

# **ANNEX IV**

## **NON-TECHNICAL SUMMARY OF THE EIA REPORT**

# **Integrated Waste Management System in Vrancea 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 Vrancea 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 Vrancea is in line with EU legislation, the National and Regional Waste Management Plan (RWMP) the Masterplan for Waste Management for Vrancea 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 Vrancea 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 Vrancea approximately 115,000 ton of waste is generated every year and currently there is collection coverage of approximately 39%. 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.

It is expected that between 30 to 40% of the waste is diverted from landfill disposal, reducing the volume for disposal to 70,000 - 80,000 ton of mixed waste per year.

## 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 table:

*Table 1: Indicators.*

Indicator	Unit	Actual Value	Targets 2016
Collection coverage urban areas	%	70	100
Collection coverage rural areas	%	10	90
Volume of waste disposed at landfill	Tons/year	0	70,000
Volume of mixed waste diverted	Tons/year	-	50,000
Volume of biodegradable waste diverted	Tons/year	-	48,000
Volume of packaging waste recycled	Tons/year	-	16,000-21,000
Volume of other waste flows	Tons/year	-	3,000
Closure and rehabilitation of 5 urban landfills	Nr	0	5
Closure and rehabilitation of 200 rural dump sites	Nr	0	200

## PROJECT DESCRIPTION

### Component 1a: Waste Collection

For mixed waste, the project proposes the introduction of a bring system using a mix of 240 litre and 1,100 litre containers in urban areas (collection 2-3 times per week) and 1,100 litre containers in rural areas (collection once per week). Containers will be placed on common hardstands to be collected with 10 m<sup>3</sup> compactor trucks. The system requires an investment of some 4,000 containers and hardstands. An additional 2,000 containers are needed to be placed on request by the industrial and institutional sector and markets to be paid by the producers of the waste. Use will be made of existing containers that are currently used for waste collection in urban areas.

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

For packaging waste containers will be provided for separate collection of paper and glass and a bag system is foreseen for plastic and metal. For this purpose the ongoing pilot project with ECOROM, a producers association, has been integrated into the current project in a sense that the project will support local authorities in obtaining equipment to organize separate collection whereas under the producer responsibility it is foreseen that arrangements for transport and recycling of packaging waste will be made with producer's organisations. Separate collection of other types of waste will be postponed until tangible agreements with producer's organisations have been made.

For bulky waste, WEEE and small hazardous waste 6 bringing stations will be established. For collection of these types of waste and illegally dumped waste also flatbed trucks are used.

It is expected that cleaning of streets and other public areas will be continued under current arrangements organised by the local authorities and no investments have been proposed under this project.

#### **Component 1b: Waste transport and transfer**

Collected waste will be transferred to 4 transfer stations (Focsani, Gugesti, Adjud and Vidra) and (in designated areas) directly to the landfill. Where possible the previous mentioned bringing stations will be established in the same area as the transfer stations. Transfer and bringing stations will be located along national/municipal paved roads to ensure easy access by trucks. The transfer stations consist of a ramp and elevated disposal area and containers with a volume of 32 m<sup>3</sup> are placed next to this area in which the waste is disposed. Design and construction of the transfer station in Gugesti is already funded by separate sources and therefore not included in the investment costs of this project.

The containers will be taken away by hauling vehicles to the Integrated Waste Management Centre in Haret. A map of the area with the various transfer station locations related to the project is presented in the following map:



Bleu marks: transfer station, Red mark landfill

### **Component 2: Integrated Waste Management Centre and Landfill**

The Integrated Municipal Waste Management Center that will be constructed in Haret locality, Vrancea County, represents a main component of the proposed waste management system that complies with the provisions of waste legislation in force. The European Directives, transposed into Romanian Legislation, focus on waste integrated management systems that provide waste treatment and elimination facilities by promoting waste reduction, reuse, recycling, recovery and gradual removal of biodegradable fraction of municipal waste from disposal.

The Integrated Waste Management Centre in Haret (near the town of Marasesti) will include a landfill, a composting plant and a sorting line. After implementation of the recycling activities it is expected that approximately 70,000 ton of waste needs to be disposed of. Following the RWMP only 1 landfill is proposed in Vrancea County and therefore a land area with a minimum of 10 ha is required plus additional space for temporary storage and services. The Haret site has a size of 17,5 hectares and is located in a relatively remote location and has the opportunity to develop other facilities near the landfill site.

The activities proposed on the Haret site (Marasesti) consist of closure of the existing non-compliant landfill, situated near the proposed site for the construction of the new

ecological landfill. The estimated period needed is 24 months. The works will start in 2008, excluding the winter season: December-February.

