Croydon Shire Council

Waste Management Strategic Plan

2013-2023

Croydon Landfill

CROYDON SHIRE

HISTORIC GULF SAVANNAH REGION

FAR NORTH QUEENSLAND

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Disclaimer

This report contains estimations & assumptions that should not be relied on entirely for future waste planning.

Any reference to companies or stakeholders relates to those identified while undertaking the study in the region and is not an exhaustive list and is not a recommendation or endorsement of any party mentioned.

NB: Any individual, business, community group or government department who wishes to participate in the implementation of this waste strategy can contact Croydon Shire on 070474807100.

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Executive Summary

This Strategic Waste Management Plan was developed by Momentum for Croydon Shire Council and adopted by Council on 21st August 2003. **The plan was then amended from the 21st of November 2013 to reflect current standards and practises.**

The plan covers a timeframe of **2013-2023**.

Mission Statement

To maintain the current levels of waste services in a cost effective & environmentally sound way.

The objectives of the Waste Management Strategy for the Shire Council are;

- Value for money waste services the community can afford
- Waste Services that comply with legislation
- Convenient Waste Services that the community want
- Environmentally sound waste services

Waste Targets

2015

Maintain cost effective and compliant waste services

2018

5 year review of this Waste Management Plan

2020

Maintain cost effective and compliant waste services

2023

5 year review of this Waste Management Plan

Additional Council Comments

Council supports a regional approach to waste management that allows improved waste management outcomes but ***must be cost effective*** *– and savings must be achieved for each council involved.*

Kerbside recycling is not viable in Croydon Shire.

Waste is a significant cost item within Council's budget.

Council supports the subsidised disposal of all commercial and domestic waste.

Introduction

The Waste Reduction and Recycling Act 2011 require all local governments in Queensland to develop and implement plans for managing waste in their local government area.

In preparing a Waste Management Plan, the Policy requires consideration of the waste management hierarchy, which promotes waste avoidance, minimisation, recycling and reusing over waste treatment and disposal practices as a means of obtaining more optimal environmental outcomes (refer to Figure 1).

The aim, when considering the waste management hierarchy, is to decrease the reliance on waste disposal as a means of waste management and increase the importance of those elements situated higher in the hierarchy.

There is no complete alternative to waste disposal and much work is being done to develop alternative waste disposal methods, including:

- Mechanical
- Biological
- Thermal

Waste Management Hierarchy

In addition to the waste management hierarchy, the Policy prescribes adherence to a number of guiding principles that are acknowledged internationally as being central to sustainable waste management. These key principles are:

- *The polluter pays principle*: that all costs associated with the management of waste (including waste minimisation, treatment, containment, disposal and environmental remediation costs) should be borne by those who generate the waste (Section 10 - Waste Management)

- *The user pays principle*: that all costs associated with the use of a resource should, if practicable, be included in the prices of goods and services (including government services) that result from that use. Disregarding any government subsidies, incentive payments, grants etc. that would otherwise lower these costs (Section 11 - Waste Management)

Recommendations

Croydon Shire Recommendations

1. Continued promotion of all waste programs
2. Continued community consultation on all waste ”initiatives
3. Reintroduction of waste management and recycling education at Primary School
4. Investigate viability of more extensive green waste mulching service to residents.
5. Examine Costs of tyre recycling.
6. Apply for funding to establish a chemical container cage surrounding the waste refuse disposal site.
7. Improve Clinical Waste disposal Practises
8. Council will continue to report on waste annually to the state government.
9. Council to continue carrying out site volume estimate of each trench and then monitor rate of fill.

1.0 Croydon Shire Council Waste Management Guiding Principles

Bold comments = statements that are emphasised.
Financial Responsibility is achieved by:

- **Providing cost effective waste options**
- **any new or proposed waste management options are carefully considered in terms of value for money and community needs**
- **ensuring the community understands and/or agrees with the financial impact of any waste management initiatives proposed**
- knowing what the community will pay for effective waste disposal
- recovering full cost of providing waste services in pricing policies is **not** realistic

Community responsibility is achieved by:

- **providing easy community access to all waste disposal facilities**
- **minimising the impact of nuisances from waste and waste management such as litter, smoke, odours or other nuisances.**
- **understanding and delivering waste services the community wants**
- providing education & information to the community and seeking their interest in the formulation of this strategy.
- providing adequate planning and implementation for the long term sustainability of waste management facilities.

Our environmental responsibility is achieved by:

- **meeting environmental licence conditions for our landfill**
- **minimising the indiscriminate burning of waste**
- **managing water on-site so environment is not damaged**
- **fulfilment of environmental duty of care**

Additional comments

- supervising what is dumped in our landfills is not viable
- reducing the quantity of waste, volume of waste & size of landfills is not necessary
- Strict adherence to the waste management hierarchy that promotes waste avoidance, reuse, reduction and recycling is impractical in a shire with such a small population base.
- Council cannot enforce measures to reduce the amount of waste disposed in landfill from the community or businesses
- Council acknowledges that kerbside recycling is not worthwhile
- **fenced and supervising waste facilities is not practical**
- **the community want continued easy access to a tidy well organised landfill**
- **our community will not accept a significant rate increase in order to improve or achieve best practice waste management**

Note: Croydon has established a high level of segregation of materials including a roofed area being used for batteries. It is a landfill site with fenced septic and animal pits, separate organic waste piles, scrap metal and a tyre collections are in operation. Safe depths of up to 2m and trench widths of 15m are being employed.

Council Leadership:

- Council supports integrated waste management systems that are environmentally, economically and socially responsible
- We have a vision of responsible waste management and will achieve this vision by finding & implementing responsible and sustainable waste solutions
- Minimising all wastes produced through Council activities

Community commitment to waste management and waste minimisation:

- Community Consultation is preferred in waste planning
- We will build on community and business support for waste minimisation with open and effective community consultation
- Our community is committed to responsible and sustainable waste management.
- The community doesn't want the existing services to change

Making use of our waste:

- Council is not concerned about the amount of waste going to landfill and has significant land available for landfill purposes

Managing the rest of our waste:

- Council wants to continue unsupervised access to the landfill site
- Waste has the potential to damage the environment
- Council will provide best value waste disposal facility to our community
- Council will provide the best value waste disposal facility that meets reasonable environmental standards
- Council accepts that kerbside recycling is not cost effective
- Council will implement improved technologies to improve waste disposal whenever it is cost/effective or has a significant environmental benefit

Monitoring and review:

- Council will review the WMP annually and rewrite the plan every 5 years.

