KATHERINE
TOWN COUNCIL

KATHERINE TOWN COUNCIL
Waste Management Strategy

2021-2026

1 INTRODUCTION

Waste management is a vital aspect in striving towards a more sustainable future. Currently waste management practices in Katherine and the wider Northern Territory are lagging the rest of Australia and there are environmental, social and economic requirements to improve. Considering this, Katherine Town Council (KTC) has developed a five year Waste Management Strategy (WMS), 2021-2026, to address the current waste management situation in Katherine and establish goals, actions and targets to set future direction.

The current Waste Management Facility (KWMF) is nearing the end of its life, and Council began to develop a KWMS, with a focus on the future infrastructure needs:

- a Closure Plan for the current landfill
- find a Site for a New Landfill
- Upgrade the existing Transfer Station

A performance agreement made with the NTEPA, provided the impetus to include into this KWMS broader issues, such as cyclic economy, carbon neutrality, resource recovery, and 'reduction, reuse and recycle' strategies, and as well as a range of governance issues.

In preparing this strategy, a public consultation of the Katherine community was conducted, highlighting:

- less than 40% satisfaction with current waste management performance
- strong resistance to increasing charges to fund improvements
- over 90% support to increase recycling
- significant support (around 50%) for improved facilities and services
- concern that Governments could do more to support local efforts

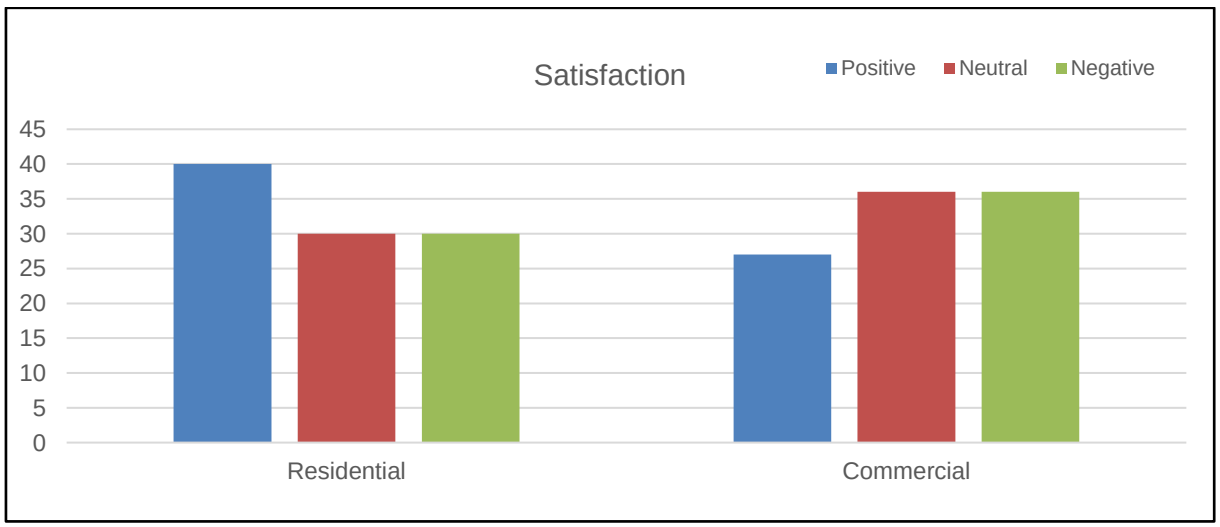


Figure 1. Public consultation results

2 PHYSICAL CONTRAINTS

Katherine has a sub-tropical climate, with a 6-8 month long Dry season and an intense 4-6-month Wet season. These factors impact fire control, dust suppression, leachate management and vehicular access. Katherine is prone to flood and storm events that threaten the KWMF infrastructure and produce considerable waste as part of the Town's clean-up.

Much of the geology around Katherine is characterised by limestone soils and karstic landforms, including the location of the current KWMF and potential sites for new landfills. This impacts the operations of the existing legacy landfill and the location, design and cost of constructing new landfills.

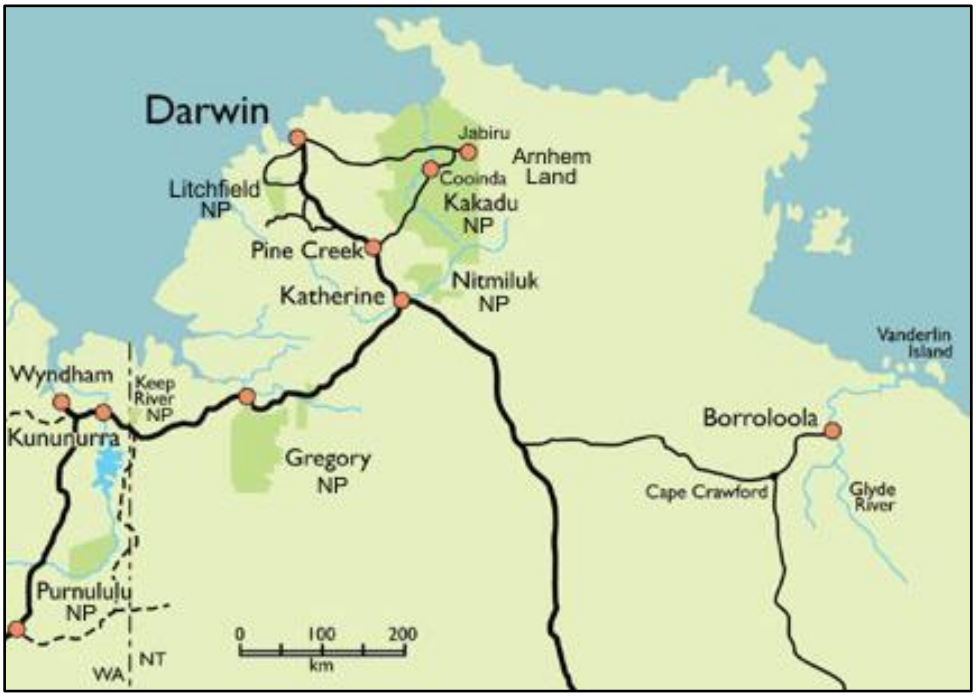


Figure 2. Location of Katherine in the context of the Northern Territory

Around 8,000 people currently live in the Katherine Municipality and the nearby Tindal RAAF Base boosts this local economy with another 2,000 residents. Despite its size, it is the administrative and economic hub for the Big Rivers Region, with a population of another 25,000 people, but spread out over an area equivalent to the size of Germany. The town is located 318km from Darwin, a trip of three hours by road, making it a remote location. These twin issues of a low economy of scale and significant remoteness undermine the financial viability of developing local recycle markets or transporting recovered resource to existing markets.

