Environmental Management Specifications

eThekwini Municipality

April 2009

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Environmental Management Policy

Vision

By 2020, eThekwini municipality will enjoy the reputation of being Africa's most caring and liveable city, where all citizens live in harmony. This Vision will be achieved by growing its economy and meeting people's needs so that all citizens enjoy a high quality of life with equal opportunities, in a city that they are truly proud of. (Integrated Development Plan 2003-2007)

In support of the metro vision, a shared vision for Durban is that it is seen:

- *As a municipal area that strives for sustainable development – optimising the developmental benefits gained from the environment through managing and protecting it effectively.*
- *As a centre with a thriving, vibrant economy with full employment that reflects a balance between social justice and well-being, economic efficiency and ecological sustainability.*
- *Where all citizens enjoy a well-structured, efficient and user-friendly city, which values its unique character and natural beauty.*
- *As a home to people who enjoy a good quality of life, including adequate nourishment, housing and education, and who enjoy safe, clean and healthy places to work and play.*
- *As a place with a rich ecological biodiversity, where unique natural resources and features are protected and access by all is promoted.*
- *In which all people recognize their role in managing the integrated built and natural environment as an essential part of their lives, and as their contribution to the lives of generations to come.*
- *Acting proudly as a world leader in metropolitan environmental management.*

SCOPE

These Environmental specifications will guide the environmental management of construction activities in construction jobs within the eThekwini Municipal Area. In this document, environmental requirements from the various legislations as well as from the eThekwini Municipality's Environmental Management Policy have been translated into an easy to implement guide. For effective results, use of this document must take note of the following:

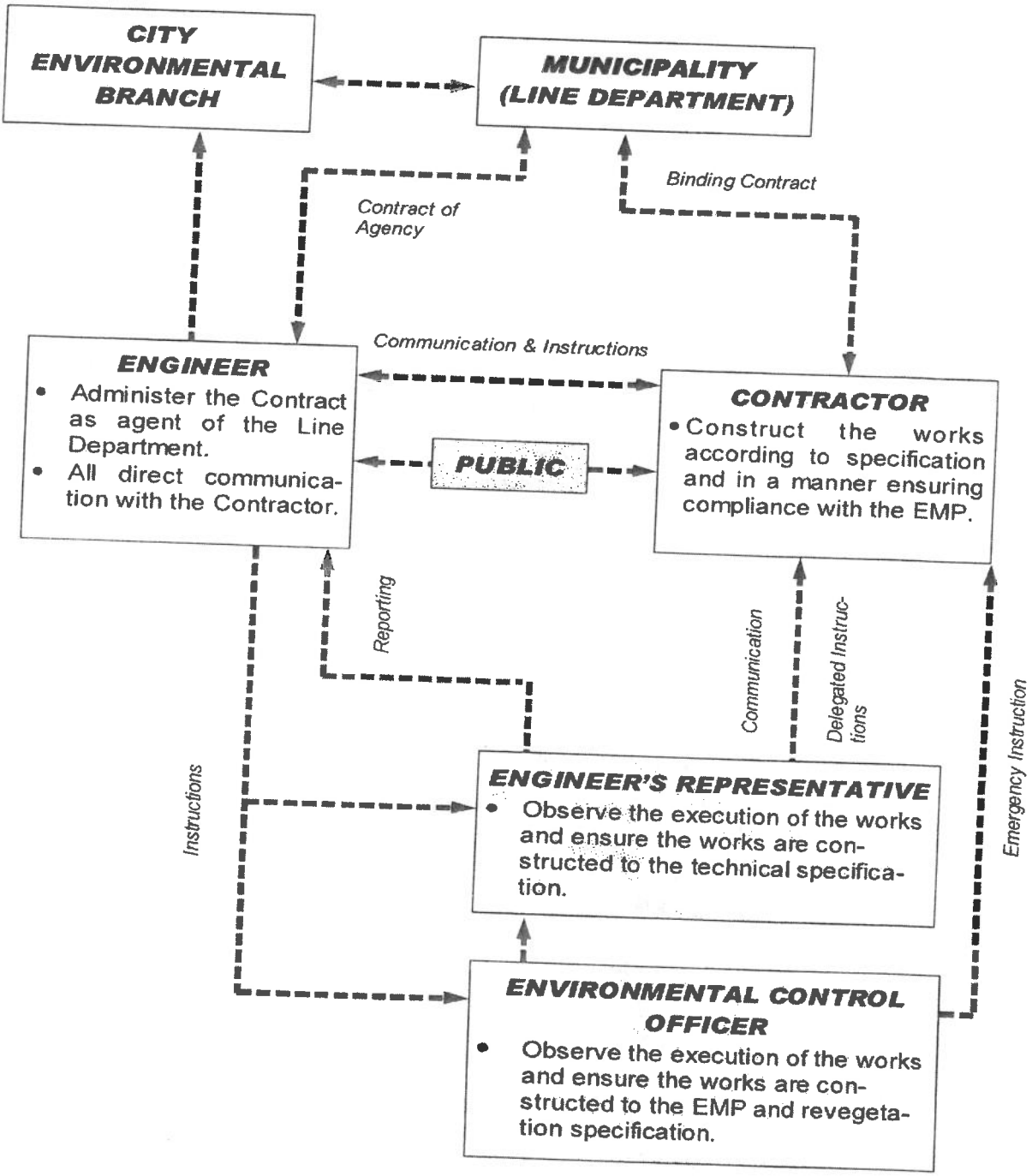
- Must be used in conjunction with any environmental authorisations issued by the other departments. These may include where applicable:
  i. The Record of Decision (ROD) from the Department of Agriculture and Environmental Affairs (DAEA).
  ii. Permits from the Department of Water Affairs and Forestry (alteration of a water course, removal of indigenous trees etc.)