- *The proximity principal*: that the waste and recovered resources should be treated as close to the source of generation as possible (Section 12 – Waste Management)

- *The product stewardship principle*: that producers, designers and/or importers of products have the ultimate responsibility for minimising any environmental harm from the production, proper use or disposal of their products (Section 13 – Waste Management)

2.0 National Waste Management Data & Trends

The Australian State of the Environment Report (2011) states that waste generation continues to grow. However, emerging evidence suggests that increases in the use of resources, energy and water may be slowing due to improved technology, and better understanding and recognition of the need to reduce human environmental impact.

At the top of the waste hierarchy, waste avoidance should continue to remain the focus of waste minimisation programs.

Waste minimisation means that we use our materials efficiently in the first instance, thus reducing environmental impact that our rapid consumption has on global resources.

Many councils have not agreed that changing community attitudes on waste is a council role.

It is critical that commonwealth initiatives, state initiatives and local government practice start to use similar terminology and directions so that a consistent waste management message is being provided to the community.

The following data is an extract from the “State of Waste and Recycling in Queensland 2012” prepared by The Department of Environment & Heritage Protection.

The report presents currently available waste statistics in Queensland including:

- Waste generation
- Waste to landfill (tonnages and composition)
- Materials recycled (tonnages and composition)
- Waste from the three major source sectors – municipal, commercial and industrial, and construction and demolition (with composition by sector)
- Individual waste materials

It is understood that this data has little relevance in the study area.

Local government area/statistical division	Population at 30 June 2011	Information provided*	Number of households with waste collection	Number of households with dry recycling collection	Number of public place recycling bins	Number of households with green recycling collection
Fitzroy REGION						
Banana SC	14,861	Survey	4,012	0	10	0
Central Highlands RC	29,533	Survey	9,019	8,985	32	0
Gladstone RC	59,402	Survey	22,182	22,188	53	0
Rockhampton RC	112,383	Survey	40,089	40,089	17	0
Woorabinda ASC	982	Phone	224	0	0	0
Mackay REGION						
Isaac RC	23,212	Survey	8,010	8,002	15	0
Mackay RC	115,677	Survey	46,418	45,106	0	0
Whitsunday RC	32,408	Survey	11,778	0	0	0
Northern REGION						
Burdekin SC	17,784	Survey	6,940	6,934	47	0
Charters Towers RC	12,461	Survey	3,829	0	1	0
Hinchinbrook SC	11,852	Survey	5,410	5,410	35	0
Palm Island ASC	2,651	Phone	386	0	0	0
Townsville CC	180,389	Survey	72,021	70,483	149	0
Far North REGION						
Aurukun ASC	1,449	-				
Cairns RC	162,740	Survey	71,946	63,153	16	0
Cassowary Coast RC	28,627	Survey	12,372	0	3	0
Cook SC	4,494	Survey	1,139	0	12	0
Croydon SC	322	Survey	105	0	0	0

Waste collection by Councils (2011)

2.1 Conflicts and Challenges

This Waste Management Plan is designed to achieve a flexible waste management service that effectively considers the conflicting demands of:

- Cost
- Convenience
- Conservation

These demands have been considered in order to implement a program for the total waste stream that is environmentally, socially and economically viable.

For this report/plan the conflicting demands are further discussed in order to attain an understanding of the methodologies used to achieve the vision/objective/goals of the plan.

These 20 C's = Conflicts and Challenges to viable waste services

Key word

1. Compliance
2. Coordination
3. Convenience
4. Complacency
5. Contamination
6. Council politics
7. Community attitudes
8. Conservation
9. Cooperation
10. Checking
11. Capital.
12. Cost p.a
13. Change
14. Careers
15. Contingencies
16. Commerce & Industry
17. Collection
18. Compaction
19. Capacity
20. Cover

3.0 Overview of Waste Management Plan

A WMP provides a consistent and co-ordinated approach to the improved management of wastes through common principles and practices, best practice environmental management, continuous improvement and opportunities for regional development". (Waste Avoidance and Resource Recovery Act 2001 NSW)

The Environmental Protection Agency's Waste Management Guideline "*Developing a local government waste management strategic plan*" provides a comprehensive overview to assist local governments in developing a local government waste management strategic plan.

Developing a local government waste management strategic plan ***(****Waste Avoidance and Resource Recovery Act 2001* ***NSW)*** states:

"A local government strategic WMP is a plan that provides a framework for waste management, within a local government area or by local governments within a region.

It provides a consistent and co-ordinated approach to the improved management of wastes through common principles and practices, best practice environmental management, continuous improvement and opportunities for regional development.

If a strategic plan is developed on a regional basis, each local government member may then develop its own action plan, based on the strategic plan, to meet its own needs, resources & timeframes. It is not necessary for each Council to have the same action plan or implementation schedule as long as there is a consistent approach to waste management".

As part of a waste management strategic plan for an area, the following information is considered mandatory for inclusion:

a. *Population profiles;*
b. *Residential, industrial, and commercial development;*
c. *Waste Generation types and amounts; and*
d. *Services, markets & facilities for dealing with different types and amounts of waste*

The guideline was designed to assist local governments and policy makers in developing local government waste management strategies as required by *The Waste Reduction and Recycling Act 2011*.

EPA Proposed WMP Objectives:

- to establish future waste management needs for the region; or
- to establish consistent waste management policies and practices throughout a region;
- to identify effective strategies for waste management;
- to foster best practices in waste management and minimisation;
- to collect information and identify trends in wastes managed;
- to improve the siting, design and operation of waste disposal facilities;
- to reduce the amount of waste disposed to landfill;
- to increase the level of quality recyclables collected;
- to develop local markets for recyclable material; or
- to raise public awareness of the issues and constraints of waste management.

4.0 Regional Profile

The Far North Queensland area comprises of several separate shires including Cairns, Tablelands and Cook to name a few of the larger councils. The region covers approximately 273,000km^2 with approximately 6.4% of Queensland's population at 275,058 people according to Australian Bureau of Statistics (2010.)

4.1 Mining

The state's north-west is Australia's leading base metal region and is expected to continue to lead the production of copper, silver, lead and zinc for the next 20 years, generating $30 billion in export revenue. While Far North Queensland continues to mine sand, gold and Bauxite.

4.2 Tourism

The tourist season in the Gulf Country starts from April and extends through to October. Many of the Gulf's towns are inaccessible during the wet season.

Tourism has decreased in outback Queensland however there were still 19,918 international visitors from 2012/2013 according to the Queensland Treasury and trade.