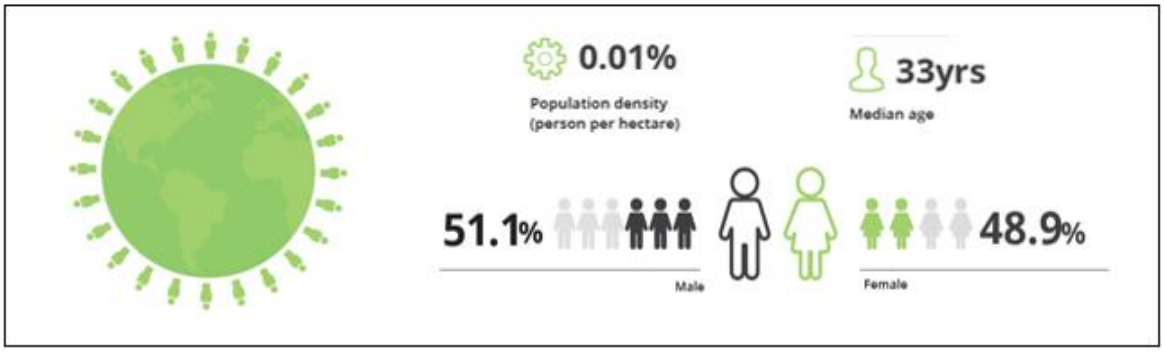


Figure 3. Location of Katherine in the context of the Northern Territory

3 POLICY AND REGULATORY INFLUENCES

3.1 CLIMATE CHANGE

Landfills are a major source of the greenhouse gas emissions of carbon dioxide and methane, due to the decomposition of organic matter that is disposed through burial. World Bank data suggests food, organic and garden waste (FOGO) makes up 32% of Municipal Solid Waste (MSW). The Katherine landfill produces around two to three tonnes of greenhouse related gases annually but, as a legacy landfill, it is not well placed to capture this landfill gas. It can, however, remove FOGO from its landfill and process this material into mulch and compost. The NT Government has set a zero-greenhouse gas emission target for 2050. While the mitigation and adaptation strategies available to the KWMF may not deliver a zero-carbon outcome, they would enable KTC to achieve realistic net-zero emissions and move toward climate neutrality.

3.2 CIRCULAR ECONOMY

The transition to a circular economy is often seen as relying on industry-wide and national level economic, change. There are many limitations on Katherine moving toward a circular economy, such as its low economy of scale and significant remoteness. Manufacturers within Katherine who modify their own processes, add to their costs and makes their products more expensive than out-of-town suppliers. Changes within the broader Australian economy (minimising packaging) may negatively impact (reduce recoverable materials) attempts to develop local recycle industries (recycle cardboard packaging waste). Locals can amend their own purchasing behaviours to move toward 'green' products, yet the effectiveness of this may lag until the broader Australian economy produces sufficient products for locals to access. The impacts and future directions of the circular economy are largely unknowable at this stage and the Katherine community will be heavily affected by global and national developments.

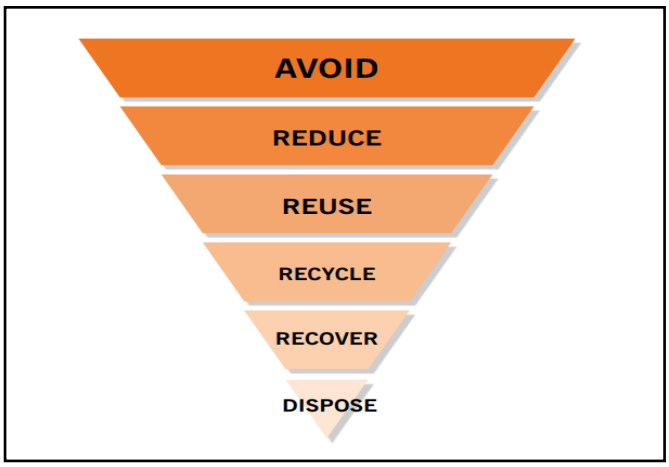


Figure 4. Population statistics of Katherine

3.3 NATIONAL POLICIES

Nationally, there are a lot of waste management issues being addressed, from the ban on exporting waste, to legislation regulating resource recovery within industry, to funding initiatives to establish markets for recycled materials. It is a dynamic field and undergoing considerable change. Within this moving context, it

will be essential for Katherine to remain open and flexible to these changes, to be ready to take advantage of the opportunities presented, yet not lock itself into a course of action that becomes superseded and requires an expensive correction. While these national changes will be largely directed at the more populous areas in the south and east of Australia, their impact will filter through to the Katherine community.

3.4 TERRITORY REGULATIONS

Environmental legislation requires landfills to review practices and upgrade facilities in line with best practice landfilling guidelines. All extensions or new landfill cells must meet rigorous design and construction standards. Closing existing landfill cells require expensive capping designs and post-closure monitoring. Upgrading the current KWMF may impact the environmental protection licencing requirements. All these major works will require extensive environmental auditing assessment and NTEPA approval.

