



Sustainable Housing Guidelines

*“When we build, let us think that we build forever.
Let it not be for present delight, nor for present use alone;
let it be such work as our descendants will thank us for.”*

- Unknown -

19. Sustainable Housing Guidelines

The generally accepted definition of sustainable development is 'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987, Brundtland Report).

In practice this means living in harmony with the natural environment, considering the social, environmental and economic aspects of our decisions, and reducing our footprint through a less energy, water and material intensive lifestyle. Social sustainability is also important and working towards a healthy and safe community is often interconnected with economic and environmental endeavours.

Purchasers in the Waterfall estate's have a major role in making their houses and environment more sustainable. Awareness of environmentally sustainable design principles and expressing these preferences to their architect, designers and builders can create great change in the industry.

The main ways that homeowners can make a difference is through;

- *Recycling of refuse*
- *Saving energy through the use of solar geysers and energy saving lighting*
- *Using passive design or 'green' architecture*
- *Storm water capture*
- *Responsible landscaping*

In line with the greater Waterfall City's "green" initiatives which have been planned, we will be striving for the implementation of long term energy management.

Sustainable energy interventions, such as solar power, efficient public transport networks and smarter building regulations, could reduce South Africa's carbon dioxide emissions by up to 864 million tons over the next 20 years.

Cities are going to have to use a long-term energy management plan as a foundation for economic development. Evidence suggests that efforts by all South African cities to diversify energy usage and energy sources are in their infancy.

Reports have indicated that if cities do not play such an active role in managing both energy supply and use, then their own economies are unlikely to succeed.

We truly believe that it is our moral obligation to start thinking not only smarter but "greener" by introducing some key initiatives and thus ensure a minimal impact on the environment and long term cost saving.

19.1 Recycling



Recycling is one of the best ways in which to have a positive impact upon the world in which we live in. Recycling is highly beneficial for the natural environment and human beings. The amount of the rubbish we create and dump into the environment is rapidly increasing everyday and is having a detrimental effect on the environment, resulting in global warming and increasing the rate at which global temperatures are rising.



Recycling is incredibly important as waste has a negative impact upon the ecosystem. Harmful chemicals and greenhouse gasses are released from rubbish in landfill sites. Recycling helps to reduce the pollution caused by waste.

Although local authorities are primarily responsible for waste collection and disposal, it is increasingly becoming more important that the public accepts co-responsibility. Extensive debates on the topic of 'sustainable development' continue to be held and it is acknowledged that the emphasis needs to be placed on preventing pollution and minimizing waste at the source, as it is significantly more costly to clean afterwards.

All the Waterfall estate's will implement a comprehensive recycling initiative and therefore become the first "Green" housing development in Southern Africa.

The successful implementation of a recycling solution will significantly help in the reduction of waste products like:

- *Paper (office, newspaper, magazines, packaging)*
- *Metals (beverage cans)*
- *Glass (bottles, broken window-panes)*
- *Plastics (bags, bottles, containers)*
- *Cardboard*
- *Computer components and printer cartridges*

19.2 Saving Energy



The demand for energy in South Africa is growing more and more every year but the supply is not keeping up. We have all experienced the inconvenience of load shedding and although the program has been suspended we believe this will only be temporary. Unless we, the South African public make a conscious effort to ease the burden on our National Grid we will be left in the dark.

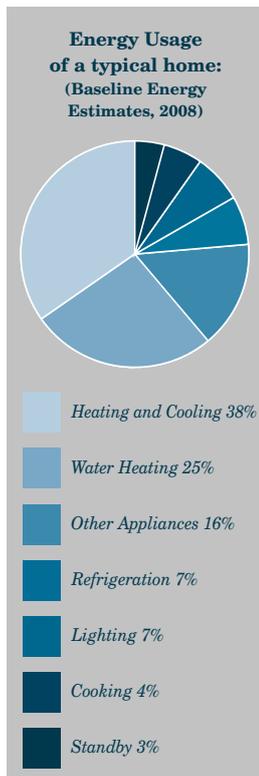
For a country that receives as much sunlight as we do, we have been rather careless in our approach to the design of our buildings, we must pay more attention to the planet's vulnerability. The easiest and cheapest area to start is with our lighting. Home owners should invest in energy saving internal and external lighting both to save on costs and reduce energy consumption. With this in mind it will be a requirement that only energy saving lamps are used in the estates.

