

The State of the Shire- Year 2000 Benchmark

Chapter 8 - Council Activities Technical Paper

April 2001

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CHAPTER 8 – COUNCIL ACTIVITIES

8.1. Introduction

This paper summarises the programs currently operated by Council and provides the public with a record of Council activities in complying with environmental licence requirements. In the year 2000, Johnstone Shire Council was operating a number of conservation initiatives including voluntary conservation agreements/covenants, energy auditing, land for wildlife, and has plans to implement a revolving fund program in the Shire as soon as funding is secured. These programs aim to conserve valuable habitat in the Shire, with efforts to date having been recognised through receipt of government awards.

Another innovation by the Council has been the option to combine all licensed activities under the one banner, with the result being the Council’s Integrated Environmental Management System (IEMS). Johnstone Shire Council was one of the first licensed operators to implement such a program, with Council’s waste facilities, sewerage and water treatment plants, motor vehicle workshop, septic systems, Greens borrow pit, animal pound and refuge, and Innisfail boat harbour. This management systems imposes strict monitoring and reporting requirements on the Council, with the results of these presented in this paper.

Council is also operating a Landfill Remediation Assessment Program for former waste management sites that may still pose a risk to the surrounding environment. This program has assessed the condition of former waste management sites and evaluated the threat to the surrounding environment, whilst recommending remediation measures to maintain or improve the condition of the sites.

Also addressed in this paper is the issue of trade waste. Trade waste is the approved discharge of liquids other than domestic sewerage into the sewerage system. It is Council’s responsibility to licence premises to discharge wastes and ensure that those wastes are within licence limits through measures such as the installation of pre-treatment devices, thereby reducing the threat to the environment and sewerage staff.

Finally, this paper is also addressing issues arising from the operation of Council’s Technical Services Department. The Technical Services Department is responsible for public infrastructure in the Shire including engineering services, water and sewerage, roads and facilities maintenance. The activities of Technical Services impact on the everyday lives of residents, thus, residents want to know how of their impact. This paper examines the performance of technical services in addressing the concerns of residents.

8.2. Shire Programs

8.2.1. Conservation Initiatives

8.2.1.1. Voluntary Conservation Agreements/Covenants¹.

In 1997 Council received Natural Heritage Trust funding for a project entitled “Implementing Rate Deferrals for Habitat Conservation”. This project funded the employment of a full time officer for 18 months to establish conservation areas on private land within the Shire of Johnstone.

The project involved providing discounts on the general property rate for landholders who enter into a legal agreement with council to protect the habitat on their land. Discounts offered range between 40 and 60% of the general rate for that portion of the property dedicated to conservation with the opportunity to increase this discount to between 60 and 100% in cases of exceptional habitat quality.

¹ Gordon, pers. comm, 2000
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HABITAT CLASSIFICATION COMPONENT OF GENERAL RATE	% DEFERRAL ON ELIGIBLE
Critical Habitat	60 **
Important Habitat	55
Important Corridor/linkage	50
Potentially Critical/Important	45
Natural Habitat/Corridor	40

** This may be increased in particular circumstances with Council Approval.
Table 8.1 Habitat Classifications and associated discounts

In the three years since the project began Council has successfully established 43 conservation agreements covering 1294 hectares (ha) and has received acclaim from both interstate and overseas for its achievements in this area. The current costs of these agreements are \$13,305.25 per rating period.

In March 1999 the State parliament passed legislation that allowed conservation covenants to be registered on title and Council’s program has now adopted this provision and converted the standard agreement to a standard covenant. The only difference between agreements and covenants is that covenants are registered on title through the Department of Natural Resources.

The major features of the agreement and covenant programs are:

- Agreements are flexible and can be tailor made to meet the needs of each individual landowner and his/her property.
- Landowners can still sustainably harvest forest products if so desired.
- Council staff provide technical advice on land management issues free of charge as part of the agreement.
- Deferrals and covenants run indefinitely unless the landowner wishes to cancel or amend the agreement.
- The area of the property to be conserved is nominated by the landowner and the higher the proportion of the property the higher the discount in dollar terms.

Cassowary habitat has been targeted as the priority for establishment of agreements but the program is open to any landowner within Johnstone Shire who wishes to preserve habitat on their land. The number of agreements in particular habitat areas is as follows.

Habitat Classification	%Deferral Component of General Rate	No. of Agreements	Area Covered by Agreements
Critical Habitat	60**	11	24.9ha
Critical Habitat (exceptional quality)		3	80.6ha
Important Habitat	55	4	92.9ha
Important Corridor/Linkage	50	22	1066.1ha
Potentially Critical/Important	45		
Natural Habitat/Corridor	40	3	29.5ha

Table 8.2 – Summary of Voluntary Conservation Agreement/Covenant program in Johnstone Shire

Council has now adopted this program on a permanent basis and has dedicated resources in the form of discounts and half of one full time position to continue establishing covenants due to the high level of interest shown by landholders within the Shire.

8.2.1.2. *Bonus Development Provisions*

An environmental audit of the Shire was carried out in preparation for the current Johnstone Planning Scheme, which was gazetted in 1997. A significant initiative of this planning scheme is the recognition of valuable remnant habitat, particularly in relation to cassowary preservation, and the inclusion of most land parcels which have significant remnant habitat on them, in the rural conservation zone. The agricultural use rights in this zone are the same as in the rural zone but additional (bonus) development rights are included in the zoning. The goal is to allow appropriate development to occur, which is compatible with the conservation value of the land, in exchange for the developer’s agreement to include the undeveloped balance area having habitat significant,

into the conservation zone. Once the land is included in the conservation zone it is protected from clearing and further development. The concept of bonus rights and continuance of existing agricultural use rights has resulted in high levels of acceptance of the rural conservation zoning by rural landholders in the Shire. There have been 17 fully implemented development approvals (many more applications and approvals not yet implemented) involving bonus rights and the approvals to the end of 2000 have resulted in protection of approximately 459 hectares.

8.2.1.3. *Revolving Funds*

The Johnstone Bush for Wildlife Revolving Fund is a joint initiative, being established with the assistance of Federal Government through the Bushcare Program under the Natural Heritage Trust. The fund aims to target land with significant wildlife and habitat conservation values, including native vegetation of national environmental significance, areas containing nationally endangered or threatened ecological communities or species, and wetlands of international significance. The main objective of the project is to ensure that land containing special habitat features is purchased, the conservation values protected on the land, and the land is then resold to buyers committed to management for conservation purposes.

Specifically, the fund aims to voluntarily acquire critical areas of habitat for the purpose of protection of that habitat and on-sale to conservation minded landholders after registering a conservation covenant over the land. The funds paid for the sale of the land will be reinvested back into the fund for future acquisition of land for habitat protection.

This initiative is subject to a funding application. However, once implemented it hopes to:

Area Protected

- Protect 50 hectares annually

Portfolio Management Efficiency

- 3 properties purchased and 3 properties sold annually
- Properties to be held for a maximum of 6 months
- Maintain the capital fund for investment

Fund Communication – the fund aims to meet the following targets annually;

- 70 enquiries from the public about purchase or sale of land
- 30 enquiries from other local governments interested in setting up similar programs
- 20 enquiries from conservation groups and persons regarding the details of the fund
- Attendance at 5 promotional opportunities during the year (eg Show, World Environment Day, National Tree Day, etc.)

8.2.1.4. *Land for Wildlife*²

Land for Wildlife is a voluntary non-binding conservation program that is aimed at recognising and rewarding those landowners that wish to manage their land for conservation as well as existing land uses.

Any landowner wishing to join the program submits an application form and is then visited by Land for Wildlife Liaison Officers who conduct a property inspection and explain the program in more detail. The Liaison officers then make a recommendation to either:

- Register the property as a land for Wildlife property.
- Register the property as working towards registration.
- Decline the property as a land for wildlife property.

The majority of properties assessed by Officers are recommended for registration. Those that are not recommended do not possess viable habitat areas (restored or retained), have a large weed infestation, or have restored habitat that is of poor quality.

Any property recommended as working towards registration may achieve registration through such methods as (but not limited to):

- Restoring quality habitat.
- Conducting weed eradication or control.
- Conducting feral animal eradication or control.

² Gordon, pers. comm. 2000
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- Conducting erosion control.

All landowners that achieve registration are issued with free sign (or signs depending on the size of the property), are entered on the land for wildlife register, receive a free quarterly newsletter and have access to technical advice on land management issues free of charge.

This program has achieved major success since it was first developed in Victoria in 1981. In 1997 the program was expanded to Southeast Queensland (733 properties covering 11 000 ha) and north Queensland in early 2000. Currently Council has 2 properties admitted to the program, covering a total of 46.25 ha.

In the year 2000, there were no landholders signed up for both the Land for Wildlife Agreement and a Voluntary Conservation Covenant, however, there is no reason why this cannot happen.

8.2.1.5. Integrated Environmental Management System (IEMS)

Council operates a number of Environmentally Relevant Activities (ERA's) including its

- Landfill
- Sewage and water treatment plants
- Motor vehicle workshop
- Animal pound and refuge (refer to Section 8.3 The Shire Council's Facilities for full list of activities covered by the IEMS).

These activities have the potential to cause environmental harm if not managed properly and are therefore contained in a joint management regime.

In accordance with the Environmental Protection Act and the Environmental Protection Regulation, these ERA's are undertaken subject to the conditions of environmental authorities issued by Queensland's Environmental Protection Agency (EPA). The license conditions include a requirement for the development and implementation of an Integrated Environmental Management System (IEMS).

The IEMS brings together under the one system, all of the components necessary to ensure a co-ordinated and consistent approach throughout Council, to achieving a continual improvement in its environmental performance. These components include:

- Monitoring programs
- Site management plans
- Recording and reporting protocols
- Inspections, audits and reviews
- Training
- Continual Improvement
- Waste prevention and management
- Emergency response

Some of these are specific to each ERA and are contained within a series of Site Based Management Plans.

Council has developed and adopted an Environmental Policy, which is the foundation of this IEMS. It reflects Council's commitment to the continual enhancement of its environmental performance, and demands no less from each of its employees and elected representatives.

Council has appointed a Co-ordinator, for the development and implementation of the IEMS, its Environmental Resource Officer, who will draw on the assistance of the EPA, and the internal resources of Council, to achieve the objectives of the IEMS.

The legal concept of "Due Diligence" places personal responsibility for environmental protection on each of Council's employees and the IEMS provides a level of protection against personal liability, provided that the individual has conscientiously adhered to its requirements.

Fundamental to the IEMS is the concept of continual improvement, which is interlinked with the aspects of staff training and system auditing. Each employee has a responsibility to facilitate and contribute to these processes.

The degree of success achieved in the implementation of the IEMS will be scrutinised by the EPA and by the community, and the opportunity exists for Johnstone Shire Council to provide the lead in environmental stewardship to the rest of the community.

Quarterly reports of compliance for all Council licensed facilities are produced as part of IEMS requirements. Results for the year 2000 are included below.

