



**THE REGIONAL ENVIRONMENTAL CENTER**  
*for Central and Eastern Europe*

**Pilot SEA Project as the Capacity Building Tool for  
SEA Protocol Implementation in Armenia**

# **STRATEGIC ENVIRONMENTAL ASSESSMENT OF THE YEREVAN CITY MASTER PLAN**

## **REPORT**

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OF THE YEREVAN CITY MASTER PLAN**

**REPORT**

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## LIST OF ACRONYMS

ACI	Aggregate Concentration Index
BOD	Biological Oxygen Demand
MPDG	Master Plan Drafting Group
MAC	Maximum Allowable Concentration
MAO	Maximum Allowable Outflow
MAL	Maximum Allowable Level
RA	Republic of Armenia
RA MH	RA Ministry of Health
RA MNP	RA Ministry of Nature Protection
RA MTA	RA Ministry of Territorial Administration
RA MTC	RA Ministry of Transport and Communication
SEA	Strategic Environmental Assessment
TEJ	Technical Economic Justification
UNDP	United Nations Development Programme
YMP	Yerevan Master Plan

## I. INTRODUCTION

The Strategic Environmental Assessment of Yerevan City Master Plan has been conducted within the framework of “Pilot SEA Project as the Capacity Building Tool for SEA Protocol Implementation in Armenia” implemented by UNDP Bratislava Regional Centre for Europe and CIS and Regional Environmental Centre for Central and Eastern Europe. The objectives of the project are the following:

- To test and demonstrate opportunities for practical application of the Strategic Environmental Assessment Protocol<sup>1</sup> (hereinafter SEA Protocol) of the UN ECE Convention on Environmental Impact Assessment in a Transboundary Context<sup>2</sup> in Armenia, considering the protocol requirement on public participation and stakeholder deliberation
- To provide recommendations for environmental optimizing and modifications of the Yerevan City Master Plan.

The current draft SEA report is developed for an expanded concept of the Yerevan City Master Plan. The scope of SEA has been developed based on the specifications of master plans of big cities, in particular with respect to all the components of the environment, including human health and their interrelations. This document will also appear as the fundamental document for future urban development program documents and projects in Armenia.

## II. THE SUBJECT OF STRATEGIC ENVIRONMENTAL ASSESSMENT

The subject of SEA is the draft Master Plan of Yerevan City for the period up to 2020 is developed by “Yerevan Project” CSJC upon the order of Yerevan Municipality, according to RA Government Decision N692 “On Developing Urban Development Program Documents of Yerevan City” from 30.10.00.

The concept of the Master Plan developed in a broad format, has been approved by RA Government Decision N443 “On approving the concept of the Yerevan City Master Plan” from 24.03.05.

### ***Timeliness of the problem***

The previous Master Plan of Yerevan City (1971) has been developed for the period up to 2000 and designed for a population of 1.1 million and a territory of 16305 ha. The territory was fully exhausted by the mid 1980s according to all main indicators.

In the transition period, the economic and energy crisis and transport blockade resulted in failure of the industry of the city. This factor also damaged the transport and engineering infrastructures and green areas. The economic and social structure of the city has undergone drastic changes deteriorating the demographic situation.

A new situation was created for urban development, which could not be foreseen within the previous programs. Construction, with some exceptions, was implemented without successful justification of urban development solutions or consideration of construction norms, economy of resources, comprehensive development of the territory and its functional significance and environmental protection.

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<sup>1</sup> Protocol was adopted in Kyiv in 2003, signed by Armenia in 2003 and not ratified yet.

<sup>2</sup> Convention has been adopted in Espoo in 1991, ratified by Armenia in 1996.

Afterwards, a number of reforms have passed in the country aimed at harmonization of the new market based economy, decentralization of governance and democratization of society.

Recently, the country experienced economic growth and market relations and future directions of city development have been developed explicitly. In parallel with sustaining the situation of economic growth, recently the process of restoring damaged critical infrastructures of the city is in place. The legal framework of development of urban construction and land use is largely developed.

### ***Goals and objectives of the Master Plan***

Yerevan City Master Plan sets forward the city development strategy based on the assessment of the current situation and opportunities for social and economic development. Main provisions of this fundamental document will serve as a basis for detailing the relevant issues in the target programs (plans, projects) on zoning, and development of infrastructures in various sectors of the economy.

The goal of the YMP is to develop a strategy for urban construction aimed at creating a favorable living environment and ensuring sustainable development.

YMP plans to achieve the mentioned goal through addressing the following objectives (courses of activities):

1. Improving the planning structure, ensuring territorial integrity of the urban environment and functional adequacy;
2. Improving the transport and engineering infrastructures:
  - a. Improving transport structures
  - b. Improving engineering infrastructures
3. Developing environmentally clean industries:
  - a. Excluding expansion of industrial zones
  - b. Re-profiling or removing agricultural facilities from the city
4. Improving the living conditions of population and modernization of housing;
5. Restoring and enhancing sustainability of the natural complex, mitigation of environmental risks for human health:
  - a. Improving all the components of the natural environment
  - b. Protecting areas from natural disasters through engineering and technical methods
6. Protecting historical and cultural heritage.

### ***General approaches of Master Plan***

The Master Plan is calculated for 1.2 million population in the framework of existing administrative borders of the city (26 300ha). The document has been developed based not on sectoral, but rather on spatial approaches and includes alternative approaches to address the problem, involving all the forms of ownership.

Yerevan is regarded as a capital city of a sovereign state, as the business and cultural center of the Republic of Armenia and the center of Yerevan agglomeration.

The Master Plan is based on the principles of sustainable development and is aimed at ensuring equal conditions for development of social, economic and ecological sectors. Implementation of the provisions of the document is envisaged through permanent monitoring, assessment of trends, forecast of needs and demand assessment conducted in parallel with implementation and periodic update of the of the document.

### **Related documents**

The Master Plan is based on the following fundamental and normative legal documents

- RA Law on Urban Development (1998)
- RA Settlement Master Plan (2003)
- Fundamentals for Social and Economic Development of Yerevan City for the period of 2004-2007 (2003)
- RA Government Decree N 609 “On Drafting, Review, Concordance, Approval and Modification of Master Plans of Municipal and Rural Communities” (02.05.03)
- Էինօժօեօյ ի նինօաա, րրյաեա ծաժաաիօե, նրաեանրաաեյ և օօաաժաաաեյ նօաի և իօրաեօրա ժաերրրե իաերժրաե և շանժրեե աիժրա, րրաեերա և նաեւրեեօ իաաեաիւօ իօրեօրա, ԱՆԻ 38-82, Արրնօժե ՆՆՆԾ (1984)

## **III. METHODOLOGY OF STRATEGIC ENVIRONMENTAL ASSESSEMENT**

### **Strategic Environmental Assessment**

SEA is a rather new method for implementation of environmental policy, which according to SEA Protocol is applied for assessing the documents providing a consent for future development (plans and programs), as well as policies and legislation if possible.

SEA of Yerevan Master Plan is aimed at forecasting possible impacts on environment and human health during implementation of Yerevan City Master Plan, preventing, mitigating and excluding negative impacts.

SEA objectives are:

- To support sustainable development, based on requirements of ecological safety and environmental limitations;
- To preserve positive impacts of the provisions of fundamental documents and proposed activity, prevent, mitigate or exclude the negative impacts and their consequences and ensure exclusion of provisions and activities with irreversible negative impact;
- To ensure assessment of possible risks for natural and anthropogenic disasters and emergencies;
- To provide opportunities for public notification and participation.

There is no specific legal or methodological document regulating SEA in Armenia. Indirectly and partially, SEA is regulated by the RA Law on “Environmental Impact Assessment” (1995), which requires environmental assessment of master plans of urban settlements. This Law stipulates conducting studies for the environmental impact assessment during the development of concept (strategic) documents. However, the scope of studies is not established by RA legislation at the moment. Implementation of the law is hampered by vagueness of the law and insufficiency of provisions on procedures of environmental assessment.

### **Basis of SEA**

Given the mentioned restriction there has been a need to develop a new methodology for SEA on Yerevan City Master Plan. It can further serve as a model for environmental assessment of other similar documents. The methodology for SEA on Yerevan City Master Plan is based on provisions of the SEA Protocol, methodology for SEA of National Development Plan and Regional Development Concepts of Czech Republic (due to certain similarities of assessment objects), materials of “SEA Manual” being developed by Regional Environmental Center of Central and Eastern Europe with support of the UNDP, and a number of provisions of the draft RA Law on State Environmental Expertise. One of the important components of the methodology is including stakeholders and the public into the SEA process based on the provisions of the UN ECE Convention on Access to

Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

The current SEA methodology significantly was based on environmental studies and materials conducted since 2001 for development of the master plan.

The measures aimed at stakeholder and public involvement have been considered as well. They include establishment of the Interagency Commission on Coordinating Activities of Development of the Yerevan City Master Plan and Yerevan Agglomeration (based on Prime Minister Decision), Working Commission on Developing the Yerevan City Master Plan (Yerevan Mayor's Decision), as well as discussions organized with participation of the Armenian Engineering Academy, Armenian Union of Architects and environmental NGOs.

### ***Goals and Objectives***

The goal of the methodology is to regulate the process of assessment for possible environmental impact resulting from implementation of the strategic documents through clear sequentially implemented activities. The given methodology envisages further integration of the environmental considerations into the sectoral development plans, programs and other fundamental documents of the country to maximize mitigation of negative environmental impacts.

Based on best international practice, the strategic environmental assessment should be applied to relevant strategic documents. Given the fact that the general Master Plan development was nearly finished when the SEA started, the main objectives of the methodology were selected to ensure maximum efficiency of SEA. They are as follows:

- Maximum approximation of the given process to the requirements of the Conventions and the relevant protocol ratified or signed by Armenia, given the absence of national legal document regulating the SEA;
- Consideration and application of requirements of national legislation during the assessment;
- Level of involvement of state environmental and health authorities in determination of the scope of the assessment;
- Ensuring communication with, and feedback of the Master Plan Drafting Group in SEA process;
- Appropriate and timely notification of stakeholders, involving them in discussions, providing opportunities to submit recommendations and considering the received opinions.

In the framework of the SEA methodology development the following steps were implemented:

- Review of relevant strategic documents and identification of key environmental (including health) objectives based on the relevant international and national legislation;
- Selection of indicators for characterizing the reference environmental objectives;
- Assessment of coverage of environment (including human health) related issues of the concept of the Master Plan and development of recommendations;
- Assessment of links between the reference environmental objectives and priorities of the master plan;
- Assessment of environmental (including human health) impact resulting from the implementation of suggested courses of activities of the draft master plan based on the selected environmental (including human health) objectives, consideration of alternatives (if any) and development of recommendations;
- Assessment of the monitoring plan – whether it provides for a realistic monitoring and analysis of key environmental (including health) impacts and development of recommendations;

- Modifications to the Master Plan by the MPDG or justification of rejected recommendations;
- Development of the SEA report, discussions with stakeholders and public, summary of opinions and consideration in the final report;
- Finalization of the SEA report and submission to the MPDG, Yerevan Mayor's Office and Ministry of Nature Protection.

Considering time limitations of the UNDP supported SEA project and the ongoing process of developing the draft master plan, the assessment of environmental (including human health) issues of the draft Master Plan have been conducted and the SEA current report has been developed for the Master Plan concept. Some recommendations have been submitted to MPDG and considered in the draft Master Plan.

### **Scope of SEA**

SEA frameworks are established based on the peculiarities of large city master plans, particularly considering involvement and interlinkages of all the components of environment including human health. The document will also serve as a strategic document for other program documents and proposed activities.

For clear identification of the SEA framework, RA Ministries of Health and Nature Protection were requested to present the list of priority issues. RA Ministry of Health has not responded. The list provided by RA Ministry of Nature Protection is given in Appendix 1.

Because of lack of baseline data on environment, including human health, the SEA methodology envisages application of summarized expert assessments, which are mainly qualitative.

Considering the fact that the Yerevan City Master Plan shall serve as a fundamental document for further development of civil construction and zoning documents, detailed plans or related design plans, which require more detailed environmental assessments. In the current stage it is worthwhile to conduct a quality based general assessment, which also is in line with the specificity of the strategic environmental assessment.

### **Stakeholder involvement**

#### *Expert discussions*

To ensure more accurate professional assessment the methodology envisages expert discussions on possible environmental, including human health, impacts likely resulting from implementing the Master Plan.

Within the framework of the SEA Project, expert hearings have been organized with involvement of relevant specialists from all interested governmental and non-governmental organizations.

The first discussion was held for scoping of the SEA. Invitation to participate in the discussion was delivered to about 50 organizations and openly announced in 3 media outlets (*Hayastani Hanrapetuyun, Aravot and Golos Armenii*) - with notification on the discussion, its content, purpose as well as the place and time to access the Master Plan. The interested persons were invited to participate in the discussion and submit their opinions and recommendations.

The second discussion was devoted to the issue of green areas of Yerevan city, which within the SEA process have been identified as the most sensitive area for negative impacts. Specialists from relevant governmental and non-governmental institutions were invited to the discussion.

The purpose of the third discussion was to receive comments and recommendations of state entities about the SEA report of the Yerevan Master Plan.

Within 10 days after the events, the experts submitted recommendations in writing to the SEA group and the MPDG.

#### *Public discussions*

For better results of strategic environmental assessment of the Master Plan, the methodology envisaged organization and implementation of public hearings.

Within the framework of the Project, the public was notified on the Yerevan Master Plan and its SEA report through newspapers *Hayastani Hanrapetuyun*, *Aravot*, *Golos Armenii* and electronic networks. Some documents of the Master Plan including the maps, have been posted and demonstrated in “YerevanProject” Institute, Public Environmental Information Center (Aarhus Center) as well as the internet sites of the environmental forum and Aarhus Center. Thirty days after notification, a public hearing was organized in cooperation with the Yerevan Municipality in line with provisions of the Law on Environmental Impact Assessment, the Law on Urban Development, the Aarhus Convention and the SEA Protocol.

Protocols of expert and public discussions are presented in Appendix 2.

#### **SEA limitations**

Development of YMP was challenged with the absence of national norms and methods related to spatial planning and environmental protection, insufficiency of data on technogenic impacts and pollution and uncertainty of industrial development prospects. These difficulties were largely addressed through adaptation of former Soviet norms and methods to local conditions, on-site research, testing calculations and expert assessments.

## **IV. REFERENCE ENVIRONMENTAL OBJECTIVES AND THEIR JUSTIFICATION**

#### ***Reference environmental objectives***

Reference environmental objectives for YMP were selected based on the results of studies of the current environmental situation, forecasts, city development prospects, environmental issues presented by RA Ministry of Nature Protection (Appendix 1), and strategic documents of the RA. The selected issues are those which will most likely have negative consequences on the environment and human health.

The reference environmental objectives are the following:

1. Reducing atmospheric pollution,
2. Using water resources rationally, reducing water pollution,
3. Protecting and restoring land cover,
4. Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests,
5. Reducing harmful impacts of wastes,
6. Protecting against physical impacts,
7. Reducing negative impacts on human health.

