

3.4.3 Pollution and Environmental Degradation (Impacts)

Land use activities and resource consumption place pressures on the environment and gradually deteriorates natural resources such as air, water and soil. The EMF establishes the spatial linkages between the use of land, the location of pollution sources and the manner in which this have changed the quality of the environment to inform the desired state of environment for the area.

Large-scale landscape modification:

The construction and development of the port and harbour and associated infrastructure have resulted in extensive transformation of the landscape. This has modified the landscape surface and impacted the natural functioning of ecosystems. Linear infrastructure (road and railway networks) has partitioned the land and created barriers that impact the flow of ecosystem goods and services. The impacts on natural geomorphological processes cause sedimentation concentration and alter drainage patterns of the floodplain area. Similarly the Gypsum Slimes Dam that was built on the floodplain has blocked the natural drainage of water.

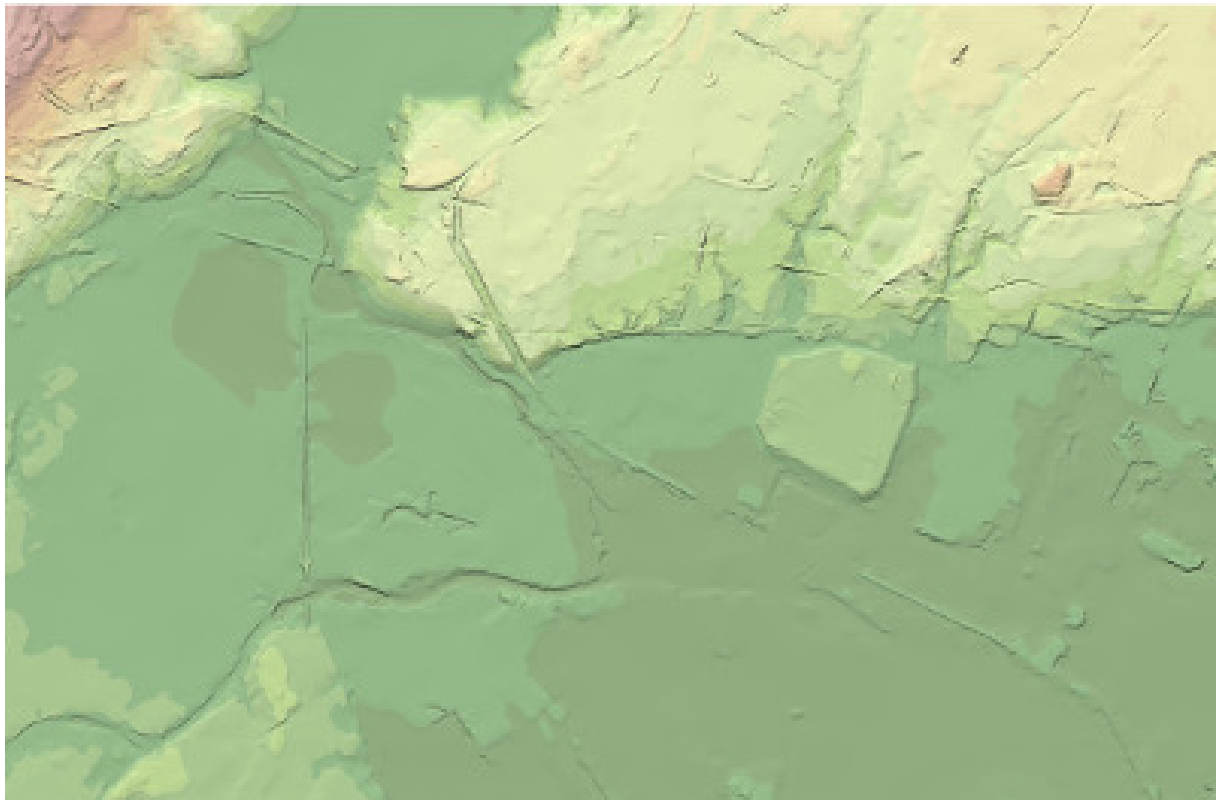


Figure 29: Extract from the shaded relief map of the study area. Note the linear structures depicting road and railway networks, as well as the tailings dam protruding from low land.

