APPENDIX ONE

Subdivision Design Principles

Part A **Neighbourhood Characteristics**

1. *General Planning*
2. *Street and Allotment Design and Layout*
3. *Landscape Design and Conservation*
4. *Open Space*

Part B **Creating Places for Living**

1. *Permeability, Access and Linkages*
2. *Amenity*
3. *Security*
4. *Neighbourhood Scale*

Part C **Neighbourhood Mobility**

1. *General Subdivision Planning*
2. *Designing the Street Network*
3. *Street Construction*
4. *Pedestrian and Cyclist Facilities*
5. *Allowing for Public Transport*

Part D **Risk Prevention**

1. *Natural Hazards*
2. *Man-Made Hazards*
3. *Designing for Safety*

Part E **Utilities**

1. *General Considerations*
2. *Sewerage*
3. *Water Supply*
4. *Electricity Reticulation*
5. *Street Design for Utilities*

Part F **Stormwater Drainage**

1. *Stormwater Disposal and Inundation*
2. *Water Quality Management*
3. *Stormwater Harvesting*
4. *Street and Landscape Design*

Part G **Energy Efficiency**

1. *General*
2. *Solar Access*

Part H **Environmental Considerations**

1. *Statement of Environmental Effects*
2. *Tree Preservation*
3. *Heritage Items*
4. *Flora and Fauna*

PART A. DESIGN PRINCIPLE : NEIGHBOURHOOD CHARACTER

1. General Planning

A. The subdivision must give a neighbourhood a strong and positive identity, by responding to site characteristics, setting, landmarks and views and through clearly readable street and open-space networks.

B. The subdivision must retain significant vegetation and habitat areas, incorporate natural and cultural features, minimise soil erosion and avoid development on flood-prone land.

C. The subdivision must integrate with the surrounding urban or rural environment, complement any existing attractive streetscapes and landscapes, and provide for convenient access to public facilities by adjoining communities.

D. The street network and pedestrian / cycleway network must take account of the topography and vegetation, natural drainage, open space systems, existing or potential site assets, and take advantage of opportunities for views and vistas.

E. The subdivision layout acknowledges the opportunities and constraints presented by the physical characteristics of the land, in its proposed design, construction and operation.

2. Street And Allotment Design and Layout

A. The street network takes account of natural drainage and open space systems and where practicable, the alignment of roads, paths and cycleways focus on vistas and landmarks where they exist.

B. Lot size and dimensions shall enable dwellings to be sited to:

- Protect natural or cultural features;
- Acknowledge site constraints including soil erosion and bushfire risk;
- Retain special features such as trees and views.

C. Allotment frontages (primary) shall be oriented to streets and open space. Allotments adjoining main roads and public open space shall be accessed by a separate service road to which those allotments have primary frontage.

Allotment sizes and dimensions must take into account the slope of the land and the desirability of minimising earthworks / cut and fill / retaining walls associated with dwelling construction.

E. The lot layout shall take into account the opportunities and constraints presented by the physical characteristics of the land, especially on-site features, topography, views, landmarks, vegetation, structures, drainage, services, access, orientation and microclimate considerations and, where appropriate, incorporate provision for existing buildings, vegetation, or natural site feature of identified conservation or heritage value.

3. *Landscape Design and Conservation*

A. Landscape enhancement must be a key element of subdivision design that achieves:-

- The creation of an attractive residential environment with clear character and identity;
- Respect for existing attractive streetscapes in established areas;
- Provision for appropriate street tree planting taking into account the image and role of the street, solar access requirements, soils, selection of appropriate species, services, and Council's adopted landscape theme for the neighbourhood;
- Minimise future damage to services by appropriate selection of species;
- Significant use of such features of the site as views, vistas, existing vegetation and landmarks.

B. The subdivision layout shall integrate with the surrounding environment through:-

- Adequate pedestrian, cycle and vehicle links to streets and open space networks;
- Streetscape and landscape design relating to the site topography and to the surrounding neighbourhood character or the desired future neighbourhood character;
- The presentation or creation of habitat corridors and protection of natural creek lines.

C. The street network must take account of the streetscapes that may be created or that already exist or are planned for the neighbourhood.

D. The design of the landscape in public streets and rights of way (ROW) shall:-

- Help define a character for new streets, compatible with the Council's adopted neighbourhood landscape theme or complement existing streetscapes;
- Be sensitive to site attributes;
- Use vegetation types and landscaping styles which help to blend development into the streetscape;
- Complement the functions of the street;
- Reinforce desired traffic speed and behaviour;
- Be of an appropriate scale relative to both the street reserve width and likely bulk of potential dwellings given the proposed allotment size;
- Promote safety and casual street surveillance from future dwellings;
- Minimises unwanted overlooking;
- Incorporate existing vegetation, wherever practicable;

- Appropriately account for streetscapes and landscapes of heritage significance;
- Assist in the management of the impact of the microclimate;
- Maximise the incorporation of absorptive landscaped features for on-site infiltration of stormwater where appropriate;
- Integrate and form linkages with parks, reserves and transport corridors;
- Enhance opportunities for pedestrian comfort;
- Achieve lines of sight for pedestrians, cyclists and vehicles;
- Provide adequate lighting for pedestrian comfort;
- Provide attractive and co-ordinated street furniture and facilities to meet user needs;
- Satisfy maintenance and utility requirements and minimise the visual impact of above-ground utility installations.

