Chapter 6

Environment Management Plan

6.1 Introduction

In the context of environmental protection, the City's natural resources will be continuously exploited and developed through appropriate technology and effective policies. Climate change adaptation and disaster risk reduction should be woven into the City's development efforts not only to avert growth suspension, retardation and regression, but to allow development strategies to work even in the face of disaster risks. Good governance shall ensure not only the provision of adequate infrastructures to mitigate the impact of disasters. Increasing political commitment shall mainstream the "disaster-proofing" paradigm in all stages of development planning.

6.2 Challenges

6.2.1 Riverbank Erosion

The absence of slope protection and river training works coupled with predominantly sandy soil make Abacan River including the different creeks in the City susceptible to erosion and riverbank failure. As a result, settlements situated along these water bodies are in constant threat of erosion.

6.2.2 Localized Flooding

While Angeles City is adequately drained because of its inherent sandy soil type including the presence of numerous creeks and a relatively huge river, localized flooding during rainy season also occurs disrupting traffic, general circulation, including trade and commence. This is mainly due to insufficient drainage facilities. The increasing occurrence of high intensity and short duration rainfall brought about by climate change and global warming exacerbates the problem.

6.2.3 Growing Solid Waste Generation

Angeles City can potentially generate 33,300 to 54,750 metric tons of solid waste per year. However, it does not have its own sanitary landfill and depends on the Kalangitan Sanitary Landfill. But since the tipping fee is said to be on the high side, Angeles City plans to establish its own facility. However, site hosting is encountering social acceptability problems due to the "not in my backyard mentality" or NIMBY.

6.2.4 Declining Environmental Quality

Declining environmental quality due to pollution and urban congestion affects the livability of the City. This trend should be reversed through proper engineering interventions, land use management, and zoning.

6.2.5 Climate Change and Global Warming

The increasing occurrence of flash floods due to high intensity, short duration rainfall is now directly linked to changing climate patterns. Reduction in rainfall reaching the land is also starting to be observed. This will consequently impact on the groundwater recharge rate.

According to the initial findings of the ongoing NWRB-JICA study in the Pampanga River Basin, Angeles City will reach the critical level of ground water supply by 2025. Supply and demand may equal by that time.

The right to potable water, food, health and to life itself is a basic human right. Being a fast urbanizing area naturally and continuously attracting heavy in-migration, this early, Angeles City should start developing an alternative source for domestic and industrial water.

6.2.6 Influx of Informal Settlers in Environmentally-Constrained Areas

After Metro Manila, Angeles City is one of the strongest informal settlements magnets in the country. Informal settlers tend to occupy marginal areas such as riverbanks, creeks and canals exposing them to floods, "off-season" typhoons and other health-related hazards. While they do not deserve to be called urban blights, they will undoubtedly affect the image of the city. Criminality and peace and order problem may also increase.

Priority should be given to urban poor living in disaster risk areas through strict implementation of the City's Zoning Ordinance, pro-active and integrated social service delivery and improving the living conditions of the City's constituencies through increased productivity and income, the minimum requirements to adequately address this social problem, can only be made possible by increased political commitment and good governance.

6.3 Potentials

Angeles City is endowed with exploitable natural resources. When properly utilized, preserved and protected, these will catalyze and sustain the city's development. These include land, water, and forest resources.

6.3.1 Forest Resources

Angeles City has an estimated forest or watershed area of more than 800 hectares located in Barangay Sapangbato. This watershed is drained by the Abacan River that passes through the entire length of Angeles City. It is about 16 kilometers away from the Mt. Pinatubo crater. A number of Indigenous Peoples (IPs) and lowlanders live in the watershed area and depend on its resources for their livelihood. Consistent with the provisions of NIPAS law and community-based forest management, the Sapangbato watershed should be declared a forest protection area. Certain uses, however, such as agri-forestry and ecotourism activities may be allowed. Since the headwaters of Abacan River originate in Sapangbato, a multi-

purpose dam may also be developed to supply Angeles City with potable water and hydroelectric power.

