I

(Information)

COMMISSION

Publication of main points of decisions to grant financial assistance under Regulation (EC) No 1164/94 establishing a Cohesion Fund

(98/C 153/01)

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PROJECT No: 97/11/15/001

1. **Name:**
   Network of centres for marine traffic control and control of marine pollution.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestario Ministerio de Economía y Hacienda

   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Dirección General de la Marina Mercante

   3.2. **Address:** C/Ruíz Alarcón, 1 28071 Madrid

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Regions:** Andalusia, Cantabria, Galicia, Ceuta, Murcia, Basque Country and Canary Islands

5. **Description:**

   This group of projects is part of the Spanish system of marine traffic centres located along the Spanish coast which, together with those already financed by the Cohesion Fund in 1993 and 1995, complete the national plan for special services to save human lives at sea and for the control of marine pollution.

   The measures are located in Santander, Vigo, Huelva, Cadiz, Ceuta and Cartagena.

   **Santander**

   The following project is planned:

   Electronic equipment for the Local Rescue Coordination Centre of Santander.

   The Local Rescue Coordination Centre of Santander will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20—30 miles).

   **Vigo**

   The following project is planned:

   Electronic equipment for the Local Rescue Coordination Centre of Vigo.

   The Centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20—30 miles).

   **Detailed description of the equipment:**

   (a) **Centre:**
   - Control and presentation
   - VHF radiogoniometer
   - VHF communications for SMM and SMT
   - MW communications
   - Communications recorder
   - Weather station
   - Link with the remote station
   - Computer system
   - Auxiliary power supply systems

   (b) **Remote station at Loredo:**
   - X-band radar
   - Link with the centre
   - Burglar and fire alarm
   - Auxiliary power supply systems
   - VHF radiogoniometer
   - Partial VHF communications for SMM

   **Santander**

   **Vigo**
(b) Remote station at Muelle de Bouza:
- X-band radar
- Link with the centre
- Burglar and fire alarm
- Auxiliary power supply systems
- VHF radiogoniometer
- Partial VHF communications for SMM

Huelva

The following project is planned:
Electronics equipment for the Local Rescue Coordination Centre of Huelva.

The centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20—30 miles).

Detailed description of the equipment:
(a) Centre:
- Control and presentation
- VHF radiogoniometer
- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station
- Link with the remote station
- Computer system
- Auxiliary power supply systems

Cadiz

The following projects are planned:
1. Refurbishing of the building housing the harbourmaster’s office and the Local Rescue Coordination Centre (CLCSM) in Cadiz.
2. Electronics equipment for the Local Rescue Coordination Centre of Cadiz.

The Local Rescue Coordination Centre of Cadiz will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20—30 miles).

Detailed description of the equipment:
(a) Centre:
- Control and presentation
- VHF radiogoniometer
- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station
- Link with the remote station
- Computer system
- Auxiliary power supply systems

(b) Remote station at El Dique de San Felipe:
- X-band radar
- Link with the centre
- Burglar and fire alarm
- Auxiliary power supply systems
- VHF radiogoniometer
- Partial VHF communications for SMM

Ceuta

The Ceuta harbourmaster’s office is temporarily housed in 300 m² premises on the upper passageway of the Ceuta Marine Station belonging to the Ceuta Port Authority. The premises are located in the normal transit area for passengers embarking on vessels and the relocation of the harbourmaster’s office is therefore urgently required.

The following project is planned:
Construction of a building to house the harbourmaster’s office and the Local Rescue Coordination Centre (CLCSM) in Ceuta.

Cartagena

The following project is planned:
Electronics equipment for the Local Rescue Coordination Centre of Cartagena.

The Centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20—30 miles).

Detailed description of the equipment:
(a) Centre:
- Control and presentation
- VHF radiogoniometer
- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station
Together, the Marine Traffic Control Centres and the Local Rescue Coordination and Control of Marine Pollution Centres will:

- act as Marine Traffic Control Centres to supervise and control traffic passing through their assigned geographical area, using the necessary technical equipment to monitor such traffic and issue all forms of messages to shipping;

- act in their area of responsibility as Local Rescue Coordination Centres to direct operations and coordinate search and rescue facilities integrated into the national organisation;

- act as regional centres to coordinate the control of marine pollution, assuming responsibility for the full availability of the various surface or air units used to combat pollution in incidents arising.

The national plan for special services to save human lives at sea lays down specific tasks for the Network of Marine Traffic Control Centres:

- Surveillance and prevention of accidents at sea
- Surveillance and control of marine traffic
- Control and combating of pollution
- Control of marine activities and port emergencies
- Broadcast of warnings to shipping
- Provision of support and information to the maritime administration

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Main work</td>
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<tr>
<td>Operational phase</td>
<td>1.1.1999</td>
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8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis is not applicable because the Rescue Coordination and Pollution Control Centres are a public service the main aim of which is to save human lives and protect the environment.

The social benefits arising from this type of project are in any case justified considering that in previous years an annual average of 3 000 operations were carried out, including rescues,
marine safety activities, prevention and control of pollution, as well as other incidents, responding to requests for aid, alarm signals, etc.

SANTANDER: In 1995 a total of 1 371 ships put in at port. 4 702 000 tonnes of goods were handled. The fishing fleet is estimated at 72 vessels.

VIGO: A total of 1 813 ships put in at Vigo during 1995. 3 700 000 tonnes of goods were handled.

HUELVA: Huelva is among the ports with the largest number of ships loading/unloading and handling hazardous goods (9 346 000 tonnes of hazardous goods, 62 % of the total).

CÁDIZ: The port of Cádiz receives an annual average of 1 800 ships/year. 5 000 000 tonnes of goods were handled in 1995.

CEUTA: Traffic is intense in the port of Ceuta (9 000 ships in 1996).

CARTAGENA: The port of Cartagena received 1 015 merchant ships in 1995 (75 % of traffic involving hazardous goods). There was also considerable Spanish Navy activity, estimated at 2 500 ship movements a year.

9. Cost and assistance:

(i) Group of projects

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Expenditure prior to eligibility date</th>
<th>Eligible costs</th>
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<td>1 579 219</td>
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(ii) Breakdown by project

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<th>Rescue vessels</th>
<th>Pollution equipment</th>
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<td>1 501 159</td>
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(iii) Assistance:

Total cost: ECU 10 051 759
Eligible cost (after 17 June 1997): ECU 9 787 556
Rate of assistance: 85 %
Cohesion Fund grant: ECU 8 319 423

ANNEX

FINANCING PLAN

Project No: 97/11/15/001

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<th>Year</th>
<th>Total cost (1)</th>
<th>Total public expenditure</th>
<th>Cohesion Fund</th>
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<td>8 319 423</td>
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</table>

(1) Total eligible cost of project.
PROJECT No: 96/11/61/025-1

1. **Name:**
   
   Reconditioning and degassing of sanitary landfill containing municipal solid waste (MSW) at Logroño.

2. **Body responsible for the application:**
   
   2.1. **Name:** Dirección General de Planificación
   
   2.2. **Address:** Paseo de la Castellana, 162
                    28071 Madrid

3. **Body responsible for implementation:**
   
   3.1. **Name:** F.E.M.P.
   
   3.2. **Address:** C/ del Nuncio nº8

4. **Location:**
   
   4.1. **Member State:** Spain
   
   4.2. **Region:** Rioja

5. **Description:**
   
   The project consists in carrying out the works and installing the equipment required for the proper operation of the landfill and for extracting gasses therefrom. The works to be undertaken are as follows:

   General services (over an area of 3 000 m²), including:
   - automation and control of weighing of MSW;
   - construction of maintenance building, office and laboratory;
   - collection, sanitation and drainage facilities;
   - electrical installation;
   - paving and planning of access roads (1 200 m²).

   Landfill site proper:
   - waterproofing (25 000 m²);
   - drainage of runoff (1 100 m);
   - leachate collection (350 m);
   - conditioning of landfill area (70 000 m²).

   Leachate treatment site (5 000 m²):
   - conditioning process and paving (2 500 m²);
   - installation of treatment tanks (1 500 m²);
   - dosage of reagents;
   - building to house toilets (20 m²).

   Degassing of landfill:
   - infrastructure required for degassing process (covering 2 500 m in length);
   - automatic system for biogas extraction;
   - flare for burning biogas;
   - electrical generator;
   - transformer and power supply plant;
   - automatic instrumentation and regulation system for degassing process.

6. **Objectives:**
   
   The project aims to improve the environmental conditions under which the landfill operates, in particular by preventing water and soil contamination by leachates and air pollution due to the uncontrolled release of biogas.

   The works envisaged will permit the treatment of 40 000 tonnes of refuse per year and will benefit 150 000 inhabitants.

   The recovered biogas will also generate 3 920 000 kWh per year.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<td>Construction of works</td>
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8. **Assessment of costs and socio-economic advantages:**

   A cost-benefit analysis focusing on social aspects and covering a period of 15 years has been carried out, taking into account the following economic flows:

   - negative flows (economic costs), including initial investments and maintenance and operating costs;
   - positive flows (economic benefits), including reduced soil and water pollution as a result of landfill as also receipts generated by the sale of electrical energy produced from biogas.
The project’s internal rate of return is 8.63%.

With a discount rate of 8% (consumption rate of interest), the net updated value is 100 million pesetas.

9. **Environmental impact analysis:**

The project meets the objectives of Article 130R of the Treaty establishing the European Community with regard to preserving, protecting and improving the quality of the environment and protecting human health.

It fits in directly with Community policy on the environment given that it arises from the implementation of European Union directives on the environment, particularly Directive 75/442/EEC (as amended by Directive 91/156/EEC) on the management of urban solid waste and that it is consistent with the fifth programme (new strategy for the environment and for sustainable development) on matters concerning waste management, urban environmental pollution and shrinkage of natural resources.

Lastly, the strategy pursued in this series of projects meets the objectives laid down in the Community Regulation on the Cohesion Fund and the guidelines of the Green Paper on the urban environment.

10. **Cost and assistance:**

Total cost: ECU 1 563 537

Eligible cost (after 2 April 1996): ECU 1 563 537

Rate of assistance: 80%

Cohesion Fund grant: ECU 1 250 830

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**ANNEX**

**FINANCING PLAN**

Project No: 96/11/61/025-1

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost ((1))</th>
<th>Public expenditure</th>
<th>National authorities</th>
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<th>Community loans</th>
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\(1\) Total eligible cost of project.
PROJECT No: 96/11/61/025-2

1. **Name:**
   Selective pneumatic transport of municipal waste in Amézola (Bilbao)

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Planificación
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** F.E.M.P.
   3.2. **Address:** C/ del Nuncio, 8

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Basque Country

5. **Description:**
   The project deals with the installation of a pneumatic network for the transport of refuse in an area covered by the special renovation plan of Amézola.

   The conventional refuse collection system gives rise to environmental and health problems which are extremely difficult to deal with, and the pneumatic refuse transport system is a valid alternative which solves most of the problems inherent in the transport and storage of waste generated by large towns.

   Briefly, the system requires the installation of a network of pipes running underground on publicly-owned land. The pipes connect residential and other establishments to a collection station where the refuse is compacted and stored. The system is devised to permit the selective collection of the various constituents of waste so as to facilitate their recycling.

   The installation is equipped with an automatic control system which runs and monitors the operations required for the collection of municipal solid waste. Transport of waste is by compressed air, which is released into the atmosphere after appropriate treatment.

   The main system components are as follows:
   Collection station made up of the following units:
   — control chamber;
   — compaction area;
   — turbo-extractor chamber;
   — chamber for pneumatic separation of waste;
   — filtering chamber;
   — processing plant;
   — storage area;
   — toilets.

   The above units are fitted out with the following equipment:
   — 110 kW turboextractors;
   — waste pneumatic separators;
   — compactors;
   — air cleaners;
   — compressed air facilities;
   — control, valve, panel etc. devices.

   Steel carbon pipelines with a 500 mm diameter in different thicknesses, welded and with outer anti-corrosion protection, including elbow pipes, laterals and trenches; the total length of the network is 1 988 m.

   The project does not cover the pipelines within the plots which will be installed and connected to the general network by private promoters.

6. **Objectives:**
   The primary purpose of the project is the installation of an infrastructure for the collection and transport of municipal waste which improves management practices in terms of the environment. The aim is also to encourage selective collection, the sorting of waste at its source as well as optimisation of transport, valorisation and recycling.

   The infrastructure in question will serve 10 590 inhabitants and have a capacity to treat 4 000 tonnes of refuse per year.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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</thead>
<tbody>
<tr>
<td>Commissioning</td>
<td>1.1.1998</td>
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</table>

8. **Assessment of costs and socio-economic advantages:**
   A cost-benefit analysis focusing on social aspects and covering a period of 15 years has been carried out on the basis of the following economic flows:
— negative flows (economic costs), including initial investments and maintenance and operating costs;
— positive flows (economic benefits), including receipts generated by the sale of products and byproducts, savings on waste management costs through the provision of recycling options, savings in raw materials, natural resources and energy through recycling and private generation and lastly improved environmental conditions at the collection stage of urban solid waste.

The project’s internal rate of return is 14.97%.

With a discount rate of 8% (consumption rate of interest), the net updated value is 120 million pesetas.

A sensitivity analysis to assess the risks and uncertainties linked to the projects should running costs increase and receipts from the sale of products and byproducts fall shows that profitability would remain at an acceptable level (consumption rate of interest of 8%).

9. Environmental impact analysis:

The projects on the management of urban solid waste meet the objectives of Article 130R of the Treaty establishing the European Community in terms of preserving, protecting and improving the quality of the environment and protecting human health.

They are in line with Community policy on the environment given that they emanate from European Union environmental Directives, particularly Directive 75/442/EEC (as amended by Directive 91/156/EEC) on the management of municipal solid waste and that they comply with the guidelines on waste management, urban environmental pollution and depletion of natural resources laid down in the Fifth Programme (new strategy for the environment and for sustainable development). The projects will also contribute to the achievement of the objectives laid down in the Regulation establishing a Cohesion Fund and the Green Paper on the urban environment.

10. Cost and assistance:

Total cost: ECU 1 821 935
Eligible cost (after 2 April 1996): ECU 1 821 935
Rate of assistance: 80%
Cohesion Fund grant: ECU 1 457 548

ANNEX

FINANCING PLAN

Project No: 96/11/61/025-2

<table>
<thead>
<tr>
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(1) Total eligible cost of project.
1. **Name:**

   Integral waste-water disposal system in Madrid: work at Valdebebas, Rejas and Viveros de la Villa water treatment plants.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Planificación (MEH)

2.2. **Address:** Paseo de la Castellana, 162

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento de Madrid

3.2. **Address:** Barceló, 6

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Madrid

5. **Description:**

   Ten projects forming part of the series of measures contained in the Second Integral Waste-Water Treatment Plan for Madrid. Five relate to work in waste-water treatment plants, and five to work on the sewage network (collector sewers and improvements to overflows).

1. **Extension of the Valdebebas waste-water treatment plant**

   Extending the treatment capacity of the Valdebebas waste-water treatment plant to a total of 600 litres per second. This will involve extending all lines to enable them to treat an average flow of 200 l/s of waste water.

   It is planned to increase the treatment capacity of the waste-water treatment plant as follows:

   (a) **Water-treatment system**

      Pre-treatment
      - one solids-removal channel with coarse and fine automatic grids
      - one sand and grease removal facility

      Primary sedimentation
      - one rectangular primary sedimentation unit with movable bridge

   (b) **Biological treatment**

      - one aeration tank
      - one circular secondary sedimentation tank

   (c) **Sludge-treatment system**

      - one primary gravity thickener
      - one biological flotation thickener
      - one anaerobic digester
      - one belt filter for dewatering sludge
      - one hopper for the storage of dewatered sludge

   (d) **Gas system**

      - one floating cylindrical gas-holder
      - one high-pressure gas-storage tank
      - one electricity generation unit

2. **Extension of the Rejas waste-water treatment plant**

   The capacity of the water treatment system will be extended from its present level of 0,6 m³/s to 1,8 m³/s.

   The extension comprises the following operational facilities:

   - one solids-removal channel with coarse grid and self-cleaning screen
   - one aerated sand and grease removal channel
   - one primary sedimentation tank
   - one biological reactor
   - two secondary sedimentation tanks
   - three sludge recirculation units

3. **Improvement and extension of the Viveros de la Villa waste-water treatment plant**

   The purpose of the work is to adapt the station to an average treatment capacity of 2,2 m³/s.

   The project comprises the following measures:

   - extension of the aeration capacity of biological treatment:
     turbo pump air compressor in the building at present housing the blowers;
   - extension and improvement of the fine bubble aeration system in the flocculation tank;
   - extension of secondary sedimentation facilities: construction of a new secondary sedimentation tank of the same size as those already in service in the plant;
— emptying, uncoupling and demolishing the biogas storage cylinder:
    this equipment must be dismantled to leave room for the new sedimentation tank. It will be moved to a new site near the entrance to the plant;
— installation of a spiral heat exchanger;
— increasing sludge-screening capacity:
    installation of a rotating screen with a mesh size of 6 mm.

4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa water treatment plant

This project consists in a tertiary treatment system for waste water, with an average flow of 2.2 m³/s, to reduce nutrients (nitrogen and phosphorus) in effluent and to filter effluent through a granular medium so as to improve the quality of water leaving the plant.

This involves:

(a) 27 500 m³ reactor for anaerobic-anoxic biological treatment.
    Installation of a new reactor comprising 10 channels, the first three in the anaerobic zone and the other seven in the anoxic zone.
(b) Connection channels to bring water leaving the primary sedimentation tanks into the anaerobic and anoxic zones, and recirculation channels for water leaving the aerated tanks at the entrance to the anoxic zone.
(c) Extension of the aeration capacity of existing biological treatment tanks.
    Adequate and guaranteed nitrification in the present biological reactor can be assured only by changing and extending the air supply system, to double its capacity.
(d) Tertiary filtration through a granular medium to improve effluent quality.
    The filtration system plan provides for four filtration units.

5. Improvement of environmental conditions at the Viveros de la Villa waste-water treatment plant

This is the second phase of the project 'Extending the existing odour control system in the Viveros de la Villa waste-water treatment plant'. Cohesion Fund assistance was approved for the first phase in 1995.

The present phase involves covering engineering structures of the present biological treatment flocculation tank and installing extraction equipment for air treatment and the corresponding network of extraction pipes. The main components of the project are as follows:

— inflatable plastic covering for the engineering structures of the flocculation tanks;
— system of air compressors and input pipes for injecting air under pressure into the flexible supports of the covering (2 Ud);
— emergency controls for compressors, using diesel or biogas powered generators;
— network of air extraction pipes composed of galvanised steel tubes;
— air extraction and treatment facilities;
— construction of a building to house air extraction and treatment equipment for pressurised air inflation of the cover.

6. Somontes collector sewer

The collector sewer will be 1 900 m long, of which 1 800 m will be underground and the rest in a trench. The flow through this collector sewer will be about 30 m³/s. The overflow will be equipped with a movable grid to prevent rainborne pollution from entering the collector sewer and the Manzanares River.

7. Rosas collector sewer and ancillary work

The total length is 4 150 metres, underground; inclines vary from one segment to another, depending on the terrain, from 1.5% at the beginning to 0.5% at the end.

The planned flow is 12 m³/s.

The collector sewer will be linked to the Rejas water treatment plant.

8. Valdebebas collector sewer II and ancillary work

The collector will measure 4 100 m, and will be laid in a trench except for the last 700 m, placed on piers because of depressions in the landscape. Inclines will vary considerably as a function of the terrain, from approximately 1% at the beginning to 2% at the end.
The total planned flow is 72.1 m³/s.

The collector sewer will be linked to the Valdebebas water treatment plant.

9. Valdebebas-Rejas collector sewer

5,900 m collector sewer laid in a trench between the Valdebebas and Rejas water treatment plants.

This collector sewer runs from Valdebebas, in the headrace supplying the Valdebebas collector sewer.

As both plants are at approximately the same altitude, the water will be pumped.

10. Improvement of overflows in the waste-water disposal system

The project to improve overflows in the waste-water disposal system is defined on the basis of the present situation. Madrid’s network of drains consists entirely of combined sewers (carrying a mixture of waste water and rainwater); at certain points in the network, where there is a suitable intercepting channel, overflows or diversion canals have been built to channel some of the flow to that channel, with a view in particular to reducing the section of the collector sewer downstream.

The overall dilution in the overflows existing at present in the Madrid sewage network is about 5:1.

The purpose of this project is to increase the dissolution of discharges into intercepting channels of the Madrid sewage system, so as to achieve a dilution of 7:1.

6. Objectives:

Aims vary from project to project.

1. Extension of the Valdebebas waste-water treatment plant

To absorb the increased flow and pollution load due to an increase in the population in the catchment area of the plant.

Assuming that the sewage system must deal with 350 l/day per head of population, the plant will have to treat an extra 370 l/s, in addition to the present volume of 220 l/s, i.e. a total of 590 l/s. Consequently, treatment capacity must be increased to 600 l/s, which means extending existing facilities by capacity to treat an additional 200 l/s.

2. Extension of the Rejas waste-water treatment plant

The main aim is to adapt the capacity of the water-treatment plant to the present average flow of 1,215 m³/s, which is 8% more than the average flow of 1,125 m³/s that the plant was designed to cope with.

Consequently, to deal with the present excess flow and the increase expected in future (17%), it is planned to build a unit of 0.57 m³/s, the same as the two already installed.

3. Improvement and extension of the Viveros de la Villa waste-water treatment plant

— To increase the waste-water treatment capacity by 0.6 m³/s, bringing the average flow up to 2.2 m³/s.

— To increase the population served by the plant by the equivalent of 286,000, bringing it up to 1,000,000.

— To increase the flexibility of present treatment, to adapt it to wide variations in flow and pollution load.

4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa water treatment plant

— To improve the quality of the effluent from the Viveros de la Villa waste-water treatment plant, which forms an important part of the Manzanares river as it flows through the urban centre of Madrid, by means of tertiary filtration.

— To reduce nutrients (nitrogen and phosphorus) in the waste water treated.

5. Environmental improvements at the Viveros de la Villa waste-water treatment plant

— To improve the environment around the plants by reducing noise and odours.

— To achieve maximum efficiency from the existing odour-treatment equipment and installations.

6. Somontes collector sewer

— To reduce the load on the sewage system, protecting the Manzanares river from rainborne pollution.

— To prevent, by means of movable grids, the discharge of rainborne pollution into the river.
— A population of 60 791 will benefit from this measure.

7. Rosas collector sewer and ancillary work

The work will benefit 20 000 inhabitants. The quantity of waste water transported will be increased to 6 275 664 m$^3$ per year and the quantity of rainwater to 12 m$^3$/s.

8. Valdebebas collector sewer II and ancillary work

Transportation of 19 968 595 m$^3$ of waste water per year and of 72,1 m$^3$/s of rainwater. To serve 104 722 inhabitants.

9. Valdebebas-Rejas collector sewer

To link the Valdebebas and Rejas water treatment plants by a pressurised conduit with reversible pumping, so that, in case of operational problems in one of the plants, flows may be transferred to the other. The flow transfer capacity is 1,3 m$^3$/s.

10. Improvement of overflows in the sewage system

— To reduce the pollution load in the intercepting channels by increasing the dilution of discharges.
— To eliminate most of the rainborne pollution in the reduced flows, by installing movable grids. This work is to be carried out at eight points of discharge into public channels.

7. Work schedule:

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8. Assessment of costs and socio-economic advantages:

A cost-benefit analysis has been carried out for the group of project over a period of 25 years. The costs comprise the investments and the running and maintenance costs.

The projects will bring environmental and social benefits:

— Reduction of damage to public water resources: the benefit is calculated on the basis of an evaluation of the pollution load of discharges expressed in pollution units (PU). The price of 1 PU in 1996 is ESP 1 000 000 with a 3 % annual increase.