Mining of heavy mineral sands ore in the study area has also modified the landscape, altering the storage capacity of the floodplain. It also lies directly within the flood routing zone below one of the restricting N2 culverts that accelerates the flood like a jet directly at the dam wall. The dam has been damaged during previous floods and is constantly being raised to limit damage from floods. Runoff and seepage from the mining operations are being released into the flood plain channels; it increases the sediment load and impact water quality.



Figure 30: Hillendale mine (Photo: D van Vuuren)



Figure 31: Slimes dam to support the Hillendale Mining Operations (Photo: D van Vuuren)



Figure 32: Flood damage to slimes dam (Photo: D Cyrus)

Air Pollution:

Localised air quality problems occur across the study area. The main air *pollution sources* in the area were identified.

Table 6: A summary of the main sources of air pollution in the study area

TYPE	SOURCES
Industrial sources	<ul style="list-style-type: none"> The main industry sources include Bayside and Hillside Aluminium, Mondi Paper & Pulp Mills, Richards Bay Coal Terminal, Foskor, Tongaat Hulett, Lafarge Cement, Ticor SA, Tata Steel and Pulp United, and the National Ports Authority. Various smaller industrial and commercial operations contribute through activities such as spray painting, sand blasting, dry cleaning, small boiler and incineration processes, etc
Mining operations	<ul style="list-style-type: none"> The two main operational mines in the municipality are Ticor Hillendale and Hlanganani Sandwork Operations. Richards Bay Minerals falls outside the municipal boundaries but has air quality impacts on the city.
Transport-related emissions	<ul style="list-style-type: none"> The main sources are from vehicles (roads), railroad, airport and shipping.
Household fuel combustion	<ul style="list-style-type: none"> The use of fuels for space heating and/or cooking within local communities.
Biomass burning	<ul style="list-style-type: none"> Crop-residue burning and general wild fires associated with agriculture (sugar cane) and forestry.
Waste treatment facilities	<ul style="list-style-type: none"> There are two water treatment facilities and three landfill sites in the municipal area. Mondi paper mills have their own landfill sites at Mondi Richards Bay and Mondi Felixton Bayside Aluminium operates an ash site.
Miscellaneous emissions	<ul style="list-style-type: none"> Wind-blown dust from open areas and agricultural activities Informal refuse burning Tyre burning Regionally transported (imported) pollutants

The *primary air pollutants* are Sulphur Dioxide (SO₂) and fine particulate matter (PM₁₀), while Fluoride has also been identified as a potential threat. Of the total annual emissions of the main pollutants in **Table 7** industry accounts for all of the hydrogen emission (HF), more than 99% of the SO₂ emission, 77% of the particulate emissions and 54% of the NO_x emission. Emissions from transportation are dominated by petrol and diesel motor vehicles that account for 44% of the total NO_x emission and 84% of the CO emissions in the City of uMhlatuze. The majority of homes are electrified and emissions from residential fuel burning are very low.

Table 7: Total emissions of key pollutants in t/a from the main source in the City of uMhlatuze (adapted from Liebenberg and Petzer, 2006 and CSIR Environmentek, 2005)³

	Particulates	SO ₂	NO _x	HF	NH ₃	H ₂ S	CO
Industry	3,316.61	21,761.12	1,214.66	95.43	104.07	18.15	
Mining	696.18						
Diesel & petrol vehicles	38.57	90.15	981.00				5,170.00
Biomass burning	234.45	9.38	48.45				1,015.94
Total	4,285.81	21,860.65	2,244.11	95.43	104.07	18.15	6,185.94

³ CSIR Environmentek (2005): Air Quality Specialist Study for the Proposed Tata Steel Ferrochrome Project at Richards Bay – Alton North Site, ENV-D-C 2005-044.

Ambient air quality limits and targets were identified for the study area; the local authority adopted these limits as local policy. Areas were identified where air quality limits are exceeded or are in danger of being exceeded, and buffer zones were determined for existing industrial areas and the identification of possible future industrial development areas that would not impact on human health and the environment. **Figure 33** identifies the buffer zones that were delineated to manage air quality impacts in the area. This information was integrated into the EMF Spatial database.