8.3. The Shire Council's Facilities

8.3.1. Innisfail Sewage Treatment Plant and associated Pump Stations

The facility is located on the western bank of Ninds Creek about 4.5 km east of the centre of Innisfail, and about 2.7 km upstream of the junction of Ninds Creek with the Johnstone River.

Events of Non-Compliance in the year 2000 included:

- 35 pump station overflows in the first half of the year, 25 of which were infiltration overflows and the remaining 10 other types of overflows. These were believed to be attributed to high rainfall in February. 6 pump station overflows in the final quarter of the year, 4 of which were infiltration and two other types of overflows.
- Exceedance of the short term limit from Biological Oxygen Demand in August 2000. In addition, the discharge limit for Biological Oxygen Demand was exceeded on 19/7/00 and 2/8/00. The maximum licence limit for Biological Oxygen Demand is specified at 25mg/L, with readings of 37 and 32 mg/L recorded respectively. The cause of this exceedance was unspecified.

Site Improvements for Environmental Compliance identified in 2000 included:

- Construction of a new sludge storage area for control of the leachate.
- Adjustment of the hypo chloride storage and pumping facility which will allow liquid to drain back into the bunded area in the case of an accidental break.
- Cleaning of the contact tank to control the influence on BOD, DO and Faecal Coliform readings.
- Trade waste septage receipt point completed and operational

Other issues in 2000 included:

- A spill at the plant on 13/10/2000 caused by the top of a non return valve failing and resulting in a direct overflow to Ninds Creek for approximately 4 hours. Emergency bunding was installed to prevent the overflow and other non return valves closed off where possible.
- 1997 and 1998 sludge was analysed and met criteria for unrestricted use.
- Staff have applied for an amendment of the licence to include new sewer overflow points at Riley Street and Bliss Street. It is anticipated that this overflow will prevent sewage influx into houses during minor flooding.
- Gross Solids Interceptor Trap – a new method was being trialed at Riley Street Overflow to see if the facility can be improved.

Nutrient Outputs from the Innisfail STP

A report being compiled by Heather Hunter of DNR suggests that the STP is one source of N and P discharged to the Johnstone River Estuary from Ninds Creek. The STP services a population of around 9000 people in the Innisfail area.

There were sufficient effluent monitoring data available to enable estimates to be made of annual loads of N and P discharged from the STP. However, rough estimates were calculated using per capita loadings in sewage effluent of 12 g/day of N and 2.5g/day of P (Gutteridge Haskins and Davey 1992). Based on these loading rates, annual STP discharges from a population of 9000 were estimated as 39 tonnes of N and 8 tonnes of P.

These loads are equivalent to <2.5% of the estimated loads of N and P discharged annually from the catchment (table 3), and are thus relatively minor at a catchment scale, compared with non-point sources of N and P. Nevertheless, the STP discharge is likely to be a more significant nutrient source during dry weather conditions, when stream flows are relatively low. Possible localised impacts of the STP discharge are indicated by the elevated N concentrations typically found at one sampling site.

8.3.2. Septic Systems (Etty Bay, Mission Beach)

As at 30/12/00, improvements for the Mission Beach public and caravan park ablution block were pending a decision about the Mission Beach Sewage System.

Etty Bay ablution block has only recently been licensed. A site base management plan is yet to be established for the site, and as such, any site improvements for environmental compliance are unknown.

Issues for the year 2000 include a mechanical and electrical failure occurred causing the overflow of sewage into the stormwater drain and onto the beach. This fault has since been rectified and regular inspections reorganised.

8.3.3. JSC Motor Vehicle Workshop

Council's Motor Vehicle Workshop is a facility operated by the Shire, for the purposes of maintenance and repairs to Council vehicles and mechanical equipment. The workshop is located in Clare St Innisfail, in a predominantly light commercial / residential area. It is situated on the northern bank of Bamboo Creek, and within 200 m of the South Johnstone River.

Site improvements for Environmental Compliance identified during 2000 included:

- Installation of a control system for handling waste. This reduced the manual handling of waste and therefore reduces the chance of accidental spillage.
- Filling of internal stormwater drains to prevent contamination inside the workshop to external stormwater.
- Completion of monthly inspection checklists.

Issues during 2000 included:

- A spill at the washdown bay resulting in kerosene and tar being spilt onto the ground beside the facility. This was caused by insufficient knowledge on how to maintain the equipment and a frog in the wrong place at the wrong time. Contaminated material was removed and clean material put back in its place.
- Training of staff on maintaining oil separators. A maintenance service was conducted on both oil separators and maintenance service of the constant monitoring system.
- New oil storage and distribution system installed.

8.3.4. Innisfail Pound and Refuge

Council's Animal Pound and Refuge is a small facility operated by Johnstone Shire, for the purposes of housing stray or nuisance domestic dogs.

The Animal Pound and Refuge is located in Downing St, Innisfail, in a predominantly rural area. It is situated on the southern side of Innisfail within 400 m of Bamboo Creek.

Site Improvements for Environmental Compliance suggested in 2000 were:

- Installation of improved drainage from the pens to the septic tank. This has prevented concentrated contamination from the pens going directly to the soil surrounding the pens.
- Installation of an additional septic tank and absorption trenches
- Drainage of stage 3 pens to septic

8.3.5. Greens Borrow Pit

This facility was newly licensed in 2000. In December 2000, planning and completion of sediment ponds and other effective sediment control measures on site.

8.3.6. Innisfail Boat Harbour

This facility was newly licensed in 2000. Items to be addressed include waste oil storage, spill response kits and improved signage. These items are expected to be completed by June 2001.

8.3.7. Innisfail Water Treatment Plant

The water treatment plant is located on the Palmerston Highway about 5 km west of Innisfail. The predominant land-use in the area surrounding the WTP is sugar cane, cattle and residential.

Exceedances of licence limits detected during monitoring of the effluent and ambient waters in the year 2000 included:

- Exceedance of recommended aluminium levels on 29/3/00. The source of the aluminium was from the plant processes, with it anticipated that when the full settling process was carried out that toxicity levels would be reduced. These levels were again within licence limits in the following quarter.

Other issues in 2000 included:

- The chemical delivery point requiring suitable bunding in the truck standing area to prevent runoff should accidental spillage occur and result in direct release to the environment.
- Diversion of water from a non-licensed discharge point to the effluent ponds.

Site improvements for environmental compliance suggested in 2000 included:

- Piping of the settling ponds to run consecutively rather than being used in isolation. This will allow the alum to better settle out before being discharged to the environment and hopefully reduce total aluminium levels.
- Adjustment of the hypo chloride storage and pumping to drain back into the bunded area in emergency situations rather than going to the environment.
- Progressive cleaning out of the settling ponds so they can be used in succession to enable a better polishing process of the effluent.

8.4. Mission Beach Sewerage Engineering and Environment Studies and Community Consultation

Sinclair Knight Merz, in association with Jelliffe Environmental, was engaged in May 1999 to investigate sewerage options for the Mission Beach area. The objectives of the investigation were to:

- Determine whether there were any deficiencies with existing on-site systems and whether they presented risks to public health or the environment.
- Examine alternative technologies and develop upgrading strategies for on-site systems.
- Examine the provision of a centralised sewerage scheme and present alternative strategies for such a scheme.
- Review sewerage charges for similar communities and show the cost implications for the alternative strategies investigated and for various rating structures.

Study Conclusions

Based on the outcomes of environmental and engineering studies and feedback from the community consultation program, future options for sewage treatment and disposal are summarised under the following headings:

- ‘Do-nothing’
- Upgrade existing on-site systems
- Centralised sewerage system.

The preferred option is a centralised sewerage system. Centralised sewerage (i.e. with vacuum/gravity collection, two tertiary sewage treatment plants and reuse / disposal by banana irrigation and / or groundwater injection) is the preferred option because:

- It eliminates public health risk
- It improves protection of the unique environmental values of the area
- It removes public health and environmental concerns associated with wet season “water logging” of local soils
- It has community support.

‘Do-nothing’

This option involves the continued use of existing on-site sewerage systems.

- Bacteria and nutrient limits currently exceed the environmental and health criteria in some areas. When vacant lots are developed most neighbourhoods will not comply with environmental criteria.

- On-site disposal is not suitable for many sites due to their limited area, and water logging of soils.
- Even when septic systems are operating effectively they do not remove nutrients or bacteria. As a result approximately 22,800 kg/year nitrogen, 4,600 kg/year phosphorus and substantial bacterial loads are being released to the environment.
- The computer modelling predicts that as population grows ammonia concentrations and bacteria levels will exceed guidelines in many neighbourhoods.
- The amount of nutrients released to the environment from the Mission Beach area is not great when compared to the amounts released from all of Queensland. The amounts of nutrients being released to the environment should not be significant enough to impact the Great Barrier Reef, however impacts on the local environment may be considerable.
- The high rainfall and high water table in many parts of the study area hinders the efficient operation of septic systems.

The ‘do-nothing’ option is not recommended.

Upgrade existing on-site systems

This option involves the upgrading of existing on-site systems to include nutrient and bacteria removal mechanisms.

- There are several treatment systems capable of removing nutrients from sewage. For example, the Amended Soil Sand Filter system would substantially reduce the release of nutrients. Nitrogen release would be reduced to approximately 9,000 kg/year and phosphorus to 2,700 kg/year.
- This option removes most bacteria from sewage effluent and thereby reduces potential risks to human health. This option is not suitable for sites that have a high water table or where there is a limited disposal area.
- This option is outside of the normal SCAP funding scope.

The set-up and operational costs for this option are higher than for other options.

Centralised sewerage system

This option involves the construction and operation of two sewage treatment plants and a sewage collection network. The preferred option for effluent disposal is irrigation and groundwater injection, however this disposal method requires further investigation.

- The cost for the least expensive central sewerage system was \$15.2 million (\$13 million without house drains) and \$300,000 per year to operate.
- If SCAP funding of \$10.8 million is provided, the annual rates per dwelling would be \$400.
- If SCAP funding of only \$8.6 million is provided the annual rates per dwelling would be \$400 and the initial cost of installation (household connection) to owners would be approximately \$2,000.
- This option would result in a very high removal of nutrients. Nitrogen in sewage effluent would be approximately 1,000 kg/year and phosphorus 230 kg per year.
- This option would eliminate almost all bacteria from sewerage effluent.

Disposal of effluent using the irrigation and groundwater injection methods need further investigation.

Next Stage

Sinclair Knight Merz recommends the adoption of the following steps in order to progress this project.

- 1) Presentation of study outcomes to Johnstone and Cardwell Shire Councils for consideration. The Councils may, adopt a single strategy or combination of strategies, eg disposal via:
 - Groundwater injection, or
 - Groundwater injection for Cardwell Shire Council and banana irrigation for Johnstone Shire Council.
- 2) Submit this report to the EPA, Department of Natural Resources and Queensland Health for technical review.
- 3) The next step is to secure Small Communities Assistance Program funding.
- 4) Undertake additional investigations as necessary, eg.
 - Hydrogeology / injection trial for the groundwater strategy,
 - Effluent agreements / wet weather release impacts for the banana
 - Irrigation strategy.
- 5) Identify additional land requirements and secure by option.
- 6) Prepare Environmental Impact Study (EIS) and supporting technical reports (as required) and comply with normal procedures to obtain approvals.