These issues are elaborated below:

1. *Reducing atmospheric pollution*  
(Including substances polluting the atmosphere)

Main sources for atmospheric pollution are vehicle transport, industrial enterprises, energy objects (Yerevan heat plant, boilers) and other static and mobile sources of emissions. Emissions of hydrogen dioxide, nitrogen dioxide, escaping organic compounds, dust and persistent organic pollutants causing atmospheric pollution, which negatively impact human health.

### *2. Using water resources rationally, reducing water pollution*

(Including reducing losses of drinking water, wastewater disposal, primary treatment of industrial wastewater, treatment of domestic wastewater, cleanup of river beds and Yerevan Lake.)

Because of outmoded water supply facilities of Yerevan City and their poor technical conditions about 70% of freshwater is being lost. An important issue is the protection of the 1<sup>st</sup> and 2<sup>nd</sup> sanitary zones of drinking water sources.

Recovery of the sewerage system of Yerevan City and construction of new systems, restoration of wastewater cleaning stations or construction new stations is an urgent issue. Depreciation of the existing sewerage networks can cause wastewater leakages, which will harm the environment and human health. Moreover, wastewater from a number of industrial enterprises is disposed into the city sewerage system without primary treatment before flowing into the wastewater treatment plant, thus causing failure of biological treatment in the plant because of contained hazardous and toxic substances.

Another serious issue is the cleaning of all Yerevan City wastewater, including rainwater. Because of depreciation and poor technical conditions of the existing treatment plant Hrazdan river becomes polluted, which in its turn pollutes the transboundary river of Araks. This may result in infringement of international obligations of Armenia and require a certain level of liability.

Sediments in riverbeds and the banks of a number of water bodies of Yerevan City (Rivers Getar and Hrazdan, "Yerevan Lake" reservoir, etc.) contain heavy metals and other hazardous substances, as well as huge amounts of domestic and construction wastes, which can negatively impact environment and human health.

Impacts from pollution are increasing due to the small environmental flows of those rivers. The poor configuration of barages, built some decades ago (concrete screens 3m in height) also promotes generation of dead zones in small lakes that essentially support pollution accumulation, further putrefaction and decrease in water quality.

### *3. Protecting and restoring land cover*

(Including protection in case of natural disasters, technogenic impact, limitation of mining activities, restoration of damaged lands.)

For many years the city territory has been polluted with heavy metals, other hazardous compounds negatively impacting soil quality. In particular, a serious problem is pollution of agricultural lands within the territory of the city with heavy metals, as well as pesticides and nitrates used for agricultural purposes. During agricultural production, these substances penetrate the crops, which are eventually consumed by human populations causing danger to human health.

The areas have been changed as a result of natural disasters and technogenic factors. There are large areas disturbed because of erosion, mudslides and landslides.

These impacts are further promoted by unregulated and illegal mining activities. Mine areas have also not been restored for many years.

*4. Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests*

After the collapse of the Soviet Union, the energy crisis and hard social-economic conditions caused serious changes to the city landscape including green areas and forests. Essential parts of green areas of the city were destroyed and continue to be replaced by petrol stations, markets, catering trade, etc.

*5. Reducing harmful impacts of wastes*

(Including collection, utilization, treatment, transfer, disposal and sterilization of solid domestic and industrial wastes)

Domestic wastes are assembled and disposed of in the city landfill and other parts of the city in an unregulated manner causing emissions of persistent organic pollutants.

Issues of managing new industrial wastes (including old waste), such as the creation of landfills for industrial wastes has not yet been resolved.

Territories of industrial enterprises are polluted with industrial wastes, oil products, stored substances, construction and other wastes. This situation remains dangerous for environment and human health.

*6. Protecting against physical impacts*

(Including noise, electromagnetic radiation and vibration)

Among the negative impacts on human health are noise, electromagnetic radiation and vibration, which is typical for large (megapolis) cities.

*7. Reducing negative impacts on human health*

Human health is essentially affected by pollution of the environment and the physical impacts, which compound the generally poor social-economic conditions further stressing human populations.

In a number of city districts the sanitary cleaning and waste disposal is not implemented appropriately causing odour pollution and promotes rodent infestation.

**Relevance to RA legislation**

In the process of SEA, a study of compliance of the selected reference environmental objectives to the RA legislation, including Conventions and their Protocols ratified or signed by Armenia, national laws, bylaws and approved national programs and plans has been conducted.

Particularly, all the reference environmental issues are based on relevant provisions of the RA Law on Fundamentals of Nature Protection Legislation in Armenia (1991), RA Law on Environmental Impact Assessment as well as National Environmental Action Plan.

The linkages of key environmental issues to other documents are given below.

<b>National legislation</b>	<b>International Agreements</b>
<b>1. Reducing atmospheric pollution</b>	
<ul style="list-style-type: none"><li>▪ RA Law on Atmospheric Air Protection (1994)</li><li>▪ National Action Plan on Persistent Organic Pollutants (2004)</li><li>▪ Poverty Reduction Strategy Program (2003)</li></ul>	<ul style="list-style-type: none"><li>• UN ECE Convention on Long-range Transboundary Air Pollution (1979)</li><li>• UN ECE Convention on Transboundary Effects of Industrial Accidents (1992)</li><li>• Kyoto Protocol under UN Framework Convention on Climate Change (1997)</li></ul>

<b>National legislation</b>	<b>International Agreements</b>
	<ul style="list-style-type: none"> <li>• Protocol “On Persistent Organic Pollutants” under UN ECE Convention on " Long-range Transboundary Air Pollution" (1998)</li> <li>• Convention “On Persistent Organic Pollutants” (2001)</li> </ul>
<i>2. Using water resources rationally, reducing water pollution</i>	
<ul style="list-style-type: none"> <li>▪ RA Water Code (2002)</li> <li>▪ Poverty Reduction Strategy Program (2003)</li> <li>▪ RA National Water Policy (2005)</li> </ul>	<ul style="list-style-type: none"> <li>• UN ECE Convention on Transboundary Effects of Industrial Accidents (1992)</li> <li>• Protocol on Water and Health under UN ECE Convention on Protection and Use of Transboundary Watercourses and International Lakes (1999)</li> </ul>
<i>3. Protecting and restoring land cover</i>	
<ul style="list-style-type: none"> <li>▪ RA Land Code (2001)</li> <li>▪ RA Underground Resources Code (2002)</li> <li>▪ RA Law on Seismic Protection (2002)</li> <li>▪ National Program to Combat Desertification in RA (2002)</li> </ul>	<ul style="list-style-type: none"> <li>▪ UN Convention on Combating Desertification (1994)</li> </ul>
<i>4. Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests</i>	
<ul style="list-style-type: none"> <li>▪ RA Forest Code (1994)</li> <li>▪ Poverty Reduction Strategy Program (2003)</li> <li>▪ RA National Forest Policy and Strategy (2004)</li> </ul>	<ul style="list-style-type: none"> <li>▪ UN Framework Convention on Climate Change (1992)</li> <li>▪ UN Convention on Combating Desertification (1994)</li> <li>▪ European Convention on Landscapes (2003)</li> </ul>
<i>5. Reducing harmful impacts from wastes</i>	
<ul style="list-style-type: none"> <li>▪ RA Law on Wastes (2004)</li> <li>▪ Poverty Reduction Strategy Program (2003)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Convention on Control of Transboundary Movements of Hazardous Waste and Their Disposal (1989)</li> <li>▪ UN Framework Convention on Climate Change (1992)</li> <li>▪ Kyoto Protocol under UN Framework Convention on Climate Change (1997)</li> <li>▪ Convention on Persistent Organic Pollutants (2001)</li> </ul>
<i>6. Protecting against physical impacts</i>	
<ul style="list-style-type: none"> <li>▪ RA Law on Sanitary Epidemiological Safety of RA Population (1992)</li> <li>▪ RA Law on Atmospheric Air Protection (1994)</li> </ul>	
<i>7. Reducing negative impacts on human health</i>	
<ul style="list-style-type: none"> <li>▪ RA Law on Ensuring Sanitary and</li> </ul>	<ul style="list-style-type: none"> <li>▪ Protocol on Water and Health under UN</li> </ul>

<b>National legislation</b>	<b>International Agreements</b>
Epidemiological Safety of RA Population (1992) ▪ RA National Environmental Health Action Plan (Government Decree N1204-N from 01.08.01)	ECE Convention on Protection and Use of Transboundary Watercourses and International Lakes (1999)

### **Indicators of reference environmental objectives**

Indicators illustrating the state of Yerevan environment (including health), have been selected to assess the environmental impact from implementation of the YMP.

In the YMP SEA report indicators are used to:

- Assess coverage of reference environmental objectives in the Concept of the Yerevan City Master Plan;
- Develop a monitoring plan for observing impacts to Yerevan city environment, including health, likely resulting from implementation of the YMP and planned activities;
- Propose additional measures aimed at meeting reference environmental objectives;
- Serve as a basis for strategic environmental assessment or environmental impact assessment of the activities stemming from the YMP.

The selected indicators of reference environmental objectives are given in the table (number table) below.

<b>Indicator</b>	
<b>1. Reducing atmospheric pollution</b>	
1.1	Decreased level of air pollution, according to MAC <ul style="list-style-type: none"> <li>• Nitrogen oxides</li> <li>▪ Hydrogen oxide</li> <li>▪ Escaping organic compounds</li> <li>▪ Persistent organic pollutants</li> <li>▪ Dust</li> </ul>
1.2.	Decreased density of construction in areas, which have high density according to the urban development norms
<b>2. Using water resources rationally, reducing of water pollution</b>	
2.1	Decreased level of water loss in city water systems (percentage)
2.2	Maintained and improved quality of drinking water
2.3	Decreased outflow levels: <ul style="list-style-type: none"> <li>▪ Decrease of total level of wastewater flow (m3/year)</li> <li>▪ Decrease of amounts of outflowing pollutants according to BOD (ton/year)</li> </ul>
2.4	Decreased level of water pollution according to MAC: <ul style="list-style-type: none"> <li>▪ BOD</li> <li>▪ Oil products</li> <li>▪ Heavy metals</li> </ul>
2.5	Increased volume of wastewater and rainwater treated (percentage)
<b>3. Protecting and restoring land cover</b>	
3.1	Decreased level of pollution with heavy metals according to ACI
3.2	Decreased level of pollution with radio nuclides, according to MAL
3.3	Decreased area of highly polluted territories (ha, percentage)
3.4	Increased area of territories geological phenomena (ha) <ul style="list-style-type: none"> <li>▪ Floods</li> <li>▪ Deluge</li> <li>▪ Landslides</li> </ul>
<b>4. Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests</b>	
4.1	Increased surface of green areas:

<b>Indicator</b>	
	<ul style="list-style-type: none"> <li>• Total surface of green areas, including those being restored and newly established (ha) <ul style="list-style-type: none"> <li>▪ Surface of green areas of common use (ha, m2/men)</li> <li>▪ Surface of specially protected environmental lands (ha)</li> <li>▪ Surface of forest lands (ha)</li> </ul> </li> </ul>
4.2	Decreased time for accessibility of green areas (min)
<b>5. Reducing harmful impacts from wastes</b>	
5.1	Maintained number (unit) and surface (ha) of regulated landfills
5.2	Decreased number (unit) and surface (ha) of not regulated landfills
5.3	Increased share of the treated and utilized waste within the general waste amount (percentage)
5.4	Increased surface of sanitary-protective zones
<b>6. Protecting against physical impacts</b>	
6.1	Decreased level of noise, according to MAL
6.2	Decreased level of radiation, according to MAL
6.3	Decreased level of vibration, according to MAL
<b>7. Reducing negative impacts on human health</b>	
7.1	Decreased number of population living in ecologically uncomfortable zone <sup>3</sup>
7.2	Decreased number of cases of population morbidity and mortality, according to the following nosological types: <ul style="list-style-type: none"> <li>▪ Respiratory diseases (men/thousand men)</li> <li>▪ Cardio-vascular diseases (men/thousand men)</li> </ul>
7.3	Decreased number of people subjected to epidemics of water transmitted diseases

## **V. COVERAGE OF YEREVAN CITY ENVIRONMENTAL ISSUES IN THE MASTER PLAN CONCEPT DOCUMENT**

A chapter on environmental protection has been developed within the Yerevan City Master Plan to provide recommendations for ensuring a favorable urban environment. However, considering the possible environmental impact of the main approaches proposed by the Master Plan, the SEA group reviewed the entire Master Plan Concept to assess the level of reflection of environmental issues. Most of the SEA group comments presented at this stage have been accepted and considered in the Master Plan document.

Comments and recommendations of the SEA group on the Concept of Yerevan City Master Plan and the extent of their consideration by the MPDG are presented below.

### **Chapter 1. Historical stages of Yerevan City formation**

SEA group had no comments and recommendations on this chapter.

### **Chapter 2. Main results of analysis of Yerevan city Master Plan (1971) implementation**

SEA group had no comments and recommendations on this chapter.

### **Chapter 3. Assessment of natural conditions and planning limitations**

#### **3.1 Land resources and utilization of territory**

- a) SEA group recommends to justify and clarify issues on elimination of agricultural lands that cover 4516 ha, increase of territory of industrial and warehouse purposes from 2459 ha to 2778 ha, increase of territory of specially protected areas from 592 ha to 1525 ha, decrease of sanitary-protective zones from 18473 ha to 933 ha, reduction of forest lands from 1234 ha to 660 ha and increase of areas of the parks and other green territories from 1119 ha to 3177 ha.<sup>4</sup>

<sup>3</sup> The borders of current and proposed ecologically uncomfortable zones are given in the Master Plan (vol. 5, diagrams 11 and 15, pg 49 and 70)

<sup>4</sup> Table 3.1.4 of land balance and use

*MPDG justified elimination of agricultural lands by the fact that according to data provided by Institute of Ecological-Noospheric studies of RA National Academy of Sciences, the agricultural lands on the territory of Yerevan, as well as the crops on these lands are contaminated with heavy metals, which can have hazardous consequences for human health. It is recommended to use the agricultural lands for the purposes of sanitary zones in cemetery surrounding,<sup>5</sup> and to ensure about 1380 ha of additional green zone reach relevant norms.*

*Industrial and storage areas currently cover 2952.6 ha. The Master Plan suggests reformation of industrial areas on the City Kentron District (downtown) into the mixed construction and common use areas. Some constructions of public significance are also envisaged here, accompanied with relevant greening activities. As a result, the industrial and storage areas will cover 2459.6 ha in 2020. Altogether, the area of industrial, mining and other industrial structures will decrease from 2765.8 ha to 2468.8 ha:*

*According to the updated balance of city lands, the surface of specially protected areas has increased at the expense of cemeteries from 595 ha to 714 ha, as well as sanitary-protection zones from 0 to 1041 ha.*

*Decrease of forest areas from 1238.7 ha to 1090 ha is conditioned by the fact that some forest areas are transferred to the category of common use green areas.*

- b) Considering the hot and dry climatic conditions of Yerevan city, the SEA group recommends to include in the Master Plan the issue of a possible increase of water surfaces in the city. Territories released due to the removal of industrial and storage facilities can be used for the purposes of greening or enlarging water surfaces.

