

NON-TECHNICAL SUMMARY OF THE EIA REPORT

Integrated Waste Management System in Giurgiu County

Environmental Impact Assessment

Non-technical summary

1. ACTIVITY DESCRIPTION

Waste generated in urban and rural localities is landfilled in the nearest illegal dumps. The illegal activities of waste disposal, spread all over the county, do not comply with environmental policy (there is no bottom sealing, leachate or biogas collection, wastewater treatment or monitoring equipment). These landfills are pollution sources with high risks for human health and environmental factors. The biogas generated pollutes the air and due to its' explosive characteristics represents a risk for human health. Spreading the untreated waste in uncontrolled dumpsites requires larger surfaces for land filling and higher expenses for monitoring.

The proposed Project consists of the necessary measures to be implemented for solving the problems related to the existing waste management system in Giurgiu County.

Street cleaning is already being carried out under existing municipal programs and does not form part of the project.

The proposed waste management system refers to municipal solid waste, such as household waste, street waste, waste from parks and gardens, market waste and household type of waste from commercial, industrial and institutional activities.

PROJECT OBJECTIVES

Implementation of an integrated waste management system in the county of Giurgiu is in line with EU legislation, the National and Regional Waste Management Plan (RWMP) the Masterplan for Waste Management for Giurgiu County and is based on the objectives of the SOP, namely:

- increase the connection rate to public sanitation services of adequate quality and at affordable tariffs;
- reduce the quantity of waste deposited in the landfills;
- increase the quantity of recycled and reused waste;
- reduce the number of old ecological burdens, and;
- Improve technological standards of disposal.

The project will also :

- strengthen the technical and managerial capacity in Giurgiu County in the implementation and operation of a regional solid waste management system;
- support the local authorities in developing and realising an efficient strategy with regard to tariffs, billing and bill collection;
- raise awareness among the inhabitants of the benefits resulting from the project, segregated waste collection and recycling of waste.

WASTE GENERATION, COLLECTION AND DIVERSION TARGETS

Based on the RWMP, in Giurgiu approximately 85,000 ton of waste is generated every year and currently there is collection coverage of approximately 40%. In order to meet

the objectives mentioned above, the proposed measures under this project are intended to achieve the following targets:

1. Provide 100% collection coverage of urban areas;
2. Provide 90% collection coverage of villages and agglomerations in rural areas;
3. To comply with the EU Landfill Directive with respect to biodegradable waste;
4. To comply with the EU Directive on Packaging Waste with regard to collection.

The project aims at diverting about 40% of the waste from landfill disposal, reducing the volume for disposal to about 56,000 ton of mixed waste per year in 2016.

INDICATORS

A list of physical indicators for project implementation will be used to monitor physical progress of the construction of the project. A final list of physical indicators will be established for monitoring purposes once design of the various components has been established.

In addition it is proposed to develop a list of performance indicators for monitoring the eventual results of the project, including the following:

Indicator	Unit	Before the project	After the project
Collection coverage urban areas	% inhabitants	90%	100%
Collection coverage rural areas	% inhabitants	10%	90%
Separate collection system of packaging and biodegradable waste in place	Yes/no	No	Yes
Volume of mixed waste diverted from the landfill	% tons	0%	40%
Total disposed mixed waste at ecological landfill in Fratesti	Ton/year - 2011	0	34,187
Total separate collected organic waste	Ton/year	0	3,558
Total separate collected packaging waste	Ton/year	0	11,647
Closure and rehabilitation of 2 urban landfills	No	0	2

PROJECT DESCRIPTION

Component 1-a: Waste Collection

Selective collection of dry recyclable waste and organic waste for composting will be provided by the project. Specific measures are foreseen for the different waste streams as described below.

- For mixed waste, the project will provide the necessary equipment for the introduction of a county-wide collection system aiming at 100% coverage in urban and 90% coverage in rural areas starting from an average collection coverage rate of 40% in 2006 equivalent to 113,810 inhabitants.
- For biodegradable waste, the project will provide for separate collection systems to be introduced in urban areas covering 30% of urban population in 2010, 60% in 2013 and 80% in 2016, whereas in rural areas home composting

will be stimulated covering 100% of rural population. Targets are to reduce the quantity of biodegradable waste that is landfilled related to the reference year 1995 (67,436 tons) with 25% in 2010, with 50% in 2013 and with 65% by 2016.