Council should consider tourist input to waste streams and the potential income from tourism to be reinvested into waste management. A major proportion of waste produced in this region is from visitors and not the ratepayers. It was beyond the scope of this project to calculate the financial impact that this sector is having and will continue to have on the management of wastes in this region.

Croydon's population is greatly influenced by the tourist season. Figures from tourists visiting Croydon's True Blue Visitors Centre alone came to a total 9,182 people in the year of 2013.



Climate

From late November through to March is a high rainfall, high humidity period. Most of the towns in the Gulf Country experience some flooding.

The dry season extends throughout the remainder of the year. Rainfall figures from BOM for Croydon are shown below.

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	222.1	180.1	116.9	25.1	7.8	8.4	3.9	2.6	5.5	13.8	44.6	114.7	744.3
Median	196.0	166.6	93.7	8.9	0.4	0.4	0.0	0.0	0.0	4.6	27.9	101.7	715.7
Highest	860.5	601.4	591.4	279.8	129.3	139.2	83.4	44.2	92.7	145.0	384.7	312.0	1565.8

5.0 Croydon Shire

5.1 Population

The town of Croydon is the only town within the Shire of Croydon. As of the April 2012, the estimated population of Croydon was 322.

The Shire of Croydon, once a booming area for gold seekers, is the dividing line between the coast of the gulf and outback Queensland. It covers an area of 29 581 square kilometres. Croydon Shire has a population density of 1:92km².

Population projections by Office of Economic and Statistical Research indicate that the population of the Croydon shire will increase by 4 to 38 persons over the next 20 years.

5.2 Industry

Major industries in the Croydon Shire are agriculture (livestock production), gold mining and tourism.

There are a number of historic buildings in the town and a walking tour map for tourists.

Lake Belmore was constructed in 1995 as the Croydon reservoir. The Lake has been stocked for fishing however limitations apply to avoid depleting stock. The Lake has provided Croydon with a valuable recreational and economic resource.

The total gross value of agricultural production in Croydon Shire from 2005 - 2006 was approximately $18.1 million, with most of this amount coming from livestock disposals.

In the 2011 census 107 people were recorded working in Croydon Shire; with 52 residents working in agriculture, forestry and fishing, 0 currently working in the mining sector, 9 in construction, 11 in hospitality, 29 in public administration and 6 people in other fields.

Croydon has a small business base that includes:

- Council Chambers
- Hotel and Caravan Park
- 3 Stores
- 2 petrol stations
- Museum
- Earthmoving & Transport Contractors

Calendar of Events - 2013

Month	Activity
April	Croydon Barra and Bream Fishing Contest
May	Heritage Week
June	Croydon Rodeo & Campdrafts Poddy Dodgers Festival

5.3 Croydon Pub:

This is the last of 36 pubs which thrived in Croydon. The pub is a major source of aluminium and glass and is involved in a recycling initiative.

NB: a glass and aluminium recycling is being undertaken with the Croydon School.

5.4 Croydon State School

Croydon School caters for grades 1 – 7 and has 43 students.

Croydon's State School has been previously involved in a can recycling program with support from the pub.

The success of a school project is almost entirely dependent on the teacher who drives it.

School Curriculum

The school can develop projects within existing programs such as health canteen, my environment. Lesson plans can be built around waste management concepts.

Educational Initiatives

- Meetings with key community leaders
- Meetings with the whole community
- Posters
- Care for common ground
- Link to education in schools

6.0 Waste Generation and Disposal

The average waste collected on Croydon is **1185**kg per person per year.

This study found more domestic than commercial waste is generated by *weight & volume*.

*The following table estimates tonnages of waste **collected** by Council as of 2008/2009 and DEHP June 2011:*

Town	Pop.	Kerbside Domestic (tonnes)	Direct Dumping (tonnes)	Industry & Commercial (tonnes)	Construction & Demolition (tonnes)	Street Bins (tonnes)	Green Waste	Kg/yr Person
Croydon	270	117	5	157	**9**	**21**	**11**	**1185**
FNQ	**265945**	**44,559**	**-**	**73159**	**65066**	**-**	**385**	**690**

** based on waste density of 131kg/m³ for uncompacted domestic and Industrial waste , 300 kg/m³ green waste and 1000 kg/m³ construction waste.*

Croydon Shire Waste Charges and Costs for 2013/2014

Domestic rate	No. bins	Commercial rate	No. bins	Total Waste Revenue	Annual Cost to Council	Balance
$189.50	120	$461.25	10	$26 752	$41,187.7	-$28 248