- 7) Secure land, effluent supply contracts, etc.
- 8) Commence design and construction phase.

More recently the Johnstone Shire Council has now supported all sewage going to Tully.

8.5. Waste

Site Based Management Plans have been prepared for each of the landfill/transfer station facilities for Stoters Hill, Goondi Bend and Bells Creek. These incorporate a stormwater management plan, leachate management plan, landfill gas management plan, groundwater management plan, site development plan and closure and post closure plan.

The IEMS also requires quarterly monitoring to be undertaken at these existing and former landfill/transfer station sites.

Provisions also exist within the Site Based Management Plans (SBMPs) to establish groundwater, leachate and landfill gas monitoring programs where they are required and do not presently exist.

8.5.1. Stoters Landfill and Transfer Station

Stoters Hill Landfill is now the Johnstone Shire's only operating waste disposal facility for inert and selected dry wastes. The site also accommodates a waste transfer facility for all wastes including some permitted regulated wastes. Such wastes are sorted in the transfer station and transported elsewhere for recycling, if economically viable or for disposal in Townsville. The Stoters Hill facility replaces the landfills at Goondi Bend and Bell's Creek which were closed in June 1999.

The landfill site, which is located on Quarry Road, off the Palmerston Highway and is approximately 6km west of Innisfail. The landfill is situated in an existing hard rock quarry, which will continue to operate in tandem with the landfill. The site is situated in a rural area, surrounded by predominantly agricultural land use, and has been operational since June 1999.

The facility will be tightly controlled, with full-time supervision during operating hours.

Monitoring is now completed on a minimum of a quarterly basis. As seen in the attached map of monitoring sites, surface water and groundwater is monitored before it is influenced by the site (Surface water at sites 3 and 4 and Groundwater at site A). In some circumstances the water quality at these locations had already exceeded the license limits due to conditions above the transfer station and landfill. At times the water quality actually improved as it passed the site.

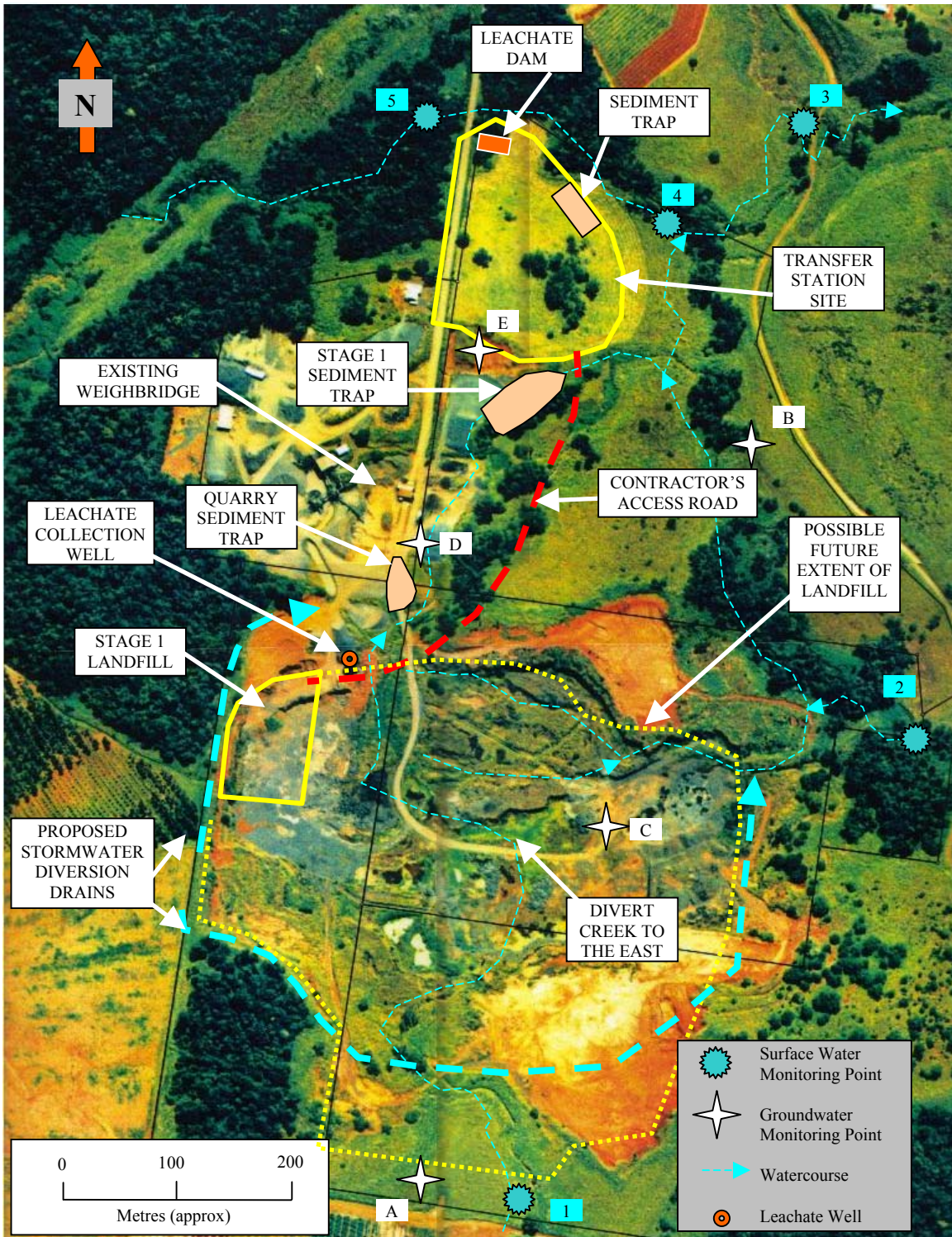


Figure 8.1 Stoters Hill Landfill Monitoring Sites

In December 2000 the level of lead in the groundwater exceeded the licence limit below the site of monitoring point E. The levels of lead in the groundwater increase each year during the summer period even above the site. During the final quarter in 2000, all sites experienced a dramatic increase in the levels of lead and site E tipped the limit by just 0.001 mg/l.

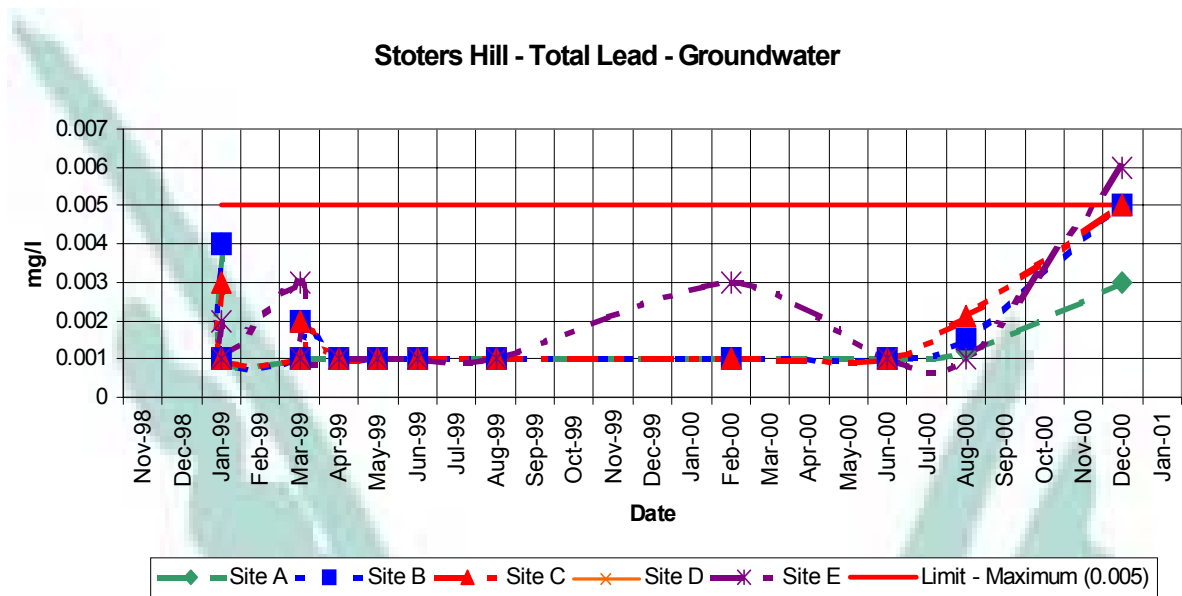


Figure 8.2 Lead in Groundwater at Stoters Hill

The surface waters at Stoters Hill exceeded license limits for lead on one occasion:

- Elevated levels of lead were experienced during the final quarter of 29000 both above and below the site, however there was further elevation of the level of lead as it passed the northern side of the site. The levels of lead experienced were still 10 times below the recommended levels for fresh water systems as listed in the Australian Water Quality Guidelines 1992.

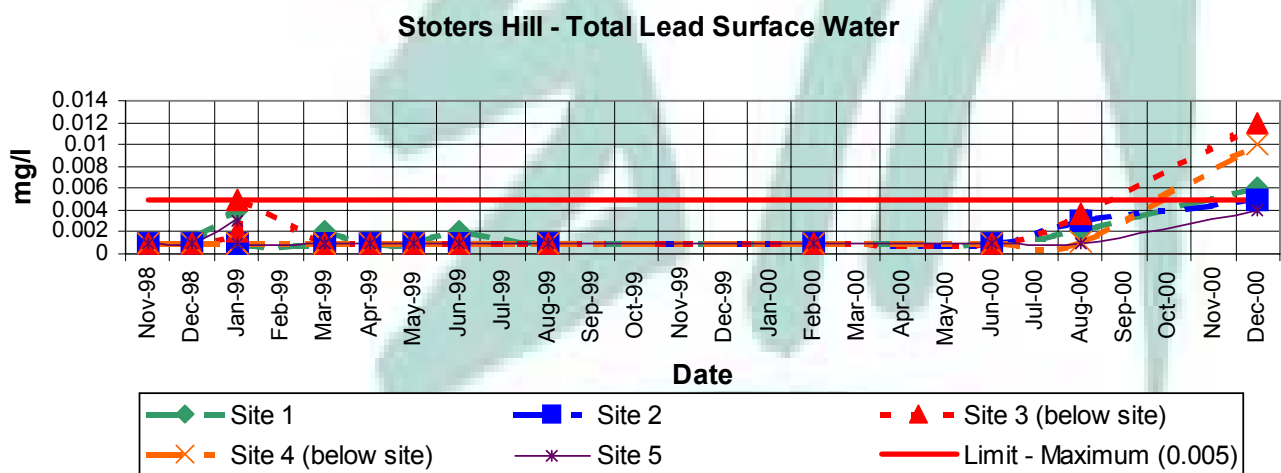


Figure 8.3 Total Lead in Surface Waters at Stoters Hill

Other issues in 2000 included:

- A litter fence was required to prevent wind blown litter in dry times
- Leachate pump had to be changed with the new pump needing to be able to handle sludge
- The bunding around the landfill was disturbed by contractors during this period, with the landfill left unbunded for an unsatisfactory period of time. This has since been reinstated.