SA must be pro-active in following the global trend towards phasing out the use of incandescent (GLS) lamps; Compact fluorescent lamps (CFLs) and LED's are the preferred energy efficient option for lighting applications; further energy savings can be achieved by using natural light through sky lights to effectively light a building during daylight hours.

Incandescent light bulbs were developed almost 125 years ago and have undergone no major modifications. They are incredibly inefficient, converting only about five percent of the energy they receive into light, the rest is lost to heat.

Tips for efficiency in houses:

- *Reducing demand by putting in efficient lights and using day lighting to reduce cooling loads*





- Solar geysers (Mandatory)
- Photovoltaic panels and inverters to produce power to be stored in batteries
- Fit an efficient convection fireplace in place of a radiant one
- Use gas for cooking and heating
- Effective passive design
- Well sealed windows and doors
- Double glazing
- Sun shades and large eave overhangs.
- Intelligent load demand metering (May become mandatory on the estate)
- Use renewable forms of energy wherever possible

These energy saving initiatives will reduce the over-all demand for maximum power, and lighten the load from Eskom significantly.

19.3 Green Architecture and Passive Design



Green architecture is not a style, trend or a vernacular. Neither is it at all new. It is a climatically, geographically and culturally appropriate method of designing architecture and constructing buildings. It combines the best of both old and new technology. Green Architecture treads lightly on this planet and respects and cares for the Earth in a sustainable manner.

The key benefits are:

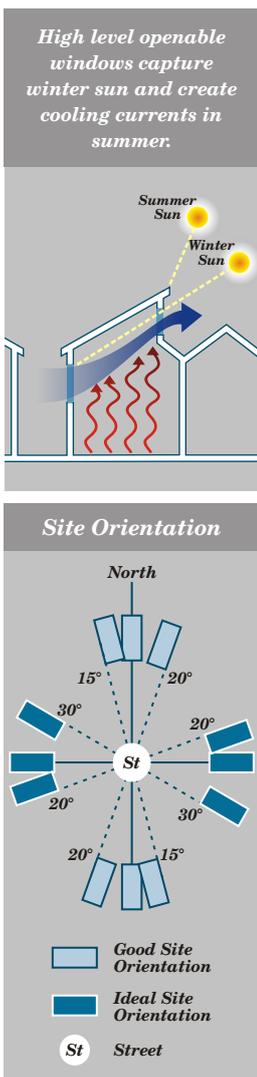
- Reduced operating and life cycle costs for buildings and their landscapes.
- Improved health and productivity for building inhabitants.
- Higher property values
- Low environmental impact
- Sustainable development
- Lower carbon footprint
- Social responsibility

Passive design is design that does not require mechanical heating or cooling. Homes that are passively designed take advantage of natural climate to maintain thermal comfort. Houses should be designed for the climate making use of:

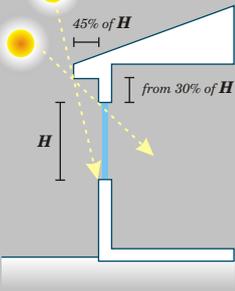
- Solar design with insulated thermal mass
- Maximised cross ventilation
- Evaporative cooling or ceiling fans if required
- Optimal positioning for solar access and exposure to cooling breezes
- All east and west glass should be shaded in summer
- Reflective insulation should be installed to keep out heat in summer
- Bulk insulation should be used in ceilings and in walls and floors
- Outdoor areas should be screened and shaded but allow winter sun in
- Garden ponds and water features should be utilised to provide evaporative cooling for the house

Orientation

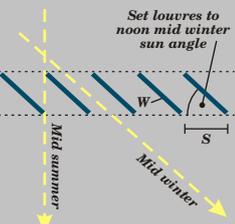
Proper orientation reduces the need for auxiliary heating and cooling, and results in lower energy bills and reduced greenhouse gas emissions. Orientation for passive heating is about using the sun as a source of free home heating. Put simply, it



General rule of thumb when designing an eave for shading.