Cost per service** = $423

*** Cost per service was calculated using the formula: Annual cost ÷ number of services.*

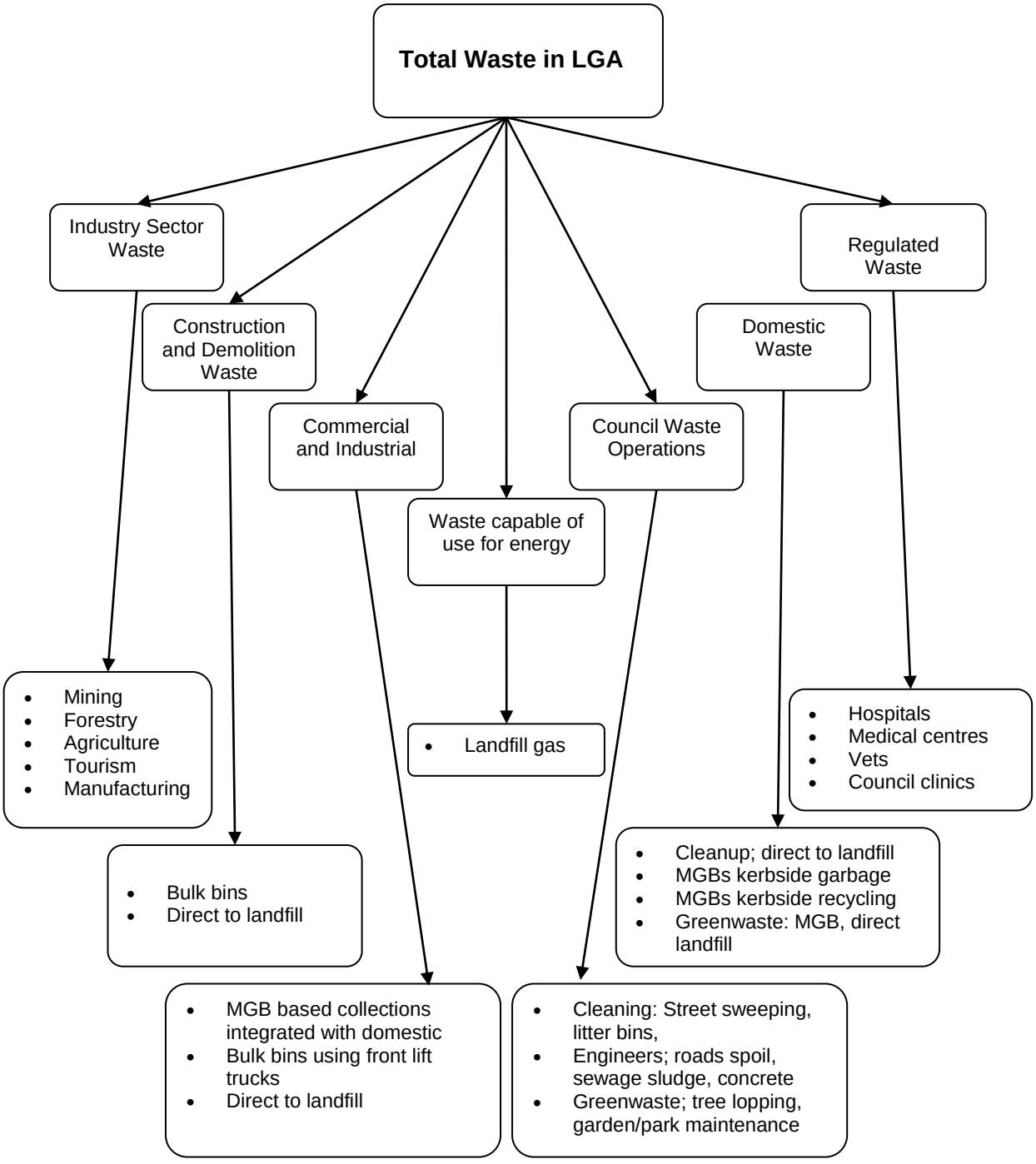
Average income*** = $205

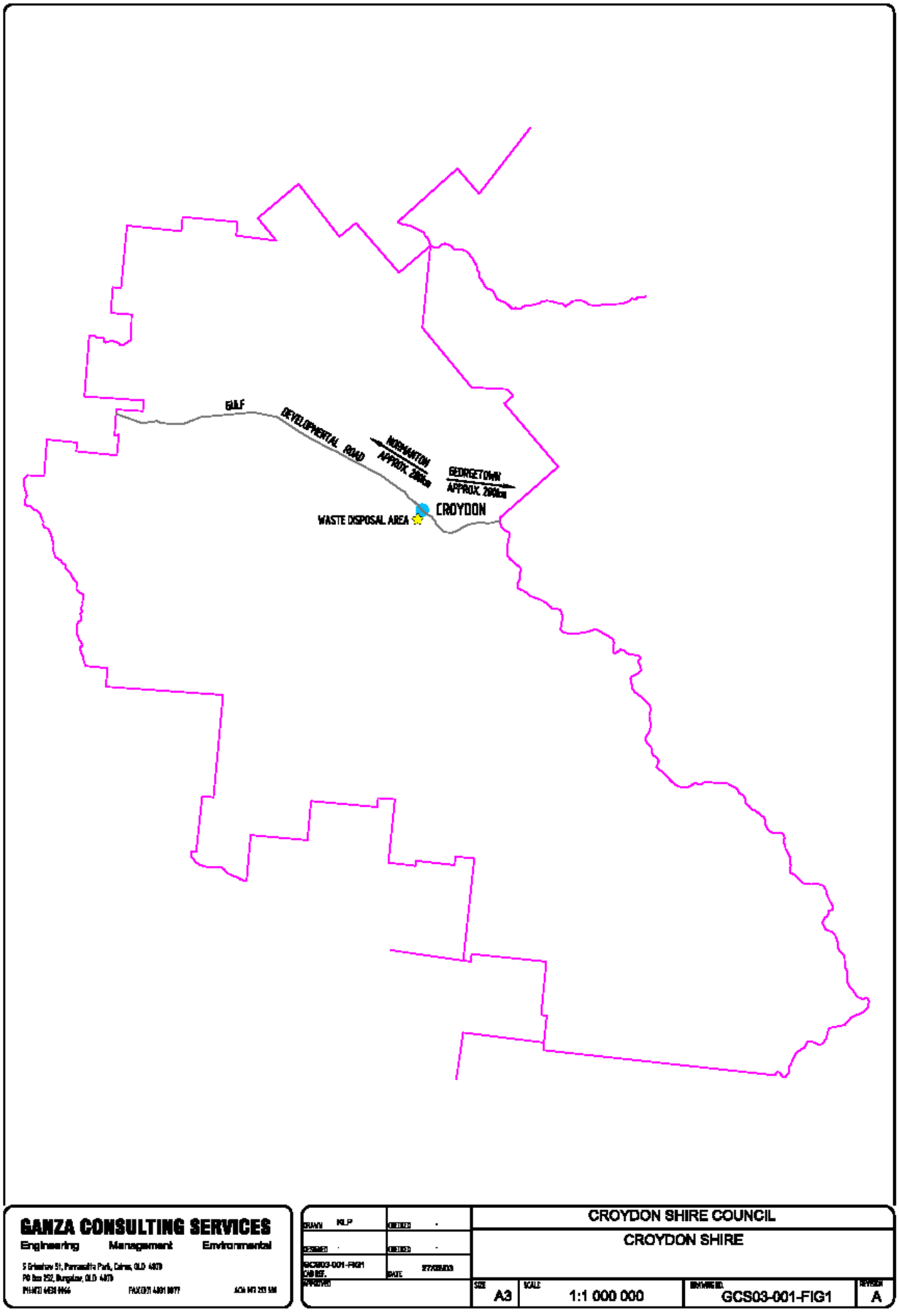
****Average income was calculated using the formula: Total revenue ÷ number of services.*

Note: Council supports the continued subsidy of waste services.



6.1 The Total Waste Stream





Location of Croydon landfill facility

6.2 Croydon Shire Landfill

Croydon Shire Council currently operates one landfill site for the shire. The landfill site is about 1 kilometre south of the centre of town. It is unclear how much of a buffer zone exists between the landfill site and neighbouring properties. The landfill site is unmanned.

The site is well organised and windblown litter did not appear to be a problem in Croydon. There was no evidence of burning.