— Sewage tax: this covers the running and maintenance costs and 20 % of the initial investment in infrastructure.

— Reduction of odours: this is calculated on the basis of the usufruct price applied to dwellings.

As it is difficult to evaluate accurately the environmental benefits of Project 14: Somontes collector sewer, and Project 20: Improvement of overflows in the waste-water disposal system, no conventional cost-benefit analysis could be carried out. Instead, a concise description of present problems of rainborne pollution has been made, specifying how far the two projects contribute to solving them in the Madrid local authority area. The volume of investment for these two projects accounts for 4,6 % of total investment for the set of projects.

The internal rate of return of the group of projects varies between 7,7 % and 28 %.

9. Environmental impact analysis:

The projects to extend waste-water treatment plants to achieve the Community’s environmental objectives by increasing their treatment capacity up to the level needed to cope with the new needs arising from the urban development of Madrid.

The improvement and extension of the waste-water treatment plants will help achieve Community environmental objectives by improving the operation of those installations currently causing problems and increasing treatment capacity to meet forecast future demand, thus improving effluent quality.

The collector sewers will be an addition to the Madrid waste-water disposal system and will enable it to cope with future urban developments.

The group of projects fulfils, in particular, the provisions of Directive 91/271/EEC concerning urban waste-water treatment.

10. Cost and assistance:

Total cost: ECU 42 830 375

Eligible cost (after 2 April 1996): ECU 42 830 375

Rate of assistance: 80 %

Cohesion Fund grant: ECU 34 264 300

Breakdown of the aid:

1. Extension of the Valdebebas waste-water treatment plant 3 133 425
2. Extension of the Rejas waste-water treatment plant 5 518 894
6. Somontes collector sewer 2 562 261
3. Improvement and extension of the Viveros de la Villa waste-water treatment plant 2 981 539
7. Rosas collector sewer and ancillary work 3 163 293
4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa waste-water treatment plant 5 659 943
8. Valdebebas collector sewer II and ancillary work 6 177 339
5. Improving environmental conditions at the Viveros waste-water treatment plant 1 029 293
9. Valdebebas-Rejas collector sewer 2 908 452
10. Improvement of overflows in the sewage system 1 129 861
Total 34 264 300

ANNEX

FINANCING PLAN

Project No: 96/11/61/030-3

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(1) Total eligible cost of project.
PROJECT No: 96/11/61/040

1. **Name:**
   Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Duero.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria Ministerio de Economía y Hacienda
   2.2. **Address:** Pº de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Dirección General para la Conservación de la Naturaleza Ministerio del Medio Ambiente Subdirección General de Control de la Erosión y Desarrollo Forestal
   **Address:** Gran Vía de S. Francisco, 4 28005 Madrid
   3.2. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio Dirección General del Medio Natural Comunidad Autónoma de Castilla y Léon
   **Address:** C/Muro, 6 Valladolid 47004
   3.3. **Name:** Consejería de Agricultura, Ganadería y Montes Dirección General de Montes y Medio Ambiente Natural Comunidad Autónoma de Galicia
   **Address:** C/San Lázaro s/n 15703 Santiago de Compostela, La Coruña

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Regions:** Galicia and Castile-Leon

5. **Description:**
   The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Duero by damaging three extremely important natural resources: vegetation, soil and water.

   Specifically, the measures in this first category involve:
   - biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
     - afforestation with species suited to the environment,
     - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
     - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

   The second category of measures concerns the regeneration of woodlands damaged by fire. Specifically, the measures in this second category are biological measures designed to encourage natural regeneration and establish protective plant cover in areas devastated by fire: They comprise:
   - reafforestation and regeneration of fire-damaged areas;
   - forestry work in existing stands to prevent forest fires.

   It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. **Objectives:**
   The main objectives of the project are as follows:
   - to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;
— to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;

— to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;

— to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

— to halt and control erosion caused by both water and wind and to assist the biological recovery of damaged areas;

— to prevent and control fire and regenerate the areas destroyed by fire;

— to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;

— to regulate the water cycle: to protect and improve the quality of water resources, to minimise the danger and frequency of floods and protect hydraulic infrastructures;

— to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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8. **Assessment of costs and socio-economic advantages:**

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

— reduced risks of flooding;

— reduced loss of forest soil;

— less silting of dams;

— improved woodlands and less desertification;

— improved water quality;

— increased general welfare.

An economic analysis was carried out for the other operations planned in the Duero catchment area.

The analysis shows a cost/benefit ratio of 0.16, a net discounted value of ESP 1,809 billion applying a discount rate of 7%, and an internal rate of return of 9.28%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. **Environmental impact analysis:**

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a
basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. **Cost and assistance:**

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**ANNEX**

**FINANCING PLAN**

Project No: 96/11/61/040

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(1) Total eligible cost of project.
PROJECT No: 96/11/61/043

1. Name: Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the northern catchment area.

2. Body responsible for the application:

   2.1. Name: Dirección General de Análisis y Programación Presupuestaria (MEH)
   Address: Paseo de la Castellana, 162
             28071 Madrid

3. Body responsible for implementation:

   3.1. Name: Dirección General para la Conservación de la Naturaleza
             y Medio Ambiente Subdirección General de Control de la Erosión y Desarrollo Forestal (MMA)
   Address: Gran Vía de S. Francisco, 4
             28005 Madrid

   3.2. Name: Consejería de Agricultura, Ganadería y Montes
             Dirección Regional de Montes y Medio Ambiente Natural
             Comunidad Autónoma de Asturias
   Address: Calle Coronel Aranda s/n
             33071 Oviedo Asturias

   3.3. Name: Consejería del Medio Ambiente y Ordenación del Territorio
             Dirección General del Medio Natural
             Junta de Castilla y León
             Comunidad Autónoma de Castilla y León
   Address: C/Muro, 9
             47004 Valladolid

   3.4. Name: Departamento de Agricultura, Ganadería y Producción Rural
             Servicio de Montes
             Diputación Foral de Navarra
   Address: C. Tudela, 20
             31002 Pamplona (Navarre)

   3.5. Name: Consejería de Agricultura, Ganadería y Pesca
             Dirección General de Montes y Conservación de Naturaleza
             Comunidad Autónoma de Cantabria
   Address: Calle Gutierrez Solana s/n
             39071 Santander

   3.6. Name: Consejería de Agricultura,
             Ganadería y Montes
             Dirección General de Montes y Medio Ambiente Natural
             Comunidad Autónoma de Galicia
   Address: Calle San Lázaro s/n
             15771 Santiago de Compostela
             (La Coruña)

4. Location:

   4.1. Member State: Spain

   4.2. Regions: Asturias, Cantabria, Castile-Leon, Navarre and Galicia

5. Description:

   The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the northern catchment area by damaging three extremely important natural resources: vegetation, soil and water.

   Specifically, the measures in this first category involve:

   - biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
     - afforestation with species suited to the environment;
     - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
     - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

   The second category of measures concerns the regeneration of woodlands damaged by fire.

   It involves biological measures to encourage natural regeneration and create protective plant cover. It includes:
— reafforestation and assistance for the regeneration of fire-damaged areas;
— stepping up forestry work in existing stands to prevent forest fires.

A surveillance system will be set up to monitor the processes linked to erosion and hydrological developments.

6. **Objectives:**

**General aims:**

The general purpose of the projects is:

— to ensure continuity of basic natural processes and sustainable protection of the environment, in particular through conservation of water, soil and genetic resources;
— to achieve balance between the nutrition supply to soils and plants on the one hand, and their absorption capacity on the other, and to regenerate ecosystems damaged by forest fire;
— to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat;
— to ensure that forest areas can fulfil their functions.

More specifically, the objectives are:

— to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
— to attenuate the destructive effects of flooding on riverbanks;
— to encourage the deposit of much of the sediment generated by erosion;
— to prevent and control fire and regenerate the areas destroyed by fire;
— to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
— to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
— to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems;

**Secondary objectives:**

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are to be pursued through integrated operations for each basic geographical unit, defined as a catchment area, and for the country as a whole. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The profitability of hydrological and forest restoration must be sought in its long-term social benefits. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

Despite this, the following costs and benefits have been calculated using the reference values and shadow prices usually taken for this type of project.

The following benefits were considered:

— reduction in the risks of flooding;
— reduced loss of forest soil;
— less silting of dams;
— improved woodlands and less desertification;
— improved water quality;
— increased general welfare.

Measures and operations in the autonomous communities of Asturias, Castile-Leon, Cantabria, Galicia and Navarre were analysed together.
Setting these benefits against investment costs results in an internal rate of return of 10.33%, sufficient to ensure that the projects are viable in socio-economic and environmental terms.

The analyses were based on the assumption the effects would last 50 years.

All the returns and benefits are indirect, since there are no plans to exploit forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. Environmental impact analysis:

(a) All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

(b) Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

(c) In accordance with Article 3(5) of Regulation (EEC) No 2158/92 on protection of the Community’s forests against fire, the forestry measures provided for in this project will comply with the Spanish forest-fire protection plan approved by the Commission on 7 February 1994.

(d) Reafforested areas will be monitored for three years following planting, to determine whether any species have disappeared and how many seedlings have been lost. Replanting will be carried out accordingly.

10. Cost and assistance:

Total cost: ECU 12 914 283
Eligible cost (after 12 April 1996): ECU 12 914 283
Rate of assistance: 80%
Cohesion Fund grant: ECU 10 331 426

ANNEX

FINANCING PLAN

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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(1) Total eligible cost of project.
PROJECT No: 96/11/61/044

1. Name:
Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Ebro.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria, Ministerio de Economía y Hacienda
Address: Paseo de la Castellana, 162 28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General para la Conservación de la Naturaleza Ministerio del Medio Ambiente Subdirección General de Control de la Erosión y Desarrollo Forestal
Address: Gran Vía de S. Francisco, 4 28005 Madrid

3.2. Name: Consejería de Agricultura y Medio Ambiente Dirección General de Medio Ambiente Comunidad Autónoma de Aragón
Address: P. de María Agustín, 36 Edif. Pignatelli 50004 Zaragoza, Aragón

3.3. Name: Consejería del Medio Ambiente y Ordenación del Territorio Dirección General del Medio Natural Junta de Castilla y León (Comunidad Autónoma)
Address: C/Muro, 9 47004 Valladolid

3.4. Name: Departamento de Agricultura, Ganadería y Producción Rural Servicio de Montes Diputación Foral de Navarra
Address: C. Tudela, 20 31002 Pamplona, Navarra

3.5. Name: Consejería del Desarrollo Autonómico Administraciones Públicas y Medio Ambiente Secretaría General para el Medio Ambiente Comunidad Autónoma de la Rioja
Address: C. Portales, 71 26071 Logroño, La Rioja

3.6. Name: Departamento de Agricultura Ganadería y Pesca Subdirección General de Conservación de la Naturaleza Generalitat de Cataluña
Address: Gran Vía de las Corts Catalanas, 612-614 08007 Barcelona, Cataluña

3.7. Name: Consejería de Medio Ambiente Dirección General de recursos Forestales Generalitat de Cataluña
Address: Arquitecto Alfaro, 39 46011 Valencia

4. Location:

4.1. Member State: Spain


5. Description:

The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the Ebro catchment area by damaging three extremely important natural resources: vegetation, soil and water.

Specifically, the measures in the first category involve:

— biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:

— afforestation with species suited to the environment,

— forestry work to preserve and improve existing stands in order to maintain the
balance between soil protection and the progression of vegetation;

— improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

The second category of measures concerns the regeneration of woodlands damaged by fire.

It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:

— reforestation and assistance for the regeneration of fire-damaged areas;
— forestry work in existing stands to prevent forest fires;

It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. **Objectives:**

The main objectives of the project are as follows:

— to ensure continuity of basic natural processes and sustainable protection of the environment, in particular through conservation of water, soil and genetic resources;
— to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
— to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
— to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

— to halt and control erosion caused by wind and water, and restore the biological capacity of degraded areas;
— to prevent and control fire and regenerate the areas destroyed by fire;
— to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air
— to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
— to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

The secondary objectives are:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are to be pursued through integrated operations for each basic geographical unit, defined as a catchment area, and for the country as a whole. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The profitability of hydrological and forest restoration must be sought in its long-term social benefits. The intangible benefits of reforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and shadow prices normally established for projects of this type.

The following benefits were considered:

— reduction in the risks of flooding,
— reduced loss of forest soil,
— less silting of dams,
— improved woodlands and less desertification,
— improved water quality,
— increased general welfare.
A joint economic analysis was carried out for the operations planned in Aragon, Castile-Leon, Catalonia, Rioja, Navarre and Valencia.

Comparison of the benefits mentioned with investment costs results in an internal rate of return of 7.57%, proof that the projects are viable in socio-economic and environmental terms.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. **Environmental impact analysis:**

   (a) All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

   (b) Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

   (c) In accordance with Article 3(5) of Regulation (EEC) No 2158/92 on protection of the Community’s forests against fire, the forestry measures provided for in this project will comply with the Spanish forest-fire protection plan approved by the Commission on 7 February 1994.

   (d) Reafforested areas will be monitored for three years following planting, to determine whether any species have disappeared and how many seedlings have been lost. Replanting will be carried out accordingly.

10. **Cost and assistance:**

    Total cost: ECU 26 001 236

    Eligible cost (after 12 April 1996): ECU 26 001 236

    Rate of assistance: 85%

    Cohesion Fund grant: ECU 22 101 050

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**ANNEX**

**FINANCING PLAN**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(1)</th>
<th>Total public expenditure</th>
<th>Cohesion Fund</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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<tbody>
<tr>
<td></td>
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<td>% 5+4/2</td>
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(1) Total eligible cost of project.
PROJECT No: 96/11/61/047

1. **Name:**

Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the eastern Júcar.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

Ministerio de Economía y Hacienda

2.2. **Address:** Pº de la Castellana, 162

28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General para la Conservación de la Naturaleza

Ministerio del Medio Ambiente

Subdirección General de Control de la Erosión y Desarrollo Forestal

*Address:* Gran Vía de S. Francisco, 4

28005 Madrid

3.2. **Name:** Consejería de Agricultura y Medio Ambiente

Dirección General de Medio Ambiente

Comunidad Autónoma de Aragón

*Address:* P. de María Agustín, 36, Edif. Pignatelli

50004 Zaragoza, Aragón

3.3. **Name:** Consejería de Agricultura y Medio Ambiente

Dirección General del Medio Ambiente Natural

Junta de Castilla la Mancha

*Address:* C/Matías Moreno, 4

45002 Toledo

3.4. **Name:** Consejería de Medio Ambiente

Dirección General de recursos Forestales

Generalitat de Valencia

*Address:* Arquitecto Alfaro, 39

46011 Valencia

4. **Location:**

4.1. **Member State:** Spain

4.2. **Regions**

Autonomous communities of Aragon, Castile-La Mancha and Valencia

5. **Description:**

The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the eastern Júcar by damaging three extremely important natural resources: vegetation, soil and water.

Specifically, the measures in this first category involve:

- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
  - afforestation with species suited to the environment,
  - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
  - stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:

- reforestation and assistance for the regeneration of fire-damaged areas;
- forestry work in existing stands to prevent forest fires;

It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.
6. **Objectives:**

The main objectives of the project are as follows:

- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these projects are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

A joint economic analysis was carried out for the projects in the eastern Júcar.

It shows a cost-benefit ratio of 0.23, a present discounted value of ESP 2,377 billion with a discount rate of 7%, and an internal rate of return of 7.06%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.
9. **Environmental impact analysis:**

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. **Cost and assistance:**

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<td>Cohesion Fund grant:</td>
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**ANNEX**

**FINANCING PLAN**

Project No: 96/11/61/047

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<th>Total public expenditure</th>
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<td>2 240 944</td>
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</table>

(¹) Total eligible cost of project.
PROJECT No: 96/11/61/048

1. **Name:**
   
   Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Tagus.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria Ministerio de Economía y Hacienda

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General para la Conservación de la Naturaleza Ministerio del Medio Ambiente Subdirección General de Control de la Erosión y Desarrollo Forestal

3.2. **Name:** Consejería de Agricultura y Medio Ambiente Director General del Medio Ambiente Natural Junta de Castilla la Mancha

3.3. **Name:** Consejería de Agricultura y Comercio Dirección General de Estructuras Agrarias Comunidad Autónoma de Extremadura

3.4. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio Dirección General del Medio Natural

3.5. **Name:** Consejería de Cooperación Agencia del Medio Ambiente Comunidad Autónoma de Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Regions:** Madrid, Castile-La Mancha, Castile-León and Extremadura

5. **Description:**

The project consists of a number of measures carried out in woodlands.

The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Tagus by damaging three extremely important natural resources: vegetation, soil and water.

Specifically, the measures in this first category involve:

- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
  - afforestation with species suited to the environment,
  - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
- improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:

- reforestation and assistance for the regeneration of fire-damaged areas;
- forestry work in existing stands to prevent forest fires.

It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.
6. **Objectives:**

The main objectives of the project are as follows:

- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;

- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;

- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;

- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;

- to prevent and control fire and regenerate the areas destroyed by fire;

- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;

- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;

- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

A joint economic analysis was carried out for the projects in the Tagus catchment area.

It shows a cost-benefit ratio of 0,17, a present discounted value of ESP 2,945 billion with a discount rate of 7%, and an internal rate of return of 8,94%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.
9. **Environmental impact analysis:**

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. **Cost and assistance:**

| Total cost: | ECU 17 729 655 |
| Eligible cost (after 12 April 1996): | ECU 17 729 655 |
| Rate of assistance: | 85% |
| Cohesion Fund grant: | ECU 15 070 207 |

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**ANNEX**

**FINANCING PLAN**

<table>
<thead>
<tr>
<th>Year</th>
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<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
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(1) Total eligible cost of project.
PROJECT No: 96/11/61/049

1. **Name:**

Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Guadiana.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal

Address: Gran Vía de S. Francisco, 4
28005 Madrid

3.2. **Name:** Consejería de Medio Ambiente
Dirección General de Planificación y Participación
Comunidad Autónoma de Andalucía

Address: Avda. de Eritaña, 2
Seville

3.3. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General del Medio Ambiente Natural
Junta de Castilla la Mancha

Address: C/Pintor Matías Moreno, 4
45002 Toledo

3.4. **Name:** Consejería de Agricultura y Comercio
Dirección General de Estructuras Agrarias
Comunidad Autónoma de Extremadura

Address: C/Adriano, 4
Mérida
Badajoz

4. **Location:**

4.1. **Member State:** Spain

4.2. **Regions:** Andalusia, Extremadura and Castile-La Mancha

5. **Description:**

The project consists of a number of measures carried out in woodlands.

The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Guadiana by damaging three extremely important natural resources: vegetation, soil and water.

Specifically, the measures in this first category involve:

- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
  - afforestation with species suited to the environment,
  - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
  - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:

- reafforestation and assistance for the regeneration of fire-damaged areas;
- forestry work in existing stands to prevent forest fires;

It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.
6. **Objectives:**

The main objectives of the project are as follows:

— to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;

— to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;

— to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;

— to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

— to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;

— to prevent and control fire and regenerate the areas destroyed by fire;

— to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;

— to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;

— to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems;

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

— reduction in the risks of flooding;

— reduced loss of forest soil;

— less silting of dams;

— improved woodlands and less desertification;

— improved water quality;

— increased general welfare.

A joint economic analysis was carried out for the projects in the Guadiana catchment area.

It shows a cost-benefit ratio of 0,20, a present discounted value of ESP 1,555 billion with a discount rate of 7 %, and an internal rate of return of 7,59 %.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.
9. **Environmental impact analysis:**

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. **Cost and assistance:**

Total cost: ECU 10 794 657

Eligible cost (after 24 April 1996): ECU 10 794 657

Rate of assistance: 85%

Cohesion Fund grant: ECU 9 175 438

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**ANNEX**

**FINANCING PLAN**

Project No: 96/11/61/049

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost</th>
<th>Total public expenditure</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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</thead>
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<tr>
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<td>1=2+11</td>
<td>2=4+6+10</td>
<td>%</td>
<td>4 5=4+2</td>
<td>6=8+9</td>
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<td>1998</td>
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<td>9 175 438 85</td>
<td>1 619 199 15</td>
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</tbody>
</table>

(*) Total eligible cost of project.
PROJECT No: 97/11/61/001

1. **Name:**
   Treatment plant for incinerable hazardous waste (processing unit).

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Planificación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Generalitat de Catalunya Departament de Medi Ambient Junta de Residus Empresa pública Planta d’Incineració de Residus Especials, SA
   3.2. **Address:** Provença 204-208 08036 Barcelona

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Regions:** Catalonia; province; Tarragona; municipality: Constantí

5. **Description:**
   The project concerns an incineration plant for special waste situated in the industrial park of Constantí in the area of Camp de Tarragona.
   
   The plant has a nominal capacity of 36 800 t/year and was designed for a real treatment capacity of 30 000 tonnes per year in a multi-purpose rotary oven with a heat recovery system for electricity generation.
   
   The plant is located on land owned by the ‘Junta de Residus’ and consists chiefly of the installations for the actual incineration process. The land and certain of the buildings and installations (furnished offices and laboratories, fully equipped workshop, electricity substation with plant, fire protection system, roads and service areas; water collection systems) belonging to ‘Junta de Residus’ have been transferred under an agreement for use and occupation to the ‘Planta d’Incineració de Residus Especials S.A.’, the State-owned company responsible for construction of the plant and are not part of the subsidised project.

   The processing unit to be subsidised includes the following:
   
   - all the civil engineering works and structures, including cementing and buildings not belonging to the Junta de Residus, required for installation of the plant components, including the chimney;
   
   - systems and buildings for the reception and storage of solid and liquid waste, the crushing of drums and the systems and facilities for feeding combustible waste;
   
   - a system for the processing of gas, including:
     
     - electrostatic precipitator,
     
     - catalyser to reduce dioxins, furans and nitrogen oxide,
     
     - heat recovery and rapid gas cooling (quench) systems,
     
     - wet scrubber,
     
     - emission measuring systems;
   
   - a generation unit including the components of the water-steam cycle such as the boiler, steam turbine and colling tower. 5 MW electricity generator (6,5 MVA);
   
   - systems for waste-water treatment, evaporation and recovery of salts;
   
   - all the auxiliary systems and equipment needed to operate the plant: instruments, electrical systems, security systems, etc.

6. **Objectives:**
   
   **Primary aims:**
   
   (a) To improve the management of special waste generated in the area, which is currently transported to France, with the attendant risks and costs. The planned plant will be able to process 30 000 t/year which, according to the estimates of incinerable waste made for Catalonia’s special waste management programme, covers the treatment of 33% of incinerable waste produced in Catalonia according to the abovementioned plan. Forecasts for the production of incinerable hazardous waste for 1996 and 2000 are 60 000 t/year (33% reduction) and 45 000 t/year (50% reduction), respectively.

   (b) To reduce emissions into the atmosphere, since the technology used meets very stringent requirements with regard to emission limits.
Secondary aims include:

(a) Making optimal use of the energy contained in the waste. To achieve this a comparative study was made of the different technologies available for the incineration of special waste with energy recovery, capable of processing not only solid waste, but also liquids and gunk, i.e. a multi-purpose system. The most suitable technology actually generates more than twice the amount of electricity consumed by the plant.

(b) Minimising water consumption. Technically, this project uses a wet method for treating gases, which means it will produce waste water. However, it is planned to reuse all such water and to discharge none into the public sewage system. A water treatment system is planned to optimise water consumption and to recycle it through the process.

(c) Reducing the transport of hazardous incinerable waste, since there are no other such plants in the area.

(d) Providing a model showing how this type of clean technology can be used, with a view to the creation of similar plants elsewhere in Spain.

(e) Giving the plant an educational role, with permanent conference rooms, guided tours, exhibitions, etc.

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<tbody>
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<tr>
<td>Processing area</td>
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<td>11.11.1998</td>
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</table>

8. Assessment of costs and socio-economic advantages:

The cost benefit analysis runs from the date of the first investments until 2013 and assumes an active life of 15 years. The plant is expected to be fully operational at the beginning of 1999 and already able to process 30 000 tonnes per year.