E. The subdivision shall contribute to or establish an agreed (with Council) and distinctive neighbourhood identity by means of incorporating a range of "signature" features into the subdivision, including:-

- Tree planting in streets and public open spaces to an agreed landscape theme;
- Street lighting;
- Entry threshold treatment including road pavement surfacing;
- Fencing;
- The enforcement of covenants which promote a selected architectural and landscape theme agreed to by the Council. NB gated estates will not be permitted.

F. The subdivision shall conserve existing fauna habitat, trees, rocks, streams and other features of natural or cultural significance, and facilitate the linkage of habitats and wildlife corridors.

4. Open Space

A. Where the layout provides open spaces, these must contribute to the legibility and character of the neighbourhood.

B. Public open spaces in subdivision shall be designed and treated so that they are not incompatible with the recreation facility requirements of Council's Developer Contributions Plan and provide:-

- Acknowledgement of the opportunities and constraints presented by the physical characteristics of the land in the proposed use, landscaping and facilities;
- Opportunities for the incorporation of existing trees, rocks, streams and other sites of natural or cultural value, and linkage of habitats and wildlife corridors;
- Opportunities to link public open spaces into a legible network where achievable;

- High accessibility to users;
- Avoidance of the need for continual lengths of solid fencing along open space areas for security, surveillance, aesthetic and maintenance reasons;
- For a clear relationship between public open space and adjoining land uses established by appropriate treatment including alignment, fencing, landscaping, and issues of security and surveillance; and
- For an appropriate recreation setting in accordance with Council's Developer Contributions Plan, for community paths, and attractive urban environment settings and focal points.

C. A subdivision layout can make provision for shared private open space that is designed according to projected user needs which is determined by:-

- The overall housing density;
- The quality and extent of alternative private and nearby public open space;
- The need to distinguish communal open space clearly from private or public open space; types of activities envisaged;
- Future maintenance and management requirements;
- The need to maintain the privacy of nearby dwellings;
- Projected needs of children for outdoor play;
- The need for landscaping to enhance a sense of enclosure of commercial open spaces, while allowing informal surveillance and meeting security needs;
- Traffic management implications; and
- The hours of operation of communal facilities.

PART B. DESIGN PRINCIPLE : CREATING PLACES FOR LIVING

1. Permeability, Access and Linkages

A. The street network must provide a high level of internal accessibility and good external connections for local vehicle, pedestrian and cycle movements, with traffic management to restrain vehicle speed, deter through-traffic and create safe conditions for other road users.

B. The subdivision layout must ensure integration (where possible) with, and convenient access to major district level open spaces.

C. Safe and efficient connections between transport corridors and residential neighbourhoods shall be provided.

D. The residential street and path network shall provide a network of pedestrian routes, and low speed and volume and routes for cyclists, with connections to adjoining streets, open spaces and activity centres.

E. Pedestrian ways and cycle routes shall where appropriate, be provided in accordance with:-

- The need to encourage walking and cycling within and to and from the neighbourhood;
- The needs of likely users (eg school children, parents with prams, the aged and/or people with disabilities, commuter and recreational cyclists);
- The need to create opportunities to link open space networks and community facilities, including public transport stations/stops, local activity centres, schools;
- Topographic and other natural constraints;
- Cyclist and pedestrian safety.

F. Subdivision layout shall provide for streets that create a safe and attractive environment by:-

- Promoting the safety of pedestrian movement within and around the neighbourhood, including access to community activity areas and bus stops, and at road crossings.
- Promote the safety of cyclist access throughout the neighbourhood, either by separate off-road cycleway, provision of on-road lane marking (where appropriate) or by shared pedestrian / cycle paths and paying particular attention to cyclist safety at crossing points.

G. The subdivision layout shall integrate with the surrounding environment through:-

- Adequate pedestrian, cycle and vehicle links to street and open space networks;
- Ensuring allotments have their primary frontages facing streets and public open spaces;
- Ensuring that allotment, street and landscape design relate to topography and the surrounding neighbourhood character;
- The preservation or creation of fauna habitat corridors and the protection of natural creek lines;

H. Where the subdivision provides for open spaces, these shall contribute to the legibility and character of the neighbourhood and provide access to a range of uses and activities.

I. Subdivisions must provide for a high degree of connectivity both within the subdivision and to the neighbourhood generally, focusing on:-

- Direct connections to popular activity spaces and places and important external access points;
- Visually significant connections such as vistas;
- Pedestrian and cyclist access.

2. ***Amenity***

A. Streets within any neighbourhood shall not operate as through traffic routes for externally generated traffic (other than for pedestrians, cyclists and public transport).

B. Traffic generated by a development shall be within the acceptable environmental capacity of the roads and streets.

C. Streets and lots shall be located so that dwellings are not subject to unacceptable levels of traffic noise.

D. The street network shall be designed to reduce traffic speeds and volumes to acceptable levels, with most dwellings fronting streets with low volumes.

E. The impact of measures intended to restrain traffic speeds and / or volumes within the subdivision, must take account of the needs of all street users and adjoining dwellings by avoiding:-

- Stop – start conditions;
- Increased vehicle emissions;
- Unacceptable traffic noise to adjoining dwellings;
- Devices which reduce convenience or safety levels for cyclists and public transport.

F. The alignment of paths must allow safe and convenient use by pedestrians and cyclists and must be varied to preserve trees and other significant features. A focus on vistas and landmarks to add visual interest shall be incorporated where possible.

G. Subdivisions must be designed so that bus stops provide for pedestrian safety, security, comfort and convenience.

H. Bus stops shall be located and designed to provide shelter or shade, seats, adequate lighting and timetable information, are overlooked from nearby buildings, and are located to minimise adverse impact on the amenity of nearby dwellings.