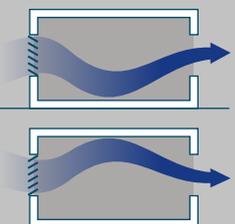


Setting your louvres to an optimal angle.



The spacing (S) between fixed horizontal louvres should be 75% of their width (W)

Consider directing air flow at levels suitable for the activity proposed for the room:



Louvres can direct airflow upward or downward.



A canopy over a window tends to direct air upward.



A gap between canopy and wall ensures a downward pressure.



Downward pressure is improved further in the case of a lowered sunshade.
Use window styles with 100% opening area such as louvre and casement.

involves allowing winter sun in and keeping unwanted summer sun out. This can all be done by using shading devices to exclude high angle summer sun and admit low angle winter sun in. Good orientation for passive cooling excludes unwanted sun and hot winds and ensures access to cooling breezes. A certain degree of passive cooling is necessary for the highveld climate.

Shading

Shading of the building and outdoor spaces reduces summer temperatures, improves comfort and saves energy. Direct sun can generate the same amount of heat as a single bar radiator. Shading can block 90 percent of this heat. With ideal north orientation, sunlight can be excluded in summer and admitted in winter using simple horizontal devices such as eaves as well as the planting of deciduous trees. East and west facing openings require a different approach, as low morning and afternoon sun from these directions can be more difficult to shade. Keep the area of glazing on east and west elevations to a minimum where possible. Shading devices can include eaves, pergolas and louvres as well as trees or planted screens with deciduous vines.

Passive Solar Heating

Passive solar heating is the most cost effective way of heating your home resulting in substantial long term savings for the homeowner. Solar radiation is trapped by the greenhouse action of correctly orientated windows exposed to full sun. Trapped heat is absorbed and stored by materials with high thermal mass, usually masonry inside the house. It is re-released at night when it is needed to offset heat losses to lower outdoor temperatures. For the best passive heating performance, daytime living areas should face north. Ideal orientation is true north and can be extended to between 15 degrees west and 20 degrees east of north. Fixed shading devices can maximize solar access to north facing glass throughout the year, without requiring much effort from the user. Proper orientation is essential for effective passive shading. Fixed shading devices above openings excludes high angle summer sun but allows low angle winter sun. Adjustable shading can be used to regulate solar access on other elevations. Correctly designed eaves are the simplest and cost effective shading method for northern elevations.

In general, living areas should be grouped along the north façade and bedrooms along the south or east façade. Living areas and the kitchen are usually the most important locations for passive heating as they are used in the day and in the evening. Bedrooms require less heating as it is easy to get warm and stay warm in bed. Childrens bedrooms can be classified as living areas if considerable hours are spent there.

Passive Cooling

Passive cooling is the least expensive means of cooling a home, as well as producing the lowest environmental impact. Passive cooling maximises the efficiency of the building envelope by minimizing heat gain from the external environment and facilitating heat loss through air movement, cooling breezes, evaporation and earth coupling.