- For packaging waste¹ the project will provide in urban areas waste containers for separate collection of paper and glass and a bag system is foreseen for plastic and metal. The separate collection for packaging waste is provided for 100% in urban area and the targets per type of waste are as follows:
 - 2007 (reference year) total recovery 34%, total recycling 28% with 22% glass;
 - 2010: total recovery 48%, total recycling 42% with 44% glass, 60% paper and cardboard and 50% metal (2010);
 - 2011: total recovery 53%, total recycling 46% with 48% glass, 60% paper and cardboard, 50% metal, 16% plastic and 15% wood;
 - 2012: total recovery 57%, total recycling 50% with 50% glass, 60% paper and cardboard, 50% metal, 18% plastic and 15% wood;
 - 2013: total recovery 60%, total recycling 55% with 60% glass, 60% paper and cardboard, 50% metal, 22.5% plastic and 15% wood.

For paper, metal, plastic in rural areas no measures are foreseen, only for glass starting from 2013 (70% of rural population).

It is considered that the 70% glass collection target in 2013, foreseen by Waste Framework Directive (Article 11§1 of the 2008/98/EC), can be achieved having in view that the most part of the recycled quantity will be collected from urban area. To be mentioned, the targets used in this project are in accordance with the provisions of the above directive.

For mixed waste, the project proposes in urban areas a bring system using 1,100 litre containers for block of flats (collection 2-3 times per week), a door to door system using 120 litre containers for individual households area from Giurgiu Municipality. For rural areas a bring system using 1,100 litre containers. Containers used for the bring system will be placed on common hardstands and containers are collected with 10 m³ compactor trucks. The system requires an additional investment of some 9,611 containers and 2744 hardstands for the bring system and 16,320 containers for the door to door system. Additional containers will be placed on request by industrial and institutional (CII) sector and markets to be paid by the producers of the waste and not by the project.

For biodegradable waste, separate collection systems will be gradually introduced in urban areas, whereas in rural areas home composting will be stimulated.

¹ According with the tender documents, the operation contract for the future IWMC operator will foresee the obligation of identifying the market opportunities for the valorisation of recycled materials. Nowadays there are several local companies undertaking recycling activities. However it's hard to estimate the market for the coming years given the actual global crisis.

The list of authorised economic agents for the collection, valorisation or elimination of recyclable waste in Giurgiu County is enclosed in Annex XVIII of Application Form.

For packaging waste containers will be provided for separate collection of paper and separate collection of glass and a bag system is foreseen for plastic and metal.

For bulky waste, WEEE and small hazardous waste 3 bringing centers will be established in each of the urban areas, one in each of the two towns and 1 in Giurgiu Municipality.

Component 1-b: Waste transport and transfer

All mixed waste will be directly transported to the IWMC in Fratesti or (for the Northern part of Giurgiu) to the landfills Glina and Chiajna, near Bucharest.

For packaging waste it has been assumed that all packaging waste will be transported to Fratesti and be sorted at the sorting line in Fratesti.

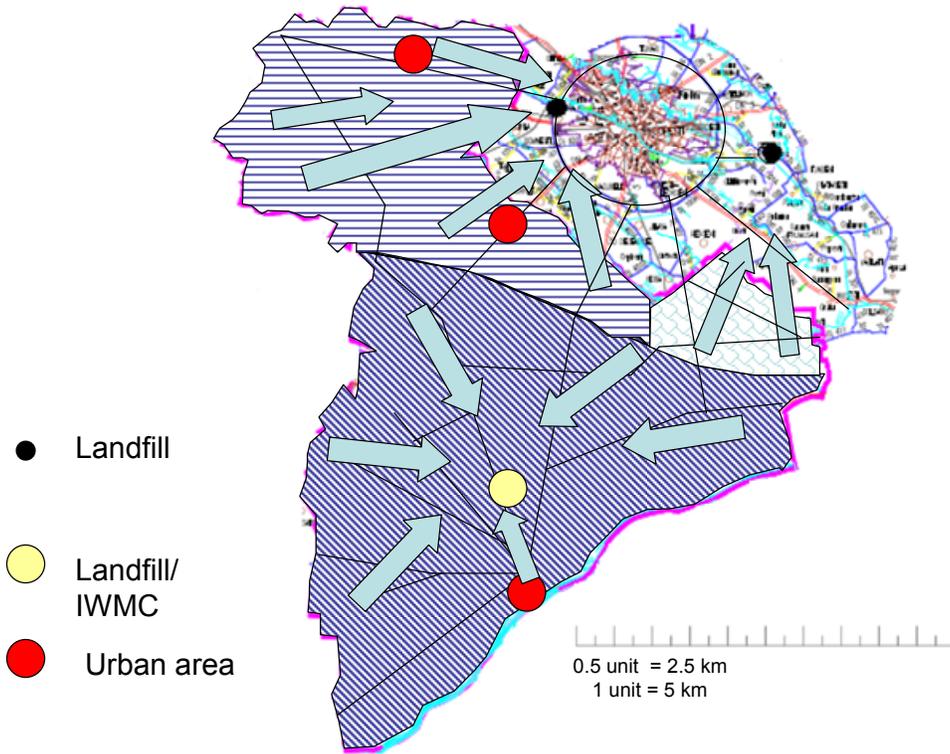
No transfer stations are being constructed in Giurgiu County as this would result in higher operational costs.

