Port Hedland is the gateway to a diverse and unique natural environment stretching along 300 kilometres of coastline. Mangroves, warm water reefs, rocky coastal outcrops and sandy beaches are separated from the mineral rich hills of the interior by vast spinifex plains. It is a ruggedly beautiful landscape that is central to Port Hedland’s identity and attracts thousands of tourists every year.

**BIODIVERSITY**

The natural environment of Port Hedland is also significant for its biodiversity and the number of rare and threatened species it supports. The endangered flatback turtle nests on Port Hedland’s beaches. Mangroves along the coast and creek estuaries provide habitat for a wide range of marine and terrestrial animals. These fragile ecological resources are protected under the Environmental Protection Act (1986), and local land use planning and development practices have important obligations to support conservation objectives.¹

**TIDAL CHANGES**

Port Hedland experiences very large tidal fluctuations, varying six metres from lowest tide to highest tide levels, known as king tides.
PORT HEDLAND/SOUTH HEDLAND

FLOODING
The low lying tidal flats and the cyclone season have created an environment condition which subjects Port Hedland to potential flooding and storm surges. The town’s existing pattern of segmented development is a response to these conditions. With growing evidence of global warming, the frequency and severity of storm events is likely to increase. Responses to flood conditions need to be incorporated into the location selection and planning as well as the form of future development.1

DUST
The port facility activities generate constant wind borne dust which spreads across the West End and beyond. The dust is comprised primarily of iron-oxide particles (93%) with levels of sodium, magnesium, aluminium, calcium, manganese and copper.

The Port Hedland Air Quality and Noise Management Plan (2010) is a comprehensive management plan for ongoing air quality and noise management that has been endorsed by the Government. This plan includes an interim guideline measure which defines an appropriate level of protection for the community whilst allowing industry to operate on a continuous improvement basis.

BUFFER ZONE
A planted dust buffer exists on the boundary of the port facilities and rest of the town. The buffer zone runs along the southern side of Wilson street and protects the commercial and residential areas to the north from a proportion of the dust created by the port.

1 Port Hedland Land Use Master Plan, 2008

An example of dust build up on walls at the new South Hedland Health Campus
Much of the land in the Town of Port Hedland is low-lying tidal flats which are prone to flooding. The areas of current developed land exist on natural higher contours. The low-lying areas between the two townships are a major constraint on the expansion of Port Hedland and prevent the two towns from merging into one community. The low lying land could be developed but requires a significant amount of infill.
PORT HEDLAND/SOUTH HEDLAND

TEMPERATURE AND HUMIDITY
The maximum temperature range in summer is between 25°C - 35°C with high humidity. There are usually several days of 45°C temperatures each year.
Winters are drier and milder with temperatures ranging from 12°C to 30°C. Winter is a short six to eight week period finishing by late August.
Port Hedland’s temperatures are moderated by its coastal location, resulting in lower maximums and higher minimums than in South Hedland. Port Hedland is also provided some relief to the summer heat by sea breezes, whereas South Hedland rarely benefits from cooling sea breezes.

RAINFALL
Rainfall is low and variable with an average of 14 rain days a year. Total annual rainfall ranges from 250-450 millimetres, however, several years can pass without significant rainfall.
Most of the summer rain comes from scattered thunderstorms and the occasional tropical cyclone.
A secondary peak in the monthly rainfall occurs in May as a result of rainfall caused by tropical cloud bands which intermittently affect the area.
Most storms occur in the summer. Inland, there is an average of 20-30 thunderstorms a year and along the coast 15-20 thunderstorms a year.

SUNSHINE
Port Hedland has an average of 219 clear days and 55 cloudy days annually. Summer is the cloudiest time of year, corresponding with the cyclone season. In winter, Port Hedland experiences an average of between 17-25 clear days per month.

THE HIGH NUMBER OF CLEAR, SUNNY DAYS MAKES SOLAR POWER PARTICULARLY APPROPRIATE IN AND AROUND PORT HEDLAND
PORT HEDLAND/SOUTH HEDLAND

WINDS

Winter morning breezes vary from easterly to southeasterly, swinging to the northeast by mid-afternoon.

Wind patterns during the warmer months are usually north westerly to westerly with an occasional morning easterly.

CYCLONES

The Town of Port Hedland is located within one of the most severe cyclonic wind regions in Australia (Region D; Category 2). The town of Port Hedland has been severely hit by several tropical cyclones in the last thirty years. Recent major cyclones include:

- Cyclone Joan in 1975
- Cyclone John in 1989 (Australia's strongest cyclone up to that date)
- Cyclone Chris in 2002, and
- Cyclone George in 2007 which killed three people and caused extensive damage to the town. It is considered to be the worst cyclone since Joan, which caused an estimated $20 million worth of damages and had maximum wind speeds of 208 kilometres per hour.

Cyclones that hit Port Hedland typically form over warm ocean waters to the north of the Western Australia. Although the typical initial direction of these systems is to the southwest, those that affect Port Hedland take a more southerly or southeasterly track as they move further south. Some cyclones form from lows that move offshore from the West Kimberley, although they do not typically have time to develop into a severe tropical cyclone.

Storm surge is a major threat to Port Hedland. Even a weak to moderate cyclone close to high tide can cause water inundation.

In March 1917, a system identified as below gale force occurred close to a tide of 7.6 metre and caused sea water surge of 0.7 metre deep in parts of the town. Apart from another event in 1939, Port Hedland has been fortunate to be spared significant surge damage in recent years.

CLIMATE

PORT HEDLAND POST OFFICE

Site No: 004002 - Opened Jan 1897 - Closed Dec 1948

Latitude: -20.3139° - Longitude: 118.5742° - Elevation 8m

PORT HEDLAND POST OFFICE

Site No: 004002 - Opened Jan 1897 - Closed Dec 1948

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Pilbara Vernacular Handbook / Part 4-31
THERMAL COMFORT LIMITS
From October to March, day time temperatures exceed the thermal comfort limit by an average of 5°C. In winter, day time temperatures and humidity levels are considered comfortable. In Autumn and Spring, nights are considered comfortable. From July through to September, night time temperatures fall below thermal comfort limits by an average of 4°C. Though night time temperatures are above the comfort limit by an average of 1.5°C in summer, outdoor sleeping is not popular as humidity levels regularly exceed 50%.

The Mahoney Tables (see Appendix) demonstrates a comparison of monthly maximum and minimum temperatures with relative humidity indicates that thermal storage is an essential requirement for comfort year round.¹

¹ Metric Handbook: Planning and Design Manual

BUILDING BIOCLIMATIC CHART
The chart opposite indicates that buildings in Port Hedland require cooling for most the year. Natural ventilation is a suitable option most of the time, however, mechanical cooling and/ or high thermal mass with night ventilation are needed for hot summer days. Summer night temperatures are within the comfort zone. From May to October, passive solar heating will help maintain a comfortable temperature at night. In these months, Port Hedland experiences an average of between 17-22 clear days a month and passive solar energy would be very effective. Refer to the Appendix for Understanding Climate for Energy Efficiency or Sustainable Design, 2007.
Port and South Hedland are typical Pilbara towns where isolation and transport costs have dictated the materials generally used in construction. Early buildings used timber frame construction, with timber shipped in from Perth. Over time, lightweight steel sections have replaced timber. The ubiquitous corrugated iron sheeting is now substituted with Colorbond Zincalume for roofs and exterior walls. Fibre cement sheeting has also been used widely for public buildings and housing. The original spinifex hut at the airport was replaced by a far more comfortable fibre cement terminal building in 1956. This was replaced in 1971 with a clay brick and steel frame structure, the masonry perhaps a gesture of the permanence of the town as a destination. Some early buildings used local stone, however, this is labour intensive construction and is now rarely used.

More and more, commercial and public buildings are using a variety of materials to respond to the climate conditions and as an expression of the Pilbara context. The Wangka Maya Aboriginal Language Culture and History Centre building has used local soils for rammed earth walls in combination with steel and timber. Singles houses continue to be predominantly lightweight steel and metal cladding on a concrete slab.