*Comment is accepted. MPDG assesses the current possibility for arranging for water surfaces as very limited, and considers organisation or restoration of small water areas as an issue subject to the following stages of planning.*

- c) Considering the importance of establishing satellite towns (technopolis) according to RA Settlement Plan with the purpose of reducing Yerevan City population and related technogenic pressure on environment and human health, the SEA group recommends to provide details of construction in the master plan. Moreover, it is recommended to establish satellite towns not in the intensely developed area surrounding the city, but rather in poorly developed areas envisaged in the settlement plan. It is suggested that Yerevan City Master Plan clearly defines and assigns the location, amount of population, trends for social and economic development, timeframe and other related issues, taking as a priority the principle of protection of the environment and human health.

*According to requirements of RA Settlement Plan the new proposed urban areas are located and distributed not in the intensively utilised areas surrounding Yerevan, but in the zone specially envisaged for regulation of Yerevan agglomeration, with a special development regime. The purpose is not suburbanization, but ensuring contra-urbanization processes in the country. The planned settlements are envisaged not as satellite or bedroom communities, but as sovereign entities, introducing principles of sustainable development in Armenia.*

*In addition to the new settlements adopted by RA Migration Scheme – Aruch and Europolis, suggested to be built in Aragatsotn and Syunik marzes, another new settlement – Hayk, is planned on Yerevan- Vayots Dzor prospective highway - 15 km to the east from Yerevan. For all the mentioned settlements detailed justification and*

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<sup>5</sup> СНиП 2.07.01-89, п.5, табл.6, СН 245-71, п.8.4, класс III

*TEJ for master plans have been conducted. Further clarification will be done in the next planning stage - in the draft spatial plan of Yerevan Agglomeration.*

- d) Along with limiting or terminating mining activities on the territory of Yerevan it is suggested to provide information on the surface area, location, further exploitation of damaged lands and the area to be restored. A program should be envisaged in the framework of YMP, for which an environmental impact assessment must be conducted.

*Comment is accepted. All the mines and damaged areas are subject to restoration and utilization. All land transformations are given in the narrative of the YMP.*

- e) It is suggested to remove all the cattle and poultry breeding facilities from the city area, clean up the territory and disinfect and rehabilitate for further use.

*Comment is accepted. All the cattle and poultry breeding facilities are removed from the city and the relevant lands are allocated for other industrial purposes.*

### 3.2. Landscape characteristics of the city

SEA group had no comments and recommendations on this chapter.

### 3.3. Engineering-geological and seismic conditions

SEA group had no comments and recommendations on this chapter.

### 3.4. Assessment of urban convenience

SEA group had no comments and recommendations on this chapter.

### 3.5. State of environment

#### Atmospheric air

- a) SEA group recommends presenting emission quantities not only by sectors – energy, industry, and vehicle transport (ton/year), but also by separate substances (nitrogen oxide, carbon oxide, etc.) in accordance with MAC.

*Comment is accepted. Emissions and pollution levels for 29 pollutants in MAC are given in the final narrative section of YMP (vol. 5, table 2.2, pg. 23 and table 2.3, pg. 25).*

- b) It is recommended to consider pollution from the hot water supply and local heaters in the winter period.

*Comment is accepted. Emissions from operating boilers and individual heaters are considered in the category “Energy” (vol. 5, table . 6.1, pg. 60).*

#### Surface water

Multiple studies have revealed the self-purification capacity of Hrazdan River as high due to it being a mountainous fast-flowing watercourse. Thus, it is proposed to explain the high level of its pollution not by the fact of low self-purification capacity, but rather by high pollution load.

*MPDP has based its judgment on materials of Methodological Guidelines on Precautionary Sanitary Control in District Planning (Ministry of Health, USSR, 1990). In this material the self-purification capacity of Hrazdan river is assessed as low. Nevertheless, high pollution of the Hrazdan River is not explained by its self-purification capacity, but rather by other factors presented in the Master Plan.*

### Land contamination

SEA group emphasizes the importance of amalgams of mercury in line with heavy metals, as there is an increase of use of mercury-contained lamps by the population, industry and other enterprises, while in RA and Yerevan there is no service for assembling and neutralization of such lamps.

*According to data provided by the Center for Ecological-Noospheric Studies, no contamination of lands with mercury has been revealed.*

### Solid urban wastes

- a) SEA group recommends addressing in the Master Plan issues related to ductile and liquid industrial wastes and construction waste.

*Comment is not accepted. In fact, environmental impact reports of master plans consider municipal solid waste. Liquid waste has been considered in the surface water pollution section (vol. 5, pg. 26-29). Ductile waste is mainly generated in Nairit plant, which operates for 2-3 months a year in 10% of its capacity, and the issue of management of this waste is considered to be subject to the plant's jurisdiction. To deal with disposal of construction waste, the YMP suggests use of small ravines around the city with conditionality for further development of the area.*

- b) It is suggested to present Nubarashen landfill's impact on environment (impact on atmospheric air – due to dioxin emissions, water resources, lands, etc.) and human health.

*Comment is accepted. The qualitative assessment of environmental impact of Nubarashen landfill is given in the final narrative of Master Plan /vol. 5, pg. 34-35/. For quantitative assessment additional studies are required. The Master Plan proposes construction of a waste treatment plant in the landfill to use methane for creation of a sanitary protective zone.*

### Sanitary-epidemiological conditions

YMP recognizes the need of having a healthy environment, which will ensure a high level of livelihood for the population. The World Health Organization has highlighted five main ecological conditions - fresh air, safe quality and sufficient amount of drinking water, safe and balanced food, comfortable housing and sustainable ecosystems. Currently all these conditions do not meet the necessary norms. The above mentioned factors, as well as social conditions stress the population of Yerevan City, which increases morbidity and mortality and decreases fertility rates. SEA group indicates that interrelations between environment and human health should be identified in order to develop adequate measures.

*Comment is accepted. MPDG considers the issue of interrelations between environment and human health as subject to special research, which has not been reflected in the concept due to lack of relevant data on the existing situation. However, relations between the urban stress (one of the components of which is the state of environment) and human health are presented in the document. The final narrative of Master Plan presents the classification of stress-indices /vol. 5, table. 5.1, pg 52/, which enables assessment of morbidity risks.*

### 3.6. Fundamentals of historical and cultural monuments protection within the territory of Yerevan City

It is recommended to include in the Master Plan the issue of establishment of natural-historical reserves (or granting them a relevant status), according to the high importance of those monuments for citizens given their scientific, environmental, aesthetic and educational value.

*Comment is accepted. The Master Plan suggests 4 sections for protection of biodiversity and recommends granting them a status of specially protected areas. The issue of natural-historical reserves can be considered when sufficient indices and justification of relevant authorities are in place (e.g. Dalma gardens).*

#### **Chapter 4. Population**

SEA group had no comments and recommendations on the chapter.

#### **Chapter 5. Preconditions and priorities of social-economic development**

##### 5.1. Priorities of social-economic development of Republic of Armenia

SEA group had no comments and recommendations on the chapter

##### 5.2. Preconditions and priorities of social-economic development

SEA group recommends clarifying the strategy and directions of development of Yerevan industry, type and amount of emissions, emissions and their impact on environment and/or human health. As the industrial development is going to be limited, the SEA group finds appropriate to use the released areas for greening purposes.

*As the prospective industrial development of the city is not identified yet, the level of emissions from the industrial sector cannot be provided. In this regard the Master Plan provides environmental limitations for industrial zones (particularly south industrial zone, where the main former sources of industrial pollution are located). Limitations are based on summary indices of MAE or of required air consumption (vol. 5, pg. 59), which should be met, irrespective of development type and rate. The Concept recommends also re-profiling and modernization of industry and promoting development of ecologically clean production.*

*MPDG suggests detailed study of industry and warehouse territories and justification and planning for use in the following planning stages.*

##### 5.3. Agricultural development strategy of Yerevan City

- a) SEA group recommends to revise the policy on developing cattle and poultry breeding (irrespective of the type) within the city borders. The cattle and poultry breeding facilities must be removed to the safe distance from the city, because even with existing protective zones the territory can further be illegally developed and thus vanish.

*Comment is accepted. All the cattle and poultry breeding facilities (287,3 ha) will be removed from the city area and the lands provided for other industrial purposes.*

- b) It is suggested that qualitative data of the agricultural lands is added to the subchapter..

*Comment is accepted. Data on agricultural lands are insufficient due to lack of relevant monitoring.*

- c) SEA group recommends to consider transfer of the territory of Dalma gardens from an agricultural area to a status of environmental lands within the category of specially protected areas.

*Comment is not accepted. Master Plan document has been based on land allocation decisions of RA Government and Yerevan City Mayor. There are several such decisions related to Dalma Gardens.*

#### **Chapter 6. Development of social infrastructure**

SEA group had no comments and recommendations on the chapter

## **Chapter 7. Development of territorial planning**

### 7.1. City location in the system of RA settlement

According to SEA group, the main goal of the YMP- limitation of Yerevan city growth and transfer of some functions of the city to marzes- is solved in the Concept only partially. Considering extremely hard ecological conditions of the city and lack of real opportunities for improving the situation, it would be appropriate to adopt a policy of gradual reduction of the city population and purpose and principles of spatial planning for Yerevan agglomeration during development of Yerevan City Master plan, to ensure development of appropriate long-term measures.

*MPDG considered the mentioned issue as a subject to territorial planning programs, while in the Yerevan City Master Plan it presents general evaluation of Yerevan City location in the RA settlement plan. Yerevan city population is calculated according to requirements of the RA Settlement Plan.*

### 7.2. Suburban area

SEA group recommends applying resettlement issues, including what should be removed from the city, location for removal, incurred costs, and what are the urban construction preconditions for implementation of comprehensive measures for environmental and human health protection (with identification of the level of reduction of pollution for some components)

*The Planning Group considered the mentioned issue as a subject for territorial planning programs.*

### 7.3. Planning and zoning

- a) It is suggested to consider the fact that some areas proposed for greening, such as Korea gorge, Dalma gardens, Nork and Erebuni already contain large green sections and thus new areas for greening be proposed.

*Comment is accepted: Besides the green areas subject to restoration the Master Plan proposes establishment of 25000 ha of new green areas.*

- b) Considering the 3000 year long history of Dalma Gardens, as well as its environmental value, the SEA group recommends to grant Dalma Gardens protection with a status of specially protected areas. The proposal of road construction through the garden territory is evaluated as contradicting the greening (environmental) principles as it reduces the green surface, divides it into parts and pollutes the area with emissions from vehicles.

*Considering that the Dalma Gardens are granted a status of forest lands by RA Government decision, the area is provided as forest-park area.*

- c) SEA group recommends to entirely protect and rehabilitate the Hakhtanak (Victory) park.

*Hakhtanak Park, as well as other public parks are presented in the Concept as green areas of common use. The issue of their restoration will be provided in the further planning stages of the Master Plan.*

- d) It is suggested to revise the issue of greening the cemeteries as green areas of common use.

*Comment is accepted. MPDG suggests greening of the cemeteries and their sanitary zones as a greening of special purpose.*

### **Chapter 8. Road network and transport of the City**

- a) Along with appreciation of successful solutions for road development, the SEA group suggests to revise the plan for a "circular speedway" from Leningradyan to Isakov streets and the vertical way passing through Dalma Gardens, considering the fact that it affects the formerly joint and sustainable ecosystem, which includes green areas, fruit and vine yards, ancient oak-trees as well as historical monuments.

*Comment is not accepted. MPDG, sharing the concern, confirms that as a main component of city planning the current transport network has no alternatives in this area. Planners have considered the prospective increase (supposedly two times) of the city vehicles and the need to unload the center of the city, which will in turn reduce the level of pollution upon the atmosphere.*

- b) SEA group mentioned that the Concept lacks data on current and prospective amounts, conditions of vehicle transport and types of fuel used.

*Comment is accepted. The final narrative of the Master Plan gives data on current and prospective emissions (vol. 5, table 6.1, pg. 60):*

### **Chapter 9. Engineering infrastructures**

#### 9.1. Water supply

- a) SEA group suggested to add data on protection of the water sources feeding Yerevan from technogenic and anthropogenic impacts.

*Comment is accepted. All the sources have I level of sanitary protection zones, according to norms. The II zone, which includes economic activities is not identified yet. The Master Plan points out the importance of II zone.*

- b) It is suggested to include the following trends: the growth of "out of city" consumers (5%), industrial growth (20%) and reduction of flow losses (20%).

*Comment is accepted. The amount for flow losses is adopted as 30%, based on financial capacities and expediency.*

- c) Alternative calculations in Table 6 of the YMP Concept lack data on water demand of budgetary and commercial enterprises.

*Comment is not accepted. MPDG has included the mentioned water demands into the summary water demand and this approach has been approved by Interagency Commission of Coordination of Development of Yerevan Master Plan and Yerevan Agglomeration.*

- d) The subchapter needs to be developed further to consider sustainable water supply in case of emergencies, alternative solutions, valuation of network improvement or conservation and other costs, legal changes and tariff policy.

*Comment is accepted. Data to ensure sustainable water supply, alternative solutions, valuation of network improvement or conservation and other costs, legal changes is given in the chapter "Emergencies" of the Master Plan. However, the tariff policy is considered not subject to the YMP.*

#### 9.2. Domestic and rain water drainage

- a) Considering the dominating role of wastewater in water pollution and negative impact to human health the SEA group recommends to include in the description of the current situation of local industrial treatment stations (current and prospective), a collector passing through Hrazdan river and the urban treatment plant.

*Comment is accepted. The issue on local industrial treatment stations is expected to be solved by enterprises rather than by the YMP document. Conditions of the collector and treatment plant are described in the Master Plan.*

- c) It is suggested to present alternatives for investment calculations.

*Comment is accepted. Investment costs are presented in YMP narrative (vol. 7).*

- d) There is a need to further develop the following issues: sewage systems, rehabilitation of irrigation networks in yards (construction of new networks and reconstruction of old ones), rehabilitation of the treatment plant (information about the plant and the extent of treatment), recycling and removal of the silt at the treatment plant, level of wastewater treatment, sanitary conditions of discharges of treated wastewater into the transboundary Hrazdan river, cleanup of the territory of the uncompleted construction of the treatment plant and clarification of investments.

*Comment is accepted. The mentioned issues are solved in the Master Plan to the extent possible. The issue on importance of the Hrazdan river mechanical treatment station is presented in the YMP and will be additionally discussed in the territorial plan of Yerevan city agglomeration.*

- e) Master Plan shall clearly define the alternative versions of rehabilitation of the sewage treatment plant cleaning station, as well as justification of the chosen version.

*Comment is accepted. However, the MPDG considers the development of alternatives an issue subject to a relevant follow up project to the master plan.*

### 9.3. Heat supply

- a) Because three proposed versions of heat supply (local, grouped and big heaters) might not operate separately, the SEA group suggests considering a more realistic combined alternative of heating.