The main costs taken into account were the investment costs, the running costs and the social costs linked to its environmental impact. The chief benefits taken into account were revenue from the rates charged, energy savings from the electricity generated, savings in resources which would have been required to transport waste to some more distant incinerator and the social benefits of terminating the environmental impact of the current waste management arrangements. On the basis of the estimates made, at a discount rate of 6%, the project has a present discounted value of PTA 12 309 million and an IRR of 18.33%, figures which are acceptable in socio-economic terms.

Existence of this infrastructure for the treatment of special waste will also have an economic spin-off for the region, improving its competitiveness, and establishing Tarragona’s image and reputation as a highly suitable place for chemical and petrochemical plants.

9. Environmental impact analysis:

The construction of this incinerator for hazardous waste in Catalonia has very clear aims. Firstly it complies with the objectives of the Fifth Community Programme and secondly it will blaze a trail for the safe elimination of hazardous waste throughout Spain, demonstrating the uses of clean technologies of this kind.

The project has therefore been designed to comply with the requirements of Directive 94/67/EC on the incineration of hazardous waste. Indeed, it goes further by including measures to reduce nitrogen oxides and a system for total recycling of the water used during the gas scrubbing process.

The technical design of the plant is based on the best available technology (BAT) not entailing excessive costs, as defined in Council Directive 84/360/EEC on the combating of air pollution.

In addition, the project meets the basic criteria of proximity and adequacy laid down in the Special Waste Management Programme for Catalonia. Being located in Constantí means that it is sufficiently isolated from other sites which emit pollution in the area, so that the plant’s own emissions can be monitored much more specifically and directly with a view to ensuring that the requirements are met.

An environmental impact assessment has been made in accordance with Directive 85/337/EEC, and the corresponding favourable declaration has been issued, which includes an environmental monitoring programme to be supervised by the environmental department of the regional government.
10. Cost and assistance:

Cost taken as basis for calculating aid (net revenue deducted): ECU 39 893 338

Rate of assistance: 80%

Total cost (processing unit): ECU 73 589 423

Eligible cost (after 24 March 1997): ECU 66 234 997

Cost taken as basis for calculating aid (net revenue deducted): ECU 39 893 338

Cohesion Fund grant: ECU 31 914 670

ANNEX

FINANCING PLAN

Project No: 97/11/61/001

<table>
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<th>Year</th>
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<td>31 914 670</td>
<td>80</td>
<td>7 978 668</td>
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(1) Total eligible cost of project.

PROJECT No: 97/11/61/002

1. Name: Treatment of urban waste water in the Ebro river basin (Navarre).

3. Body responsible for implementation:

3.1. Name: Gobierno de Navarra Dpto. de Administración Local (Nilsa)

2. Body responsible for the application:

3.2. Address: Blas de la Serra, 1 Edificio Fuente Príncipe II

2.1. Name: Dirección General de Análisis y Programación Presupuestaria

2.2. Address: Paseo de la Castellana, 162 28046 Madrid

4. Location:

4.1. Member State: Spain
4.2. **Region:** Navarre  
**Municipalities:** Tudela, Cárcar, Andosilla and San Adrián

5. **Description:**

A group of three projects: two for collector sewers and one for a waste-water treatment plant.

The first project concerns the collector sewer to collect waste water from the urban settlement of Tudela, which is currently being discharged directly into the Ebro river, and convey it to the location of the treatment plant to be constructed. The second project involves construction of the treatment plant itself. Treatment will comprise a two-stage percolating filter with primary, secondary and final sedimentation, complying with the treatment standards set out in Directive 91/271/EEC.

The third project concerns a collector sewer to collect waste water from Cárcar, Andosilla and San Adrián, which is currently discharged without any treatment, and convey it to the location of the treatment plant to be constructed. This treatment plant will comprise a two-stage percolating filter with the necessary primary, secondary and final settling basins, and is the subject of a separate project to be financed under the master sanitation plan for the rivers of Navarre.

5.1. **Tudela collector**

The project can be split into four different types of work in different terrains: work to be carried out under the cover of the Queiles river, connecting in Mediavilla, laying the pipeline to the waste-water treatment plant and constructing the pump station:

(a) Queiles collector sewer:
   - total length: 509 m
   - diameter: 268 m of 1 000 mm; 241 m of 600 mm
   - number of manholes: 21
   - the project includes a proportional part of the installation of service lines.

(b) Connecting in Mediavilla:
   - total length: 114 m
   - diameter: 500 mm
   - Vortex type spillway: 1 unit.

(c) Pipeline to the treatment plant:
   - total length: 1 936 m
   - diameter: 1 000 mm

(d) Pump station (civil works)

5.2. **Tudela waste-water treatment plant**

The project consists of seven specific units:

(a) Preliminary treatment and pumping of untreated sewage:
   - Screen for gross solids: 2 units

(b) Primary sedimentation:
   - Number of units: 2
   - Type: circular
   - Diameter: 25 m
   - Reduction of organic load: 25% of BOD₅

(c) Biological filters, Stage 1:
   - Number of units: 3
   - Type: circular
   - Diameter: 30 m
   - Reduction of organic load: 89% of BOD₅

(d) Secondary sedimentation:
   - Number of units: 2
   - Type: circular
   - Diameter: 25 m

(e) Biological treatment, Stage 2:
   - Number of units: 2
   - Type: circular
   - Diameter: 20 m
   - Reduction of organic load: 35% of BOD₅

(f) Final sedimentation:
   - Number of units: 2
   - Type: circular
   - Diameter: 25 m

(g) Sludge handling:
   - Thickeners: 2 units
   - Type: circular
   - Inner diameter: 8 m.

5.3. **Collector for Cárcar-Andosilla and San Adrián**

The project consists of the main collector sewer, secondary lines and a range of single elements, described below:
6. **Objectives:**

The measures included in this set of projects are part of the general strategy being followed to solve the problem of serious loss of river-water quality in the sanitation plan for the rivers of Navarre, approved by the regional government. This plan is coordinated with the national plan for the disposal and treatment of urban waste water and with Directive 91/271/EEC.

The measures in this project constitute the next step in improving the quality of the Ebro river in Navarre, following completion of the waste-water treatment projects for Pamplona. These measures will solve a serious environmental and public health problem, given that the inlet of the Canal Imperial, which carries water to supply the city of Zaragoza, is situated a few kilometres downstream from Tudela.

Specifically, the main technical parameters regarding the population served and the water quality to be obtained from the Tudela treatment plant are as follows:

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<td>Design population equivalent</td>
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<tr>
<td>Total average BOD₅ on entry (mg/l)</td>
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<tr>
<td>Total average BOD₅ on exit (mg/l)</td>
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<tr>
<td>Total average SS on entry (mg/l)</td>
<td>250</td>
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<tr>
<td>Total average SS on exit (mg/l)</td>
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<tr>
<td>Average daily volume of water (m³/day)</td>
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<tr>
<td>Industrial waste</td>
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7. **Work schedule:**

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<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<td>Commissioning</td>
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8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the following basis:

- utility value = 25 years
- net book value = 0
- discount = 6%

The following were put on the positive side of the equation:

- sanitation tax
- financial estimate of the environmental benefit of reducing the pollution load of discharge
- revenue from re-use of treated water

The following were put on the negative side:

- initial investment
- operating and maintenance costs
The results are:

IRR : 6.54 %

9. Environmental impact analysis:

1. The project will improve water quality by providing sewer systems and treatment facilities to municipalities which currently have none, thereby allowing water to be re-used for ecological purposes. The project will therefore contribute to achieving the objectives of Article 130R of the EC Treaty and the fifth Community programme of policy and action in relation to the environment and sustainable development.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream from Tudela which might even affect human health) and palliative (reducing the pollution load of discharge downstream of the treatment plant).

2. The planned sewers must be connected to a treatment plant before they are put into service.

3. Sludge from the planned treatment plant intended for use in agriculture must comply with Directive 86/278/EEC. Remaining sludge must be treated, depending on its composition, in accordance with the Community Directives on the treatment of waste.

10. Cost and assistance:

Total cost: ECU 9 612 496

Eligible cost (after 2 April 1996): ECU 9 612 496

Rate of assistance: 80%

Cohesion Fund grant: ECU 7 689 997

ANNEX

FINANCING PLAN

Project No: 97/11/61/002

<table>
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<th>Year</th>
<th>Total cost(1)</th>
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<td>1 922 499</td>
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1. **Name:**

Integral waste-water disposal and treatment in nature reserves and protected areas of the Autonomous Community of Extremadura.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria MEH

2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Medio Ambiente, Urbanismo y Turismo

3.2. **Address:** Santa Eulalia, 30

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Autonomous Community of Extremadura

5. **Description:**

This group of 17 projects involves the work necessary to provide waste-water treatment for towns in the catchment basins of the Monfragüe, Cornalvo, la Garganta de los Infiernos and los Barruecos Nature Reserves. The work involves construction of collector systems and waste-water treatment plants.

The proposed installations will include secondary treatment facilities to ensure that effluent meets the required standards.

5.1. **Monfragüe Nature Reserve**

The Reserve, with a total area of 17 852 ha, is bordered by the River Tagus and the River Tiétar. The following work is to be carried out in the towns lying in the catchment areas of the Reserve:

**Waste-water disposal and treatment in Malpartida de Plasencia**

Collectors:

— Collectors, 1 400 m long by 400 mm diameter and 900 m long by 300 mm diameter, for the collection of waste water from parts of the town not yet connected to the sewer system.

— Collector, 1 100 m long by 400 mm diameter, to connect the system to the waste-water treatment plant.

— Submerged pumps for raising water from one of the areas.

Waste-water treatment plant:

— Distributor at the junction of the old and new collectors to direct waste water to the treatment plant.

— General by-pass of the treatment plant.

— Initial solids removal using an automatic screen.

— Sand-trap/oil separator.

— Flow meter.

— Sedimentation tank/sludge digestor.

— Biological treatment using a bacteria bed.

— Secondary sedimentation using a scraper sedimentation tank, with collection of scum and other floating material.

— Disinfection of effluent before final discharge.

— Pumping of sludge to sedimentation tank/digestor.

— Dewatering of digested sludge using a belt filter press.

**Waste-water disposal and treatment in Toril and Villarreal de San Carlos**

Collectors:

— Collector, 1 500 m long by 300 mm diameter, to connect the existing sewer system to the treatment plant.

Waste-water treatment plants:

— General by-pass of the plant.


— Sand-trap/oil separator.

— Sedimentation tank/digestor.

— Biological treatment using a compact percolating filter.

— Secondary sedimentation.

— Disinfection of effluent before final discharge.

— Pumping of sludge to sedimentation tank/digestor.

— Dewatering of sludge in drying beds.
Waste-water disposal and treatment in Serrejón, Jaraicejo, Torrejón el Rubio, Casas de Millán y Mirabel

Collectors in Serrejón:
— Extension of the collector from discharge point 1 (north-west) with 800 m of 400 mm diameter piping.
— Extension of the collector from discharge point 2 (north-east) to the junction with discharge point 1 at the site of the new treatment plant with 1 500 m of 400 mm diameter piping.

Collectors in Jaraicejo:
— Extension of the collector from discharge point 1 to the junction with discharge point 2 with 600 m of 300 mm diameter piping.
— Extension of the pipe carrying the combined discharges to discharge point 3 at the site of the new treatment plant with 500 m of 400 mm diameter piping.

Collectors in Torrejón el Rubio:
— Renovation of the existing 600 mm diameter collector and correction of its alignment over 1 750 m.

Collectors in Casas de Millán:
— Connecting the two existing discharge points by means of a 400 m long 400 mm diameter collector.
— Extension of the collector carrying the combined discharges to the site of the new treatment plant with 400 m of 500 mm diameter piping.

Collectors in Mirabel:
— Renovation of the existing 500 mm diameter collector over 1 500 m.

Treatment plants:
— General by-pass of the treatment plant.
— Solids removal using an automatic screen and a manual screen in the by-pass.
— Sand-trap/oil separator.
— Biological treatment with nitrification/denitrification by prolonged aeration.
— Elimination of phosphorous by chemical precipitation.
— Secondary sedimentation.
— Disinfection of effluent before final discharge.
— Recirculation of sludge by pumping.
— Pumping out of sludge.
— Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in Casas de Miravete

Collectors:
— Extension of the collector from discharge point 1 with 150 m of 300 mm diameter piping.
— Extension of the collector from discharge point 2 to the junction with the extension of the collector from discharge point 1 at the site of the new treatment plant with 250 m of 300 mm diameter piping.

Waste-water treatment plant:
— Solids removal using an automatic screen and a manual screen in the by-pass.
— Sand-trap/oil separator.
— Biological treatment.
— Secondary sedimentation.
— Disinfection of effluent before final discharge.
— Recirculation of sludge by pumping.
— Pumping out of sludge.
— Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in Serradilla

Collectors:
— Extension of the collector from discharge point 1 to the collector to discharge point 2 with 750 m of 400 mm diameter piping.
— Extension of the collector carrying the combined discharge to discharge point 3 and piping to the site of new treatment plant.

Waste-water treatment plant:
— Distributor at the junction of the old and new collectors to transport waste water to the treatment plant.
— General by-pass of the treatment plant.
— Initial solids removal using an automatic screen.
— Sand-trap.
— Flow meter.
— Sedimentation tank/sludge digestor.
— Biological treatment using a bacteria bed.
— Secondary sedimentation using a sedimentation tank with a scraper to remove scum and floating solids.
— Disinfection of effluent before final discharge.
— Pumping of sludge to sedimentation tank/digestor.
— Dewatering of digested sludge using a belt filter press.

5.2. Cornalvo Nature Reserve

The Reserve has an approximate area of 10 740 hectares. The following work is to be carried out in the towns lying in the catchment areas of the Reserve:

**Waste-water disposal and treatment in Mirandilla**

Collectors:
— Construction of a spillway and laying 1 500 m of 400 mm diameter collector.

Waste-water treatment plant:
— General by-pass of the treatment plant.
— Initial solids removal using an automatic screen.
— Sand-trap/oil separator.
— Flow meter.
— Sedimentation tank/sludge digestor.
— Biological treatment using a bacteria bed.
— Secondary sedimentation using a sedimentation tank with a scraper to collect scum and other floating material.
— Disinfection of effluent before final discharge.
— Pumping of sludge to sedimentation tank/digestor.
— Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in San Pedro de Mérida, Trujillanos and Torrefresneda

Collectors:
— Laying 1 300 m of 400 mm diameter collector.

Waste-water treatment plant:
— General by-pass of the treatment plant.
— Solids removal using an automatic screen and a manual screen in the by-pass.
— Sand-trap/oil separator.
— Biological treatment with nitrification/denitrification by prolonged aeration.
— Elimination of phosphorous by chemical precipitation.
— Secondary sedimentation.
— Disinfection of effluent before final discharge.
— Recirculation of sludge by pumping.
— Pumping out of sludge.
— Dewatering of digested sludge in drying beds.

5.3. La Garganta de los Infiernos Nature Reserve

The Reserve lies in the comarca of Valle de Jerte on the border between the Communities of Extremadura and Castile-Leon. The following work is to be carried out in the towns lying in the catchment area of the Reserve:

**Waste-water disposal and treatment in Jerte**

Collectors:
— Laying 1 600 m of 400 mm diameter collector to transport part of the waste water to the new treatment plant.
Waste-water treatment plant:
- General by-pass of the treatment plant.
- Initial solids removal using automatic screens.
- Sand-trap/oil separator.
- Flow meter.
- Sedimentation tank/sludge digestor.
- Biological treatment using a bacteria bed.
- Secondary sedimentation using a sedimentation tank with a scraper to collect scum and other floating material.
- Disinfection of effluent before final discharge.
- Pumping of sludge to sedimentation tank/digestor.
- Dewatering of digested sludge in drying beds.

5.4. Los Barruecos Nature Reserve

Lying to the south of the town of Malpartida de Cáceres, the Reserve is a site of geological, geomorphological, faunistic and cultural importance.

The following work is to be carried out in the town located in the catchment area of the Reserve:

Waste-water disposal and treatment in Malpartida de Cáceres

Collectors:
- Laying of four sections of 500 mm diameter collector to transport waste water from the town to the new treatment plant.

Waste-water treatment plant:
- Inlet structure with spillway.
- Initial solids removal using a screen.
- Pumps to lift waste water.
- Solids removal.
- Sand-trap/oil separator.
- Sedimentation tank/sludge digestor.
- Biological treatment using activated sludge.
- Secondary sedimentation.
- Recirculation of biological sludge.
- Pumping of excess sludge to the sedimentation tank/digestor.
- Dewatering of sludge using a belt filter press.

6. Objectives:

The principal objective is to provide the towns neighbouring the Montfrague, Cornalvo, la Garganta de los Infiernos and los Barruecos Nature Reserves with collector systems and waste-water treatment plants in order to prevent the discharge of untreated waste from damaging water quality in the watercourses which form the basis of the ecosystems of the Reserves.

The objective can be quantified in terms of the populations of the towns discharging waste water into the watercourses flowing through the Reserves.

<table>
<thead>
<tr>
<th>Nature reserve</th>
<th>Population equivalent</th>
<th>Flow (m³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monfragüe</td>
<td>13 100</td>
<td>3 275</td>
</tr>
<tr>
<td>Cornalvo</td>
<td>5 010</td>
<td>1 253</td>
</tr>
<tr>
<td>La Garganta de los Infiernos</td>
<td>2 060</td>
<td>514</td>
</tr>
<tr>
<td>Los Barruecos</td>
<td>5 660</td>
<td>1 416</td>
</tr>
</tbody>
</table>

The technical details of the group of projects are as follows:

<table>
<thead>
<tr>
<th>Entry Exit</th>
<th>BOD (in mg/l)</th>
<th>SS (in mg/l)</th>
<th>Dry matter (sludge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry</td>
<td>Between 116</td>
<td>Between 126</td>
<td>20 %</td>
</tr>
<tr>
<td></td>
<td>and 350</td>
<td>and 378</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>25</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>January 1997</td>
<td>May 1997</td>
</tr>
<tr>
<td>Purchase of land</td>
<td>May 1997</td>
<td></td>
</tr>
<tr>
<td>Main work</td>
<td>April 1997</td>
<td>December 1998</td>
</tr>
</tbody>
</table>

8. Assessment of costs and socio-economic advantages:

The economic analysis was based on a period of 20 years, considered as the working life of the treatment plants.

It was based on the following parameters:
- cost of the project: initial investment and operating and maintenance costs,
- benefits:
  - revenue generated by a municipal tax, equal to the operating and maintenance costs,
— exploitation of the environmental benefits deriving from improved water quality,
— environmental benefits linked to the increase in the number of visitors to the area, based on estimated expenditure per visitor.

The results were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Internal rate of return (%)</th>
<th>Cost-benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monfragüe</td>
<td>7,3</td>
<td>0,58</td>
</tr>
<tr>
<td>Cornalvo</td>
<td>7,1</td>
<td>0,59</td>
</tr>
<tr>
<td>Garganta de los Infiernos</td>
<td>9,3</td>
<td>0,52</td>
</tr>
<tr>
<td>Los Barruecos</td>
<td>7,0</td>
<td>0,62</td>
</tr>
</tbody>
</table>

9. **Environmental impact analysis:**

This project will provide adequate waste-water treatment for number of towns which currently lack it, reducing the pollution discharged into the rivers in the area and considerably improving water quality.

10. **Cost and assistance:**

Total cost: ECU 11 247 558

Eligible cost (after 23 April 1997): ECU 11 247 558

Rate of assistance: 80%  

Cohesion Fund grant: ECU 8 998 046

Breakdown of costs by Reserve:

- Monfragüe: ECU 6 140 100
- Cornalvo: ECU 2 665 840
- La Garganta de los Infiernos: ECU 853 276
- Los Barruecos: ECU 1 588 342

Total: ECU 11 247 558

---

**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/004

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) Total public expenditure</td>
<td>Cohesion Fund</td>
<td>National authorities</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>3=2/1</td>
<td>4=5/4</td>
</tr>
<tr>
<td>1997</td>
<td>5 322 920</td>
<td>5 322 920</td>
<td>100</td>
<td>4 258 336</td>
</tr>
<tr>
<td>1998</td>
<td>5 924 638</td>
<td>5 924 638</td>
<td>100</td>
<td>4 739 710</td>
</tr>
<tr>
<td>Total</td>
<td>11 247 558</td>
<td>11 247 558</td>
<td>100</td>
<td>8 998 046</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/005

1. **Name:**
   Plants for composting sludge from waste-water treatment plant in the Autonomous Community of Extremadura.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General Análisis y Programación Presupuestaria MEH
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Consejería de Medio Ambiente, Urbanismo y Turismo
   3.2. **Address:** Santa Eulalia, 30

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Autonomous Community of Extremadura

5. **Description:**
   The project involves the construction of two composting plants, one in Montijo, Badajoz Province, and one in Monroy, Cáceres Province, to treat sludge from urban waste-water treatment plants to permit its use in agriculture.

The system selected for both plants is composting in closed tunnels, since this requires only very compact plants, with totally closed treatment areas, which blend into the landscape without any visual impact and without causing odour problems.

The Monroy composting plant will have a capacity of 22 220 tonnes of sludge per year from the Cáceres, Plasencia, Navalmorral de la Mata, Coria and Trujillo waste-water treatment plants.

The Montijo composting plant will have a capacity of 46 300 tonnes of sludge per year from the Badajoz, Almendralejo, Don Benito-Villanueva de la Serena, Mérida, Montijo and Villafranca de los Barros waste-water treatment plants.

The plant buildings will have a main bay of 2 500 m² and will contain all the equipment required for the plants' operation.

6. **Objectives:**
   The plants will treat sludge from waste-water treatment plants to permit its use in agriculture, since there is a shortage of organic material in Extremadura for intensively farmed land.

   The detailed objectives of the projects are as follows:

   **Montijo composting plant**

<table>
<thead>
<tr>
<th>Waste-water treatment plant</th>
<th>Population concerned (Population equivalent)</th>
<th>Sludge production (tonnes/year)</th>
<th>Compost production (tonnes/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badajoz</td>
<td>210 000</td>
<td>20 965</td>
<td>5 240</td>
</tr>
<tr>
<td>Almendralejo</td>
<td>49 700</td>
<td>4 240</td>
<td>1 060</td>
</tr>
<tr>
<td>Don Benito-Villanueva</td>
<td>72 240</td>
<td>7 215</td>
<td>1 800</td>
</tr>
<tr>
<td>Mérida</td>
<td>85 000</td>
<td>7 250</td>
<td>1 820</td>
</tr>
<tr>
<td>Montijo</td>
<td>32 500</td>
<td>2 930</td>
<td>730</td>
</tr>
<tr>
<td>Villafranca de los Barros</td>
<td>41 000</td>
<td>3 700</td>
<td>925</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>490 440</td>
<td>46 300</td>
<td>11 575</td>
</tr>
</tbody>
</table>
Monroy composting plant

<table>
<thead>
<tr>
<th>Waste-water treatment plant</th>
<th>Population concerned (Population equivalent)</th>
<th>Sludge production (tonnes/year)</th>
<th>Compost production (tonnes/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasencia</td>
<td>58 500</td>
<td>4 991</td>
<td>1 250</td>
</tr>
<tr>
<td>Cáceres</td>
<td>120 000</td>
<td>11 980</td>
<td>3 000</td>
</tr>
<tr>
<td>Navalnoral de la Mata</td>
<td>24 960</td>
<td>2 250</td>
<td>560</td>
</tr>
<tr>
<td>Trujillo</td>
<td>12 600</td>
<td>1 259</td>
<td>310</td>
</tr>
<tr>
<td>Coria</td>
<td>19 300</td>
<td>1 740</td>
<td>435</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>235 360</strong></td>
<td><strong>22 220</strong></td>
<td><strong>5 555</strong></td>
</tr>
</tbody>
</table>

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.1.1997</td>
<td>1.4.1997</td>
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<tr>
<td>Purchase of land</td>
<td></td>
<td>1.4.1997</td>
</tr>
<tr>
<td>Main work</td>
<td>1.5.1997</td>
<td>1.11.1998</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis was based on a period of 20 years, considered to be the working life of the plants.

