# 8. HUMAN SETTLEMENTS

## 8.1 INTRODUCTION

Human settlements are an important part of the State of Environment report because of the potential impacts they have on the natural (biodiversity) and physical (air, water, noise, light, visual) environment as well as being influenced by them (EPA 1999b). This chapter will cover a number of areas of human settlement including:

- population;
- development footprint;
- water;
- waste management;
- noise pollution;
- ecological footprints; and
- visual quality.

The effects of human settlement on biodiversity, air quality and water quality is discussed in depth in separate chapters.

## 8.2 ISSUES & PRESSURES

### 8.2.1 Population & Development Footprint

***Indicators: Size of Population in Noosa Shire***

***Population Cap***

***Area of Noosa covered by Urban Development***

Noosa Shire is relatively sparsely settled when compared with many local government areas in South-East Queensland at 2-20 people per square kilometre for most of the Shire with a small pocket at 20-200 per square kilometre (EPA 1999b). Noosa Shire has an annual growth rate of 2.5% (DCILGP 1998), with the population growing by over 4% in the last year (ABS 1999). The majority of population growth in Noosa Shire is due to people migrating from other places. Only low levels of natural growth occur (NSC 1999).

The Australian Bureau of Statistics estimate of resident population in 1996 was 36,336 persons. The Noosa Shire Strategic Plan projects a resident population of around 56,500 persons by 2007. This population level is currently the approximate population capacity under the existing planning scheme and is often referred to as the “population cap” for Noosa Shire (NSC 1999).

Urban development (including land zoned residential, commercial, industrial, village and special facilities) covers approximately 2,482ha (3.1%) of the 80,240ha land area of Noosa Shire. The Shire has approximately 940km sealed highways, streets and secondary roads.

### 8.2.2 Water Usage

***Indicator: Amount of water used per head of population.***

Noosa Shire’s reticulated water supply comes directly from the Mary River and from Lake MacDonald on Six Mile Creek from the reticulated supply, a tributary of the Mary River. In 1999/00 6,304.96 megalitres of reticulated water supply was used in the Shire. Many areas of the Shire rely on rainwater collected in dams and tanks for water usage.

Water has been metered since 1996 in Noosa Shire and a user pays charging structure introduced in the same year. The Council has a "Demand Management Strategy" which it put together in consultation with WaterWise Queensland, an initiative of the Department of Natural Resources. WaterWise aims to reduce the demand for water through public awareness and education targeting the home, the workplace, on the farm, and in the catchment (EPA 1999b).

Since November 1993, all new and replacement toilet cisterns are required to be of the 6/3 litre dual flush type. Since mid 1997 Council has been trialing "Zip" infra-red water saving urinal flushers and is progressively installing them to all Council operated toilet blocks. Water consumption in the Shire reduced by 21% over the pre-metering amount in the first billing period after meters were introduced. There was a 39% reduction in water consumption in toilet blocks fitted with the Zip system.

The WaterWise Business Plan for 1999/00 proposed to target education as a precursor to adopting initiatives such as rebates for water efficient appliances like low flow shower roses. Projects proposed include:

- Education of primary school students at 10 target schools to promote WaterWise use;
- A WaterWise poster competition following the Primary School Education Program;
- A WaterWise workshop for secondary school teachers to help them teach students about water issues, water and wastewater treatment and the importance of conserving and caring for water resources;
- A review of Local Laws to outlaw dump and flush urinals;
- A workshop for Councillors and Council staff to look at system management, leakage and "unaccounted for" water;
- An information evening for headmasters and school bursars to encourage water efficient practices in schools;
- An information evening for plumbers to create advocates in the community for water conservation;
- Water audits of Council facilities to reduce usage and as a role model to the community; and
- WaterWise Council staff briefings to sell the benefits, to themselves and the community, of wise water usage.

### 8.2.3 Waste

***Indicators: Amount of waste in kg generated per head of population per annum.***

***Tonnage of waste to landfill.***

***Rates of recycling.***

***Number of compost bins distributed.***

***Number of composting toilets.***

**Introduction**

The major sources of waste in Noosa Shire which will be dealt with here are:

- Solid waste including household refuse;
- Liquid waste, particularly sewerage; and
- Hazardous waste (household and industrial).