13 municipalities and local communities in Giurgiu have established contracts with private operators to collect and dispose waste in the landfills Glina and Chiajna close to Bucharest. Reasons for this are that the current landfill in Giurgiu had to be closed, but also because the Northern part of Giurgiu is closer to Bucharest as compared to the location of the current or planned landfill. Because of this, consultants have carried out a preliminary analysis of the costs of three alternative ways of disposing the waste generated in Giurgiu as follows:

1. Municipalities located in the Northern part of Giurgiu transport and dispose their waste in landfills close to Bucharest and the Southern part of Giurgiu dispose waste in the new landfill in Fratesti (see figure below for geographic details).
2. All waste generated in Giurgiu is disposed of in the new landfill in Fratesti, Giurgiu;
3. All waste generated in Giurgiu is disposed of in the existing landfills close to Bucharest.

Based on a financial least cost analysis of these three alternatives consultants propose to select alternative 1, which has been used as the “Base Case” for the project described in this summary. Contacts with the owners of the landfills near Bucharest have been established to indicate that there would be sufficient capacity in those landfills to receive the waste from the Northern part of Giurgiu. The two sanitary landfills are in Chiajna and Glina localities, both owned by private companies who agreed to receive the waste from Northern part of Giurgiu County.

GIURGIU – Alternative 1: Mixed waste flow



All mixed waste will be directly transported to the IWMC in Fratesti or (for the Northern part of Giurgiu) to the landfills Glina and Chiajna, near Bucharest.

For packaging waste it has been assumed that all packaging waste will be transported to Fratesti and be sorted at the sorting line in Fratesti.

No transfer stations are being constructed in Giurgiu County as this would result in higher operational costs.

Component 2: Integrated Waste Management Centre and Landfill

The project will provide for an Integrated Waste Management Centre in Fratesti that will include a landfill, a composting plant and a sorting line with the following characteristics:

	Designed capacity tons/ year	Input tons/ year 2016	Output tons/ year 2016
Composting line	12,000	11,000	4,400
Sorting line	12,000	6,500	4,550

The Fratesti site has a size of 16.4 hectares and is located in a relatively remote location and has the opportunity to develop other facilities near the landfill site. The total storage capacity of the Fratesti landfill is 0.7 million m³ and the lifetime is estimated to be 23 years.

The landfill will be constructed in 3 cells. The first cell is approximately 1.88 ha (sufficient for 7 years operation) and the costs are part of the project. The other two cells, that are not included in the investments for this project, will be approximately 1.3 ha together (sufficient for 9 and 7 years respectively) and are planned for 2017 and 2025 respectively. Besides storage, the landfill also includes a surface water management system, leachate treatment and a gas collection and flaring system. In addition to this, there will also be an administrative building, weighbridge plus weighbridge house, garage, workshop, fuel station and parking area.

Component 3: Closure of existing urban and rural dumpsites

In Giurgiu there are three major sites identified near urban areas (Giurgiu, Bolintin Vale and Mihailesti). All these three urban landfill sites will be closed and need be capped after that the new site in Fratesti is opened. When the new landfill opens, the newly generated waste will be transported to the new landfill site.

According to GD 349/2005 Giurgiu landfill ceased activity in 31 December 2007, waste generated in the Giurgiu town being transported to one of the ecological landfill of Bucharest (Glina landfill). Design for the landfill closure in Giurgiu has already been initiated and the costs of closure are proposed to be included in the project.

Although the Mihailesti landfill is mentioned to be closed in the calendar provided by the GD 349/2005, the land is private property and the landfill closure cannot be included in this project.

The current situation in Giurgiu County regarding the existing non compliant urban landfills is presented in the table below:

Landfill	Surface (ha)	Average height of waste (m)	Estimated existing waste volume (m ³)
Giurgiu	8.5	1.5	567 000
Bolintin Vale	2	1.2	200 000
Mihailesti	2	-	120 000
Total			~ 887 000

As well, there are 190 identified dumpsites in the Giurgiu County. The dumpsites in rural areas are relatively small, varying from a few cubic meters to several thousand cubic meters. These are primarily situated on village borders, near waterways or on municipal ground in the neighborhood of the municipality. It has to be noted that in the Northern area waste is disposed at many places, which makes it almost impossible to identify individual dumpsites. All rural dumpsites are uncontrolled and non-compliant.

The closure of existing rural dumpsites is not a component of this project. The County Council together with the Local Councils agreed to close the rural dumpsites before July 2009, with local funds.