- Where there is a project specific EMP that has been approved either as part of the Environmental Impact Assessment (EIA) or approved by the Environmental Management Department of the eThekwini Municipality, the project specific EMP will take precedence over this generic EMP
- Where a project specific EMP has been made a requirement, using this generic EMP as a project specific EMP is not acceptable. An EMP addressing specific environmental requirements of that specific project must be compiled. This generic document can, however, be used as a guide.

Compliance monitoring is to be done by an ECO where there is a requirement for one; otherwise this will be done by EMD officials of the Municipality.

- Where necessary, the ECO can request that specialist input be sought for specific activities pertaining to the environment during and post construction.
- Where this generic EMP is used for the City Capital Projects, ECO reports must also be forwarded to the Environmentalist: Municipal Infrastructure

PARTIES TO THE CONSTRUCTION CONTRACT AND THEIR INTERACTION



SECTION A: MANAGEMENT OF CONSTRUCTION ACTIVITIES AND WORKFORCE

		Responsibility
A.1 Access Routes *Sound environmental principles must be followed whilst establishing access to the site.*	A.1.1 Survey Points	
	a) Roads or trails that are cut to provide temporary access for survey work must be minimised.	Contractor (C)
	b) Marking of survey points must be done with the ECO's approval or Engineer where there is no ECO.	C
	c) Vegetation clearing must be kept to a minimum during survey operations, no trees to be removed unless with approval of the ECO.	C
	A.1.2 Access Routes	
	a) The Contractor must take into account any limitations identified and recommendations made during the environmental studies when deciding on an access route to the construction site. Where no EIA has been done, natural vegetation present on site must be avoided.	C
	b) The location of all underground services and servitudes must be identified and confirmed.	Engineer (E)
	c) Choice of access routes should take into account minimum disturbance to residents and businesses neighbouring the site.	E
	A.1.2.1 Maintenance of access roads	
	a) Movement of vehicles and machinery around the site must be restricted to designated routes otherwise operation outside these routes is illegal.	C
	b) Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damage as soon as these develop.	C
	c) If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt.	C
	d) Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas.	C
	e) Cognisance of vehicle weight / dimensions must be taken when using access constructed out of certain materials. e.g. paved surfaces / cobbled entranceways.	C
	A.1.3 Haulage Roads	
	a) All roads for construction access must be planned and approved by the Engineer and ECO ahead of construction activities. They should not be created on an ad-hoc basis.	E
	b) Roads must follow natural contours to reduce stormwater erosion.	E
	c) Roads must have as little cut and fill as possible.	E

	d) Road widths and the radii of curves are to be reduced to the minimum required.	E
	e) No trees / shrubs / groundcover may be removed or vegetation stripped without the prior permission of the Engineer/ECO.	E
	f) Agreed turning areas for haulage vehicles are to be formalised and used by the Contractor. No turning manoeuvres other than at the designated places shall be permitted.	E
	g) Contractors shall construct formal drainage on all temporary haulage roads in the form of side drains and mitre drains to prevent erosion and point source discharge of run-off.	C
	h) Scour check walls must be constructed in the side drains as follows:	C
	i) Scour checks can be constructed from rocks available on site or using driven wooden pegs. Smaller rocks must be placed on the invert of side drain upstream and downstream of the scour checks.	C
	j) Haulage roads must allow for the natural flow of water where required.	C
	k) All stream / river crossings and temporary bridges shall be built to the Engineer's/ECO's approval.	C
	l) Contractors shall ensure that all side and mitre drains and scour check walls on access and haul roads are functioning properly and are well maintained.	C
A.2. Setting up Construction Camp and Maintenance *Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.*	A.2.1 Layout a) Choice of site for the Contractor's camp requires the Engineer's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones and slip / unstable zones. A site plan must be submitted to the Engineer for approval.	E
	b) No – go areas identified at design or during the EIA process must be demarcated and fenced where possible. These may include environmentally sensitive areas and other existing servitudes.	E
	c) The construction camp may not be situated on a floodplain or on slopes greater than 1:3.	E
	d) If the Contractor chooses to locate the camp site on private land, he must get prior written permission from both the Engineer and the landowner.	C
	e) In cases where on-site accommodation will not be required, the construction camp can thus be comprised of: – site office – ablution facilities	