It was based on the following parameters:

— cost of the project: initial investment and operating and maintenance costs,

— benefits, including the direct benefits from the sale of compost and the indirect benefits from the reduction in social costs (reduction of water, soil and atmospheric pollution).

To these must be added to socio-economic benefits deriving from the increase in the productive capacity of agricultural land resulting from the application of the compost produced.

The internal rate of return for the Montijo plant is 15,6 % and for the Monroy plant 8,1 %.

9. **Environmental impact analysis:**

The projects will help reduce disposal by controlled tipping of sludge produced during the treatment of waste water and permit its use in agriculture under satisfactory conditions following stabilisation.

The project is a preventive measure since its aim is to ensure the satisfactory management and use in agriculture of sludge and prevent actions harmful to the environment.

Treatment of the sludge will meet the requirements of Directive 86/278/EEC on the use of sewage sludge in agriculture.

10. **Cost and assistance:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost</td>
<td>ECU 11 595 590</td>
</tr>
<tr>
<td>Eligible cost (after 23 April 1997):</td>
<td>ECU 11 595 590</td>
</tr>
<tr>
<td>Rate of assistance:</td>
<td>80%</td>
</tr>
<tr>
<td>Cohesion Fund grant:</td>
<td>ECU 9 276 472</td>
</tr>
<tr>
<td>Breakdown of costs:</td>
<td></td>
</tr>
<tr>
<td>1. Montijo plant</td>
<td>ECU 6 797 053</td>
</tr>
<tr>
<td>2. Monroy plant</td>
<td>ECU 4 798 537</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>ECU 11 595 590</td>
</tr>
</tbody>
</table>
FINANCING PLAN

**Project No: 97/11/61/005**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>3=2/1</td>
<td>4</td>
</tr>
<tr>
<td>1997</td>
<td>3 506 062</td>
<td>3 506 062</td>
<td>100</td>
<td>2 804 850</td>
</tr>
<tr>
<td>1998</td>
<td>8 089 528</td>
<td>8 089 528</td>
<td>100</td>
<td>6 471 622</td>
</tr>
<tr>
<td>Total</td>
<td>11 595 590</td>
<td>11 595 590</td>
<td>100</td>
<td>9 276 472</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.

**PROJECT No: 97/11/61/006**

1. **Name:**

Plan for the environmental reclamation of the stretch of the river Ebro running through Logroño.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento de Logroño

3.2. **Address:** Avda. de la paz, 11
26071 Logroño

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Rioja

5. **Description:**

The project consists of a number of measures to reclaim the banks of the river Ebro for use as a leisure and amenity area for the town of Logroño.

These measures form part of an environmental reclamation plan for the Ebro area, costing more than ESP 10 000 million. This application is for aid of almost ESP 382 million to improve sewerage and water-treatment facilities, develop the green spaces along the river banks, construct a footpath along the left (northern) bank, develop the Parque del Ebro on the right bank, improve the footbridge over the river and restore the original appearance and route of the river by dismantling the walls of several disused swimming pools obstructing the river bed and a redundant weir.

Most of the measures concern the left bank where, in addition to the reclamation of the green areas, effluent will no longer discharged directly into the river but will be diverted into a new sewer and pumped across one of the existing bridges to the main sewer on the right bank.

Also on the left bank, it is planned to construct a new footpath to connect two areas formerly very close to the river (La Playa and the Pozo de Cubillas). Along this footpath a permanent cultural centre for environmental observation and experimentation, the Casa de las Ciencias y el Medio Natural, will shortly be created.
On the right bank, measures include the surfacing of several footpaths in the Parque del Ebro.

A redundant weir will be demolished and the walls of disused swimming pools in the river bed dismantled. As a result of this, the northern bank will have to be reinforced and permanent boundaries established for the southern bank to protect the woods from flooding.

As the parks on the two banks are linked by an existing footbridge, the project includes entries for maintenance work and development (repair of a damaged support column, treatment of joints and supports, resurfacing, etc.).

It is also planned to lay piping along one bridge to supply drinking water to the urban areas on the northern bank and the newly-created green spaces.

The measures as a whole comprise the following:

- collector sewer: 1,535 m
- footpaths: 1,800 m
- developed green areas: 73,500 m²

6. Objectives:

The main objective is to restore as a leisure and amenity area for the town a number of sites close to the river and footpaths that are currently in a serious state of disrepair.

At the same time, the environmental state of the river is to be upgraded by discontinuing the direct discharge of effluent into the river from urban areas on the left bank and conveying it to the treatment plant now under construction.

The quantified objectives are:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>126,000</td>
<td>Inhabitants affected</td>
</tr>
<tr>
<td>350,000 m³</td>
<td>Water currently treated</td>
</tr>
<tr>
<td>900,000 m³</td>
<td>Water to be treated</td>
</tr>
<tr>
<td>73,500 m²</td>
<td>Green areas restored</td>
</tr>
</tbody>
</table>

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.11.1996</td>
<td>31.7.1997</td>
</tr>
<tr>
<td>Main work</td>
<td>1.2.1998</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. Assessment of costs and socio-economic advantages:

(a) A cost-benefit analysis has been carried out on the following basis:
- investments for a working life of 25 years,
- operating and maintenance costs at ESP 11 million/year, i.e. 2.83% of the initial investment,
- assessment of the environmental benefits: improved water quality, public health, river bed,
- evaluation of public interest: restoration of recreational areas.

(b) The internal rate of return (IRR) is 15%.

The net present value of all the projects included in the application is ESP 382 million (1997).

(c) Creation of jobs:
- during implementation: direct: 20; indirect: 40 (21 months),
- during operation: direct: 4; indirect: 1.

9. Environmental impact analysis:

(a) The projects are consistent with the following objectives, set out in Article 130R of the EC Treaty:
- preserving, protecting and upgrading the quality of the environment,
- contribution to the protection of public health,
- ensuring the rational use of natural resources.

(b) The projects as a whole are in keeping with the following objectives of the Fifth Community action programme:
- the sustainable management of natural resources through the reduction of water pollution,
- proper management of water resources,
- enhancing the quality of urban environment,
- improving public health and safety.

(c) The project concerns the piping and collection of urban waste water as provided for in Directive 91/271/EEC on the treatment
of urban waste water and the Spanish laws incorporating the Directive into national law. The proposed measure is for the environmental rehabilitation of a seriously run-down section of the river bank, the construction of a footpath and the discontinuance of the direct discharge of effluent into the river in order to reduce pollution levels and improve water quality significantly.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount (in ECU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost</td>
<td>2 292 234</td>
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<tr>
<td>Eligible cost (after 24 April 1997)</td>
<td>2 292 234</td>
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<tr>
<td>Rate of assistance</td>
<td>80%</td>
</tr>
<tr>
<td>Cohesion Fund grant</td>
<td>1 833 787</td>
</tr>
</tbody>
</table>

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**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/006

<table>
<thead>
<tr>
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<th>Community loans</th>
</tr>
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<td></td>
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<tr>
<td>Total</td>
<td>2 292 234</td>
<td>2 292 234</td>
<td>1 833 787</td>
<td>458 447</td>
</tr>
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</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/007

1. **Name:**

   Improvement of the drainage system of the Vitoria-Gasteiz solid municipal waste tip and regulation of river flows.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General Análisis y Programación Presupuestaria

   2.2. **Address:** Paseo de la Castellana, 162

   28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Ayuntamiento de Vitoria Gasteiz

   3.2. **Address:** C/Dato, 11

   Vitoria

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Basque Country

5. **Description:**

   The project is to be implemented under the Vitoria-Gasteiz Sewage System Hydrological Control and Environmental Improvement Plan, drawn up in order to solve the problems currently affecting the city’s waste-water collection and treatment system. The principal aim is to prevent, as far as possible, massive flows of water from rivers and streams into the collector.

   The Plan consists of the ‘Project to divert the flow of the Rivers Santo Tomás and Errekaleor’, which received aid from the Cohesion Fund in 1996, and the ‘Project for the improvement of the drainage system of the Vitoria-Gasteiz solid municipal waste tip and regulation of river flows into the sewage system’ now being presented. The principal aim of this second project is to solve the problems caused by the waters of the Rivers Zapardiel, Batán, Ali and Esquivel entering the city’s sewage system and to improve the drainage system of the Vitoria-Gasteiz waste tip located in the basin of the River Zapardiel.

   The solution chosen consists in digging a large collector canal 9 422 m long running approximately southeast-northwest from the upper end of the solid urban waste tip to collect flows from the Rivers Zapardiel, Batán, Ali and Esquivel and carry them to the River Zadorra downstream from the Asteguieta bridge. The construction of two small detention reservoirs on route will permit the regulation of floods and thus permit the reduction of the size of the channel along subsequent sections. These will be provided by two earth dams (total volume 235 000 m³). The work will be completed with a series of landscaping and environmental measures over an area of 150 000 m² to create a green corridor linking the Montes de Vitoria and the banks of the River Zadorra.

   The technical details of the planned works are as follows:

   1. **River Zapardiel diversion channel** (1st section)

   The waters of the River Zapardiel are to be diverted from the upper end of the tip by means of an earth dam. A channel will be dug around the tip (width at the base of 1,5 m, height 1,2 m and 45° walls).

   2. **Gardélegui detention reservoir**

   It is planned to construct a 22 m high earth dam with a 125 m long crest. The reservoir will have a capacity of 500 000 m³.

   3. **River Zapardiel diversion channel** (2nd section)

   A channel will be dug from the Gardélegui reservoir (width at the base of 0,8 m, height 1 m and 45° walls).

   4. **River Batán diversion channel**

   This channel will have two standard sections: an open section and a reinforced concrete underground section.

   5. **Berrosteguieta detention reservoir**

   A 20 m high rubble dam with 34/1 V sides. The outflow system will consist of a lateral flow spillway and an undersluice (600 m diameter pipe).

   6. **River Ali diversion channel**

   Water released from the Berrosteguieta reservoir will be carried to the River Esquivel by a 1 050 m long channel.
7. **River Esquível diversion channel**

The channel will carry water from the River Esquível and the Berrosteguita reservoir to the Torroguico Stream. The channel will be 25 m wide and have a total length of 800 m.

8. **Channelling of the Torroguico Stream**

This is to cope with flows from the River Esquível. The section will increased over 2 300 m, maintaining the longitudinal profile and one of the banks.

9. **Torroguico Stream diversion channel**

This will be a 300 m long underground channel in reinforced concrete with internal dimensions of 4.20 m wide and 2.5 m high.

10. **Environmental works (see above)**

6. **Objectives:**

The project has the following objectives:

- To minimise the volume of water from the Rivers Zapardiel, Batán, Ali and Esquível basins currently entering the sewage system.

- To regulate the resulting flows so as to minimise surges along the new channels and reduce the peak flow into the River Zadorra.

- To permit the expansion of the existing Vitoria-Gasteiz solid urban waste tip and prevent runoff from its catchment area entering the leachate-collection system.

- To create a green corridor along the southwestern boundary of the city, connecting the Zabalgana and Armentia periurban parks with the Montes de Vitoria and the banks of the Zadorra.

The diversion of the Rivers Zapardiel, Batán, Ali and Esquível will immediately reduce the volume of water being treated by the waste-water treatment plant, thus increasing its efficiency and reducing the uncontrolled discharge of waste water into the River Zadorra caused by overloading of the sewage system. This will considerably reduce the risk of flooding in the city.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

(a) A cost/benefit analysis was carried out on the basis of the following assumptions:

- working life of investments: 25 years,

- operating and maintenance costs: 6%,

- environmental improvements: improved urban environment, reduced risk of flooding, reduced risk of pollution by leachates, reduced levels of pollution in the River Zadorra.

(b) Number of inhabitants benefiting: 209 704.

(c) Internal rate of return (IRR): 25%; net present value (NPV): ESP 2 291 019 million at a discount rate of 6%; cost/benefit ratio: 2.83.

9. **Environmental impact analysis:**

(a) General assessment:

- The project is covered by Article 130R of the Treaty establishing the European Community.

- The project addresses the issues and goals set out in the Fifth Community Programme of Policy and Action in relation to the Environment and Sustainable Development, which states 'For the purposes of improving the quality of life and as a condition for achieving sustainable development, it is essential to secure sufficient water of adequate quality throughout the Community without upsetting the natural equilibrium of the environment'.

The project fulfils the following aims laid down in the Programme:

- integrated pollution control and prevention of discharges,

- improved urban environment,

- improved public health and safety.

- The project aims to solve the problems of the control and collection of urban waste water in accordance with the guidelines laid down in Directive 91/271/EEC
concerning urban waste-water treatment. It complies with the objectives and lines of action laid down in the recently adopted National Waste Water Disposal and Treatment Plan (Resolution of 28 April 1995, BOE 113 of 12 May 1995), which is, in turn, based on criteria laid down in Directive 91/271/EEC.

(b) Specific assessment:

— The purpose of the project is solve the problem of flooding by regulating the Rivers Zadorra and Batán by means of detention reservoirs.

— Improvements to the drainage system at the Vitoria-Gasteiz solid urban waste tip are intended to prevent surface runoff from the upper Zapardiel basin crossing the tipping area, thus preventing the overload of the leachate collector and the possible pollution of the subterranean aquifer.

— Landscaping of an area of 150 000 m² to create a green corridor linking the Montes de Vitoria and the banks of the Zadorra.

10. Cost and assistance:

Total cost: ECU 4 326 230

Eligible cost (after 24 April 1997): ECU 4 326 230

Rate of assistance: 80%

Cohesion Fund grant: ECU 3 460 984

ANNEX

FINANCING PLAN

Project No: 97/11/61/007

<table>
<thead>
<tr>
<th>Year</th>
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</tr>
<tr>
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</tr>
<tr>
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<td>4 326 230</td>
<td>100</td>
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</table>

(1) Total eligible cost of project.
1. **Name:**

Phase II of the integral waste-water disposal and treatment system for the Bay of Santander: pumping station and underwater outfall.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162

28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Medio Ambiente y Ordenación del Territorio del Gobierno de Cantabria

3.2. **Address:** Pº de Pereda, 16

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Cantabria

4.3. **Municipalities:** Astillero, Camargo and Santander

5. **Description:**

The integral waste-water disposal and treatment system for the Bay of Santander will consist of the following:

— effluent treatment and disposal in the southern section of the city of Santander and the Camargo-Astillero area and the pumping of waste water to the main pumping station;

— the pumping of all waste water in the southern section of the city of Santander and the Camargo-Astillero and Santa Cruz de Bezana areas and from the existing El Sardinero pumping station, currently conveyed to the San Román waste-water treatment plant;

— the laying of an underwater outfall for disposal at sea of the treated waste water.

The work is being undertaken in several phases:

Phase I: collection of effluent from the Camargo-Astillero area and the southern part of Santander,

Phase II: main pumping station and underwater outfall,

Phase III: waste-water disposal and treatment plant for Santa Cruz de Bezana.

The work schedule for Phase II is as follows:

1. Main pumping station: waste water collected from the Camargo and Astillero areas and the southern part of Santander will be pumped to the northern part of the city for treatment through three conduits 1 000 mm in diameter and 1 336 m long.

2. Conveyance from the main pumping station: force and gravity mains from Cazoña to the San Román waste-water treatment plant. The construction of the first section will entail creating a tunnel 3,20 m in diameter and 878 m long; the second section will consist of piping 1,5 m in diameter and 1 286 m long buried in a trench; the last section will consist of a double conduit 1 200 mm in diameter.

3. Underwater outfall: an underground section 500 m long and a 2 200 m underwater section fitted with three diffusers 250 m, 150 m and 200 m long respectively.

The first phase consists simply of collecting effluent at the place where the pumping station is to be constructed in the second phase. The second phase is therefore of critical importance to the project, since without it totally untreated waste water would be discharged at sea in one continuous flow, worsening the situation by raising the concentration of polluting load. In the second phase, the waste water will be pumped to the future treatment plant in the northern part of Santander.

6. **Objectives:**

The integral waste-water disposal and treatment system for the Bay of Santander is in line with the Spanish Government’s national plan for waste-water treatment (1995—2000), which is aimed principally at:

— expanding waste-water collection and treatment facilities in compliance with Directive 91/271/EEC;

— reducing pollution levels in order to meet bathing water quality standards.

The project aims to provide the area in question with water treatment facilities that will help reduce waste water discharges which are contaminating the bay and, secondly, to bring the polluting load of the remaining discharge within the maximum levels set by law.

The package of measures comprising Phases I, II and III will benefit a fixed future population of 216 611 representing a population equivalent of some 359 513.
7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioning</td>
<td>1.1.2000</td>
<td></td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the following basis:
- useful life of the waste-water treatment plant: 20 years
- net book value: 0
- discount rate: 6%.

The following were put on the positive side of the equation:
- water charges
- financial estimate of the environmental benefit of reducing the pollution in the discharged water

The following were put on the negative side:
- the initial investment
- operating and maintenance costs.

The results are:
- an IRR of 59.4%.

However, other benefits which are difficult to quantify were not taken into account, such as an increase in the local population’s welfare and standard of living by improving health and environmental conditions and the development of rural tourism and fisheries, which are important in the region.

9. **Environmental impact analysis:**

The project is intended to improve water quality by providing sewers and water treatment facilities in municipalities which currently have none. The project is coherent, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community action programme on the environment and sustainable development. The project complies also with the obligations set out in Directive 91/271/EEC, and the measures provided for in it are both preventive (avoiding the possibility of environmental problems in the bay which might even affect human health) and palliative (reducing the contaminant loads of waste-water to be discharged from the outfall once the treatment plant has been built).

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th>Total cost (€)</th>
<th>ECU 28 537 098</th>
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<tr>
<td>Eligible cost (after 29 April 1997):</td>
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<td>Rate of assistance:</td>
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<td>Cohesion Fund grant:</td>
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**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/012

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<td>22 829 678</td>
<td>80</td>
<td>5 707 420</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/013

1. Name: Waste-water disposal for Bajo Nalón, Asturias.

2. Body responsible for the application:
   2.1. Name: Dirección General de Análisis y Programación Presupuestaria
   2.2. Address: Paseo de la Castellana, 162
                  28071 Madrid

3. Body responsible for implementation:
   3.1. Name: Consejería de Fomento del Principado de Asturias
   3.2. Address: C/Coronel Aranda 2
                  33005 Oviedo

4. Location:
   4.1. Member State: Spain
   4.2. Region: Asturias

5. Description:
   This operation comprises several projects (collector sewer systems for Muros de Nalón, Pravia and Soto del Barco; collector and interceptor sewer to serve all these urban centres and a waste-water treatment plant) to improve water quality at the mouth River Nalón.

5.1. Muros de Nalón system

New sewers to supplement the existing ones for the urban areas of Muros de Nalón and San Esteban de Pravia.

The project involves providing:
- 30 332 m of pipeline ranging in diameter from 150 mm to 1 000 mm,
- 608 manholes,
- four spillways,
- three lifting stations with a total of seven pumps (two of 41 kW, three of 75 kW and two of 9.4 kW).

5.2. Pravia system

New sewers to supplement the existing ones for the urban areas of Agones, Cañedo, Forcinas and Forcinas de Arriba, Peñaullán, Bances, Los Cabos, Somado and Valle de Arango, all of which belong to the municipality of Pravia.

The project involves providing:
- 32 332 m of pipeline ranging in diameter from 150 mm to 1 000 mm,
- 843 manholes,
- two spillways,
- one lifting station with three 30 kW pumps.

5.3. Soto del Barco system

New sewers for San Juan de la Arena, El Castillo, Soto del Barco and Riberas in the municipality of Soto del Barco.

The project involves providing:
- 38 095 m of pipeline ranging in diameter from 80 mm to 1 000 mm,
- 802 manholes,
- five spillways,
- three lifting stations with a total of three 17.5 kW and five 12.5 kW pumps.

5.4. Bajo Nalón interceptor sewer

Construction of a main interceptor sewer with three branches, two on the left bank of the River Nalón and one on the right bank, to collect waste water from the sewer systems serving Cañedo, Forcinas, Agones, Bances, Peñaullán, Los Cabos, Somado, Muros de Nalón, San Esteban de Pravia, San Juan de la Arena, El Castillo, Soto del Barco and Riberas.

The main characteristics are as follows:
- 22 703 m of pipeline ranging in diameter from 100 mm to 1 200 mm,
- 61 manholes,
- five lifting stations with a total of 26 pumps of between 4.2 kW and 130 kW,
- 94 piping clamps.

Bajo Nalón waste-water treatment plant

Construction of a waste-water treatment plant to treat urban waste water from the Pravia, Muros de Nalón and Soto del Barco municipalities. The plant is intended to serve a population of 20 800
inhabitants equivalent, based on urban planning data, with an average daily through-flow of 6 500 m³.

The main features of the plant are as follows:

— Inflow unit:
  installation of a spillway and later two pits for primary screening of coarse solids through grilles with 100 mm openings.

— Screening channels:
  two screens for coarse and fine solids with openings of 30 mm and 40 mm respectively.

— Lifting system:
  untreated water will be raised using Archimedes' screws.

— Raised storage tank:
  the lifting system will discharge into a storage tank fitted with a spillway.

— Grit removal and separation of floating solids:
  installation of two longitudinal aerated desanders, with grease removal.

— Grit removal:
  abrasion-resistant pumps are planned.

— Biological treatment:
  two lines for treatment by prolonged aeration with carrousel-type water flow.

— Sludge dewatering:
  to be carried out mechanically.

— Sludge dewatering by belt filter presses:
— chemical stabilisation of dewatered sludge.

6. Objectives:

The planned measures comply with the Law of the Principality of the Asturias on the supply of water and waste-water treatment, which comes under the national plan for waste-water treatment. The main aim is to extend sewerage and waste-water treatment facilities to comply with the guidelines set by Directive 91/271/EEC.

The aim is to improve water quality in the final 14 km of the River Nalón and complete the sewerage and waste-water treatment facilities available upstream in this catchment area under the programme for the development of central Asturias.

The main parameters regarding the population served and the water quality to be obtained are as follows:

<table>
<thead>
<tr>
<th>Bajo Nalón waste-water treatment plant:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project No: 97/11/61/013</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Present population (inhabitants)</td>
</tr>
<tr>
<td>Present population equivalent (p.e.)</td>
</tr>
<tr>
<td>Design population</td>
</tr>
<tr>
<td>Design population equivalent (p.e.)</td>
</tr>
<tr>
<td>Total average BOD₅ on entry (mg/l)</td>
</tr>
<tr>
<td>Total average BOD₅ on exit (mg/l)</td>
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<tr>
<td>Total average SS on entry (mg/l)</td>
</tr>
<tr>
<td>Total average SS on exit (mg/l)</td>
</tr>
<tr>
<td>Average daily volume (m³/day)</td>
</tr>
<tr>
<td>Industrial waste</td>
</tr>
</tbody>
</table>

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
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<tbody>
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<td>Preparation of project</td>
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<td>Purchase of land</td>
<td>1.5.1997</td>
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<td>1.4.2000</td>
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</table>

8. Assessment of costs and socio-economic advantages:

A cost-benefit analysis has been carried out on the following basis:
— utility value of the infrastructure = 25 years,
— net book value = 0,
— discount rate = 6 %.

The following were put on the positive side of the equation:
— sanitation tax,
— financial estimate of the environmental benefit of reducing the pollution load of discharge,
— benefits from recreational use,
— improved public health,
— revenue from re-use of treated water.
The following were put on the negative side:

— initial investment,

— operating and maintenance costs.