**CLIMATE CONTROL**

The first motorised cooling system was installed in the local butcher’s shop in 1931. Today, there are few buildings without air conditioning. Although there are attempts to use it in conjunction with passive climate control devices such as awnings, deep eaves and other shade structures, too many buildings still rely on air conditioning for cooling.
The following analysis on the future role and character of Port Hedland is cited in the Draft Pilbara Planning and Infrastructure Framework:

"Port Hedland City, which comprises Port Hedland (gazetted in 1896) and South Hedland (established in 1966), functions as the regional centre for the East Pilbara. Its pivotal location as one of the Pilbara’s major ports together with the increasing international demand for mineral resources provides Port Hedland with a long-term security on which it can confidently diversify its economic base and provide for a higher threshold of community service provision."

The combined population of Port Hedland and South Hedland is estimated to expand from 19,000 to 50,000 people by 2035. Residential development in Port Hedland will change significantly to accommodate this growth, with more townhouses and other forms of medium-density living being made available to residents. Average densities are likely to increase from R30 to R50 and maximum building heights will increase from seven storeys (Lawson Apartments in South Hedland) to ten or more storeys. To meet demand, the stock of dwelling units is anticipated to increase from 4,450 (2006) to 19,200 (2035).

The Town of Port Hedland recently commenced work on the Port Hedland City Growth Plan, which will replace the Land Use Master Plan - a local planning strategy that was endorsed by the WA Planning Commission in 2008. The Port Hedland City Growth Plan will reconsider expansion areas for various land uses and determine appropriate residential densities throughout Port Hedland and South Hedland.

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1 Pilbara Planning and Infrastructure Framework, 2011

Pilbara Vernacular Handbook / Part 4-34
PORT HEDLAND/SOUTH HEDLAND

OPPORTUNITIES AND CONSTRAINTS

PUBLIC REALM
CLIMATE
CONSTRAINT
One of the most severe cyclonic wind regions in Australia (Region D, Category 2) averaging four cyclones a year. This affects both the built and vegetated environment.

WIND
Windborne dust and salt.

HIGH LEVELS OF CORROSION ASSOCIATED WITH PROXIMITY TO OCEAN AND SALT MINING.

OPPORTUNITY
High number of sunshine hours and clear days provide opportunities outdoor lifestyle and the use of solar power.

TOPOGRAPHY
CONSTRAINT
Low lying areas prone to flooding and inundation, restricting development.

OPPORTUNITY
Capitalise on the ocean views provided by the dunal landforms in Port Hedland.

VEGETATION
CONSTRAINT
Low, erratic rainfall in combination with regular cyclone events limits vegetation options.

Opportunity
Provide more street trees and median treatments, particularly in South Hedland.

WATER SUPPLY
CONSTRAINT
Current water supply is said to be at capacity.

OPPORTUNITY
Develop a new water supply chain which includes a water-recycling plant.

Maximise Water Sensitive Urban Design (WSUD) developments and strategies.

Consider designs which include water saving strategies which can be readily implemented at a civic and residential level.

TOURISM
CONSTRAINT
Poor quality or limited accommodation and tourist amenities limit the expansion of tourism.

Expense of travel, especially airfares.

OPPORTUNITY
Cooperative strategic development with WA Tourism to promote Port Hedland as a tourist destination.

Rezoning to enable tourism development in prime locations.

COMMERCIAL VIABILITY
CONSTRAINT
Separation of Port and South Hedland resulting in a dispersion of key community infrastructure, amenity and commercial functions, limiting the viability of each town centre.

OPPORTUNITY
Encourage more connections between the two townships by collocating similar functions and amenities.

INDUSTRY
CONSTRAINT
Noise created by port 24 hours a day.

Large quantities of dust created by the port.

OPPORTUNITY
Resource tourism, especially at night. The drama of industry lights is a unique backdrop to civic functions.

HOUSING AND BUILT FORM
INFRASTRUCTURE CAPACITY
CONSTRAINT
Improvements to infrastructure needed.

Many lots not connected to sewage. Sewage treatment plant in need of upgrade and relocation.

OPPORTUNITY
Promote Climate Responsive Design with sustainable initiatives to substantially minimise the reliance and use on current utility infrastructure.

HOUSING COST
CONSTRAINT
Highly volatile house prices create difficulties in attracting the finance necessary to develop new residential areas or to undertake larger scale commercial projects.

Current housing demand is not being met which is increasing the cost of housing in the region, especially for lower income earners.

Limited land release opportunities for housing in Port Hedland.

OPPORTUNITY
Develop housing types appropriate to Port and South Hedland residents’ needs.

Improve technical knowledge of materials and systems suited to Pilbara conditions.

Designs with more pre-fabricated components.

Exploring new densities and typologies for greater built form diversity as the town becomes more heavily populated.

THE HIGH NUMBER OF SUNSHINE HOURS AND CLEAR DAYS PROVIDE OPPORTUNITIES FOR OUTDOOR LIFESTYLE AND THE USE OF SOLAR POWER.
Our preparedness to respond to future growth will be critical in whether Port Hedland becomes a desirable place to not only experience financial gain but to experience living in a unique community. The following values and principles provide a framework to deliver Port and South Hedland specific strategies which when applied, will influence a way of living that is distinctive to the region.

PORT HEDLAND/SOUTH HEDLAND

**DESIGN VALUES**

**Responding to CLIMATE**
- Control solar heat gain
- Encourage natural ventilation and air movement
- Minimise conditions which create heat islands
- Work to local conditions

**Incorporating the NATURAL LANDSCAPE**
- Respect topography
- Use vegetation, especially native vegetation
- Ensure biodiversity

**Building on the PILBARA CHARACTER & IDENTITY**
- Consider community-based art, culture and creativity
- Consider local character and design
- Work with Port Hedland friendly materials
- Acknowledge informality
- Consider street life: content, movement and conviviality
- Identify opportunities for tourism

**Enhancing LIVABILITY**
- Ensure open space diversity
- Incorporate access and connections to open space
- Develop outdoor meeting and living places
- Design for water
- Diversify the built environment

**MOBILISING FOR CHANGE**
- Focus on town centre vitality
- Focus on town local economies
- Create affordable housing
PORT HEDLAND/SOUTH HEDLAND

Public Realm

- For Port Hedland and South Hedland’s future subdivision plans, ensure cardinal lot orientation is a primary consideration. Narrow lots oriented north-south will allow neighbouring buildings to shade east and west walls. Wider lots oriented east-west will reduce surface area of east and west walls and limit heat ingress.

- Consider extensive tree planting in the public realm for any new development areas in Port and South Hedland. The shade provided by these trees will significantly reduce heat absorption and reflection of hard surface areas such as roads, footpaths and building facades.

- Provide wide, shaded road reserves to all residential streets. This will ensure areas of cool outdoor living space to the front of houses when density prevents breeze-cooled rear gardens.

- Increased setbacks in new subdivisions for both Port Hedland and South Hedland will allow for generous vegetation planting around the perimeter of new houses which can provide effective passive shading.

- Deep awnings to shop fronts will shade both the glazing and the footpath below and are encouraged.

- Explore opportunities for buildings to shade themselves as well as pedestrians, by providing canopies/awnings over footpaths and between buildings.

- Locate street and open space seating under trees and shade structures to provide comfortable places for people to meet and rest.

DESIGN STRATEGIES

Responding to CLIMATE

PRINCIPLE: CONTROL SOLAR HEAT GAIN

In the hot, humid conditions of Port and South Hedland, controlling the amount of heat absorbed from the sun is critically important for the comfort of people occupying the towns. Urban design strategies must acknowledge the sun’s path and focus on maximising shade throughout all public areas in order to encourage more frequent and varied use.
Responding to CLIMATE

**PRINCIPLE: CONTROL SOLAR HEAT GAIN**

Controlling the amount of heat a house absorbs is imperative for maintaining a comfortable living environment and reducing energy consumption. Because Port Hedland experiences comfortable winter temperatures, houses should be designed to passively moderate temperatures, only resorting to mechanical cooling as a supplementary strategy in the hot summer months.