Gradient of Road	Scour Check Spacing
<4%	Not required
5%	20m
8%	10m
10%	5m

	– designated first aid area – eating areas – staff lockers and showers (where water and waterborne sewers are available) – material storage areas – batching plant (if required) – refuelling areas (if required) – maintenance areas (if required) - crushers (if required) - waste collection areas - parking areas for earthmoving equipment	
	f) Cut and fill must be avoided where possible during the set up of the construction camp.	C
	g) The size of the construction camp should be minimised (especially where natural vegetation or grassland has had to be cleared for its construction).	C
	h) Adequate parking must be provided for site staff and visitors and for earthmoving / construction equipment.	C
	i) The Contractor must attend to drainage of the camp site to avoid standing water and / or soil erosion.	C
	A.2.2 Ablutions	
	a) Where waterborne sewerage is not available, temporary chemical toilets must be provided by a company that has been approved by the Engineer. Such toilets must be available for all site staff, both at the camp site, and on all working areas as agreed by the Engineer.	C
	b) Toilets should be no closer than 50m from any natural water bodies.	C
	c) Toilets should not be further than 100m from where staff is working.	C
	d) No more than 20 people should share one toilet.	C
	e) Chemical toilets are to be maintained in a clean state and should be moved to ensure that they adequately service the work areas.	C
	f) The construction of "long drop" toilets is forbidden.	C
	g) Under no circumstances may open areas or the surrounding bush be used as a toilet facility.	C
	h) All shower areas must be properly constructed and must drain into a properly constructed soak away when waterborne sewerage is not available.	C
	A.2.4 Eating Areas	
	a) Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	C
	b) All litter throughout the site should be picked up and placed in the bins provided.	C
	A.2.5 Housekeeping	

	a) The contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	C
A.3. Education of Site Staff on General and Environmental Conduct *These points need to be made clear to all staff on site before the project begins.*	A.3.1 Environmental Education and Awareness Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: - What is meant by "environment". - Why the environment needs to be protected and conserved. - How construction activities can impact on the environment. - What can be done to mitigate against such impacts. - Awareness of emergency and spills response provisions. - Social responsibility during construction. e.g. being considerate to local residents. It is the Contractor's responsibility to provide the site foreman with no less that 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. a) Translators are to be used where necessary. b) The Engineer / Environmental Control Officer should be on hand to explain more difficult / technical issues and to answer questions. c) The use of pictures and real-life examples is encouraged as these tend to be more easily remembered. d) Use should be made of environmental awareness posters on site. e) Construction workers should be made aware that they are not to make excessive noise (e.g. shouting / hooting) when the site is near to commercial / residential areas. f) The need for a "clean site" policy also needs to be explained to the construction workers. g) The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. A.3.2 Worker Conduct on Site	C C C C C C C C C C C

	A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:	
	a) No alcohol / drugs to be present on site.	C
	b) No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel).	C
	c) Prevent excessive noise.	C
	d) Prevent unsocial behaviour.	C
	e) Bringing pets onto the site is forbidden.	C
	f) No harvesting of firewood or medicinal plants, no hunting, trapping or collection of birds or animals from the site or from the areas adjacent to it.	C
	g) Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility are forbidden).	C
	h) Trespassing on private / commercial properties adjoining the site is forbidden.	C
	i) Driving under the influence of alcohol is prohibited.	C
	j) Other than pre-approved security staff, no workers shall be permitted to live on site.	C
A.4. Establishing Storage Areas *Storage areas can be hazardous, unsightly and can cause environmental pollution if not designed and managed carefully.*	A.4.1 General Substances and Materials	
	a) Choice of location for storage areas must take into account prevailing winds, distance to water bodies and general on-site topography.	E
	b) Storage areas must be designated, demarcated and fenced if necessary.	C
	c) Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by children / animals etc.	C
	d) Fire prevention facilities must be present at all storage facilities.	C
	e) If electrical equipment for substations is stored on site a fire break will be required around the storage area.	C
	A.4.2 Hazardous Substances and Materials **Definition**: Hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic. Examples include: - diesel, petroleum, oil, bituminous products - cement - solvent based paints - lubricants - explosives	

	- drilling fluids - pesticides, herbicides - LPG	
	a) In some cases, storage of hazardous substances may require EIA authorization. The contractor is to ensure that such authorization has been obtained before such substances are kept on site.	C
	b) Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.	C
	c) Hazardous storage and refuelling areas must be bunded with an impermeable liner to protect groundwater quality. The Contractor shall submit a method statement to the Engineer for approval.	C
	d) Fuel tanks must meet relevant specifications and be bunded and elevated so that leaks may be easily detected. Fuel bunds must be constructed to properly contain at least the entire maximum volume of the fuel being stored.	C
	e) Storage areas containing hazardous substances / materials must be clearly demarcated and required signs displayed..	C
	f) It is very important that the proximity of houses, schools etc is taken into account when deciding on storage areas for hazardous substances.	E
	g) Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.	C
	h) Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	C
	i) Contractors shall submit .a method statement and plans for the storage of hazardous materials and emergency procedures.	C
A.5. Handling of Hazardous substances / materials	A.5.1 Handling of Hazardous Materials	
	a) All concrete mixing must take place on a designated, impermeable surface.	C
	b) No vehicles transporting concrete to the site may be washed on site.	C
	c) No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.	C
	d) Lime and other powders must not be mixed during excessively windy conditions.	C
	e) All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.	C
	f) Hazardous substances / materials are to be transported in sealed containers or bags.	C