I The subdivision design must achieve:-

- The creation of an attractive residential environment with clear character and identity;
- Respect for existing attractive streetscapes in established areas;
- Provision for appropriate street tree planting taking into account the image and role of the street, solar access requirements, soils, selection of appropriate species and services;
- Significant use of such features of the site as views, vistas, existing vegetation and landmarks.

J. The design of landscape in public streets and rights of way (ROW) shall:-

- Help define a character for new streets compatible with Council's adopted neighbourhood landscape theme or complement existing streetscapes;
- Be sensitive to site attributes;

- Complement the functions of the street;
- Reinforce desired traffic speed and behaviour;
- Be of an appropriate scale relative to both the street reserve width and the bulk of dwelling houses likely to occupy the subdivision;
- Promote safety and casual street surveillance;
- Incorporate existing vegetation, wherever practicable;
- Assist in the management of the impact of the microclimate;
- Appropriately account for streetscapes and landscapes of heritage significance;
- Integrate and form linkages with parks, reserves and transport corridors;
- Enhance opportunities for pedestrian comfort;
- Achieve lines of sight for pedestrians, cyclist and vehicles;
- Provide adequate lighting for pedestrian and vehicle safety;
- Provide attractive and co-ordinated street furniture and facilities to meet user needs in accordance with Council's adopted neighbourhood standard;
- Satisfy maintenance and utility requirements and minimise the visual impact of above – ground utility installations.

K. Lot sizes and dimensions shall enable future dwellings to be sited to:-

- Comply with specific building line and boundary setbacks;
- Protect natural or cultural features;
- Acknowledge site constraints including soil erosion and bushfire risk;
- Retain special features such as trees and views;
- Used materials and construction techniques in subdivisions which are robust and aesthetically pleasing.
- Allow siting to maximise solar access

3. Security

A. The subdivision layout shall enhance personal safety and perceptions of safety, and minimise potential for crime, vandalism and fear through achievement of surveillance by drivers of passing vehicles, pedestrians and occupants of future dwellings.

B. The pedestrian network shall be safe, attractive and efficient, running largely along public spaces (including streets and open spaces) fronted by houses, and avoid uses that generate major breaks in surveillance on routes to and from public transport or those used at night.

C. Pedestrian paths and cycleways shall be well lit and located where there is casual surveillance.

D. The subdivision layout shall enhance personal safety and minimise potential for crime, vandalism, and fear.

E. Lot frontages shall be orientated to streets and open spaces so that personal and property security, deterrence of crime and vandalism, and surveillance of footpaths and public open space are facilitated.

F. Major pedestrian, cycle and vehicle thoroughfares must be identified and reinforced as 'safe routes' through:-

- Appropriate lighting;
- The potential for casual surveillance from houses;
- Minimised opportunities for concealment;
- Landscaping which allows long – distance sight lines;
- Avoidance of 'blind' corners.

4. Neighbourhood Scale

A. The subdivision layout shall, where appropriate, provide for accessible open spaces that are compatible with Council's Developer Contributions Plan requirements, that contribute to the legibility and character of the neighbourhood and provide for access to a range of uses and activities, and contribute to environmental care.

B. The street network shall facilitate walking and cycling within the neighbourhood and to local activity centres like open space, recreation facilities, schools, shops and the like.

C. The subdivision layout must wherever possible create a sense of enclosure for residential neighbourhoods or discreet parts thereof, through the definition of such precincts by means of:-

- Retention and enhancement of existing vegetation located on primary and secondary ridge lines, spurs, bluffs and knowls, by means of covenants;
- Locating larger allotments on those parts of the site situated near to or on such primary and secondary ridge lines, etc;
- The imposition of restrictive covenants to prevent the erection of buildings, fences and prevent the removal of vegetation on these primary and secondary ridge lines, etc.

D. The subdivision design must address neighbourhood and precinct definition through the incorporation of other natural features such as water courses, dams, wetlands, stands of existing vegetation and the like, into the subdivision design by means of:

- Enhancing vegetation along water courses to create attractive and functional riparian zones including clearing of noxious weeds and trees;
- The prohibition of buildings and fencing within the riparian zones;
- The prohibition of tree felling and lopping in riparian zones;
- The alignment of streets, pathways and cycleways adjacent to riparian zones;
- The protection of riparian zones by means of the dedication of drainage reserves

or through the use of restrictive covenants.

E. Local public open space in subdivisions must contribute to the legibility and character of the neighbourhood, must be compatible with Developer Contributions Plan or LEP, and where appropriate, provide for:-

- Accessibility to users in conjunction with existing facilities;
- Acknowledgement of the opportunities and constraints presented by the physical characteristics of the land in its proposed use, landscaping and facilities;
- Opportunities for the incorporation of existing trees, rocks, streams and other sites of natural or cultural value, and linkage of habitats and wildlife corridors;
- Opportunities to link public open spaces into a legible network;
- Public safety and reasonable amenity of adjoining land users in the design of facilities and associated engineering works;
- Cost effective maintenance;
- A clear relationship between public open space and adjoining land uses established by appropriate treatment including alignment, fencing, landscaping, and issues of security and surveillance, and
- Avoidance of continual lengths of solid fencing along open space areas for security, surveillance, aesthetic and maintenance reasons.