The enormous costs involved in providing EPA compliant waste management facilities and services for rural and remote communities is not unique to KTC but impacts all Regional Councils within the Big Rivers Region. There has been a growing concept for pooling local resources and drawing upon Territory and National Governments to support the development of a Regional Waste Hub at Katherine to service the entire Big Rivers Region.

3.5 LOCAL REQUIREMENTS

Council aim to provide the Katherine community with an efficient and affordable waste disposal service and encourage reduce, reuse and recycle practices. Council endeavours to:

- Ensuring a safe and healthy environment within the Municipality, by providing effective waste collection and disposal services.
- Providing efficient waste management facilities, that are affordable for users, while maintaining service levels and asset value.
- Actively raising awareness of waste issues and promoting reduce, reuse and recycle practices.

4 WASTE INDUSTRY CHALLENGES AND OPPORTUNITIES

National and State Governments have developed policies and funding to stimulate the development of waste markets, but the range of options available remain small and are concentrated in the populated parts of Australia. The Territory Government acknowledges that, due to insufficient end-use market demand and a low economy-of-scale, it does not have the capacity to develop innovative recycle markets. Thus, the bulk of these markets are going to remain interstate for the foreseeable future. Katherine's small economy of scale and remoteness exacerbates this vulnerability and lack of access to recycle markets.

While energy-from-waste (EfW) facilities operate in other parts of the world, only a handful are in planned for Australia. These could be a potential market for high carbon content waste (tyres, plastics, wood, textiles, paper and cardboard). However, as most of the proposed EfW facilities are interstate, it is unclear whether transport costs would render these future options unviable for Katherine. There has been a proposal to build an EfW incinerator in Darwin to power a finance sector data security bank, but the proposal is yet to gain NTEPA approval and the timeframe for when this venture may become operational is unknown.

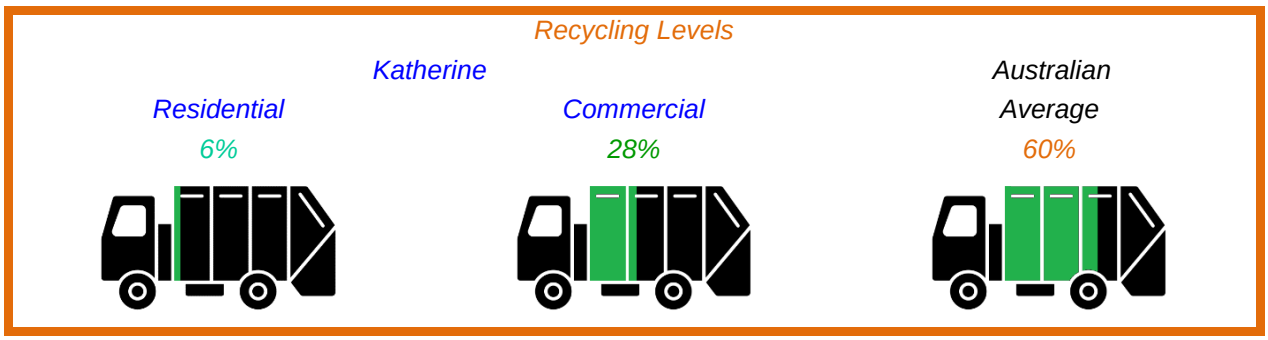


Figure 5. Recycling levels in Katherine versus the Australian average

5 KATHERINE WASTE DILEMMA

The history of waste management in Katherine has been similar to many rural and remote localities. In the early days, there was no regulation and few people to impact. In more recent times, society and governments have improved their understanding of the importance of protecting the environment and treating waste as a valuable resource. The twin problems of a low economy of scale and significant remoteness from existing recycle markets, together with little local historic precedent have undermined KTC's recycling efforts, though recent changes to the KWMF, including the charging structure have led to big improvements.

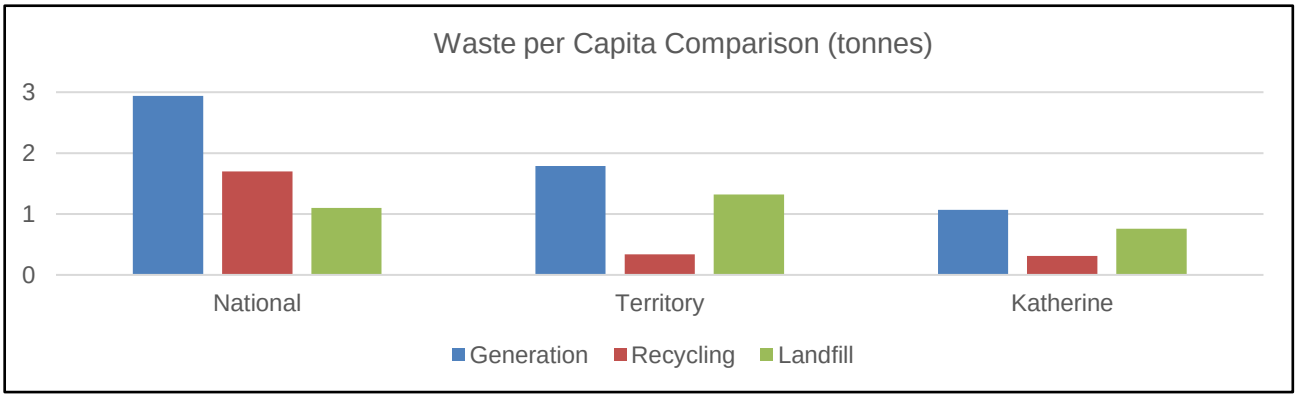


Figure 6. Waste data per capita

In 2017, a desktop assessment was made of the potential remaining lifespan of the landfill within the waste management facility. This realisation led to planning for a new landfill and closure of the existing landfill. Both activities must be conducted in line with NTEPA regulations. The costs involved are enormous and the process complex and time consuming. Estimates for a new landfill are around $5M. Closing a landfill has been estimated at about $1.5M per hectare. The current landfill is about 8 hectares, bringing closure costs to about $12M. An airspace assessment in 2020 suggested the current landfill has a remaining life span of 5yrs, but this could be extended out to about 11 years with appropriate management. This includes:

- using landfill specific machinery, to improve compaction rates, so more can be fitted in
- upgrading the transfer station, to improve recycle rates, so less has to be fitted in
- raise the height of the landfill by 2 metres, so there is more room to put waste in

KTC currently raise money to pay for promoting waste reduction and recycling, waste collection, KWMF operations and future infrastructure needs. However, there is a significant shortfall in revenue and costs. The air space of the existing landfill is estimated to be around $472/t, which is subsidised by rates and current weighbridge charges to leave a short fall of around $299/t.