6.3.2 Land Resources

The predominant soil types of Angeles City are Angeles City coarse and Angeles fine sand. These soils are not only good for agriculture, they are also best for settlement development because of good internal drainage.

Angeles City has a predominantly flat to gently rolling topography. Its rolling to hilly areas are its forest cover found in the central and western part of Sapangbato. Its elevation ranges from 60 meters to 440 meters above mean sea level. Because of this terrain and favorable physical characteristics, Angeles City is an ideal place for settlement development.

6.3.3 Water Resources

More than 60 percent of Angeles City's land area is groundwater easy areas. In said areas, potable water can be abstracted very easily at depths of 20 meter and less. These are the areas with flat to gently rolling slopes located in central and eastern Angeles City.

Towards the west are ground water difficult areas that are characterized by rolling to undulating terrain and steep slopes. However, these areas are rich in surface water as they form part of the City's watershed where the headwaters of Abacan river are located. As earlier

mentioned, this resource can be developed and tapped to supply the potable water in Angles City which according to recent Japan International Cooperation Agency (JICA) study will reach the critical level by 2025. In addition to the dam, a hydroelectric power facility may also be constructed to optimize benefits since hydroelectric power plants are not water consumptive infrastructure facilities. These multi-purpose infrastructures will augment the potable water and power-requirements of the City.

6.4 Goals

6.4.1 A Balanced and Livable Environment

As contained in the Vision Statement of Angeles City, the ultimate end of local governance is the total improvement of the quality of life of the people. This shall mean achieving socio-economic progress but not to the detriment and expense of the environment. A balanced development and a livable community are envisioned for Angeles City.

6.5 Objectives and Targets

Hereunder are the objectives and targets for environmental management:

1. Implement climate change adaptation and disaster risk reduction measures particularly on water resources development;

2. Reduce the increasing levels of air and water pollution;

3. Implement solid, liquid and toxic and hazardous wastes disposal and management measures;
4. Address riverbank erosion;
5. Preserve and enhance the watershed cover of the City;
6. Implement programs and projects on carbon sequestration to arrest global warming;
7. Address localized flooding in built-up areas;
8. Resettle informal settlers located in environmentally constrained areas;
9. Implement rivers and creeks clean-up; and
10. Implement compatible uses of land and livelihood activities in identified protected areas.

6.6 Programs and Projects

Resource-based growth in line with the principle of Sustainable Development shall be pursued. This, and in accordance with the City's vision about the natural environment five (5) major programs will be implemented, as follows:

6.6.1 Ecological Waste Management Program

With a population of more than 300 thousand and still growing, Angeles City produces tons of wastes daily. Since the services of sanitary

landfills outside the City are said to be on the high side, the City may opt to develop its own waste management facility. However, local site hosting is facing a potential social acceptability issue. In this regard, the City may have to explore the following alternatives:

1. Continued use of the Kalangitan Sanitary Landfill in Capas, Tarlac;
2. Enter into a joint venture agreement with neighboring towns or City for the development of a common sanitary landfill;
3. Establish its own sanitary landfill and accordingly address or respond to the social acceptability issues; and
4. Establish a Materials Recovery Facility (MRF) with recycling re-use and composting capability in order to reduce the volume of waste that has to go to a commercial sanitary landfill located outside the City.

In the long-term, Angeles City needs to establish its own solid waste management facility within its territory or in joint venture agreement with neighboring municipalities or city. In the interim, it can expand the operation of its existing materials recovery facility in Pampang and look for possible site in Cuayan.

Materials recovery will focus on re-use, recycling, and composting. This will not only provide livelihood, it will also dramatically reduce the volume of refuse ending up in the nearby landfill in Capas, Tarlac. Thus, the financial exposure of the City on the tipping fee will go down at the same time employment and livelihood will be generated.

All the above measures and considerations shall find clear and legitimate expression in a Comprehensive Ecological Waste Management Code for the City of Angeles.