Site Improvements for Environmental Compliance identified in 2000 included:

- Repair of leachate pump and installation of a backup pump - completed
- Correction and cleaning of drainage around greenwaste site - completed
- Installation and maintenance of sediment and erosion control measures
- Installation of a litter fence - completed

8.5.2. Bells Creek Landfill and Transfer Station

Bell’s Creek Landfill and Transfer Station is a small facility which services the southern areas of the Shire. It currently accepts domestic and certain regulated wastes to the transfer station and has a holding permit for greenwaste. The landfill was closed in May 1999.

The landfill and transfer station are located adjacent to the Bruce Highway, approximately midway between El Arish and Silkwood, in a predominantly agricultural area and is situated on the southern bank of Bell’s Creek, which drains into South Maria Creek and ultimately to the sea just south of Kurrimine Beach.

The landfill has been progressing from west to east and the active face is currently at a point almost halfway along the length of the site.

The transfer station is located at the western end of the site, and the access to it is constructed partially on the old landfill. All waste accepted at the transfer station will be partially sorted on site and removed to the Stoters Hill Transfer Station for further sorting before ultimate disposal at either the Stoters Landfill (dry waste only) or other waste facilities outside the Shire.

Provision has been made in the past at Bell’s Creek landfill for separate storage of waste drums and recyclables including metals, car batteries, waste oil, green waste, etc. This will continue (temporary storage for collection), at the transfer station and it will be better controlled than pre May 1999 as the site will be manned during operating hours and locked after hours.

Regular monitoring was initiated in May 1999 at this site and is now completed at least quarterly. Graduate bores are yet to be installed at the site however surface monitoring sites can be seen in the map below.

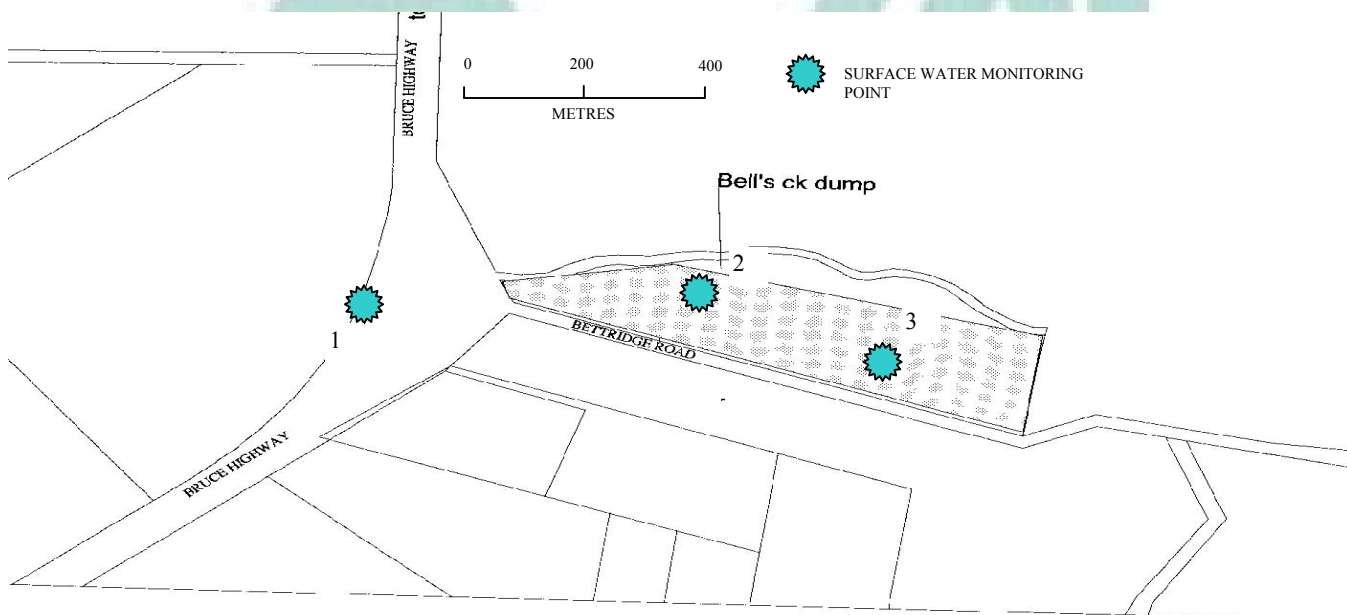


Figure 8.4 Bell’s Creek Landfill & Transfer Station – Surface Water Monitoring Points

The surface waters have never exceeded any specified license limits on the site but the levels of chemical oxygen demand were of concern in August 2000 when it rose from 1mg per litre in the previous sampling to 57mg/l in August. It was thought that the high levels were due to poorly biodegradable compounds in the water such as tomins and lignins

Other issues in the year 2000 included:

- Site works including landfill shaping, drainage and leachate collection are yet to be completed awaiting mulching of greenwaste on site.

8.5.3. Goondi Bend Waste Disposal Facility

Goondi Bend Landfill has been Johnstone Shire’s main waste disposal facility for domestic and certain regulated wastes in recent times. The landfill which is located adjacent to the Bruce Highway on the northern approach into the Town, is situated in close proximity to residential,

commercial and light industrial land use, and has been closed to the general public following the opening of the Stoters Hill facility in June 1999.

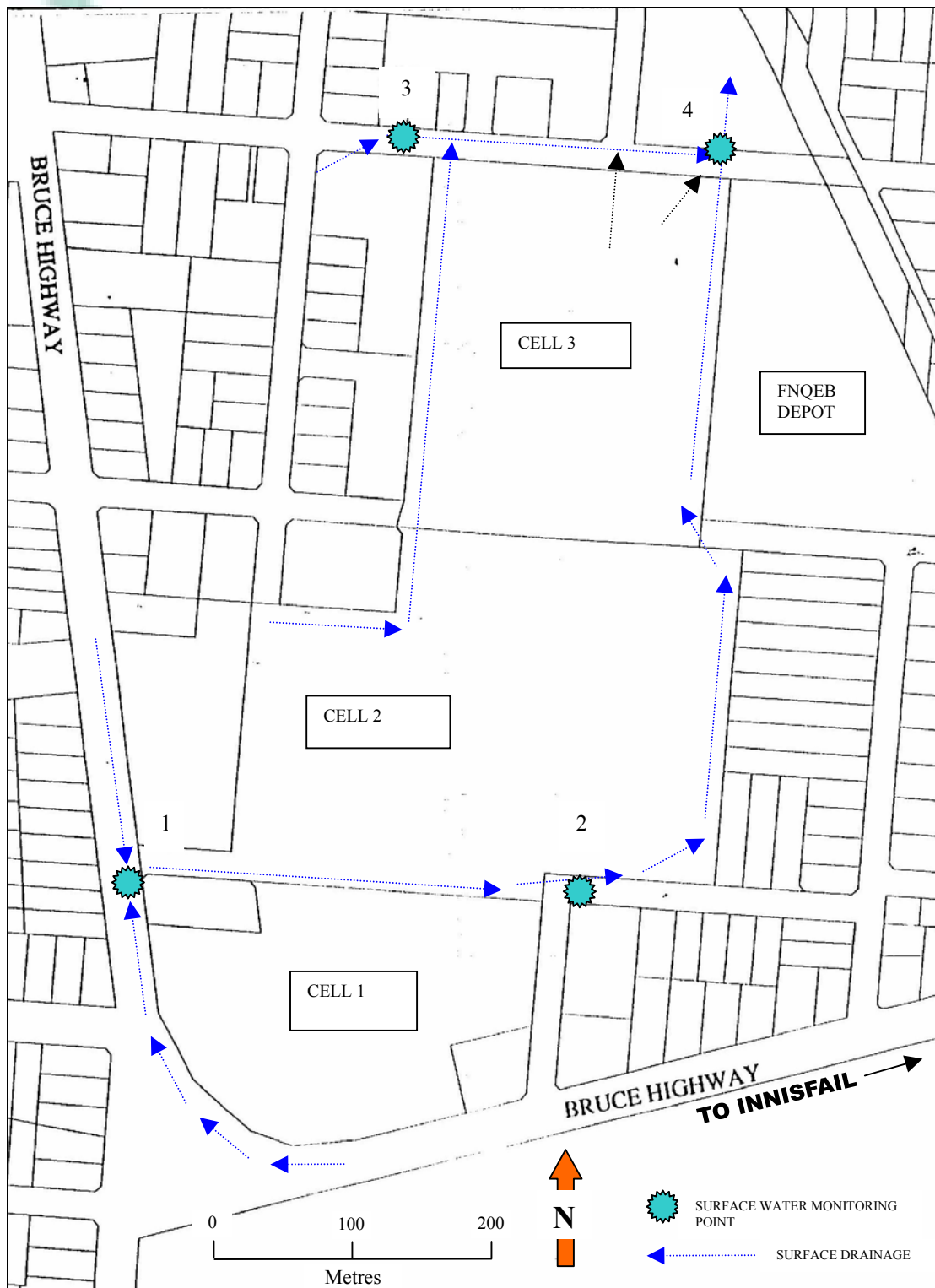


Figure 8.5 Goondi Bend Landfill – Surface Water Monitoring Points

The Goondi Bend facility has been operating for over 20 years and for much of that time has had little supervision and control over waste acceptance criteria. Late in this period site management changed, with a full time presence on site during opening hours.

The previous cells in the southern end of the site having been covered and developed as sporting fields. Only controlled access to the landfill is permitted, with the deposit of inert material to allow the final landform to be achieved. General domestic waste and recyclables are now taken to Stoters Hill Transfer Station.

Incidents of non-compliance in 2000 included:

- A new regular an organised monitoring program commenced on the site in May 1999. Some groundwater bores have been installed on the older stages of the landfill (this information is reported under the Landfill Remediation Assessment Program) however, further monitoring bores are yet to be established. The location of the surface monitoring points can be seen in the map above.
- Surface waters have exceeded licence limits in iron and ammonia. The levels of iron appear to be very cyclic at this stage with high peaks during the dry season each year. The high levels are near where car bodies and drums were located at the landfill, and iron flocs can be seen in the water. There has been no evidence of organochlorine or organophosphate contamination of waters. The level of contamination is associated with the high levels of ammonia as nitrogen which is a major products of landfills and can be an indicator of leachate. The level of ammonia at this point may have also been increased by fertilising of the sports fields before monitoring occurred. Ammonia is a non-cumulative, non-persistent toxicant to aquatic life.