As with the rest of Queensland, the volume of waste generated within the Shire has the potential to impact on the environment, including the destruction of habitat (for landfill) and the generation of air and water pollution. There is a waste management hierarchy in order of priority (EPA 1999b):

1. Avoid the production of waste;
2. Reduce the volume of waste generated;

3. Reuse as much waste as possible;
4. Turn waste into another useful product;
5. Use waste to generate energy;
6. Make the waste less hazardous to the environment by treating it; and
7. Utilise the most "environmentally friendly" means of disposal of the waste.

Although Council did not achieve the goal of 50% reduction in waste disposal to landfill in the Shire by the year 2000, the Council is active in encouraging recycling, cleaner production and the composting of green waste.

**Waste Disposal**

**Solids (Unrecyclable)**

Solid domestic waste is collected in two, 240 litre plastic "wheelie" bins, 1 for general refuse and the other for recyclables. The general refuse eventually finds its way to the Shire's landfill site at Noosaville, which has at least 60 years of service life left.

Noosaville landfill is the only landfill in the Shire and is used to bury non-recyclables. It incorporates both stormwater and leachate management systems in line with best environmental practice. In addition, underground bores upstream and downstream of the site are used to monitor underground water quality to minimise the possibility of contamination. Up and downstream surface waters are also regularly monitored for signs of pollution. The tonnage of waste that enters the landfill site is monitored via a weighbridge at the transfer station attached to the landfill, and records are kept.

Approximately 46,000 tonnes of waste is buried in Council's land fill annually (Barnes pers.comm) . This is equivalent to 1.266 tonnes of waste generated per head of resident population (excludes visitors).

**The Remediation of Old Landfills in Noosa – Case Study**

Council has undertaken remediation of contaminated sites within the Noosa Shire, such as old landfill sites. A recent example is the remediation of the old landfill at Pomona which has been replaced with a modern Waste Transfer Station.

The procedure adopted for remediation of the old landfill site at Pomona and in other areas involved the following actions:

- Assessment of the old site by Environmental Engineers to determine the measures required to ensure that the contaminated land is maintained environmentally secure whilst decomposition of old waste occurs.
- Development of a closure plan for the old landfill involving construction works to ensure any pollutants do not escape from the site.

The engineered remediation process for the contaminated land involves the following works:

- Re-contouring the surface of the old landfill to a gentle dome shape and covering the surface of the old landfill with a thick layer of compacted clay. This prevents rainwater from entering into the buried waste and producing dirty water (leachate).
- Construction of wide shallow storm water drains around the perimeter of the old landfill that take the rainwater which falls on the site to sedimentation ponds in order to remove any silt.
- Top dressing over the top of the clay capping with a blend of sewage sludge and green waste mulch to provide good topsoil for grass or plants to be grown on.
- Seeding of the site with selected grasses to prevent any future erosion of the site and assist the remediation process.

- Installation of in-ground water monitoring bores, which are used to monitor underground water both upstream and downstream from the old landfill sites to ensure no contaminants are escaping.
- Implementation of a water sampling and monitoring program of the site with ongoing monitoring continuing for at least thirty years.

Many remediated old landfill sites may be used in the future for passive recreation purposes after such time as monitoring provides sufficient information to ensure that the land is safe and secure for such uses.

**Recyclables (Solid, Liquid and Gas)**

Noosa Shire has 5 waste transfer and recycling centres. There are three major ones located at Cooroy, Pomona and Eumundi Road, Noosaville and two minor ones at Northshore and Kin Kin.

"Co-mingled" (unsorted) recyclables are only collected at the minor waste transfer stations, whilst green waste, tyres, concrete, cardboard, metal (car bodies, fridges, stoves and batteries etc), co-mingled recyclables, chemicals, gases and oil (sump oil etc) are collected at major transfer stations. Recyclables are also collected by a number of schools and community groups (eg scouts) in the Shire. Commercial companies collect recyclables such as tyres, photographic waste, liquids, metal, cooking oil and solvents direct from businesses.