	g) Spraying of herbicides / pesticides should not take place under windy conditions and must comply with OHSA specs and other chemical handling laws. The emergency numbers in Section C should be consulted should any accidents / spillages of hazardous substances and / or materials take place. The Contractor is to outline a method statement for the dealing of accidents / spillages of hazardous materials. This statement must be handed to the Engineer as well as to DWAF should the incident occur near to a body of water.	C
A.6. Materials Management – Sourcing *Materials must be sourced in a legal and sustainable way to prevent off-site environmental degradation.*	A.6.1 Source of Materials a) Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work. b) The supplier must provide proof that they have sourced materials from an approved site. A signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation. c) Where materials are borrowed (mined), proof must be provided of authorisation to utilise these materials from the landowner / mineral rights owner and the Department of Minerals and Energy. A.6.2 Stockpile Management a) Stockpiles should not be situated such that they obstruct natural water pathways. b) Stockpiles should not exceed 2m in height unless otherwise permitted by the Engineer. c) If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by indigenous vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.	C C C C C C C
A.7. Dust Control	a) Vehicles travelling along the access roads must adhere to speed limits to avoid creating excessive dust. b) A speed limit of 30km/hr must be adhered to on all dirt roads unless specified otherwise. c) Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust. d) Where dust is unavoidable in residential or commercial areas, screening may also be required utilising wooden supports and shade cloth.	C C C C

	e) Stockpiles may cause dust and so must be managed in accordance with the guidelines in Materials Management in section A.6. above. f) Fine materials being transported must be covered with tarps or equivalent material.	C C
A.8. Air Pollution *Establishment of the camp site, and related temporary works can reduce air quality.*	a) The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed. b) Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption etc. c) Should excessive emissions be observed, the Contractor is to have the equipment seen to as soon as possible. d) No fires are allowed on site except for the burning of firebreaks.	C C C C
A.9. Water Quality *Water quality is affected by the incorrect handling of substances and materials. Soil erosion and sediment is also detrimental to water quality.* *Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.*	a) Storage areas that contain hazardous substances must be bunded with an approved impermeable liner. b) Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity. c) A designated, bunded area is to be set aside for vehicle washing and maintenance. Materials caught in this bunded area must be disposed of to a suitable waste site or as directed by the Engineer. d) Care must be taken to ensure that run-off from vehicle or plant washing does not enter the ground water. Wash water must be passed through a three-chamber sand, oil and grease trap prior to being discharged as effluent to a regular municipal sewer. e) Provision should be made during set up for all polluted run off to be treated to the Engineer's approval before being discharged into the stormwater system. f) Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these should then be disposed of to a suitable waste site. g) Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Engineer) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc. h) Emergency contact numbers in Section C should be referred to in order to deal with spillages and contamination of aquatic environments.	C C C C C C C C
A.10. Waste Management	A.10.1. Set up of waste management procedures	

and Disposal *Definition: "Refuse" refers to all construction waste (such as rubble, asphalt millings, cement bags, waste cement, timber, cans, other containers, wire and nails), household and office waste*	a) The excavation and use of rubbish pits on site is forbidden.	C
	b) Burning of waste is forbidden.	C
	c) A fenced area must be allocated for waste sorting and disposal.	C
	d) Individual skips for different types of waste (e.g. "household" type refuse, building rubble, etc) should be provided. See section C for waste disposal resources within the eThekwini area.	C
	A.10.2 <u>On-Site Waste Management</u>	
	a) Refuse must be placed in the designated skips / bins which must be regularly emptied. These should remain within demarcated areas and should be designed to prevent refuse from being blown out by wind.	C
	b) In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front where relevant.	C
	c) Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	C
	d) Recycling is to be encouraged by providing separate receptacles for different types of waste and making sure that staff are aware of their uses.	C
	A.10.3 <u>Waste disposal</u>	
	Non-hazardous Waste	
	All waste must be removed from the site and transported to a landfill site as listed in Section C.	C
	a) Waybills proving disposal at each site shall be provided for the Engineer's inspection.	C
	b) Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the Engineer, or at disposal sites as listed in Section C.	C
	c) Waste from chemical toilets should be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas.	C
	Hazardous Waste	
	a) Hazardous waste disposal must be carried out by an approved waste Contractor as listed in Section C. Waybills for this should be provided.	C
	b) A sump (earth or other) must be created for concrete waste. This is to be de-sludged regularly and the cement waste is to be removed to a tip site as approved by Durban Solid Waste or listed in Section C.	C