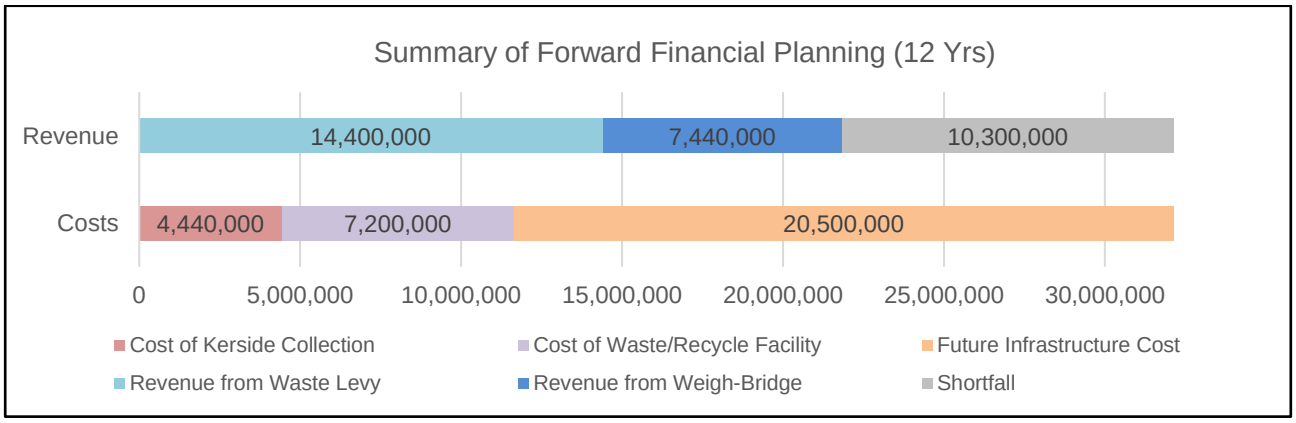


Figure 7. Financial planning over the next 12 years

By making early investments to facilities and equipment, modifications to operational practices, and adjustments to the final closure profile of the landfill, its life could be extended to around eleven years. This would:

- provide considerably more time to accumulate the revenue required to pay for these future infrastructure needs
- provide greater opportunity to establish revenue from resource recovery activities
- foster a change within the community to reduce waste generation and increase reuse and recycling activities
- enable staged closure of the existing landfill, breaking up that large cost into smaller amounts and spreading it out over a longer period
- defer for a few years the need to begin construction of a new landfill
- push back the cycle of opening new cells and closing old ones that the new landfill would require.

It is recommended at Council adopt the following measures:

- immediate (2021) investment to obtain or secure the services of a landfill-specific compactor and/or shredder machinery, to increase compaction rates
- immediate (2021) tendering for design of the upgrade of the transfer station, with a view to completing the lay down areas within the same year (2021) and the flat-floor sorting area within the next year (2022), to increase recycling rates and divert waste from the landfill
- immediate (2021) planning for waste placement to:
- raise the average height of the landfill by two metres
- prepare for the closure of the landfill in four stages to even out the costs across the life of the landfill
- immediate (2021) tendering for a Closure Plan that incorporates a four-stage capping strategy
- tendering for closure/capping works be undertaken as soon as the Closure Plan is completed, to ensure the first stage of capping can occur in 2023
- work on the new landfill to proceed, so that tenure arrangements, planning, Pastoral Board and EPA approvals, native title and professional design work are all completed, so that construction is ready to begin in 2027

The following graph illustrates the options for extending the life of the existing landfill, including. the timeframe and budgetary implications.

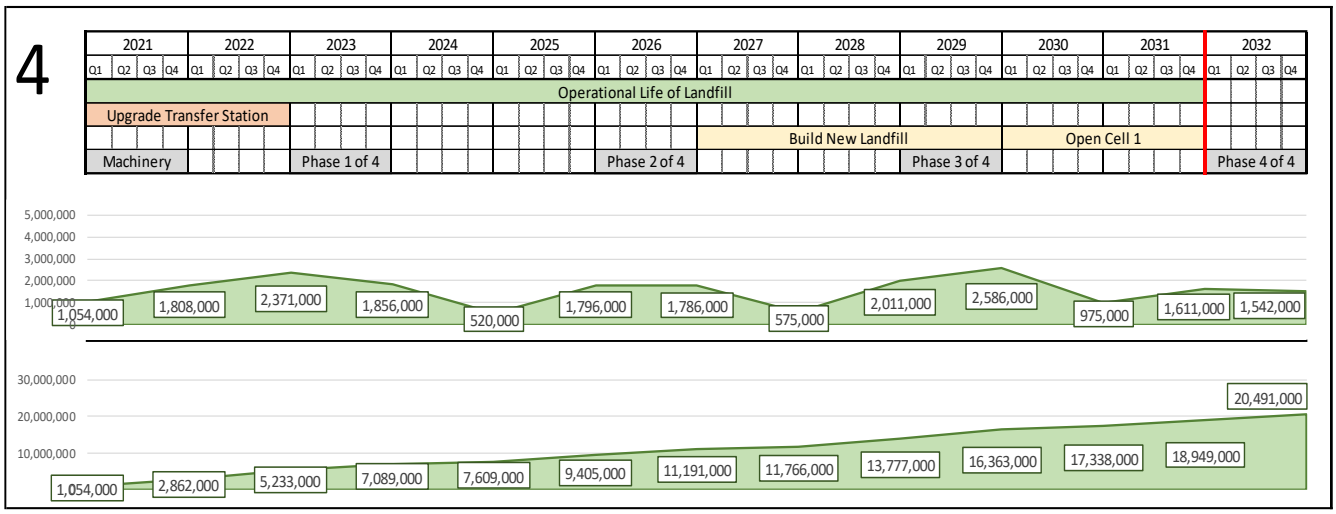


Figure 8. Graph outlining options to expand the lifespan of the landfill

6 WASTE MANAGEMENT STRATEGY

6.1 VISION

The vision of the KWMS is to ensure the community of Katherine has a total waste management service that:

- ensures a safe and healthy environment within the Katherine township and out-lying Municipal communities, by providing efficient waste disposal services and promoting sanitary practices.
- provides cost effective kerbside collection services and waste management facilities, that are affordable for users while raising sufficient revenue to maintain service levels and asset value.
- protects the public amenity and lifestyle of the Katherine community, ensuring no disturbances from noise, odours, sights, pests and so on.
- protects the environment, by maintaining the quality of surface and ground water, air, native fauna and flora ecosystems, and by eliminating pollution and illegal dumping.
- facilitates the development of a cyclic economy, through providing opportunities and promoting practices to reduce waste, re-use second-hand items, and recycle materials.

6.2 OBJECTIVES

This KWMS outlines actions to provide KTC with a clear direction over the next ten years. It will enable KTC to build upon key documents, including municipal plans, environmental management plans and environmental protection licenses.

Its objectives are organised in a set of interconnected themes:

6.2.1 GOVERNANCE

a. immediately establish a **strategic framework**, to guide KTC waste management policies, programs and service delivery, track progress, and enable a regular annual review of performance

b. ensure ongoing accurate and comprehensive waste **data** collection and analysis

c. ensure regular monitoring and reporting of service delivery effectiveness, in order to provide for **continuous improvement and best practice**

d. ensure ongoing monitoring, reporting and environmental auditing, in full compliance with **NTEPA licencing and regulations**

e. ensure ongoing professional levels of support and guidance for waste management **staff, contractors and partners** working in the transfer station, landfill and other related facilities

f. ensure ongoing **whole-of-Council integration** of waste management policies and targets, across Council's departmental operations, Council's procurement activities, service hires, hosting of public events, and so on.

6.2.2 PUBLIC ENGAGEMENT

g. engage with and **educate** the broader Katherine community (e.g. residents, commercial operators, schools, community organisations, etc) on ways to reduce, reuse and recycle waste material, through:

   i. undertaking regular waste education campaigns, within 1 year
   ii. participation in waste-related programs, such as Keep Australia Beautiful, Dirty Girl, One Planet Councils, within 2 years
   iii. establishment of a waste management education centre 2028

h. create **interactive formats** e.g. advisory committee, newsletters, press releases, web pages for regular two-way sharing of information e.g. policies and programs, charges and procedures, performance reports with all stakeholders e.g. rate payers, commercial operators and members of the general public within 1 year

i. across the life of the strategy, investigate the potential for developing **partnerships** with and between Council, community groups and commercial operators, such as:

   i. MOUs with stakeholders, such as fire department, veterinary clinics, within 1-2 year
   ii. a MRF for kerbside recycling, within 4-5 years
   iii. a green waste mulching operation within 4-5 years
   iv. a nursery within 5-6 years
   v. a tip shop within 7-8 years
   vi. an education centre within 8-9 years
   vii. cottage industry business incubator within 5-6 years
   viii. sustainable procurement policy advice service within 8-9 years

6.2.3 RESOURCE RECOVERY AND WASTE REDUCTION

j. encourage a community-wide **reduction** of waste generation of 10% across the life of the strategy, through establishing a recycle shop at the WMF, by 2027

   i. providing opportunities to reuse or recycle unwanted items
   ii. providing recycling advisory services to commercial and industrial bodies

k. improve **resource recovery** at the WMF, by increasing waste streaming from both commercial operators and domestic users, through upgrading the KWMF by 2023

   i. improved laydown areas
   ii. covered flat floor sorting facility
   iii. using the waste charges system to create incentive for sorting

l. by 2026, undertake research into developing **local markets** for recyclable materials through partnerships with existing enterprises or supporting small scale start ups

6.2.4 WASTE MANAGEMENT INFRASTRUCTURE AND SERVICES

m. ensure waste management facilities and services meet current and future **needs of stakeholders** residential and commercial with the Municipality, such as

i. kerbside collection and transfer station facilities for rate payers, residents and indigenous communities
ii. landfill capable of disposing of all the different types of waste including listed wastes generated by commercial and industry operators

n. ensure waste services maintain comparable **affordability** with other relevant jurisdictions, while meeting operational and future infrastructure costs

o. ensure ongoing development of **best practice** in operating facilities and delivering services

p. ensure ongoing **compliance with NTEPA regulations**, including:

i. appropriate planning, approvals and oversight of service delivery and infrastructure works:

- new landfill - Notice of Intent, Approvals, Licencing, Design and Construction
- existing landfill - Closure Plan, Capping Design, Post-closure Monitoring
- upgrading of transfer station - Approvals, Licencing for listed waste handling
- establishing new transfer stations and other facilities - Approvals, Licencing

ii. monitoring and reporting of environmental impacts

- water quality monitoring
- leachate management
- pyrolysis and fires
- nuisance issues - dust, noise, smells, etc
- accidents and incidents

q. undertake research into developing the KWMF as a **waste management regional hub** for the Big Rivers Region, working in partnership with NTG, Regional Councils, waste-related commercial operators, and waste management professionals, and to be completed by 2024.