Noosa Council has a contract with Cleanaway to recycle white goods and car bodies.

Noosa Council also has a contract with Queensland Paper Recyclers to recycle paper within Council offices. Recycling bins are also provided on every floor for tins, plastics etc. Where possible Council officers photocopy on both sides of paper.

The Council displays a comprehensive list of the commercial and community groups which collect or accept recyclables on its web page and brochures are available direct from Council.

Re-useable goods are recovered at the Noosaville site to be cleared, repaired, renovated or recreated.

**Brite Side Industries Case Study**

Brite Side Industries is an innovative recycling project, which was funded by the State Government's Community Jobs Program. A partnership between Noosa Council and Noosa Community Training Centre Inc, it is based at Eumundi Road Refuse Station, Noosaville. Its 11 full time employees assist customers to unload their reusable resources from their vehicles, then clean, repair, renovate or recreate them into saleable items. Some of the items "recreated" include outdoor and indoor furniture, clocks and even butterfly houses. They will even custom make items as required. The long term aim of the project is to be self sustaining.

The Council encourages residents to compost their greenwaste (kitchen scraps, lawn clippings etc) through public education (advertising, brochures) and by providing compost bins at reduced costs (subsidised by Noosa Council). These are purchased by the Council for distribution through local nurseries. Over the past 18 months 176 compost bins have been purchased by residents (Mrozowski pers comm.).

Tip fees are charged for solid waste and tyres, but not for recyclables, green waste (to a limit) and clean soil, which is a further incentive to encourage recycling. Noosa Council is also trying to educate residents and builders to segregate the materials they bring to the tip and charge more for unsegregated waste.

Waste oil is treated then used as furnace oil. Grease trap waste is used in a composting process to produce soil conditioners. Some fats from grease trap waste are used to produce tallow.

Kerbside collection of recyclables commenced on 1 December 1994 within Noosa Shire. Table 8.1 shows the percentage of households in the Shire with kerbside collection of recyclables, the total weight of recyclables collected per annum, the average weight of recyclables for all households serviced, and the average weight of recyclables per household participating for the period 1995 – 1998 inclusive.

*Table 8.1 Kerbside Collection of Recyclables*

| Year | % of households participating | Total weight of recyclables collected (kg) | Average weight of recyclables/ household serviced (kg) | Average weight of recyclables/household participating in recycling (kg) |
|---|---|---|---|---|
| 1995 | 43.9% | 923,868 | 3.58 | 8.09 |
| 1996 | 46.5% | 1,121,856 | 4.17 | 8.90 |
| 1997 | 47.9% | 1,226,000 | 4.13 | 8.70 |
| 1998 | 42.6% | 1,332,510 | 4.13 | 9.67 |
| **Overall Average** | **45.2%** | **1,151,059** | **4.00** | **8.84** |

The average participation rate for the period 1995 – 1998 was 45.2% of the households in Noosa Shire. The total weight of recyclables collected has risen steadily and averaged approximately 1,151 tonnes per annum. An average of 4.00kg of recyclables were collected fortnightly for each participating household.

Council is currently stockpiling concrete in preparation for it being crushed at a later date for use as road base.

**Sewerage**

***Indicator: Percentage of biosolids recycled per annum.***

Sewerage flow in Noosa Shire averages 3643 ML per annum producing 5680 wet tonnes (785 dry tonnes) of biosolids. Noosa Council has entered into an agreement to recycle one hundred percent of the biosolids onto Noosa Springs Golf Course. Council is also undertaking trials to combine the sewage sludge with green waste and soil to develop soil conditioners high in plant nutrients. This will be applied to old landfill sites to promote plant growth.

**Domestic Sewerage Plants (including Septic Tanks)**

***Indicator: Number of composting toilets***

There are approximately 450 domestic sewerage plants in Noosa Shire (Steel pers. comm.). These are supposed to be serviced quarterly by private contractors, but many owners have difficulty in complying with this requirement. Testing of these units has revealed that 30-40% fail to comply with the effluent quality specified by the manufacturers. Where soil quality is poor little absorption of effluent is occurring. While in clay soils there is little chance of the effluent entering the groundwater, surface runoff may pollute streams. There is no groundwater testing currently occurring to monitor the situation.