To achieve this, buildings should be designed to minimise the absorption of heat and oriented for the maximum shading of roofs, walls, windows and doors from direct sunlight. In particular, wide eaves, shading vegetation and light coloured, reflective building materials would significantly improve the houses’ performance in Port and South Hedland.

- The shading of houses and their associated outdoor spaces is critical in Port and South Hedland. Projecting roofs, verandahs, shading devices, trees, surrounding walls and ancillary buildings are just some of the ways to achieve this much needed shade.
- West facing walls will be exposed to the direct afternoon sun and are likely to be the most affected by solar heat gain. Where possible, consider minimising west wall lengths, and the expanse of west facing glazing as these are the most difficult to protect from direct solar heat gain.
- Ensure solar control methods and/or vertical shading to unavoidable west facing walls to mitigate solar heat gain into the house. Explore the use of vertical screens, louvres, trees or awnings in these areas.
- Ensure houses use lighter coloured roof sheeting and maximised insulation. This will ensure heat gains through the roof are minimised.
- Consider pavilion-style housing design surrounded by deep eaves and verandahs to protect all external walls from direct sunlight.
- Consider using a compact building form as this will reduce the amount of material exposed to solar radiation, as well as the house’s running costs.
- The shading of houses and outdoor spaces is critical. Consider using projected roofs, verandahs, shading devices, trees, surrounding walls and ancillary buildings to achieve additional shade.
Responding to CLIMATE

PRINCIPLE: CONTROL SOLAR HEAT GAIN

Housing and Built Form

- Consider the use of wide eaves from 800-900 millimetres to help minimise direct solar heat gain on external walls and windows.
- Consider adjusting the size and orientation of windows to suit Port Hedland’s high exposure to the sun. The Mahoney Tables used in this study recommend that openings make up 10-20% of the wall area. Openings on the east and west should be minimised and shaded to exclude low east and west sun. Port Hedland often experiences clear sky days so it is possible minimise window sizes to reduce heat transference from the outside, without compromising light levels available to the interior.

Narrow eaves provide minimal protection from direct sun on this new house in South Hedland

The high and sparse palm canopy provides minimal shade

Extensive vegetation planting can provide additional shade, but should be used in conjunction with more permanent shading options such as eaves

Impermeable enclosed balcony will be difficult to naturally ventilate or purge hot air

New medium density housing in Port Hedland has minimal eave overhang and no shading devices to protect windows

Shade structures, such as porticos can provide good shade coverage to entries

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PORT HEDLAND/SOUTH HEDLAND

PRINCIPLE: ENCOURAGE NATURAL VENTILATION AND AIR MOVEMENT

The effect of humidity on human comfort is most noticeable when air temperatures are high and air movement is low. Port Hedland experiences humidity throughout the year, particularly in summer, which coincides with the wet season. Strategies to encourage natural ventilation and air movement can greatly enhance the comfort of residents.

Paramount to achieving air movement through urban and suburban space, is the appropriate location and orientation of road networks. In Port Hedland, this network is predominantly linear and reasonably successful in allowing cooling sea breezes from the north and north-west to permeate the suburbs. The dunal landform blocks the sea breezes in some areas. In South Hedland however, the circular street layout impedes breezes flowing through the town.

CAPTURING AND UTILISING SEA BREEZES

- Future development behind the primary dunal system will need to consider how cooling ocean breezes might be able to permeate the area. Consider channelling breezes through the dune by the insertion of roads or corridors cut through the landform.
- Consider orienting new streets to best allow the channelling of cool prevailing breezes, such that all new lots have access to natural cooling ventilation. Road orientation which responds to wind directions can provide more opportunity for breezes to cool and ventilate houses. Cooling breezes will be most effective if the long axis of the lot runs across the breeze path.
- Explore ways in which shaded outdoor spaces can be oriented to capture sea breezes and ocean views in Port Hedland.

FENCES

- Encourage designing fences with a high level of breeze permeability to enhance natural ventilation at an individual and town scale.

BREEZE CORRIDORS

- Consider the inclusion of breeze corridors/easements in the form of large setbacks between houses to future residential lots in Port Hedland and South Hedland. These setbacks will ensure all lots have access to cooling breezes.

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PORT HEDLAND/SOUTH HEDLAND

Responding to CLIMATE

PUBLIC REALM

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Responding to CLIMATE

PRINCIPLE: ENCOURAGE NATURAL VENTILATION AND AIR MOVEMENT

Many houses in Port Hedland are affected by dust from the port operations. This makes opening windows difficult at certain times of the day (particularly in the West End), so these houses are less able to benefit from cooling sea breezes. Internal cooling should therefore focus on ways to improve the efficiency of mechanical cooling, such as the use of ceiling fans and zone controlled air conditioning so that only occupied areas are cooled.

High solid fences are used throughout South Hedland. Permeable front and side fencing will enable breezes to reach houses and provide passive cooling.

Housing and Built Form

ORIENTATION
- Consider orienting openings to the north to take advantage of Port Hedland's cooling sea breezes.

PLAN
- Consider narrow house plans with maximum one room depth. This plan-shape will allow for best cross ventilation through all rooms.
- Ensure that air movement is available to each functional area of open plan houses.

CEILING FANS
- Include ceiling fans to all habitable rooms. Ceilings of 2.7 metre minimum height, with fans offset 0.3 metres below the ceiling, is the most efficient configuration.
- Offset fans from the centre of the room to ensure effective air movement.
- Consider including a ceiling fan in a shaded, breeze cooled outdoor living area. The fan will create pressure zones, drawing the breeze through the space.

OPENINGS
- Consider non-glazed openings such as ventilation shutters, to take advantage of breezes without potential for heat gain through glass.
- Locate openings at different heights to draw cool air in at lower levels an and flush hot air out through higher openings.
- Use mesh, woven or batten screens for shade structures so that air can flow through and hot air is not trapped underneath.
PORT HEDLAND/SOUTH HEDLAND

PRINCIPLE: MINIMISE CONDITIONS WHICH CREATE HEAT ISLANDS

Sensitive landscaping and shading can be used to minimise the heat island effect in urban environments, improving the comfort and usability of both outdoor and indoor spaces.

When designing or retrofitting houses in Port and South Hedland, a combination of elements can be used to create a cool micro-climate, including extensive tree planting around the perimeter of the building, wide eaves or awnings and minimal hard scape to outdoor areas.

Various areas in both Port and South Hedland, especially shopping centres, are surrounded by hardstand carpark. Without adequate shading within carpark these areas absorb heat and create heat islands.

**Public Realm**

- South Hedland’s town centre is dominated by areas of exposed hardscape and asphalt carpark. Ensure future developments minimise the use of these heat-absorbing ground treatments and incorporate ground cover vegetation and shade planting in the public realm. Car parking areas should include large trees planted in a regular grid between car bays to provide maximum shade to both the cars and the hard surfaces when bays are empty (trees placed every 4 bays is preferable).
- Consider light coloured gravel or light coloured paving where hard surfaces are necessary. These surfaces will absorb less heat but ensure glare is minimised.
- Consider minimising building setbacks in built-up streets, particularly to the east and west. This will allow urban buildings to provide shade to adjacent buildings, streets, car parks and pedestrian walkways. This is particularly effective on lots with cardinal orientation.
- Explore the use of water features integrated with shade and vegetation to provide evaporative cooling in urban spaces. Ensure these are designed with water sensitive urban design (WSUD) considerations.

South Hedland town centre is currently dominated by carpark and heat absorbing hard surfaces

Planting shade trees in carpark areas will shade both cars and hard surfaces when bays are empty

Explore ways in which planted ground covers can be used to replace areas of asphalt and paving to minimise the absorption of heat
Responding to CLIMATE

PRINCIPLE: MINIMISE CONDITIONS WHICH CREATE HEAT ISLANDS
The outdoor temperature around a house has a significant impact on the temperatures within a house. Landscaping and shading can be used to reduce the heat island effect, enhancing the thermal comfort and reducing the energy use of houses. Port Hedland also has the opportunity to take advantage of cooling sea breezes to mitigate some of the heat gained through the day.