The method of landfill operation is open trench; 15m wide x varying length x 2m deep (at 11/10/13) Each end has been graded to a 1:4 Slope to allow tracked vehicle access and the side walls were battered at 1:2 and free of erosion. Rills of approx. 750mm have been constructed lengthways along the pit to prevent vehicles from dropping over the edge.

The majority of waste received at the site is sourced from kerbside collection services.

Access roads are unpaved and moderately sandy. Wet weather access is not difficult. A ring road encompasses the current landfill site with 12 months a year access. There is excellent signage which directs residents to the numerous segregated wastes.

Various recyclables
Vegetation
Household waste
Septic waste – now fenced
Animals – now fenced

Batteries and Waste Oil

Oils are being disposed of in their designated area at Councils Workshop. Currently NQ Resources are transporting the goods from Croydon's depot to Townsville in a specialised container for 6.5c/L. This practise usually occurs annually or as the needs occurs.

There is an undercover used battery area at Croydon's Landfill. Batteries levels are monitored and recycled very infrequently due to the lack of accumulation.

Tyres

Approximately 500 tyres are in the designated area. The town mechanic stockpiles tyres in town and periodically disposes of them to the landfill. Funding is not currently available to cover the costs of recycling the entire stockpile but an annual review of funds has been adopted.

Scrap Metal

There is a designated area for steel and scrap metal at the landfill. The disposal area is about 6m wide and about 15m long. There is very little annual scrap metal contribution to Croydon Landfill and thus recycling of metal organised on a needs basis.

Chemical/Fuel Drums

Very few chemical or fuel drums are disposed in Croydon landfill.

Greenwaste

A greenwaste area is located next to the main domestic trench. Council gets the green waste chipped periodically dependant on volumes available to make the exercise worthwhile.

Other Wastes

There are several other wastes stored separately at the Croydon landfill. These include:

- Septic waste
- Dead animals
- Hazardous waste are mainly Council generated

These are well signed however there are little of these wastes generated in the shire.

Recycling

A designated area at the landfill has been set aside for plastic, aluminium, glass and paper recyclables that is not yet being utilised.

Landfill Design

Croydon currently have a problem with limited machinery in the town. Machinery that is used to dig and service the landfill is often out of town for months doing roadworks. They usually stay out until the project is completed.

Landfill cell at capacity prior to Compaction and capping.

Next cell constructed and bunded to prevent premature access

Site Supervision – Health and Safety

The landfill site is unsupervised and open to the public at all times.

Collapsing walls could be a potential problem and this has been addressed by the placement of bund walls so cars and trailers can't get too close to the pit. The depth has been reduced to a maximum of 2m. Soil is stockpiled in long runs rather than tall piles prior to use.

Stormwater and Groundwater Management

The wet season creates some leachate which filters away through the deep sand. Not a great deal of leachate is generated however, as the amount of waste on site is fairly minimal. The Capping layer also has reasonable clay content and is fairly impermeable. Capping of

the dump is proactively managed throughout the wet season limiting the waste exposed to rainwater.

Clinical Waste (Medical Waste)

Croydon Hospital currently discards sharps under safe containment to Atherton for incineration. Other Clinical wastes are not required to be treated before entering council's landfill. However they are subject to the following provisions

- the waste must have been generated in a scheduled area in order to qualify for disposal in a scheduled area landfill. Clinical waste generated outside a scheduled area must not be transported into a scheduled area or disposed of in a landfill;
- the waste must be disposed of under supervised burial conditions.
  Supervised burial means that:
- a local government representative should supervise the immediate burial of the waste;
- clinical waste should be deposited at the lowest edge of the landfill working face or excavation;
- the waste should be covered immediately with at least one metre of solid general waste or clean fill;
- any compaction must only be on the cover material, not on the clinical waste directly;
- the clinical waste disposal area should be at least two metres from the proposed or design edge of the
  landfill;
- the location of the deposited waste should be marked on the landfill site map;
- clinical waste should be at least two metres below the final surface of the landfill ;
- the name and address of the generating premise(s), and the amount and type of waste deposited should be
  recorded;
- a copy of this information should be given to the person depositing the waste for their records.

Normanton Hospital currently couriers its medical waste to Mt ISA for treatment and a similar practise may be adopted based on cost.

6.3 Waste Minimisation Opportunities

Several opportunities for waste minimisation in the region were identified.

Greenwaste

- More regular mulching or shredded of greenwaste at landfill and supplied free to residents and Council

Waste Oil Recycling

The Federal Government offers grants to Council's to establish waste oil collection facilities.

North Queensland Resource Recovery & Pasminco are key stakeholders in oil recycling in the Gulf. North Queensland Resource Recovery – Contact Mr Garth Jones Ph: 4774 7333. Oil currently collects from the Croydon works depot and the Shell service station.

Tyre Recycling

Australia wide the annual disposal rate of tyres is about 29,000,000 tyres PA (equivalent passenger vehicle units) representing about 230,000 tonnes of material available for recycling of which about 30% is recycled, 60% is disposed of by legal landfill disposal and an estimated 10% is illegally dumped according to ATRA 2006 Waste Generation an Resource Efficiency paper.

Tyres are listed as a regulated waste by the EPA & disposal in landfills is not appropriate practice. Banning whole tyres to landfill is largely due to the impact of burning tyres and their tendency to "float" up after being buried as this compromises the integrity of the final cap.

The Local Authority Waste Management Advisory Committee (LAWMAC) has resolved not to dispose of tyres to landfill, however some of the most remote Councils have no viable alternatives. Tyres are stockpiled at landfills throughout the Gulf and often set on fire.

Tyre recyclers

A number of tyre recyclers operate in QLD and can be contacted for a quotation:

- Tyre Cycle Australia 1300 829 253
- Recycling Technology International Pty Ltd (07) 5484 5055

Tyres are separately stockpiled at the Croydon landfill.

6.4 Landfill Management

Croydon has a very small population and small quantities of waste generation.

Unmanned, unsupervised landfills expose Council to public liability threat, but there has never been any accident or incident in 35 years.

The cost of improving waste systems is significant and is not warranted at this time. The landfill is being operated in full compliance with EPA requirements.

Issues that would need to be considered include:

- Construction principles
- General operations
- Environmental duty of care
- Origin, nature and quantity of waste to be received
- Waste treatment and stabilisation
- Fencing, litter and vector control
- Intended life span
- Pest management (foot and mouth issues)
- EPA licensing processes and outcomes

- Ongoing funding of waste management

This study did not measure the amount of clean combustible waste. However, from the business surveys, previous waste audits and the commercial waste composition done at Normanton, approximately 59% of all waste produced commercially could be diverted from the landfill and burnt relatively safely in a permanent pit burn facility, licenced by the EPA.

