filters heat as well as UVR will be the principle requirement.

- **Shade Requirements - Quantity**

The following sites will require the provision of protective shade:

a. Toddler's pools and associated parents spectator areas.

These areas should be provided with permanent shade with maximum UVR protection. Permanent structures are considered the most efficient means of achieving this level of shade. Spectator areas adjacent to toddlers' pools require a high level of protective shade in the form of permanent or demountable structures or vegetation. Consideration should be given to reflected ultraviolet

radiation from buildings, concrete etc. Replacing these surfaces with less reflective material is encouraged.

b. Adult's pools

Users of a general pool will generally include casual and lap swimmers. Some activity will be similar to that which occurs in toddlers pools: moving around in the water for extended periods of time. For this reason, a portion of any pool should be provided with permanent shade, providing the opportunity to swim in the shade if desired. It is recommended that a minimum of 20% of the total area of any general use pool should be in protective shade.

c. Pool Spectator Areas

Municipal swimming pool centres have traditionally included large open areas for spectators and sun bathing. It is recommended that a minimum of 40% of the total open area within any swimming pool complex be provided with permanent protective shade. Additionally, provision should be made for temporary protective shading of all spectator areas during events which involve large spectator groups such as school carnivals.

Table 7.2: Summary of shade requirements recommended for public swimming pool centres

Quantity	Location	Type	Considerations
Minimum	40% total area	natural shade	People using public swimming pool centres are particularly susceptible to high risk behaviour for UVR exposure. The user group is predominantly young and the Centre is in use during the high risk period of the year. Proximity of shaded structures to reflective surfaces should be considered Solid roof materials which transmit light yet block UVR are effective at pool sites
	Canteen area	solid roof	
	100% toddler pool and surrounding supervising area	solid roof or constructed shade	
	swimming lesson area and supervisors area	portable or constructed shade	
	spectator areas-carnivals	portable or natural shade	
	20% of the area of a general use pools	constructed shade	
Preferred	75% total pool grounds	integrated natural and constructed shade	
	100% grand stand seating	solid roof	
	Carnivals and events - officials and competitors	portable shade	
	30% of the area of general use pools	constructed shade	

The following goals and actions are recommended for public swimming centres:

Goals

- A minimum of 40% of the total open area surrounding swimming pools should be provided with permanent protective shade.
- A minimum of 20% of the total area of a general use pool should be in protective shade.

- Toddler's pools and surrounds should be provided with permanent shade which deletes maximum levels of ultraviolet radiation whilst allowing the transmission of light and warmth.

Action plan

1. A shade audit will be carried out at each public swimming pool centre. The centres will then be ranked according to their requirements for shade provision.

2. A strategy will be developed for shade provision (based on the recommended shade requirements in Table 7.2) at each public pool centre.

3. Council staff will work together with the pool supervisors to develop complimentary sun protection policies and programs (see: section 8.2).

4. Provision of shade may be via demountable structures for temporary shading of spectators during events such as school carnivals or permanent shade over areas such as toddler pools.

7.3 Playground/Public Reserves

Playgrounds and public reserves exclusively involve outdoor activity, are in year round use and attract a user group which is significantly comprised of children. However, they are not in regular daily use and may be considered a lower priority than places such as child care centres.

- **Shade Requirements - Quality**

Playgrounds and public reserves will require provision of year round protection from UVR. Comfort and the general principles of design should be given particular consideration in the provision of sites for protective shade in playgrounds and public facilities as these facilities are allocated exclusively for recreational activity. Scale, character and landscape quality should be considered in the design process to ensure development of high quality open space which will be attractive to users.

- **Shade Requirements - Quantity**

It is recommended that protective shade be provided for not less than 30% of the overall area of any public reserve devoted to informal recreation. This shade could be provided via permanent structures or by tree planting. Other areas to be provided with shade include:

- BBQ/Picnic Areas: permanent shade should be provided for every BBQ facility at a rate of approximately 6.5 sq m/BBQ or picnic table. This shade could be provided for individual BBQ`s or as a communal facility such as a pavilion or grove of trees.

- Playground Equipment: it is recommended that all play equipment be at least partially located in protective shade. This shade may be created external to the play equipment by use of vegetation or shade structures or it may be thrown by the equipment itself.

Table 7.3: summary of shade requirements recommended for playgrounds/public reserves

Quantity	Location	Type	Considerations
Minimum	All playground equipment	natural	These areas are not in use on a regular daily basis.
	Supervision area adjacent to playground equipment	natural	

	All seating and tables and BBQ's	natural or roofed	Natural shade near BBQ's must avoid potential fire hazard. As well as providing protective shade it is important to create a comfortable atmosphere .
	30% of total ground cover	Combination of natural and constructed shade	
Preferred	All Playground equipment	constructed shade	
	40% of total ground cover	natural and constructed shade	

In 1990, the AIEH initiated research on local government policies and practices and found that 69% of councils reported that no shade cover was provided over play equipment (AIEH *et.al*., 1993). The following goals and actions are recommended for shade provision in public reserves and playgrounds:

Goals

- Protective shade should be provided for not less than 30% of the overall area of any public reserve devoted to informal recreation.
- All play equipment should be at least partially located in protective shade.
- Permanent shade should be provided for every BBQ facility or picnic area at a rate of approximately 6.5 sq m/BBQ or picnic table.