The integrated waste management concept takes into consideration the environmental pollution reduction by source selective collection, treatment and recovery of municipal waste. By implementing these measures, only refuse, non-recoverable waste, will be stored in the ecological landfill from Haret. The proposed activities are sorting (for recycling), treatment and final disposal of non-hazardous waste, household and similar waste. In addition, biogas collection and treatment of wastewaters are proposed.

With regard to the sorting line, the proposed measure is to include a simple sorting line in the project, The sorting line enables sorting of various types of packaging waste and to achieve a better quality of the separated components, hence increased market potential which will make it easier to come to an agreement with producers associations. Furthermore the sorting line will contribute and increase the likelihood of achieving the recycling targets for Romania.

The treatment technology consists of biological treatment, that uses the aerobic technology – decomposition, sorting of recyclables and storage of non-recoverable materials in an ecological landfill. Selective collection at source in two categories: recoverable and non-recoverable will allow from the beginning the storage of non-recoverable waste and treatment of recoverable waste after transport in IWMC.

The total storage capacity of the Haret landfill is 1.8 million m<sup>3</sup> and the lifetime is estimated to be 26 years. The landfill will be constructed over 3 periods. The first cell is approximately 5 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 5.5 ha together (sufficient for 9 and 10 years respectively) and are planned for 2017 and 2026 respectively. In the design the closure is also taken into account. 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.

It is foreseen that the composting line consists of a reception area, composting area, maturing area and a storage area. In total approximately 1.5 - 2 ha is required. The proposed technique is windrow composting.

The need for introducing MBT technology to achieve the targets has been analysed and evaluated. It has been concluded that there is no requirement to use this technology in the short term and that the introduction of such technology at this stage will considerably increase the costs of waste treatment and disposal whereas the effectiveness of more cost efficient options cannot yet be evaluated. It is therefore recommended to again analyse the need and technical specifications of MBT technology in a regional context and taking into account the effectiveness of alternative and more cost efficient measures. Such an analysis could be carried out in about 5-7years from now and possible investments could be incorporated in the next programming period.

The Integrated Waste Management Center will serve the entire county population 393,768 inhabitants, from which 149,000 live in urban area and 244,768 in rural area.

The operation period of the proposed waste management system is 26 years (estimated lifetime of the landfill at Haret).

### **Component 3: Closure of existing urban and rural dumpsites**

In Vrancea there are five major sites identified near urban areas (Golesti, Adjud, Haret, Panciu and Odobesti). For environmental, financial and technical reasons, the sites in Panciu and Odobesti will be cleaned and the waste will be transported to Adjud and Haret. After that the remaining urban sites in Haret, Golesti and Adjud will be closed and capped.

When the new landfill opens and the transfer stations are put in place, it is expected that the newly generated waste will be transported to the new landfill site.

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 neighbourhood of the municipality. It is estimated that there are approximately 200 dumpsites in the County. All these dumpsites are uncontrolled and non compliant. Legally rural dumpsites were to be closed by the end of 2006; however the MESD intends to extend this deadline to July 2009. The project includes the closure and the clean up of the existing rural dumpsites. The waste of the rural dumpsites will be disposed of in existing urban landfills (before these are closed) and in a selected number of larger rural dumpsites that will subsequently be closed and capped in accordance with Romanian and EU legislation. Furthermore the closed rural dump sites will be fenced where needed in order to prevent the continuation of dump activities. Before rural dumpsites are closed and cleaned it is important to ensure that the collection system in these areas is operational.

### **Component 4: Public awareness, Technical Assistance and Supervision**

Support to the Local Authorities in the fields of public awareness, project implementation and supervision will include:

- 1. Public Awareness:* Significant efforts are needed for raising the level of public awareness for waste-related 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.
- 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 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.

*Table 2: Impact assessment.*

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 identified on the following activities:

- a) The activity in the Integrated Waste Management System (IWMC).
- b) The activity in the waste transfer points/station.

### 2.2. Water

Near the proposed site for the construction of IWMC is the old Zabrauti River bed, which is deviated above towards Panciu vineyard. The closest river downstream is Siret River situated at 8 km distance.

In conclusion, Zabrauti River is deviated form the proposed site. In addition, there will be no residual water discharge from IWMC into the surrounding environment.

The most important SCI is Siret Valey situated at 2 km distance form the landfill proposed site.

## **Water pollution sources**

### Construction period

During the construction period approximate 80 persons will work. The wastewater produced by the personnel will be 1.6 m<sup>3</sup>/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.

#### - Waste transfer points/station

- Rainwater from the concrete platforms (if they are not cleaned) and transport means (if they are not properly cleaned).

### ***2.2.1. 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.

An impact on surface water is not possible because the Siret River is located at approximate 8 km distance from the site.

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.