6.2.5 PROTECTION OF THE NATURAL ENVIRONMENT AND MUNICIPAL AMENITY

r. reduce the incidence of **litter**, across the life of the strategy, through

i. establishing an education centre in conjunction with a recycle shop at the WMF
ii. providing education services to the public
iii. providing education campaigns targeted to indigenous communities and school groups
iv. improving wind-blown litter mitigation strategies at the WMF

s. eliminate **illegal dumping**, across the life of the strategy, through

i. working in partnership with NTG agencies, community groups to address the issue
ii. providing education services, public notices and targeted campaigns to the public
iii. arranging for 'Litter' Rangers to investigate and prosecute offenders

t. undertake research by 2024 into the impact of **climate change** on waste management practices and develop mitigation and adaptation strategies to achieve **carbon neutrality**

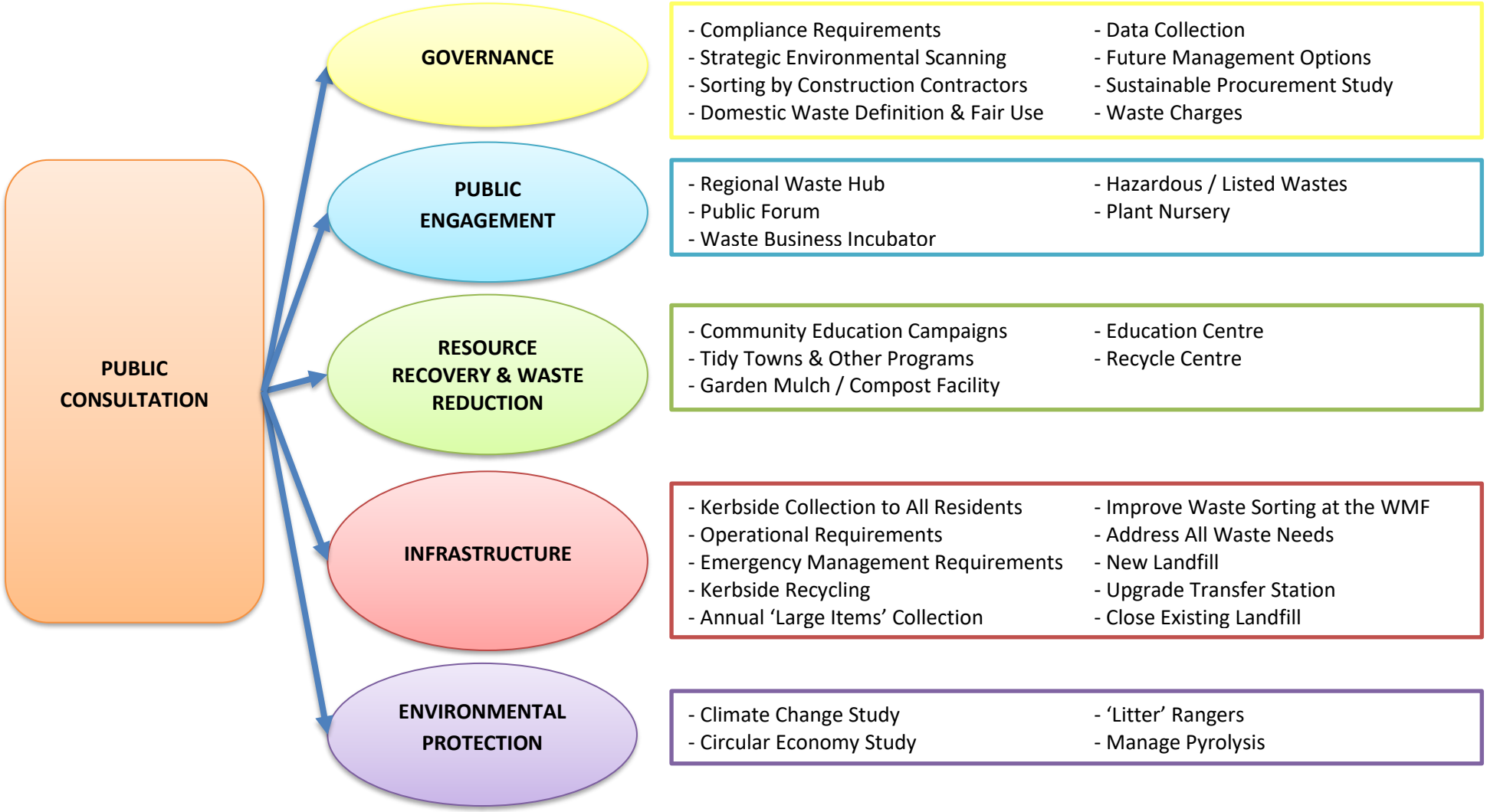
u. undertake research by 2025 into the barriers and opportunities for developing a **cyclic economy** within the Katherine community

7 RECOMMENDATIONS

The recommendations developed in the background study to this executive summary have been regrouped under their relevant objective themes in the following Action Plan Framework. Indicative timeframes, budgets and relevant stakeholders have been added. The types of Action which Council will need to engage in has also been categorised:

- **A** - research, policy & procedural development
- **B** - liaison, support, advocacy and collaboration
- **C** - engagement of consultants and contractors
- **D** - direct physical activity of Council

7.1 STRATEGY DEVELOPMENT PROCESS



7.2 PROPOSED ACTION PLAN

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
	Governance					
1	**Sustainable Procurement Study (Recommendation # 3)**	**2023**	**30 K**			
	review internal procurement policy to align with a circular economy		5 K			**A**
	raise awareness of the issues within the community		15 K	▪ Community		**B**
	establish guidance service and information materials for businesses and residents		10 K	▪ Businesses		**D**
2	**Environmental Scanning of Developments in Waste Management (Recommendation # 4)**	**2021**				
	maintain a watching brief and regularly report to Council on the national waste scene, identifying emerging issues that may impact on how KTC operate, such as: - regulatory changes to reporting (e.g. pollution) - national programs to deal with specific waste issues (e.g. changes to tyre stewardship) - funding grants that may become available to upgrade facilities and services	Ongoing		▪ NTG ▪ LGANT		**A**
3	**Compliance Requirements (Recommendation # 6)**	**2021**	**5 K**			
	undertake a study across all Territory related regulations, in order to identify: - how these regulations might impact Council's own waste management policies & programs - the extent of actions required for Council to be fully compliant	Ongoing	5 K	▪ NTG		**A**
4	**Data Collection (Recommendation # 10)**	**2021**	**75K**			
	establish arrangements for (C&D) contractors to pre-arrange for waste disposal at the KWMF	2021				**A**
	redevelop weighbridge so all vehicles can be weighed in and out	2022	50 K			**D**
	review categories of waste data collection to in line with industry standard	2022				**A**