Action Plan

1. A shade audit will be carried out at major public reserves/playgrounds. These areas will then be ranked according to their requirements for shade provision.
2. A strategy will be developed for shade provision (based on the recommended shade requirements outlined in Table 7.3) at each public reserve/playground.
3. Shade may be created ideally by the use of vegetation and shade structures, or shade may be thrown by the equipment itself.
4. During special events, provision of shade may be made via demountable shade structures for temporary shading.

7.4 Playing Fields

Sporting fields are traditionally wide open spaces where little or no consideration has been given to shade provision. Shade for players, officials and spectators is essential.

Playing fields are subject to year round use with peaks occurring in the sports seasons - summer and winter. People playing sport on playing fields obviously cannot be protected by shade, although they are particularly vulnerable to UVR exposure. Some protective shade should be provided for spectators in areas surrounding playing fields, and for players not participating in events e.g. cricketers waiting to bat.

- **Shade Requirements - Quality**

Major playing fields will receive spectators year round but spectator use is likely to be restricted to certain times of the week when sporting events occur. For general purposes, shade should be

provided via tree planting. For major sporting facilities shade structures may be required for the spectator zones.

- **Shade Requirements - Quantity**

Decisions regarding quantities of protective shade for spectator areas adjacent to playing fields should be made after an assessment of levels of spectator use in numbers and frequency. For playing fields that receive large spectator crowds on a regular basis, provision should be made for protective shade not less than 50% of the total spectator area.

Table 7.4: Summary of recommended shade requirements for playing fields

Quantity	Location	Type	Considerations
Minimum	50% spectator seating or general viewing area	solid roof	Requirement for 100% player off-field area essential because players are always Present, yet spectators often lack in numbers.
	100% player off-field area	solid roof	
	official area	portable shade	
	80% of perimeter of ground	natural shade	
Preferred	100% spectator seating	solid roof	
	100% non-seating area	natural shade	
	100% player off-officials area	solid roof	
	100% perimeter of grounds	natural shade	
Tennis/Netball Courts	10 sq.m. per court	permanent structures or pavilions augmented by vegetation	

The following goals and actions are recommended for playing fields:

Goals

- Major playing fields should have no less than 50% of the total spectator area protected from ultraviolet radiation.
- Shade should be provided for 100% of the area of all playing fields for players awaiting participation in events, e.g. cricketers, runners etc.
- For minor playing fields, provision should be made for some protective shade adjacent to playing fields in convenient locations for spectators.

Action Plan

1. A shade audit will be carried out at each playing field. These playing fields will then be ranked according to their requirements for shade provision.
2. A strategy will be formulated for shade provision (based on the recommended shade requirements outlined in Table 7.4) at each playing field.

3. Council staff will work together with sporting bodies and other organisations who use council controlled playing fields to develop and implement sun protection programs (see: section 8.2).

4. During special events, temporary provision of shade may be made via demountable shade structures.

5. Portable structures will be required for the official area - scoring time keeping etc.

The following goal and actions are recommended for tennis and netball courts:

Goal

- Protective shade should be provided for all tennis and netball courts at a rate of 10 sq. m per court.

Action Plan

1. A shade audit will be carried out at each tennis and netball complex. These areas will then be ranked according to their requirements for shade provision.

2. A strategy will be developed for shade provision at each tennis and netball complex.

3. Sporting bodies and other organisations who use council controlled complexes will be encouraged to develop complimentary sun protection programs.

4. During special events, temporary provision of shade may be made via demountable shade structures.

5. Portable structures will be required for the official area, i.e. scoring, time keeping etc.

7.5 General Streetscape

A number of public places can be grouped under the heading of general streetscape. Recommendations are made for the following public places:

- pedestrian malls and shopping centres;
- pedestrian thoroughfares; and
- transport interchange zones, bus stops, taxi stands.

Provision of adequate protective shade in the streetscape is a vital component of a safe public environment in any local government area.

- **Shade Requirements - Quality**

All of these sites will be in constant year round use and will require year round shade provision. General shade provision should be for summer protection but there should be some provision made for winter protective shade, allowing some heat and light transmission for sites where people are likely to gather for extended periods of time.

- Outdoor shopping centres will require a mix of summer and winter protective shade. This should be provided by street tree planting and by permanent structures such as awnings and covered ways.

- Pedestrian thoroughfares, which are in regular use should be identified and given priority for protective shade provision. Particular thoroughfares, which will require priority treatment could include:
  - pedestrian links between transport networks and schools, places of work or retail centres and sporting facilities;
  - pedestrian links between car parks and work places or retail centres; and
  - transport interchange zones and bus/taxi stops will require winter and summer shade provision.

- **Shade Requirements - Quantity**

a. General Streetscape

It is recommended that streets which receive significant levels of pedestrian traffic on a regular basis be provided with protective summer shade on one side of the street as a minimum. This could be achieved by the planting of street trees. Street trees on identified pedestrian thoroughfares should be planted at spacing's which allow sufficient interlocking foliage at maturity to provide continuous shade along the thoroughfare.