Component 4: Public awareness, Technical Assistance and Supervision

The project will also support the Local Authorities in the fields of public awareness, Technical Assistance for Management of Project Implementation, assistance for arranging contracts with operators, for Supervision for works and supply contracts.

Component 4 include the following activities:

1. *Public Awareness:* Significant efforts are needed for raising the level of public awareness for waste-related and environmental issues. Key issues include the need for reduction of waste at source, source separation of recyclable materials from the general waste stream and payment of charges/user fees to sustain County wide collection, treatment and disposal services. A budget for public awareness is included in the annual cost estimates for the project.

2. *Technical Assistance:* Technical assistance is foreseen under the project for management assistance to the PIU in the management of project implementation and preparation of tender documents and contracts with various operators And in the preparation and execution of public awareness activities.

3. *Supervision:* Assistance is foreseen to be financed under the project for supervision of the various works and supply contracts in accordance with the implementation plan.

2. THE POTENTIAL ENVIRONMENTAL IMPACT, INCLUDING THE IMPACT OUTSIDE THE SITE AND MITIGATION MEASURES

2.1 Methodology

The identification of environmental pollution sources is based on the feasibility study and existing environmental conditions, as observed during the field visits.

The environmental impact of the IWMS (Integrated Waste Management System) during the construction and operation periods has been evaluated in accordance with the provisions of European and Romanian legislation (CD 85/337/CEE regarding the environmental impact of major public and private projects modified and completed by CD 97/11/EC).

For each major environmental problem the necessary measures for the prevention, reduction or elimination of negative impacts have been identified. The positive impact of each proposed activity has also been underlined.

The potential impact assessment is based on the proposed conditions and general characteristics of this development project. The environmental impact is quantified as Zero, Insignificant, Moderate, and Significant.

Zero	Absence of any form of reduced impact
Insignificant	Possible, produced at low level for a very short period.
Moderate	The impact can determine a negative or positive modification of existing environmental conditions or can have effects on human health.
Significant	It is estimated that the impact can have significant effects on environment or human health, on a large scale or long period.

The project does not produce an impact outside the borders.

The impact sources during the construction and operational periods are as activities the activity in the Integrated Waste Management System (IWMC).

2.2. Water

In addition, there will be no residual water discharge from IWMC into the surrounding environment.

2.2.1. Water pollution sources

Construction period

During the construction period approximate 80 persons will work. The wastewater produced by the personnel will be 1.6 m³/day (the estimated wastewater production is 20 l/person/day). At present, there are no facilities for treatment and removal of wastewater.

The personnel will use ecological toilets during the construction period and no wastewater will be discharged into the environment.

For water, a well will be constructed that will be used also in the operation period.

Operation period

- IWMC:

The potential water pollution sources during the operation period of the proposed IWMC are: leachate from the landfill, household wastewater, washing water from vehicles and equipment, wastewater treatment plant if not functioned properly, rainwater contaminated.

The project considered these potential pollution sources:

- The IWMC site is not connected to any natural water source; all wastewater is treated and recycled.
- Adequate measures for platform cleaning
- The drained rainwater from the covered platforms is expected to be clean.
- The infiltrated rainwater is treated in a closed system.

2.2.2. Impact forecast

Construction period

During construction period accidental contamination can appear with substance like petrol produces, natural oils or construction raw materials (cement, lime) that can have an impact on phreatic water of the site area. However, specific actions will be considered for accidental losses.

During the construction activities, the hazardous materials will be kept in closed containers in order to minimize the access and exposure. During the construction period, the impact on water is considered insignificant.

Operation period:

- IWMC:

The potential impact on the water quality is very limited due to the wastewater treatment system.

The impact on the water quality during the operational period is considered zero, due to the foreseen mitigation measures.

2.2..3. Foreseen measures for the prevention, reduction and, when possible, elimination of any significant effects on the environment

Construction period

In the construction period, contractual obligations are foreseen with regard to water protection measures:

- A special deposit for technological waste;
- A deposit for the materials used in constructions;
- Ecological toilets for the involved personnel in the construction works of IWMC;
- Washing equipment for the vehicle tires at the IWMC;
- Warning messages in all the potential dangerous places for human health and environment.
- Adequate means for the prevention of spreading of material (soil, clay, waste or construction materials) on public roads/areas or other places with risk to human health or the environment.

Operation period

-IWMC:

The IWMC site is not connected to any natural water source; the wastewater is recycled and treated. The landfill's bottom is sealed in accordance with the current legislation provision. The groundwater and leachate are monitored. Pumps are provided as prevention measures of accidental losses of leachate in case of higher quantities of leachate or incapacity of surface water pumps.

In emergency cases, the pump station and the pressure line are the only places where the leakage of the wastewater in the environment is possible. In these cases, the activity from the pumping station has to be stopped and the wastewater will be temporarily stored.