F. A subdivision layout can make provision for shared private open space that is designed according to projected user needs which is determined by:-

- The overall housing density;
- The quality and extent of alternative private and nearby public open space;
- The need to distinguish communal open space clearly from private or public open space; types of activities envisaged;
- Future maintenance and management requirements;
- The need to maintain the privacy of nearby dwellings;
- Projected needs of children for outdoor play;
- The need for landscaping to enhance a sense of enclosure of commercial open spaces, while allowing informal surveillance and meeting security needs;
- Traffic management implications; and
- The hours of operation of communal facilities.

PART C. DESIGN PRINCIPLE : NEIGHBOURHOOD MOBILITY

1. General Subdivision Planning

A. The street network must provide a high level of internal accessibility and good external connections for local vehicle, pedestrian and cycle movements, with traffic management to restrain vehicle speed, deter through – traffic and create safe conditions for all road users.

B. The vehicle, cyclist and pedestrian network shall minimise fossil fuel use by reducing local vehicle trips, travel distances and speeds, maximising public transport effectiveness, and encouraging walking and cycling to daily activities.

C. The street layout must retain significant vegetation and fauna habitat areas.

D. The layout of the subdivision must be integrated with the surrounding urban environment, complement existing attractive streetscapes and landscapes, and provide for shared use of public facilities by adjoining communities.

E. The spacing of connections between street networks in precincts or neighbourhoods and road networks in corridors shall protect the performance of the road corridors and preserve the environmental quality of the street networks in the neighbourhood.

F. Streets within any neighbourhood must not operate as through traffic routes for externally generated traffic (other than for pedestrians, cyclists and public transport).

G. The street network shall connect with external traffic routes (or corridors) in such a way as to maximise movement efficiency on the traffic routes.

H. Access arrangements for housing along an arterial road shall not impede the traffic performance of the road. Separate service road access shall be provided where appropriate.

I. The street network in the subdivision shall meet local needs and allow for the provision of public transport, for pedestrians and cyclists, and for expected vehicle traffic.

J. Safe and efficient connections between transport corridors and residential neighbourhoods shall be provided where necessary.

K. Safe and convenient links must be provided for pedestrians and cyclists across transport corridors.

L. The proposed allotments shall not be exposed to an unacceptable traffic noise;

M. Corridor traffic routes shall be designed so that they are more convenient for through traffic than streets within neighbourhoods.

N. Public transport routes, pedestrian and cycleways, and road and street networks shall be provided in a manner that they complement each other.

2. *Designing the Street Network*

Function, Structure and Convenience

A. The street network must have a clear structure, and component streets must conform to their function in the network.

B. The street network must make clear physical distinctions between each type of street. These distinctions shall be based on function, legibility, convenience, traffic volumes, vehicle speeds, public safety and amenity.

C. The design features of each type of residential street shall be designed to encourage driver behaviour appropriate to the primary function of the street in the network.

D. The street network shall create convenient movement for residents between their homes and higher – order roads.

E. Where appropriate and subject to investigation of likely or existing bus routes in the neighbourhood, there shall be provision for bus routes which are direct and safely accessible by foot from all dwellings and activity centres, provide links with external areas and are efficient to operate.

F. The street network must facilitate safe walking and cycling within the neighbourhood and to local community activity centres like shops, open space and recreation facilities, and bus stops either within or external to the neighbourhood;

G. The street network shall take proper account of the topography and vegetation, respect any existing or potential site assets, and take advantage of opportunities for views and vistas.

H. The street network shall take proper account of the streetscapes that may be created or that already exist in the neighbourhood.

I. The street network shall be oriented, where practicable, to promote efficient solar access for future dwellings.

J. The street network shall take proper account of natural drainage and open space systems – either existing or proposed by the Council.

K. Traffic generated by a subdivision shall be within the acceptable environmental capacity of the roads and streets.

L. Streets shall not operate as through – traffic routes for externally generated traffic, but should also seek to limit the length of time local drivers need to spend in a low speed environment.

M. The street network shall be designed to reduce traffic speeds and volumes to acceptable levels, with most allotments fronting streets with low volumes.

N. The impact of measures intended to restrain traffic speeds and / or volumes throughout the subdivision must take account of the needs of all street users and adjoining allotments (potential dwellings) by avoiding:-

- Stop – start conditions;
- Increased vehicle emissions;
- Unacceptable traffic noise to adjoining allotments (potential dwellings).
- Devices which reduce convenience or safety levels for cyclists and public transport.

O. Streets and lots shall be located and designed so that dwellings are not subject to unacceptable levels of traffic noise.

P. The street network shall provide for the cost effective provision of public utilities in the neighbourhood.

Function, Width and Parking

A. The design features of each type of residential street must convey its primary function.

B. The street reserve width shall be sufficient to cater for all street functions, including;

- Safe and efficient movement of all users;

- Provision for parked vehicles;
- Provision of landscaping;
- Location, construction and maintenance of public utilities.

C. The carriageway width, together with the verge width and crossover dimensions, shall allow for unobstructed and efficient access to individual lots and sites, even when a car is parked on the opposite side of the street.

D. On-street carparking shall be provided according to projected needs which will be determined by:-

- The number and size of allotment (potential dwellings) proposed;
- Availability of public transport;
- The provision of on-site car parking;
- Locations of non-residential uses such as schools and local shops;
- The occasional need for overflow parking.

E. Carparking shall be designed and located to:-

- Conveniently and safely serve all users of the street, including pedestrians, cyclists and vehicles;
- Enable efficient use of car spaces and accessways including adequate manoeuvrability for vehicles between the street and the lot;
- Fit in with any adopted street network and hierarchy objectives, and with any related local traffic management plans;
- Be cost effective;
- Achieve relevant streetscape requirements.