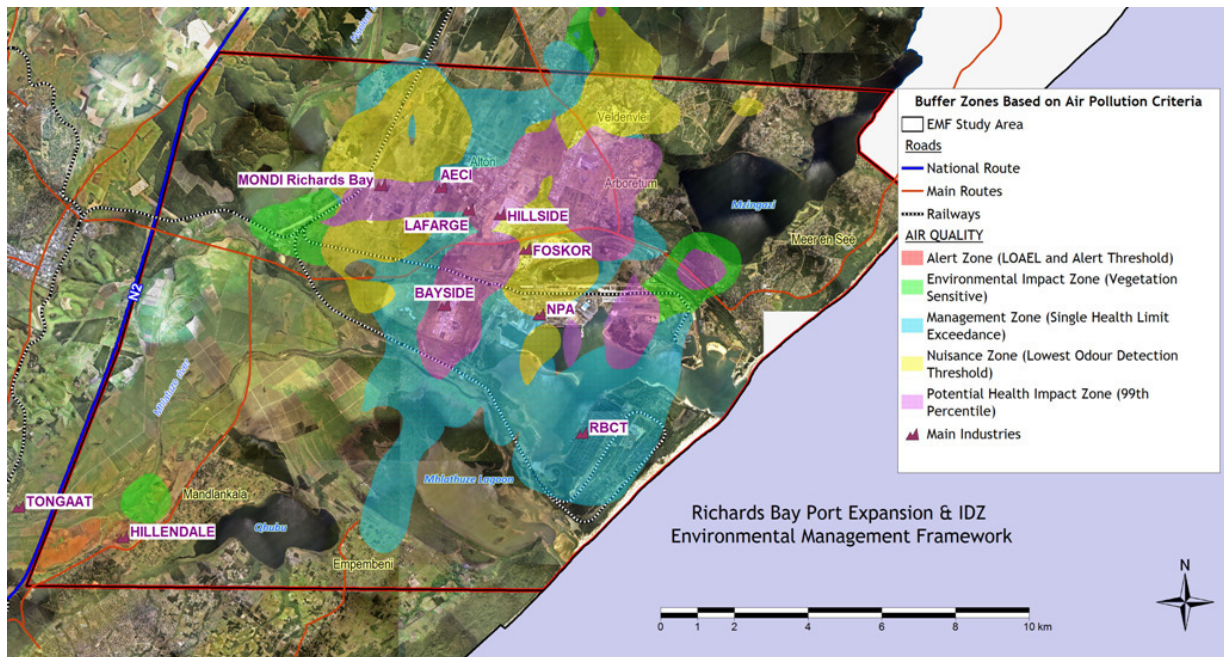


Figure 33: Buffer Zones Based on Air Pollution Criteria

ISSUES:

- Air pollution is a significant constraint for the development of industry in the area. Further industrial development resulting in SO₂ and PM₁₀ emissions should preferably not be considered within the CBD and the industrial areas surrounding it and Arboretum until as the concentrations are within acceptable levels.
- It is clear that air quality capacity in Richards Bay has been reached and it is unlikely that the situation will change in the foreseeable future.
- There is a potential land use conflict in the strategic direction proposed by the Minister of Trade and Industry through the IDZ. Opportunities do however exist for industry types with no or low air pollution potential. Industrial activities with pollution potential could also be sited in the hinterland where air quality capacity has not yet reached limits.
- The possibility of declaring the area as an air pollution "hot spot" should be investigated.
- The issue of port emissions of pollutants from the Port, particularly shipping activities, was raised as a concern.
- The impact of current air pollution on human health in Richards Bay is not clearly understood but the public has raised concern about the nuisance factor.
- The impact of climate change on the atmospheric conditions (and hence climate change) is unclear and should be considered in planning.

Damage to Water Resources:

Past development practices have also resulted in *damage to water resource* features resulting in the need for substantial remedial work. Water has become *contaminated* from atmospheric pollution, agricultural fertilizers, industrial spillages and runoff. Some industries installed effluent ponds to manage the impact of the pollution. In contrast there are polluted features from uncontrolled contamination.



Figure 34: Damage to the stream channel in Alton due to undercutting of the stream bed (Photo: B Kelbe).