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
	ensure all materials into the WMF can be tracked, to landfill or to recycle markets	2024	5 K	▪ NTG		D
	set up automated system to streamline efficiencies	2026	20 K	▪ Weighbridge Vendors		D
5	**Definitions of Waste Types (Recommendation # 11)**	**2021**				
	formalise the distinction between commercial waste and domestic waste			▪ Community		A
6	**Fair Use Policy (Recommendation # 22)**					
	develop a policy for fair domestic use of the transfer station (including public information sharing)			▪ Community		A
7	**Streaming of Waste by Construction Contractors (Recommendation # 23)**		**5 K**			
	establish requirements for C&D contractors to pre-arrange for waste disposal at the KWMF			▪ Contractors		A
	develop a formal 'Certificate of Social Responsibility' for companies with waste-sorting practices		5 K	▪ Businesses		B
8	**Waste Charges (Recommendation # 33)**	**2021**				
	review the charging structure to align with air-space values, in a stepped, gradual way, over the remaining life of the existing landfill			▪ Community ▪ Businesses		A
9	**Future Management Options (Recommendation # 35)**		**75 K**			
	undertake a feasibility study into outsourcing options for the operations of the WMF - transfer station - landfill (existing, new)	2023	25 K	▪ NTG ▪ LGANT ▪ Regional Councils		C

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
	investigate and implement outsourcing of operations and machinery hire where cost effective - shredding - fire management - earth works - kerbside collection - tip face management - material recycle facility (MRF) services	2021-26	40 K	▪ Community ▪ Businesses ▪ Waste Industry		D
	develop partnerships with local businesses to outsource or jointly operate: - recycle shop - education centre - green waste processing facility - plant nursery - business incubator	2024-28	10 K			B
	Public Engagement					
10	**Regional Waste Hub (Recommendation # 9)**		**25 K**			
	liaise with Big Rivers Region Stakeholders - to foster direction, support and funding	2021-22		▪ NTG ▪ LGANT		B
	support a joint study into developing a total Big Rivers Regional Waste Management Solution: - a centralised landfill - transfer stations in all large and small settlements, appropriate to their needs - coordinated, comprehensive and ongoing public education and awareness raising - partnership arrangements with private enterprises, re: - facility management - service delivery - development of recycle markets: - Tyres - Air Conditioners - Metals - Building Timbers - Paper/Cardboard - Plastics - Glass - E-Waste - Oil	2022-24	25 K	▪ Regional Councils ▪ Community ▪ Businesses ▪ Waste Service Providers		A B

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
11	**Public Engagement (Recommendation # 12)**	**2021**	**5 K pa**			
	undertake public forums, on a regular quarterly basis, to: - provide information to the public - receive feedback from users - explore trends in waste management and opportunities for the Katherine community		5 K pa	▪ Community ▪ Businesses		**B**
12	**Waste Business Incubator (Recommendation # 15)**	**2026**	**50 K pa**			
	liaise with Chamber of Commerce, Kalano Business Incubator, NTG and other potential stakeholders for direction, support and funding			▪ NTG ▪ Businesses		**B**
	explore the options of setting up a business incubator to foster and support cottage industry level businesses that use recovered waste materials		50 K pa			**A**
13	**Hazardous/Listed Wastes (Recommendation # 16)**	**2021**	**5 K**			
	foster the removal from the community of stockpiled hazardous waste - amnesty program - liaise with NTEPA, Regional Councils, NTG regarding any hazardous or dangerous situations (e.g. illegal dumps, car bodies, refrigerators)		5 K	▪ NTG ▪ Community ▪ Business		**B**
14	**Plant Nursery (Recommendation # 28)**	**2024-25**	**15 K**			
	liaise with stakeholders interested in establishing and operating a plant nursery			▪ Business		**B**
	explore options for setting up the project to include: - establishment of nursery, growing plants for Council and public sale		15 K			**A**
	Resource Recovery and Waste Reduction Strategies					
15	**Community Education Campaigns (Recommendation # 13)**	**Ongoing**	**15K**			
	engage professionals to deliver annual waste campaign for the Katherine community		15 K	▪ Community		**C**

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
16	**Tidy Town and other Programs (Recommendation # 14)**	**Ongoing**	**5 K pa**			
	arrange participation in the Tidy Towns Program		5 K pa	▪ KAB NT		D
	liaise with community groups to explore other potential programs, such as: - KAB-NT regarding their Eco-Schools Program - DirtGirlWorld regarding their Get Grubby program			▪ Community		B
17	**Recycle Centre (Recommendation # 25)**	**2027**	**250 K**			
	liaise with stakeholders with an interest to establishing and operating the recycle centre			▪ Business ▪ Community		B
	explore options for setting up the project as a social venture to take pressure off financial barriers and allow for greater social capital support (i.e. supported employment)					B
	establish the infrastructure required for a recycle centre - shop and staff amenities - covered and secure compound for storage and display - public access areas (goods drop-off point, customer car parking)		250 K			C