The platform has to be maintained clean in order to control the quality of rainwater. Daily cleaning of the platform will be made using a sweeper vehicle with a vacuum cleaner and water (similar water used in street cleaning). For rainwater collection from the site area the following processes are scheduled:

- Drainage channel in the interior side of each slope
- Drainage channel in the interior side of the area of the dike crest
- Drainage channel at the base of the dike area

During operation of the first cell, the rainwater falls on the waste and leachate is produced. The rainwater leakage into the waste is collected through drainage and collection systems placed on the landfill's bottom and slopes for treatment purposes.

2.3. Air

2.3.1. Air pollution sources

The execution and operation of proposed works will generate air pollution.

Construction period

During the construction period, the air pollution sources are gasses and dust released by:

- vehicles
- earthworks
- Asphalt casting for access roads

Operation period

- IWMC:

The air pollution sources during the operation period of the Integrated Waste Management Center (IWMC) are:

- Landfill site – biogas is produced
- Composting plant – the main pollutant is ammonia
- The wastewater treatment plant – the main pollutants are volatile organic compounds (VOC)

VOC emissions or other gasses are not significant for environmental impact.

- Vehicles - emissions used at the landfill operation.

2.3.2. Impact forecast

- IWMC:

The maximum pollutant concentrations from the nearest locality in the most unfavorable period, after the construction of landfill, cannot exceed the Maximum Allowed Values, defined in the Romanian legislation in force.

The green belt foreseen for the IWMC will have the role to reduce odor from the landfill.

During the operation period of the IWMC the impact on air is considered insignificant.

2.3.3. Mitigation measures

The proposed measures for air and environment protection are:

Construction period

The proposed measures for the pollution prevention of air and environment that must be stipulated in the contract are:

- New jobs : using local work resources

- Assurance of safe working conditions;
- Daily inspection of the site;
- Warnings about potential danger;
- Elaboration of guidelines referring to human health protection and safety in operation;
- specialized workers in digging and constructions;
- The personnel will wear adequate protection equipment (gloves, protection shoes, helm, gas mask, etc);
- Construction works will be stopped during snow periods, when the work area is covered with snow;
- In special cases, the constructor will ask the designer to solve emergency problems. In dangerous cases, the constructor will stop all the activities and will ask withdrawal of workers and equipments.

Operation period

The gas and odors emissions from the landfill can be reduced by biogas collection, periodical inspection and training of personnel.

The proposed management of biogas collection is to search an efficient use of energy as soon as the gas quantity is big enough and the gas quality is proved to be stable.

The biogas management system will include a fixed measurement device of gas flow for production monitoring. Also a mobile device will be available for the temperature and gas composition measurement at gas wells.

The following measures are also proposed, besides biogas collection and management:

- plantation of a green belt around the IMWC and the points/transport stations of waste;
- keeping of buildings, platforms and containers in good functioning conditions;
- a temporary roof will be provided for the waste with inert materials, the final covering system will be installed after completion of the waste storage process.

Periodically the dust generated in the IWMC will be monitored and the roads will be stained in dry weather. Also periodically, the storage of materials will be checked.

2.4. Soil and geology

2.4.1. Soil pollution sources

Construction period

During the construction period of IWMC, the soil can be polluted with waste like packaging waste, used oils from vehicles and spare parts of equipment. The earthworks will modify the actual state of soil.

Operation period

The soil pollution sources are the household waste from IWMC offices, the accidental spread of waste during collection, transport to IWMC, operation of treatment facilities of technological waste or leakages from the sewerage system.

All these sources may be easily cancelled by mitigation measures.

2.4.2. Impact forecast

Construction period

- earthworks and construction of the concrete platforms in the IWMC produces a negative impact on soil;
- The direct storage of construction materials on soil leads to an insignificant soil impact;
- The impact due to the accidental losses of used oils is considered insignificant because it may be controlled by implementing a set of rules for the maintenance of transport vehicles and equipment. The contamination level of soil due to the accidental losses depends on the technical parameters of equipment and installations and on the foreseen mitigation measures.

Construction works will include excavation and cementing, surface compaction and leveling, concrete casting. Extraction and filling material handling must be done carefully. This includes the selection and reconditioning of the area. The working area will be reconditioned to the original or a better form.

During the construction period of IWMC the impact on soil is considered insignificant.

Operation period

Potential pollution of soil and subsoil, during operation of IWMC is minimal and can be produced by the accidental losses.

Impact can be considered as insignificant.

2.5. Noise

2.5.1. Noise pollution sources

Construction period

During the execution period of facilities in the IWMC, the activities will generate noise and vibration from mechanical equipment. By contractual obligations, the noise level produced from the equipment used in the construction works will have to comply with the maximum allowable values foreseen in the legislation.