In new subdivisions, pedestrian routes should be located to take best advantage of available shade. For streets running in an east-west direction, pedestrian thoroughfares should be located on the south side of the street. Deciduous trees located north of footpaths will then throw sufficient summer protective shade while allowing moderate sun penetration during winter. There is no ideal location for pedestrian routes on streets running north-south. As a rule, each situation needs to be assessed individually and where possible trees should be planted on both sides of the street. Overhead wires should be located on the opposite side of the street to identified pedestrian routes to avoid conflict with street trees.

Table 7.5.1: Summary of recommended shade requirements for pedestrian thoroughfares.

Quantity	Location	Type	Considerations
Minimum	1.2 metres from pathway every 15 - 20 metres	natural shade	Tree canopy covering path 2.4 metre clearance from ground to tree canopy. Trees planted on opposite sides at distance specified provide a balanced effect.
Preferred	1.2 metres from pathway every 15 - 20 metres	natural shade	A one (1) metre clearance between shade tree and curb should be allowed
	drink taps and rest stops	constructed shade	

b. Transport Interchange Zones; bus/taxi stops

Levels of protective shade in the general streetscape should be increased at all public transport stops. Protective shade for major public transport stops should be provided for the entire waiting area in the form of permanent structures that provide summer and winter shade supplemented by the planting of shade trees in densities greater than in the general streetscape. Minor public transport stops should be provided with protective shade trees as a minimum measure. Constructed shelters should be provided where possible.

Table 7.5.2: Summary of recommended shade requirements for transport interchange zones

Quantity	Location	Type	Considerations
Minimum	all seating, main waiting area	natural	Shade does not block view of oncoming traffic Shade does not block view of potential harm
Preferred	10 sq. m roof over seating/main waiting area	constructed summer/winter shade	
	70% adjacent waiting area	natural	

Provision of adequate protective shade in the general streetscape is a vital measure in the development of a safe public environment. The following goals and actions are recommended for the general streetscape:

Goals

- Streets which receive significant levels of pedestrian traffic on a regular basis should be provided with summer protective shade on one side of the street as a minimum.
- A street tree policy should be developed to ensure proper selection, planting and maintenance of street trees and trees in general.
- Protective shade for primary and major public transport stops should be provided for the entire waiting area in the form of permanent structures to provide summer and winter shade supplemented by planting of shade trees at densities greater than in general streetscape planting.
- Minor public transport stops should be provided with the provision of shade trees as a minimum. Constructed shelters should be provided wherever possible.
- Gathering zones such as outdoor entertainment areas and eating areas should receive priority for summer and winter shade provision.
- In new subdivisions, pedestrian routes should be located to take best advantage of available shade.
- All pedestrian thoroughfares linking schools to public transport pick-up points should be provided with protective summer shade.

Action Plan

1. A shade audit will be conducted on each streetscape. This will identify streets which receive significant levels of pedestrian traffic. Each area will then be ranked according to the requirements for provision of shade.

2. A strategy will be developed for shade provision (based on the recommended shade requirements outlined in Table 7.5.1 and Table 7.5.2) in the general streetscape area based on the guidelines recommended in this Strategy.

7.6 Places of Work

Places of work are environments where people carry out their day to day working activities. They may include offices, factories or retail premises. Many such places will have outdoor areas set aside for the use of workers for recreational purposes.

Outdoor spaces associated with places of work create sites where significant risks for UVR exposure could occur. They will be in year round use and are likely to be used in the middle of the day when the danger of exposure is highest. There is consequently a need to ensure provision of protective shade environments in these places.

Although councils do not have direct control over conditions in privately owned premises, the opportunity exists for the provision of safe shade in the work place through the general development control process.

Table 7.6: Summary of recommended shade requirements for work places

Quantity	Location	Type	Considerations
Minimum	User area 2 sq. m. per person	Natural shade	Potential for UVR reflection from surrounding surfaces is reduced by protective shade
Preferred	User area 5 sq. m. per person	Integrated solid roof and shade trees	
	All seating and tables	Natural shade	

The following goal is recommended for work place areas:

Goal

- Requirements in this Strategy for providing shade will be included as development controls in Councils weather control and urban design guidelines for commercial development.

7.7 Schools

Schools are mentioned in this Strategy because, as is the case with child care centres, the school environment provides the opportunity to minimise daily UVR exposure because school pupils spend their entire day within the school confines. Prudent provision of safe shade in schools could be a significant factor in the reduction of exposure to direct sunlight.

The spaces within school boundaries are however, do not fall in the jurisdiction of local government for building and development control. Nevertheless, it is recommended that the areas under local government control which surround schools or are associated with their daily use should be given high priority for provision of shade. These places could include the general streetscape, school bus stops and pedestrian links between schools and transport routes.

The following goal and action is recommended for school areas:

Goal

- Areas under local government control, which surround schools or are associated with their general use, for example bus stops, should be given high priority for provision of shade.

Action Plan

A shade audit will be conducted on each streetscape. This will identify streets which receive significant levels of pedestrian, particularly school traffic. Each area will then be ranked according to the requirements for provision of shade.

8.0 Sun Protection Programs

Sun protection awareness programs are an essential part of Councils Sun Protection Strategy. They are designed to: compliment shade provision in public places; increase the awareness of the community; and encourage people to avoid and reduce UVR exposure. These programs have been drafted from Sun Protection Policy Guidelines for Local Government (1992).