The results are:

— IRR: 15.25%,

— PDV: ESP 7 410 million.

A sensitivity analysis was made, varying the parameters used to calculate those benefits which are more subjective to quantify (recreational use, public health). This analysis results in an IRR above 3% even in the worst case (benefits reduced by 75%).

2. The planned sewers must be connected to a treatment plant before they are put into service.

9. **Environmental impact analysis:**

1. The project will improve water quality by providing sewer systems and treatment facilities to municipalities which currently have none, thereby allowing water to be re-used for ecological purposes. The project will therefore contribute to achieving the objectives of Article 130R of the EC Treaty and the Fifth Community programme of policy and action in relation to the environment and sustainable development.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream of the cities concerned, which might even affect human health) and palliative (reducing the pollution load of discharge downstream of the treatment plant concerned).

10. **Cost and assistance:**

| Total cost: | ECU 34 845 299 |
| Eligible cost (after 29 April 1997): | ECU 34 845 299 |
| Rate of assistance: | 80% |
| Cohesion Fund grant: | ECU 27 876 239 |

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**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/013

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
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<td>34 845 299</td>
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<td>27 876 239</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/014

1. **Name:**

Biological treatment of effluent from 30 urban areas in the following river basins: Besós (4), Ebro (2), Francolí (1), Garona (4), Llobregat (6), Riera de la Bishal (1), Rieres del Maresme (3), Rieres Meridionals (2), Segre (3), Ter (3) and Tordera (1).

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
                   28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Junta de Sanejament
   3.2. **Address:** Dirección Provença 204-208
                   08036 Barcelona

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Catalonia

5. **Description:**

Various waste-water disposal systems consisting of treatment plants and collector networks.

The water-treatment systems of the plants will conform to the following standard model: removal of coarse solids, removal of fine solids, desanding/degreasing, flow measurement, mixing and flocculation, primary sedimentation, biological reaction, secondary sedimentation, recirculation of sludge and chlorination.

The sludge-treatment systems of the plants will conform to the following standard model: primary-sludge extraction, primary-sludge thickening, mixing, digestion, storage of digested sludge, dewatering and storage of dewatered sludge.

In detail:

1. **Caldes de Montbui**

Extension of the existing treatment plant:

(i) water treatment: bypass of the biological treatment unit, biological reactor, secondary sedimentation, recirculation of sludge;
(ii) sludge treatment: thickening of activated sludge, conditioning, dewatering in a belt filter press, storage and disposal of sludge.

2. **La Llagosta**

Extension of the existing treatment plant:

(i) water treatment: biological reactors, clarification, disinfection;
(ii) sludge treatment: thickening of activated sludge by flotation, mixed-sludge reservoir, anaerobic digestors, storage of mixed digested sludge, dewatering, storage and disposal of sludge.

3. **Montornés del Vallès**

Extension of the existing treatment plant. Construction of:

(i) secondary treatment unit: pre-aeration tank, three biological reactors, three secondary sedimentation basins;
(ii) sludge treatment: thickening by flotation, anaerobic digestion, dewatering in centrifuges, storage of digested sludge.

4. **Sabadell — Riu Ripoll**

Construction of a waste-water treatment plant on the standard model.

5. **Flix**

Construction of a waste-water treatment plant on the standard model.

Laying collectors:

<table>
<thead>
<tr>
<th>Collectors</th>
<th>Diameter (mm)</th>
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<th>Material</th>
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<tr>
<td>Main</td>
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<td>17</td>
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<td>Main</td>
<td>400</td>
<td>711</td>
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<tr>
<td>Main</td>
<td>250</td>
<td>911</td>
<td>polyethylene</td>
</tr>
<tr>
<td>Main</td>
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<tr>
<td>Main</td>
<td>315</td>
<td>832</td>
<td>polyethylene</td>
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</table>
6. Móra la Nova — Móra d’Ebre

Construction of a waste-water treatment plant on the standard model.

Laying collectors:

<table>
<thead>
<tr>
<th>Collectors</th>
<th>Diameter (mm)</th>
<th>Length (m)</th>
<th>Material</th>
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<tr>
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7. Valls

Construction of a waste-water treatment plant on the standard model, with phosphate removal.

8. Bossost


<table>
<thead>
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9. Escunhau

Construction of a waste-water treatment plant on the standard model, with percolating filters.

Collectors:

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<td>PVC</td>
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<td>776</td>
<td>PVC</td>
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10. Les


Collectors:

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</table>

11. Vielha e Mijaran


Collectors:

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<td>300</td>
<td>373</td>
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<tr>
<td>400</td>
<td>1 266</td>
</tr>
<tr>
<td>600-800</td>
<td>3 350</td>
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</table>

12. Castellbell i el Vilar

Drafting the specifications and project for the waste-water treatment plant.

13. Gelida

14. Els Hostalets de Pierola

Construction of a waste-water treatment plant on the standard model.

15. Moià


Collectors:

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Length (m)</th>
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<tbody>
<tr>
<td>200</td>
<td>499</td>
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<tr>
<td>400</td>
<td>2 788</td>
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<tr>
<td>500</td>
<td>1 548</td>
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16. El Pont de Vilomara

Construction of a waste-water treatment plant on the standard model.

Collectors:

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<th>Diameter (mm)</th>
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</thead>
<tbody>
<tr>
<td>—</td>
<td>862</td>
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<tr>
<td>160</td>
<td>127</td>
</tr>
<tr>
<td>400</td>
<td>360</td>
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</table>

17. Terrassa

Extension of the existing treatment plant:

(i) water treatment: biological treatment using activated sludge, secondary sedimentation and chlorination;

(ii) sludge treatment: thickening of excess activated sludge, storage of mixed sludge, anaerobic digestion, mechanical dewatering.

18. El Vendrell

Construction of a waste-water treatment plant on the standard model.

Three pumping stations.

Collectors:

<table>
<thead>
<tr>
<th>Description</th>
<th>Diameter (mm)</th>
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</thead>
<tbody>
<tr>
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<tr>
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<td>400-600</td>
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19. Arenys de Mar

Construction of a waste-water treatment plant on the standard model.

Alterations to a pumping station.

Collectors:

<table>
<thead>
<tr>
<th>Description</th>
<th>Diameter (mm)</th>
<th>Length (m)</th>
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<tr>
<td>Pressure</td>
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</table>

20. Sant Andreu de Llavaneres

Construction of a waste-water treatment plant on the standard model.

21. Sant Pol de Mar

Construction of a waste-water treatment plant on the standard model.

Alterations to the existing pumping unit on the marine outfall. Pressure pipes, 250—350 mm in diameter, 1 650 m long.

22. Alcanar (les Cases)

Construction of a waste-water treatment plant on the standard model. Removal of phosphates and disinfection of effluent before discharge into the sea.

Pressure piping: 250, 280 and 315 mm diameter, 2 203 m long.

Collectors: 400 and 500 mm diameter, 1 125 m long.

Four pumping stations.
23. **L’Ametlla de Mar**

Construction of a waste-water treatment plant on the standard model.

Asbestos-cement pressure piping, 300 mm diameter, 1 300 m long.

Asbestos-cement piping from the treatment plant to the marine outfall, 250 mm diameter, 1 065 m long.

24. **La Masella**


25. **La Molina**


26. **Supermolina**


27. **Les Planes d’Hostoles**


28. **Riudellots de la Selva**

Construction of a waste-water treatment plant on the standard model.

29. **Vilobi d’Onyar**

Construction of a waste-water treatment plant on the standard model.

30. **Santa Maria de Palautordera**


Collectors: 125—600 mm diameter, 3 990 m long.

6. **Objectives:**

Various waste-water treatment systems.

<table>
<thead>
<tr>
<th>System</th>
<th>Current population</th>
<th>Design</th>
<th>Influent (mg/l)</th>
<th>Effluent (mg/l)</th>
<th>Influent (SS mg/l)</th>
<th>Effluent (SS mg/l)</th>
<th>Volume water (m³/d)</th>
<th>% Industrial</th>
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<td>318</td>
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<td>Influent (1) (SS mg/l)</td>
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</table>

(1) BOD and SS values for influent are estimated on the basis of efficiency and values for effluent.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

(a) A cost/benefit analysis was carried out on the following assumptions:

- working life of investments: 20 years
- operating and maintenance costs

- environmental benefits: preservation, protection and improvement of the coastal environment, preservation of the quality of non-polluted waters, reduction of water pollution and decontamination of polluted waters.

(b) Jobs created during the:

- construction stage: (21 months): direct: 980 jobs; indirect: 1 770 jobs
- operating stage: direct: 100 jobs; indirect: 50 jobs

(c) The internal rate of return is 14.13%, the net present value (at 7%) ESP 12 368,72 million and the cost/benefit ratio 1.2.
9. **Environmental impact analysis:**

The project aims to fulfil, inter alia, the following objectives laid down in Article 130R(1) of the EC Treaty:

— the preservation, protection and improvement of the environment,

— the protection of public health.

The project addresses the following issues covered by the Fifth Community Programme of Policy and Action in relation to the Environment and Sustainable Development:

— management of water resources,

— coastal areas.

The project will preserve, protect and improve the environment of coastal areas subject to heavy pressure from mass tourism and property development. The use of water for bathing means that appropriate hygiene standards must be maintained.

10. **Cost and assistance:**

Total cost: ECU 83 589 903

Eligible cost (after 30 April 1997): ECU 83 589 903

Rate of assistance: 80%

Cohesion Fund grant: ECU 66 871 922

**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/014

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
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<tr>
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<td>Total public expenditure</td>
<td>Cohesion Fund</td>
<td>National authorities</td>
<td>Other</td>
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<td>29 680 256</td>
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<td>23 744 204</td>
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<td>83 589 903</td>
<td>83 589 903</td>
<td>100</td>
<td>66 871 922</td>
</tr>
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</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/015

1. **Name:**
   Integral management of solid municipal waste in the Community of Madrid.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Consejería de Medio Ambiente y Desarrollo Regional (GEDESMA)
   3.2. **Address:** C/Princesa nº 3 28008 Madrid

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Madrid

5. **Description:**
   The group of projects is to be implemented under the 1997—99 Solid Municipal Waste Management Plan for the Madrid region and consists of four principal projects:

5.1. **Sorting at source and selective collection**
   (a) The purchase and supply to residents’ associations and local authorities of the following equipment:
   - containers for glass (1 050 units),
   - container for sacks for packaging (21 000 units),
   - sacks for packaging (678 million sacks) and dustbins (1 000 units),
   - containers for hazardous waste:
     - for pharmaceutical products: 3 200 units,
     - for batteries: 1 200 units,
   - vehicles to deal with the extra work involved in collection with sorting at source (10 units) comprising the following:
     - tractor unit,
     - semi-trailer,
     - container loading equipment.
   Hazardous waste will be sent as soon as possible for suitable treatment.

   (b) An information campaign aimed at the general public and at gaining support for the Regional Management Plan among those responsible for its application at municipal level.

   The campaign will use the following means and materials: leaflets, posters, articles in newspapers and in local and national magazines, radio announcements, television programmes, television advertisements, videos, educational material, stickers, placards, badges, ballons, letters.

   Courses and activities relating to the sorting at source, selective collection and recycling of waste will also be organised for the Community of Madrid, the municipalities, teachers and the general public through social organisations.

5.2. **Sorting plants**
   It is planned to establish sorting plants in the municipalities of Pinto, Nueva Rendija and Colmenar Viejo to carry out through sorting of waste to facilitate greater reuse, using automatic sorting where possible.

   The plants will separate the following types of waste for sale on the recycling market:
   - ferrous metals,
   - non-ferrous metals,
   - aluminium,
   - plastics,
   - tetrapacks,
   - glass,
   - paper and board.

   The plants will be built on land adjacent to the existing waste tips so as to keep the costs of transporting waste both to and from the plant to a minimum.
5.3. **Closing, sealing and degassing the La Rendija waste tip**

The Rendija waste tip in the municipality of Mejorada del Campo, subject to health monitoring, has recently reached the end of its working life and must be closed. This must be done in accordance with a number of technical criteria:

- sealing by covering with insulating material to prevent rainwater percolating through; the covering will comprise the following: layer of vegetation, layer of topsoil, layer of sand for drainage, barrier layer of clay, base layer,
- degassing using biogas collection and treatment systems, with or without electricity generation,
- inspecting and monitoring the tip after sealing as long as it is active (gas emissions, treatment of leachate, repairing of cracks, etc.).

The final reclamation of the La Rendija waste tip will require the following essential work:

- earth works and laying the different layers necessary to ensure effective sealing of the tip,
- installation of piping for rainwater and run-off water,
- installation of wells, piping and equipment for degassing,
- laying topsoil and replanting the whole of the surface with indigenous plants.

6. **Objectives:**

The measures are intended to achieve a number of objectives for the recovery of raw materials from solid municipal waste generated in the Madrid region with a consequent reduction in the amount of waste for disposal.

The objectives are as follows:

- paper and board: 45% by 2000 (80 000 tonnes/year)
- glass: 35% by 2000 (44 000 tonnes/year)
- metals: 15% by 2000 (5 250 tonnes/year)
- plastics: 10% in 2000 (11 000 tonnes/year)
- tetrapacks: 15% in 2000 (1 500 tonnes/year)
- other: recovery of other raw materials in waste is expected to increase gradually as public awareness grows.

Furthermore, the amount of waste which is now disposed of by controlled tipping will be reduced, thus extending the working life of tips subject to health monitoring in the Madrid region.

**Quantification of objectives by project**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of inhabitants benefiting</th>
<th>Tonnes/year of waste collected and/or treated</th>
<th>Number of containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of containers for sacks for packaging</td>
<td>2 094 000</td>
<td>198 250</td>
<td>21 023</td>
</tr>
<tr>
<td>Purchase of vehicles for sorting at source</td>
<td>2 094 000</td>
<td>62 200</td>
<td>—</td>
</tr>
<tr>
<td>Purchase of containers for the selective collection of glass</td>
<td>735 000</td>
<td>22 000</td>
<td>1 050</td>
</tr>
<tr>
<td>Activity</td>
<td>Number of inhabitants benefiting</td>
<td>Tonnes/year of waste collected and/or treated</td>
<td>Number of containers</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Purchase and distribution of sacks for packaging and bins</td>
<td>2,094,000</td>
<td>198,250</td>
<td>600,000</td>
</tr>
<tr>
<td>Purchase of containers for hazardous waste (pharmaceutical products)</td>
<td>2,094,000</td>
<td>n.a.</td>
<td>3,200</td>
</tr>
<tr>
<td>Purchase of containers for hazardous waste (batteries)</td>
<td>2,094,000</td>
<td>214</td>
<td>1,200</td>
</tr>
<tr>
<td>Public awareness campaigns</td>
<td>2,094,000</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

### SORTING PLANTS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of inhabitants benefiting</th>
<th>Tonnes/year of waste collected and/or treated</th>
<th>Number of containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of the Pinto sorting plant</td>
<td>1,433,000</td>
<td>98,250</td>
<td>—</td>
</tr>
<tr>
<td>Construction of the Nueva Rendija sorting plant</td>
<td>397,000</td>
<td>50,000</td>
<td>—</td>
</tr>
<tr>
<td>Construction of the Colmenar Viejo sorting plant</td>
<td>264,000</td>
<td>50,000</td>
<td>—</td>
</tr>
</tbody>
</table>

### CONTROLLED TIPS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of inhabitants benefiting</th>
<th>Tonnes/year of waste collected and/or treated</th>
<th>Number of containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing, degassing and landscaping</td>
<td>397,000</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.1.1997</td>
<td>1.7.1997</td>
</tr>
<tr>
<td>Main work</td>
<td>1.7.1997</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The internal rate of return is 7.1%. A cost-benefit analysis was carried out on the following assumptions:

- working life of the group of projects and objectives achieved: estimated at eight years based on the average working life of the investments;
- cost of the investments;
- income from the recovery of paper and board;
- income from the recovery of glass;
- income from the recovery of scrap iron;
- income from the recovery of plastic;
- savings from the reduction in the amount of waste produced.

Operating costs were not included in the cost-benefit analysis since these will be covered by the income from the sale of recyclable materials. The operating accounts of the sorting plants are therefore balanced.

9. **Environmental impact analysis:**

The environmental objectives of the Plan include the prudent and rational utilisation of natural resources referred to in Article 130R of the EC Treaty by increasing the reutilisation and recycling
of raw materials. Along with the energy savings which will be achieved, this will also help preserve, protect and improve the quality of the environment, also referred to in the Article concerned.

The project involves both palliative and preventive measures in that it is intended to rectify environmentally negative situations, such as the indiscriminate consumption of resources and raw materials and the management of solid municipal waste based on tipping, in accordance with current Community and national policies, and that one of the basic objectives of the Plan is the reduction of the amount of waste created. Making people aware of the cost of solid municipal waste management is very important so as to encourage them to buy products whose packaging uses fewer raw materials which then create waste for treatment.

The project is in accordance with Directives 91/156/EEC, 91/689/EEC and 94/62/EEC and the acts transposing them into national law such as the Law on Packaging, the Basic Law on Waste and the Law on Packaging and Packaging Waste and take account of Law 42/75 on Municipal waste, as amended by Royal Decree 1136/86 on the Collection and Treatment of Solid Municipal Waste and the Law on Packaging and Packaging Waste, and it therefore fully complies with Community environmental rules.

10. Cost and assistance:

Total cost: ECU 21 555 340

Eligible cost (after 6 May 1997): ECU 21 555 340

Rate of assistance: 80 %

Cohesion Fund grant: ECU 17 244 272

Breakdown of total cost (in ECU):

- Construction of the Pinto sorting plant: 3 910 375
- Construction of the Nueva Rendija sorting plant: 2 178 465
- Construction of the Colmenar Viejo sorting plant: 2 142 258
- Sealing, degassing and landscaping of tips: 298 105
- Purchase of containers for sacks for packaging: 2 205 021
- Purchase of vehicles for sorting at source: 1 086 215
- Purchase of containers for the selective collection of glass: 380 175
- Purchase and distribution of sacks for packaging and bins: 2 871 229
- Purchase of containers for hazardous waste (pharmaceutical products): 72 414
- Purchase of containers for hazardous waste (batteries): 72 414
- Public awareness campaigns: 6 338 669

Total: 21 555 340
ANNEX

FINANCING PLAN

Project No: 97/11/61/015

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Total public expenditure</th>
<th>Cohesion Fund</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>4=3+2/1</td>
<td>5=4/2</td>
<td>6=8+9</td>
<td>7=6/2</td>
</tr>
<tr>
<td>1997</td>
<td>6 226 542</td>
<td>6 226 542</td>
<td>4 981 234</td>
<td>1 245 308</td>
<td>1 245 308</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>9 101 646</td>
<td>9 101 646</td>
<td>7 281 316</td>
<td>1 820 330</td>
<td>1 820 330</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>6 227 152</td>
<td>6 227 152</td>
<td>4 981 722</td>
<td>1 245 430</td>
<td>1 245 430</td>
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<tr>
<td>Total</td>
<td>21 555 340</td>
<td>21 555 340</td>
<td>17 244 272</td>
<td>4 311 068</td>
<td>4 311 068</td>
<td></td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.

PROJECT No: 97/11/61/016

1. Name:

Waste-water treatment plants for Alcañiz, Barbastro, Calatayud and Ejea de los Caballeros.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria M.E.H.

2.2. Address: Paseo de la Castellana, 162 28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General del Agua Diputación General de Aragón

3.2. Address: Pº Mª Agustín, 36 50071 Zaragoza

4. Location:

4.1. Member State: Spain

4.2. Region: Aragon

5. Description:

5.1. Waste-water disposal and treatment for Alcañiz

Collector leading to the plant, 500 mm in diameter, 550 m long.

Group of four projects involving the construction of collectors and waste-water treatment plants. All the plants will provide secondary treatment, using biodiscs in the Barbastro plant and activated sludge systems in the other plants.

Nutrient reduction is planned for the Alcañiz plant, which will be discharging in a sensitive area.

Biological waste-water treatment plant with a conventional activated sludge system.
Water treatment:
- spillway and general by-pass
- tank for coarse materials
- lifting of untreated water using four submersible pumps
- fine screening with two independent screens
- desander and de-greaser with aeration
- primary settling tank, one unit 15 m in diameter
- biological reaction line
- secondary settling tank 19 m in diameter
- chlorination tank.

Sludge treatment:
- recirculation of secondary sludge using pumps
- transportation of primary sludge using pumps
- aerobic digestion
- thickening of digested sludge
- dewatering of digested sludge using two belt filter presses.

Physico-chemical treatment is included.

5.2. Waste-water disposal and treatment for Barbastro

315 mm diameter collector over a length of 141 m, and 800 mm diameter collector to the treatment plant located some 1 000 m downstream.

The planned treatment plant will use the biodisc process.

Water treatment:
- pumping unit to lift water using three submerged pumps
- screen to remove coarse solids
- automatic revolving screen to remove fine solids
- twin sand-trap with grease removal
- two primary settling tanks of 16 m diameter
- six biodisc modules for biological treatment
- two secondary settling two tanks of 18 m diameter
- chlorination.

Sludge treatment:
- recirculation of secondary sludge, using pumps
- pumping of primary sludge
- thickening of primary sludge by gravity
- anaerobic digestion in two digestors
- dewatering of sludge using belt filter press.

5.3. Waste-water disposal and treatment for Calatayud

1 400 m long collector made of concrete pipe 80 cm in diameter. Includes spillways on both tanks of the Jalón river and a syphon drainage crossing to carry the flow from the left-bank collector.

The planned treatment plant will involve conventional biological treatment of activated sludge at half load and will include physico-chemical treatment prior to primary settling.

Water treatment:
- inlet structure
- tank for coarse materials
- lifting of untreated water
- general by-pass
- automatic screens for removal of fine solids
- twin sand-traps with grease removal and aeration
- two primary settling tanks of 18 m diameter
- two biological reactors aerated by turbine
- two secondary settling tanks of 25 m diameter.

Sludge treatment:
- pumping, recirculation and removal of sludge
- aerobic digestion in two tanks
- thickening of digested sludge
- dewatering of sludge using three belt filter presses.
5.4. Waste-water disposal and treatment for Ejea de los Caballeros

1 000 mm diameter collector to the inlet structure. A second collector, with a diameter of 800 mm, leading from the Valdecerrín industrial estate to the inlet structure.

The planned treatment plant will involve conventional biological treatment of activated sludge at half load.

Water treatment:
— spillway and general by-pass
— lifting of untreated water
— two automatic screens to remove fine solids
— twin sand-traps with grease removal and aeration
— two primary settling tanks of 27 m diameter
— biological reactor
— four secondary settling tanks of 27 m diameter.

Sludge treatment:
— pumping, recirculation and removal of sludge
— two units for preliminary dewatering of primary sludge
— aerobic digestion
— dewatering of sludge by means of preliminary dewatering and belt filter presses

6. Objectives:

The design capacities and quality objectives of treatment are:

<table>
<thead>
<tr>
<th></th>
<th>Alcañiz</th>
<th>Barbastro</th>
<th>Calatayud</th>
<th>Ejea de los Caballeros</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily through-flow</td>
<td>62.5 l/s</td>
<td>100 l/s</td>
<td>115.7 l/s</td>
<td>187.7 l/s</td>
</tr>
<tr>
<td>Peak flow</td>
<td>125 l/s</td>
<td>211 l/s</td>
<td>199 l/s</td>
<td>469 l/s</td>
</tr>
<tr>
<td>Inhabitants equivalent</td>
<td>19,800</td>
<td>20,000</td>
<td>48,330</td>
<td>62,150</td>
</tr>
<tr>
<td>Organic load (BOD₅):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— on entry</td>
<td>220 mg/l</td>
<td>139 mg/l</td>
<td>290 mg/l</td>
<td>230 mg/l</td>
</tr>
<tr>
<td>— on exit</td>
<td>25 mg/l</td>
<td>20 mg/l</td>
<td>25 mg/l</td>
<td>15 mg/l</td>
</tr>
<tr>
<td>Suspended solids:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— on entry</td>
<td>280 mg/l</td>
<td>100 mg/l</td>
<td>300 mg/l</td>
<td>120 mg/l</td>
</tr>
<tr>
<td>— on exit</td>
<td>25 mg/l</td>
<td>30 mg/l</td>
<td>35 mg/l</td>
<td>15 mg/l</td>
</tr>
</tbody>
</table>

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>1.6.1997</td>
<td>30.11.1999</td>
</tr>
</tbody>
</table>

— Investment and operating costs.