F. Bus routes shall have a carriageway width to allow for the movement of buses unimpeded by parked cars, safely accommodate cyclists and avoid the need for cars to overtake parked buses.

Designing for Safety

A. The design of the streets shall facilitate safe use by pedestrians, particularly people with disabilities, the aged and children, by:-

- Providing a carriageway width which allows vehicles to proceed safely at the operating speed intended for that level of street;
- Making allowances for restrictions caused by on-street parking;
- Providing a horizontal and vertical alignment which is not conducive to excessive vehicle speeds;
- Promoting the safety of pedestrians where it is intended that they use the carriageway at bus stops and other crossing points;
- Promoting the safety of cyclists in streets and at crossings points.

B. Speed reduction techniques and devices shall be incorporated into the subdivision to achieve desired speeds, as part of the design for the whole street environment, and address the following principles:-

- Slow points including either horizontal or vertical deflection shall be designed to slow traffic to design speeds;
- Slow points and carriageway narrowings shall be designed to take into account the needs of cyclists, by ensuring speed compatibility, adequate space for concurrent passage or off-street diversions;
- Landscape design, on-street parking and streetscape design shall be used to complement speed restriction measures;
- Speed restriction techniques and devices shall not be used in isolation;
- The verge, when considered in conjunction with the horizontal alignment and permitted fence, wall and other property frontage treatments must provide for safe sight distances, taking into account expected vehicle speeds and pedestrian and cyclist movements.

C. The street network shall be designed to incorporate safe sight distances, (based on the speeds at which vehicles may travel in the street), at access points to properties, pedestrian and cyclist crossings and at junctions and intersections.

D. Allotment driveway egress movements shall not create a safety hazard.

E. Junctions along residential streets shall be spaced to create safe and convenient vehicle movements.

Geometric Design

A. The horizontal and vertical alignments and crossfall of streets shall reflect physical land characteristics and major drainage functions, while satisfying safety criteria.

B. Geometric design for intersections, roundabouts and slow points must be consistent with the vehicle speed intended for each street

C. Kerb radii at intersections and junctions shall be kept to a minimum, subject to

satisfying required turning templates (including those for service and emergency vehicles), to keep pedestrian crossing distances to a minimum and to control the speeds of turning vehicles.

D. Allotment layout, dimensions and configurations on land abutting major collector streets shall ensure that all vehicles can enter or leave the street in a forward direction.

Streetscaping / Landscaping

A. The alignment of streets must not involve the significant removal of or threat to the health and wellbeing of existing significant vegetation and fauna habitat.

B. The street must be designed as an integrated element of an overall neighbourhood landscape theme approved by Council, that achieves:-

- The creation of an attractive residential environment with distinctive character and identity compatible with the approved neighbourhood landscape theme;
- Respect for existing attractive streetscapes in established neighbourhoods;
- Provision for appropriate street tree planting taking into account the image and role of the street, sole access, soils, selection of appropriate species, and services;
- The utilisation of existing site features such as views and vistas, existing vegetation and landmarks.

C. The design of the landscape in public streets and rights of way (ROW) shall:-

- Help define a character for new streets compatible with the approved neighbourhood landscape theme or complement existing streetscapes;
- Be sensitive to site attributes;
- Utilise vegetation types and landscape styles which help to blend the development into the streetscape;
- Complement the functions of the street;
- Reinforce desired traffic speed and driver behaviour;
- Be of an appropriate scale relative to both the street reserve width and likely 'bulk' of potential dwellings, given the proposed allotment size;
- Promote safety and casual street surveillance from future dwellings;
- Incorporate existing vegetation wherever practicable;
- Appropriately account for streetscapes and landscapes of heritage significance;
- Assist in the management of the impact of the microclimate;
- Maximise the incorporation of absorptive landscape features for on-site infiltration of stormwater where appropriate;
- Integrate and form linkages with parks, reserves and transport corridors (where applicable);

- Enhance opportunities for pedestrian comfort;
- Achieve lines of sight for pedestrians, cyclists and vehicles;
- Provide adequate lighting for pedestrian and vehicle safety;
- Provide attractive and co-ordinated street furniture and facilities to meet user needs in accordance with Council's adopted neighbourhood standard;
- Satisfy maintenance and utility requirements and minimise the visual impact of above – ground utility installations.

3. *Street Construction*

A. Public street and right of way (ROW) construction and whole of lifecycle costs shall be kept as low as practicable.

B. Street pavement, edging and landscaping must support the specified functions and amenity of the street.

C. The street pavement edge shall be designed and constructed to:-

- Control vehicle movements by delineating the carriageway for all users;
- Assist in reducing stormwater runoff into the reticulated system, by carrying stormwater to a desired outlet or by providing for infiltration into the subsoil;
- Provide for people with disabilities, by allowing safe passage of wheelchairs and other mobility aids;

D. Street pavement surfaces shall be well designed and durable enough to carry wheel loads of travelling and parked vehicles; ensure the safe passage of vehicles, pedestrians and cyclists, and people with disabilities, the discharge of rainfall and the preservation of all – weather access; and allow for reasonable travel comfort.

4. *Pedestrian and Cyclist Facilities*

A. The pedestrian network shall be safe, attractive and efficient, running largely along public spaces (including streets and open spaces) fronted by houses, and avoiding uses that generate major breaks in surveillance on routes to and from public transport or those used at night.

B. Safe and convenient links must be provided for pedestrians and cyclists across transport corridors.

C. The street network shall facilitate walking and cycling within the neighbourhood and to local community activity centres such as shops, open spaces and local community activity centres.