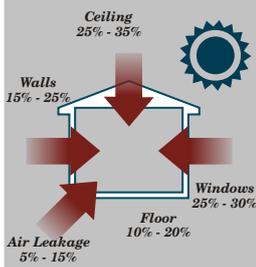
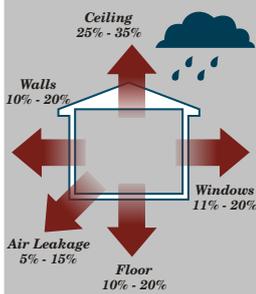
This can be facilitated through:

- Orientation for exposure to cooling breezes

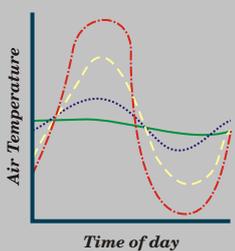
Typical sources of warm air leakage:

- Vented sky lights.
- Gaps between walls or ceilings and cornices.
- Construction joints between wall materials.
- Gaps where pipes penetrate walls.
- Gaps between floor boards.
- Gaps between walls or floors and skirting boards.
- Gaps between and around windows.
- Air vents and exhaust fans.
- Gaps around fixed air-conditioners and heaters.
- Gaps around door frames.
- Gaps up chimneys.
- Vented downlights.

Typical heat gains and losses in a temperate climate:



Thermal mass is the ability of a material to absorb heat energy.



- Increase natural ventilation by reducing barriers to air paths through the building
- Fans that provide ventilation and air movement in the absence of breezes
- Appropriate windows and glazing to minimize unwanted heat gains and maximize ventilation
- Effective shading
- Living and sleeping areas zoned appropriately for climate
- Evaporate cooling units

Insulation

Insulation acts as a barrier to heat flow and is essential to keeping your home warm in winter and cool in summer. A well insulated and designed home will provide year round comfort, cutting cooling and heating bills by up to half and, in turn reducing greenhouse gas emissions. The appropriate degree of insulation will depend on climate, building construction type and if auxiliary heating and cooling is to be used. Energy efficiency can also be improved by weather sealing. Weather proofing or draught sealing is the most effective method of achieving energy savings whilst maintaining healthy indoor air quality. Up to 25% of heat loss from a home is due to draughts while up to 38% of our total greenhouse gas emissions are due to heating and air conditioning. Insulation of roofs is mandatory and insulation cast into the floor slab and installed in the wall cavities is strongly recommended along with the insulation of hot water pipes and tanks.

Thermal Mass

Thermal mass is the ability of any material to absorb heat energy. A lot of heat energy is required to change the temperature of high density materials like concrete, bricks and tiles. They are therefore said to have high thermal mass. Lightweight materials like timber have low thermal mass. Appropriate use of thermal mass in your home can make a big difference to comfort, as well as cooling and heating bills. Correct use of thermal mass modulates internal temperatures by averaging day/night extremes while on the other hand, incorrect use can exacerbate the worst extremes of the climate, radiating heat all night during a summer heatwave or absorbing all the heat you produce on a winter night. Thermal mass should always be used in conjunction with good passive design.

Glazing

Glazing has a major impact on the energy efficiency of the building envelope. Poorly designed windows, skylights and glazed surfaces can make your home too hot or too cold. If designed correctly, they will help maintain year round comfort, reducing or all together eliminating the need for artificial heating and cooling. Windows in a typical insulated home can account for more heat gain or loss than any other element in the building fabric. In summer, heat gain through an unshaded window can be up to 100 times greater than through the same area of insulated wall. Locate and size windows and shading to let sunshine in when the temperature is cold and exclude it when it is hot. Locate window and door openings to enhance natural cooling by cross ventilation. Provide seals to openings to minimize unwanted draughts. Solar heat gains through glass can be reduced by using spectrally selective glazing which filters



solar radiation, allowing maximum light visible light transmission while reflecting unwanted UV and solar near-infrared wavelengths. Reflective glass also allows for this but must be cleaned regularly and causes a glare which may annoy neighbours. For this reason its use is expressly forbidden within the estate. Double glazing or insulating glazing is also effective but are cost prohibitive for most developments.

Skylights

Skylights can make a major contribution to energy efficiency and comfort within the home. Daylight provides cool light, meaning that a given amount of light is accompanied by less heat gain than most types of artificial light. Skylights provide one of the best and easiest ways to admit daylight and distribute it evenly, displacing most artificial light, improving light quality and reducing heat generation and saving on energy costs.