Large land areas have been retained in South Hedland’s housing developments in the form of drainage swales. Beyond performing stormwater drainage functions, these also significantly cool the surrounding environment if higher areas are vegetated.

- Explore ways in which mulch, ground covers, and light coloured gravel/paving can be used in place of concrete/asphalt to minimise the absorption of heat.
- In areas with hard paving, explore strategies to shade it, such as using vegetation to reduce thermal intensity and built structures like trellises and pergolas.
- Create a micro-climate within a lot to protect the house from the sun and hot winds. Lighter coloured walls/roofs absorb less solar radiation. Use light coloured or reflective paints, cladding, roofing and screening but ensure glare is not increased.
- Include shaded outdoor living space orientated north or south that can be cooled by the prevailing breeze and/or incorporates a ceiling fan.
- A sheltered outdoor space could be used to connect the street and the building entry, providing a cooling path for air entering the building, as well as protection from the sun and rain. Consider how this may be integrated with other features, such as boat storage.

CONSTRUCTION MATERIALS
- Insulated thermal mass construction can slow heat gains from inside to outside, but must ensure adequate shading to prevent slowly re-radiated heat in the evenings.
- Lightweight construction will transfer heat more quickly, but if properly insulated can equally prevent heat movement from outside to inside without the slowly re-radiated heat that affects thermal mass.
Responding to CLIMATE

PRINCIPLE: WORK TO LOCAL CONDITIONS
Location and environment place unique and difficult constraints on the planning and design in both Port and South Hedland. It is important to acknowledge these and respond to them to achieve successful open spaces and urban environments.

PUBLIC REALM

HEAT
- Explore ways in which landscape in the public realm could be designed to moderate hot conditions.

DUST
- Ensure Port Hedland’s urban spaces are adequately protected from wind-borne dust created by the port. Planting and building bulk, if appropriately located, can provide some protection to pedestrians.
- Use vegetation buffers to reduce wind-borne sand.

CYCLONES
- Ensure cyclone defensive design is incorporated into all new projects in Port and South Hedland.
- Explore strategies to protect vegetation from damage during cyclones such as using wind breaks, ensuring adequate drainage and planting trees in groves.
- Ensure species planted can tolerate the extensive rain associated with the annual cyclone season.

WATER
- To ensure water demands can be met as the town grows, include water conservation and recycling measures in new developments.

DRAINAGE
- Acknowledge the existing drainage
Responding to CLIMATE

PRINCIPLE: WORK TO LOCAL CONDITIONS

Public Realm

conditions in Port Hedland and ensure that new development addresses the risk of inundation through subdivision design.

- Acknowledge the difficulty in dealing with storm water drainage in South Hedland and ensure future swales are designed to cope with the large quantities of rain which often fall in a short period of time.
- Use swales and drainage as urban place-making opportunities.

PORT HEDLAND/SOUTH HEDLAND

DESIGN STRATEGIES

Drainage swales will be required to cope with large quantities of rain associated with cyclone season. Swales can be natural, gravel troughs, or artificially landscaped to include larger filtering rocks.

Drainage is a critical consideration in medium to high density development and strategies to detain storm water on site and slow its release into the public realm are required.

Surface drainage channel sheds storm water runoff from the road into a swale near South Hedland town centre.
Responding to CLIMATE

PRINCIPLE: WORK TO LOCAL CONDITIONS

Designing houses with consideration of the unique challenges faced in Port and South Hedland will help mitigate the impact these have on residents and assist in developing a distinctive vernacular for the towns.

Housing and Built Form

- Ensure openings and outdoor living areas have insect screens to protect residents from mosquitoes and flies.

HEAT
- Consider strategies to capitalise on Port Hedland’s high number of sunshine hours and to overcome high energy costs, such as photovoltaic panels and solar hot water systems.
- Re-think air-conditioning. Instead consider maximising passive cooling techniques and design principals or a combined use of passive and mechanical cooling. As passive ventilation will not be sufficient in the hottest months of summer, ensure mechanical cooling systems are integrated into the design. Consider designing buildings with a sealed inner zone which is cooled by efficient mechanical air conditioning in summer and an openable outer zone for passive ventilation for the rest of the year.

DUST
- Whilst designing for air movement and cross ventilation is important for comfort, also consider orientating houses and placing walls to protect living areas from wind borne dust and hot winds.

Outdoor areas allow with insect screens ventilation and protection from mosquitoes - South Hedland

Mechanical cooling systems which are not integrated into the design of houses appear as afterthought intrusions and detract from the appearance of the house.
Responding to CLIMATE

PORT HEDLAND/SOUTH HEDLAND

Housing and Built Form

PRINCIPLE: WORK TO LOCAL CONDITIONS

CYCLONES

• Consider strategies to strengthen buildings against cyclones and storm surge.

• In areas susceptible to flooding, consider raising floor levels and entrances sufficiently above average flood levels, using ramps to connect the ground to entrances. Consider materials which can cope with water inundation, such as timber boards, vinyl or ceramic tiles.

DRAINAGE

• Design to the topography of the lot, using natural falls of the land to carry stormwater away from the house.

• For developments in low-lying areas prone to flooding, raise the floor on piles or similar to avoid stormwater flooding.

COASTAL

• Consider materials which are corrosive resistant such as Colorbond sheeting. Untreated metal is to be avoided.

In low-lying areas, houses raised on piles will be less susceptible to flood damage internal
MINIMISE EARTHWORKS

- Align future roadways with natural site features to avoid extensive natural destruction and retain drainage channels.
- Avoid leveling and grading to create uniform slopes for ease of construction or to expedite planning. Rather, consider limiting earthworks to infrastructure and service corridors, retaining topography on lots.

NATURAL DRAINAGE

- Be sure to assess the existing hydrology and site drainage conditions before modifying landmass, particularly in South Hedland, where stormwater and its drainage requires considerable planning and infrastructure. Retain natural systems where possible.
- Future development earmarked in low lying areas between Port Hedland and South Hedland will need to consider the flow-on effects of infilling this site. Major grading can affect drainage with unknown consequences further afield.

WIND ACTION

- Consider the channeling of cooling sea breezes when developing behind the primary dunal system in Port Hedland.
**Housing and Built Form**

**DRAINAGE**
- Avoid leveling a site for ease of building. Consider house designs which work with natural contours, not against them, to resolve storm water run-off on sloping lots.

**WIND ACTION**
- Explore how topography can be used to capture views and breezes on individual lots in Port Hedland. Houses located on high ground with openings to the north have the opportunity to maximise natural cooling by directing the sea breeze through the house.

**MAXIMISE VIEWS**
- Take advantage of site terrain to maximise connections and views to beach areas and other areas of open space.

**USE TOPOGRAPHY FOR THERMAL COMFORT**
- On sloping sites, consider building into the ground to take advantage of the sub-surface cooler temperatures to keep rooms cool.
- Houses situated on the leeward side of Port Hedland’s dunes, will have limited access to sea breezes. Focus on providing shading to the house and outside areas by using shaded mass as a strategy to provide coolth.
**Incorporating the NATURAL LANDSCAPE**

**PRINCIPLE: USE VEGETATION, ESPECIALLY NATIVE VEGETATION**

Vegetation will influence solar radiation gains, humidity levels, wind speeds and directions and act as a screen to filter wind, dust and sun.

Port Hedland has an established tree planting strategy which is effective in providing shade to areas of the public realm. An extensively vegetated screen has been planted in Port Hedland to protect commercial and residential areas from the dust created by port activities.

South Hedland has patches of established vegetation but requires street tree infill.

**PLANT FOR PROTECTION FROM THE SUN**

- Plant advanced verge trees at subdivision construction stage to fast track the future shade benefits.
- Plant trees closer together than usual to ensure a continuous canopy, providing shading and cooling of the ground plane and shading pedestrian networks.