A.11. Social Impacts *It is important take notice of the needs and wishes of those living or working adjacent to the site. Failure to do say can cause disruption to work and increase costs in the form of delays.*	A.11.1 Public Participation a) During the set up phase of the project, the Contractor needs to make contact with those people that are Interested or Affected by the development (I&AP's).	C
	b) These people will usually have been identified by the environmental consultant that was assigned to the project. If this wasn't the case, the I&AP's can be identified as those who either: - Live close by to the site - Work close by to the site - Will have their services / infrastructure affected by the project - Have a general interest in the project - The Councillor for the ward in which the construction is taking place.	C
	A.11.2 Visual Impacts a) Storage facilities, elevated tanks and other temporary structures on site should be located such that they have as little visual impact on local residents as possible.	C
	b) Lighting on the construction site should be pointed downwards and away from oncoming traffic and nearby houses.	C
	c) In areas where the visual environment is particularly important (e.g. along commercial / tourism routes), the site may require screening in the form of shade cloth or other suitable materials prior to the beginning of construction.	C
	d) Special attention should be given to the screening of highly reflective materials on site.	C
	e) If screening is being used, this must be moved and re-erected as the work front progresses.	C
	f) The site must be kept clean to minimise the visual impact of the site.	C
Regular communication between the Contractor and Interested and Affected Parties (I&AP's) is important for the duration of the contract.	A.11.3 Disruption of Infrastructure and Services a) Disruption of access for local residents must be minimised and must have the Engineer's permission.	C
	b) The Contractor is to inform neighbours in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the Engineer's and Contractor's details or other method approved by the Engineer.	C
	A.11.4 Noise a) Construction vehicles are to be fitted with standard silencers prior to the beginning of construction.	C

	b) Equipment that is fitted with noise reduction facilities (eg Side flaps, silencers etc) will be used as per operating instructions and maintained properly during site operations.	C
	c) Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbours.	C
	d) Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site.	C
	e) Examples of these include: - noise generated by jackhammers - blasting - drilling - dewatering pumps	
	f) Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	C
	A.11.5 Communication with Interested and Affected Parties (I&AP's)	
	a) The Engineer and Contractor are responsible for on-going communication with those people that are interested in / affected by the project.	E & C
	b) A complaints register should be housed at the site office. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. This register is to be tabled during monthly site meetings.	C
	c) I&AP's need to be made aware of the existence of the complaints book and the methods of communication available to them.	C
	d) Queries and complaints are to be handled by: - documenting details of such communications - submitting these for inclusion in complaints register - bringing issues to Engineer's attention immediately taking remedial action as per Engineer's instruction	C
	e) Selected staff are to be made available for formal consultation with I&AP's in order to: - explain construction process - answer questions	C
A.12. Security and Safety	A.12.1 Fencing	
	a) Secure the site in order to reduce the opportunity for criminal activity in the locality of the construction site.	C
	b) Confined sites within residential / commercial areas should be fenced and manned to control the access of persons to the site. Note: This is not always feasible on linear projects such as roads or pipelines.	C
	c) Potentially hazardous areas such as trenches are to be demarcated and clearly marked with appropriate signage.	C
	A.12.2 Lighting	

	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.	C
	A.12.3 Risks Associated with Materials on Site	
	a) Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	C
	b) Flammable materials should be stored as far as possible from adjacent residents / businesses.	C
	c) Fire fighting equipment should be present on site at all times as per OHSA.	C
	d) Obstruction to drivers' line of site due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	C
	e) No materials are to be stored in unstable or high-risk areas such as in floodplains or on steep slopes.	C
	f) All IAP's should be notified in advance of any known potential risks associated with the construction site and the activities on it.	C
	Examples of these include: - stringing of power lines - blasting - earthworks / earthmoving machinery on steep slopes above houses / infrastructure - risk to residences along haulage roads / access routes	

A.13. Soil Erosion

The stripping of vegetation during preliminary activities and earthworks on site greatly increases the risk of erosion.

Uncontrolled soil erosion may cause siltation and pollution of water bodies and result in loss of valuable topsoil.

A.13.1 Topsoil Stripping and Stockpiling

Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area. C

A.13.2 Exposed Surfaces

a) The full length of the works shall not be stripped of vegetation prior to commencing other activities. The time that stripped areas are exposed shall be minimised wherever possible. C

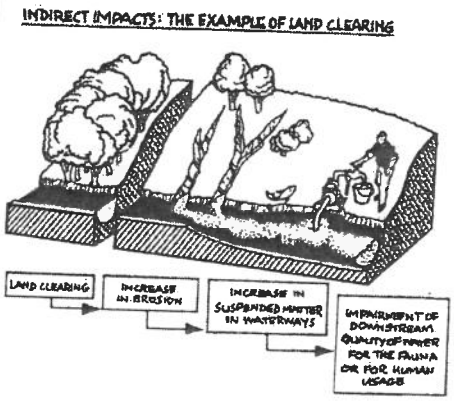


Figure 1: Effects of land clearing

b) Topsoiling and revegetation shall commence immediately after the completion of an activity and at an agreed distance behind any particular work front. E

c) Stormwater control and wind screening should be undertaken to prevent soil loss from the site. E

d) Side tipping of spoil and excavated materials shall not be permitted – all spoil material shall be disposed of as directed by the Engineer. E