Council does not have a register of septic tanks or compost toilets. Based on a proposed rural garbage service there are approximately 4,500 septic tanks and 100 (estimate only) compost toilets within the Shire.

Domestic sewerage plants are having a growing environmental impact so care needs to be taken where they are placed. Septic tanks generate a high level of complaints so consideration is being given to regulating their use through a licensing system.

Discharge of sewerage directly into Noosa River from houseboats is a problem as there are still a number of older boats without holding tanks. The problem is addressed to a limited extent in the Noosa River Catchment Strategy (Draft, NRCCC, undated) and draft Waterway Transport Management Plan.

**Cleaner Production Program**

Noosa Council is working with the local industrial and the commercial sector to encourage cleaner production to minimise waste and reduction in energy consumption.

**Stormwater**

Noosa Council requires the installation of bin wash facilities (for the washing out of refuse bins) in commercial premises and in unit developments with four or more units. These discharge the waste water generated into the sewerage system. Council also has a program to stencil stormwater inlets to encourage the public not to dispose of waste into the stormwater system and ultimately into the Shire's waterways. Following the introduction of the *Environmental Protection Act* 1994, monitoring of outlets from the industrial area to Eenie Creek and Lake Doonella indicate a dramatic improvement in on site environmental practices.

**Domestic Hazardous Waste**

Domestic hazardous waste is collected at the major Waste Transfer Stations and the landfill. No fees are charged for their disposal.

**Sharps Waste**

Over the past 12 months Council has been installing "sharps" containers, for the disposal of injecting needles, in the seven most used public toilets in Noosa Shire.

**Environmental Monitoring and Licensing**

***Indicator: Number of licensed environmentally relevant activities***

Following the introduction of the *Environmental Protection Act* 1994 and the Environmental Protection Regulation by the Queensland Government, local authorities are required to license environmentally relevant activities (ERAs) by private industry, such as concrete batching plants, motor vehicle workshop etc. Council is also required to licence their own ERAs, including waste processing facilities, water and sewage treatment plants, quarries, workshops and dredging.

In response to this Noosa Council introduced an incentive licensing scheme for industry, which rewards high environmental performance with lower licensing fees. Council is implementing an Integrated Environmental Management System (IEMS) for its internal operations which covers all of Council's ERAs. The Council intends to apply to the Environmental Protection Agency for a single licence to cover all of Council's ERAs. In addition, relevant Council officers have been trained to conduct routine environmental audits of Council facilities and to prevent environmental incidents or to respond to these if they occur.

Council has licensed 140 ERAs to date.

### 8.2.4 Noise

***Indicator: Number of Noise Complaints***

Noise related to developments and commercial operations is covered under the Environmental Protection (Noise) Policy 1997 (EPP Noise). In response, Council's environmental health officers undertook specific training in regard to the EPP Noise.

There were noise complaints covering a range of sources during the period 1 July 1999 and 1 June 2000. They are shown in Table 8.2:

***Table 8.2 Noise Complaints***

| Source | No of Complaints |
|---|---|
| Dogs barking or howling | 346 |
| Noise (unspecified) | 70 |
| **Total** | **416** |

Dogs barking and howling are the greatest source of noise nuisance within the Shire.

Major roads are often a significant source of noise pollution for local residents. The Department of Main Roads has responded in recent years by installing noise barriers between major roads and adjoining residents. In Noosa Shire because there are no major highways near to settled areas, the extent of noise barriers is limited.

**Traffic**

***Indicator: Change in average daily traffic counts at selected locations during peak Christmas period***

The Christmas period between 15 December and 15 January is one of the busiest times for road traffic within Noosa Shire. Generally, all traffic counts have shown an increase between 1995 and 2000. A summary of traffic count information for the Christmas period at three key locations within Shire are shown in Table 8.3 below.