8.1 Child Care Services

Childhood sunlight exposure is critical for both non-melonocytic skin cancer and melanoma (see: Appendix 7). A child's delicate skin is more sensitive than an adult's skin because the pigment in the skin, which is a natural protection from the sun, develops mainly after infancy. Additionally, because most children in childcare are likely to spend the entire day at the centre, the opportunity exists to create environments in which daily UVR exposure is effectively controlled.

Council controlled child care services, including child care centres, Family Day Care Units and Vacation Care programs will be required to promote positive attitudes towards sun protection.

Goals

- All council controlled childcare services will implement a 'No Hat, No Sunscreen - Play in the Shade' policy.
- All council controlled childcare services will schedule outdoor activities before 9am and after 3pm (EST) unless the activity is conducted in shaded areas.
- All child care workers will be encouraged to adopt positive preventative sun protection behaviours and act as role models for the children in their care.
- All child care workers will have a good knowledge of sun protection issues.

Action Plan

When enrolling a child, parents will be:

- Informed of the SunSmart Policy;
- Requested to provide a hat with an 8 cm wide brim or legionnaire style for outdoors and shirts with collars and sleeves made from a closely woven material;
- Encouraged to provide SPF 15+, broad spectrum, water resistant sunscreen for their child's use;
- Requested to apply SPF 15+, broad spectrum, water resistant sunscreen to the child before leaving home. (Alternatively, a large pack of sunscreen can be placed at the entrance of the child care centre and the parents can use this for their children. A stamp can be put on the child's hand so the staff know which children have been applied with sunscreen);
- Encouraged to practise skin protective behaviour themselves and act as positive role models for the children.

Staff and Carers will:

- Be encouraged to adopt their own Sun Protection policy using the guidelines distributed by the Cancer Council - 'SunSmart Advice for Pre-schools and Child Care Services'.
- Be expected to practise skin protective behaviour such as wearing hats and appropriate clothing for all outdoor activities;
- Direct children to use shaded areas where possible;
- Adopt a flexible approach to planning that will promote optimum use of shaded areas;
- Supervise the wearing of protective clothing and administer sunscreen where appropriate. Parents will be required to give authority and directive to administer the sunscreen.
- Childcare workers and carers within Family Day Care will participate in a skin cancer education training module.

- Childcare workers and carers within Family Day Care will design and implement sun protection awareness activities with the children in their care. These activities may include: face painting; sunscreen treasure hunts; making paper hats; and tree planting activities.

- Encourage the Office of Child Care to include the provision of shade on the 'Safety Check' list.

8.2 Community Use of Council Controlled Venues/Facilities; Special Events
People that utilise Council venues and attend special events such as markets and street parades are likely to be exposed to high levels of UV radiation. One of the major factors in the development of melanoma is episodic exposure to UVR of a level sufficient to cause sunburn. The most effective way of reducing the risks of skin cancer is rescheduling activities to avoid the sun between 9 am and 3 pm EST, hence avoiding peak radiation times. However, in many circumstances this will not be possible or practical.

8.2.1. General

Goals

- All organisations wishing to use Council controlled venues/facilities will be encouraged to schedule activities to limit the amount of time participants and organisers will be exposed to ultraviolet radiation.

- Organisers of special events and sporting activities will be encouraged to provide shade for participants.

Action Plan

1. A sun protection message will be included on all licences for the use of Council controlled venues (see: Appendix 8).

2. Include information about being SunSmart in pre-publicity and application forms for programs such as festivals and markets.

8.2.2 Public Swimming Centres

Goals

- All workers at public swimming pools will be encouraged to adopt positive sun protection behaviours and act as role models for the people using the facilities.

- All pool staff at public swimming pools will have a good knowledge of sun protection issues.

- Pool staff will be encouraged to schedule work activities to limit the amount of UVR exposure they receive.

Actions

1. Pool supervisors will participate in a skin cancer education training module.

2. Pool staff will be encouraged to wear hats and protective clothing while working.

3. Erect a sign about children’s risk of over exposure and general sun prevention measures.

4. Possibly allow users to leave in the middle of the day and return without extra cost.

5. Encourage employees to clean the pool in the early morning or late afternoon.

6. Provide council controlled pools with sunscreen free of charge to users.

8.2.3 Sports Events

Goals

- All sporting organisations wishing to use Council controlled venues/facilities will be encouraged to schedule activities to limit the amount of time participants and organisers will be exposed to ultraviolet radiation.

- Organisers of special events and sporting activities will be encouraged to provide shade for participants.

Action Plan

Council staff will work together with Lismore District Sports Association (LDSA) to formulate a policy for sun protection, modelled on the Sun Protection Policy Guidelines - "Play your Part in SunSmart Sport", developed by NSW Cancer Council, NSW Health and NSW Sport and Recreation.

8.3 Sun Protection Education

Goals

- Increase the level of awareness of skin cancer issues within the community.

- Inform the community of the Sun Protection Strategy and the importance of using shade in addition to personal sun protection measures.