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
18	**Education Centre (Recommendation # 26)**	**2028**	**15 K**			
	liaise with stakeholders with an interest to establishing and operating the education centre			▪ Community		**B**
	explore the opportunities and requirements for establishing an education centre to: - run Council's public waste-awareness campaigns and events - outreach education to schools, clubs - inform and advise the public re home composting, reusing items, recycling containers - advisory service to businesses re sustainable procurement, improved waste management - sale of items to public for home composting, home recycling kits, etc			▪ NTG ▪ Community ▪ Businesses		**A B**
	investigate - infrastructure requirements for an education centre - requirements for the provision of services - outreach, materials, products, etc		15 K			**A**
19	**Garden Mulch/Compost Facility (Recommendation # 27)**	**2024-25**	**15 K**			
	liaise with stakeholders interested in establishing and operating a mulching facility					**B**
	explore options for setting up the green waste mulching facility		15 K			**A**
	Infrastructure and Services					
20	**Operational Requirements (Recommendation # 7)**		**36 K pa**			
	implement compliance requirements based on EPL & EMP					**D**
	develop Manual of Operations to foster best practice					**A D**
	conduct environmental monitoring and reporting in line with NTEPA and NPI regulations		36 K pa			**D**
21	**Emergency Management Requirements (Recommendation # 8)**					

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
	review arrangements for managing waste generated from natural disasters (floods, fires)			▪ Emergency Mngt Committee		A B
22	**Kerbside Recycling (Recommendation # 18)**		**55 K**			
	conduct sample bin audit to determine mix of kerbside waste		5 K			C
	partner with CDS operator to conduct limited trial of kerbside recycling		50 K			B C
	liaise with cafe/restaurant and landscape operators, to explore options for FOGO collection			▪ Businesses		B
23	**Extend Collection Services to all 'Rural-Suburbs' (Recommendation # 19)**					
	liaise with relevant residents (Edith, Florina, Venn)			▪ Target Residents		B
	explore options for waste collection services (kerbside, mini transfer stations, skip bins)			▪ Waste Service Providers		A
24	**Annual Kerbside 'Large Items' Collection (Recommendation # 20)**		**50 K pa**			
	explore options for setting up an annual, pre-Wet Season, large-item, kerbside collection			▪ Community ▪ Businesses ▪ Waste Service Providers		B
	contract service for community, for pre- Wet Season	Sep/Oct pa	50 K pa	▪ Waste Service Providers		C
25	**Address all waste types the community need to deal with (Recommendation # 24)**					
	study the types of waste needs that exist within the community			▪ NTG		A
	explore current and future options for managing these wastes			▪ Waste Service Providers		A B

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
26	**New Landfill (Recommendations # 5, # 29, # 32)**	**2023-31**	**2, 720 K**			
	undertake a short community consultation on the new site and access arrangements					**B**
	liaise with Manbulloo owners, NTG, NLC re tenure arrangements	2023-25		▪ Manbulloo ▪ NTG ▪ NLC		**B C**
	liaise with NTG, Pastoral Board, NTEPA re approvals and licencing for the facility	2023-25		▪ NTG ▪ Pastoral Board ▪ NTEPA		**B C**
	engage a consultant to design the new landfill, leachate and monitoring systems	2026	320 K			**C**
	construction (buildings, roads, fences, fire breaks, leachate system, ponds, earthworks, cells)	2027-29	2,300 K			**C**
	set up (operational procedures, staffing, equipment) for operations to begin in 2032	2030-31	100 K			**C D**
27	**Transfer Station (Recommendations # 21, # 30, # 32)**	**2021-22**	**5,250 K**			
	implement immediate (2021) remedial upgrades to laydown areas, internal roads, signage, etc	2021	55 K	▪ NTG ▪ Community ▪ Businesses		**D**
	immediately undertake to obtain the services of landfill-specific machinery (compactor, shredder) either through direct investment or long term contractual arrangements		1,000 K			
	engage consultant to design the upgrade to the transfer station	2021-22	75 K			**C**
	ensure the design makes provision (space, services, MOU's) for future developments - Recycle Shop, Education Centre, Greenwaste Mulching Facility, Plant Nursery					**C**
	construct roads and laydown areas to facilitate sorting recyclable materials	2021-22	400 K			**C**
	construct a large, covered, flat-floor sorting facility	2021-22	1,000 K			**C**
	set up (procedures, staffing, equipment, buildings) for operations to begin before 2023	2021-22	2, 720 K			**A D**

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
28	**Closure of Existing Landfill (Recommendations # 5, # 31)**		**12,546 K**			
	undertake remedial work to reshape the landfill footprint and batter profiles		600 K			C D
	engage a consultant to prepare a four stage closure plan and a post-closure monitoring plan, that allows for the final height of the landfill to be two metres higher than at present, and to be completed before 2022		75 K			C
	capping construction - Stage 1 - engage a contractor to be ready to begin work by 2023	2023	2,923 K			C
	capping construction - Stage 2	2026	2,923 K			C
	capping construction - Stage 3	2029	2,923 K			C
	capping construction - Stage 4	2032	2,923 K			C
	post closure monitoring	from 2023	180 K			D
	Protection of Environment and Amenity					
29	**Climate Change Study (Recommendation # 1)**	**2024**	**25 K**			
	undertake a study into the implications of climate change on the Katherine community		25 K			A
	develop a set of best practice mitigation and adaptation options.					A
30	**Circular Economy Study (Recommendation # 2)**	**2025**	**25 K**			
	undertake a study into the implications of a circular economy on the Katherine community		25 K			A
	develop best practice options for fostering small-scale, cottage industry recycling					A

	THEME - STRATEGIES	TIMEFRAME	$	STAKEHOLDERS	REF	TYPE
31	**'Litter' Rangers (Recommendation # 17)**	**2022**	**80 K pa**			
	bolster the number and capacity of Council Rangers to: - investigate and prosecute - conduct regular public awareness campaigns - maintain presence (e.g. signage, patrols)		80 K pa			D
	foster a greater partnership with stakeholders who deal with environmental protection issues: - research incidents, develop broad solutions, implement coordinated programs			▪ NTEPA ▪ DIPL ▪ Regional Councils		B
32	**Pyrolysis Fires (Recommendation # 33)**	**2021**	**500 K**			
	remedial works on batter slopes		400 K			C
	environmental audit		100 K			C