**PLANT FOR SITE CONDITIONS**

- Re-vegetate drainage swales in South Hedland with drought tolerant species. Providing continual shade to swale areas will encourage pedestrian use as informal paths.

**CREATE BUFFER ZONES**

- Maintain and extend vegetated buffer screens throughout Port Hedland.
- Plant vegetated screens along the hot dry east west and south perimeter of South Hedland to protect from hot desert breezes whilst allowing cooling sea breezes to penetrate from the north.

**PRESERVE EXISTING VEGETATION**

- Provide by-laws to protect new and existing verge trees during construction of new developments.

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**Public Realm**

**PORT HEDLAND/SOUTH HEDLAND DESIGN STRATEGIES**

**Public Realm**

- Trees with wide spreading habits, planted at close intervals will provide significant shade to footpaths in the public realm - Broome
- Footpaths such as this one require shade if they are to be used in the hotter months. Explore infill planting
- Plant species should be chosen according to their suitability for the Port Hedland conditions
- Plant advanced verge trees at subdivision construction stage to fast track the future shade benefits.
- Plant trees closer together than usual to ensure a continuous canopy, providing shading and cooling of the ground plane and shading pedestrian networks.
- Re-vegetate drainage swales in South Hedland with drought tolerant species. Providing continual shade to swale areas will encourage pedestrian use as informal paths.
- Maintain and extend vegetated buffer screens throughout Port Hedland.
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- Provide by-laws to protect new and existing verge trees during construction of new developments.
Here the footpath is located on the opposite side of the road to shade trees. Plant trees along the existing footpath or install a footpath along existing verge trees.

Infill planting
- Prioritise the planting of trees within the South Hedland town centre main street, Throssel Road, Hamilton Road entry from Port Hedland and Forrest Circle.
- South Hedland has a fragmented network of footpaths that lack shading. Infill planting between existing trees to provide continuous shade will assist in making them more usable during the hotter months.
- Develop and promote a request format for residents in South Hedland to request a tree to be planted on their verge.
- Encourage resident commitment to providing establishment watering for newly planted verge trees.

PORT HEDLAND/SOUTH HEDLAND

Public Realm

Incorporating the NATURAL LANDSCAPE

PRINCIPLE: USE VEGETATION, ESPECIALLY NATIVE VEGETATION
Incorporating the NATURAL LANDSCAPE

**PRINCIPLE: USE VEGETATION, ESPECIALLY NATIVE VEGETATION**

*Individual home owners can contribute to maximising the beneficial effects of vegetation at a town scale through preserving and enhancing as much vegetation as possible on their lots. To ensure the longevity of plants, ensure natural site conditions are considered, including the prevalence of storm fronts and cyclones and the long periods of extreme heat and drought.*

**Housing and Built Form**

**PLANT FOR PROTECTION FROM THE SUN**
- Plant large shrubs or trees on the east and west of houses to block morning and afternoon sun.
- Choose trees that have a spreading habit that maximizes shade coverage.
- Use vegetation to reduce thermal intensity and lower temperatures in outdoor living areas especially where there are large areas of paving. Vines on trellises over courtyards, pergolas and driveways will provide this protection.

**PLANT FOR SITE CONDITIONS**
- Encourage the use of local, drought resistant species to cope with Port Hedland’s low, sporadic rainfall and cyclone conditions such as Eucalyptus Victrix.

**CREATE BUFFER ZONES**
- Use vegetation buffers to protect openings from strong winds and dust, particularly during cyclone season where strong winds can have damaging effects.

**PRESERVE EXISTING VEGETATION**
- Consider clearing only the building footprint of a site, retaining existing vegetation around the house.

**INFILL PLANTING**
- Offer local native tube-stock to encourage home owners to plant environmentally sustainable food for fauna throughout the town.

*Mass site clearing is often unnecessary and should be avoided*
Incorporating the NATURAL LANDSCAPE

PRINCIPLE: ENSURE BIODIVERSITY

Port Hedland is home to a diverse range of local flora and fauna. Development in the public realm should strengthen and protect this quality, ensuring that the environmental value of Port Hedland’s unique landscape is highly prized in the community. Development should also respect and protect natural habitats, enabling the continued migration of local fauna such as the Flatback Turtle.

Public Realm

- Pursue the long term protection and management of natural areas through preparation of a ‘Local Biodiversity Strategy’ consistent with WALGA’s Local Government Biodiversity Planning Guidelines.
- Consider planting local endemic vegetation species in road verges, public open space and drainage swales. This will increase the survival potential of plants and encourage local native fauna to cohabit urban spaces.
- Ensuring clear access and exit corridors are possible to local fauna from all vegetated public open space.
- Potential biodiversity corridors are located throughout Port and South Hedland. Maintaining the links to the external landscape must be considered when future development is planned.
- Encourage beach access while minimising adverse impacts on the environment by defining public access points and walkways.
- Explore strategies to integrate the unique biodiversity of Port Hedland into public open space, for example, by developing a raised boardwalk through the mangroves.
- Protect Flatback Turtle nesting areas by avoiding street lighting near nesting areas.¹

¹ Refer Town of Port Hedland, Design Guidelines for Pretty Pool for more information on turtle sensitive lighting.
Housing and Built Form

- Individual house owners can contribute to improving the biodiversity of their town by planting local native shrubs and trees in their gardens and avoiding the introduction of exotic plant species.
- Encourage house owners to remove weeds promptly and in a way that prevents the spread of invasive species into the endemic landscape.
- Because Port Hedland is surrounded by endemic landscape and is home to many endangered and protected species, ensure domestic pets are controlled to avoid harming native fauna.

The environmental impacts of future development need to be assessed early in the planning process.

Many non-endemic species can be highly water dependent and will not provide food for local fauna. Use native species to assist in developing habitats across the suburbs.
Building on the PILBARA CHARACTER & IDENTITY

PRINCIPLE: CONSIDER COMMUNITY-BASED ART, CULTURE AND CREATIVITY

South Hedland currently lacks the strong community spirit cultivated in Port Hedland. Strategies to address this, such as locating community associations in a prominent Town Centre location, should be considered.

- Port Hedland is home to a large and diverse indigenous population. Identify areas of indigenous heritage and explore ways in which their significance can be protected and celebrated by the community.
- Work with the indigenous community to seek ways in which inspiration from the area’s indigenous heritage can be incorporated into public spaces to develop Port Hedland’s sense of place.
- Provide facilities for the recognition and teaching of traditional Aboriginal languages, art forms and culture.
- Reserve land for a transient accommodation facility for indigenous visitors, in a location to be determined in consultation with the Kariyarra Working Party and local Aboriginal people.
- Locate after-school care adjacent to local library to provide access to this facility and to the wider local community.
- The high cost for freighted fresh fruit and vegetables to Port Hedland increases the interest and viability to create community gardens. A central location of these gardens is important to ensure continuity and maintenance. Schools, community groups and local businesses will then benefit from the produce and the community involvement.

PORT HEDLAND/SOUTH HEDLAND

Design Strategies

Public Realm

- The Wangka Maya Aboriginal Language Culture and History Centre provides an opportunity for traditional practices to be shared in the future.
- A community garden like this one in Onslow can provide locally grown produce and bring the community together.
- A public art statue of a kangaroo is not specific to South Hedland, whereas the turtle sculptures have meaning and provide interpretive opportunities.
- Successful interpretive public art in Port Hedland.
PORT HEDLAND/SOUTH HEDLAND

Building on the PILBARA CHARACTER & IDENTITY

PRINCIPLE: CONSIDER LOCAL CHARACTER AND DESIGN

Some suburban areas of South Hedland are very confronting. Large expanses of high fencing and unkempt verge contribute to an uninviting environment for pedestrians, discouraging community interaction between residents and passing neighbours.