Action Plan

1. Provide information to property owners in regard to planning for shade provision.
2. Provide information to pool owners concerning shade provision in the pool area.
3. Include a flier in rates notice or in the local newspaper to assist in increasing the awareness of the community of the importance of sun safety and making use of available shade
4. Erect a sign at high use public places such as Lismore Public Swimming Pool or the playground in Heritage Park which includes the following information:
   a. Slip, Slop, Slap, Wrap;
   b. A clock face showing times when ultraviolet radiation is at its peak;
   c. The importance of using shade.

9.0 Considerations for Development Control

9.1 General Planning Instruments

Planning services can take the provision of shade for sun protection in to consideration for the preparation of statutory and non-statutory plans, policy documents and in the assessment of development applications.

Adequate levels of protective shade in the landscape component of all development proposals should be considered as a requirement for approval. Conditions can be imposed on development in respect of shade provision under Section 90 of the NSW Environmental Planning and Assessment Act 1979 (EPA Act), Clauses (d), (e), (f), (h), (m), (o), (p) and (r).

9.2 Section 94 Contributions for Private Developers

Section 94 of the EPA Act makes provision for local government authorities to place levies on development for improvements to amenities or services required to meet increased demand caused by the development. Councils who wish to levy developers under Section 94 are required

to prepare a comprehensive plan describing means and areas for which contributions will be sought.

Before contributions for shade provision can be included in a Section 94 plan, it will be necessary to completely substantiate a connection between development and an increased need for protective shade.

Particular shade devices, which may be funded through developers` contributions may include:

- tree planting, picnic shelters, playground shelters or pavilions for open space associated with new residential sub-divisions;
- awnings or other shade structures in shopping centres;
- street tree planting or bus shelters for new sub-divisions.

Where a connection can be made between new residential development and an increased need for protective shade, private developers may be required to contribute financially towards council's policy for shade in open spaces.

9.3 Tree Preservation Orders

Tree Preservation Orders constitute an important mechanism for provision of protective shade as they provide a means of ensuring preservation of existing significant trees, which are a vital resource for protective shade. Significant shade trees will be conserved through Council's Tree Preservation Order, Development Control Plan No. 17

9.4 Footway Restaurant Approvals

Many local government planning authorities are seeing evidence of increased interest in establishment of outdoor dining facilities. Provision for protective shade as recommended in this Strategy should be a condition of approval for footway restaurants. Plans for outdoor dining should include information regarding proposed shade facilities.

9.5 Private Swimming Pool Approvals

Council could incorporate information regarding dangers of exposure to UVR and the need for protective shade in their codes for the construction of private pools. Private pool owners could be encouraged to replace trees removed for pool construction. Council could develop libraries of recommended shade structures or devices suitable for use adjacent to pools and these should be made accessible to the public.

9.6 Places of Work

Although Councils do not have direct control over conditions in privately owned premises, an opportunity exists to require the provision of safe shade in the general development control process. The requirements in this Strategy for protective shade in eating areas could be included as development controls in Council's guidelines for commercial and industrial development.

10.0 Time Line of Strategy

Table 10.1: Time line for developments of the Sun Protection Strategy

Action	Date
Identify and prioritise public places and sensitive land uses	Feb 1997
Include shade auditing in Council's estimates program for 1997	March 1997
Conduct shade audits on prioritised public places and sensitive land uses	June/July 1997
Re-prioritise sites based on the findings of the shade audits if necessary	June 1997
Add to the Plans of Management for public places and sensitive land uses	on-going

11.0 References

Anti-Cancer Council of Victoria (1990) *A Comprehensive Guide to Becoming a SunSmart Council*, Anti-Cancer Council of Victoria, Victoria.

Australian Institute of Environmental Health (NSW Div.), Cancer Council and NSW Health (1993) *Sun Protection Strategies for NSW. A Guide for Local Government*, AIEH, NSW.

Australian Institute of Environmental Health (NSW Div.), Cancer Council and NSW Health (1992*) Sun Protection Policy Guidelines for Local Government*, AIEH, NSW.

Australian Institute of Environmental Health [Queensland Div.] (1995*) Creating Shade at Public Facilities. Policy and guidelines for Local Government*, AIEH, Queensland.

Cancer Council (no date) *SunSmart Advice for Pre-schools and Child Care Centres*, Cancer Council, Woolloomooloo, NSW.

NSW Cancer Council, NSW Health & NSW Sport and Recreation, Play *Your Part in SunSmart Sport - Sun Protection Policy Guidelines for Sporting Organisations (Draft).*

NSW Health & Cancer Council (1995*) Skin Cancer Control in New South Wales - Health Promotion Strategic Plan 1995-2000*, Cancer Council & NSW Health Department.

12.0 Appendices
Appendix 1 [from: NSW Health & Cancer Council, (1995)]

Strategic Plan for the Prevention of Skin Cancer.

Specific Targets
Increase the percentage of councils with a policy for outdoor workers
Decrease the percentage of councils who did not schedule activities to limits workers exposure between 11 am and 3pm.

Increase in the percentage of councils who provide some sort of portable shade construction for outdoor workers when needed.

Increase the percentage of councils who provide long sleeve shirts for sun protection.

Increase the percentage of outdoor workers using a high level of solar protection.