19.4 Water Conservation



The protection, conservation, efficiency and re-use of water is a vital part of our estate. As South Africa is a country that is water poor and there is much that can be done to reduce consumption. This could be done by fitting items such as: Dual flush toilets (which are mandatory), flow reducing or aerating taps, flow reducing or aerating showers, a smaller shaped bath, low volume and low consumption appliances such as dishwashers and washing machines. Rainwater, or grey water from baths and basins, can also be captured and stored for irrigation purposes. Low water-use vegetation or 'Xeriscaping' can greatly reduce the need for supplementary garden watering. See our website or saleshouse showroom for recommended suppliers.

19.5 Biodiversity Impacts on Site



Replanting cleared sites is no substitute for leaving native vegetation intact. Once any land is cleared it is almost impossible to recover the full range of indigenous species, remove introduced species and restore ecological processes. Given the natural beauty and biodiversity of the estate it is recommended that homeowners attempt to minimize biodiversity impacts. This can be done by:

- Limiting clearing outside the building footprint. Vehicle tracks, contractors carpark, and rubbish dumps should be concentrated in one contained area.
- Any significant indigenous or habitat trees should be designed around and retained.
- Rehabilitating disturbed areas with saved topsoil and salvaged plants from cleared areas.
- Using indigenous species in the garden.
- Maintain links between adjacent bush and your garden if possible.
- Avoid introducing environmental weeds into your garden
- Avoid unnecessary disturbance to vegetation and soil.

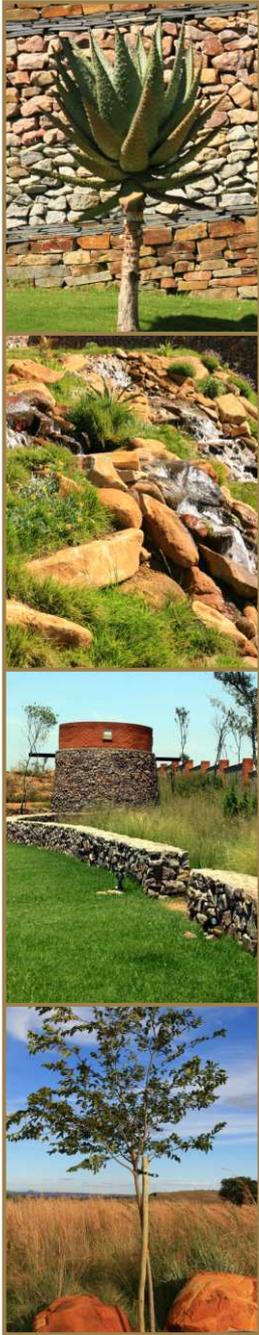


19.6 Environmentally Conscious Landscaping



Being environmentally conscious developments, the Waterfall estate's have an indigenous tree planting policy. The proposed indigenous landscaping policy will reinforce the uniquely South African nature of this estate. Sustainable landscapes are concerned with the planning and design of outdoor space. It is important to consider the landscape as an integral part of your home's sustainable design.

The topography of a garden should ideally reflect the original slope to minimize the



impact on drainage patterns. Storm water retention ponds can be constructed along drainage lines to collect rain water that can be used in many ways, from irrigating common areas, to creating diverse habitats for flora and fauna. Exotic species should be removed from the drainage lines on an erf if applicable and replaced with indigenous plants, marsh and reed species. Hard landscaping should be kept to a minimum. At no stage during the construction or operational phase should the flow of water into any of the retention ponds be cut off.

The landscaping in the development area should be of a continuous style and theme. One has to bear in mind that landscaping is more than just aesthetic. The environment must inform the design and layout of the site. The landscape design must be an integral part of the planning and not an aesthetic after thought. All landscaping must emphasize and enhance the urban design and can be used for screening, or as a wind-break or to frame select views.

Plants used for landscaping must be indigenous and the use of endemic plants must be promoted. The site is an intermediate between the pure grasslands of the highveld and the more wooded vegetation of the Bushveld, false thornveld and thornveld.