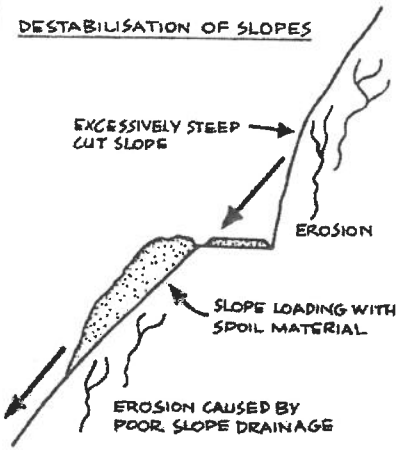


Figure 2: Problems caused by side tipping

e) Battering of all banks shall be such that cut and fill embankments are no steeper than previous natural slopes unless otherwise permitted by the Engineer. Cut and fill embankments steeper than previous ground levels shall be revegetated immediately on completion of trimming or shall be protected against erosion using bioengineered stabilisation measures as shown in figures 3 & 4. Deep-rooted vegetation such as Vetiver grass is effective to stabilise steeper embankments. — C

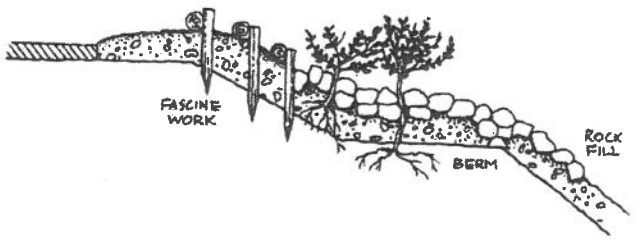


Figure 3: Bio-engineered solution to slope stabilisation

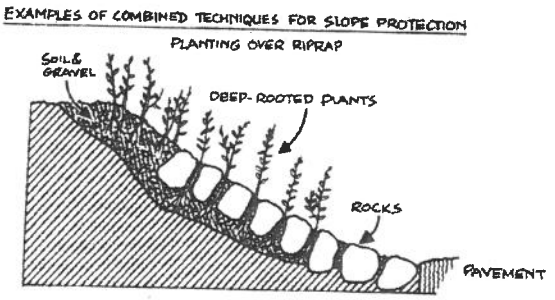


Figure 4: Further bio-engineering solutions to slope protection

f) All embankments, unless otherwise directed by the Engineer, shall be protected by a cut off drain to prevent water from cascading down the face of the embankment and causing erosion. — C

A.14. Storm-water *Serious financial and environmental impacts can be caused by unmanaged stormwater.* *Construction activities frequently result in diversions of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water.* *Measures in this section are aimed at reducing the erosive potential of stormwater.*	A.14.1 General Principles: a) To prevent stormwater damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system designed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings (siting and return period etc). b) During site establishment, stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer. (e.g. due to demolition work). c) Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. d) The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies should be kept to a minimum in terms of: - Removal of riparian vegetation - Opening up of the stream channel e) Earth, stone and rubble must not be placed in stormwater channels, drainage lines or rivers. f) There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. g) The use of high velocity stormwater pipelines should be avoided in favour of open, high friction, semi-permeable channels wherever feasible. h) A number of smaller stormwater outfall points should be constructed rather than a few large outfall points. i) Stormwater outfalls should be designed to reduce flow velocity and avoid streambank and soil erosion. A.14.2 Stormwater Detention Ponds a) Detention ponds should be vegetated either with wetland vegetation or grass from the Revegetation Specification. The detention ponds must not block the water flow, but should encourage spreading of the flow over a wider area to reduce velocity and encourage infiltration. (see figure 5). b) Peak stormwater discharge from the site / area should not be increased with development of the site / area. Stormwater should be detained on site through the use of stormwater detention ponds wherever possible. A series of detention ponds may be required where flow volumes are high.	C C C C C C C C C C C C

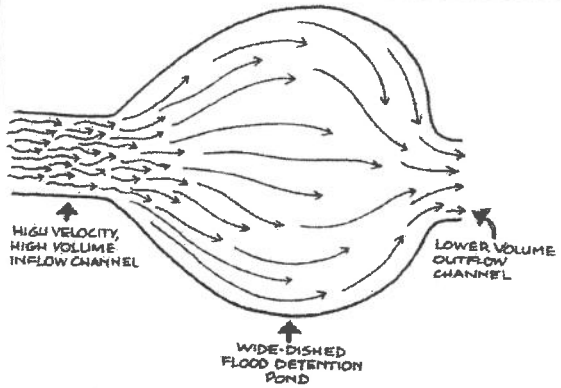


Figure 5: Reduced flow velocity due to dispersal by detention pond.