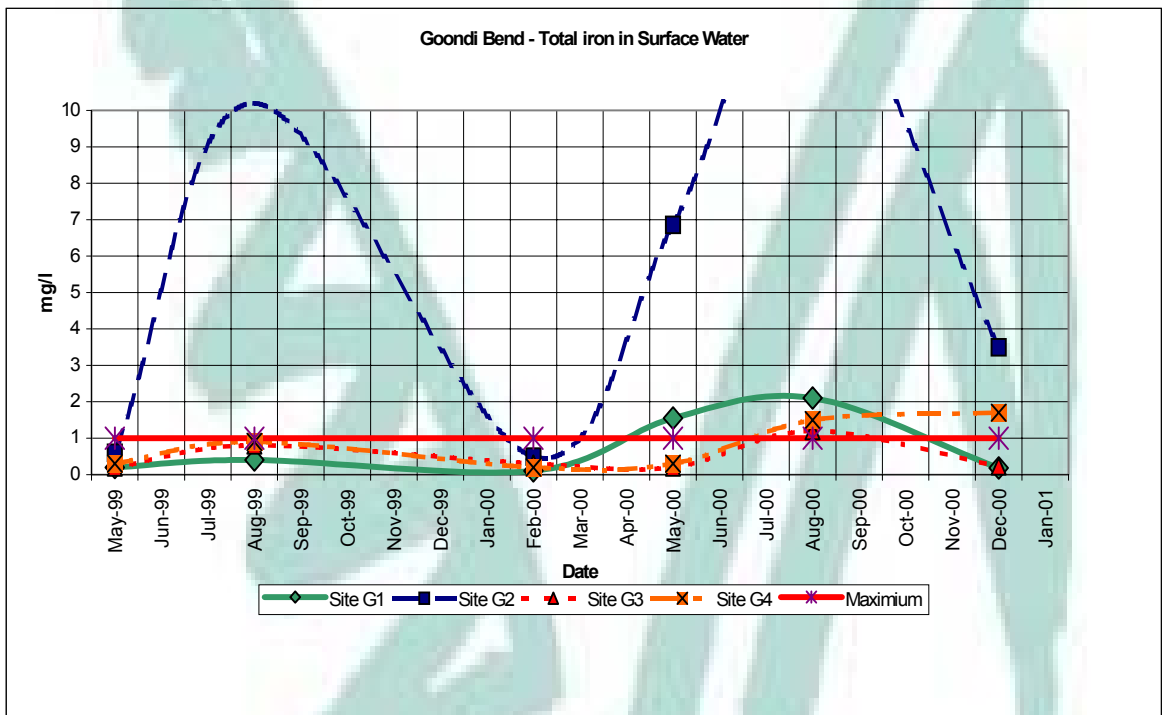


Figure 8.6 Iron in Surface Waters at Goondi Bend

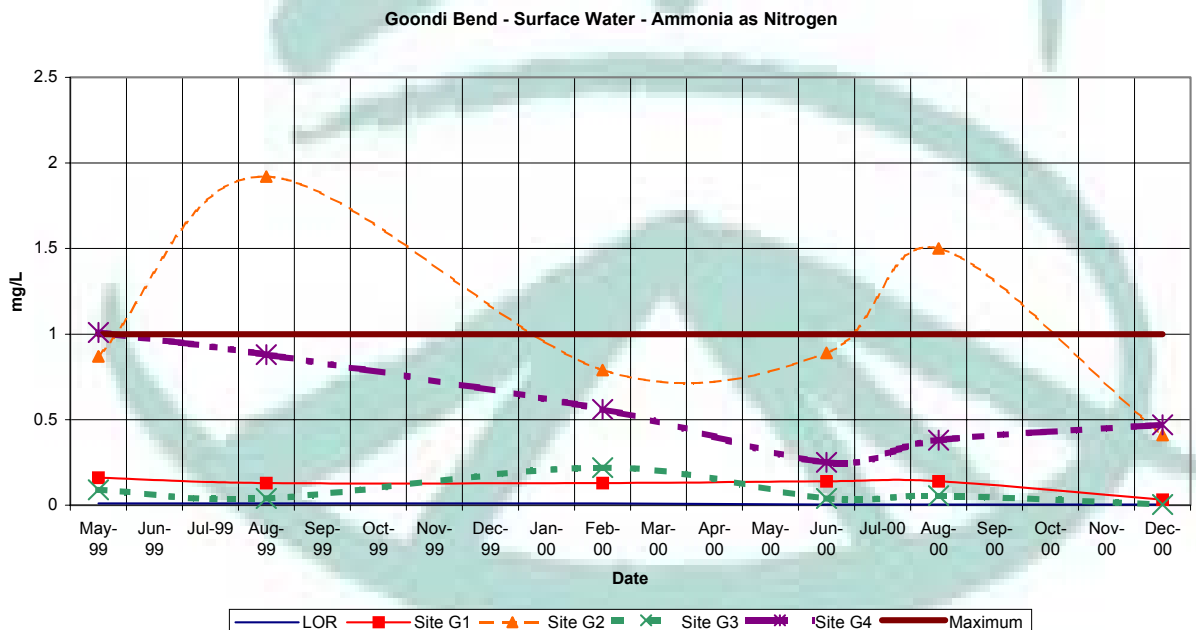


Figure 8.7 Ammonia Nitrogen in Surface Waters at Goondi Bend

Other non-compliance issues were in relation to lead levels, pH levels and suspended solids. All of these parameters were recorded at high levels prior to entering the sites and thus are not associated with the landfill site.

Site Improvements for Environmental Compliance identified in 2000 include:

- Capping of stage 2 - completed
- Fill is being deposited at stage 3 to try and obtain the final shape for the facility.
- Quotes have been received on constructing groundwater monitoring bores, with these expected to be constructed in early 2001.

8.6. Landfill Remediation Assessment Program

Johnstone Shire Council identified seven former waste management sites for assessment under the Landfill Remediation Assessment Program (LRAP) which is being coordinated by the Department of Communication and Information, Local Government, Planning and Sports (DCILGPS). The LRAP is 50% funded by the DCILGPS with the remainder provided by Council.

The sites include:

- Goondi Bend
- Downing Street
- Flying Fish Point
- Mourilyan Harbour Road
- Cowley Beach
- Kurrimine Beach
- Muff Creek

8.6.1. Muff Creek

Muff Creek landfill is located on Bingil Bay Road about 100 m from its intersection with Garners Beach Road. It is within close proximity of residential land use and surrounded by rainforest. Some waste is covered by the adjacent ‘unnamed’ creek while fill and cyclone debris (sand and vegetation) have been placed over sections of the site. The landfill commenced operation in 1980 and closed in 1988. It served Bingil Bay and the surrounding agricultural and residential areas. There was minimal control over waste acceptance criteria. The extent of the landfill is discernible by the vegetation clearing and is approximately 0.5 hectares.

Based on the results Muff Creek is a small-scale landfill which is generating leachate and contaminating groundwater. The surrounding environment is bushland, residential and agriculture. Council has indicated that groundwater within the area is used for domestic purposes and based on the groundwater results, may pose a risk to consumers/users.

Release of contaminants from the landfill to the surrounding soils appears to be limited as the results do not indicate any significant contamination in surrounding soils. Based on this, as long as the site is not disturbed (waste exposed) there is a low risk of contaminating adjacent soils. The risk would be significantly reduced by adequate capping which would also minimise water infiltration.

The downstream sediment sample has levels of zinc and nickel above the sediment quality guideline which may be due to the landfill (as exposed waste located in the creek is some 5 m upstream) or may be at naturally occurring levels. To reduce the risk of contamination it is recommended that the waste be removed and the side of the landfill sealed.

Investigation of landfill gas (methane) did not find any high levels of methane even within test pits with exposed waste. Based on the size of the landfill (5 000 to 10 000 m³), type of waste (21-30% inert/hardfill, 21-30% general waste, 41-50% regulated waste and 0-10% municipal waste), surrounding land use (agriculture, bushland, rural residential), wet climate, sandy geology and lack of compaction, methane generation is not likely to be a risk and a gas monitoring program would not be warranted.

Groundwater quality deteriorated downstream with an increase in faecal coliform levels. However, overall the results suggest that all three bores have levels of landfill contaminants but they typically do not deteriorate downstream and are generally within the guidelines. There may be migration of contaminants upstream (Borehole 1) but this cannot be confirmed until further monitoring is undertaken.

Further groundwater monitoring is suggested to determine the extent of any contamination from the landfill.

It is noted that the groundwater table is between 1.8 m and 4.1 m below the surface and that the waste is at least 0.5 to 1.0 m below the surface. Subsequently, water infiltration into the landfill is likely to contribute substantially to leachate. If the site was covered by an impermeable layer or even if the drainage of the site was improved, potential leachate generation would be reduced and associated risk also reduced. Further groundwater monitoring would indicate whether the site should be capped or not. However, as the results of this investigation indicate limited contamination, improved drainage is suggested as a minimum.

Remediation Measures

The following measures were recommended to Council:

- Remove exposed waste and profile side of landfill.
- Ongoing groundwater monitoring at least every 3 months for 2 years.
- Improve drainage of site to reduce water infiltration.
- Cap landfill.

8.6.2. Goondi Bend

Goondi Bend landfill is located adjacent to the Bruce Highway on the northern approach to Innisfail. It is within close proximity to residential, commercial and light industrial land use. It consists of three cells, of which cells 1 and 2 are addressed by this investigation. Cell 3 is closed to the public but is still receiving green waste and fill. The extent of the landfill is discernible by the batters surrounding the site and is approximately 3 hectares.

Based on the results Goondi Bend is a large landfill site which is generating leachate and likely to be generating methane. The results have not specifically pin pointed any major contaminant issue associated with the site, however, the investigation is a snap shot in time which may or may not represent long term trends. Ground and surface water contamination has been identified and further groundwater monitoring, including the construction of a groundwater monitoring bore at the back of the site (behind Cell 3), is recommended as it will allow the more accurate determination of the extent of contamination. Due to the large amount of water (surface and groundwater) present within the Innisfail region dilution of any contaminants being released is likely and will reduce the risk of potential environmental harm and public health issues.

The surrounding environment is urban residential with limited industrial operations. According to Council, the groundwater is not utilised by residents for potable or irrigation use, which reduces risks associated with groundwater. It is not known whether groundwater will be sourced in the future and controlling groundwater bore installations is difficult as the area does not fall within Department of Natural Resources licensing jurisdiction. It is unlikely that groundwater will be used for potable purposes in the future as residents utilise the water sourced from the upper Johnstone River supplied through the reticulation system.

Release of contaminants to the surrounding soils appears to be limited, as results of capping and surrounding soils do not illustrate any significant migration of contaminants from the landfill to the surrounding soils (which are not contaminated). Capping compacted to a permeability of 1×10^{-9} m/s is recommended for Cell 1 and the batters of the Cells 1 and 2. Capping is also recommended for the eastern side of Cell 2. Capping should ensure stormwater runoff can flow off-site and not allow water to pond on the landfill. By capping the landfill, a significant amount of water infiltration will be reduced. In turn this will reduce leachate generation and the amount of water (ground and surface) which may be contaminated.

Goondi Bend is a large landfill having received more than 100 000 m³ of waste which has not been compacted sufficiently and therefore has many voids for methane to be produced and settle in. The landfill also has several extrusion points which have resulted from the (original) drainage paths under the landfill (refer to Figure 1). These paths may allow methane to move within the landfill however movement may be limited by the water within the cells. Considering the above and locality of landfill (within Innisfail and adjacent to residential, commercial and industrial land uses) methane generation may pose a high risk. To minimise the risk, further investigation involving an extensive gas monitoring program is recommended (and indeed required by the EPA in the post closure plan for Goondi Bend).