This should be kept in mind during the plant selection process. Invasive plant species must be removed and all disturbed areas must be rehabilitated.

The use of drought resistant plants must also be promoted. Low water-use vegetation or 'Xeriscaping' can also greatly reduce the need for supplementary garden watering thus preserving our natural resource.

In the last 10 years the theme in urban and corporate landscaping has shifted significantly towards the use of plants indigenous to South Africa. Previously, designs had remained very stereotyped and were often characterized by mass planting and the use of limited so called "fool proof" species. This was due to the fact that most landscapers did not know a wide variety of indigenous plants or how to use these plants in a more integrated and wild life friendly manner. It is recommended that homeowners use a landscaper who has extensive knowledge in this field. A list of recommended landscapers is available on request.

A list of recommended plants and trees has been incorporated into the architectural and landscaping guidelines for your information.

19.7 Sustainable Communities



When you choose a home you are also choosing a street and most of all a community. A street is more than a collection of buildings and trees. Well-designed and cared for streets encourage connected, inclusive, supportive, and safe communities. A good street consists of houses that have their own character but fit together in a complementary, respectful way. Characteristic attributes like building height, street setbacks, form and materials as set out in the architectural guidelines will assist with this. A good street improves quality of life in numerous ways by:

- Promoting community interaction.
- Providing a safe environment
- Enhancing the character and comfort of the neighbourhood



- *Enhancing the character and comfort of the neighbourhood*
- *Encouraging people to walk to the shops and around the neighbourhood*
- *Increasing property demand and resale value.*
- *Houses facing towards streets, parks and open spaces improve visual access and security but must be balanced with good site orientation for passive heating and cooling.*
- *Garages should be situated away from the house frontage to minimize their visual impact. This also allows more landscaping at the street frontage and establishes a direct visual connection between the house and the street for security.*
- *The width of driveways should be limited and shared driveways should be considered. This allows for more of the street frontage to be landscaped and provides a better environment for pedestrians.*
- *Trees should be planted to enhance the quality of the street. Good tree cover increases property values and provides improved shade, habitat, windbreaks, air quality and appearance.*
- *High walls and hedges on the street should be avoided as they isolate the home from the neighbourhood. They create a perception of isolation and impede observation of the street.*
- *Respect your neighbour's privacy, sunlight and views. Utilise appropriate building setbacks and building height to retain your neighbour's view while maximizing your own.*

19.8 Energy Use



Electricity is the most widely available energy source and is the only source able to run the full range of household appliances. However, it is the most greenhouse intensive. It is also becoming more expensive. Natural or liquefied petroleum gas (LPG) is less expensive to use than electricity and provides fewer greenhouse gas emissions. It can be used for water heating, room heating, and cooking. Solar water heaters and passive solar building techniques reduce the need to use nonrenewable resources. Other fuels such as wood and coal should only be used in small quantities such as for heating as they create air quality problems in urban areas. Renewable energy is the cleanest form of energy and systems using solar and wind are becoming increasingly accessible to homeowners. Renewable power systems use renewable energy sources to produce electricity with very low greenhouse gas emissions. Renewable energy sources such as the sun, wind, and water are continuously replenished from natural sources. Renewable energy systems operate at low cost but can be expensive to install. However, the KWh price is unaffected by future energy price rises.

Efficient energy use is the best way to reduce energy bills and environmental impacts while maintaining or improving comfort levels. While some solutions cost nothing at all, most investments in energy efficiency will pay for themselves through lower energy bills.

Heating and cooling your home

Use high efficiency gas, electric heat pump, under floor solar heating or wood heaters for room heating rather than electric convection and radiant heaters. Radiant heaters are only suitable for bathrooms where they are only used for a very short period of time. Using the passive design principles contained in this handbook will also help to minimize the need for heating and cooling. Use ceiling fans if possible instead of air conditioning. If cooling is required then use evaporative systems or high efficiency air conditioning units with occupancy sensing. These units should be appropriately sized for their environments and be maintained regularly. Use thermostatic controls for hot water and temperature regulation systems and set on the most efficient level.