PUBLIC REALM

• Maintain evidence of the early patterns of development in Port Hedland and incorporate where possible, references to former street layouts, land uses and building forms in new development areas.
• There is an opportunity to maintain and promote the West End’s unique heritage buildings through tourism.
• In South Hedland, consider a new approach to development where more appropriate climatic measures dictate street layout, land use and building forms. Specifically, ensure cardinal orientation for all new lots.
• Implement streetscape upgrades (including substantial planting of native trees) to areas of South Hedland where existing treatments are degraded. Encourage residents to maintain the verge in front of their house.
• Ensure areas of public open space and drainage reserve are adequately landscaped with shade trees, and well maintained by the relevant bodies.
• Ensure that the new South Hedland town centre presents an identifiable and attractive main street, surrounded by attractive and functional public spaces. This will help to encourage pedestrian activity and activate the centre.
• Plant local trees to develop a local character for South Hedland.
• Consider making streets in and around

Recent community building using local stone for the entry wall that resonates with the stone heritage buildings of the area

Use heritage buildings as inspiration for future buildings

South Hedland TAFE Campus courtyard should be used as a model when creating shopping centre malls in the Pilbara. Refer Case Study 6
Public Realm

the South Hedland town centre more ‘people friendly’. The current dominance of cars and car parking over pedestrians and pedestrian access ways encourages people to drive into town and discourages pedestrians from interacting with the street.

- Identify the combination of forms, textures, scale, and materials which contribute to the distinctive character of the area and continue these through new development areas.
- Look to the Pilbara landscape for inspiration from the colours, textures, light, land forms.
- Utilise public art and landscaping to help direct visitors into the town.
- Ensure new development areas include well designed streetscapes with hardy trees and shaded footpaths.
PRINCIPLE: CONSIDER LOCAL CHARACTER AND DESIGN

The majority of housing in Port and South Hedland is single story and detached, with a few medium density townhouses. Climate responsive design is an intrinsic part of the local vernacular, particularly within the historic areas of town. Often these buildings feature timber louvres, wide eaves and wraparound verandahs - characteristics lacking in the newer subdivisions. South Hedland also has excellent examples of architecture both older (South Hedland TAFE - refer to Case Study 06) and contemporary.

Housing and Built Form

- Encourage the locating of outdoor living areas at the front of houses to populate the streetscape and enhance the existing sense of community.
- Discourage impermeable fencing to maintain an open and inviting streetscape. Ensure all future developments have restrictions on solid front fencing.
- Offer incentives for fence replacement in streets where high, solid fences are prominent.
- Consider re-use of demolition materials. This reflects past building practices as well as sustainability.
- Consider designing outdoor living and sleeping areas.
- Consider familiar building elements such as a perimeter verandah particularly when building in masonry.
- Develop residential building typologies that include Climate Responsive Design (CRD) principles to help develop a local character in South Hedland.
- Ensure new developments acknowledge the unique requirements of the local population through considerations such as the storage of boats and the provision of parking for large vehicles. Seek ways to achieve this without compromising the streetscape.
PRINCIPLE: WORK WITH PORT HEDLAND FRIENDLY MATERIALS
When choosing building materials for use in the public realm, a number of factors come into play. The durability of a material will impact upon how long it lasts and what sort of maintenance is needed. Additionally, every design decision regarding materials influences the thermal comfort of those interacting with the space.

Public Realm

- Explore the use of indigenous materials in public spaces (such as gravel, sand and rock) to minimise environmental impact and celebrate local identity.
- Ensure all materials used in the public realm are of the highest quality and are suitable to and offer longevity in the harsh climatic conditions of Port Hedland. Materials will need to be able to withstand the effects of extreme heat, salt and occasional cyclones.

This South Hedland park uses local gravel under a pergola structure to provide a shady rest area adjacent to the exposed oval.

Inspiration for materials can come from the shards of broken glass and stones littered through the pindan soil.
Seek out locally sourced materials to reduce transport costs. Rammed earth and concrete can use local sand, aggregates and earth. Concrete is able to be produced locally, using cement that is shipped in.

Minimise cutting to reduce wastage of imported materials. Design to standardised sizing of building elements.

WALLS

High mass building materials can be effective in stabilising internal room temperatures in Port and South Hedland. However, they need to be designed with the surround cover of a verandah, patio, wide eaves or wide canopy of trees. Without this type of shade, high mass materials will absorb heat during the day and re-emit it into the interior of the house at night making the house uncomfortable for sleeping.

If this type of shade is not possible, well insulated lightweight/framed construction is preferable.

Thermal mass of masonry is 30% more effective if on the inside and insulated on the outside, such as in the case of reverse brick veneer. The veneer surface will shade the masonry and an air gap also allow air movement to keep masonry surfaces cooler.

Consider a mix of building materials which respond to the climate. For example, use light frame construction for east and west walls where the low angle sun is difficult to effectively shade, and masonry for the southern and northern facing walls with wide overhangs or verandahs.

Housing and Built Form

Rammed earth created with local sands utilises local material. The shade of wide eaves help to stabilise thermal mass temperatures of the walls.

The Port Hedland Post Office is one of the oldest buildings in the town and demonstrates the importance of materials which can withstand the harsh climatic conditions.

Some materials, like the brickwork used in the South Hedland TAFE Campus, are self shading, with deep recesses creating shadows on the surface of the brick beside it.
**PORT HEDLAND/SOUTH HEDLAND**

**Building on the PILBARA CHARACTER & IDENTITY**

**PRINCIPLE: WORK WITH PORT HEDLAND-FRIENDLY MATERIALS**

**Housing and Built Form**

- Lighter coloured roof sheeting combined with insulation will ensure heat gains through the roof are minimised.

**INSULATION**

- A combination of insulation bats (low heat transfer) and aluminium foil (reduced radiation) in a wall or roof cavity will provide the best combination of insulation.

**GLAZING**

- Utilise the advances in glass technology to reduce internal heat gain by specifying Low E (low emissivity), double glazing or tinted glass.

**WINDOWS AND DOORS**

- Aluminium frames are thermally inefficient and have a very high embodied energy. If specifying aluminium, consider a thermal break and a core of foam or rigid board insulation made from expanded polystyrene (EPS) to improve thermal performance.

- Timber frames are more suited to the Pilbara climate because of timber’s conductivity and low embodied energy, but its bulk can add to transportation costs and termite treatment is required.

**FINISHES**

- Choose finishes according to their reflectivity and heat absorbing properties. Light colours have good reflectivity and are preferable for sun exposed surfaces. Care needs to be taken to avoid excessive glare.
Building on the PILBARA CHARACTER & IDENTITY

PRINCIPLE: ACKNOWLEDGE INFORMALITY

Port Hedland maintains an informal, seaside lifestyle as a recreation hub for fishing, boating and swimming. Future development should acknowledge this quality as an intrinsic part of life in Port Hedland and continue to respond to this informal relationship between the natural and built environments.

PUBLIC REALM

- Identify, assess and protect buildings and sites of historical and cultural significance. Celebrate these sites and make them known to residents for their role in development of the local community. Refer to the Town of Port Hedland Municipal Inventory of Heritage Places in the Appendix.
- Look for everyday aspects of living in Port Hedland which make it unique and design to accommodate these.
- Enhance coastal amenities to support recreational activities which are popular with residents, such as fishing, boating and sailing.
- Protect and maximise views of the ocean and harbour when developing new areas, ensuring new development does not inhibit visual or physical access to these areas.
- Consider night views to the Port in new development areas. The lights and operation of the Port are both beautiful and reflect the nature of the town.
- Allow gravel footpaths in South Hedland to remain in areas and encourage their use in future development.
- Retain areas which are used by local indigenous people and ensure they are protected.
Housing and Built Form

- Continue to design houses with strongly integrated outdoor spaces to take advantage of climate and lifestyle. Consider creating areas for outdoor living which protect the users from the sun, hot winds and rain. These spaces can be used in the evening when the heat of the day builds up in the house and residents move outside into the cooler night air.
- Maintain an informal approach to landscaping so the house become integrated into the surrounding natural environment.
- Plan for lifestyle and incorporate spaces for outdoor cooking, boat storage, shaded lawn and outdoor living.