*Comment is accepted. The three heat supply types as well as the combined alternative are regarded as realistic in the relevant social-economic conditions.*

- b) The three alternatives of heating are reviewed from the financial point of view, while there is a need to consider the environmental aspects as well, which will enable to make a right choice among alternatives.

*Comment is accepted. Emissions are assessed (vol. 5, table 6.1, pg 60/). For each heating alternative, energy effective technologies with minimum environmental impact are chosen.*

### 9.4. Gas supply

SEA group has no comments and recommendations on this subchapter.

### 9.5. Electricity and communication

SEA group has no comments and recommendations on this subchapter.

## **Chapter 10. Greening of the City**

- a) SEA group has noticed that although the surface of green zones of common use have reached the normative demands (the common use areas should be developed from

4.9 to 19.15 m<sup>3</sup>/men), it does not solve the issue of accessibility of green areas, as those are located far from the living areas and can not ensure the requirement of 15 minutes walking distance. The issue is particularly complicated in the Kentron district (downtown), which has high housing density levels. It is suggested that a greening policy is adopted for Yerevan, which can be launched immediately and completed even after the Master Plan period and will enable utilization of released areas for greening purposes.

*Comment is accepted. Accessibility of green areas has been based on the current opportunity. The possibility of establishing new green areas should be discussed.*

- b) SEA group finds that due to a not clearly defined legend in the mapping system of the YMP concept it is impossible to ensure compatibility of current and proposed greening schedules to the narrative. Thus, it is recommended to clarify this issue in the Master Plan.

*Comment is accepted. Conventional signs are clarified in the final version of the Master Plan graphical part.*

### **Chapter 11. Measures to prevent emergencies and technogenic phenomena in Yerevan City**

- a) SEA group recommends providing the measures for protection of the Yerevan city territory in the master plan, which will allow assessing effectiveness and sufficiency of the proposed activities.

*Comment is accepted. Based on justification of MPDG the YMP discusses in detail the preventive measures for emergencies and technogenic phenomena, which have been approved by the Interagency Commission on Coordination of Development Master Plan and Yerevan Agglomeration. More detailed descriptions of measures are subject to planning phases following the Master Plan document.*

- b) SEA group recommended reconstruction of barrages in the territory of Yerevan city instead of their suggested repair works, as the water pollution is caused by poor construction of barrages.

*Comment is accepted.*

### **Chapter 12. Environmental protection**

To the SEA group, the principles and purpose of protection of environment and human health match the general concept of sustainable development. Measures proposed in subchapters also are aimed at protection of each component, however they are not appropriately justified.

#### Protection of atmospheric air

- a) It is recommended to justify the forecast of reduction of air pollution as a result of planned activities to decrease transport emissions and to provide relevant data and calculations: amount of emission of each substance, its decrease, pollution according to MAC. Taking into consideration the fact that although total emission amounts are being reduced by 20%, but still exceed the MAC by 2-4 times, additional measures to reduce emissions should be envisaged aimed at reducing emissions to the limits of allowable norms.

*Comment is accepted. In order to reduce vehicle transport emissions additional measures are envisaged, such as utilization of canalizations, which will reduce the*

*emissions by 60% and air pollution to 1.3 MAC (vol. 5 pg. 58). Proposed emissions and air pollution are presented in the final narrative of YMP (vol. 5, tables 6.1, 6.2 pg. 60).*

- b) If development of industries is limited to the formula given in the Concept, the air pollution out of the industrial zones will not exceed the MAC. However, when the industrial emissions are added to emissions from transport the MAC will be exceeded.

*Comment is accepted.* While developing the MAE norms, the background pollution has been considered and calculated accordingly (vol. 5, pg. 59).

- c) It is suggested to develop electric transport aimed at mitigating air pollution .

*Comment is accepted.* The proposed transport scheme envisages development of the share of the electrical transport (subway, trolleybus).

#### Protection of surface water

- a) The Concept provides data on reducing pollutant discharge into the Hrazdan River by 85% due to wastewater treatment at the treatment plant. There is a need to justify this data and at the same time to solve the problem of treating the remaining 15% of wastewater. Also, it is suggested to assess the pollution of Hrazdan River given the malfunctioning of the Kaghsi treatment plant.

*Comment has been accepted.* YMP Tables 2.5 and 2.6 provides the amount of treated pollutants (85%) (vol. 5, pg. 28-29). The remaining 15% is within the range of MAE. Pollution of Hrazdan River will be possible to assess only if a relevant monitoring network is in place.

- b) SEA group recommends presenting water quality data for Yerevan water structures, as well as envisaging measures aimed at improving water quality.

*Comment is accepted.* Pollution of surface water and reservoirs is given according to official data. Measures on surface water protection plan aim at ensuring normative quality of water (vol. 5, pg. 60).

- c) It is suggested to plan for measures to remove and disinfect the silt of Yerevan lake.

*Comment is accepted.* Cleanup and sterilization of the silt in Yerevan Lake is planned (vol. 5, pg 60).

#### Land protection

It is suggested to present concrete measures aimed at land protection, their efficiency, success and further use of contaminated lands.

*Comment is accepted.* Land protection measures are given in volume 5, pg 61.

#### Management of solid urban wastes

- a) It is suggested to justify forecasts related to waste amounts given the unclear prospects and volumes of development of industries.

*Comment is accepted.* According to justification of MPDG, the volume of solid domestic wastes has been identified based on proposed number of population and average index of waste per capita (about 0.5 kg/men day). The general volume of solid waste is identified in accordance with methods used for large cities.

- b) It is recommended to consider the expediency of establishing landfills of industrial and construction wastes.

*According to official data, currently 95 percent of wastes belong to 5th level of toxicity. Thus, the issue on establishing a landfill for toxic wastes is considered not urgent (vol. 5, pg. 62).*

#### Protection from noise

SEA group suggests verifying the normative amounts for noise given in the YMP concept and plan for additional measures for noise protection in the master plan.

*Comment is accepted. Noise MAL is defined in Sanitary Norms and Rules 11-12-77. Comprehensive measures for noise protection are given in volume 5, pg 63.*

#### Protection from electromagnetic radiation

- a) YMP concept does not contain information on the current situation with electromagnetic radiation. There is no assessment related to the fact that rapid changes of electromagnetic radiation has been taken place during the last decade, the number of transmission stations has significantly increased, including TV, radio and cellular communication stations. The Concept states that the size of sanitary protective zones should be considered only after attainment of data on the technical description of radiation sources is in place. However, it is impossible to identify the areas appropriate for settlement without relevant measurements. It is suggested to consider the existing and proposed electromagnetic radiation sources, impacts and particular preventive measures.

*Comment has been accepted. Currently there is no measurement of electromagnetic radiation. Sanitary protective zones are set forth for protection from electromagnetic radiation, considering the potential of increasing radiation power (vol. 5, pg. 64).*

- b) Considering the lack of data on vibration in the baseline data it is recommended to include it the monitoring programs.

*Impact of vibration has not been assessed due to lack of data.*

#### **Chapter 13. Technical-economical indices”**

The table “Technical-economical indices” does not illustrate the transport development plans. In the same table, the proposed environmental indices exceed the allowable norms.

*Comment is accepted. The clarified indices will be given in the final narrative of the YMP.*

#### **Chapter 14. Investments**

- a) SEA group recommends presenting the amount of environmental protection measures and investments in a separate section.

*Comment is accepted. Volumes of environmental investments will be separated from the general investments estimated for implementation of YMP.*

#### **General comments**

SEA group has provided a number of general comments to the YMP concept document, which have been accepted by MPDG, which are presented below:

1. YMP concept does not contain a policy to remove from the residential areas enterprises and plants located outside the industrial areas, which are polluting air, water and soil.

*Concept is accepted. YMP also stresses the importance of ensuring environmental conditions in the process of reconstructing industrial enterprises and establishing new ones.*

2. Activities aimed at protection of the components of environment are not classified by priorities except for surface water.

*Comment is accepted. Classification of measures to protect the components of the environment by priorities is given in the summary table (vol. 5, pg.69).*

3. It is recommended to present the efficiency and sufficiency of proposed measures as well as the state of the components of the environment (including qualitative indicators).

*Comment is accepted. Proposed environmental indicators are presented in the YMP final narrative (vol. 5, table 6.6),*

4. There is a need for elaboration of a list of scientific and operational programs stemming from the YMP, the required funding for implementation of those, sources of funding and timetable of implementation (agriculture, greening, road construction, water supply and removal, industry, waste management, etc.).

*Comment is accepted. A separate volume of the YMP is devoted to the proposed relevant measures and programs.*

5. Lack of alternative solutions suggested by the YMP and of the ecological-economic calculations to justify selection of the preferable alternatives as well as justification of effectiveness and sufficiency of measures are evaluated by the SEA team as a shortcoming.

*Alternatives along with comparative analysis of population growth, territory, components of infrastructures, have been discussed in the stage of concept development. YMP is based on the proposed number of population of 1200000, within a framework of unchanged administrative borders, which has been set forth by decision of Interagency Commission and served as a basis for ecological-economic calculations and development of activities. Alternative versions have also been developed in the stage of formulating the Master Plan scheme (grade lines and zones, population density, service provision, greening, infrastructures, etc.).*

6. The Concept does not provide risk assessment for proposed activities.

*Activities have been developed based on the assessment of natural and technogenic disasters. More detailed assessment will take place during implementation of particular activities.*

7. Concept does not provide policy on involvement of the private sector into the greening, sewage system, wastewater treatment, water supply, waste removal, recycling and other sectors.

*Comment is accepted. The given recommendation is considered in the YMP. All the anticipated investments are distributed between state, community and private investors.*

8. It is recommended to assess the expenditures needed for implementation of environmental activities and provide relevant justifications.

*Comment is accepted. Expenditures for implementation of essential parts of environmental measures are assessed and given in the common list of required investments for implementation of YMP.*

## **VI. POSSIBLE ENVIRONMENTAL CONSEQUENCES WITHOUT IMPLEMENTATION OF YEREVAN MASTER PLAN (Zero alternative)**

Yerevan City Master Plan provides for implementation of a number of measures aimed at implementing priority courses of activities. Without implementation of those measures, the ecological pressure in the city would be worsened and the human health risks increased. Thus in the situation of a zero alternative:

- Absence of transport flow redistribution and road traffic optimizing network, as well as failure to carry out legal measures on mandatory use of neutralizers of vehicle emissions, given the doubled increase of vehicles will cause an increase of air pollution with nitrogen and hydrogen oxides in highway areas up to 5.0 MAC. Noise will also exceed allowable levels by 10dBa.
- Failure to carry out restoration of city sewage networks and wastewater treatment, prevention of discharges of unregulated municipal and industrial wastes to surface watercourses, and restoration and enlargement of a flood network will result in high levels of water resource pollution and the use of the latter in recreational purposes will be prohibited (as it was previously). In the case of not changing the current condition of sewage network, the risk of epidemics will remain high because of discharge of sewage water into the water supply system.
- It is expected that land contamination with heavy metals will be reduced in parallel with liquidation of the sources causing contamination (restrictions of ethylated petrol utilization, closure of a number of industries). However, absence of control over the compliance to the MAE norms for prospective (or unregulated) sources of air pollution may cause increased quantities of heavy metals in the environment. Failure to carry out activities aimed at cleaning of heavily polluted areas and excluding the contaminated agricultural lands from the land balance will cause serious danger to public health, as significant concentrations of heavy metals persist in agricultural products.
- Given the increase of solid domestic wastes, including plastics, not building a waste treatment plant and not using methane from the landfills, the city landfill will cause a danger to the environment from the high level of toxic dioxin emissions generated due to self-combustion of wastes and discharged into the atmosphere and possible pollution of groundwater.
- Failure to carry measures on restoration of green areas (total surface increase by two times, common use areas increase by 4.5 times) and retaining the existing conditions, the negative impact on environment will be increased including degraded microclimate, reduction of air pollutant sinks and an increase of noise level. In particular, in not restoring Nork forests the concentration of dust in the atmosphere will remain high (up to 4 MAC), mainly due to generation of dust in areas deprived of tree cover.

- o Lack of engineered protection of city areas, buildings, infrastructures and population will experience significant damages as a result of floods, landslides, deluges and other geological phenomena.

## VII. POSSIBLE ENVIRONMENTAL IMPACT AS A RESULT OF IMPLEMENTATION OF YEREVAN MASTER PLAN

The possible environmental impacts from implementation of YMP are assessed by taking into consideration the linkages of the main directions of the YMP with reference to environmental objectives and the possible impacts of those on the latter.

### **Linkages of the main directions of YMP with reference environmental objectives**

For purpose of this assessment “0” will mean no linkages, “1”-low link, “2”-average link, “3” strong link:

Reference Environmental Objectives	Priority Directions of the Master Plan						
	Improving the planning structure, ensuring territorial integrity of the urban environment and functional adequacy	Improving transport and engineering infrastructures	Developing environmentally clean industries	Improving the living conditions for human populations and modernization of housing	Restoring and enhancing sustainability of the natural complex, mitigation of environmental risks for human health	Protecting historical and cultural heritage	
Reducing atmospheric pollution	1	3	3	1	1	0	
Using water resources rationally, reducing water pollution	1	3	3	2	2	0	
Protecting and restoring land cover	1	1	2	0	3	0	
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	3	1	1	1	2	1	
Reducing harmful impacts of wastes	0	0	3	1	1	0	
Protecting against physical impacts	2	2	1	1	0	0	
Reducing negative impacts on human health	2	3	3	3	2	2	

### **Impacts on reference environmental objectives as a result of implementation of main directions of the YMP**

For purpose of this assessment “0” will mean no impact, “1”- low impact, “2” high impact. Marks §+! and §-! will correspondingly mean positive and negative impacts.

1. Improving the planning structure, ensuring territorial integrity of the urban environment and functional adequacy	
Reference environmental objective	Possible environmental impact

Reducing atmospheric pollution	+1 <sup>6</sup>
Using water resources rationally, reducing water pollution	0
Protecting and restoring land cover	+1
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	+2
Reducing harmful impacts from wastes	0
Protecting against physical impacts	+1
Reducing negative impacts on human health	+1

## 2. Improving the transport and engineering infrastructures

### a. Improving transport structures

<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	+1
Using water resources rationally, reducing water pollution	0
Protecting and restoring land cover	0
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	-1
Reducing harmful impacts from wastes	0
Protecting against physical impacts	+1 <sup>7</sup>
Reducing negative impacts on human health	+1

### b. Improving engineering infrastructure

<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	0
Using water resources rationally, reducing water pollution	+2
Protecting and restoring land cover	0
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	0
Reducing harmful impacts from wastes	0
Protecting against physical impacts	-1 <sup>8</sup>
Reducing negative impacts on human health	+1

## 3. Developing environmentally clean industries

### a. Excluding expansion of industrial zones

<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	+1

<sup>6</sup> Pollution is distributed unequally within the city territory.