The volume of mixed solid waste is reduced by almost 80% when burnt. Burning waste produces toxic emissions and explosions. However, the burning of segregated waste such as cardboard, greenwaste & timber could reduce these emissions to within acceptable limits.

The requirement for regular cover

Regular cover with efficient equipment will minimise the potential risks of litter displacement and vector (fly, midge and mosquito) breeding. Suitably compacted cover material makes it more difficult for feral animals, particularly pigs and cats, to gain access to the tip face. Council sources cover material from overburden, removed from trench during construction.

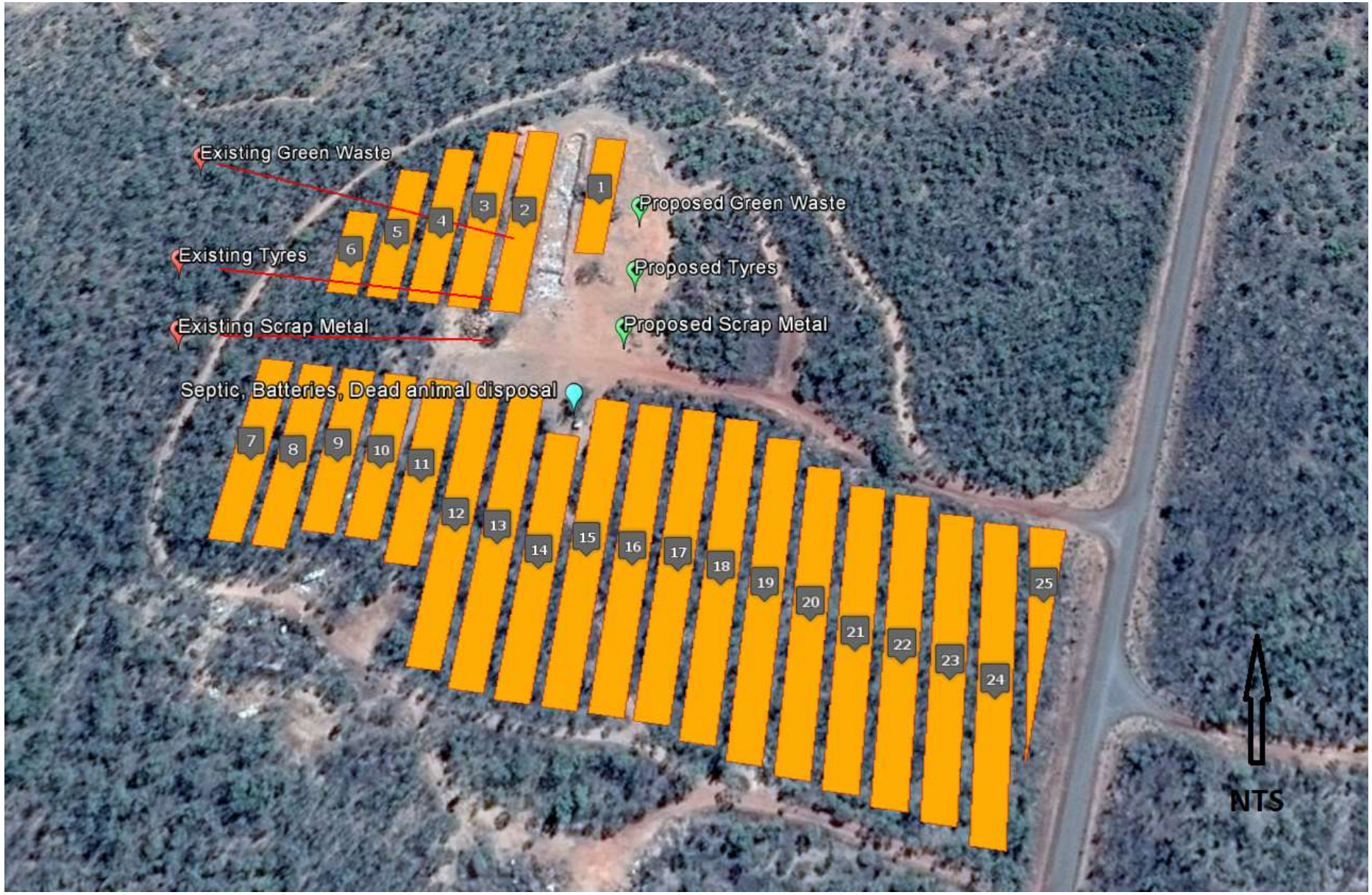
Trench Size

Most rural Councils build the biggest trench possible while machinery is available. This makes good economic sense, but creates a more difficult site to manage. Appendix A suggests a trench 50m long, two bucket widths wide (10-15m) and 2m deep.

Planning for a new landfill

Croydon has used 23% of its current land reserve and expects a service life of at least 50 years.