8. Assessment of costs and socio-economic advantages:

The economic analysis was made for a working life of 25 years using the following factors:

— availability of better quality water for re-use, evaluated in terms of possible savings in water treatment by municipalities down-stream of the treatment plants;
environmental benefits from reduced pollution, evaluated on the basis of the difference in the pollution load of discharged water with and without the treatment plant.

The profitability indicators are:

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost/benefit ratio</th>
<th>Internal rate of return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcañiz</td>
<td>1,07</td>
<td>7,60 %</td>
</tr>
<tr>
<td>Barbastro</td>
<td>1,18</td>
<td>9,19 %</td>
</tr>
<tr>
<td>Calatayud</td>
<td>1,13</td>
<td>8,82 %</td>
</tr>
<tr>
<td>Ejea de los Caballeros</td>
<td>1,20</td>
<td>10,37 %</td>
</tr>
</tbody>
</table>

9. Environmental impact analysis:

The projects will contribute to preventing contamination of aquatic environments and improve the water quality of the Guadalope, Vero, Jalón and Arba rivers.

The projects are included in the waste-water disposal and treatment plan of the Autonomous Community of Aragon, which is coordinated with the national plan designed to achieve compliance with Directive 91/271/EEC.

The collectors must be connected to the treatment plants before they are put into use.

10. Cost and assistance:

Total cost: ECU 17 709 504

Eligible cost (after 6 May 1997): ECU 17 300 895

Rate of assistance: 80 %

Cohesion Fund grant: ECU 13 840 716

Breakdown of the cost (in ECU):

1. Alcañiz 2 326 897
2. Barbastro 2 954 437
3. Calatayud 5 856 497
4. Ejea de los Caballeros 6 163 064

Total 17 300 895

ANNEX

FINANCING PLAN

Project No: 97/11/61/016

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in ECU)</td>
<td>Total public expenditure</td>
<td>Cohesion Fund</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=2+11 2=4+6+10 3=2/1</td>
<td>4 5=4/2 6=4+9</td>
</tr>
<tr>
<td>1997</td>
<td>1 562 031</td>
<td>1 562 031 100 1 249 625 80</td>
<td>312 406 20</td>
</tr>
<tr>
<td>1998</td>
<td>11 727 245</td>
<td>11 727 245 100 9 381 796 80</td>
<td>2 345 449 20</td>
</tr>
<tr>
<td>1999</td>
<td>4 011 619</td>
<td>4 011 619 100 3 209 295 80</td>
<td>802 324 20</td>
</tr>
<tr>
<td>Total</td>
<td>17 300 895</td>
<td>17 300 895 100 13 840 716 80</td>
<td>3 460 179 20</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/017

1. **Name:**

Waste-water treatment plants for Binéfar, Calamocha, Cariñena, Fraga and Tarazona.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria M.E.H.

2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General del Agua Diputación General de Aragón

3.2. **Address:** Pº Mº Agustin, 36 50071 Zaragoza

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Aragon

5. **Description:**

Set of five projects involving the construction of collectors and waste-water treatment plants. All the plants will provide secondary treatment, using biodiscs in the Fraga plant, activated sludge systems in the Binéfar and Cariñena plants and protracted aeration in the Tarazona plant.

5.1. **Waste-water treatment for Binéfar**

Biological waste-water treatment plant with a conventional biological system using activated sludge.

Water treatment:

— pumping unit to lift water using five submersible pumps
— automatic screens to remove coarse and fine solids
— twin sand-trap with grease removal and aeration
— two primary settling tanks of 19 m diameter
— two biological reactors
— two secondary settling tanks of 21 m diameter
— chlorination tank
— discharge into the Faleva collector, which flows from the irrigable area into the Arroyo de la Vell, which in turn empties into the river Cinca.

Sludge treatment:

— recirculation of secondary sludge, using pumps
— pumping of primary sludge and removal of excess sludge
— thickening
— anaerobic digestion
— dewatering of sludge using a belt filter press.

5.2. **Waste-water disposal and treatment for Calamocha**

600 mm diameter collector over a length of 620 m.

The planned treatment plant will use a fixed-support biological process with forced aeration and sludge washing.

Water treatment:

— lifting of untreated water using two submerged pumps
— screen with removable rungs at distance of 1 mm
— twin sand-trap with grease removal
— primary settling tank with a useful diameter of 18,3 m
— six aerated biological filters in two sets of three rows
— 175 m³ tank for treated water to be used for washing filters before discharge into the Jiloca river
— pumps and compressors for washing filters
— storage and washing water and recirculation to the primary settling tank.

Sludge treatment:

— pumping of sludge from the primary settling tank
— addition of lime to stabilise the sludge
— thickening by gravity
— dewatering using a band filter press.
5.3. Waste-water treatment for Cariñena

The planned treatment plant will involve conventional biological treatment using activated sludge at half load and will include physico-chemical treatment prior to primary settling. The project will make partial use of existing civil works on the site for a treatment plant that was never finished.

Water treatment:
- spillway at entrance
- pumping unit
- two fine-screening channels
- twin sand-trap with grease removal
- homogenisation tank
- physico-chemical treatment
- primary settling tank 10,6 m in diameter
- two existing biological reactors
- existing secondary settling tank
- final discharge into the Frasno river.

Sludge treatment:
- pumping, recirculation and removal of sludge
- thickening of biological sludge
- aerobic digestion in two existing tanks
- thickening of digested and primary sludge
- dewatering on belt filter press.

5.4. Waste-water disposal and treatment for Fraga

Collector for the left bank, made up of two sections of 595 m and 362 m respectively, which meet at a pumping unit before crossing the Cinca river to join the system on the right bank of the river.

Collector 180 m long from the current discharge point of the right bank to the treatment plant, including a pumping unit.

The planned treatment plant will be use biofilm processes, more particularly biodiscs.

Water treatment:
- screen to remove coarse solids
- automatic revolving screen to remove fine solids
- twin sand-trap
- two primary settling tanks with a useful diameter of 12 m
- four biodiscs modules for biological treatment
- secondary settling tank with a useful diameter of 20 m
- chlorination
- discharge into the Cinca river.

Sludge treatment:
- pumping of sludge from the primary settling tank
- pumping of mixed sludge from the primary settling tank
- thickening of mixed sludge by gravity
- anaerobic digestion
- dewatering using belt filter press.

5.5. Waste-water disposal and treatment for Tarazona

Two segments of collector, 1 330 m and 375 m long respectively, from the current discharge points to the treatment plant.

The planned treatment plant will involve biological treatment using activated sludge at low load or protracted aeration. Sludge is not further stabilised because the treatment process itself provides adequate stability.

Water treatment:
- inlet structure and general bypass
- lifting of untreated water
- automatic screen for the removal of fine solids
- sand-trap with grease removal
- by — pass for the biological reactor and distribution chamber
- biological reactor made up of two oxidation channels
- discharge into the Queiles river.

Sludge treatment:
- pumping to remove excess sludge
- thickening in a gravity unit
- sludge tank
- dewatering using a belt filter press.
6. **Objectives:**

The design capacities and quality objectives of treatment are:

<table>
<thead>
<tr>
<th></th>
<th>Binéfar</th>
<th>Calamocha</th>
<th>Cariñena</th>
<th>Fraga</th>
<th>Tarazona</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily through-flow</td>
<td>142 l/s</td>
<td>78 l/s</td>
<td>19 l/s</td>
<td>59 l/s</td>
<td>47 l/s</td>
</tr>
<tr>
<td>Peak flow</td>
<td>230 l/s</td>
<td>139 l/s</td>
<td>37 l/s</td>
<td>81 l/s</td>
<td>118 l/s</td>
</tr>
<tr>
<td>Inhabitants equivalent</td>
<td>27 000</td>
<td>26 500</td>
<td>11 600</td>
<td>11 300</td>
<td>18 400</td>
</tr>
<tr>
<td>Organic load (BOD₅)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— on entry</td>
<td>132 mg/l</td>
<td>236 mg/l</td>
<td>435 mg/l</td>
<td>132 mg/l</td>
<td>270 mg/l</td>
</tr>
<tr>
<td>— exit</td>
<td>25 mg/l</td>
<td>25 mg/l</td>
<td>15 mg/l</td>
<td>20 mg/l</td>
<td></td>
</tr>
<tr>
<td>Suspended solids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— on entry</td>
<td>127 mg/l</td>
<td>183 mg/l</td>
<td>400 mg/l</td>
<td>124 mg/l</td>
<td>170 mg/l</td>
</tr>
<tr>
<td>— exit</td>
<td>35 mg/l</td>
<td>30 mg/l</td>
<td>30 mg/l</td>
<td>20 mg/l</td>
<td>30 mg/l</td>
</tr>
</tbody>
</table>

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>1.11.1997</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis was made for a working life of 25 years using the following factors:

— Investment and operating costs.

— Benefits:

— availability of better quality water for re-use, evaluated in terms of possible savings in water treatment by municipalities down-stream of the treatment plants;

— environmental benefits from reduced pollution, evaluated on the basis of the difference in the pollution load of discharged water with and without the treatment plant.

The profitability indicators are:

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost/benefit ratio</th>
<th>IRR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binéfar</td>
<td>1,39</td>
<td>14.95%</td>
</tr>
<tr>
<td>Calamocha</td>
<td>1,35</td>
<td>13.25%</td>
</tr>
<tr>
<td>Cariñena</td>
<td>0,83</td>
<td>0.68%</td>
</tr>
<tr>
<td>Fraga</td>
<td>1,00</td>
<td>6.05%</td>
</tr>
<tr>
<td>Tarazona</td>
<td>1,16</td>
<td>9.48%</td>
</tr>
</tbody>
</table>

9. **Environmental impact analysis:**

The projects will contribute to preventing contamination of aquatic environments and improve the water quality of the La Faleva, Jiloca, Frasno, Cinca and Queiles rivers.

The projects are included in the waste-water disposal and treatment plan of the Autonomous Community of Aragon, which is coordinated with the national plan designed to achieve compliance with Directive 91/271/EEC.

The collectors must be connected to the treatment plants before they are put into use.

10. **Cost and assistance:**

Total cost: ECU 12 273 151

Eligible cost (after 6 May 1997): ECU 11 986 470

Rate of assistance: 80 %

Cohesion Fund grant: ECU 9 589 176

Breakdown of cost (in ECU):

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost (ECU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binéfar</td>
<td>2 548 333</td>
</tr>
<tr>
<td>Calamocha</td>
<td>2 689 540</td>
</tr>
<tr>
<td>Cariñena</td>
<td>2 374 245</td>
</tr>
<tr>
<td>Fraga</td>
<td>2 221 730</td>
</tr>
<tr>
<td>Tarazona</td>
<td>2 152 622</td>
</tr>
</tbody>
</table>

Total 11 986 470
ANNEX

FINANCING PLAN

Project No: 97/11/61/017

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>3=2/1</td>
<td>4</td>
</tr>
<tr>
<td>1997</td>
<td>300 391</td>
<td>300 391</td>
<td>100</td>
<td>240 312</td>
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<tr>
<td>1998</td>
<td>10 033 042</td>
<td>10 033 042</td>
<td>100</td>
<td>8 026 434</td>
</tr>
<tr>
<td>1999</td>
<td>1 653 037</td>
<td>1 653 037</td>
<td>100</td>
<td>1 322 430</td>
</tr>
<tr>
<td>Total</td>
<td>11 986 470</td>
<td>11 986 470</td>
<td>100</td>
<td>9 589 176</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.

PROJECT No: 97/11/61/018

1. **Name:** Waste-water collection system for Murcia.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria M.E.H.

   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** C.A. Región de Murcia Consejería Medio Ambiente, Agricultura y Agua

   3.2. **Address:** Plaza Santoña Murcia

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Murcia

5. **Description:**

   The project concerns an integrated system of collector sewers to collect all the urban waste water of the city of Murcia and its built-up environs and convey it to the treatment plant.

   The project can be split into different sections with different characteristics, as follows:

   **Phase 1**

   Central collector: concerns most of the sewer system of the city centre, running from north to south. Reinforced concrete pipe is planned, with a no-load full cross-section conveyance capacity of 12 m³/s, over a length of 2 040 m. The inside diameter will be 3 m. Special installation is planned, mostly involving sinking or tunnels.

   A series of inlets, connections and spillways are planned, all in reinforced concrete. Specifically, an inlet well (10 m x 10 m x 5 m), the ‘Azarbe Mayor’ spillway (spillway with stationary lip, 70 m long with an evacuation capacity of 13 m³/s >), a connecting channel (12.7 x 0.91 m...
rectangular cross-section with a capacity of 25 m³/s, 90 m long) and a storm basin and spillway (5 m x 0.85 m cross-section, 90 m long, with a stationary-lip weir) to connect to the section of pipeline (12 m³/s) also acting as a spillway for excess flow (up to 13 m³/s).

Phase 2

Connection of the city’s main collectors along the route, including the Antalayas collector (single reinforced concrete box connection) and the S. Felix collector connection, which includes a new variation in the route (length 1 000 m; reinforced concrete pipeline with a diameter of 1.9 m).

Phase 3

The Segura river left bank collector running along the left bank of the river to the treatment plant (total length: 4 770 m; reinforced concrete pipeline with a diameter of 2.1–2.2 m depending on the section). Includes intake (capacity: 7–8 m³/s sewage diluted to 5/1).

Phase 4

The Segura river right bank collector mainly conveys the waste-water from the north-western suburbs. The collector is 1 350 m long, with a diameter of 2 m and a flow of 5 m³/s (sewage diluted to 5/1). The river crossing is a double pipeline with a diameter of 1.0 m over a length of 80 m.

Phase 5

The Azarbe Mayor and eastern zone collector mainly collects the waste water from the north-western suburbs. It is 4 870 m long, with diameters ranging from 0.60–1.0 m. Two pump stations (Castillas and Llano de Brujas) are positioned along the route. There will also be an emergency spillway for the pumping stations (Casillas-Azarbe Mayor spillway, 600 m long with a diameter of 0.90 m) and a spillway for overflow diluted rainwater (Azarbe Mayor-Azarbe Merancho connection, reinforced concrete channel, 300 m long with a cross-section of 6 m²). This connection will also act as a safety by-pass and additional emergency overflow for the entire sewage system of the northern part of the city.

The project also includes all the necessary ancillary works, repositioning, environmental rehabilitation, etc., as well as the automatic computer and general control systems for the entire sewer complex.

This application also covers the technical assistance needed to programme and prepare the construction plans and for the control, security, engineering and general financial and technical monitoring of the work.

6. **Objectives:**

The objective of the project is to install a sewer system to collect and convey urban waste water from the city of Murcia and its surroundings for treatment at the treatment plant.

The project will prevent discharge pollution, safeguard the quality of water in the Segura river, enable waste water to be re-used, improve the standard of living in the city, both through the benefits of urban sewers and by improving the river environment in the city and settlements downstream, improve public health and comply with Directive 91/271/EEC.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>1.1.1998</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

(a) A cost-benefit analysis has been carried out on the following basis:

- investments for a working life of 20 years
- running and maintenance costs; ESP 20/m³ treated,
- charge for supply and treatment of water (to cover the operating and maintenance costs of the sewer systems and treatment plants),
- assessment of environmental benefits: improved water quality, increased water resources thanks to re-use.

(b) 330 000 inhabitants will benefit from the project.

(c) The internal rate of return (IRR) is 17.44%. The net value added is ESP 8 428 million at 1998 prices, at a discount rate of 6%.
(d) Creation of jobs:

- during operation: direct: 20; indirect: 20.

9. Environmental impact analysis:

The project is consistent with the objectives of Article 130R of the EC Treaty and with the Fifth environment Community Programme of Policy and Action in relation to the Environment and Sustainable Development, which stipulates that ‘for the purposes of improving the quality of life and as a condition for achieving sustainable development, it is essential to secure sufficient water of adequate quality throughout the Community without upsetting the natural equilibrium of the environment’. The project contributes to the following of the Programme’s objectives:

- integrated pollution control and prevention of waste,
- improvement of public health and safety.


10. Cost and assistance:

Total cost: ECU 23 959 843

Eligible cost (after 6 May 1997): ECU 23 959 843

Rate of assistance: 80%

Cohesion grant: ECU 19 167 874

ANNEX

FINANCING PLAN

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Total public expenditure</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Other</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>479 197</td>
<td>479 197</td>
<td>100</td>
<td>383 358</td>
<td>80</td>
<td>95 839</td>
<td>20</td>
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<tr>
<td>1998</td>
<td>6 708 756</td>
<td>6 708 756</td>
<td>100</td>
<td>5 367 004</td>
<td>80</td>
<td>1 341 752</td>
<td>20</td>
</tr>
<tr>
<td>1999</td>
<td>16 771 890</td>
<td>16 771 890</td>
<td>100</td>
<td>13 417 512</td>
<td>80</td>
<td>3 354 378</td>
<td>20</td>
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<tr>
<td>Total</td>
<td>23 959 843</td>
<td>23 959 843</td>
<td>100</td>
<td>19 167 874</td>
<td>80</td>
<td>4 791 969</td>
<td>20</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
1. **Name:**

Arga General Plan.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162

28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento de Pamplona

Gerencia de Urbanismo

3.2. **Address:** Plaza Consistorial s/n

31001 Pamplona

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Navarre

5. **Description:**

A global measure is planned for the river and its environs within the Pamplona city area aimed at conserving and restoring its natural values and integrating it in so far as possible into the urban structure of the city. The measure will cover both banks of the river for 11 km.

Of the 11 prepared projects, one is to be implemented by the City Council with its own funds (Parque del Vergel, for which tenders are currently being considered) and another is a medium-term project (pedestrian walkway over the Arga at Errotazar); the remaining nine have been regrouped as eight projects for the purposes of application for Cohesion Fund assistance.

These latter eight projects aim to cover an overall area of about 1 000 000 m² (with compulsory purchase of 89 291 m² of land which has come to be owned privately), with an area of 530 000 m² directly affected by the measures. The projects will take in 19 780 metres of riverbank, including the planting of 6 726 trees and work on 9 115 metres of paths.

1. **Project for environmental restoration for the Magdalena river area**

This project covers areas directly and indirectly bordering the river: on the left bank from the city boundaries to the Ripa de Medialuna, and on the right bank from Lagun Artea, again on the city boundaries, to the la Chantrea bridge, taking in a total of about 140 000 m² (60 000 m² on the left bank, 80 000 m² on the right).

The following measures are planned:

— General cleaning operation of all riverbanks, with the removal of refuse, tree-trunks and flood flotsam, as well as selective felling and grubbing, and ground clearance. Subsequent planting will be aimed at combating minor erosion and will tend to replace the existing poplars with riverbank species of shrubs.

— Ground clearance allowing the reopening of the old path running along the left bank and under the bridge at Beloso Bajo.

— General cleaning operation, removal of fallen trees and selective felling on the Beloso-Medialuna embankment and on the flat area below it, with subsequent planting aimed at restoring the natural wooded area.

— Opening to the public of the landing stage of the Amaya sports complex, with creation of proper access points.

— Building of a footbridge across the river, allowing the connection of the lower stretches of the Magdalena river area with the embankment walk at la Cuesta de Beloso, which will also receive attention.

— Substitution of a dry stone revetment with an imitation stone concrete wall in the Lagun Artea area, in order to avoid narrowing this stretch of river and thus also solving drainage problems in the Iturriapurria river area.

— Building of a flat dike path, involving partial shifting of the existing revetment towards the adjoining vegetable plots and using it as a foundation; the path is then to be continued by reconstructing the existing path leading over a small rise.

— Creation of a park (20 000 m²) in the Playa de Magdalena area, with trees, lawns and some park furniture.

— Removal of existing vegetable plots near the Magdalena bridge and the creation of a park area (13 500 m²), with reconstructive work on the banks, planting of open shrubbery and some park furniture.
2. Project for environmental restoration and general work on the area around the Caparrosso mill

This project involves restoration and new general work on the area directly bordering on the river along the left bank from the Ripa de la Medialuna to the la Chantrea bridge, covering a total area of 50 000 m².

Privately-owned riverside lands are to be returned to public use (compulsory purchase of 2 939 m²), paths opened up and banks made more accessible in a river area at present in a very poor condition, both environmentally and in regard to public use. The entire riverbank (840 m) will be replanted, and the existing footbridge (‘las pasarelas’) renovated.

The project includes the restoration of the medieval Caparroso mill, at present in a state of semi-ruin, together with its weir, branch stream and other accompanying structures, leaving it ready for use as the future Arga River Environmental Education Centre.

The following measures are also planned:

- General cleaning operation, removal of fallen trees and selective felling on the Medialuna embankment, with subsequent planting of riverbank shrub species.

- Complete restoration of the Caparrosso mill building (706,75 m²) and its immediate environs, including repair of the sluice, with dredging, cleaning and restoration of the branch stream, etc. The complex will be readied for use, except for interior fittings, as the Arga River Environmental Education Centre.

- Development of the area surrounding the Caparrosso mill, with pedestrian access, sowing of lawns, tree planting and park furniture.

- Shallow dredging of the river bed under the mill wheel, with general cleaning of the river banks, removal of refuse, fallen trunks and flood flotsam, as well as selective ground clearance between the weir and ‘las pasarelas’.

- Demolition of the existing semi-ruined footbridge (‘las pasarelas’), and construction of a new safer footbridge, better designed for resistance to flooding.

- Conservation of the present poplar grove between the mill and the la Magdalena bridge, with levelling of a small rise, a general cleaning operation, removal of refuse and flood flotsam, selective felling and subsequent planting of riverbank species.

- General felling of the acacia grove between the la Magdalena and la Chantrea bridges, after general cleaning of the riverbanks and subsequent planting of herbaceous and native species.

3. Project for work on banks and footbridge in the Aranzadi river area

The project covers environmental restoration and general work on all riverbanks between the la Chantrea bridge and the San Pedro weir, including the construction of a new footbridge for connection with Aranzadi. The measures will affect 34 000 m²: 24 000 m² on the right bank and 10 000 m² on the left.

The following measures are planned:

- General cleaning operation, removal of fallen trees and selective felling and ground clearance covering the whole the embankment, as well as subsequent replanting with native riverside trees and shrubs.

- Shallow dredging of the Ciganda mill island and creation of semi-permanent access points to the river for future cleaning operations.

- Recovery for public use of a riverside plot belonging to the Ciganda foundation, adjacent to the la Chantrea bridge on the right bank (compulsory purchase of 3 883 m²), with removal of fencing and planting of riverside species.

- Repair of existing points of erosion on the Playa de Alemanes, using a cement revetment and tarungars, with general access and embankment work.

- Building of a footbridge from the Alemanes (la Chantrea) to Aranzadi, including connection with existing path.

- Repair of the badly eroded section of an enclosure wall around the Capuchinos estate.

- Construction of a dry stone revetment supporting the entire base of the Errotazar embankment, with spreading of ground matting and subsequent planting of bushes and herbaceous plants over the embankment itself.

- Partial demolition, rebuilding and restoration of the San Pedro mill wheel.

4. Project for general work on the riverbanks in the Rochapea Derecha river area

The project plans environmental restoration and general work on the right bank taking in the entire river area between the Vergel and Cuatro Vientos bridges. An area of about 33 000 m² is to be covered.
The following measures are planned:

— General work on the riverbanks along this stretch of river, with reconstructive work on banks and embankments on certain sections, cleaning, clearance, selective felling and replanting using riverside species.