D. A network of pedestrian ways and cycle routes shall be provided (where appropriate) in accordance with:-

- Any relevant Developer Contributions Plan;
- The need to encourage walking and cycling throughout the neighbourhood;
- The needs of likely users of the pedestrian / cycleway system, including people with disabilities (by allowing safe passage of wheelchairs and other mobility aids).

- The need to create opportunities to link open space networks and community facilities including bus stops, schools and local community activity centres etc and provide convenient resident access to same;

- A respect for topographic, drainage and vegetation constraints;

- The need to ensure cyclist and pedestrian safety;

E. The location of footpaths and cycleways in a street reservation shall be determined by:-

- Whether vehicle speeds and volumes are low and the use of the street pavement by cyclists does not affect the comfort and safety of pedestrians;

- Whether pedestrians and cyclists are protected from parked vehicles and vehicles moving along the street and on driveways;

- Whether postal delivery will be significantly inconvenienced;

- The location of physical services;

- Cross falls;

- Landscaping;

- Whether there is any development fronting that part or side of the street;

- Cost-effective construction.

F. The alignment of paths shall allow safe and convenient use by pedestrians, cyclists and people with disabilities, and be varied to preserve trees and other significant features. A focus on vistas and landmarks should add visual interest where they exist.

G. Pedestrian paths and cycleways shall be well lit and located where there is casual surveillance from potential future dwellings.

H. Footpaths or shared paths must be designed and constructed of appropriate width, longitudinal gradient and sight distance to cater for the number of projected pedestrians and cyclists, and user types (eg the aged, the very young, people with prams and in wheelchairs, and people with disabilities).

I. Design of the street and the pavement shall accommodate pedestrian and cyclist use of street pavements in access places, and cyclist use of street pavements in access streets and collector streets.

J. Cycleway design shall make provision for the location of seats at appropriate points.

K. There shall be adequate provision for passing width paths, widened at potential conflict points or junctions on high use facilities to allow for passing of pedestrians / cyclists in opposite directions.

L. Safe street crossings shall be provided for all street users with safe sight distances and adequate pavement markings, warning signs and safety rails (where appropriate for cyclists).

M. Pedestrian and cyclist paths shall be constructed to provide a stable surface for all users, which are easily maintained.

5. Allowing for Public Transport

A. Following investigation into potential future bus routes and existing bus routes in the neighbourhood, there shall be provision in the subdivision (where appropriate) for bus routes which are direct and safely accessible by foot from all dwellings and local community activity centres, provide links with external areas, and are efficient to operate.

B. Streets carrying bus routes shall provide for ease of movement of buses between developments (subdivisions) and for links to major activity centres within and external to the neighbourhood without complicated turning movements.

C. Buses shall be able to safely gain access to the subdivision where a route is proposed and to cross arterial roads when travelling between developments, without complicated turning manoeuvres.

D. The alignment and geometry of the streets that form a bus route shall allow for the efficient and unimpeded movement of buses without facilitating high traffic speeds, safely accommodate cyclists and avoid cars overtaking parked buses.

E. Bus stops shall be included in subdivisions, where appropriate, at locations approved by the local bus operator and Council, and provide for pedestrian safety, security, comfort and convenience.

F. Bus stops shall be designed to prevent vehicles from overtaking a stationary bus, or reduced vehicle speeds to ensure safe pedestrian crossing.

G. Bus stops shall be located, designed and constructed to provide adequate shelter or shade, seats, lighting and timetable information, be overlooked from nearby allotments (potential dwellings) or local activity centres; and located to minimise adverse impact on the amenity of nearby dwellings.

PART D. DESIGN PRINCIPLE : RISK PREVENTION

1. Natural Hazards

A. The subdivision layout must avoid development on flood-prone land, land that is geotechnically sensitive, land that has been identified as a potentially contaminated or contaminated site that has not been appropriately rehabilitated.

B. The subdivision shall be designed to allocate appropriate uses to areas of geotechnical instability, filled land, contaminated or potentially contaminated land, unhealthy building land, chronically waterlogged land and areas affected by mines subsidence. A Geotechnical Report will generally be required by Council for areas affected by geotechnical instability. Details relating to the report and appropriate qualifications for geotechnical consultants can be obtained from Council.

C. The layout of residential subdivision abutting areas of high or extreme bushfire hazard must ensure that streets are designed, located and connected to allow safe and efficient movement of fire emergency vehicles, and lots must be configured for the siting and design of houses that incorporate appropriate bushfire protection measures.

2. Man-Made Hazards

A. Adequate buffers shall be maintained between utilities and allotments to protect residential amenity and health.

B. Public open space must provide for public safety and reasonable amenity of adjoining land users in the design of facilities and associated engineering works.

3. Designing For Safety

A. The design of subdivisions shall facilitate safe use by pedestrians, particularly people with disabilities, the aged and children by:-

- Providing a carriageway width which allows vehicles to proceed safely at the operating speed intended for that level of street;
- Making allowances for restrictions caused by on-street parking;
- Providing a horizontal and vertical alignment which is not conducive to excessive speeds;
- Promoting the safety of pedestrians where it is intended that they use the carriageway at bus stops and other crossing points;
- Promoting the safety of cyclists in streets and at crossings points.