Cooking Efficiently

In general choose gas hobs rather than electric. They are often cheaper to use, have more responsive controls and produce 50% less greenhouse gas emissions than an equivalent electric unit. A gas oven will also produce less greenhouse gas than an equivalent quality electric model. However some very efficient electric hobs and ovens are available from several manufacturers.

Appliances

Electrical appliances account for about 30% of household energy use. When buying white goods such as refrigerators, freezers, tumble dryers, and dishwashers look for the Energy Rating label. This gives a star rating and annual energy consumption for the appliance. The more stars, the more efficient the appliance. An efficient appliance usually costs a little more to buy, but will soon pay for itself in reduced energy bills.

Other Items

There are many small items throughout the home that consume a lot of energy. These include pool filter pumps, heated towel rails, computers, televisions, and gaming consoles. Ensure they are not left on unnecessarily.

Lighting

Use fluorescent or compact fluorescent lamps as they are substantially more energy efficient and long lasting, they are also available in the warm white colour spectrum similar to natural sunlight and, with newer production technology, are not subject to the flickering once associated with fluorescent lighting products.

- Avoid using low voltage down lights for general lighting as they are not energy efficient. Compact fluorescents for down lights are becoming available.
- Use occupancy sensors for certain lighting applications
- Turn off lights when not in use and use separate switches for each light fitting.
- Use timers or sensors on outdoor lights which can also be solar powered.
- Use the minimum wattage lamp to provide sufficient light.





- Use task lighting to supplement general lighting if needed.
- Use well designed windows and skylights to provide natural light while keeping winter warmth in and summer heat out.

Reducing standby energy consumption

Standby energy is drawn when some electrical equipment is not actually being used, such as when the TV is turned off with the remote control rather than the switch on the unit or at the wall. It is sometimes used to power digital displays or maintain memory settings, but often it is just wasted energy.

Be aware of the standby energy use of electrical equipment such as televisions, DVD players, clocks, computers, faxes, microwaves, security systems, battery chargers and power packs. Some appliances, such as video/DVD players and microwave ovens with digital displays, can use much more energy over a year in standby than in actual operation. Standby energy use can account for 10% or more of household electricity use.

Home office and entertainment equipment

- Large screen TV's use more energy than those with a smaller screen.
- If buying a computer consider buying a laptop, they require less materials to make and less energy to run.
- An LCD screen for desktop computers will use less energy and take up less space than a traditional CRT monitor.
- Switch off computers and printers if you won't be using them for half an hour or more.
- Look for printers and faxes that can use recycled paper. Use recycled ink and toner cartridges. Re-use blank sides of used paper.

Home Automation

Home automation is the automated or remote control of appliances and equipment in the home. Automated controls can be used to turn equipment on or off or adjust the operating settings at predetermined times, on site or remotely, or can be set to adjust the operation of equipment in response to changes in the home environment, e.g. temperature. Homes using these techniques, which may also involve the integration of broadband communications, are sometimes called smart homes or smart houses.

Home automation systems can, however, only improve the energy efficiency of your home if they are designed for this purpose. A well designed automation system can improve passive solar heating and passive cooling through the control of blinds, windows, vents and fans. It can also control heaters and air conditioners so they are only used when and where they are needed to achieve a desired temperature.

A hot water system can be automated to switch off when not required, such as when the homeowner is on holiday. Solar systems can be controlled so they do not require heat boosting during summer months.



Lights can be automated so that they operate only when needed and switch off when rooms are vacant. This can be done through motion sensors and timers or through more elaborate centralized systems. Motion sensors can be used to switch on external lights when needed or lights when entering the home, rather than leaving lights on.

Motion sensors, light sensors, and timing controls could be used to switch off lights when they are no longer needed. Priority should be given to rooms like bathrooms, pantries and toilets that often have light left on unnecessarily.