Croydon Landfill 50 Year + Plan



Croydon Landfill Design

					North West point		North East point		South East point		South West point	
Cell	Area m^2	Volume m^3	Expected Years	Schedule	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
1	1055	2380	1.3	2014	142.23934	-18.22453	142.23948	-18.22453	142.23943	-18.22516	142.23930	-18.22516
2	1629	3931	2.1	2015	142.23893	-18.22547	142.23908	-18.22548	142.23915	-18.22450	142.23901	-18.22449
3	1586	3814	2.0	2017	142.23882	-18.22451	142.23896	-18.22451	142.23889	-18.22546	142.23875	-18.22545
4	1382	3262	1.7	2019	142.23862	-18.22461	142.23876	-18.22462	142.23870	-18.22545	142.23856	-18.22543
5	1134	2593	1.4	2021	142.23842	-18.22474	142.23856	-18.22475	142.23851	-18.22543	142.23837	-18.22542
6	711	1452	0.8	2022	142.23818	-18.22540	142.23832	-18.22541	142.23835	-18.22499	142.23821	-18.22497
7	1375	3244	1.7	2023	142.23789	-18.22656	142.23803	-18.22657	142.23810	-18.22575	142.23795	-18.22574
8	1374	3241	1.7	2025	142.23808	-18.22658	142.23822	-18.22659	142.23828	-18.22577	142.23814	-18.22576
9	1231	2856	1.5	2027	142.23827	-18.22651	142.23842	-18.22652	142.23847	-18.22579	142.23833	-18.22577
10	1232	2859	1.5	2028	142.23846	-18.22653	142.23861	-18.22654	142.23866	-18.22581	142.23852	-18.22579
11	1378	3251	1.7	2030	142.23865	-18.22663	142.23879	-18.22665	142.23885	-18.22582	142.23871	-18.22581
12	2048	5063	2.7	2031	142.23880	-18.22705	142.23894	-18.22707	142.23904	-18.22584	142.23890	-18.22583
13	2152	5342	2.8	2034	142.23909	-18.22585	142.23923	-18.22586	142.23912	-18.22715	142.23898	-18.22713
14	1877	4599	2.4	2037	142.23926	-18.22605	142.23940	-18.22606	142.23931	-18.22718	142.23917	-18.22717
15	2192	5451	2.9	2039	142.23936	-18.22719	142.23950	-18.22720	142.23960	-18.22589	142.23946	-18.22588
16	2202	5477	2.9	2042	142.23955	-18.22721	142.23969	-18.22722	142.23979	-18.22590	142.23965	-18.22589
17	1921	5369	2.8	2045	142.23972	-18.22723	142.23987	-18.22724	142.23998	-18.22592	142.23984	-18.22591
18	2270	5661	3.0	2048	142.23991	-18.22730	142.24005	-18.22731	142.24017	-18.22596	142.24003	-18.22595
19	2242	5585	3.0	2051	142.24009	-18.22737	142.24023	-18.22738	142.24035	-18.22604	142.24021	-18.22603
20	2106	5219	2.8	2054	142.24039	-18.22616	142.24053	-18.22617	142.24042	-18.22743	142.24028	-18.22742
21	2042	5046	2.7	2057	142.24046	-18.22746	142.24060	-18.22747	142.24072	-18.22625	142.24057	-18.22624
22	2078	5143	2.7	2059	142.24065	-18.22751	142.24079	-18.22752	142.24090	-18.22628	142.24076	-18.22627
23	2020	4986	2.6	2062	142.24094	-18.22635	142.24108	-18.22636	142.24097	-18.22757	142.24083	-18.22756
24	2097	5193	2.7	2065	142.24113	-18.22638	142.24127	-18.22639	142.24115	-18.22765	142.24102	-18.22763
25	784	1901	1.0	2067	142.24132	-18.22639	142.24146	-18.22640	142.24125	-18.22733		

Notes: Expected years calculated from current waste volume usage rates. No population increase or improved waste management practises were considered. Pit of 15 meters by depths of 3 meters with 1:2 Side batters and 1:4 batters at ends were adopted.

7.0 Methodology

Information was gathered on existing infrastructure, situational analysis, domestic waste generation, commercial waste generation and waste deposited at landfills.

7.1 Project Direction and Limitations

Recyclable materials and wastes were not audited by Council.

From the beginning of the project it was clear that conventional recycling was not an option for the Gulf Region due to resource limitations and high cost of transport. So it is important to find local groups and companies that can assist with cost effective transport options.

Consultation with stakeholders and a thorough situational analysis 'on-the-ground', established strategies for a number of problem materials were identified. These were:

- Aluminium
- Paper & Cardboard
- Greenwaste
- Batteries
- Tyres
- Waste Oil

The consultation process found that waste strategies for rural and remote shires will not be driven by waste composition statistics or land limitations or other urban issues that are driving most the waste management reforms in QLD.

7.2 Domestic Waste Generation

Waste collection from domestic premises was calculated by weighing randomly selected domestic Mobile Garbage Bins (MGBs) using digital scales accurate to 100g/10kg.

Total domestic waste = average waste x presentation rate x number of total services. Update

Domestic waste stream composition was determined by sorting a very small sample of waste from Normanton and should not be relied on as an accurate estimation or for waste planning.

Council waste collection staff provided details of collection methods, waste generation throughout different times of the year, recycling/reusing opportunities and problem wastes.

7.3 Waste Deposited at Landfill

Councils were to calculate the total amount of waste deposited at each landfill.

7.4 Typical Waste Composition

Domestic Waste Stream Composition

Component	Normanton (Volume %)	Normanton (Weight %)
Cardboard/Paper	22.5	19.0
Plastic (Recyclable)	29.2	20.8
Plastic (Non-recyclable)	17.9	8.8
Aluminium	4.5	8.1
Steel	7.9	11.3
Glass	4.5	18.3
Organic Waste	13.5	13.7
Total	**100**	**100**

**These estimates are based on surveys of commercial premises at Normanton*

Commercial Waste Stream Composition

Component	Normanton (Volume %)	Normanton (Weight %)
Cardboard/Paper	59.3	47.3
Plastic (Recyclable)	11.1	7.7
Plastic (Non-recyclable)	8.6	6.8
Aluminium	6.2	5.7
Steel	1.3	5.7
Glass	4.9	16.2
Organic Waste	8.6	10.6
Total	**100**	**100**

**These estimates are based on surveys of commercial premises at Normanton*

8.0 Key Waste Strategies

1. Council leadership
2. Community commitment to responsible waste management
3. Regional waste management
4. Making effective use of our waste
5. Management the rest of our waste
6. Complying with legislation
7. Monitoring & review, R&D

8.1 Council Leadership

Goals/ outcomes	***Actions***	***Comments ideas (costs etc time frame)***
Lead by example in effective waste minimisation	Continue to encourage to implement waste reduction	
Amend the Waste Management Strategic Plan	Develop a revised Council strategic waste management plan by 21st November 2018	

Aim:

These strategies are about leading by example, developing excellent waste policy, providing adequate waste budgets, supporting waste minimisation innovations and lobbying higher levels of government.

Broad Principles:

- *Council has a vision of responsible waste management and will achieve this vision by finding & implementing responsible, flexible, cost effective, sustainable waste solutions.*
- *Council will lead by example and minimising all wastes it produces.*
- *Council supports the waste management hierarchy that promotes waste avoidance, reuse, reduction and recycling.*
- *Council supports integrated waste management systems that are environmentally, economically and socially responsible.*
- *Council will allocate adequate funds for responsible waste management.*
- *Council will support cost effective local waste minimisation initiatives.*

8.2 Community commitment to responsible waste management

Goals/ outcomes	***Actions***	***Comments ideas (costs time frame)***
Develop and implement community education and information programs to increase awareness of waste management and waste avoidance and minimisation issues and to provide practical examples on how to reduce waste.	Work with the community on all waste initiatives Reintroduce to local schools & community groups to implement a aluminium can recycling scheme that links in with existing infrastructure	

Aim:

These strategies are to engage the community by participation, involvement, education, community awareness & commitment to responsible waste management.