Further groundwater monitoring and capping of the site will allow the extent of groundwater contamination to be determined and once these are established, measures for leachate collection may be necessary to limit off-site migration and environmental and public health harm.

Remediation Measures

The following measures were recommended to Council:

- Analyse groundwater used for irrigation to assess public health risks.
- Ongoing groundwater monitoring at least every 3 months (seasonal variations) for 2 years.
- Install groundwater bore.
- Capping of Cell 1 (especially if it is to be used as sportsground).
- Capping of the eastern side of Cell 2.
- Capping of sides (batters) of Cells 1 and 2.
- Gas monitoring program and installation of gas collection and passive venting system.

8.6.3. Mourilyan

Mourilyan Harbour Road Landfill is located on Bulguru Swamp on Mourilyan Harbour Road approximately 3.5 km from its intersection with the Bruce Highway. It is about 100 m from the nearest residence and adjacent to a wetland. The landfill is approximately 200 m long and 150 m wide and consists of trenches and aboveground disposal. Uncompacted fill has been placed over the site which is not levelled.

The landfill commenced operation in the 1950s and closed in 1988. It served the Mourilyan area stretching from the Harbour to Etty Bay to the Bruce Highway. Waste was received from the sugar mill, farmers (cane and banana), commercial enterprises (hotels, takeaway) and residential areas. There was minimal control over waste acceptance criteria. The extent of landfill is discernible by vegetation clearing and is approximately 3 hectares in size.

Based on the results the Mourilyan site is a medium scale landfill which is likely to be generating leachate and methane. The surrounding environment is agriculture and bushland with residential housing located within close proximity. The groundwater within the area is sourced for irrigation purposes by adjacent agricultural properties and poses a risk depending on the extent of contamination and dilution of contaminants entering the groundwater.

Release of contaminants from the landfill to the surrounding soils appears to be limited as the results do not indicate significant contamination in surrounding soils. Analysis of the capping/cover samples found two to have elevated levels of copper and nickel, however these are just above environmental level for each metal and may be the natural levels for the particular soils. Based on this and the fact that the surrounding soils are not contaminated, as long as there is no disturbance to the existing site (eg exposure of waste) there is a low risk of contaminating adjacent soils.

Any risk (current and future) will be minimised significantly by the landfill being capped. It is noted that the site has been planted with a mixture of rainforest saplings. Based on the investigation, waste is about 1 m below the soil placed over the site and it is unlikely that the shallow rooted rainforest trees will cause significant penetration which could result in release of contaminants. However, if the site is to be capped to minimise off-site migration of contaminants through surface waters and groundwaters, the trees would need to be removed to allow a relatively impermeable layer of clay to be placed over the site.

Landfill gas sampling indicates that methane generation is occurring below the soil surface, however, not at a significantly high level. In considering the adjacent land use of agriculture and bushland, reasonably remote location from residential areas and lack of compaction of landfill (voids), methane generation is a low risk. Test pits indicated some green waste which produces quantities of methane, however, at this stage the risk associated with methane generation is low in the context of the surrounding area and a gas monitoring program would not be warranted. However, if the surrounding area undergoes extensive development (namely residential) a preliminary gas monitoring program/investigation may be warranted to reduce public risk.

Deterioration in water quality downstream was observed but it is not considered significant for the surrounding environment. However this is a snapshot in time and with adverse seasonal conditions (eg inundation) the site may pose a high risk of water contamination.

Groundwater results indicate migration of leachate from the landfill with elevated levels of faecal coliforms and conductivity. However, generally the difference in groundwater quality between upstream and downstream boreholes is not very significant with many potential contaminants below the guidelines. To confirm the full extent of migration of contaminants from the landfill another borehole to the southeast of the site is suggested. By installing a borehole at this location, samples representative of groundwater passing through the majority of the site can be obtained.

Once the extent of the contamination is confirmed, the need for capping of the site can be evaluated. If the contamination is significant capping of the site is recommended as the waste is generally 1 m below the surface while the groundwater table is 2.5 to 2.8 m below the surface. Currently, rainfall and runoff pass through the permeable cover and through the waste and into the groundwater. By capping the site with a relatively impermeable cover the quantity of leachate generated will be significantly reduced as this infiltration of water would be prevented. Current infiltration of water may also be reduced (though not significantly) by providing surface drainage and other measures to minimise water entering the site and ponding.

Without the additional bore the risk associated with groundwater contamination cannot be adequately assessed, however, at this stage considering the types of waste disposed of at the site (including industrial) and sandy geology there is a moderate to high risk of groundwater contamination.

Remediation Measures

The following measures were recommended to Council:

- Ongoing groundwater monitoring at least every 3 months for 2 years.
- Install downstream borehole.
- Improve drainage of the site
- Cap landfill.

8.6.4. Kurrimine Beach

Kurrimine Beach Landfill is located on the corner of the Murdering Road approximately 350 m from the town of Kurrimine Beach. The landfill is located within a patch of remnant bushland. To the east of this bushland is Kurrimine Beach while the remaining boundaries are surrounded by a banana plantation and other agricultural activities. Most of the waste is covered with fill with some waste exposed on the edges. The landfill commenced operation in the 1950s and closed in 1988. It served Kurrimine Beach and the surrounding agricultural and rural residential areas. There was minimal control over waste acceptance criteria. The extent of the landfill is discernible by the vegetation clearing and is approximately 2 hectares.

Based on the results Kurrimine is a small to medium scale landfill which is likely to be generating leachate and appears to be contaminating groundwater to a small degree. The surrounding environment is bushland, residential and agriculture.

Release of contaminants from the landfill to the surrounding soils appears to be limited as the results do not indicate any significant contamination in surrounding soils. Analysis of the capping/cover samples found two to have elevated levels of nickel and one to have an elevated copper level. Based on this, as long as there is no disturbance to the existing site (eg exposure of waste) there is a low risk of contaminating adjacent soils. The risk would be significantly reduced by placing a relatively impermeable cover (capping) over the site, which would also minimise water, infiltration and leachate generation.

Investigation of landfill gas (methane) did not find any high levels of methane even within test pits with exposed waste. Methane levels did however increase at areas where exposed waste was located indicating some activity. In considering the size of the landfill (10 000 to 50 000 m³), type of waste (11-20% inert/landfill, 31-40% general waste, 31-40% municipal waste, 0-10% regulated waste), lack of compaction of landfill, wet climate, sandy geology, and adjacent property (bushland) methane generation is unlikely to pose a significant risk. The implementation of a detailed gas monitoring program is not warranted.

The surface water samples do not clearly suggest impact from any leachate from the landfill on surface waters. Whilst there is an increase in BOD₅, total organic carbon and total phosphorus, correlation between these increases and landfill discharge cannot positively be confirmed.

Analysis of groundwater indicates it is being influenced by the landfill with a slight increase in faecal coliforms and the presence of total phosphorus and total oxidised nitrogen, however, typical contaminants, such as ammonia are not present. The results upstream indicate that there may be migration of contaminants upstream which may be due to the complex dunal system.

Council is not aware of any groundwater use in the area but it is likely that groundwater is used for irrigation. Based on the groundwater results there is not a significant risk involved with irrigating secondary produce, however, the faecal coliform levels may pose a risk to primary produce.

The surface area of the landfill is large and the groundwater level is approximately 4.1 m below the surface. Test pits indicate that waste is at least 0.3 to 0.5 m below the surface and that a significant amount of waste is above groundwater. As a consequence leachate is likely to be mainly generated by rainfall (rather than groundwater contacting the waste). It is noted that there was no significant rainfall event prior to sampling so the potential contamination of groundwater from the leachate may not be represented by the samples obtained during the site investigation. For this reason further groundwater monitoring is recommended. In addition, capping of the site is suggested but should be assessed based on the results of further groundwater monitoring. If capping is not undertaken it is suggested that the drainage of the site be improved to prevent water ponding on site and flowing into the site.

Remediation Measures

The following measures were recommended to Council:

- Ongoing groundwater monitoring at least every 3 months for 2 years.
- Cap landfill.
- Improve drainage of site to reduce water infiltration.

8.6.5. Downing Street

Downing Street landfill is located on an area used as a cane farm at the end of Downing Street. It is located adjacent to Council's pound facility and caretakers house. Other residential properties are located some 100m north of the site (on the opposite side of Bamboo Creek) or 200m south of the site (opposite the cemetery). Large waste objects remain exposed however the majority of the waste has been placed in trenches.

The landfill commenced operation in the 1950s and closed in 1988. It served Innisfail accepting the majority of waste from the household collection service. The site was readily accessed by the public (including cane and banana farmers and light industry) and had minimal control over waste acceptance criteria. The extent of the landfill is discernible by the particles of waste scattered throughout the cane field and is approximately 2 hectares.

Based on the results Downing Street is a large landfill site which is generating leachate. The results have identified contaminant migration in the groundwater as the downstream groundwater samples have elevated faecal coliforms and ammonia which are typical products of a landfill. The contaminant levels are not very high which is likely to be due to the age of the landfill and large amount of rainfall which the Innisfail region receives. This 'flushing' effect reduces risks associated with potential environmental harm and public health, however, it does not eliminate such risks.

The surrounding environment is mainly agriculture with nearby urban residential land use. The north and west of the site is bounded by Bamboo Creek which is a large tributary of Johnstone River. According to Council groundwater is not sourced for consumption or irrigation within the area. It is not known whether groundwater will be utilised in the future for irrigation or consumption. It is however, unlikely that the water will be sourced for consumption as Innisfail is serviced by treated water supplied by a reticulation system.

The current land use maximises cane production by ensuring water infiltrates into the soil (by tilling and loosening the soil) to promote cane production. The permeability of the representative sample obtained from the site illustrates the high infiltration of surface water into the old landfill site. The average permeability of 4.18×10^{-3} m/s is high (ie. very permeable) and well below the EPA requirements of 1×10^{-9} m/s for landfill capping. A comparison between the two translates into the water taking 24 seconds to pass through 100 mm of soil with the existing permeability and water taking 3 years to pass through 100 mm of soil with a permeability of 1×10^{-9} m/s.

Release of contaminants to the surrounding soils appears to be limited, as results of capping and surrounding soils do not indicate migration of contaminants off-site into the surrounding soils. Capping materials have high levels of zinc and copper while the surrounding soils do not. Capping the entire extent of the landfill can reduce leachate generation and contaminant migration. The capping should be graded to ensure stormwater runoff can flow off site and not pond on the landfill cover. Capping of the landfill is inconsistent with the current land use of cane production which requires a high infiltration of water. By capping the landfill, risk associated with leachate migration, including environmental harm, are reduced. Although results indicate that ammonia is being released into the groundwaters, it is within the aquatic guidelines and should therefore not adversely impact the receiving environment. Faecal coliforms levels are also above the recreational level but is unlikely to affect the receiving aquatic ecosystem. Receiving surface waters have a higher level of faecal coliforms which has potential to adversely effect the health of those who contact the water. The landfill may not warrant capping at this stage as the results indicate limited environmental effects. With further monitoring the extent of contamination can be confirmed (as these results are a snap shot in time and may or may not represent the long term trends) which can be used to justify the final use of the site (ie. continued use or capping of the site).