Operation period

The noise pollution sources of IWMC operation are:

- mechanical equipment of waste separation line (sorting plant) and biological treatment line (composting plant).
- mechanical equipment used in waste land filling technology.
- mechanical equipment of WWTP.
- transport vehicles of solid waste used in waste collection and transport to IWMC;
- Submerged pump used in the drilled well for water supply.

For short periods (normally no more than 1 minute or 2-3 minutes in the winter season) noise is produced when waste containers are loaded or discharged.

It is expected that the noise level produced in waste loading – discharge cycles and during transport will comply with the maximum allowable values specific to the used equipment.

Same accepted noise level is expected in closure activities of existing landfills and dumpsites.

The noise impact is considered to be insignificant and will not have any influence on any noise sensitive receptor: residential, commercial or other institutions.

The sites selected for the construction of IWMC are in accordance with legislation in force regarding the minimum distance from living areas: are situated to more than 1 km distance.

2.5.2. Mitigation measures

The noise absorption devices of equipment will be periodically checked and maintained during the construction and operation period.

2.6. Biodiversity

There are no protected areas (Natura 2000 areas) at the proposed sites. The flora and fauna diversity is relatively poor.

2.6.1. Impact forecast

Construction period

The impact on existing flora and fauna at Fratesti site is not significant during construction period, where are carried out earthworks for IWMC.

The main deterioration may consist of vegetation destruction, which represents the natural habitat of the poor existing fauna. The fauna will be negatively affected by noise and dust emissions due to works.

Operation period

In the IWMC neighborhood, flora and fauna are poor and won't be affected by the works that will take place over an area of 20 ha near the existing site. Given the fact that in the mountain area, the biodiversity is much more pronounced, the temporary waste storage won't affect the fauna in the area. The activity in the area will consist of

2-3 vehicles per day, that will load and unload the containers of waste in half an hour after each arrival.

In conclusion, the project impact on biodiversity is considered insignificant during the construction and operation period.

Closure of existing non-compliant landfills and dumpsites will have a positive impact on fauna and flora.

2.6.2. Mitigation measures

The proposed mitigation measures for impact reduction on biodiversity are:

Construction period

In order to avoid additional loss of biotopes, the construction area must be limited to the smallest area necessary for the works. Dumping and storage of the excessive soil and materials must be done inside the construction area. The vehicles must work only inside the construction area and must not exceed these limits. The biotope structures removed inside the construction areas must be restored after the works closure.

Operation period

In order to reduce disturbance of wild life during the operation period, the proposed method is to work in the planned time without exceeding the emissions threshold. Periodic checks will be made.

In addition, in order to avoid accidents, traffic pointers will be installed with regard to animals.

2.7. Landscape

2.7.1. Impact forecast

Construction period

The proposed sites for the IWMC construction have no special value regarding the landscape. The area proposed for the IWMC construction has already a waste landfill, which will be closed. Closing of that means, also, the cultivation of land.

The landscape will be affected by the construction of the new waste management center and by waste transport vehicles traffic.

During the construction of the new IWMC, some visual impact may appear due to:

- earthworks for foundation;
- equipment storage;
- materials storage;
- soil resulted from earthworks.

However, seeing the recent use of the IWMC proposed site as waste landfill, the impact upon the landscape during the construction phase is considered insignificant.

Operation period

During the operation period, the impact on the landscape is generated by:

- waste treatment and disposal in the new landfill;
- heavy transport and the soil drilling equipment;
- administration building for and IWMC operation.
- Waste transport to IWMC.

Analysis of the type and esthetic value of the landscape, points a positive general impact of planned economical activities. The construction and operation of internal and adjacent infrastructure of IWMC will temporary deteriorate some of the esthetic resources of the adjacent area.

Having in view the significant positive aspects and the insignificant negative aspects, the general impact of the proposed project is considered positive.

2.7.2. Mitigation measures

Construction period

The following measures that must be taken during the construction phase will be specified in the contracts with contractors and operators and will be monitored:

- 1) The spreading of construction materials will be avoided;
- 2) The extension of the work area will be avoided by boundary setting;
- 3) The earthworks will be controlled in order to avoid the dust dispersal;
- 4) The trucks that transport materials will be covered ;
- 5) The area will be cleaned after completion of works and the surroundings will be brought back into the initial natural conditions.

Operation period

The management measures of the landscape in the IWMC area will be implemented after the closure of construction works. The slopes of the new ecological landfill in Fratesti will be covered with perennial grass. Also, a green belt will be planted around the waste management centre. The planting will begin during the construction phase in order to be ready in the operation period.

The following measures are planned. These measures will be mentioned in the contracts and periodically monitored, and will involve public participation, public education and cooperation with the local authorities.