Health Promotion Outcomes

Policy Guidelines, Public Awareness	Healthy Settings, Positive Attitudes	Healthy Lifestyles
Implementation of sun protection policies and shade guidelines Shade measurements conducted Inclusion of shade provision in development and building applications Local councils and commercial agencies to agree to provide shade in existing recreation and outdoor community areas Guidelines and information on shade provision for the home environment available Information on sun protective environments included in training for architects, designers and town planners Information in relation to sun protection and policy implementation available to sport, recreation and community groups through education and training	Increase in adequate provision of sun protective shade Positive change in attitudes, knowledge and skills among sport, recreation and community groups Positive change in knowledge, attitudes and skills of participants in sport and recreation	Increase in sport and recreational sun protection behaviour Increase in sun protection behaviour amongst trainers and recreational leaders Increase in use of shade by sport and recreation participants.

Appendix 2 [from: AIEH Q. div., (1994)]

Reflected UVR

Ultraviolet radiation is subject to reflection and scattering by nearby objects. Materials that are highly reflective will significantly raise levels of ambient UVR in their vicinity. This diffuse radiation may come from all directions and the intensity of solar radiation can be raised by more than 50%. Potential reflected UVR must be identified when designing protective shade for an area (AIEH, Q. div)

The amount of light that is reflected by a material will depend on three characteristics:

* Surface density: hard surfaces such as paving will reflect higher levels of UVR than softer surfaces such as grass.
* Surface finish: smooth surfaces such as glass, aluminium sheeting or smooth concrete will reflect higher levels of UVR than coarse surfaces such as timber cladding, terracotta tiles or brick paving.

* Surface colour: bright colours will reflect higher levels of UVR than darker colours.

Table: Percentage of UVR reflected from certain materials.

MATERIAL	REFLECTION (% OF UVR)
Lawn Grass	2.0 - 5.0
Grasslands	0.8 - 1.6
Soil - Clay/Humus	4.0 - 6.0
Light Coloured Concrete (Footpath)	8.2 - 12.0
Bitumen Road	4.1 - 8.9
House Paint - White	22.0
Open Water	3.3 - 8.0
Beach Sand - Wet	7.1
Beach Sand - Dry	15 - 18

(Source: AIEH, 1994)

A shade audit will identify potential areas for reflected radiation. The angle and design of shade structures must be considered with regard to potential UVR reflection.

Appendix 3 [from: AIEH et.al., (1992)]

Protective Shade Material

A broad range of manufactured and natural materials are suitable for use in provision of protective shade. These include vegetation, fabrics such as shade cloths and canvasses and rigid materials such as thickened glass, polycarbonates and conventional building materials. Below is a description of qualities and appropriate applications for some materials commonly used for protection from UVR.

Vegetation

Foliage and timber in vegetation act as physical barriers to UVR, infrared and visible light, offering high rates of protection. However, gaps in foliage allow 100% transmittance of radiation. Therefore, the effectiveness of vegetation for protective shade is a function of the density of the shadow thrown. Spaces in dense shadow can be considered to be protective shade.

Manufactured Materials

Shade Cloths

Shade cloth is the least effective roofing material for protection from UVR. It often gives a false sense of security, as a large degree of UVR may penetrate the material. If shade cloth is used it is strongly recommended that signage is used within the area to inform people that it is necessary to wear protective clothing. The amount of transmission of UVR depends on the shade factor. That is:

* if rated 50%, it absorbs 50% and transmits 50% (UPF of 2)
* if rated 80%, it absorbs 80% and transmits 20% (UPF of 5)
* if rated 90%, it absorbs 90% and transmits 10% (UPF of 10)

(AIEH, Q. div)
Shade cloth with maximum protection against UVR is recommended.

Manufactured shade cloths perform similarly to vegetation as materials for protective for protective shade provision. They act as physical barriers with no transmittance of radiation through the yarns of the fabric but with 100% transmittance through openings in the fabric structure. Only shade cloths with ratings greater than 80% could be considered suitable for effective protective summer shade. Shade cloths with ratings down to 50% would be suitable only for protective winter shade. The effect of colour, washing and the application of stress, may alter the UV absorption property. If a shade cloth is tightly stretched to form a cover, the holes may expand and therefore allow more UVR to penetrate (AIEH, Q. div).

Canvasses

Woven canvas is often used for umbrellas. Canvasses have good protective qualities for UVR, although their effectiveness deteriorates with time as the materials absorb UVR and are exposed to weather. Manufacturers should be consulted to determine the effective life of canvas products used for protective shade.

Polyweaves

Polyweaves are fabrics woven from synthetic materials using flat filaments rather than round profile threads commonly used in shade cloths. They behave similarly to shade cloths for protection from UVR but tend to throw a denser shadow which makes them moderately more effective for protective shade. Some materials are plastic coated and may therefore provide more protection since plastics generally absorb UVR strongly. Polyweaves with ratings greater than 80% are effective for protective shade.

Polycarbonate and Fibreglass
Polycarbonates are all highly effective in reflecting UVR, achieving close to 100% reflectivity. Transmittable qualities for infrared heat and visible light differ widely between individual products according to profile, colour and thickness. This characteristic can be useful for provision of effective winter shade where moderate levels of heat and light are desirable to produce comfortable, protective environments.

Fibreglass sheeting materials behave similarly to polycarbonates for radiation reflectivity. They tend, however, to be less durable and have shorter effective lives.