6.6.2 Climate Change Adaptation and Disaster Risk Reduction Program

Short duration and high intensity rainfall more often than not lead to flashfloods. Global warming and changing climate patterns have to do with it. Evidence shows local rainfall variability tends to visit some areas more rarely. Angeles City being fast-urbanizing, this will eventually impact on the groundwater recharge rate. Potable water supply and demand are expected to balance by 2025. Since the City relies heavily on groundwater resource, an alternative source such as surface water must be explored.

In order to secure the potable water supply of Angeles City, the Sapangbato watershed must be protected and preserved. Since the headquarters of Abacan river originate from this watershed, surface water flow should be tapped by the construction of a dam.

This water will be used to supply the City's domestic and industrial water requirement. Subject to a detailed feasibility study, a mini-hydroelectric power plant may also be integrated with the dam reservoir to optimize benefits. Hydroelectric turbines are non-water consumptive.

The increasing level of carbon dioxide in the atmosphere accelerates global warming. Twenty percent (20%) of emissions are attributed to

deforestation. To halt this phenomenon, trees and other vegetations must be planted so that carbon in the air can be deposited or sequestered into their biomass. This in part will help reduce the rate of global warming.

As such, the City has to improve its vegetation cover both at urban and watershed areas. Planting of trees and other perennial crops and vegetations everywhere, so to speak, is a must.

Interventions to protect the environment to avert disastrous events can be harmonized through appropriate design technology particularly the Water Sensitive Urban Development Design which strong advocacy has become the practice of cities around the globe. Advocacy and policy incentives is also found wanting for the Development of Private Parks as Ecology Parks. Involvement of every stakeholder can be harnessed through Luntiang Barangay and City-wide Park and Open Spaces Greening Project, which together with Water Sensitive Design and Private Park Development is expected to make urban living not only safe and sound, but also comfortable and leisurely.

6.6.3 Air Water, and Noise Pollution Control Program

Vehicular and industrial emissions are the primary causes of air quality deterioration in Angeles City. As regards domestic and industrial waste water treatment, septic tanks the primary means to detoxify liquid wastes. These are said to be effective only in low density areas. In high density urban

centers like Angeles City, the rate of effluent flow coming from the different septic tanks may be too much for the soil to naturally decompose. Noise pollution in the City primarily comes from vehicles, and to certain extent from construction, and commercial and industrial operations.

In view of the foregoing, the following projects need to be implemented in order to improve the livability of the City, to wit:

1. Waste water and sewerage system development project;
2. Emission control and monitoring project; and
3. Noise pollution control and safe sound levels enforcement project.

To be more effective, initiatives on waste water and sewerage system shall be complemented with the Establishment of Inter-Barangay Bantay Ilog Kontra sa Basura Task Force.

To ensure have a close watch on the hazards to public health, an Anti-Smoking Campaign shall be given more force through appropriate legislation and implementation support measures.

6.6.4 Sustainable Resource Utilization Program

Due to population pressure and sustained economic growth, land supply in Angeles City is increasingly becoming low. Thus, resource use optimization measures must be implemented. In the City's watershed area,

compatible land use activities other than strict protection and preservation must be promoted. To give the IPs and non-IPs settlements in Sapagbato an alternative source of livelihood, the following projects must be implemented:

1. Establishment of Sapangbato Eco-tourism Park;
2. Implementation of Agri-forestry, and Sloping Agriculture Land Technology (SALT); and,
3. Credit and marketing support project.

6.6.5 Environmentally-Constrained Areas Management Program

Angeles City is almost free from physical development constraints other than riverbank erosion and localized flooding in the built-up areas. The problem is compounded by solid waste dumping in water channels. Informal settlements along or on riverbanks, creeks and canals and on other water channels have to be relocated, and prevented from coming back. The following measures must be implemented:

1. Abacan rivers and creeks clean up;
2. Preparation of Drainage Master Plan for Angeles City;
3. Rehabilitation of existing and correction of new drainage facilities;
4. Resettlement and relocation of informal settlers in disaster risk areas; and,
5. Construction of river timing slope protection works in Abacan River and other water channels in the City.