- 1) An important measure is closure of existing waste landfills;
- 2) All vehicles and containers will be maintained and washed in IWMC;
- 3) The soil of the evapo-transpiration basin (ETB) will be maintained by irrigation and by salt quantity control of soil.
- 4) The platforms and containers must be maintained in good conditions;

- 5) The colors and the materials will be chosen in order to be in harmony with the surroundings.
- 6) During winter, special measures will be taken in order to maintain the access roads to the containers open.
- 7) Special uniforms will be provided for personnel to maintain professional standards and provide safety.

2.8. Economic and social conditions

2.8.1. Impact forecast

Construction period

The workers can be exposed to a high level of noise and dust, during the site leveling, road access and facilities construction.

During this period, the impact can be reduced by applying the foreseen measures necessary to avoid any accidents. The noise emission from the equipment will respect the legislation in force regarding the allowed noise limits.

A positive impact is new jobs created during construction period.

Operation period

For the operation period the following aspects are considered:

- Noise: the workers can be exposed to a high level of noise during waste discharge and compaction;
- Dust: the workers can be exposed to a high level of dust during the construction and closure of the new cell;
- Gas emissions: biogas emission can affect the workers;
- Hazardous waste: inadequate handling of hazardous waste can affect the workers;
- Odors: the workers can be disturbed by the smell resulting from the inadequate coverage and discharge of waste in the containers placed on in the IWMC.

In general in urban areas public hygiene will be improved by introduction of the new waste management system. The collecting points will be cleaned and checked.

A more efficient waste collection will be implemented, preventing leakage from waste containers. The closure of garbage storage points from blocks of flats will eliminate the smell problems inside buildings.

Health and working conditions of sanitation workers will be improved, mainly by delivering safety equipment and improved facilities in the IWMC. The closing of garbage storage points from blocks of flats will contribute to better working conditions for sanitation workers. The existing uncontrolled landfills from each locality of Giurgiu County will be closed and recovered for farming and other purposes.

The unacceptable and unhygienic conditions in which waste is currently collected, will be stopped and new and better jobs will be offered by Project implementation. So, this will be added to the positive impact to general public hygiene.

The analysis of the socio-economic effects caused by the project execution has identified a positive impact by an increase in the number of new jobs, as well during the construction period, as during the operation period.

These jobs will be for different professions, from chemistry assistant to experienced engineers.

The project will create new jobs in waste collection, treatment and ecological disposal in accordance to the legislation in force and will increase the economic activities of the inhabitants in different sectors such as transport, commerce, maintenance – repairs etc.

As a positive effect of cleaning, tourism may increase in the whole county. More jobs will thus be created.

2.8.2. Mitigation measures

The following measures and monitoring programs will be implemented:

Public health:

- 1) Maintenance of the dust control during the construction activities and during the transport of the materials by watering them.
- 2) The correct manipulation of the solid waste during transport and disposal.
- 3) The correct manipulation, by respecting the safety requirements, in collecting and disposing the solid waste, in order to prevent the appearance of odors.
- 4) The strict control on animals and insects (diseases) such as dogs, cats, rats etc.
- 5) Creating a permanent coverage of the cell during operation in order to prevent odors.
- 6) Inhabitants are not allowed to enter in the solid waste landfill site, in order to prevent fire or waste spreading.

Health and occupational safety:

- 1) Maintenance of the dust control during the construction activities and during the transport of materials.
- 2) The implementation of safety procedures and the provision of safety equipments for workers.
- 3) Informing and preparing the drivers and workers with regard to correct handling of waste and personal protection equipment.
- 4) The frequent clinical examination of the workers.
- 5) The instruction of the employees in identifying the hazardous waste and in applying the specific handling procedures.

- 6) Wastewater from the construction and operating periods must be collected in a more secure manner.

2.9. Cultural and Ethnic Circumstances, Cultural Inheritance

Generally, the activities that are proposed will not affect, directly or indirectly, the cultural inheritance of the area. No historical objectives could be identified in the mentioned area. The anticipated impact is considered to be zero.

3. SUMMARY OF IMPACT FORECAST

3.1. Impact during the construction period (short term impacts)

The IWMC construction, with the activities mentioned above, will be in accordance with Romanian and international standards, which includes public consultation of residents, ensuring adequate temporary and safety roads for residents and constructors. The construction permit will be obtained for each proposed site. Measures are foreseen for avoiding spreading of waste and soil.

The duration of the construction period of the proposed project is 12 months. The most sensitive potential receptors will be affected only in a localized sense during the period in which works are developed. All construction will to some extent result in disturbance of the area .

A summary of the activities and associated impacts, which are estimated during the construction phase, is presented in Table 3.1.