*Table 8.3 Christmas Period Average Daily Traffic Counts*

| Location | 2000 | Change Between 1995 and 2000 |
|---|---|---|
| David Low Way South of Noosa | 24,768 | 2,582 (increase) |
| Eumundi Noosa Road South of Beckmans Road | 15,297 | 3,552 (increase) |
| Cooroy-Noosa Road at Gyndier Drive | 7,896 | 472 (increase) |

## 8.3 SUMMARY REPORT CARD AND INDICATORS

### 8.3.1 Summary Report Card

| OVERALL HUMAN SETTLEMENTS REPORT CARD | | | |
|---|---|---|---|
| **Pressure Assessment** | **Reasons** | **Response Assessment** | **Reasons** |
| **C** | • High growth in population, which will increase pressure on the environment.<br>• Increasing demand for material goods, larger private vehicles, houses etc by Australian population as a whole will increase pressure on environment through resource use and output of pollution, waste etc.<br>• Number of licensed environmentally relevant activities. | **Low** | • Council has identified a population ceiling for Noosa Shire.<br>• Low percentage of Shire covered by urban development.<br>• Innovative waste management programs in place targeting recovery and reuse of recyclables and use of sewage sludge.<br>• Participating in Water Wise program and has introduced other initiatives to reduce water usage.<br>• Commitment to the monitoring of ERAs both within Council and in Noosa Shire generally. |
| Key pressures which are the targets for action are:<br>** Increase in waste generation and water usage<br>*** Unsustainable development and population growth<br>*** Decreasing water quality and waterways as a result of development<br>** Increase in noise pollution<br>Level of Priority and Urgency<br>*** highest ** * lowest | | | |

**Implications:**

If the existing and future development within Noosa Shire is not managed in a sustainable manner the high environmental values of the Shire will decrease. The understanding of the interactions between human settlements and the components of the environment is critical in the development of sustainable solutions.

### 8.3.2 Summary of Human Settlement Indicators

| Indicator | Indicator Type *Pressure, Condition, Response* | Information Status |
|---|---|---|
| **Population and Development Footprint** | C | 36,336 (1996) |
| ☐ Size of population in Noosa Shire | | |
| ☐ Area (%) of Noosa Shire covered by urban development | C | 2,482ha (2.9%) |
| ☐ Amount of water used per head of population | C | approximately 148 KL/person (1999/00)[1] |
| **Waste** | | |
| ☐ Amount of waste generated per head of population per annum | P | 1.266 tonnes per head of popn |
| ☐ Tonnage of waste to landfill | C | 46,000 tonnes buried to landfill |
| ☐ Number of composting bins distributed | R | Average of 45.2% participating (1995-98) |
| ☐ Rates of recycling | | |
| **Sewage** | | |
| ☐ Number of domestic wastewater treatment plants | R | 450 (approx) |
| ☐ Number of compost toilets | R | 100 (estimate) |
| ☐ Number of septic tanks | R | 4,000 |
| ☐ Percentage of biosolids recycled per annum | R | 100% |
| **Compliance and Regulations** | | |
| ☐ Number of licensed ERAs | P | 140 |
| ☐ Number of noise complaints | P | 416 (1999/00) |
| **Traffic** | | |
| Change in average daily traffic counts over Christmas period: | P | |
| ☐ David Low Way | | +2,582 (1995-2000) |
| ☐ Eumundi-Noosa Road | | +3553 (1995-2000) |
| ☐ Cooroy-Noosa Road | | +472 (1995-2000) |

Table Notes:
1. Calculated by dividing the total water used by the estimated Shire population in 2000 of 42,420. Part of Noosa is not on reticulated water.

## 8.4 Toward ESD – Action Plan for Human Settlements

To maintain the environmental and visual qualities of Noosa Shire human settlements and the waste products they produce need to be carefully managed, and the innovative and best practice waste management and other programs being undertaken in the Shire need to be continued, enhanced and supplemented.

These issues also need to be addressed by each individual citizen in the products they buy and the actions they take.

## 8.5 Action Plan

| Action | Responsibility |
|---|---|
| Monitor groundwater for contamination by septic tanks and take remedial action as required. | NSC |
| Record the number of odour complaints from Council's sewerage treatment plant. | NSC |
| Achieve the goal of 50% reduction of waste disposal to landfill by end 2001. | NSC |
| Establish a register for septic tanks and compost toilets within the Shire. | NSC |