Glass
Glass is effective in providing shade to varying degrees depending on its thickness. Normal window glass will provide good protection from the UVA part of the ultraviolet spectrum but allows transmittance of significant levels of UVB. Only thickened glass or glass with a UV protective film is suitable for provision of protective shade.

Awnings and outdoor roofing materials
These solid roofs are durable and require little maintenance. All weather protection is provided. It is favoured that solid roofs be implemented for solar protection in areas of high use, for long periods of time and especially if the users are of a young age group.

Other materials
Any opaque material will provide screening to UVR. All standard building materials, if opaque, will be suitable for provision of protective shade.

Appendix 4: [from: AIEH et.al., (1992)]

Considerations for protective shade

Trees

Trees in a community constitute an important resource for a great number of reasons. The planting of trees as devices for protective shade is a long term measure, as usable shade will only be achieved as the plants begin to reach mature dimensions (AIEH, 1992).

Species Selection, Care and Maintenance
Trees need to have particular forms to be suitable for protective shade. In order for trees to be effective as shade producers, adequate planning is necessary as well as sufficient levels of care and maintenance to ensure that the trees reach their full potential.

Trees which are to be planted as single specimens for shade need to have broad, dense canopies and sufficient clearance beneath the canopy to allow access. Trees with open crowns and less dense foliage will throw adequate protective shade if planted as groups so that the foliage overlaps when the trees are mature. Tall trees and small shrubs can be a useful combination when space is restricted (AIEH, 1992)

Deciduous trees can be used in situations where summer shade is required but some light and warmth is needed in winter. Most deciduous trees will allow about 45% sun penetration when bare, thus producing a broken shade which in most situations is sufficient for winter protection.

A list of trees adapted to the northern rivers area and suitable for shade protection is available in Appendix.

Structure

Built structures can be used to achieve protective shade for summer and winter conditions. Unlike trees, built structures will produce immediate shade, the dimensions of which can be predicted reasonably accurately. Upfront costs will, however be greater than is the case with tree planting. Structures can be used where immediate protective shade is required.

Structures may be free standing or they may be attached to building. Verandas on buildings or the buildings themselves will throw shade and this should be accounted for when designing for protective shade. Structures may be fixed and permanent or they may be portable and demountable.

Permanent structures should be used for picnic or bus shelters, shade shelters at swimming pools, or at child care centres. Demountable structures should be used for situations where demand for use of an area is likely to fluctuate. Lightweight demountable structures could be used to provide temporary spectator shade for swimming carnivals and other sporting events (AIEH, 1992).

The type of shade that a structure produces will depend on the materials selected for its cladding. Structures clad with opaque materials such as iron or aluminium are suitable for protective summer shade but may produce cold, dark environments unsuitable for winter conditions. Cladding with net materials such as shade cloth and Polyweaves will produce shaded environments which would produce adequate winter protection but would not generally be considered as being suitable for mid-summer conditions (unless materials which exclude 80% or more of UVR are used). For a full description of materials suitable for shade provision, see: Appendix.

Generally, structures for protective shade should be selected on a site specific basis to fulfil the requirements for protective shade proposed by the site.

Planning and Design for Protective Shade

The planning process for protective shade will employ one or more of the materials listed in Appendix 3. In order for the structural or natural shade to be both protective and inviting, the following issues need to be addressed:

Orientation: Outdoor and indoor living spaces should generally be orientated in a northerly direction in accordance with the general principles of solar access.

Reflectivity: Levels of reflectivity of UVR need to be considered when selecting materials and colours in the design process. Sites where reflective materials occur in abundance may require more concentrated use of shade devices in order to achieve protective shade. Such conditions could occur in highly urbanised environments such as commercial or retail zones where large areas of paving or glass are likely to exist (AIEH, 1992).

Solar paths: Particular sites will experience varying degrees of UVR exposure according to the times they are in use and the position and the intensity of the sun at those times. Design for protective shade should provide for maximum protection by locating shade devices according to the sun's position during periods of high use.

Existing Conditions: Existing vegetation and structures both within and exterior to a site should be considered for their value as shade devices and protected accordingly.

Assessing levels of protective shade

For the purpose of this strategy, measurement of areas of protective shade should not be considered an exact science. Shade should be assessed based on intuitive decisions about how people are likely to use the places and what sort of protective areas they are likely to require to carry out their activities in relative safety.

Aggregate Shade

The shade pattern thrown by an object is not static. It will change size and location through the day and throughout the year as the sun changes position in the sky. Any shade should be positioned or planted to ensure that the shading of the area is as complete as possible between the hours of 10am and 3pm for the periods in which particular sites are likely to be in use. The minimum levels of protective shade for an area will occur between 9 am and 3pm (EST) during the shortest day when the site is in use. This is termed aggregate shade.

For example: a public swimming pool is likely to be in use for outdoor activity in the spring and summer months only so the aggregate shade potential will occur during the shortest day in that period (the equinoxes: 21st March and 23rd September) and a public reserve will be in use throughout the year so the aggregate shade potential will be achieved at the winter solstice (the shortest day in winter).

Appendix 5 [from: AIEH Q. div. (1995)]

The Shade Audit
It is useful if all calculations are made during the middle hours of the day (12 noon), when the sun is close to being directly overhead. Shade protection is important during the hours of 9am and 3pm EST and this consideration must be taken into account when undertaking the audit.