Broad Principles:

- *Our community is committed to responsible and sustainable waste management.*
- *Community Consultation is preferable in waste planning*
- *Our community will not accept a cost increase to improve waste management services.*
- The community doesn't want existing services to change.

Action ideas:

Develop a community education/information program to increase awareness of waste avoidance and minimisation issues & to provide practical examples on how to reduce waste.

Develop a regional communication and awareness program for the WMP.

5.3 Regional Waste Management

Goals/ outcomes	***Actions***	***Comments ideas (costs etc time frame)***
Explore opportunities to secure better pricing and other economies of scale possibilities	Consider future sharing plant, equipment and an expert operator between the shires	

Aim:

These strategies are to encourage initiatives that are not viable for individual councils and include sharing resources, costs, equipment and expertise.

Broad Principles:

- *Explore opportunities to secure better pricing and other economies of scale possibilities*
- *Ensure all waste programs are the most effective means of managing waste regionally.*
- *Regional cooperation can effectively utilise resources, to minimise cost, reduce environmental impact and avoid duplication.*
- *Some infrastructure will continue to be developed by individual Councils to manage their own wastes and resources that may also be available to other regional councils.*

Action ideas:

Collect information on existing contracts for the coordination of local and regional service contracts to achieve economies of scale and optimise resource recovery.

To investigate the purchasing of appropriate/affordable plant and equipment. Consideration to appropriate plant and equipment for regional domestic, C&I waste collection services.

Plant & equipment to be considered in a regional waste management initiative include:

- 20 tonne + compactor
- Greenwaste shredder

8.4 Making effective use of our waste

Goals/ outcomes	***Actions***	***Comments ideas (costs etc time frame)***
Investigate cost effective options to process and use all green and organic wastes.	Continue to mulch (up to 5" logs) all vegetation pruned by Council. Consider an annual greenwaste mulching program at the landfill site. The mulch could be available For parks & gardens or the public.	
Identify and evaluate options for resource recovery targeting the major types of wastes generated in Shire.	Negotiate with metal recyclers for the removal of all car bodies	

Aim: this section is about changing waste from a liability to a resource. The waste hierarchy applies here as Councils implement programs to avoid, reduce, reuse, recycle, recover and treat.

Broad Principles:

- *Council recognises that waste can be a potential resource, but the small population does not generate enough materials to be viable.*
- *Council is not concerned about the amount of waste going to landfill and has significant land available for landfill purposes and very little waste.*
- *Council accepts that kerbside recycling is not cost effective*

8.5 Managing the rest of the waste

Goals/ outcomes	***Actions***	***Comments ideas (costs time frame)***
Provide waste management facilities that are affordable, safe, convenient and environmentally responsible	Operate landfill in accordance with EPA licence requirements	
To ensure waste does minimal damage to the environment	Cover waste regularly as required by the EPA licence	

Aim: To establish efficient & effective residual waste collection and disposal facilities.

Broad Principles:

- *Waste has the potential to damage the environment.*
- *Council has a responsibility to manage waste thoughtfully.*
- *Ensure that wastes are stored, collected, transported and disposed of in a safe, efficient and responsible manner.*
- *Landfill, emission to air and discharge to water are the three options for 'disposal' of residual wastes. All 3 disposal options involve pollution and loss of environmental value.*

Strategic decisions:

Disposal to landfill will continue to be a preferred option for residual waste in the region.

Council will continue to provide improving waste management services.

Landfills to be convenient to main town centre.

Council will provide the cheapest possible waste disposal facility to our community.

Action ideas:

Level of service

Provide waste management facilities that are affordable, safe, convenient, environmentally responsible and promote waste minimisation.

Site volumes

Council to carry out site volume estimate of each trench and then monitor rate of fill.

Waste Collection and Disposal

Manage disposal of putrescible materials to avoid odour, vermin and disease vector activity.

Previously tyres were disposed of in the landfill trench

8.6 Complying with legislation

Goals/ outcomes	***Actions***	***Comments ideas (costs time frame)***
Ensure waste facilities comply with EPA licence conditions	Ensure waste facilities comply with EPA licence conditions	
Provide a safe landfill	Restrict the depth of landfill to 2m. Prevent indiscriminate burning of waste in the Croydon landfill	

Aim: To provide waste services that are safe for the public and environmentally compliant.

Broad Principles:

- *Waste disposal and collection facilities must be compliant with EPA licence conditions.*
- *All facilities must be safe to the general public that use them.*
- *Occupational health and safety legislation applies to all waste management staff.*

Action ideas:

Council will comply with all reasonable EPA licence conditions within the time specified.
Landfill will be established on sites with impermeable clay soil & leachate control systems where possible.

8.7 Monitoring and Review, R&D.

Aim : Strategic waste management requires regular performance monitoring and review to ensure goals and targets are being met. Regular advances in waste collection and disposal technology warrants a research and development component.

Broad Principles:

Regular audit and monitoring will determine if waste goals/targets are being achieved.

Goals/ outcomes	***Actions***	***Comments ideas (costs etc time frame)***
To determine the current volume of waste disposed p.a.	Carry out site volume estimate of each trench and then monitor rate of fill.	
To ensure the WMP is current	Perform annual WMP review of actions & recommendations	

Aim: to ensure waste targets are being achieved in a cost effective manner

Broad Principles

- Ensure waste minimisation and low waste generation rates continue.

Action ideas:

- Reassess waste management goals to determine if they are still relevant.
- GPS mapping and rehabilitation of all existing and previous waste sites.
- Council to undertake an annual audit of waste to determine waste disposed at landfill
- Council to undertake annual volume survey of landfills, to determine waste disposal rate.

9.0 Council Adoption of Waste Management Plan

Croydon Shire Council adopted the Waste Management Strategic Plan on 20 March 2014, resolution number 05/03/14.

The waste management strategic plan will be made available for inspection free of charge during office hours, at Council Office, Samwell Street, Croydon.

Copies of the plan may be purchased from the local government for $5.00.

Signed this 31st day of August 2017, at Croydon Shire offices, Croydon.

on behalf of Croydon Shire Council

Mayor..... Witness.....

Name ...Trevor...Pickering..... Name ...Denise...Knudsen.....

CEO.....Witness.....

Name..William...Kerwin..... Name ...Denise...Knudsen.....

Responsible Officer.....Witness.....

Name...Garry...Pickering..... Name ...Denise...Knudsen.....