<sup>7</sup> This grade refers to the noise.

<sup>8</sup> This grade relates to the future increase of power of electromagnetic radiation sources in future.

Using water resources rationally, reducing water pollution	+1
Protecting and restoring land cover	+1
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	+1
Reducing harmful impacts of wastes	+1
Protecting from physical impacts	+1
Reducing negative impacts on human health	+1
<b>b. Re-profiling or removing agricultural facilities from the city</b>	
<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	+1
Using water resources rationally, reducing water pollution	+1
Protecting and restoring land cover	+1
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	+1
Reducing harmful impacts from wastes	+1
Protecting against physical impacts	0
Reducing negative impacts on human health	+1

<b>4. Improving the living conditions for human populations and modernization of housing</b>	
<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	-1
Using water resources rationally, reducing water pollution	+1
Protecting and restoring land cover	0
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	-2 <sup>9</sup>
Reducing harmful impacts from wastes	0
Protecting against physical impacts	0
Reducing negative impacts on human health	+2

<b>5. Restoring and enhancing sustainability of the natural complex, mitigation of environmental risks for human health</b>	
<b>a. Improving all the components of the natural environment</b>	
<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	+1
Using water resources rationally, reducing water pollution	+1
Protecting and restoring land cover	+1
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	+1
Reducing harmful impacts from wastes	+1

<sup>9</sup> This grade relates to the likely negative impacts of service sector objects and new residential areas

Protecting against physical impacts	+1
Reducing negative impacts on human health	+2
<b>b. Protecting areas from natural disasters through engineering and technical methods</b>	
<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	0
Using water resources rationally, reducing water pollution	+1
Protecting and restoring land cover	0
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	+2
Reducing harmful impacts from wastes	0
Protecting against physical impacts	0
Reducing negative impacts on human health	+1

<b>6. Protecting historical and cultural heritage</b>	
<i>Reference environmental objective</i>	<i>Possible environmental impact</i>
Reducing atmospheric pollution	0
Using water resources rationally, reducing water pollution	0
Protecting and restoring land cover	0
Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests	0
Reducing harmful impacts from wastes	0
Protecting against physical impacts	0
Reducing negative impacts on human health	+1

The results of assessments given in the table above illustrate that implementation of the main directions of the Yerevan Master Plan will have positive or no impact on achieving the reference environmental objectives. Exceptions include the following:

- *The objective of reduction of atmospheric pollution* will probably be difficult to achieve as the improved living conditions of population and modernization of housing may be accompanied by increased number of building floors and concentration of population and result in increased number of garages and heating sources; a phenomenon that takes place in present construction practices.
- For accomplishment of *the objective of protection and restoration of landscapes, forests and green zones, forestation and greening of new territories*, serious obstacles can be the improved living conditions and modernization of housing, which are confirmed by the existing trends of construction on the green areas. Besides, in some cases green areas can be affected by construction of new roads within the direction of improving transport structures.
- *The objective of protection from physical impacts* may not be achieved, in particular the level of radiation may not be decreased as the improvement of engineering infrastructures may result in an increased level of power thereby increasing radiation sources.

## VIII. RECOMMENDATIONS

Measures to establish buffer zones proposed by the YMP to resolve the issue of protection against physical impacts are evaluated as sufficient by the SEA team.

Towards accomplishing the *objectives of reduction of atmospheric pollution and of protection and restoration of landscapes, forests and green zones, forestation and greening of new territories*, it is recommended to plan for the following measures in the relevant phases of implementation of the Master Plan, given the hot and dry natural and climatic conditions and unfavorable location in terms of absorbing the atmospheric pollutants:

- To exclude any construction on territories, which by year 1998 have been covered with vegetation (such as Dalma Orchards) or soil, including the mountain slopes (such as the Nork forest, forest-type park adjacent to the Babayan street) and to revise the relevant decisions of the Government of Armenia, taking into consideration the critical environmental value of those areas for the city and the fact that decisions on development of the mentioned areas have been adopted without environmental expertise of the relevant concepts (programs) for development.
- During the lifetime of the Master Plan document to revise the lease agreements on the green areas of common use to ensure by year 2020 around 75-80 percent of green or water bodies in those areas.
- In communities with high density of construction and unfavorable environmental conditions (particularly, in Kentron community) to change the category of industrial and agricultural lands to urban green areas of common use.
- To exclude any higher level construction density in territories, which already have high density of construction, specifically in Kentron and Arabkir communities, given the unfavorable environmental conditions of these communities.
- To protect and exclude construction on stony and herrenlose areas of common use, which have been illegally used and greened by the local residents (such as gardens on the street of Zakaria Sarkavag and Berdadzor-Kaqavadzor area).
- To maintain the existing forest areas within the category of forest lands rather than transferring those to the category of urban lands of common use in order to exclude the construction on the given areas until the protection of the latter category of lands is regulated.
- In the list of measures to follow the Master Plan adoption, to plan to develop a Project on the Historical-cultural Justification and Monuments' Protection Zones as a priority action.
- To revise the list of species of trees and bushes planned for greening the city.
- To plan for actions to use the water removed from metro tunnels for irrigation purposes.
- To plan for measures to change the tax policy in order to promote recovery of the green areas suffered from unregulated construction.
- Recover the irrigation channel and tunnel of Dalma Orchards, which have a historical and cultural value.
- To plan for measures to ensure compliance of construction density and greening percentage to the urban development norms not only at the city level, but also at the level of communities, trying to ensure balanced distribution throughout the city.
- To take measures to regulate the number of floors of constructed buildings.
- To plan for measures to green the areas around the city borders.

## IX. PROGRAM OF MONITORING OF ENVIRONMENTAL IMPACTS OF IMPLEMENTATION OF YMP

Considering the generalized character of methods for strategic environmental assessment, lack of benchmark data for environmental impact assessments, cumulative

nature of likely environmental impacts from implementation of documents and activities associated with the YMP and deficiencies of scientific justifications of forecasts, it is necessary to develop and implement an environmental monitoring program. This will assist in preventing or mitigating negative impacts upon the environment and human health, through periodic observations and relevant measures. It is recommended that the Environmental Department of Yerevan Municipality coordinate the collection and analysis of monitoring data.

The suggested monitoring program is based on the indicators developed for reference environmental objectives. It is suggested that monitoring to the extent of meeting environmental objectives are analyzed based on the indicators of impacts, for which below is given the expedient frequency of data collection and responsible authorities.

In addition, it is recommended that all the relevant programs and projects stemming from the Yerevan Master Plan undergo another level of strategic environmental assessment or environmental impact assessment.

<b>Indicator</b>		<b>Baseline data</b>	<b>2020 target</b>	<b>Frequency of data acquisition</b>	<b>Responsible authority</b>
<b>1. Reducing atmospheric pollution</b>					
1.1	Decreased level of air pollution, according MAC <ul style="list-style-type: none"> <li>• Nitrogen oxides</li> <li>▪ Hydrogen oxide</li> <li>▪ Escaping organic compounds</li> <li>▪ Persistent organic pollutants</li> <li>▪ Dust</li> </ul>			3 years	RA MNP
1.2.	Decreased density of construction in areas, which have high density according to the urban development norms				
<b>2. Using water resources rationally, reducing water pollution</b>					
2.1	Decreased level of water loss in city water systems (percentage)	70%	20%	3 years	RA MTA, Yerevan Water Sewage Company
2.2	Maintained and improved quality of drinking water				
2.3	Decreased outflow levels <ul style="list-style-type: none"> <li>▪ Decrease total level of wastewater flow (m3/year)</li> <li>▪ Decrease amounts of outflowing pollutants according to BOD (ton/year)</li> </ul>	128.3 no data	- up to 70%	3 years	RA MNP RA MTA, Yerevan Water Sewage Company
2.4	Decreased level of water pollution according to MAC <ul style="list-style-type: none"> <li>▪ BOD</li> <li>▪ Oil products</li> <li>▪ Heavy metals</li> </ul>	20 2-5 11-13 (copper)	6 - -	3 years	RA MNP
2.5	Increased volume of wastewater and rainwater treated (percentage)	-	-	3 years	RA MTA, Yerevan Water Sewage Company
<b>3. Protecting and restoring land cover</b>					
3.1	Decreased level of pollution with heavy metals according to ACI	32-128 ACI` 2800ha	16-32 ACI` 0ha	5 years	RA MNP
3.2	Decreased level of radionuclide pollution, according to MAL	1.4	1.1	5 years	RA MNP
3.3	Decreased area of highly polluted territories (ha, percentage)	land` 2800 ha air` 5600 ha	-	5 years	RA MNP
3.4	Increased area of <b>territories geological phenomena</b> (clarify) (ha) <ul style="list-style-type: none"> <li>▪ Floods</li> <li>▪ Deluge</li> </ul>	- -	- -	5 years	RA MTA

<b>Indicator</b>		<b>Baseline data</b>	<b>2020 target</b>	<b>Frequency of data acquisition</b>	<b>Responsible authority</b>
	▪ Landslides	-	-		
<b>4. Protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests</b>					
4.1	Increased surface of green areas <ul style="list-style-type: none"> <li>• Total surface of green areas, including those being restored and newly established (ha)</li> <li>▪ Surface of green areas of common use (ha, m2/men)</li> <li>▪ Surface of specially protected environmental lands (ha)</li> <li>▪ Surface of forest lands (ha)</li> </ul>	- 543 0 1238.7	- 2382.3 - 1090.0	1 year 3 years 3 years 3 years	Yerevan Municipality Real Estate Cadastre Committee
4.2	Decreased time for accessibility of green areas (min)	-	15 minutes	7 years	Yerevan Municipality
<b>5. Reducing harmful impacts from wastes</b>					
5.1	Maintained number (unit) and surface (ha) of regulated landfills	1, -	1, -	5 years	Yerevan Municipality
5.2	Decreased number (unit) and surface (ha) of not regulated landfills			1 year	Yerevan Municipality Neighborhood Communities
5.3	Increased share of the treated and utilized waste within the general waste amount (percentage)	15	75	5 years	RA MNP
5.4	Increased surface of sanitary-protective zones	0	1041	3 years	Yerevan Municipality Neighborhood Communities
<b>6. Protecting against physical impacts</b>					
6.1	Decreased level of noise, according to MAL	1-5	1-3	1 year	RA MH
6.2	Decreased level of radiation, according to MAL	-	-	5 years	RA MTC
6.3	Decreased level of vibration, according to MAL	-	-	5 years	RA MTC
<b>7. Reducing negative impacts on human health</b>					
7.1	Decreased number of population living in ecologically uncomfortable zone <sup>10</sup>	-	-	1 year	RA MH
7.2	Decreased number of cases of population morbidity and mortality, according to the following nosological types: <ul style="list-style-type: none"> <li>▪ Respiratory diseases (men/thousand men)</li> <li>▪ Cardio-vascular diseases (men/thousand men)</li> </ul>	-	-	1 year	RA MH

<sup>10</sup> The borders of current and proposed ecologically uncomfortable zones are given in the Master Plan (vol. 5, diagrams 11 and 15, pg 49 and 70)

<b>Indicator</b>		<b>Baseline data</b>	<b>2020 target</b>	<b>Frequency of data acquisition</b>	<b>Responsible authority</b>
7.3	Decreased number of people subjected to epidemics of water transmitted diseases	-	-	1 year	RA MH

**List of Environmental Issues  
Related to the New Master Plan of Yerevan City**

(Issues for Strategic Environmental Assessment  
as suggested by RA Ministry of Nature Protection)

**Land resources protection**

- Current and prospective land distribution by purpose and functional significance
- Conservation and utilization of the fertile land
- Protection of areas from emergencies and anthropogenic impact

**Water resources protection**

- Installation of sewage systems in the areas of the city that do not have sewerage (domestic, industrial and rainfall),
- Ensuring cleaning facilities for industrial (primary) and domestic wastewater and rainfall
- Recovery of the water supply systems

**Underground resources protection**

- List of reserve, operational and explored mines and their location,
- Current conditions and development of underground reserves, as well as underground transport means (metro)
- Limitation of mine exploitation and restoration of territories

**Air basin protection**

- Information about hazardous emissions from static and mobile sources (current and prospective),
- Measures on mitigation of atmospheric pollution in the reporting period (out of the period if needed), aimed at reducing the pollution level to the marginal allowable norms,
- Creation of centralized heating systems
- Measures aimed at reducing transport emissions
  - Program on developing high quality inner-city public transport aimed at purchasing large and middle buses and protection and development of electrical transport, as well as improved services for passengers
  - Measures aimed at formulating an efficient financial mechanism for development of the metro
  - Link the scheme of on-ground public transport with metro

**Regulation of transport**

- Prospective program on road network
- Supportive measures for ensuring development and safety of the pedestrian and bicycle lanes, aimed at establishing partial limitations of the traffic in the resting and crowded areas of the city
- Proposing automated systems for traffic regulating
- Measures aimed at establishing parking facilities
- Providing for traffic organizational scheme

**Mitigation of waste impacts**

- Improvement of conditions of the Nubarashen landfill, disinfection of solid domestic wastes, excluding the option of combustion
- Establishing a specialized polygon for sterilization of other hazardous wastes

**Mitigation of other physical impacts**

- Noise
- Vibration
- Electromagnetic radiation

### **Conservation and restoration of the specially protected areas of Yerevan City**

*To include in the forest lands category*

- Forest area nearby the Antarayin street
- Forest-park on the crossway of Babayan-Azatutyan streets
- Forest area nearby Babayan-Ulnesti-David Anghaght streets
- Erablur
- Forest-park nearby Lvovyan street
- Forest area nearby the Khorenatsi street
- Karmir Blur
- Zoo
- Soil protecting plantations in Hrazdan Gorge
- Soil protecting forests of Nork-Marash – Sari Tagh
- Nubarashen forest
- Soil protecting plantations of Jrashen-Voghjaberd
- Park in the end of Papazyan street

*To include in the list of the specially protected areas with an environmental function in the following areas*

- Dalma gardens, including Sardur gardens – total area 533 ha
- Botany garden
- Water protecting plantations of Yerevan Lake
- Green massive of Tsitsernakaberd memorial

*City parks*

- English Boulevard
- Park of “Almast” factory
- Komitas Park
- “Hakhtanak” park
- Ghukasyan park
- Parks of Malatia-Sebastia community
- Children’s Park
- Park of Mergelyan Institute
- Shahumyan Park
- Pushkin Park
- Vardavar Park
- Circle Park
- Opera Parks

### **Protection of green areas**

- Protection and restoration of forests, forestation of new territories
- Protection and restoration of green areas, greening of new territories

### **Protection of monuments**

- Historical and archaeological monuments
- Natural monuments

### **Other environmental issues**

- To ensure compliance with normative requirements for location of service providing enterprises aimed at reducing the movements for the population.