A.14.3 Unchannelled Flow

a) During construction unchannelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw / hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependant on slope. (see figure 6 & 7). C

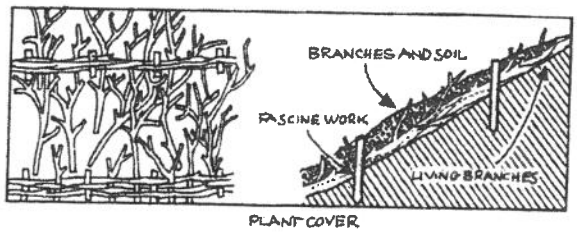


Figure 6: Brush packing of plant material to guard against loss of topsoil during heavy rains.

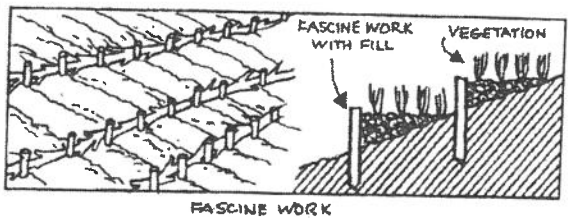
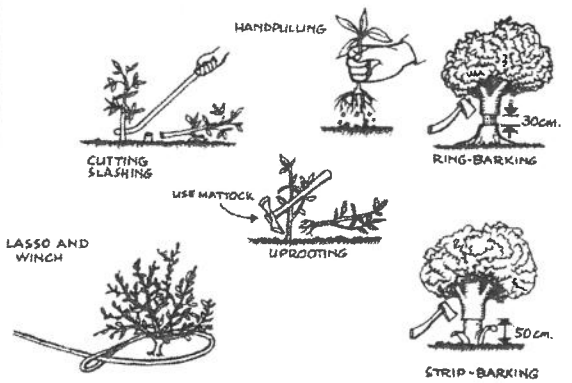


Figure 7: Fascine work to guard against erosion and washaways.

b) Where surface runoff is concentrated (e.g. along exposed roadways / tracks), flow should be slowed by contouring with hay bales or bundled vegetation generated during site clearance operation. If the area must be used for construction vehicles, berms may be used instead. The berms must be at least 30cm high and well compacted. The berms should channel concentrated flow into detention ponds or areas protected with hay bales for flow reduction and sediment capture. C

A.15. Conservation of Natural Environment	A.15.1 Fauna and Flora	
	a) No vegetation may be cleared without prior permission from the Engineer.	C
	b) Trees that are not to be cleared should be marked beforehand with danger tape. The ECO must be given a chance to mark vegetation that is to be conserved before the Contractor begins clearing the site.	C
	c) Only trees that have NOT been marked beforehand are to be removed.	C
	d) Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material).	C
	e) Disturbance to birds, animals and reptiles and their habitats should be minimised wherever possible.	C
	f) The hunting of birds and animals on site and in surrounding areas is forbidden.	C
	g) Snares and traps on site and in surrounding areas are forbidden.	C
	h) Immediate revegetation of stripped areas and removal of aliens by weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation.	C
	i) Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction.	C
		
	Figure 8: Methods of alien vegetation clearing	
	j) Where possible, cleared indigenous vegetation should be kept in a nursery for use at a later stage in the site rehabilitation process.	C
	A.15.2 Sensitive Habitats	
	Areas which are identified by the Engineer or the environmental control officer as being ecologically sensitive and which are adjacent to any construction work are to be suitably demarcated to prevent damage by	C

	plant and labour. Temporary bonnox type fencing should be used and should be moved in phases as the construction progresses from one area to the next.	
A.16. Cultural Environment	Prior to the commencement of construction, all staff need to know what possible archeological or historical objects of value may look like and to notify the Engineer / Contractor should such an item be uncovered. a) Possible items of historical or archaeological value include old stone foundations, tools, clayware, jewellery, remains, fossils etc. b) Should something of this nature be uncovered, the Research and Professional Services Division of AMAFA should be contacted and work should be stopped immediately. AMAFA's head office is in Ulundi and their PMB office will deal with any queries within the eThekwini Municipality. c) The contact details are: telephone no 033-3946543, fax 033-3426097.	C E E
A.17. Climate Change The climate is changing due to the anthropogenic production of greenhouse gases and land-use change. Minimising the release of greenhouse gases and area of land disturbed should thus be strived throughout the construction and post construction activities.	Construction and post construction activities have the potential to contribute significantly to climate change through the use of carbon intensive equipment, transport of materials and labour as well as through the removal of vegetation and soil disturbance. It is therefore the responsibility of both the engineer and contractor to be aware of the effect of their activities on climate change and limit these impacts wherever possible. This should be done by: a) Utilizing materials that are produced as close to the site as possible, that require less carbon in their production, have been or can be recycled, have acceptable longevity and use less packaging. b) Minimizing the removal of vegetation and disturbance of the soil (both carbon stores) c) Utilizing carbon emissions efficient vehicles in a conservative manner. d) Educating employees about the impacts of climate change and the ways to mitigate their contribution to climate change.	C C C C