Table 3.1 Summary of impact during construction period

Impact	IWMC construction
Noise	•
Dust	•
Odours	
Wastewater pollution	
Soil losses	•
Traffic disturbance	
Utilities services disturbance	
Access disturbance	•
Cultural resources disturbance	
Roads disturbance	
Visual impacts	•
Security, health and safety	•
Animal or vegetation disturbance	
Pathogens dispersion	
pollution due to wastewater and waste spreading on streets	

These impacts during the construction activities are temporary and of a minor importance.

3.2. Impacts during the operation period (long term impacts)

The impacts on the environment will be generated by the following operational activities:

- The operation and maintenance of the composting and sorting plants.
- The operation of new ecological landfill.

The main results of the waste treatment in composting and sorting plants are compost and recyclable materials – iron, non ferrous materials, paper, glass, plastic, unrecyclable materials.

The treatment of solid waste and their elimination process may be a serious source of odors. The sorting and composting plants that are inadequately built and operated and the incorrect manipulation of waste may become a serious problem for the public health.

An overall view on the various themes of the waste management program and on their impact on the environment can be seen in Table 3.2.

The activities considered without impact are not mentioned.

Table 3.2. Summary of the impact during the construction and operational phases.

Identification of the impact and of the positive effects on the environment	IWMC construction
Environment plans and policy	+
Compatibility with the sectoral programs	+
Land use	+
Human population	–
Visual aspect	–
Public hygiene	+
Health and occupational safety	+
Socio-economy	+
Natural resources	–
Soils	–
Ground water	NA
Surface water	NA
Air quality	+
Flora and fauna	+
Cultural inheritance	NA
Historical monuments	NA
Material assets	NA
Roads	+

Legend: + positive effects; - negative effects; NA = non-applicable

The environment and the public hygiene will be improved by implementing a new integrated waste management system, which includes IWMC in Fratesti locality.

The health and the occupational safety of workers will be improved, especially by providing safety equipment.

Waste scavenging will be prevented by the new waste management system. Due to this fact, a number of people will lose their jobs. However, the unacceptable and unhygienic conditions in which the waste scavenging takes place today will end. This will increase the positive effect of public hygiene in general and will create new jobs.

The rehabilitation program of existing landfills and dumpsites will have a positive effect upon the soil and water quality.

The waste management program is evaluated as neutral with regard to the aspect of cultural inheritance.

3.3. Main conclusions of EIA

During the operation period, the impact is considered to be positive. Specially, the public hygiene, social and economic conditions will be significantly improved by an integrated waste management system. The project has as main purpose the environmental improvement and protection.

The negative impacts are related to the construction period and mitigation measures have been considered in this regard.

The negative impacts during the operation period and the visual impact will be reduced by correct design of system components.

3.4. Forecast on life quality and social conditions

During the operation period, the project will have a positive impact. By waste collection, transport, treatment and ecological landfilling a high level of sanitation will be assured in the county.

The social and economic impact will be significant positive due to new jobs creation and compliance with environmental legislation.

3.5. Monitoring

We suggest the following be included in the monitoring of future landfill:

- Monitoring environmental quality;
- Monitoring technology;
- Monitoring after site closure.

The system for monitoring the landfill after closure consists of:

- i. Monitoring of groundwater: monitoring wells placed one upstream and two downstream of landfill site; chemical and biological parameters will

be monitored, the analysis will be conducted in accredited laboratory according to legal norms.

- ii. Monitoring of capping system: visual inspections of landfill cap in order to prevent and correct the land sliding, subsidence of final layer, uncontrolled growth of vegetation
- iii. Monitoring of gas emissions : FID detector

The monitoring tasks in relation to the closed landfills is not included in the future services, as it is the responsibility of the operator (in this case the municipalities owning the respective landfills), according to the provisions of GD 349/2005, Art.25.

3.6. Difficulties

One of the encountered difficulties was the lack of publications that contain information about the environment, especially suitable maps, hydrogeological information, including public health data on water quality for groundwater.

There are also still many unknown elements, which will be known after the technical execution of the project, such as the nature and quantity of substances to be used in treating the leachate. These elements will be known in subsequent phases of the project.

Finally, it should be noted that in general assessments, especially quantitative ones, are subject to many uncertainties related to predictions and impact assessments potential.

The main assumptions made in prediction and assessment of potential impacts on the environment can be defined as conservative, meaning that the results are "safe side".

Some benefits of the project can be evaluated only in a general manner. This covers issues such as closing landfills existing non-organic, when obtaining a clear improvement of environmental condition.

This benefit can not be assessed only in a general manner, because precise predictions would require extensive measurements of the existing situation (ambient air, soil, underground water, etc..) and modelling techniques in detail, which exceeds the purpose of the study Assessment Environmental Impact.