Continue traditional building techniques which celebrate the informal Port Hedland lifestyle. Outdoor living areas, such as the verandah on the old medical staff quarter’s building, are a good example of responsive design which accommodates both the climate and lifestyle of Port Hedland residents.
PORT HEDLAND/SOUTH HEDLAND

Building on the PILBARA CHARACTER & IDENTITY

PRINCIPLE: CONSIDER STREET LIFE: CONTENT, MOVEMENT AND CONVIVIALITY

Successful places have opportunities for a variety of experiences, such as informal meeting places, street markets and comfortable places to sit, eat and people watch. These opportunities facilitate a sense of belonging and identity - key aspects in creating a community.

- Encourage cycling as an alternative to car transport by including appropriate biking facilities in all new roads and to key destinations.
- Ensure that new areas of public open space are in close proximity to retail and commercial facilities to encourage the interaction of these functions and their potential users.
- Consider compact development that retains breeze permeability and provides shade to the public realm from adjacent building forms. This will ensure a more comfortable micro climate on the street which may encourage greater pedestrian activity.
- Explore how the spaces between buildings in the town centre can be used to support a range of activities, such as cafes, retail etc. Encouraging air flow through them will make them more comfortable, and thus more likely to be used.
- Develop a system of compact, walkable precincts to minimise car dependence. Ensure future development maintains walkable distances to amenities.
- Encourage the use of the town centre at night when the climate is cooler through lighting and extended openings hours. Consider night time cinema and night markets at the courthouse and a new town plaza at South Hedland.

Public Realm

Providing appropriate facilities at key locations throughout the town will encourage cycling.

Seating is often whatever is available - outside the South Health Campus.

People in South Hedland currently have limited choice in avoiding the sun when walking to public facilities.
PRINCIPLE: IDENTIFY OPPORTUNITIES FOR TOURISM

Like other Pilbara towns, Port and South Hedland have relied on large industry, namely mining, to fund public works improvements. Development of tourism in the region would diversify income, generating opportunities for the town and ensure long-term financial sustainability and independence.

The region offers unique attractions and activities to tourists including the Courthouse Art Gallery, Dalgety House, Don Rhodes Mining Museum, cultural and heritage walking trails, the port, Pioneer and Pearlers’ Cemetery and viewing and monitoring of nesting Flatback Turtles from October to March.

PUBLIC REALM

- Identify sites for new tourism accommodation facilities, with a focus on quality hotel developments and expanded caravan and camping facilities, including expansion of Cooke Point and Black Rock caravan parks.
- Encourage the development of unique accommodation options such as a luxury nature resort or fixed tent adventure camp.
- Provide opportunities to access and learn about the complex ecology of Port Hedland’s coastal environment and stark interface between nature and industry.
- Both Port Hedland and South Hedland need to offer high end resort style accommodation to attract holiday makers, along with high quality caravan parks with restrictions on long-term accommodation to ensure tourists can access a range of short-term accommodation.
- Encourage developers to invest in short stay accommodation such as resorts, serviced apartments and family chalets by capitalising on Port Hedland’s geographic and recreational amenities.
Enhancing Livability

PRINCIPLE: ENSURE OPEN SPACE DIVERSITY

In Port Hedland, public spaces by the ocean are most popular during the evening when the afternoon sea breezes offer some relief from the day’s heat. Public open spaces can, however, be more useable during the day if correctly designed for shade and amenity.

Public Realm

- Continue to ensure vehicle access tracks to the Spoilbank area are maintained.
- Provide fish cleaning facilities at the most popular fishing spots throughout the town.
- Upgrade and extend walkways and bike paths within the town to encourage non-vehicular traffic and pedestrian engagement with the public realm. Plan for dual circulation network for pedestrians and vehicles so that there is more opportunity for shaded, attractive routes for pedestrians.
- Allow drainage swales in South Hedland to continue to have minimal maintenance requirements. Look for opportunities for the higher ground of these swales to offer park type amenity such as shaded paths and seating. This will contribute to providing attractive pedestrian/cyclist access across the town.
- Maintain and upgrade existing areas of open space and identify opportunities as to how they can serve multiple ecological functions whilst contributing to the social life of the community.
- Consider options for informal play and the inclusion of meeting points for parents and children in public spaces.
- A mixture of created and natural/retained landscape should make up the balance of public open space and recreation spaces.

PORT HEDLAND/SOUTH HEDLAND

A reserve upgrade in South Hedland includes retaining the existing sporting field, adding shaded seating, concrete footpath and exercise equipment to make the open space more attractive to various types of users.

Rationalise playground locations to ensure they are in areas of demand.

Local public open space has a good provision of natural shade. However, basic amenity, such as seating, is required.
PRINCIPLE: INCORPORATE ACCESS AND CONNECTIONS TO OPEN SPACE

In both South and Port Hedland, the provision of improved path networks and connections will capitalise on the areas of public open space already available.

Enhancing LIVABILITY

Public Realm

- Consider easy access to multifunctional open spaces for all people, including mobility impaired, the elderly, school children cycling to school and people who rely on walking.
- South Hedland has an impressive network of playing fields and public open space, but much of it takes the form of irrigated areas of lawn. Providing shaded outdoor spaces for functions other than sport - preferably adjacent to playing fields and ovals - would encourage greater use of these spaces.
- Review path networks. South Hedland in particular has many gaps and needs close study and action.
- Plant trees and low shrubs in drainage swales. Ensure plants can withstand long periods of drought and then inundation during the wet seasons.
- Review and develop a network of formalised paths through the swales to encourage walking and permeability and access to adjacent subdivisions.
- Continue to develop a dedicated bike-path that provides safe access between South Hedland and Port Hedland.
- Encourage cycling as an alternative to car travel, especially for short trips.
- Provide barbecues, picnic tables, shelters and lighting to public open spaces to activate these spaces in the evening when the cooler conditions are more appropriate for outdoor eating.

Bibra Vernacular Handbook / Part 4-67
Public Realm

- Consider lighting one or two specific open spaces to be utilised at night for events. In deciding which open spaces may be suitable use Crime Prevention Through Environmental Design (CPTED) principles and sporting access requirements as your guide.
- Maintain and enhance public access to the water through improving amenities such as jetties, ramps and beach facilities.
- Consider the safe access for children to public open spaces to acknowledge and maintain Port Hedland's high level of childhood freedom.
Enhancing Livability

PRINCIPLE: DEVELOP OUTDOOR MEETING AND LIVING PLACES

The climate in Port and South Hedland is perfect for encouraging people to socialise and connect outdoors in their community, especially in the evenings when they can enjoy the cooler external temperatures.

Public Realm

• Maximise opportunities for public access, recreation and conservation in coastal foreshore areas.
• Due to the hot climate, ensure outdoor places provide extensive shade coverage, including shaded seating and drinking facilities. Ensure public open space are located to facilitate available cooling breezes, have the infrastructure to both large and intimate support community gatherings.
• Create places for alfresco refreshments and outdoor dining on footpaths in the town centre.
• Populate both town centres with gardens, boardwalks, shade and seating to encourage use and draw people into town.
• Enhance beach amenities to support activities important to residents, such as fishing, boating and swimming.

The shaded pavilion space at the Port Hedland Aquatic Centre provides a place for parents to sit and watch the children or for a group to meet for lunch between recreational activities in the water.

Due to the extreme heat often experienced in Port Hedland, ensure extensive shade is provided to recreation areas, preferably by trees.

Public open space along the foreshore is popular and needs to offer different experiences in each park.
PRINCIPLE: DESIGN FOR WATER

Rainfall in Port and South Hedland is variable; low for much of the year and heavy during cyclone season. The towns must acknowledge this through ensuring water is used responsibly and effectively.