B. Speed reduction techniques and devices shall be incorporated into subdivisions, to achieve desired speeds and be part of a design for the whole street environment, and address the following principles:-

- Slow points including either horizontal or vertical deflection shall be designed to slow traffic to design speeds;
- Slow points and carriageway narrowings shall be designed to take into account the needs of cyclists, by ensuring speed compatibility, adequate space for concurrent passage or off-street diversions;
- Landscape design, on-street parking and streetscape design shall be used to complement speed restriction measures;
- Speed restriction techniques and devices shall not be used in isolation;
- The verge, when considered in conjunction with the horizontal alignment and permitted fence, wall and other property frontage treatments, shall provide for safe sight distances, taking into account expected vehicle speeds and pedestrian and cyclist movements.

C. Safe sight distances, based on the speeds at which vehicles may travel in the street, shall be provided at access points to properties, pedestrian and cyclist crossings and at junctions and intersections.

PART E. DESIGN PRINCIPLE : UTILITIES

1. General Considerations

A. The design and provision of public utilities, including sewerage, water, electricity, gas, street lighting, and communication services, shall be cost-effective over their life cycle and incorporate provisions to minimise adverse environmental impact in the short and long term.

B. Adequate buffers shall be maintained between utilities and houses to protect residential amenity and health.

C. The design, siting and construction of public infrastructure and utilities shall take proper account of public safety and the amenity of adjoining land users (or potential land users).

D. Subdivision shall be staged to ensure that each stage is fully serviced before it is released.

2. Sewerage

A. Where connection to existing sewer mains are available, the subdivision shall be provided with sewerage networks to transport sewage from domestic properties using gravity flow pipes / or when this is uneconomic by pumping to a main.

B. Where existing sewer mains are not available, the ability of the land to manage forseeable effluent productions from the development must be assessed. In this regard if the allotment is within an area covered by a State Environmental Planning Policy or Regional Environmental Plan an Effluent/Water Cycle Management Study will be required.

C. Sewerage networks are accessible, easy to maintain, and cost – effective based on life – cycle costs.

3. Water Supply

A. Subdivision shall be staged within locations where there is an adequate water supply for domestic and fire fighting purposes.

B. Water supply networks shall be accessible, easy to maintain, and cost – effective based on life – cycle costs.

C. The selection of materials used for the construction of water supply networks shall be determined by suitability, durability, ease of maintenance and cost – effectiveness considering whole-of-life cycle costing, achieving beneficial environmental impacts / energy savings etc from new materials and technologies.

4. Electricity Reticulation

A. All reticulated electricity and communication conduits shall be laid underground.

B. The provision of electrical services shall not be carried out until all appropriate investigations relating to fauna and flora affected by the electrical service installation have been completed.

C. All relevant requirements of AS/NZ 1158.3.1 : 1999 relating to street lighting apply.

5. *Street Design For Utilities*

A. The street network shall provide for the cost effective provision of public utilities; including water, sewerage, electricity, telecommunications and gas.

B. Compatible public utility services shall be co-located in common trenching in order to minimise the land required and the costs for underground services.

C. The street reserve width must be sufficient to cater for all street functions, including the location, construction and maintenance of public utilities, taking into account special site conditions and likely future requirements.

D. The design of landscape in public streets and rights of way (ROW) shall:-

- Provide adequate lighting for pedestrian and vehicle safety;
- Satisfy maintenance and utility requirements and minimises the visual impact of above ground utilities;
- Minimise the risk of damage to overhead and underground power lines and other services.

PART F. DESIGN PRINCIPLE : STORMWATER DRAINAGE

1. *Stormwater Disposal And Inundation*

Council will require documented proof that downstream easements from the property have been obtained. The easement shall be continuous from the subject property through to a defined watercourse.

Major System

A. The major stormwater drainage system shall have the capacity to safely convey stormwater flows resulting from storms more intense than 5 year ARI Storm under normal operating conditions, taking into account partial minor system blockage.

B. The major storm water drainage system must have the capacity to safely convey, but with property damage, stormwater flows resulting from more extreme events such as the 100 year ARI Storm.

C. Appropriate covenants shall be attached to all land potentially affected by the 100 year ARI Storm flood event to restrict filling of land, building and fencing locations, heights and materials in accordance with Council's DCP No. 34 Potentially Flood Affected Land.

D. Development within floodways shall be avoided such that there is a low risk of damage to property and risk to human safety.

E. The major storm water system must be designed to ensure that there are no flow paths which would increase risk to public safety and property

F. Wherever possible natural streams and vegetation shall be retained and less flood sensitive land uses such as open space shall be incorporated into the drainage corridor.

G. Proposed storm water detention facilities shall be placed and designed to improve the amenity and function of the neighbourhood encouraging multiple use where appropriate, and design to complement the existing natural drainage system.

Minor System

A. The minor stormwater drainage system shall have the capacity to control stormwater flows under normal operating conditions for the 5 Year ARI Storm without blockage.

B. Drainage networks must be well defined to ensure there are no hidden flow paths which could reduce their capacity to convey design flows.

C. The minor system design shall minimise undesirable ponding for a prolonged period resulting from the 5 Year ARI Storm.

D. The design of the minor system shall take full account of existing downstream systems, in particular, the potential for any flows to cause a nuisance to downstream and upstream properties or impact on natural systems, or existing and planned infrastructure.

E. The minor system design must allow for the safe passage of vehicles at reduced speed on streets which have been affected by runoff from the 5 Year ARI Storm.

F. The minor system shall be accessible and easily maintained.

G. Where a portion of the minor system lies within a site, access shall be available for maintenance.

H. The selection of materials used for the construction of the minor system shall be based on their suitability, durability, maintainability, cost-effectiveness and ability to enhance local environmental quality.