The 12 year old landfill has approximately 10 000 m³ to 50 000 m³ of waste which has not been adequately compacted and therefore has voids for methane to produce and settle in. The waste has been placed in trenches which are separated by about 5 m. This reduces the potential for methane production and movement, and reduces the risk compared to the waste being one entity. There are no low lying extrusion points, however the soil is extremely permeable. There is one house within 250 m of the site and the immediate surrounding area is agricultural (cane production). It is noted that household waste and night soil have been disposed of at the site and generate methane, however, based on the characteristics of the site and surrounding environment, methane generation is not considered to be a significant risk and an extensive gas monitoring program would not be warranted.

Further groundwater monitoring will allow the extent of groundwater contamination to be determined and if this is established, measures for leachate collection and capping may be necessary to limit off-site migration and environmental and public health harm.

Remediation Measures

The following measures were recommended to Council:

- Ongoing groundwater monitoring at least every 3 months for 2 years.
- Cap landfill.

8.6.6. Flying Fish Point

Flying Fish Point landfill is located on Flying Fish Point Road some 3 km from Flying Fish Point. It is located some 500 m from residential areas and has been formed over mangrove swamp. Waste has been placed on the surface of the mangrove swamp and has extended towards the unnamed creek adjacent to the site

The landfill serviced Flying Fish Point only and commenced operation in 1970 and was closed in 1988. General waste (excluding municipal waste collection) was disposed of at the site and the extent of the landfill is discernible by the extent of vegetation clearing.

Based on the results Flying Fish Point is a small scale landfill which is generating leachate. The surrounding environment includes a tidal creek bound by mangroves, rainforest and residential dwellings. The groundwater within the area is utilised but the groundwater at the site is not likely to be one of the aquifers sourced for water as it is saltwater. For this reason it is unlikely that it will be sourced for consumption or irrigation in the future.

Release of contaminants from the landfill to the surrounding soils appears to be limited as the results do not indicate any significant contamination of surrounding soils. The capping is not considered to be contaminated with the exception of an elevated zinc level for Cap 3. Based on this, if there is no disturbance to the existing site (eg exposure of waste) there is a low risk of contaminating adjacent soils. Note that this disturbance includes root infiltration from trees which have been planted on-site. It is understood that these trees are a mix of rainforest saplings which have shallow root systems. Considering the depth of waste is at least 1 m the rainforest trees may not pose a risk to the site as the roots are unlikely to penetrate to the waste and thereby release buried contaminants. As

the waste is buried at groundwater depth, capping of the site would not be warranted, however, it is suggested that the site be profiled to prevent ponding of water. Tree coverage will reduce rain infiltration but not significantly.

Investigation of landfill gas (methane) did not find any high levels of methane even within test pits with exposed waste. Considering the type and quantity of waste deposited at the site (5 000-10 000 m³ consisting of 81-90% general waste), surrounding land use (residential), the wet environment (rainfall and mudflats) and geology (saturated alluvium soil, lagoon sediment) methane production is considered to be a low risk and any gas monitoring of the site is not warranted. The downstream water sample only indicates high levels of faecal coliforms and iron which may be attributed to upstream catchment activities and potentially the landfill as the collected leachate also had elevated levels of faecal coliforms and iron.

Groundwater downstream of landfill is contaminated with also some migration of contaminants also in the direction of Borehole 1. Typical landfill contaminants including ammonia, phosphorus and iron are present and indicative of off-site migration of contaminants through groundwater. The receiving environment is limited as the site is located near the sea and drains to a creek which reports to open waters which have the capacity to dilute and breakdown contaminants and thereby reduce environmental harm. However, the landfill is contaminating the receiving environment.

Further groundwater monitoring and the installation of a new upstream borehole (as Borehole 1 is located in another aquifer) is suggested. The monitoring would confirm the extent of leachate migration and if the additional data indicates further contamination which poses a significant risk to the environment and public health measures for leachate collection may be necessary to limit off-site migration (eg bunding of site to limit groundwater level fluctuations through adjacent tidal waterway).

Remediation Measures

The following measures were recommended to Council:

- Ongoing groundwater monitoring at least every 3 months (seasonal variations).
- Install upstream borehole.
- Improve drainage of site.

8.6.7. Cowley Beach

Cowley Beach landfill is located on the northern side of the access road to Cowley Beach and is some 500 m west of the town. It is in close proximity to residential and commercial land use, and is basically one cell made up of trenches and aboveground disposal. Some waste on the eastern side of the landfill remains uncovered and, in past years, uncompacted fill has been placed over the remaining site. The landfill commenced operation in the 1950s and closed in 1988. It served Cowley Beach and the surrounding agricultural and rural residential areas. There was minimal control over waste acceptance criteria. The extent of the landfill is discernible by the vegetation clearing and is approximately 0.5 hectares.

Based on the results, Cowley Beach is a small landfill site (5 000 to 10 000 m³ of waste) whose impact on the surrounding environment is difficult to evaluate as there were no leachate and surface waters to sample. The sandy geology of the area ensures water filters into the ground and subsequently limits the potential spatial impact of the landfill site and confines it to groundwater.

Soil samples of capping and surrounding soils were analysed for contamination. The surrounding soils have levels of metal and phenolics below the guidelines and do not have any pesticides detectable. This indicates that there has not been any significant migration of contaminants from the landfill which is consistent with the sandy soils which allow surface waters enter the ground very quickly.

Two of the four capping/cover samples have elevated levels of zinc but the levels are just above the environmental level of 200 mg/kg and well below the residential health level of 7 000 mg/kg. The zinc levels are likely to be natural to the soil, and as there has been no migration into the surrounding soils to date, they are not likely to pose a risk.

The small landfill has approximately 5 000 m³ to 10 000m³ of waste which has mainly consisted of general waste (71-80%) and inert/hardfill (11-20%). It is located some distance from residential

area and is surrounded by mainly bushland with agricultural land located to the south. The surrounding geology consists of sand. The results indicate methane generation but the quantities and type of waste and surrounding environment limit the risk associated with methane generation. Further investigation including a gas monitoring program is not warranted.

The results of groundwater sampling from the three boreholes indicate an increase in contaminant levels for turbidity, total organic carbon and total phosphorus which are likely to be from the landfill although the results of other typical landfill contaminants such as ammonia are present (above raw water guideline) but not above the aquatic biodiversity guideline. Ammonia and faecal coliform levels are high upstream which may be due to septic tanks within the area or migration of contaminants.

The surrounding environment is bushland to the north, residential to east and agriculture to south. No creeks or waterbodies are adjacent to the site and according to Council groundwater within the area is used for domestic use. Sourcing contaminated groundwater for domestic use poses a high health risk.

To reduce water infiltration to the site capping of the landfill with a relatively impermeable cover is suggested. The capping will limit contaminant migration and leachate generation, and should be graded to ensure stormwater runoff can flow off the cover and not pond. The groundwater level is about 2.7 m from the surface and the waste is at the surface or just below. By limiting water infiltration it will reduce the quantity of leachate generated as the rainfall is prevented from passing through the waste and into the groundwater.

Further groundwater monitoring is also suggested as it will allow confirmation of the extent of leachate generation and migration. If the extent of contamination is greater than identified in this investigation, additional measures to reduce environmental harm may be required.

Remediation Measures

The following measures were recommended to Council:

- Ongoing groundwater monitoring at least every 3 months for 2 years.
- Improve drainage of site.
- Cap landfill.

As part of the Landfill Remediation Assessment Program (LRAP), regular monitoring is to be undertaken at these sites. The monitoring program is summarised in the table below.

Site	Program	Sampled	No. of Samples
Cowley Beach	LRAP	Ground Water	3
Downing Street	LRAP	Ground Water	2
Flying Fish Point	LRAP	Ground Water	3
Goondi Bend	LRAP	Ground Water	3
Kurrimine Beach	LRAP	Ground Water	3
Mourilyan Harbour	LRAP	Ground Water	3
Muff Creek	LRAP	Ground Water	3

Table 8.3 summary of LRAP

8.7. Devolved Environmentally Relevant Activities³

Under the *Environmental Protection Act 1994* the responsibility for administering some of the provisions of the Act have been devolved to Local Government. Those activities that are likely to cause environmental harm have been listed in the act as Environmentally Relevant Activities (ERA’s) and require either a licence or an approval. Licences apply to those activities (listed in the schedule as level 1 activities) that are likely to cause serious environmental harm or pollution and approvals apply to those activities (listed in the schedule as level 2 activities) considered to be least likely to cause environmental harm.

³ Gordon, pers. comm, 2000
Council Activities – Chapter 8

JOHNSTONE SHIRE COUNCIL ENVIRONMENTALLY RELEVANT ACTIVITIES
For the year ending 30 June 2000

ENVIRONMENTAL AUTHORITIES ADMINISTERED

Total Number of Licences	119
Total Number of Level 1 Approvals	69
Total Number of Level 2 Approvals	50
Number of Licences issued in 1999-2000	21
Number of Level 1 approvals issued in 1999-2000	12
Number of Level 2 approvals issued in 1999-2000	9
Cancelled or suspended	0
Refused	0

ERA(s) FOR WHICH ENVIRONMENTAL AUTHORITIES WERE ISSUED

Total ERAs	120
4(a) Poultry Farms	3
11(a) Crude oil and Petroleum product Storage (10 000 – 500 000l)	2
20(a) Extraction of Rock and Other Materials	9
22(a) Screening Materials with a capacity of less than 5000 tonnes per year	2
23(a) Abrasive Blasting	2
24 Boilermaking or Engineering	15
25(b) Metal Surface Coating	1
27 Scrap metal yards and auto dismantlers	2
28 Motor Vehicle Workshops	53
43 Animal Housing	3
47 Pet, Stock and Aquaculture Food Manufacturers	3
51 Plastic Manufacturing	2
52 Printing	6
62 Concrete Batching	3
68 Wood Product Manufacturing	12
69 Boat Maintaining or Repairing	2

FEE WAIVER APPLICATIONS

Fee waiver applications processed and statutory grounds s49(2)(a)
number waived because of financial hardship 1

Fee waiver applications processed and statutory grounds s49(2)(b)
number waived because of financial hardship 1

Resolutions or local laws made under s196

Council has resolved not to charge fees for businesses at a compliance level.