**Protocol N1**  
**Public Discussion of the Concept of Yerevan City New Master Plan**

*(Union of Architects, Yerevan; 30.03.05).*

**Agenda**

1. Information on the development of the draft concept of the Yerevan City New Master Plan, with an emphasis of problems  
Reporter - G. Mushegyan, Director of “YerevanProject” CSJC.
2. Main provisions of the Concept of the Yerevan City New Master Plan  
Reporter - P. Sogomonyan, Head of Yerevan City Master Plan division of “YerevanProject” CSJC
3. Presentation of selected sections of the Concept of Yerevan City New Master Plan
  - Road system, transport and engineering infrastructures of the city – reported by G. Mushegyan
  - Environmental Protection - reported by M.Vermishev

The following issues have been raised during the discussions:

**1. V. Harutyunyan, Architect**

What areas of the city are proposed for greening purposes?

What is the fate of areas between communities?

What is envisaged by Master Plan in regard to monuments and their protection zones?

**2. A. Iskoyan, EPAC NGO**

How is the issue on red lines reflected in the Concept?

**3. A Pogosyan, President of Consumers` Union**

The green areas in Yerevan are consistently being destroyed, the construction density increases. How are these issues reflected in the Master Plan Concept?

**4. E. Arevshatyan, Architect**

How is the issue of industrial areas solved?

**5. A. Kanayan, Architect**

What are the main urbanization factors for further development of Yerevan City? Is the unemployment issue reflected in the section on social issues?

**6. A. Iskoyan, EPAC NGO**

To what extent is the proposal to include agricultural areas into reserve lands justified?

**7. H. Sanasaryan, “Greens Union” NGO**

Master Plan Concept proposes maximum and minimum margins for ecological norms.

**8. V. Harutyunyan, Architect**

Is utilization of underground water, existing on the territory of Yerevan City proposed for irrigation purposes?

**9. A. Iskoyan, EPAC NGO**

Please present the approach for further fate of ecologically hazardous industries.

**10. B. Ghazaryan, RA Ministry of Nature Protection**

How is the increase of atmospheric air pollution explained?

**11. V. Harutyunyan, Architect.**

How do you imagine protection of copyright on the implemented work and the suggested zones?

**12. S Adamyán, “Bird Lovers’ Union” NGO**

Where are the green zones envisaged?

**13. H. Sanasaryán, “Greens’ Union” NGO**

Please provide the NGOs with documents of Master Plan Concept for getting acquainted with those.

**14. E. Arevshatyan, Architect**

Is the current urban construction policy considered in the recommendations of the environmental section?

**15. N. Chilingaryán, Architect**

What are the approaches for further development of city suburbs?

**16. A. Sargsyan, “Union of Housing-Communal Employees” NGO**

What approaches are proposed for cemeteries and landfills?

**17. S. Karapetyán “ Diseases Prevention Center”**

How will the centralized heating issue be solved?

**18. A. Iskoyán, EPAC NGO**

What is the fate of the “Yerevan Lake” reservoir?

**19. S. Ayvazyan, coordinator of Council for Public Ecological Union of Yerevan City**

How does the Yerevan City Master Plan affect the floors of buildings of the city and the city design issues?

The answers to questions were provided by G. Mushegyán, P. Sogomonyán and M.Vermishev, in accordance with the main provisions developed by concept.

As a result of discussions it was decided to consider the following recommendations:

**1. S. Arustamyán, Architect**

Organize the forthcoming discussions by specialized topics.

**2. A. Sargsyan, «Union of Apartment-utility Workers» NGO**

Create a web-site.

**3. V. Harutyunyan, Architect**

Establish an independent working group of architects to discuss the development activities.

President of the Union of Architects

M.Minasyán

**Protocol N**  
**Session of the Board of Engineering Academy of RA**

Yerevan

5 May, 2005.

**Participants**

RA Engineering Academy Presidium and Academy Members.

**Invited**

**Yerevan City Master Plan Drafting Group** - "YerevanProject" CSJC  
(G. Mushegyan, P. Sogomonyan, A. Aloyan, Z. Mamyanyan, M. Vermishev, A. Nalbandyan, L. Kojoyan, A. Sogomonyan, A. Manasyan, R. Tashchyan)

**S. Ayvazyan** –Coordinator of UNDP Project on Strategic Environmental Assessment of the Yerevan City Master Plan

**R. Amirkhanyan** – Editor of "Sheninfo" monthly magazine.

**Agenda**

Information on the development of the draft concept of the Yerevan City New Master Plan with an emphasis of problems

*Reporters - G. Mushegyan, P. Sogomonyan, A. Aloyan, M. Vermishev, A. Nalbandyan.*

Comments were made by *H. Pogosyan, G. Shakhkhan, G. Babayan, D. Kertmendjyan, S. Tovmasyan, R. Amirkhanyan, A. Grigoryan, S. Shahinyan, Yu. Safaryan.*

*As a result of discussions it was decided to:*

1. Approve the draft Yerevan City Master Plan, giving a credit for high quality of provided materials and planning proposals.
2. Recommend the provided document for adoption along with a developed action plan on further implementation of Master Plan.

Chaired by Vice President of RA Engineering Academy  
Chief Scientific Secretary

Yu. Safaryan

Scientific Secretary

R. Barsegyan

**UNDP Pilot SEA Project as the Capacity Building Tool for  
Strategic Environmental Assessment Protocol Implementation in Armenia**

**Protocol  
Expert Discussion (part I)**

11 May, 2005

The first Expert discussion in the framework of the strategic environmental assessment of the Yerevan City Master Plan was held in UNDP Armenia Conference hall on 11 May, 2005. The meeting was attended by 62 representatives from government, public and academic sectors, as well as individuals.

Authors of the Yerevan City Master Plan presented the current status of the city, changes envisaged by the new Master Plan and the possible impact on the city environment was discussed.

Mr. Armen Martirosyan - UNDP Environmental Portfolio Manager, and Ms. Sona Ayvazyan – SEA project Coordinator welcomed participants and introduced the project goals and agenda for the discussion.

Representatives of the “YerevanProject” Institute presented the concept of the new Master Plan supported by relevant maps and solutions proposed by the current document. The chief architect of the Yerevan City Master Plan Mr. Petros Soghomonyan presented the current status of the City, the borders, the general changes proposed by the new draft Master Plan.

Mr. G.Mugheghyan, Director of the “YerevanProject” Institute presented the proposal on improvement of the transport and engineering infrastructures, envisaged by the draft master plan. The environmental and health issues were covered by environmental protection team leader of the draft Mr. Mikhail Vermishev.

Mr. Vermishev indicated that in the framework of the Master Plan development of the environmental issues of Yerevan City were studied in the main areas of air, water, soil, green areas, electromagnetic impact, noise, etc. He presented in detail the current environmental status of the City and the envisaged changes and environmental measures, resulting from the activities suggested by the draft master plan.

After the reporting a broad discussion was held. The relevant specialists of the Master Plan Planning Group answered questions. Questions and answers are given below.

(note: I will not edit any Q & A since the original record should not be altered assuming that this is a transcription of the original discussion)

**Q.** (*Armen Poghosyan, “Consumers Union” NGO*). Please, present the structure of transport, development of the city electrical transport and the relevance to the other transport means according to the draft Master Plan.

**A.** To implement reforms in the transport structure of the city the vans and trolleybuses will be offered to replace the micro-buses. Calculations for the anticipated ration of transport means have not been conducted so far. They will be provided in the Master Plan document.

**Q.** (*Hakop Sanasaryan, "Greens' Union of Armenia" NGO*). Is it feasible to construct a wastewater treatment plant near the Kaghsi village, taking into consideration the fact, that Hrazdan river is being essentially polluted before entering Yerevan?

**A.** The question is studied not under the Yerevan City Master Plan, but under the plan of Yerevan agglomeration, while on-site activities of the unfinished construction of a treatment plant or modernization of the old plant are envisaged for Yerevan.

**Q.** (*Hakob Sanasaryan, Greens' Union of Armenia" NGO*). Are the illegal constructions in the green zones of Yerevan, particularly in the Victory park, Circle park or surroundings of Opera house, are subject to destruction and if those areas are considered by the Master Plan as green areas?

**A.** Destroying of the constructions in the Yerevan City parks depends on decision of the RA government, as they are given for lease. For the new greening areas the Master Plan has considered current RA Government Decisions. For example, the lands under "Mkoyi antar" area are allocated for construction of Canadian district, so the area is represented in the Master Plan as an area under construction.

**Q.** (*Elena Manvelyan, "Armenian Women for Health and Healthy Environment" NGO*). Does the Master Plan envisage increase of waste quantity and what solutions are suggested for waste management?

**A.** The Master Plan envisages increase of wastes amount. To solve the issue construction of waste treatment plant in Nubarashen is suggested (no combustion), which will ensure treatment of almost 80% of wastes. A protective green belt is proposed in landfill area with diameter of 500 m.

**Q.** (*Ara Mejlumyan, RA Ministry of Agriculture*). What is envisaged by Master Plan on solving the issue of scarcity of places in the cemeteries? Is creation of a crematory planned? Some time ago Yerevan Municipality has asked for area in 2 ha near the Yerevan heat plant for this purpose.

**A..** The Master Plan supposes construction of a new cemetery in Achapnyak area. Construction of crematory still remains unsolved.

**Q** (*Karine Danielyan, "Association for Sustainable Human Development" NGO*). On Abovyan Street, under the construction of Hyusisayin (Northern) Avenue, a number of historical buildings are being destroyed. What about further fate of these buildings?

**A.** The stones of the mentioned buildings have been numbered and will be transferred to another suitable location. For example, some monumental buildings are transferred to the Hanrapetutyan (Republican) street from different locations and a street with 19-th century Yerevan attitude is established.

**Q** (*Karine Danielyan, "Association for Sustainable Human Development" NGO*). How will the green territories of the City be enlarged according to Master Plan?

**A.** Recently the City lost total 350 ha of green areas and those are classified according to forest cutting – cut, partially cut, etc. According to the new Master Plan the green areas will be preserved, in some cases the categories for them will be changed (e.g. for Nork Forest). The Master Plan envisages increasing the total area of green territories up to 1700 ha. Some green plates are envisaged on the roofs of houses.

**Q** (*Gohar Oganezova, "Armenian Botanical Union" NGO*). Why the forests are not being restored as forests and their status is being changed?

**A.** The old forests will be recovered. The total forested area will cover about 1000 ha.

**Q** (*Alexander Danielyan, "Qulque-chose" LTD*). Does the Master Plan envisage establishment of parks with their infrastructures?

**A.** The single park of the mentioned type is the Victory Park, the new one has not been envisaged.

**Q** (*Ara Mejlumyan, RA Ministry of Agriculture*). Formerly large forests did exist in Erebuni, Nork-Marash and other communities. It will be appropriate to restore them.

**A** All those forests will be recovered except for the Marash forest.

**Q** (*Armenuhi Demirchyan, RA Ministry of Culture and Youth Affairs*). In Hrazdan Gorge 11 historical-archaeological monuments are stored, including area of US Embassy. What will be their fate?

**A** This question should be solved by RA Ministry of Culture and Youth Affairs.

**Q** (*Edward Mesropyan, "Jinj" LTD*). Can you provide the sources for financing implementation of envisaged measures? For example in the water supply system it is envisaged to keep the norms of 150l/day per capita and to reduce the losses up to 20%. Is this realistic?

**A** Only the 20% of all the investments are envisaged from the state budget, the rest part will be covered from other sources. For example in the water supply system investments may come from grants, credits, etc. In the energy sector investments should be made by owner, etc.

**Q** (*Robert Dashtoyan, Yerevan State Engineering University, "Survival" NGO*) What is envisaged for Northern segment district and will the green areas of the district be destroyed?

**A.** Construction of the mentioned area is currently stopped, and the already constructed fences will be destroyed and removed.

**Q** (*Sarah Persian, architect*). The historical-cultural monuments and the historical face of Yerevan are being destroyed. What is envisaged by Yerevan City Master Plan in this regard?

**A** The historical face of Yerevan will not be destroyed. The monuments will be transferred to another suitable location.

**Q** (*Inga Zarafyan, "Ecolur" NGO*). Circle park and other damaged green areas formerly were considered as hot spots. Particularly the National Report of the MNP points them as so. How they are reflected in the Yerevan City Master Plan?

**A.** The mentioned areas are covered in the document as green zones.

**Q** (*Siren Shatvoryan, Institute of Energy*) – What is envisaged with regard to solve the car parking facilities in the downtown?

**A.** According to the Master Plan the car parking facilities should be located in underground facilities.

**Q** (*Harutyun Harutyunyan, RA Ministry of Agriculture*) According to international norms the cities with population over 1 mln shall be surrounded with forest belt (50 km in radius). What does the Master Plan envisage in this regard?

**A** According to international standards for the cities similar to Yerevan the forest belt in radius of 0.5 km is envisaged. In the surrounding of Yerevan creation of green zone of various regimes is envisaged, including reserves and recreational zones.

**Q** (*Aram Koslakyun, Yerevan State Medical University after M. Heratsi*). "Hrazdan" stadium and "Rossia" cinema are transferred to fairs. What does the Master Plan suggest to solve this issue?

**A** The given question is not in the framework of the Master Plan development.

**Q** (*Lilit Stepanyan, RA Institute of Hydro-ecology and Ichthyology*). What is the fate of the single park in Avan? The territory of the park is reduced due to enlargement of the cemetery, despite of the complaints of the population.

**A** The green zone of the area will be conserved. The activities on the cemetery enlargement are stopped, here will be established a green zone.

**Q** (*Artur Manukyan, Service on Seismic Protection*). Currently the constructions are being built without considering the seismic norms. What does the Master Plan suppose in this regard? While implementing construction works the types of the bottom soil (soft and firm soils) should be considered. Have the ecological damages in the result of earthquake been calculated?

**A** The seismic issues have been discussed and bottom soil types considered. Unfortunately, construction activities are being implemented with violations. In the case of earthquake the city will experience not only ecological damages, but it will be a biological crisis.

**Q** (*Karapet Ohanyan, Aeratsia station*). What does the Master Plan propose with regard to flood system of the city?

**A** All the rivers and streams in Yerevan are currently considered as flood system. To regulate this issue the Master Plan envisages construction of flood system and a separate treatment plant.

**Q** (*Armen Poghosyan, "Consumers' Union" NGO*). How does the working group of the Master Plan envisage demolishing of illegal buildings on the green areas? Will the relevant mechanisms be proposed?

**A** Mechanisms will be suggested and proposals developed on extirpation of illegal buildings, although we can not say in what extend they will be implemented.

**Q** Is the depreciation of the housing sector one of the Master Plan issues? If yes, what strategy is developed to solve the issue?

**A** Rehabilitation and modernization of housing sector are among the priority issues of the Master Plan and relevant measures are suggested.

**Q** Sewerage system of Nairit is flown into Hrazdan river and the wastewater is being discharged into the river without treatment. What does the Master Plan propose in this regard?

**A** The question is not the Master Plan issue and should be solved by relevant infrastructures.

**Q** Does the Master Plan envisage accomplishing of construction of metro line "Barekamutyun- Achapnyak"?

**A** The Master Plan envisages not only this line, but also other lines envisaged by the former scheme for city metro development.