Public Realm

- Re-design selected irrigated sporting fields and public open space to be hydro-zoned. Group plants and ground-covers with similar water needs together for more efficient watering.
- Explore ways in which landscape design in the public realms could be designed to tolerate dry and hot conditions as well as heavy rain events.
- Use local, water-efficient ground covers instead of lawn in some areas of public open space. Ensure there are also adequate grassed playing fields to accommodate sporting participation.
- Incorporate water features, such as ponds, fountains and streams into landscape design using recycled water to cool public spaces. Combine these with shade and greenery to enhance cooling.
- Explore strategies of retaining heavy rainfall in sub-surface retention systems or subsoil aquifers for irrigation. Consider redirecting rainfall into nearby public open space.
- Ensure water does not stagnate and create a mosquito hazard by providing adequate drainage in the public realm and ensuring water features are aerated.
- Consider strategies to prevent waste from entering the drainage swales.
Housing and Built Form

- Consider planting local plants and trees which are drought tolerant.
- Encourage the use of mulch to keep soils moist and limit evaporative water loss in gardens.
- Consider methods of storm water capture for irrigation, such as siphoning some of the storm water into gardens and directing the overflow into swales.
- If reticulation is required, consider using subsurface irrigation to minimise potential water wastage through evaporation. Consider linking this to a grey water system.
- Consider water-wise irrigation procedures such as moisture monitors and rain sensors on programmable, timed irrigation systems.
- Ensure water-efficient and sanitary equipment is installed to all homes.
- Explore ways in which household water can be used for irrigation or other grey water uses, such as flushing toilets.
- Provide adequate drainage for heavy rains during cyclones to avoid erosion.
PRINCIPLE: DIVERSIFY THE BUILT ENVIRONMENT

Planning in both Port and South Hedland needs to ensure a range of lot sizes and zoning requirements are applied throughout the towns. Mixed-use development in town centres will also add to the urban fabric and building types produced from them. Refer to the Hedland Growth Plan currently being finalised by the Town of Port Hedland.

- Consider densifying suburban areas through re-zoning and the providing of new lots at higher density zoning. Purposely apply diversity at all scales from town centre to the single lot residential.
- Encourage housing in the town centres of South Hedland and the West End. This will allow access to service and entertainment facilities for workers who chose to live within the town centres.
- Provide aged housing that is appropriate to its occupants needs and Port Hedlands conditions. Use passive cooling solutions that minimize the reliance on mechanical cooling/ventilation, with rooms that can be isolated to facilitate efficient use of mechanical cooling during hot periods.
- Explore methods of integrating transient workforce accommodation into different areas of the town and limiting its proportion in future developments in order to enhance the diversity of the town. Consider developing these as mixed-use to encourage integration in the town.

PORT HEDLAND/SOUTH HEDLAND

Enhancing Livability

Public Realm

Currently construction is predominately single level development for public and commercial buildings. Housing is also mainly single level detached with some two storey development.
**PORT HEDLAND/SOUTH HEDLAND**

**Enhancing Livability**

**PRINCIPLE: DIVERSIFY THE BUILT ENVIRONMENT**

The town of Port Hedland currently has a transient workforce of 1,400 people. These workers primarily live in camp accommodation outside of the town centre. As permanent residency is preferred in the future, a more diverse range of living options need to be available to cater for these people.

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**Housing and Built Form**

- Encourage a wider range of housing types within the suburbs of Port and South Hedland by identifying suitable areas for specific types of housing, including home office or other live/work arrangements.
- Increase the density of residential development in areas with appropriate infrastructure access, services and amenity. Support the improvement or provision of infrastructure (for example, providing sewer connection to the Cemetery Beach area).
- Three and four bedroom detached houses account for over 75% of the existing housing stock in Port Hedland. Provide alternative, smaller housing types to encourage a larger range of demographics, including young singles and couples and independent elderly residents.

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1 Pilbara planning and infrastructure, Feb 2011
PRINCIPLE: FOCUS ON TOWN CENTRE VITALITY

Ensuring that the town centres of Port Hedland and South Hedland are pedestrian-friendly and socially diverse will in turn, ensure that the streets are active and used by locals. Currently, vehicles and vehicle movement in the town centre of South Hedland dominate. South Hedland’s town revitalisation plan is beginning to address these issues and look to more appropriate planning for the urban centre.

MOBILISING FOR CHANGE

• Encourage a diverse mix of uses in both town centres. Balancing retail and office uses with a range of cultural, entertainment and residential functions will increase the level of activity throughout the day and night.
• Relocate businesses into the town centre to increase the town centre as a destination.
• Focus on maintaining openness and permeability within both town centres. This will promote pedestrian activity and movement.
• In urban areas, consider building design responses to the harsh Port Hedland climate, that incorporate large shaded eaves and shaded, planted courtyards to create a cooler micro-climate year-round.
• Explore ways in which the existing commercial buildings could address the street in South Hedland. Consider retrofitting awnings to ensure the town centre offers continuous protection from primarily the sun.
• Revitalise the town centres through providing quality public open space, such as a plaza or pedestrian street, or reusing existing spaces (such as a car park) to host a variety of events such as a night markets.

Public Realm

Retail and professional services exhibit poor streetscapes in South Hedland. The high, solid fence which surrounds the sports shop and only allows access during business hours, these businesses need to be encouraged to relocate into the revitalised town centre.

In Port Hedland, a retrofitted awning over the existing footpath in the town centre provides a shaded space for pedestrians to use.

Recent shopping centre developments make stronger connections with the street through secondary access openings and clear glazing.

Retail and professional services exhibit poor streetscapes in South Hedland. The high, solid fence which surrounds the sports shop and only allows access during business hours, these businesses need to be encouraged to relocate into the revitalised town centre.

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Public Realm
MOBILISING FOR CHANGE

PORT HEDLAND/SOUTH HEDLAND

PRINCIPLE: FOCUS ON TOWN LOCAL ECONOMIES

Port Hedland’s future is currently dependent on the growth of the mining industry and port activities. For long-term sustainability, Port and South Hedland need to establish new economic and social drivers to encourage a stable population, independent of these two industries.

Public Realm

- Provide for the orderly expansion of services by clustering new development with existing facilities where possible, in defined transport and utility corridors that minimise environmental and land use impacts.
- Ensure developable land is available for local industries.
- Offer opportunities for local land ownership in commercial zones to protect business owners from outside factors affecting their income, such as a dramatic increase in rent.
- Identify any potential local producers of goods and services that are undeveloped and find locations or opportunities to make the connection between producer and purchaser.
- Encourage opportunities for a local fishing market to be held regularly. A community garden which sells locally grown produce may offer a site for this kind of small scale economy.

This old train carriage has been converted to a café and provides a service whilst embracing the history of the town.

Existing local businesses in South Hedland need to be considered in the growth of the town revitalisation.

The West End is likely to have fewer residents and a strategy to attract visitors should be considered.
MOBILISING FOR CHANGE

PRINCIPLE: CREATE AFFORDABLE HOUSING

As well as the high cost of purchasing and renting houses in Port and South Hedland, the cost of living is higher than in capital cities. This is because of high transport costs. Strategies and clever thinking are required to source products and materials by more cost effective ways. Generally houses in Port Hedland rely on mechanical cooling for most of the year. Providing housing that is well designed with passive cooling solutions that minimise the reliance on mechanical cooling will greatly reduce household energy costs.

Housing and Built Form

- Encourage the design of smaller, climatically responsive houses to reduce the higher than average building and operating costs in Port Hedland. Offer smaller lots to encourage this.
- Provide housing options which enable concurrent use of houses so that two sets of occupants can utilise the same house at different times to suit their work schedules.
- Provide compact housing with rooms that can be isolated to facilitate efficient use of mechanical cooling during very hot periods.
- Encourage small apartment developments within the new South Hedland town centre that cater residents, both short and long stay, which might not require a full size family home
- Explore new or different construction methods. Support local industries, employ local trades and source local products.
- Explore cost saving options for the mass ordering of products which require transport and shipping from Perth or International locations.
- Establish a recycling consciousness and make the trading of recyclable materials and products easier by setting up a network of locations both community based and commercial. This will be a cheaper option than transporting materials and products from Perth or beyond.