Automation can be used to operate appliances, lighting and equipment only when needed. Remote control and timer control of appliances from coffee makers to home theatres to spas, can lead to energy savings if the appliances usually use standby power, even though they are not operating, e.g. stereos, TV's, DVD's and home office equipment. It is also useful when the need for the equipment to operate varies, such as for pool pumps, where daily operating hours can be matched to the season.

Home automation systems work by managing the electric power of the device being automatically controlled. The degree of intelligence and how it is distributed between the elements of the home automation system varies with the design and with the manufacturer.

Control can be implemented by isolated sensors, timers, and processors embedded in the switches and relays. Alternatively centralized control can be obtained through networked sensors linked to a controller or computer, which then operates the power systems of equipment throughout the house.

The operation of more sophisticated devices such as central heaters, air conditioners, or home theatres can also be brought under the control of the automation system, but with more intelligent controlled devices, care is needed to ensure that the controllers instructions do not create conflicts.

Automated equipment can therefore include any appliance or machinery in the home, the operation of which is controlled through its electricity supply.

Automation and electricity demand

Homeowners may be required, as part of Eskoms' and the developers' new energy policy, to have a smart meter/load management system installed in their homes in order for the electricity supplier to be able to meter electricity demand and usage and switch off certain items like geysers during high demand times. This system replaces the ripple relay system that was previously used. Design the electrical installation to ensure that all the non-essential loads are grouped on the same circuits. This will facilitate future remote shedding of these non-essential circuits by the distributor using a load management system/smart meter technologies. By installing the system, homeowners will see the following benefits:

- *A reduced carbon footprint for the estate*
- *Reduced energy bills*



Solar Geysers

Solar geysers are mandatory on all of the Waterfall estate's. This is in line with current Eskom requirements and our green homes initiative. Homeowners are not however limited to one product although the developers will endeavor to source certain recommended units at a reduced price for the homeowners. From an aesthetic point of view split solar geyser units are preferred. This means that the solar panel that heats the water is separate from the geyser. This allows the homeowner to place the low profile panels unobtrusively on the roof while placing the bulky geyser within the roof void. If planned correctly the water or glycol will circulate through convection and no pump will be necessary. A pump is, however, recommended in the unlikely event that there is total cloud cover for an extended period of time. For aesthetic reasons it is also a requirement that any visible solar panels and have their frames and geysers powder coated in a charcoal colour or to match the roof. This is to avoid glare and minimize the aesthetic impact.

The use of solar geysers has several benefits. In addition to saving on electricity bills, and reduction in electrical demands the owner also has a permanent hot water supply which is not reliant on Eskom. Homeowners may also wish to take advantage of additional benefits such as underfloor heating. Underfloor heating is achieved through the circulation of hot water through piping installed in the floor. This can be controlled through the use of valves and pumps to heat individual rooms or the entire house and can even be linked to a home automation system which will monitor the temperature, activate pumps and open and close valves to maintain the desired environment in the home. Obviously the electrical cost savings are substantial as the only power required is that for the pump.

20. General

These building, landscaping, I.T and sustainable housing guidelines are to be read in conjunction with the Agreement of Sale between the homeowner and the developer and the constitution of the Home Owners Association including any amendments thereto.

Even if a homeowner may have complied with these set out guidelines the development company will have the absolute discretion to reject any plans which do not, in its sole discretion embody the spirit of what is intended for the built environment in the estate.

The Aesthetics Committee will in its absolute discretion, be entitled but not obliged to waive any of these guidelines but any waiver granted shall not constitute a precedent which will automatically be applicable to any other homeowner(s). Homeowners must be members of the Home Owners Association. During the development period, the developer shall be entitled in its absolute discretion to amend these guidelines from time to time.

Should at any time any disputes arise relating to the application or implementation of these guidelines the Aesthetics Committee and or the development company's decision shall be final and binding on the parties concerned. These guidelines may not be amended by the Home Owners Association in future without the development company's written consent.