In the end Sona Ayvazyan, Project Coordinator applies to the participants to present recommendations and proposals to project team or to the following discussion on May 16, 2005.

## **List of Participants**

### **State Organizations**

1. Avagyan Sergey, Ministry of Health
2. Grigoryan Artak, National Institute of Standards and Quality of RA
3. Muradyan Siranuysh, Ministry of Nature Protection, Agency of Biological Resources Management
4. Hakobyan Irina, Ministry of Nature Protection, Division of Dangerous Materials and Waste Management
5. Vardanyan Svetlana, Ministry of Nature Protection
6. Ghazaryan Boris, SEA Project Expert, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO

7. Drnoyan Azganush, SEA Project Expert, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
8. Movsisyan Karine, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
9. Harutyunyan Harutyun, Ministry of Agriculture, Forests Management Agency
10. Mejlumyan Ara, Ministry of Agriculture, Forests Management Agency
11. Poghosyan Ashot, Ministry of Energy
12. Badalyan Hayk, Ministry of Energy
13. Demirchyan Armenuhi, Ministry of Culture and Youth Affairs
14. Chitchyan Levon, Ministry of Transport and Communication
15. Srapyan Samvel, Ministry of Urban Development, Housing and Communal Policy Division
16. Harutyunyan Spartak, Agency of National Survey of Seismic Protection
17. Manukyan Arthur, Agency of National Survey of Seismic Protection
18. Kosemyan Romik, Yerevan Municipality, Department of Nature Protection
19. Danielyan Samvel, Yerevan Municipality, Chief Architect
20. Ohanyan Karapet, Aeration Station of Yerevan
21. Khachatryan Henzel, "Yerevan Jrmugh-Koyughi" CJSC
22. Simonyan Armine, "Water System's Development Project" PIU

### ***Academia and Design Institutions***

23. Stepanyan Lilit, Institute of Hydrology and Ichthyology, National Academy of Sciences
24. Qoslakyan Aram, Yerevan State Medical University after M. Heratsi
25. Amiraghyan Sergey, "Armenian Project Institute" CJSC
26. Matasyan Romen, "EnergoProject Institute" CJSC
27. Shatvoryan Suren, "Institute of Energy" CJSC
28. Khachkalyan Misha, "ComunNakhagits Institute" CJSC
29. Kachyants Mesrop, "ComunNakhagits Institute" CJSC
30. Zaqaryan Manuk, "ComunNakhagits Institute" CJSC
31. Arustamyan Margarita, "Armenian Industrial Project Institute" CJSC
32. Safaryan Lida, "Armenian Industrial Project Institute" CJSC
33. Soghomonyan Petros, "YerevanProject Institute" CJSC
34. Musheghyan Gurgen, "YerevanProject Institute" CJSC
35. Vermishev Mikhail, "YerevanProject Institute" CJSC
36. Hovhannisyanyan Karlen, "YerevanProject Institute" CJSC
37. Krishchyan Henrikh, "YerevanProject Institute" CJSC
38. Soxomonyan Anna, "YerevanProject Institute" CJSC
39. Mamyanyan Zaruhi, "YerevanProject Institute" CJSC
40. Aloyan Artyom, "YerevanProject Institute" CJSC

### ***NGOs and Individuals***

41. Hovsepyan Arevik, "Sustainable Water Environment" NGO
42. Oganezova Gohar, "Armenian Botanic Society" NGO
43. Poghosyan Armen, "Consumers' Union" NGO
44. Khachatryan Hrachya, "Gas-motor Association" NGO
45. Dallakyan Gayane, "Gas-motor Association" NGO
46. Darbinyan Nune, "Eco-glob" NGO
47. Dashtoyan Robert, Yerevan State Architectural University, "Survival" NGO
48. Danielyan Karine, "Association for Sustainable Human Development" NGO
49. Manvelyan Elena, "Armenian Women for Health and Healthy Environment" NGO
50. Burghajyan Suren, "Union of Architects of Armenia" NGO
51. Zarafyan Inga, "Ecolur" NGO
52. Sanasaryan Hakop, "Greens' Union of Armenia" NGO
53. Safaryan Derenik, "Old Yerevan Peopla" NGO
54. Karapetyan Irina, Center for Regional Development
55. Tevosyan Vram, Expert on EIA

56. Petrosyan Sarhat, Economist

57. Petrosyan Lilit, Architect

***Private Companies***

58. Mesropyan Eduard, "Jinj"LTD

59. Danielyan Aleksandr, "Qulque-chose" LTD

***International Organizations and Projects***

60. Martirosyan Armen, UNDP

61. Ayvazyan Sona, UNDP SEA Project

62. Vermishyan Arman, UNDP SEA Project

**UNDP Pilot SEA Project as the Capacity Building Tool for  
Strategic Environmental Assessment Protocol Implementation in Armenia**

**Protocol  
Expert Discussion (part II)**

16 May, 2005

Expert discussion in the framework of the strategic environmental assessment of the Yerevan City Master Plan has been continued in UNDP Armenia Conference hall on 16 May, 2005. The meeting was attended by 27 representatives from government, public and academic sectors, as well as individuals.

Sona Ayvazyan, Project Coordinator welcomed the participants and presented the agenda for discussions. The Q&A session was followed. The brief protocol on the Q&A is given below.

**Q** (*Hakop Sanasaryan, "Greens' Union of Armenia" NGO*) What methodology has been applied to develop the land balance of the city? How can the green zones of the city increase twice if there are examples of destruction of green zones, particularly Nork, Circle park, Dalma gardens, etc.

**A** During development of land balance the current existing methods were applied and relevant normative-legal documents considered. During developing the borders of green areas RA Government decisions on land allocations were considered, e.g. part of the Dalma orchards. The territory of green areas is planned to increase through restoration and conservation of existing areas and developing the new ones.

**Q** (*Gohar Oganezova, "Armenian Botanical Union" NGO*). Through the valuable lands of Dalma orchards a transport road is envisaged. Isn't it possible to bypass this area?

**A** The transport road on this territory will essentially reduce the emissions from transport and from the environmental viewpoint can positively affect the atmospheric air. Besides, investigation of Dalma orchards shows that the soil in the given area is contaminated and it will be a wrong to use with agricultural purposes.

**Q** (*Gohar Oganezova, "Armenian Botanical Union" NGO*). What is envisaged to implement with regard to treatment of snow melt water?

**A.** The Master Plan envisages to separate the flood and sewerage systems and to organize their treatment.

**Q** (*Gohar Oganezova, "Armenian Botanical Union" NGO*). Does the Master Plan cover issues on greening of the backyards?

**A** Greening of the backyards is rather hard issue, although it is included in the master plan.

**Q** (*Levon Chitchyan, Ministry of Transport and Communication*). The railway in the area from Tigran Mets street and to the furniture fabric is envisaged to be removed, while this can cause serious problems with cargo transportation

**A.** According to normative the railway is not allowed in the city, so the given line is envisaged to be removed. Except of this there are also two other lines in the city.

**Q** (*Levon Chitchyan, Ministry of Transport and Communication*). What is envisaged for operating concrete and asphalt plants? Are they supposed to be removed from the city or not?

**A.** In Soviet times it was decided to remove 48 various industries from Yerevan. The Master Plan envisages transfer of some of them, e.g. electrical technical plant near the Ayrarat Cinema. Pollution control over these industries is assigned to sanitary and environmental inspectorates.

**Q** (*Levon Chitchyan, Ministry of Transport and Communication*). What do the Master Plan envisage with regard to pavements?

**A.** The given issue is not the matter of master plan.

**Q** (*Hakop Sanasaryan, "Greens' Union of Armenia" NGO*) What does the Master Plan envisage with regard to the number of floors of houses in the city?

**A** The given issue is not subject to the master plan. Although for each zone territorial density norms do exist, which indirectly limit the number of floors.

**Proposal** (*Armen Poghosyan, "Consumers' Union" NGO*). Can't the Master Plan propose limitation for number of floors?

**A** It is an issue of urban construction and the Master Plan should not deal with it.

**Proposal** (*Hakop Sanasaryan, "Greens' Union of Armenia" NGO*) To assign in the Master Plan the issue on conservation of the historical-cultural face of the City.

**A** It is also not the issue of Master Plan and should be regulated by Chief architect of Yerevan, architect of the given construction and other relevant specialists.

**Q** (*Armen Poghosyan, "Consumers' Union" NGO*). Please present the ratio of transport types envisaged by master plan.

**A.** Answer to this question is available at "YerevanProject" Institute. The ratio calculation is still being developed.

**Q** (*Armen Poghosyan, "Consumers' Union" NGO*). Is the tramway totally being excluded from the city?

**A** The construction of city streets doesn't allow to have this type of transport. From the first view it seems that tramway is ecologically clean, but actually it creates traffic jams, disturbs traffic and increases emissions level.

**Proposal** (*Hakop Sanasaryan, "Greens' Union of Armenia" NGO*) Establish a working group for studying Master Plan documents, which will ensure cooperation with stakeholders.

**A** The Master Plan documents are available for public access in the "YerevanProject" Institute.

**Q** (*Robert Dashtoyan, "Survival" NGO*). A number of illegal houses are built in the green area near the Babayan Street. What is envisaged in this area?

**A** On the given territory the land category has been changed by RA Government Decision. Currently it is envisaged for construction purposes.

**Q** (*Atom Sargsyan, "Union of Housing-Communal Employees" NGO*). Is the number of communities subject for reduction?

**A.** The issue on the number of communities should be regulated by RA Government decision. Anyway the city will not be enlarged.

By the end of discussions Sona Ayvazyan, Project coordinator, applies to the participants to submit recommendations and proposals to project team.

## List of Participants

### State Organizations

1. Karapetyan Seryozha, Ministry of Health
2. Eganyan Armen, Ministry of Trade and Economic Development
3. Vardanyan Svetlana, Ministry of Nature Protection
4. Ghazaryan Boris, SEA Project Expert, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
5. Badalyan Hayk, Ministry of Energy
6. Poghosyan Ashot, Ministry of Energy
7. Chitchyan Levon, Ministry of Transport and Communication

***Academia and Design Institutions***

8. Soghomonyan Petros, "YerevanProject Institute" CJSC
9. Musheghyan Gurgen, "YerevanProject Institute" CJSC
10. Nalbandyan Armen, "YerevanProject Institute" CJSC
11. Aloyan Artyom, "YerevanProject Institute" CJSC
12. Krishchyan Henrikh, "YerevanProject Institute" CJSC
13. Stepanov Eduard, "YerevanProject Institute" CJSC
14. Mamyán Zaruhi, "YerevanProject Institute" CJSC

***NGOs and Individuals***

15. Sanasaryan Hakob, Green Union of Armenia
16. Oganezova Gohar, Armenian Botanic Society
17. Poghosyan Armen, Union of Consumers
18. Karapetyan Irina, Transparency Int./ CRD
19. Sargsyan Atom, "Union of Communal Housing Workers " NGO
20. Dashtoyan Robert, Yerevan State Architectural University, "Survival" NGO
21. Khachatryan Hrachya, "Gas-motor Association" NGO
22. Dasaryan Arsen, Doctor
23. Baghdasaryan Sedrak, Architect
24. Petrosyan Sarhat, Architect

***International Organizations and Projects***

25. Simonyan Anahit, UNIDO
26. Ayvazyan Sona, UNDP SEA Project
27. Vermishyan Arman, UNDP SEA Project

**UNDP Pilot SEA Project as the Capacity Building Tool for  
Strategic Environmental Assessment Protocol Implementation in Armenia**

**Expert Discussion on the Green Areas Planned  
within the Framework of the Yerevan Master Plan**

**PROTOCOL**

21 October, 2005

On October 21, 2005 within the framework of the Pilot Project on strategic environmental assessment of the draft Master Plan of Yerevan city a discussion was held in UNDP Armenia Conference Hall devoted to the issue of green areas planned by the new master plan. Participants of the discussion included 46 people, including representatives of scientific, governmental, non-governmental and international institutions and mass media as well as individual citizens.

Opening remarks were given by Sona Ayvazyan, UNDP SEA Project Coordinator. Petros Soghomonyan, Chief Architect of the Yerevan draft Master Plan and Artyom Aloyan, leading specialist of the draft Master Plan presented the activities implemented in the process of drafting, involvement of specialized institutions and refinement of the draft Master Plan based on recommendations. The greening section of the Master Plan was introduced by Armen Nalbandyan, the responsible specialist for greening. He mentioned that during the drafting process the current state of green areas were studied and the actual borders of those were identified. Mr. Nalbandyan indicated the sections of the city, which are planned to be recovered or protected (Dalma Orchards, Nork slopes, Hrazdan Gorge, etc.) and areas, which are proposed for greening by categories of specific use (particularly forests), common use and limited use. He also presented the proposal to establish green buffer zones along the roads.

Boris Ghazaryan, expert of strategic environmental assessment of the SEA Pilot Project introduced the purpose of the SEA Project, its objectives, applied methodology, the issue of protecting and restoring landscapes, green areas and forests, greening of new areas and planting forests as a reference environmental objective, etc.

Questions were asked and comments were made by the following participants:

- Hrant Sargsyan (*"Tapan Eco-club"* NGO) - a question about the status of the forests adjacent to the borders of Yerevan;
- Srбуhi Harutyunyan (*"Social-ecological Association"* NGO) – questions about the norms that form the bases for planning of green areas, the future of capital buildings on the territory of green areas and location of ecopolis;
- Levon Nersisyan (*A.Sakharov Human Rights Protection Center*) – questions about the scope of work given by the Yerevan Municipality, anticipated population growth in the city and the measures planned in case of relevant increase of transportation means;
- Nora Gabrielyan (*Institute of Botany of National Academy of Sciences*) – a question about the proposed types of trees and bushes to be planted in the city;
- Aleksey Tarverdyan (*Armenian Water Project Institute*) – a suggestion about removing the proposal on cutting the infected trees in the city;
- Karen Manvelyan (*WWF Armenia Office*) – a question about the planned activities in the landslide areas;
- Inga Zarafyan (*"Ecolur"* NGO) – a question about the status of the suggestions provided by the participants at hearings and the mechanisms for consideration of those by decision-makers;

- Arsen Arustamyan (*Urban Development Institute*) – suggestions to make changes in the tax policy, which would promote the closure of objects constructed in green areas, and to maintain the “yellow lines” around the buildings;
- Harutyun Harutyunyan (*Ministry of Agriculture*) – a question about the financial resources allocated for restoration and protection of green areas and a suggestion about revision of the list of types of trees and bushes to be planted in the city;
- Karapet Karapetyan (*Department of Emergencies*) – a question about the anti-fire measures planned for the protection of green areas and concurrence of those with the fire department;
- Aida Iskoyan (*EPAC*) – a question about creation of buffer zones around the industrial enterprises and isolation issues;
- Derenik Safaryan (*“Old Yerevan People” NGO*) – a question about the restoration of the irrigation system and building of a new one;
- Karen Afrikyan (*“Armenian Forests” NGO*) – a suggestion to use water removed from metro tunnels for irrigation purposes;
- Silva Adamyan (*“Center of Bird Lovers” NGO*) – a question about the status of the gardens in the Berdadzor and Kaqavadzor areas;
- Artemis Lepejyan (*“Women’s Union St. Sandukht” NGO*) – a suggestion for ensuring balanced distribution of green areas throughout the city;
- Arman Vermishyan (*“Burg” NGO*) – suggestions to consider the factor of traffic load when deciding where to establish green areas, to replace the areas, where old houses are removed, with green spaces and an opinion that creation of green area around the landfill in Nubarashen will not have a significant effect in cleaning the air.