SECTION B: POST CONSTRUCTION ACTIVITIES

		Responsibility
B.1 Construction Camp	a) All structures comprising the construction camp are to be removed from site.	C
	b) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. and these should be cleaned up.	C
	c) All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be topsoiled and re-grassed using the guidelines set out in the revegetation specification that forms part of this document.	C
	d) The Contractor must arrange the cancellation of all temporary services.	C
B.2 Vegetation	a) All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation.	C
	b) Open areas are to be re-planted as per the revegetation specification.	C
	c) All vegetation that has been cleared during construction is to be removed from site or used as mulch as per the revegetation specification, (except for seeding alien vegetation).	C
	d) The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.	C
B.3 Land Rehabilitation	a) All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.	C
	b) All rubble is to be removed from the site to an approved disposal site as listed in Section C or approved by the Engineer. Burying of rubble on site is prohibited.	C
	c) The site is to be cleared of all litter.	C
	d) Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer.	C
	e) All embankments are to be trimmed, shaped and re-planted to the satisfaction of the Engineer.	C
	f) Borrow pits are to be closed and rehabilitated in accordance with the DME-approved management plan for each borrow pit. The Contractor shall liase with the Engineer regarding these requirements.	C
	g) The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.	C

SECTION B: POST CONSTRUCTION ACTIVITIES

B.4 Materials and Infrastructure	a) Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	C
	b) All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.	C
	c) All leftover building materials must be returned to the depot or removed from the site.	C
	d) The Contractor must repair any damage that the construction works has caused to neighbouring properties.	C
B.5 General	a) A meeting is to be held on site between the Engineer, ECO and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer and ECO prior to "sign off" or completion being.	E
	b) Temporary roads must be closed and access across these blocked.	C
	c) Access or haulage roads that were built across watercourses must be rehabilitated by removing temporary bridges and any other materials placed in / or near to watercourses. Revegetation of banks or streambeds must be as necessary to stabilise these and must be approved by the Engineer and ECO.	C
	d) All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer and ECO.	C

SECTION C: CONTACT NUMBERS UPDATED JULY 2008

C.1 General Numbers	
eThekwini Police	**24 hr Emergencies**: Tel: 031-361 00 00 Control Room/General Enquiries: Tel: 031-300 33 99 Or 031-300 32 85
eThekwini Fire Department	**24 hr Emergencies**: Tel: 031-361 00 00
eThekwini Electricity (Electrical Call Centre)	Help line: Tel: 0801 313111
eThekwini Water (Engineering Service Contact Centre)	Help line: Tel: 0800 323235
eThekwini Waste Water (Engineering Service Contact Centre) (Emergencies, spillages, pollution of water bodies and General Enquiries)	Help line: Tel: 0800 323235
eThekwini Environmental Management Branch	Tel: 031-311 7875
Abzorbit (24 Hour response for oil and chemical spills on land or water, bioremediation, distributors of PEAT SORB)	**24 hr Emergency Response** Doug: 083 269 8790 Gerald: 083 2536618
FFS Refiners (for the free collection of used lubricating oil)	Tel: 031-465 1466
ROSE Foundation (for the free collection of used lubricating oil)	Tel: 086 110 1961

C.2 Waste Management Contact Details	
Durban Soil Waste (DSW) Disposal Branch – General Waste Help Line (Contact for locations and facilities offered at refuse sites within the eThekwini Municipality)	Tel: 031 - 302 4804 Fax: 031- 263 1122
Durban Soil Waste (DSW) Disposal Branch – Landfill Site Help Line (Contact for locations and facilities offered at landfill sites within the eThekwini Municipality)	Tel: 031 - 2631371 Fax: 031 - 2631310
DSW Business Branch (Contact for arranging refuse collection from the construction site)	Tel: 031 - 3024807 Fax: 031 - 2631119

C.3 Permitted Hazardous Waste Sites & Hazardous Waste Contractors	
Bulbul Drive, Chatsworth (Waste Services) This site handles general and low hazardous waste.	Waste Services: Tel: 031-460 4600
Shongweni (Enviroserv Waste Management) This site handles general and low hazardous waste.	Site (Nick Mannie): Tel: 031-769 1134 Enviroserv: Tel: 031-902 1526

C.4 DSW Permitted General Waste Sites (for All Non-Hazardous Waste)	
Bisasar Road – Springfield	Tel: 031 - 263 1371
Tongaat/La Mercy	Tel: 082 532 9527 or 072 233 8960
Mariannhill	Tel: 031 – 7008929/46
Kwamgenwa (South Coast)	Morgan Nadasen: Tel: 031 – 4625320

C.5 DSW Non-Managed Disposal Sites (for Building Rubble, Spoil Material, Garden Refuse)	
Shallcross (near Chatsworth)	Tel: 031 - 7008929
Wyebank (Kloof)	Tel: 031 - 7008929

SECTION C: CONTACT NUMBERS UPDATED JULY 2008

C.6 Garden Refuse Sites for contractors (No numbers available)
General enquiries: 031 311 8830
Bellair Road (This is a full recycling facility and accepts materials such as glass, plastic, used appliances, steel, & copper.)
Mount Edgecombe (Off Flanders Road)