Closure of the old landfill situated near the proposed site will have a positive impact on the water quality.

#### Operation period:

##### - IWMC:

The potential impact on the water quality is very limited due to the wastewater treatment system and to the 8 km distance from the nearest surface water (Siret River).

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

##### - Waste transfer points/station

There are no waster sources near the sites proposed for the construction of the transfer station/points in the localities: Focsani, Adjud and Vidra.

#### ***2.2.2. 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 and transfer station/points;
- 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.

- Waste transfer points/station:

In order to avoid contact of rainwater with the concrete platforms and waste disposal containers, the transfer station/points will be covered with a roof.

The impact is considered as insignificant.

## **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.

##### - Waste transfer points/station:

The air pollution sources during the operation period of the transfer station/points are:

- Vehicles - emissions used at waste transport to the transfer station/points;
- Odors from the waste disposal containers placed in the transfer station/points.

### **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.

A positive influence is expected after the closure of existing non-compliant waste landfill, situated near the proposed site for IWMC construction.

During the operation period of the IWMC and transfer station/points the impact on air is considered insignificant.

#### **- Waste transfer points/station:**

The impact is considered insignificant having in view that the waste will be stored at the transfer station/points for maximum 24 hours.

### **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:

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

### 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.
- Temporary storage of waste in the transfer station/points for maximum 24 hours.

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 and transfer station/points, 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 and/or transfer to station/points, temporary storage in transfer station/points, 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 and at the transfer station/points 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 and transfer station/points, the impact on soil is considered insignificant.

#### Operation period

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

Impact can be considered as insignificant.

#### *Closure of the existing waste landfill in Haret*

Closure of the existing waste landfill will have a positive impact on soil.

## **2.5. Noise**

### ***2.5.1. Noise pollution sources***

#### Construction period

During the execution period of facilities in the IWMC and of transfer station/points, 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 and Transfer Station/Points 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 Transfer station/points and 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 and transfer station/points 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 at the proposed sites. The flora and fauna diversity is relatively poor. The closest area with interesting biodiversity is Siret Valley, located at 2 km distance (West) from the IWMC site.

The Siret Valley is a SPA (ROSPA0071) covered by Article 4 (4) of Birds Directive 79/409/EEC and Article 6 (3) of Habitats Directive 92/43/EEC and also representing a candidate site of riverine type for protection under Ramsar Convention. It is known that landfill's activities could attract gulls and crows and the landfill falls under 2 km of a SPA vulnerable to disturbance or predation by these pests. It is recommended that a screening for the appropriate assessment according to Article 6 (3) of Habitats Directive to be considering when performing the SEA for the Vrancea County waste Management Plan.

### ***2.6.1. Impact forecast***

#### Construction period

The impact on existing flora and fauna at Haret site is not significant during construction period, where are carried out earthworks for IWMC. Regarding the sites proposed for the construction of transfer station/points the impact on fauna and flora during construction period is considered insignificant.

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, which will load and unload the containers of waste in half an hour after each arrival.

The sites proposed for the construction of transfer station/points are characterized by poor fauna and flora.

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 and transfer station/points 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, transfer station/points and by waste transport vehicles traffic.

During the construction of the new IWMC and transfer station/points, 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 and/or transfer station/points.

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 and transfer station/points will temporary deteriorate some of the esthetic resources of the adjacent area.

However, the landscape of Haret is already affected by the existing uncontrolled waste landfill which will be close) after the first cell of the new ecological landfill is constructed. The closure of the existent non-compliant landfill will have a positive impact on landscape.

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, specially on transfer station/points sites;
- 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 and transfer station/points areas will be implemented after the closure of construction works. The slopes of the new ecological landfill in Haret 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) The concrete platform and containers used for the temporary waste storage in transfer station/points will be maintained in clean conditions. The operation of each transfer station/points will be supervised by a person.
- 7) During winter, special measures will be taken in order to maintain the access roads to the containers open.

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 in each transfer station/points or receiving platforms/containers 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 and transfer station/points. 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 Vrancea 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.
- 7) New jobs : using local work resources
- 8) Assurance of safe working conditions;
- 9) Daily inspection of the site;
- 10) Warnings about potential danger;
- 11) Elaboration of guidelines referring to human health protection and safety in operation;
- 12) specialized workers in digging and constructions;
- 13) The personnel will wear adequate protection equipment (gloves, protection shoes, helm, gas mask, etc);
- 14) Construction works will be stopped during snow periods, when the work area is covered with snow;
- 15) 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.

**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 and transfer station/points 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	•
Odors	
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 biological and mechanical treatment station.
- The operation and maintenance of the hygienic emplacement for waste disposal.

The main final results of the household waste are compost, 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 from Haret.

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

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 land filling 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 Vrancea.

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.