— Work on a pedestrian path running the length of the riverbank, with three planting and some park furniture.

— Demolition of structures near the Curtidores bridge, work on the ground cleared, and replanting.

— Addition of a new arch to the right-hand abutment of the Plazaola bridge. The pedestrian path will pass under the arch which will also help to manage excess flow when the river is in flood.

5. Project for general work on the riverbanks in the Rochapea Izquierda river area

This project involves stabilising and reinforcing the embankments, as well as environmental restoration and general work, along the entire left riverbank between the San Pedro weir and the Cuatro Vientos bridge. An area of about 30 000 m² is to be covered.

The following measures are planned:

— Creation of a pedestrian path, with the addition of some park furniture, connecting the road at San Pedro bridge with the road leading up to the Portal de Zumalacárregui and passing under the Vergel bridge.

— Reinforcement of the base of the existing dressed stone wall behind the Vergel bridge, with general cleaning and jointing.

— Shallow dredging of the island at the old Curtidores mill weir with creation of semi-permanent access to the river for future cleaning operations.

— Demolition of ruined buildings in Curtidores, landscaping and replanting of grounds.

— General cleaning operation, removal of fallen trees, selective felling and ground clearance on the banks and embankments with replanting of riverside species.

6. Project to restore the Eugui gardens and general work on nearby riverbanks

This project covers the restoration of the old Eugui gardens, which have all but disappeared, located at the beginning of the Avenida de San Jorge, near Cuatro Vientos. Environmental restoration and general work is furthermore planned along the right bank between the San Jorge bridge and the ‘pasarela de los tubos’ bridge covering a total of about 20 000 m².

The following measures are planned:

— Creation of access to the river and environs, including a ramp and steps from the Avenida de San Jorge, near the Cuatro Vientos bridge.

— Cleaning operation in the Eugui gardens (approximately 10 000 m²), work on some of its architectural and horticultural elements.

— Creation of a pedestrian path, with some park furniture, running parallel to the river and connecting the Eugui gardens with the ‘pasarela de los tubos’ bridge and the San Jorge path.

— Work on the ‘pasarela de los tubos’ bridge, conserving the vertical structure and base supporting the supply and drainage pipes and covering them with a metal structure to support the base of the new footbridge.

7. Project for general work on the banks in the San Jorge river area

This project provides for environmental restoration and general work on all riverbanks between the Cuatro Vientos and Miluce bridges, except for the sections covered by the previous project (Eurgui). The project covers 125 000 m².

The following actions are planned:

— Creation of a permanent access point to the river downstream from the Cuatro Vientos bridge, with reconstructive work on the left bank, unblocking and cleaning of the arch of the bridge, and shallow dredging of the existing gravel island.

— Construction of a low dry stone revetment downstream from the Biurdana mill on the left bank, with reconstructive work on the embankment and replanting along the top of the revetment.

— General work on the Biurdana weir, with a slipway for the passage of vessels, and the creation of a permanent access point to river for future cleaning operations. Building of a nearby landing stage.

— General work on all riverbanks in the area, with reconstructive work on banks and embankments on some sections, removal of the existing dike path along the right bank before the San Jorge bridge. Subsequent cleaning operation with ground clearance, selective felling and replanting with riverside species.

— Dredging of the riverbed downstream from the Biurdana weir, with filling and banking of left shore before the San Jorge bridge.

— Work on pedestrian path along the right bank.
— Replacement with lines of native riverside trees of some of the poplar plantations on the right bank (at the Explanada de Biurdana and between the San Jorge and Miluce bridges), at present in a poor state of health.

— Creation of small dry stone revetments to combat points of erosion along both banks in the San Jorge and Berichitos areas.

8. **Project for general work on the banks in the Landaben river area**

This project covers environmental restoration and general work on both riverbanks (on the left bank as far as the Ilundáin mill and on the right as far as the junction with the pedestrian footbridge leading to the Barañáin industrial estate) between the Miluce bridge and city boundaries. About 100 000 m² will be covered.

The following measures are planned:

— Creation of a pedestrian path along the right bank with some park furniture, linking with the existing network of paths.

— General work on all of the riverbanks in the area, with reconstructive work on banks and embankments on some sections, a subsequent cleaning operation and planting with riverside species.

— Lowering of the rise at Viveros de Diputación, with subsequent reconstructive work on the embankment and planting.

— Minor work to combat erosion at various points along both banks.

— Creation of a point of passage for vessels in the weir at the Ilundáin mill.

— Aesthetic improvement of the Landaben industrial state area using plant screens.

6. **Objectives:**

(a) The general aim of the measures planned by the City Council of Pamplona under the Arga General Plan is to conserve and improve the natural value of the river and its environs, and integrate them into the existing urban structure of Pamplona, in order to create a wealth and variety of land- and cityscapes.

(b) The specific aims of this plan are:

— to encourage the natural development of a river environment so that typical ecosystems can flourish. A natural corridor through a largely urban environment will thus be created for even the most sensitive species of fauna;

— to preserve the existing course of the river by prioritising ‘soft’ measures, thus conserving a characteristic feature of the city, valuable both aesthetically and as a public utility;

— to implement correct design and treatment of the river, its banks and environs, in accordance both with existing data and a planned hydraulic study, allowing proper drainage and management of flood water in order to minimise the negative effects of flooding;

— to allow access to and passage along all riverbank areas in the city; passage from one bank to another should be possible where direct linear progress is impeded.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

(a) A cost/benefit analysis has been made based on the following premises:

— operational life of investment: 25 years;

— operating and maintenance costs;

— evaluation of environmental benefits: this group of projects, seen within the global framework of the Arga General Plan, involves the comprehensive and coordinated restoration of the River Arga and its banks within the city of Pamplona. A number of associated auxiliary measures furthermore aim to improve the urban environs of the river: recovery of lands at present used for purposes incompatible with the plan, minimisation of the negative effects of ordinary and extraordinary rises in the water level, the creation of parks and gardens, improvement of pedestrian access to the areas in the north of the city, etc.
(b) Number of inhabitants affected: 3 581 392

(c) Internal rate of return: 65%; current net value at 6% discount rate = 6 206; cost/benefit ratio = 11.7.

9. **Environmental impact analysis:**

The planned group of projects is in line with other environmental projects contributing to the fulfilment of the aims of Article 130R of the EC Treaty since it refers specifically to one of the aims of the Fifth Community Programme of policy and action: improvement of the environmental quality of urban areas and raising levels of public health and safety.

It must also be seen within the framework of the following Community Directives:

— Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora; Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds and the Bern Convention of 19 September 1979. The various projects have no environmental effect on any sensitive area; while it is true that the river as a whole is of natural interest, it cannot be considered as an area of natural interest in accordance with any of the categories defined by Community regulations, regardless of how broadly these are interpreted.

— Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water and Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection or improvement in order to support fish life; these are not applicable given that the projects in no way aim to raise levels of water purity or to create bathing areas.


10. **Cost and assistance:**

Total cost: ECU 6 383 465

<table>
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<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
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<th>Other</th>
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(1) Total eligible cost of project.

ANNEX

FINANCING PLAN

Project No: 97/11/61/019

(in ECU)
1. **Name:**

   Improvement of waste-water disposal system in the old town of Palma de Mallorca.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

   2.2. **Address:** Paseo de la Castellana, 162

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Province:** Balearic Islands

3. **Body responsible for implementation:**

   3.1. **Name:** Ayuntamiento de Palma

   3.2. **Address:** Pza. Cort, 1

   07001 Palma de Mallorca

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Province:** Balearic Islands

5. **Description:**

   a) **General**

   The purpose of this project is to renovate sanitation infrastructure in four districts in the historic centre of Palma: Bonaire-Concepció-Jaume III; Correos-Jaume II; Cort-Seu-Montisión and Sindicat-Sant Miquel.

   It is planned to replace conduits of less than 300 mm diameter, and to install a separate sewer system in the streets where storm water and sewage are still carried in the same conduits. The new conduits will be laid at various depths, in separate trenches of a width of 1,20 m. The conduits will be made of PVC, with double walls, and comply with ISO DP-9971 standards and the general technical requirements for urban sanitary conduits established by the Moptma (Ministry of Public Works), and approved by the municipal firm EMAYA, responsible for the management of the sanitation network. The project also includes the renovation of drains, siphons and connections with private dwellings, to ensure that they are adapted to the new network.

   Conduit lengths in metres are as follows:
   
   - waste water disposal: 6 594 m
   - storm water disposal: 5 426 m

   **Total length of piping:** 12 020 m
   **Area of surfacing concerned:** 27 078 m²
   **Area drained:** 43 ha

   (b) **Detailed description**

   Quantitative data for each area are described below:

   **District 1 — Bonaire-Concepció-Jaume III**

   Conduit lengths are as follows:
   
   - waste water disposal: 1 392 m
   - storm water disposal: 737 m
   **Total length of piping:** 2 129 m
   **Area of surfacing concerned:** 4 267 m²
   **Area drained:** 9,75 ha

   The total budget for District 1 is ESP 175 428 504.

   **District 2 — Correos-Jaume II**

   Conduit lengths are as follows:
   
   - waste water disposal: 1 609 m
   - storm water disposal: 1 320 m
   **Total length of piping:** 2 929 m
   **Land area concerned:** 6 890 m²
   **Area drained:** 9,11 ha

   The total budget for District 2 is ESP 256 249 532.

   **District 3 — Cort-Seu-Montisión**

   Conduit lengths are as follows:
   
   - waste water disposal: 2 057 m
   - storm water disposal: 1 871 m
   **Total length of piping:** 3 928 m
   **Land area concerned:** 8 536 m²
   **Area drained:** 15,10 ha

   The total budget for District 3 is ESP 341 708 025.

   **District 4 — Sindicat-Sant Miquel**

   Conduit lengths are as follows:
   
   - waste water disposal: 1 536 m
   - storm water disposal: 1 498 m
   **Total length of piping:** 3 034 m
   **Land area concerned:** 7 205 m²
   **Area drained:** 9,31 ha

   The total budget for District 4 is ESP 268 221 859.
6. Objectives:

The main objective is to improve conditions of sanitation in the old town, and the secondary objective is to restore the old town, which is losing inhabitants at an alarming rate.

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
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<tbody>
<tr>
<td>Construction</td>
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8. Assessment of costs and socio-economic advantages:

(a) A cost-benefit analysis has been carried out on the following basis:
- useful life of the investment: 25 years,
- operating and maintenance costs,
- charges for water supply and treatment (to cover operating and maintenance costs),
- assessment of environmental benefits: improvement in the urban environment, flood prevention, public health.

(b) The project will benefit 7,677 people.

(c) The internal rate of return is 7.8%, the net discounted value ESP 201,437 (using a discount rate of 6%), and the cost/benefit ratio is 1.2.

(d) Job creation:
- in the implementation stage: 22,000 direct jobs; 4,400 indirect jobs.

9. Environmental impact analysis:

(a) These projects are related to the objectives of Community action on the environment laid down in Article 130R of the Treaty:
- preserving, protecting and improving the quality of the environment,
- protecting human health,
- prudent and rational utilisation of natural resources.

(b) The group of projects is intended to achieve the objectives laid down in the Fifth Action Programme:
- sustainable management of natural resources, by reducing pollution of water resources;
- appropriate management of water resources;
- improved quality of the urban environment;
- better public health and safety.

(c) The aim of the project is to control and collect urban waste water in accordance with Directive 91/271/EEC concerning urban waste-water treatment. It complies with the objectives and guidelines laid down in the national plan for treatment of waste water, and in the legislation transposing Directive 91/271/EEC into national law.

10. Cost and assistance:

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ANNEX

FINANCING PLAN

Project No: 97/11/61/026

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(1) Total eligible cost of project.

PROJECT No: 97/11/61/027

1. **Name:**
   Improvement and expansion of infrastructure for the management and treatment of solid municipal waste in Getxo.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
                   28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Ayuntamiento de Getxo
   3.2. **Address:** Fueros, 8
                   48990 Getxo

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Basque country

5. **Description:**
   (a) **General**
   The municipal tip of Getxo is to be expanded because it will soon be full. The acquisition of adjacent land will provide additional tipping capacity of 785 000 m³, which will prolong the working life of the tip by more than 15 years. The purchased land will cover some 74 000 m², so that additional land will be available to receive inert waste from minor works in the municipality of Getxo.

   (b) **Specific**
   – Expansion of the site: the present total area of the tip must be expanded to cater for future waste. An adjacent plot of land some 40 m wide and 320 m long on the north-east border will therefore be purchased, to provide an additional 12 800 m². In addition, it will be
necessary to purchase a plot of land covering an area of some 22,400 m² to the east of the tip, which belongs to the Greater Bilbao water consortium.

— Access: access to the tips by the road between the Dominican Convent and the actual tip will be altered and improved to facilitate tipping from the upper platforms.

At the same time, the weighing control system will be adjusted. Unauthorised persons will be prevented from entering the tip area by an enclosure around the entire perimeter. The fence will be made of plastic-coated galvanised mesh 3 mm thick, with appropriate locks and security devices.

— Management of run-off water: perimeter drainage will be installed by making concrete trenches of adequate size to ensure that run-off water does not enter the tip. These perimeter trenches will empty into a chamber where the water quality can be checked before it is discharged. This chamber will also help equalise the flow.

— Management of leachates: All the leachates from the tip will be collected in a network independent of the run-off network. The quality of leachates will be monitored and will be appropriately treated before discharge if legal levels are exceeded.

— Biogas relief system: Biogas is generated by the fermentation of the organic matter in the waste. The degassing system will comprise equally spaced pits in which biogas will collect, connected to pipes and flares to burn off the gas. At a later date, the different alternatives for using the biogas, such as electricity generation, heating, etc. will be examined.

— Replanting and environmental rehabilitation: the creation of slopes, banks and working faces will simplify the task of replanting and rehabilitation once the tip is finally decommissioned. Local and fast-growing species available in nurseries will be chosen for replanting. It is planned to cover the entire area of the tip with topsoil and to carry out hydro-seeding.

Measures to be carried out on the rest of the land:

— Construction of a tip for inert waste generated within the municipality of Getxo by small-scale home renovation and shop-fitting.

— Construction of a transfer installation for the dispatch of waste to an energy generating plant; machinery storage areas, etc.

6. Objectives:

— To bring the tip into line with existing legislation and create ideal technical operating conditions.

— To extend the working life of the tip by 15 years.

— To install a tip for inert waste.

— To create other environmental infrastructure.

7. Work schedule:

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8. Assessment of costs and socio-economic advantages:

(a) A cost-benefit analysis was carried out on the following basis:

— investments for a working life of 15 years,

— maintenance and operating costs, rehabilitation and sealing of the tip,

— assessment of environmental benefits,

— reduction of biogas emissions into the air, reduction of soil and water pollution caused by leaching from uncontrolled tips, recovery of land for alternative use following the sealing of uncontrolled tips and the tip in question at the end of its working life, extended as a result of this project.
(b) The project will benefit 85 000 inhabitants.

(c) Internal rate of return: 21.46%; net present value (at a discount rate of 6%): ESP 487 919 000; cost/benefit ratio (at a discount rate of 6%): 2.42.

9. **Environmental impact analysis:**

These measures form part of the Community’s environmental policy, complying with the Community Directives on the environment, in particular Directive 75/442/EEC (as amended by Directive 91/156/EEC) on solid urban waste, and with the Fifth Community Programme (new strategy for the environment and sustainable development) as regards the reduction of pollution of water resources, waste management, degradation of the urban environment and damage to natural resources and biodiversity.

This group of projects also meets the objectives of the Community Regulation on the Cohesion Fund and the Green Paper on the urban environment.

The measures also contribute to the objectives of the Community’s policy on waste:

— preventing the production of waste,
— maximising the recycling and re-use of materials,
— minimising the proportion of waste which is unusable by:
  — using waste as a fuel,
  — incineration,
  — disposal in controlled tips.

By contributing to these aims, the projects comply with the general objective of rational and sustainable use of resources.


10. **Cost and assistance:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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(1) Total eligible cost of project.

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**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/027
PROJECT No: 97/11/61/028

1. **Name:**
   Treatment of waste discharged into Mediterranean rivers and coastal areas in the Autonomous Community of Valencia.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
   28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Entitat Pública de Sanejament d’Aigües
   3.2. **Address:** C/ General Elio n° 8
   46010 Valencia

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Autonomous Community of Valencia
   Municipalities: Nules, Castellón, Pinedo, Cullera, Gandia, Jávea, Calpe, Orihuela, Bétera, Segorbe, Utiel

5. **Description:**
   The group of projects includes the following work:
   (1) Collector sewers and waste-water treatment plant at Nules.
   (2) Expansion of Castellón waste-water treatment plant — second phase.
   (3) Collector sewers and waste-water treatment plant at Segorbe.
   (4) Expansion of Pinedo (Valencia) waste-water treatment plant — second phase.
   (5) Collector sewers and waste-water treatment plant at Bétera.
   (6) Collector sewers and waste-water treatment plant at Utiel.
   (7) Collector sewers and waste-water treatment plant at Cullera.
   (8) Waste-water treatment plant for the Safor Sur district (Gandia).
   (9) Collector sewers for the Safor Sur district (Gandia).
   (10) Collector sewers and waste-water treatment plant at Jávea.
   (11) Collector sewers and waste-water treatment plant at Calpe.
   (12) Collector sewers and waste-water treatment plant at Orihuela-Litoral.

5.1. **Collector sewers and waste-water treatment plant at Nules and Villavieja**

(a) **Collector sewers**
   The system of collector sewers for Nules will collect rain water and waste water with required dilution.
   The collector sewers are designed for a drainage capacity in the design year of up to 1 160 l/second, with overflow at Barranco de Juan de Mora before the waste water is treated. The collector sewers have an overall length of 1 392 m.

(b) **Waste-water treatment plant**
   This project will provide treatment for a densely populated area with considerable industrial waste throughout the year.
   The estimated average waste-water flow is 8 000 m³/day in winter and 9 000 m³/day in summer; given the small variation in seasonal flow, treatment will be similar throughout the year.
   The flow will be treated in two lines by conventional biological processing using activated sludge at average loading with pre-treatment, primary sedimentation, and activation basin and grader and disinfection of effluent. The stabilised sludge produced in the biological process is subsequently thickened and dewatered, then re-used in agriculture or disposed of in a controlled tip.
   The plant is designed for an activate sludge process at average loading, with stabilisation of sludge in an aerobic digestor. It also has an automated integrated control system for operation, influent/effluent parameters and management, run from a central master computer and automated control panels using software specially configured for this plant.
5.2. Expansion of the Castellón treatment plant — second phase

The treatment system for the city of Castellón, provincial capital and fourth most populous city in the Autonomous Community of Valencia, is to be expanded.

At present the treatment system includes a complete plant with secondary treatment for 37,500 m$^3$/day and primary treatment for another 37,500 m$^3$/day; treated water that is not re-used is piped into the sea through an underwater outfall 2,700 m from the shore.

This project will provide secondary biological treatment for the 20,000 m$^3$/day that currently receives only primary treatment, in order to make more water available for irrigation and to improve the quality of the underwater discharge.

The expansion involves a conventional treatment system using activated sludge at average loading.

The possibility is also being studied of filtering all of the water treated biologically in Castellón, both currently and after the expansion; this would provide a volume of up to 500 l/second of filtered disinfected water for irrigation.

The biological sludge produced will be digested anaerobically and then dewatered. It will be used in agriculture or disposed of in a controlled tip.

The appropriate control, automation and management equipment will also be installed.

5.3. Collector sewers and waste-water treatment plant at Segorbe

(a) Collector sewers

The collector sewer system will collect rain water and waste water, with suitable dilution, from the population centres of Geldo, Castellnovo, Altura, Segorbe and Peñalba (administratively belonging to Segorbe); it is also planned to include Navajas.

The treatment plant has a planned maximum flow of 305.6 l/second, with overflow into the Palancia river at the start of each stretch of collector sewers and prior to the Palancia river treatment plant. There is a total of 11,222 m of collector sewers (not including the sewers for Navajas) of which only 1,692 m are force mains with two pump stations.

(b) Waste-water treatment plant

This project will provide treatment for a large zone almost co-extensive with the district of Alto Palancia, affecting water quality along the upper stretches of the river.

The estimated flow is 3,200 m$^3$/day in winter and 5,800 m$^3$/day in summer, so that the plant must be flexible enough to cover both seasons. The estimated population equivalent is 16,300 in winter and 30,000 in summer.

The flow will be treated in a biological line using activated sludge at low loading (oxidation channel), with a pre-treatment capacity of up to 1,100 m$^3$/h. The effluent will then be disinfected before being discharged into the Palancia river or re-used in irrigation.

The sludge generated will be thickened and dewatered. It can be re-used in agriculture or disposed of in a controlled tip.

There will also be an integrated automatic control system, with all the necessary hard- and software specially configured for this plant.

5.4. Expansion of the Pinedo II treatment plant

The treatment system in the Pinedo II waste-water treatment plant is to be expanded. The plant serves the city of Valencia and a number of municipalities in its metropolitan area. At present it is equipped with primary treatment with flocculation and sedimentation, and an underwater outfall. This second expansion aims at providing biological treatment for 185,000 m$^3$/day.

Once the Pinedo II plant has been equipped with biological treatment facilities, it will, together with the Pinedo I plant (which already has biological treatment), provide a total of 310,000 m$^3$/day with secondary treatment.

Biological treatment will use a process of activated sludge at average loading, aeration using fine bubble diffusers, and suction sedimentation.

The possibility is also being studied of providing tertiary treatment for about a third of the flow, using flocculation, precipitation and filtering...
prior to disinfecting; this water might then be used for supplying the lake of Albufera.

The fraction of water which does not receive tertiary treatment will be disinfected before being discharged through the outfall or re-used for irrigation.

The new sludge produced will be stabilised using anaerobic digestion and then dewatered by centrifugation prior to thermal drying. The sludge will finally be re-used in agriculture or disposed of in a controlled tip.

The plant will be provided with all necessary electrical and control equipment, automation, the soft- and hardware required for its operation and facilities for controlling environmental impact (mainly noise and odour).

5.5. Collector sewers and waste-water treatment plant at Bétera

(a) Collector sewers

The collector sewer system which will serve Bétera will collect rain and waste water, with suitable dilution.

The planned collector sewers will provide a drainage-capacity of 1 800 l/second by the design year, with overflow at Barranco del Carraixet prior to treatment. The total length of the collector sewers is 5 849 m.

(b) Waste-water treatment plant

This measure provides waste-water treatment for a densely populated area with the beginnings of year-round industrial activity; the estimated population equivalent is 15 000.

The estimated average year-round flow is 2 400 m³/day. There is little variation between summer and winter, so treatment is planned for a constant flow. The flow is treated with a conventional biological process in one line using activated sludge at low loading, with pre-treatment, an extended aeration basin and clarifier, and disinfecting of the effluent.

The biologically treated water will be used for irrigation or discharged into the Barranco del Carraixet.

The sludge produced in the extended aeration basin will subsequently be thickened and dewatered for re-use in agriculture or disposal in a controlled tip.

There will also be an automated integrated control system with a central master computer and automated control panels, as well as software suitable for this type of plant.

5.6. Collector sewers and waste-water treatment plant at Utiel

(a) Collector sewers

The collector sewer system which will serve Utiel will collect rain water and waste water, with suitable dilution.

It is planned that the collector sewers will progressively discharge into the Magro river, along which they run, so that only the diluted flow to be treated in the plant (202,54 l/second) will be pumped to the treatment plant on the other side of the river from the town.

In all there are 4 300 m of collector sewers, only 270 m of which are force mains from a single pump station.

(b) Waste-water treatment plant

This measure provides treatment for a population centre very much affected by pollution from dense agricultural industrialisation of a seasonal nature.

There is a two-stage in-line biological process for an average peak flow of 145,8 m³/h, preceded by pre-treatment for up to 729,6 m³/h and followed by disinfecting. The flow variation is due to a high dilution flow, since this is a single sewer system and a significant improvement in the quality of the river water is desired.