Answers to questions were provided by P.Soghomonyan, M.Vermishev and A.Nalbandyan. In the end of the discussion S.Ayvazyan proposed to submit written comments and suggestions to the SEA team.

### **List of Participants**

#### **State Organizations**

1. Poghosyan Hermine, National Assembly, Standing Committee on Social Affairs, Health and Environmental Issues
2. Karapetyan Sergey, Ministry of Health
3. Ghazaryan Boris, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
4. Movsisyan Karine, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
5. Harutyunyan Harutyun, Ministry of Agriculture, Forests Management Agency
6. Stepanyan Vilen, Ministry of Territorial Administration, Department of Emergencies
7. Karapetyan Karapet, Ministry of Territorial Administration, Department of Emergencies
8. Sngryan Edan, Ministry of Territorial Administration, Department of Emergencies
9. Edigaryan Armine, Ministry of Transport and Communication
10. Kocharyan Boris, Municipality of Yerevan, Architectural Department
11. Kosemyan Romik, Municipality of Yerevan, Department of Nature Protection
12. Maksapetyan Suren, Municipality of Yerevan, Department of Nature Protection

#### **Academia and Design Institutions**

13. Gabrielyan Nora, NAS, Institute of Botany
14. Kanayan Ashot, Yerevan State Architecture and Construction Institute
15. Parazyan Marina, Yerevan State Architectural and Construction Institute
16. Renee Richer, American University of Armenia
17. Arustamyan Arsen, Scientific-Research Institute “Town-planning”
18. Tarverdyan Aleksey, “Armenian Water Project Institute” CJSC

19. Soghomonyan Petros, "YerevanProject Institute" CJSC
20. Vermishev Mikhail, "YerevanProject Institute" CJSC
21. Nalbandyan Armen, "YerevanProject Institute" CJSC
22. Aloyan Artyom, "YerevanProject Institute" CJSC

***NGOs and Individuals***

23. Minasyan Mkrtich, "Union of Architects of Armenia" NGO
24. Burghajyan Suren, "Union of Architects of Armenia" NGO
25. Eloyan Levon, "Union of Architects of Armenia" NGO
26. Sargsyan Hrant, "Tapan Ecoclub" NGO
27. Galoyan Svetlana, "Khazer" NGO
28. Hovsepyan Arevik, "Sustainable Water Environment" NGO
29. Harutyunyan Srбуhi, "Social-Ecological Association" NGO
30. Petrosyan Vazgen, "Green Yerevan" NGO
31. Mkrtchyan Aram, "Green Yerevan" NGO
32. Oganezova Gohar, "Armenian Botanic Society" NGO
33. Safaryan Derenik, "Old Yerevan People" NGO
34. Lepejyan Artemis, "Women's Union St. Sandukht" NGO
35. Nersisyan Levon, "A.Sakharov Human Rights Center" NGO
36. Tufenkyan Jeffrey, "Armenian Forests" NGO
37. Iskoyan Aida, "EPAC" NGO
38. Petrosyan Arthur, "Agroecotour" NGO
39. Zarafyan Inga, "Ecolur" NGO
40. Karapetyan Irina, Center for Regional Development
41. Afrikyan Karen, "Armenian Forests" NGO
42. Adamyan Silva, "Armenian Center of Bird Lovers" NGO

***International Organizations and Projects***

43. Ghazinyan Gohar, OSCE Armenian Office
44. Manvelyan Karen, WWF
45. Ayvazyan Sona, UNDP SEA Project
46. Vermishyan Arman, UNDP SEA Project

**UNDP Pilot SEA Project as the Capacity Building Tool for  
Strategic Environmental Assessment Protocol Implementation in Armenia**

**Expert Discussion on the Yerevan Master Plan and its SEA Report  
with Involvement of State Institutions**

**PROTOCOL**

25 October, 2005

On October 25, 2005 within the framework of the Pilot Project on strategic environmental assessment of the draft of new Master Plan of Yerevan city a discussion was held in UNDP Armenia Conference Hall with participation of 24 representatives from state institutions.

Opening remarks were given by Armen Martirosyan, UNDP Portfolio Manager, who introduced the purpose and objectives of the SEA pilot Project. Sona Ayvazyan, SEA Pilot Project Coordinator presented the concept of SEA, process of SEA of the Yerevan Master Plan and methodology.

Environmental and health issues related to the Yerevan Draft Master Plan were presented by Mikhail Vermishev, head of the environmental protection section of the Master Plan. He mentioned that during the process of drafting the Master Plan the environmental issues have been addressed by main subjects such as air, water, soil, green areas, waste, electromagnetic impact, noise, etc. Mr. Vermishev introduced the current state of the environment in Yerevan, anticipated impacts as a result of implementation of planned activities and relevant environmental measures.

Questions were asked and comments were made by the following participants:

- Vilen Stepanyan (*Department of Emergencies*) – a question about the issue of radiation from the facilities of cellular communication;
- Boris Ghazaryan (*SEA Project Expert*) – suggestions to include in the Master Plan a list of issues to be addressed in phases following the adoption of the Master Plan and to arrange for measures to use additional treatment facilities for car emissions;
- Azganush Drmoyan (*SEA Project Expert*) – a question about the mechanisms to restore the green areas, on which there are already buildings constructed, a suggestion to keep the forest areas within the category of forests and use the areas of poultry production and industrial units, planned for reconstruction, for establishing as green areas;
- Sona Ayvazyan (*SEA Project Coordinator*) – a question about the planned measures to demolish illegal constructions on the pavements;
- Arman Vermishyan (*SEA Project Coordinator*) – a question about the fortune of historical monuments;
- Elza Cholakhyan (*Ministry of Trade and Economic Development*) – a suggestion to develop measures for protection of the historical-cultural appearance of the city in certain parts of Yerevan, such as the Small Center;
- Karapet Karapetyan (*Department of Emergencies*) – a question about building of shelters, given the fact that the existing ones have either been privatized or are in bad condition;
- Mariam Badalyan (*Prosecutor's Office*) – a question about the budget of the <sup>a</sup> SEA Project

In the end of the discussion S.Ayvazyan proposed to submit written comments and suggestions to the SEA team.

## **List of Participants**

### ***State Organizations***

1. Petikyan Aida, Ministry of Health
2. Karapetyan Sergey, Ministry of Health
3. Cholakhyan Elza, Ministry of Trade and Economic Development
4. Ghazaryan Boris, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
5. Drnoyan Azganush, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
6. Stepanyan Vilen, Ministry of Territorial Administration, Department of Emergencies
7. Karapetyan Karapet, Ministry of Territorial Administration, Department of Emergencies
8. Edigaryan Armine, Ministry of Transport and Communication
9. Badalyan Mariam, General Prosecutor's Office
10. Hovhannisyanyan Sargis, National Statistical Agency
11. Danielyan Gor, Republic of Armenia Police

### ***Academia and Design Institutions***

12. Soghomonyan Petros, "YerevanProject Institute" CJSC
13. Musheghyan Gurgen, "YerevanProject Institute" CJSC
14. Vermishev Mighayil, "YerevanProject Institute" CJSC
15. Nalbandyan Armen, "YerevanProject Institute" CJSC
16. Aloyan Artyom, "YerevanProject Institute" CJSC
17. Arsenyan Razmik, "YerevanProject Institute" CJSC
18. Krishchyan Henrigh, "YerevanProject Institute" CJSC
19. Stepanov Eduard, "YerevanProject Institute" CJSC
20. Mamyanyan Zaruhi, "YerevanProject Institute" CJSC
21. Kojoyan Liana, "YerevanProject Institute" CJSC

### ***International Organizations and Projects***

22. Martirosyan Armen, UNDP
23. Ayvazyan Sona, UNDP SEA Project
24. Vermishyan Arman, UNDP SEA Project

**UNDP Pilot SEA Project as the Capacity Building Tool for  
Strategic Environmental Assessment Protocol Implementation in Armenia**

**Public Discussion on the Yerevan Master Plan and its SEA Report**

**PROTOCOL**

12 November, 2005

On November 12, 2005 a public discussion was held in Tekeyan Center in Yerevan, which was attended by 68 people, including representatives of the scientific community, governmental and non-governmental institutions, international organizations and mass media as well as individual citizens.

The purpose of the event was to make a presentation of the Yerevan Master Plan and the likely environmental impacts from its implementation.

Opening remarks were given by Sona Ayvazyan, SEA Pilot Project Coordinator, who introduced the purpose of the event and the agenda, and Chief Architect of Yerevan, who thanked the organizers for the preparation of the discussion.

New Draft Master Plan of Yerevan, the process of its development, main directions and environmental issues were presented by Gurgen Musheghyan, Director of "YerevanProject" Institute, Petros Soghomonyan, Chief Architect of the Master Plan, Mikhail Vermishev, Head of the Environmental Section and Armen Nalbandyan, responsible specialist for the section on greening.

Questions were asked and comments were made by the following participants:

- S.Davtyan (*"Kaqavadzor-Berdadzor"* NGO) – a question about protection of the green planted by residents of the Kaqavadzor-Berdadzor area and their shelters located in this area;
- A.Poghosyan (*"Consumers' Union"* NGO) – a question about the anticipated ratio of transportation means and protection of green areas.
- H.Sanasaryan (*"Greens' Union of Armenia"* NGO) – a suggestion to make an evaluation of the phenomenon of illegal construction, regulate the number of floors of buildings, revise the issue of protection of agricultural lands, in particular the valuable trees of Dalma Orchards;
- J.Kirakosyan (*"People is the Owner of the Country"* NGO) – an issue of the value of Dalma Orchards and their protection and the problem of lessees being removed from those lands;
- G.Gabrielyan (*"Environmental Academy"* NGO) – a suggestion to create thick green buffer zones along the highways;
- H.Melonyan (*"ArmStateHydromet"*) – a suggestion to consider in the Master Plan document issues related to seasonal variations and movement of winds.

Answers to questions were provided by S.Danielyan, G.Musheghyan and A.Nalbandyan. They stated that most of the raised questions have already been reflected in the Draft Master Plan. Legal issues related to the social and housing policies are not subject to the Master Plan. As for the urban development issues, which are not to be resolved by the Master Plan and thus have not been reflected in the document, will be addressed in development phases following the adoption of the Master Plan.

**List of Participants**

### **State Organizations**

1. Soghomonyan Tatul, National Assembly
2. Poghosyan Hermine, National Assembly, Standing Committee on Social Affairs, Health and Environmental Issues
3. Santrosyan Ashot, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
4. Ghazaryan Boris, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
5. Drnoyan Azganush, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
6. Afyan Nadejda, Ministry of Nature Protection, "Environmental Protection Expertise" SNCO
7. Badalyan Mariam, General Prosecutor's Office
8. Stepanyan Vilen, Ministry of Territorial Administration, Department of Emergencies
9. Sngryan Edan, Ministry of Territorial Administration, Department of Emergencies
10. Danielyan Samvel, Yerevan Municipality, Chief Architect
11. Melqonyan Harutyun, Ministry of Nature Protection, "ArmStateHydromet"
12. Hovhannisyanyan Sargis, National Statistical Agency

### **Academia and Design Institutions**

13. Sargsyan Karine, Armenian State Agrarian University
14. Hayrapetyan Eduard, Armenian State Agrarian University
15. Zakharyan Manuk, "ComunProjectInstitute" CJSC
16. Rubenyan Ruben, "YerevanProject Institute" CJSC
17. Soghomonyan Petros, "YerevanProject Institute" CJSC
18. Musheghyan Gurgen, "YerevanProject Institute" CJSC
19. Vermishev Mikhail, "YerevanProject Institute" CJSC
20. Nalbandyan Armen, "YerevanProject Institute" CJSC
21. Aloyan Artyom, "YerevanProject Institute" CJSC
22. Krishchyan Henrikh, "YerevanProject Institute" CJSC
23. Stepanov Eduard, "YerevanProject Institute" CJSC
24. Soghomonyan Anna, "YerevanProject Institute" CJSC
25. Mamyanyan Zaruhi, "YerevanProject Institute" CJSC

### **Private Companies**

26. Mesropyan Eduard, "Jinj"LTD
27. Orapashkhyanyan Garegin, "Hovnanyan International" LTD

### **NGOs and Individuals**

28. Sanasaryan Hakob, "Greens' Union of Armenia" NGO
29. Poghosyan Armen, "Union of Consumers" NGO
30. Karapetyan Irina, "Center for Regional Development" NGO
31. Hovsepnyan Arevik, "Sustainable Water Environment" NGO
32. Hakobyan Edgar, "Citizen's National Initiative" NGO
33. Gabrielyan Greta, "Ecological Academy" NGO
34. Avetisyan Bella, "Armenia Tree Project" NGO
35. Khachatryan Meri, "A.Sakharov Human Rights Center" NGO
36. Davtyan Susanna, "Kaqavaberd-Berdadzor" NGO
37. Miqayelyan S., "Kaqavaberd-Berdadzor" NGO
38. Mkrtchyan Aram, "Green Yerevan" NGO
39. Petrosyan Narbe, Citizen
40. Antonyan S., Citizen
41. Andreyanyan Grisha, Citizen
42. Amirkhanyan Asya, Citizen
43. Kozmanyanyan Anahit, Citizen
44. Kirakosyan Ts., Citizen
45. Astvatsaturyan Stepan, Citizen

***International Organizations and Projects***

46. Ghazinyan Gohar, OSCE Armenian Office
47. Harutyunyan Samvel, Chemonics/USAID
48. Dallaqyan Gayane, Chemonics/USAID
49. Keghyan Eduard, Chemonics/USAID
50. Gevorgyan Aram, PA/USAID
51. Jenderejyan Anna, REC Caucasus
52. Vardanyan Anna, CENN
53. Tevosyan Vram, CENN
54. Ayvazyan Sona, UNDP SEA Project
55. Vermishyan Arman, UNDP SEA Project

***Mass Media***

56. Tonoyan Ivetta, "Kentron" TV
57. Petrosyan Amalya, Panorama
58. Tadevosyan Lilit, "Hay" TV
59. Nersisyan Anush, "Hartak"
60. Khadlytan Arevik, "Shant" TV
61. Grigoryan Arkadi, Armnews
62. Danielyan Nelli, "Erkir Media" TV
63. Navasardyan Anna, National Radio
64. Avagyan Anahit, National Radio
65. Aharonyan Armine, Openarmenia.com
66. Sargsyan Mane, Arminfo
67. Hovhannisyan Kristine, Armenpress
68. Representative, Arka