ENFORCEMENT ACTION TAKEN

Environmental management programs

Approvals	2
Environmental protection orders	1

Prosecutions

Finalised	0
Commenced	0
Infringement notices	3

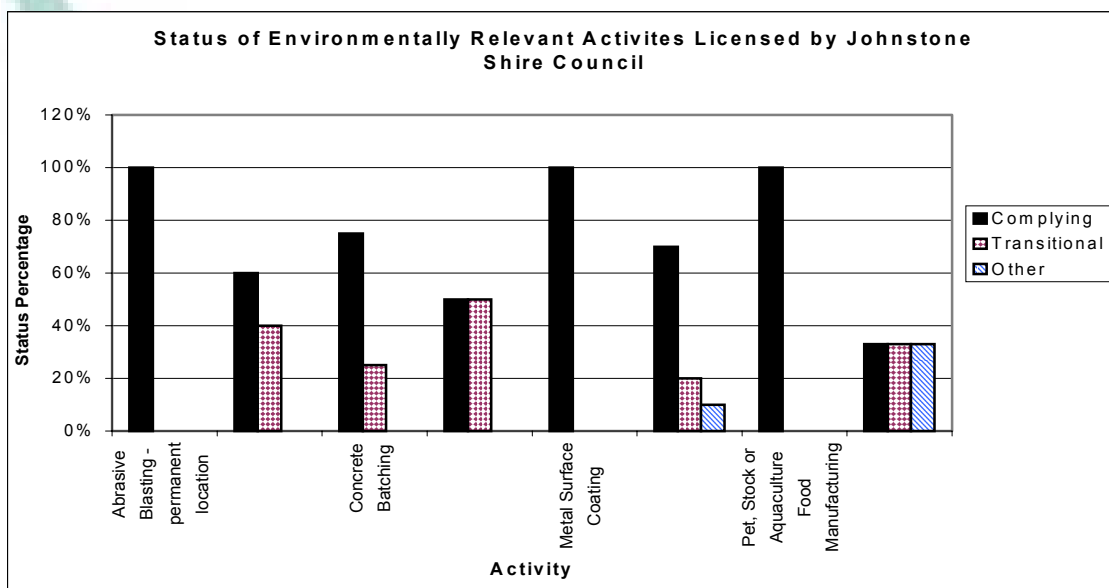
COMPLAINTS RECEIVED

Number of incidents leading to complaints

Type of environmental factor involved

Air	1
Water	3
Noise	5
Waste	1
And/or other	3
Total complaints	13

There have been seven approvals for transport of waste within the Shire



8.8. Trade Waste⁴

As part of Council’s responsibilities under both the *Environmental Protection Act 1994* and the associated *Environmental Protection (Water) Policy 1997 (EPP water)* a trade waste Environmental Management Plan and permit system has been developed to not only reduce (or eliminate) the environmental impacts of improper disposal of waste. Such operations also ensure that Council’s sewer system is not damaged by illegal waste discharges and that sewage staff are able to work in as safe an environment as possible.

The EPP on water states that only uncontaminated water discharges can be directed to stormwater drains, gullies creeks etc. The trade waste system provides for any business or commercial enterprise within the sewered area of the Shire to dispose of liquid trade waste via the sewer so long as it meets the sewer admission limits. The *Sewage and Water Supply Act 1949-1982* defines trade waste as any liquid waste that is not domestic sewage.

The permit system allows Council to determine what waste is being discharged by which businesses, and require certain businesses to install pre-treatment devices that will ensure that the discharges meet council’s sewer entry limits.

Council’s Trade Waste Environmental Management Plan was adopted in June 2000 and the date for compliance for all businesses within the Shire is December 2001. By this date any business previously discharging waste to stormwater must have diverted their discharge to Council’s Sewer System and (if applicable), have installed a pre-treatment device to remove or reduce levels of substances in the waste water to the point of compliance. Any business that has chosen not to comply by this date will be charged a monthly waste generator fee.

Some examples of businesses or activities affected by this Plan and the pre-treatment devices required include:

- Takeaway food outlets, restaurants and hotels - grease trap/interceptor.
- Oily waste waster from workshops - coalescent plate separator (minimum)
- Vehicle wash down water (from commercial enterprises) - silt trap or coalescent plate separator (if degreasing vehicles or engines).
- Swimming pool backwash water - appropriate filters and balancing tanks to reduce chlorine levels.
- Discharges from printing and photographic developing - ink separators and silver recovery devices.

⁴ Gordon, pers. comm, 2000.
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Currently Council has issued permits for 20 businesses. Council anticipates another 100 to 120 licences to be issued by December 2001. A break down of businesses that currently hold permits is as follows:

- Doctors Surgeries – 2
- Mobile septage and grease trap waste carriers – 5
- Motor vehicle workshops – 12
- Printers – 1

8.9. Technical Services and Works Depot⁵

Technical Services and the Works Depot are responsible for:

- *Engineering services* – areas of operation include engineering management, asset management (roads and structures), design, drafting and surveying and safety, with services including asset management, project management, maintenance management, technical advice and information and engineering design, drafting and surveying.
- *Water and sewerage* – areas of operation include water and sewerage infrastructure, water and wastewater treatment, and sewerage treatment, with services including asset management, project management, maintenance management, and technical advice and information.
- *Roads* – services provided by the road area of operation includes road maintenance.
- *Facilities maintenance* – undertakes maintenance and maintenance management responsibilities in respect of designated infrastructure assets as well as providing administrative and procurement function in support of other operational areas. Primary responsibilities include bridge/drainage maintenance services, parks and building services, revegetation program, purchasing and stores, workshop operations and plant fleet management and maintenance.

These departments had a total employment of approximately 100 people in December 2000.

Unsealed Roads

As at year 2000, there are approximately 212 kilometres of unsealed roads in the Shire (1), and approximately 282 kilometres of sealed roads. Road maintenance on unsealed roads in 99/00 was \$1,052,000, equating to approximately \$5,000/km, in comparison to the \$537,000 spent on maintaining sealed roads at almost \$1,900/km. However, the construction of new roads was costed at an average of \$250,000 /km in December 2000.

Unsealed roads in the Johnstone Shire face pressure from traffic converting gravel to dust believed to amount to 250 tonnes per annum (2). Although a possible correlation between unsealed rural roads and dust related illness/health has been suggested, no data exists to verify this suggestion.

In 99/00, the amount of new sealed roadway constructed (not including sealed widening of existing narrow width sealed roadways) was 3km. The Johnstone Shire Council's Manager, Technical Services estimates that people residing on unsealed roads travelled less than 5km before reaching a sealed road, however no data exists to verify this.

Maintenance of Potholes

The maintenance of main roads was handed back to the Main Roads Department in 2000. Council is now only responsible for maintaining Shire roads.

Reactive Issues

- On high use roads major pothole repairs are normally undertaken within 3 days, and within 14 days for minor roads. Currently, for small area repairs cold mixed asphalt is the repair material used, whilst for large areas hot mixed asphalt is used.
- Pothole repairs undertaken are very successful except for repairs undertaken on high use roads in very wet conditions.

⁵ Higgins, pers. comm, 2000.

Compiled from information in road register.

JSC staff observation that 10% of total amount of gravel (2,500 tonnes) placed on rural roads in 1999/2000 is converted to dust.

Information obtained from 1999/2000 Budget Expenditures.

Estimate of tonnage provided by JSC Facilities Superintendent.

Proactive issues

- Council has adopted a ten-year rolling resealing program for the 1,600,000 square metres of sealed surfacing in the Shire, so that on average 160,000 square metres of resurfacing is undertaken each year at a present cost of around \$400,000.

Drainage

It is estimated that 10 tonnes of litter are collected from roadsides each year (4), although household rubbish does not normally influence the performance of major drain lines. Drainage in the Shire is under pressure possibly from major natural wetlands that may have been altered due to alteration of natural drainage paths in the past. These include “Sweeney’s Creek” (Innisfail), “Town Swamp” (Innisfail), and Bulguru Swamp (Innisfail/Mourilyan). No data presently exists on the extent of unnatural water stagnation and its effects (if any), nor the relationship between water stagnation/mosquitos (or other vectors) and public health.

In 1999/2000, \$351,000 was spent maintaining roadside drainage (3). Excepting those major flood related incidents, there are few properties or services in the Shire where access can not be made because of poor drainage.

There are several locations in the Shire where urban stormwater is discharged from Council constructed drainage across private property to a lawful point of discharge without there being registered drainage easements in place. Some of these locations have been addressed in recent years.

Peak river flows during flood events are recorded at river gauging stations on the major river systems. A major flood study is currently being undertaken, with the estimated completion date of June 2001.

Bikeways

Council has recently constructed bikelanes at Bay Road and Laurie Street. No data presently exists as to whether community use of bike transport would significantly change if bikelanes were available.

The present condition of bikeways is satisfactory. No data exists on the current usage of bikeways in the Shire.

As part of the development of Council’s Shire Planning Scheme, a bikeway strategy was developed through community consultation, which includes consideration of bikeway linkages between the Shire’s urban communities. No work has started on these linkages.

The Effects of Flooding

There is little data on the effects of flooding on urban or rural lands. A study on the Johnstone River Floodplain will be completed in June 2002. Similarly, there is no data on the beneficial effects of flooding on rural land.

Effects of Economic Expansion on Road Networks

Technical Services advise that there is presently no data on industry expansion/change and the relationship between this and changes to road usage patterns. Similarly, no data is available on transport haulage by type in the Shire (eg road transport – rigid truck, semi trailer and combination trailer, light tramway, railway or air).

Council has adopted road maintenance as part of its core business. This has resulted in increased maintenance expenditure for widening of narrow bitumen road, heavy maintenance for unsealed roads, and for the 10 year sealed road resurfacing program.

Other Issues

Access to freshwater swimming holes and fishing spots is available through the Shire. Ready access currently exists at locations, which include:

- Polly Creek (off Jubilee Road)
- Warraker Creek (off Cooroo Lands Road)

- Gerry Vyner Park (Wangan)
- South Johnstone River (No. 6 Branch Road)
- Liverpool Creek (Warrakin Road/Japoonvale/Walter Lever Estate Road/Nyletta Road)
- North Johnstone River (Palmerston Highway)

No data exists in the following areas:

- Whether additional swimming holes and fishing spots are required,
- The number of garbage bins in public places, with bins presently placed as needed, and
- The number of tables and chairs in shade in Council’s parks and gardens.

8.10. Deficiencies in Data

There were no deficiencies in data for Council Activities.

8.11. Recommendations

- That Council continue to resource voluntary conservation programs in the Shire
- That Council provide resources to ensure the development of the Johnstone Revolving Fund
- That Council continue to resource the Integrated Environmental Management System
- That Council upgrade the Innisfail Sewage Treatment Plant to reduce the amount of nutrient going to waterways with initial investigations to be completed by December 2003.
- That site based management plans be developed for the Innisfail Boat Harbour, Green Gravel Pit, and Mission Beach and Etty Bay ablution blocks.
- That Council seek resources to ensure the installation of an appropriate sewage treatment system at Mission Beach
- That Council resource the site closure plan for Goondi and Bells Creek Dump to ensure adequate environment management of these sites by 2004.
- That Council resource the recommendations for the Landfill Remediation Assessment Program over the next 5 years.
- That Council implement the Trade Waste Management Plan
- That Council continue to implement the road resealing program
- That Council commission an investigation into the use of bikeways in the Shire and ascertain where future bikeways should be constructed.
- That Council investigate discharge locations from urban drainage systems and arrange registered drainage easements where required to protect the discharge path to the lawful point of discharge.

8.12. Bibliography and Further Reading

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