I. The subdivision design shall make provision for the disposal of stormwater from individual sites in such a way as not to cause a nuisance or damage to any other properties.

2. *Water Quality Management*

A. Adequate provision shall be made for measures during the construction of the subdivision to ensure that the land form is stabilised and erosion is controlled. Every construction certificate application shall be accompanied by a Sedimentation And Erosion Management Plan for implementation during the subdivision construction phase.

B. The storm water drainage system design shall optimise the interception, retention and removal of water-borne pollutants prior to entering downstream water sources or systems.

C. The drainage system design must minimise the environmental impact of urban run-off on surface receiving water quality and on other aspects of the natural environment, such as creek configuration and existing vegetation, by employing all possible techniques which are technically appropriate and effective in reducing run-off and pollution travel in the catchment.

D. The drainage system design must minimise the environmental impact of urban run-off, on groundwater quality.

E. The drainage system design must ensure the continuation, in healthy condition, of a

wide diversity of wetland and riparian habitats in the landscape.

F. The potential for contamination of the stormwater system by sewage overflows shall be investigated and measures put in place to prevent such contamination.

3. Stormwater Harvesting

A. The potential for stormwater harvesting for later use as "Second Quality Water" shall be investigated with every subdivision proposal.

B. Storage of harvested water, using the following techniques shall be considered as an integral part of the subdivision:-

- Surface storage for slow release into the surrounding soil mass for take up in the root zone of trees and shrubs.
- Storage in existing or constructed wetlands for later use during dry periods.
- Storage in aquifers via direct infiltration where soils permit such infiltration or via recharge bores where aquifers of suitable characteristics exist.
- Rainwater tanks onsite with development.

4. Street and Landscape Design

A. The street network shall take proper account of natural drainage and open space systems.

B. The street pavement edge shall assist in reducing stormwater runoff into the reticulated system by conveying stormwater to a desired outlet or by providing for infiltration into the subsoil.

C. Street pavement surfaces shall be well designed and durable enough to accommodate the discharge of rainfall to the stormwater system in an appropriate manner. (ie no adverse impact on water quality).

D. Where the subdivision provides public open space, these shall contribute, wherever possible, to stormwater management.

E. The design of the landscape in public streets and rights of way (ROW) shall maximise the inclusion of absorptive landscape areas for on-site infiltration of stormwater where appropriate, subject to soil and drainage conditions.

F. The multi-function role of public open space and its use as a community facility and for stormwater management shall be recognised and promoted in the subdivision.

PART G. DESIGN PRINCIPLE : ENERGY EFFICIENCY

1. General

A. The street and lot orientation and lot dimensions shall facilitate the siting and design of dwellings which conserve non-renewable energy sources and assist in design appropriate for the climatic conditions.

B. The vehicle, cyclist and pedestrian networks, lot design and lot density shall be designed to minimise fossil fuel use by reducing local vehicle trips, travel distances and speeds, maximising public transport effectiveness, and encouraging walking and cycling to daily activities.

C. Lots shall be orientated to facilitate the siting of dwellings to take advantage of microclimatic benefits, and have dimensions to allow adequate on-site solar access and access to breezes taking into account likely dwelling size and the relationship of each lot to the street.

D. The impact of measures intended to restrain traffic speeds and / or volumes shall avoid:-

- Stop-start conditions;
- Increased vehicle emissions;
- Unacceptable traffic noise to adjoining dwellings;

2. *Solar Access*

A. Allotment design, configuration and orientation shall maximise passive energy opportunities and allow for the consequent design and siting of energy efficient housing.

B. Allotments must be of a suitable shape to permit the location of a dwelling and private open space with suitable solar access.

C. Streetscape components such as street trees shall not detrimentally affect solar access to potential dwelling sites by ensuring:-

- The selection of tree species that provide summer shade whilst not impeding solar access to potential dwelling sites in winter;

D. Streetscapes shall be designed to contribute to winter windbreaks, where appropriate.

E. The design of the landscape in public streets and rights of way (ROW) shall assist in the management of the microclimate.

PART H. ENVIRONMENTAL CONSIDERATIONS

1. *Statement of Environmental Effects* ***Information***

A Statement of Environmental Effects is required for most development applications. This statement normally addresses such matters as:-

- suitability of the land
- access
- traffic generation
- risk of flooding
- flora and fauna
- local amenity

2. *Tree Preservation*

The proposed plan of subdivision shall identify vegetation that is significant to the overall landscape of the area. Trees to be removed shall also be identified on the plan of subdivision

Lodging of Bond

Any significant tree/s identified by Council shall be protected at all times during excavation and/or construction, and Council may require the applicant to lodge a bond at the time of engineering plan approval, to be forfeited in the event that the trees are either damaged or removed. Any such bond is to remain in force for a period of six (6) months after the issue of the Subdivision Certificate or registration of the linen plan.

3. *Heritage Items*

Aboriginal and other Relic

Any sites of Aboriginal carvings or relics or sites significant to heritage for other reasons shall be identified in the application. The National Parks and Wildlife Service should be contacted for details and verification.

All recognised heritage items, including natural features of the site and man-made buildings, works and sites are to be identified and retained. Local Items of Environmental Heritage are listed in Council's Local Environmental Plan. The Heritage Council should be contacted for details and verification. Adequate area is to be retained around any heritage item to protect its setting

4. *Flora and Fauna*

Pursuant to Section 55A of the *Environmental Planning & Assessment Act 1979* a Threatened Species Assessment will generally be required to be undertaken. In addition to this planning provision, State Environmental Planning Policy No 44 applies.