1. To identify the expected UVR reflection
a) Work out the total area of the site
□sq.m

b) Identify what area of the site is covered by fully enclosed buildings
□sq.m

c) Identify what are of the site is covered by incumbent structures
□sq.m
(e.g. monuments in parks, ponds not intended for recreational use)

d) Calculate the total area which is not utilised for human activity b□ + c□=
□sq.m
(It may not always be applicable to add B e.g. when it is an enclosed dressing room beneath a grand stand)

e) Total the area for outdoor human activity a□ - d□ =
□sq.m

f) Identify the total shaded area for outdoor human activity, measured at midday (structures such as awnings may be measured, shade from trees calculated by measurement of shadow)
□sq.m

g) Work out the total outdoor activity area which is subject to direct UVR from sun at midday
e □ - f □ = □ sq.m

h) Calculate the percentage of direct UVR exposure at the site (g□/e□) x 100 = □%

i) Estimate the reflected UVR at the site, using the table in Appendix 2
Source 1 □%
Source 2 □%
Source 3 □%
TOTAL □%

The Total expected UVR therefore is h □ + □ i = □ %
(The total should not exceed 100%. For simplicity, where H is 90% and I is 20%, then the total Expected UVR is 100% not 110%)

2. To identify the effectiveness of existing shade at a site:
a) During the middle hours of the day, calculate the amount of shade from constructed shade and express as a percentage of the total area. □%
b) During the middle hours of the day, calculate the amount of natural shade and express as a percentage of the total area. □%

c) Determine the suitability of existing shade by itemising the following

Type of shade	Percentage of outdoor area covered	Protection factor (see: Appendix 3)

d) Note the effectiveness of existing constructed shade

e) Do artificial shade structures require maintenance to be fully effective? If yes, identify some of the potential costs and methods to avoid these.

f) Note the effectiveness of existing natural shade

g) Determine the suitability of existing shade for activities regularly carried out at the site (is the shade suitably angled for users/spectators during the hours of the most use)?

h) Note the aesthetics of the existing shade

i) Summarise the effectiveness of the existing shade at the site

3. To identify the action required to improve shade at the site:

a) Outline the preferred amount of shade which is recommended for this facility, using the technical guidelines outlined in section 7.

b) Recommend the type of shade suitable for the area. Account for (i) the needs and wants of the users of the site (ii) the types of activity popularly carried out at the site (iii) local environmental conditions/issues which may pertain the site (iv) costs and (v) the aesthetics of existing and recommended shade

c) Construct plans for the increased shade. It would be useful to display these for public comment to ensure the needs of the community are being met.

d) Take steps to implement the shade.

Appendix 6 [from: AIEH Q. div. (1994)]

Priority Scoring System

This system is useful to prioritise areas where action for shade provision is required. It can be adapted to be more relevant to the local environment and the community. Each facility should be assessed individually. Several additional factors unique to each Local Government will also need to be considered.

FACTOR:		**POINT:**
AGE	> 60% users aged 0 - 8 years	1
	> 60% users aged 8 - 20 years	1
OUTDOOR ACTIVITY likely to occur in minimal clothing		2
OUTDOOR ACTIVITY likely to occur between 9am and 4pm		2
>50% OF THE ACTIVITY occurs outdoors		2
OUTDOOR ACTIVITY occurs for > 10 minutes at a time in the summer		2
OUTDOOR ACTIVITY occurs > 15 minutes at a time in winter		2
THE PLACE is likely to be used for regular outdoor activity		2

Each Local Government will have a variety of additional factors to consider which will directly affect the development of a Sun Protection Strategy. Consideration needs to be given to factors such as: economy; climate; community attitudes.

Facilities with the highest score should be categorised as priority one (1).

Appendix 7 [from: AIEH Q. div. (1994)]

Types of Skin Cancer

There are three main types of skin cancer:

- The Basal Cell Carcinoma (BCC) is the most common form of skin cancer and subsequently the most easily treated. It appears as a lump and/or red scaly patch. It is either red, pale or pearly in colour and often has a raised edge. As it grows it becomes ulcerated.

- The Squamous Cell Carcinoma (SCC) is a skin cancer which is a red, thickened scaly spot which may bleed. It appears in sites often exposed to the sun such as the back of the hand. It will grow over a number of months.

- The Malignant Melanoma is the most dangerous type of skin cancer. It appears as a new spot or freckle, or may exist, yet changes colour or shape. If untreated, the cancer cells can spread rapidly to other parts of the body. If detected early enough, it is 95% curable.

Appendix 8 [from: AIEH et.al., 1992)]

The following message is to be included on all licences for the community use of council controlled venues/facilities.

'Lismore City Council is a Sun Safe Council'
Lismore City Council and the? Committee who have the care, control and management of parks and public reserves encourages all organisations and sporting bodies to consider the harmful effects of ultraviolet radiation when scheduling games, outdoor events and festivals, particularly in the summer months.

Where possible, all outdoor games/ events/ festivals that are not under cover could be rescheduled to take place outside of the hours of 10am and 3pm daylight saving time. Where this cannot be achieved, adequate shade and sun protection equipment should be made available to all participants where practical.

Children and young people under the age of 20 years are most at risk. Help them avoid problems associated with skin cancer by taking preventative action today.

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