The sludge produced is stabilised using anaerobic digestion and thickened and dewatered before being re-used in agriculture or disposed of in a controlled tip.

The plant has an automated integrated control system.
5.7. Collector sewers and waste-water treatment plant at Cullera

(a) Collector sewers

The collector sewer network which will serve Cullera will collect rain water and waste water, with suitable dilution.

Collector sewers are planned with drainage capacity of 2 900 l/second by the design year, with overflow into the Júcar river prior to treatment.

There is a total of 12 045 m of collector sewers with three intermediate pump stations.

(b) Waste-water treatment plant

Treatment is planned for a densely populated area with a very large population increase in the summer because Cullera is a tourist resort. The resident population is 20 336; the population equivalent in summer is 100 000 in summer.

This is an exclusively urban measure for a densely populated area with all discharge into the bay of Cullera, which is a sensitive area for the purposes of Directive 91/271/EEC.

The plant has been designed with the only Orbal-type biological reactor capable of dealing with the expected flow variations, in a low-loading carousel system with nitrification-denitrification and biological elimination of phosphorus; the addition of thermic salts is planned if this should prove necessary.

The water treated biologically will be used for irrigation or discharged into the river.

The stabilised sludge produced in the biological process will be thickened and dewatered for re-use in agriculture or disposed of in a controlled tip.

There is also an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automatic switchboards, and relevant software specified for this type of plant.

5.8. Gandía-Safor Sur waste-water treatment plant

This measure provides for the drainage of a large densely populated area with a 50% summer increase. The average population equivalent is 280 000.

The estimate waste water flows are 40 000 m³/day in winter and 60 000 m³/day in summer. Given the large seasonal variation, differentiated treatment is planned.

The 40 000 m³/day winter flow (and the same quantity of the summer flow) will be treated with a conventional line using activated sludge at average loading, with primary pre-treatment, activation basin, grading and disinfecting. The sludge will be anaerobically digested and then dewatered by centrifugation.

The additional 20 000 m³/day bringing the flow up to its summer average of 60 000 m³/day will receive pre-treatment with coagulation-flocculation and primary sedimentation. The sludge from this process will also be digested, then re-used in agriculture or disposed of in a controlled tip.

The biologically treated water will be used for irrigation or discharged into the Serpis river; summer peak flows which will have received only primary treatment will be discharged into the sea through the existing outfall.

There will also be an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.9. General collector sewers for Gandía and Safor Sur

The project is composed of a general system of collector sewers connecting all the local municipal systems covered by the measure.

A single network of collector sewers is planned, with a system of overflows for rainwater into the local public waterways. Water is piped to the Gandia-Safor Sur plant for treatment. A total of 18 555 m of collector sewers is to be constructed, using various types of piping of diameters varying between 400 and 1 000 mm (47% are large diameter = 1 000 mm).

The sewer system is designed to convey urban and industrial discharge from the municipalities covered by the measure to the treatment plant. The following measures are planned:

— Safor Sur general collector sewer;
— Safor Oeste general collector sewer;
— collector sewers linking the existing and planned waste-water treatment plants;
— interceptor sewer at Gandía;
— other collector sewers (secondary lines).

5.10 Collector sewers and waste-water treatment plant at Jávea

(a) Collector sewers

A total of 7 621 m of collector sewers with five intermediate pump stations is planned.

(b) Waste-water treatment plant

Waste-water treatment is planned for an area heavily affected by tourism, which more than doubles its population in summer. The design parameters are for a population equivalent of 39 200.

The planned flow for treatment is 4 200 m³/day in winter and 8 400 m³/day in summer. All waste water will receive biological treatment with elimination of nitrogen and phosphorus, since the bay of Jávea has been declared a sensitive area.

The plant has been designed for an activated sludge process at very low loading with stabilisation of sludge in the reactor itself and addition of metallic salts to control phosphorus.

Most of the treated water will be used for irrigation, so phosphorus removal will only be necessary for water discharged into the sea.

The stabilised sludge produced in the biological process will be thickened and dewatered for use in agriculture or disposed of in a controlled tip.

There will also be an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.11. Collector sewers and waste-water treatment plant at Calpe

(a) Collector sewers

The system of collector sewers for Calpe will collect rain water and waste water, with suitable dilution.

(b) Waste-water treatment plant

Waste-water treatment is to be provided for an area heavily affected by tourism, which more than doubles its population in summer.

The planned treatment flow is 5 600 m³/day in winter and 11 200 m³/day in summer, all treated biologically and with elimination of nitrogen and phosphorous, since the bay of Calpe has been declared a sensitive area.

The plant has been designed for an activated sludge process at very low loading, with stabilisation of sludge in the reactor itself and addition of metallic salts to control phosphorous.

Treated water will be discharged through the underwate outfall, though it would be suitable for irrigation if the need arose.

The stabilised sludge produced in the biological process is thickened and dewatered for use in agriculture or disposal in a controlled tip.

There is also an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.12. Collector sewers and waste-water treatment plant at Orihuela-Litoral

(a) Collector sewers

The system of collector sewers for Orihuela is a single one which will collect rain water and waste water, with suitable dilution.

A total of 14 880 m of collectors is planned with five intermediate pump stations.

(b) Waste-water treatment plant

Orihuela is a large coastal area covering some 2 700 hectares, primarily a location for second homes, with a summer population of 90 000 and a winter population of 7 000.
Since the average annual rainfall in the area is under 300 mm, as much as possible of the treated water will be used for irrigation.

The treatment line will have a flow of 18,000 m$^3$/day, of which 12,000 will be biological and 6,000 m$^3$/day primary treatment only, with physical-chemical treatment for the peak demand periods in August.

The water receiving biological treatment with primary treatment, activated sludge at average loading, disinfecting and aerobic sludge digestion will be used for irrigation, while the portion receiving only physical-chemical treatment will be discharged into the public waterways.

The stabilised sludge produced in the biological process will be thickened and dewatered for use in agriculture or disposed of in a controlled tip.

Sludge from the primary line will be stabilised with lime and sent to a tip.

6. **Objectives:**

The projects are in line with the master plan for waste-water disposal and treatment in the Autonomous Community of Valencia and contribute to the objectives of the section of the Spanish Government’s national plan for waste-water treatment which applies to Valencia.

The main objective is to provide waste-water treatment to all population centres with more than 500 inhabitants, thereby complying more than adequately with Directive 91/271/EEC.

The present project aims to provide some form of treatment for 15% of the population equivalent provided for in the national plan.

The main technical parameters of the population to be covered and the quality of the water to be obtained in each treatment station are:

<table>
<thead>
<tr>
<th></th>
<th>Nules</th>
<th>Castellón</th>
<th>Segorbe</th>
<th>Bétera</th>
<th>Pinedo 2 (Second expansion)</th>
<th>Utiel</th>
<th>Cullera</th>
<th>Gandia (plant)</th>
<th>Jávea</th>
<th>Calpe</th>
<th>Orihuela-Litoral</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present population</td>
<td>11,535</td>
<td>67,535</td>
<td>12,500</td>
<td>10,000</td>
<td>365,000</td>
<td>12,000</td>
<td>20,336</td>
<td>77,115</td>
<td>16,244</td>
<td>11,525</td>
<td>7,000</td>
<td>610,790</td>
</tr>
<tr>
<td>Seasonal population</td>
<td>10,000</td>
<td>12,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design population equivalent (p.e.)</td>
<td>30,000</td>
<td>146,250</td>
<td>35,000</td>
<td>20,000</td>
<td>478,225</td>
<td>46,000</td>
<td>100,000</td>
<td>280,020</td>
<td>39,200</td>
<td>42,500</td>
<td>90,000</td>
<td>1,307,195</td>
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<td>BOD$_5$ on entry</td>
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<td>250</td>
<td>305</td>
<td>375</td>
<td>235</td>
<td>250</td>
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<td>250</td>
<td>280</td>
<td>280</td>
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<td>300</td>
</tr>
<tr>
<td>SS on entry</td>
<td>300</td>
<td>300</td>
<td>350</td>
<td>450</td>
<td>240</td>
<td>567</td>
<td>300</td>
<td>270</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>SS on exit</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Industrial waste</td>
<td>61%</td>
<td>53%</td>
<td>0</td>
<td>0</td>
<td>24%</td>
<td>74%</td>
<td>0</td>
<td>15%</td>
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<td>0</td>
<td>0</td>
<td>287,405</td>
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7. **Work schedule:**

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<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.3.1995</td>
<td>30.6.1998</td>
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</table>

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- operational life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = between 3 and 10%.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged,
- re-use of water.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are:

- For an environmental sensitivity coefficient of 1.5, the internal rate of return obtained is 19% for the group of projects, the present discounted value being positive for discount rates below 7%.

- For an environmental sensitivity coefficient of 2, the IRR obtained is 22%, the present discounted value being positive for discount rates below 8%.

9. **Environmental impact analysis:**

(1) The project is intended to improve the quality of water and provide sewer systems and waste-water treatment to municipalities previously lacking them and allows water to be re-used for ecological purposes. The group of projects is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies Directive 91/271/EEC.

The work involves the collection and treatment of waste water, preventing untreated discharge. Given its nature and location, this type of measure considerably increases the quality of water for bathing, even in population centres with a population equivalent of less than 150 000.

Since these are urban centres of great importance to tourism (Orihuela-Litoral, Calpe, Jávea, Gandía and Cullera), the measure has considerable impact on health and the use of natural resources for tourism.

The Pinedo measure, for example, will help re-supply water to the lake of Albufera, a sensitive area in the Autonomous Community of Valencia.

The measures are preventive in that they involve the construction of complete waste-water disposal systems (sewers and treatment plants) in municipalities which do not as yet have them or they expand secondary treatment in plants already operating.

(2) The collector sewers planned in the project must be connected to a treatment plant before they are put into operation.

(3) Sludge from the planned treatment plants used in agriculture must meet the requirements of Directive 86/278/EEC.

10. **Cost and assistance:**

Total cost: ECU 94 245 329

Eligible cost (after 12 May 1997): ECU 93 764 644

Rate of assistance: 80%

Cohesion Fund grant: ECU 75 011 715
Breakdown of total eligible cost by project (in ECU):

Collector sewers and treatment plant at Nules 3 003 905
Expansion of Castellón treatment plant — second phase 6 608 591
Collector sewers and treatment plant at Segorbe 4 326 825
Expansion of Pinedo (Valencia) treatment plant — second phase 29 193 037
Collector sewers and treatment plant at Bétera 2 249 324
Collector sewers and treatment plant at Utiel 5 563 232
Collector sewers and treatment plant at Cullera 9 179 934
Collector sewers and treatment plant at Safor Sur (Gandia) 14 918 288
Collector sewers and treatment plant at Jávea 6 428 549
Collector sewers and treatment plant at Calpe 4 769 979
Collector sewers and treatment plant at Orihuela-Litoral 7 522 980

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**ANNEX**

**FINANCING PLAN**

**Project No: 97/11/61/028**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>Total public expenditure</td>
<td>Cohesion Fund</td>
<td>National authorities</td>
</tr>
<tr>
<td></td>
<td>2+4+6+10</td>
<td>% 3=2/1</td>
<td>4</td>
<td>% 5+4/2</td>
</tr>
<tr>
<td>1997</td>
<td>11 411 913</td>
<td>11 411 913</td>
<td>100</td>
<td>9 129 530</td>
</tr>
<tr>
<td>1998</td>
<td>30 814 245</td>
<td>30 814 245</td>
<td>100</td>
<td>24 651 397</td>
</tr>
<tr>
<td>1999</td>
<td>38 952 028</td>
<td>38 952 028</td>
<td>100</td>
<td>31 161 622</td>
</tr>
<tr>
<td>2000</td>
<td>12 586 458</td>
<td>12 586 458</td>
<td>100</td>
<td>10 069 166</td>
</tr>
<tr>
<td>Total</td>
<td>93 764 644</td>
<td>93 764 644</td>
<td>100</td>
<td>75 011 715</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/030

1. **Name:**
   Waste-water treatment in Andalusia.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
   28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Junta de Andalucía Dirección General de Obras Hidráulicas
   3.2. **Address:** Avda. República Argentina 43, 2a. y 3a
   41011 Seville

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Andalusia

5. **Description:**
   The aim of the group of projects covered by this application is to reduce the impact of pollution from urban sewage on public waterways and on the coast, in the context of the general planning of the Junta de Andalucía in line with Community regulations in this sphere.

   The first two projects concern the two main urban centres in Andalusia (Seville, Project I and Málaga, Project 2). Project 3 aims at collecting the waste water from both Cadiz and San Fernando, one of the largest centres in Andalusia in terms of population equivalent.

   Projects 4, 5 and 6 (Linears, Andújar and Bailén) are located on the upper Guadalquivir river. The river authorities have been issuing continuous warnings on the precarious situation now existing along this stretch of river due to the establishment there of industries with a pollution potential and because of a number of medium-sized cities very nearby.

   Project 7 (La Ballena) is located in an area only now opening up to tourism, but which has great tourist potential and cannot afford to be handicapped by coastal waters polluted by untreated sewage.

5.1. **Guadalhorce (Málaga) waste-water treatment plant second phase**

   This plant currently treats half of all urban waste-water discharge for Málaga and its metropolitan area, and provides only pre-treatment. The project involves installing a conventional treatment plant using activated sludge at average loading.

   The main elements of the planned expansion are described below:
   - Expansion of the present grit and grease removal facility from six lines to seven.
   - Primary sedimentation: 12 lines of rectangular settling basins, including 10 equipped with a rotating bridge, skimmers and bottom scrapers.
   - Removal of primary sludge.
   - Aeration tank: six parallel lines.
   - Secondary sedimentation: 12 lines of rectangular settling basins with rotating bridge, skimmers and bottom scrapers.
   - Recirculation of sludge and thickening of primary sludge in three gravity thickening lines.
   - Removal and thickening of excess sludge.
   - Mixing and pumping of thickened sludge.
   - Anaerobic digestion in five digestors.
   - Aerobic-anaerobic digestion in addition to the above during the summer season.
   - Storage of thickened sludge.
   - Storage of gas produced in sludge thickening process.
   - Sludge dewatering
   - Energy recovery.

5.2. **Expansion of Copero (Seville) waste-water treatment plant**

   Although the existing plant treats waste water from a population equivalent of approximately one million, it provides only primary treatment. Inclusion of biological treatment and expansion of the sludge treatment facilities are therefore required.
The project includes the following:

— Aeration tank: eight parallel lines.
— Secondary sedimentation: eight lines of circular suction settling basins equipped with a diametric rotating bridge.
— Recirculation of sludge.
— Removal and thickening of excess sludge.
— Pumping of thickened sludge.
— Pumping to digestors.
— Anaerobic digestion in three digestors.
— Storage of digested sludge.
— Sludge dewatering.

5.3. Cadiz-San Fernando waste-water treatment plant

This is a new plant built to provide centralised treatment for these two coastal municipalities, using a conventional system using activated sludge at average loading.

The plant will include the following:

— Intake unit: reception tank with spillway and general by-pass.
— Solids removal: three lines for mechanical removal of coarse and fine solids with bar screens.
— Grit and grease removal: three longitudinal aerated channels.
— Primary sedimentation: three lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
— Removal of primary sludge.
— Aeration tank.
— Secondary sedimentation: three lines of circular settling basins.
— Recirculation of sludge.
— Storage of digested sludge.
— Gasometer.
— Sludge dewatering.

5.4. Linares (Jaén) waste-water treatment plant

This project involves the construction of a new plant equipped with activated sludge technology for the treatment of waste-water discharged in this population centre. Its main elements include:

— Intake and lifting of raw sewage, reception chamber with spillway and general by-pass.
— Mechanically cleaned unit for removal of coarse solids.
— Grit and grease removal: two longitudinal aerated channels, grit grader and grease concentrator.
— Primary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
— Removal of primary sludge.
— Aeration tank: two parallel lines.
— Secondary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
— Recirculation of sludge.
— Removal and thickening of primary sludge.
— Pumping of sludge to digestors.
— Anaerobic digestion: mixing using biogas through a compressor.
— Storage of digested sludge.
— Gasometer.
— Sludge dewatering.

5.5. Andújar (Jaén) waste-water treatment plant

This project involves the construction of a new plant equipped with extended aeration or total oxidation technology. Its main elements are:

— Solids removal: two fine screening lines with automatic screens and one auxiliary unit with manual screen.

— Grit and grease removal: two longitudinal aerated channels, grit grader and grease concentrator.

— Aeration tank: two parallel lines.

— Secondary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmer and bottom scrapers.

— Recirculation of sludge.

— Removal and thickening of excess sludge.

— Sludge dewatering.

5.6. Bailén (Jaén) waste-water treatment plant

As in the previous project, this is a new plant with extended aeration, including the following main elements:

— Intake unit: reception chamber with spillway and general by-pass.

— Solids removal: one channel with mechanical bar screen for coarse solids and fine screening. An auxiliary channel with manual screen.

— Grit and grease removal: one longitudinal aerated channel, grit grader and grease concentrator.

— Aeration tank: one line.

— Secondary sedimentation: one line of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.

5.7. Expansion of La Ballena waste-water treatment plant, Rota (Cádiz)

This project involves providing a developing tourist complex with the necessary infrastructure to treat waste water in an extended aeration plant. The treated effluent will be re-used for irrigation.

The main elements of the expansion are:

— Aeration tank: two parallel lines.

— Secondary sedimentation: two circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.

— Tertiary treatment: filtration in three sand beds.

— Disinfecting using chlorine gas in the filtered-water tank.

— Equipment for preparing and proportioning the chlorine gas.

— Recirculation of sludge.

— Removal and thickening of excess sludge.

— Sludge dewatering.

6. Objectives:

The group of projects planned is in line with the measures provided for in the plan for water supply and waste-water disposal infrastructure for Andalusia, which in turn adopts the basic criteria of the Spanish Government’s national plan for waste-water treatment.

The general aim of all of these projects thus covers the following priorities:

— to provide a response to large-scale pollution by capitals or large urban centres (Projects 1, 2 and 3);

— to solve the problem of the so-called ‘critical points’, or stretches of river which, because of their particular morphology or nearby industrial developments generating a high level of pollution, have suffered a serious decline in water quality (Projects 4, 5 and 6);

— to minimise coastal discharge of waste-water. Tourism, concentrated mainly along the coast, is one of the main sources of revenue for Andalusia and one of the main driving forces behind its economy (Project 7).
The main parameters relating to the population to be covered and the quality of water desired are as follows:

<table>
<thead>
<tr>
<th>Plant Location</th>
<th>Present Population</th>
<th>Present Population Equivalent (p.e.)</th>
<th>Design Population</th>
<th>Design Population Equivalent (p.e.)</th>
<th>Total Average BOD$_5$ on Entry (mg/l)</th>
<th>Total Average BOD$_5$ on Exit (mg/l)</th>
<th>Total Average SS on Entry (mg/l)</th>
<th>Total Average SS on Exit (mg/l)</th>
<th>Average Daily Volume of Water (m$^3$/day)</th>
<th>Industrial Waste (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalhorce plant (second phase) (Malaga)</td>
<td>450 000</td>
<td>575 000</td>
<td>700 000</td>
<td>288</td>
<td>&lt;25</td>
<td>308</td>
<td>&lt;25</td>
<td>175 350</td>
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<td></td>
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<tr>
<td>El Copero, Sur Plant (Seville)</td>
<td>800 000</td>
<td>1 050 000</td>
<td>1 050 000</td>
<td>210</td>
<td>&lt;25</td>
<td>90</td>
<td>&lt;30</td>
<td>255 000</td>
<td>23,81</td>
<td></td>
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<tr>
<td>Cadiz San Fernando plant</td>
<td>240 000</td>
<td>180 000</td>
<td>300 000</td>
<td>300</td>
<td>&lt;25</td>
<td>300</td>
<td>&lt;35</td>
<td>75 000</td>
<td>14,29</td>
<td></td>
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<tr>
<td>Linares plant</td>
<td>55 000</td>
<td>60 000</td>
<td>60 000</td>
<td>235</td>
<td>&lt;25</td>
<td>313</td>
<td>&lt;30</td>
<td>11 873</td>
<td>8,33</td>
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<tr>
<td>Andujar plant</td>
<td>32 000</td>
<td>39 000</td>
<td>45 000</td>
<td>350</td>
<td>&lt;25</td>
<td>360</td>
<td>&lt;35</td>
<td>9 418</td>
<td>17,95</td>
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<tr>
<td>Bailen plant</td>
<td>16 500</td>
<td>17 272</td>
<td>22 997</td>
<td>260</td>
<td>&lt;25</td>
<td>320</td>
<td>&lt;35</td>
<td>5 549</td>
<td>4,47</td>
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<td>Costa Ballena plant</td>
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<td>24 971</td>
<td>85 000</td>
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<td>&lt;20</td>
<td>17 700</td>
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7. **Work schedule:**

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<tr>
<th>Category of work</th>
<th>Commencement</th>
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<tbody>
<tr>
<td>Preparation of project</td>
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<td>Main work</td>
<td>December 1995</td>
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</tr>
<tr>
<td>Operational phase</td>
<td>Januar 2000</td>
<td>—</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- operational life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = 4%.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The internal rates of return obtained vary between 7% for the Guadalhorce expansion project and 19.5% for the El Copero Sur waste-water treatment plant in Seville.

9. **Environmental impact analysis:**

This project improves the quality of water by providing treatment facilities to municipalities which lacked them or by expanding and improving existing facilities. It also permits the re-use of water for ecological ends in certain cases. The project is therefore a coherent one, consistent with the objectives set out in Article 130R of the
EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies with Directive 91/271/EEC. The measures provided for in it are both preventive (voiding the possibility of environmental problems which might even affect human health) and palliative (reducing the pollution loading of discharge downstream of the treatment plants concerned).

10. **Cost and assistance:**

   **Total cost:** ECU 78 082 930

   **Eligible cost (after 14 May 1997):** ECU 66 623 551

   **Rate of assistance:** 80%

   **Cohesion Fund grant:** ECU 53 298 841

---

**ANNEX**

**FINANCING PLAN**

**Project No:** 97/11/61/030

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/031

1. **Name:**

Waste-water disposal and treatment in population centres in the network of protected natural areas in the Autonomous Community of Andalusia.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Medio Ambiente Dirección General de Protección Ambiental

3.2. **Address:** Avda. de Leonardo Da Vinci s/n, 41011 Seville

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Andalusia

5. **Description:**

The project aims to equip 55 population centres in 47 municipalities with waste-water treatment plants, together with the necessary collector sewer systems, discharge from which affects the network of protected areas declared under the laws of the Autonomous Community of Andalusia.

The main criteria taken into account in defining each of these individual projects are:

1. To supply the respective population centres with collector systems (with weighting of technical and economic factors) and with relief systems in case of heavy rainfall based on acceptable dilution coefficients.

2. To minimise the need for force mains and the installation of equipment.

3. To use low-cost treatment technology.

4. To provide simple systems for the treatment of sludge given the mainly domestic origin of the water to be treated.

5. All projects must ensure the secondary treatment of waste water.

6. All effluents discharged into natural water courses must comply with the relevant European Union requirements.

A brief description is given below of each individual project, giving its title, the population centre affected, its municipality and province, the protected area concerned, the treatment system and the work and equipment involved:

5.1. **Waste-water treatment plant in Escullar**

— Population centre (municipality/province): Escullar (Escullar/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and chlorination.

5.2. **Waste-water treatment plant in Bayarcal**

— Population centre (municipality/province): Bayarcal (Bayarcal/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and chlorination.

5.3. **Waste-water treatment plant in Alhama de Almería**

— Population centre (municipality/province): Alhama de Almeria (Canjayar/Almeria).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and chlorination.

5.4. **Waste-water treatment plant in Abrucena**


— Protected area: Parque Natural de Sierra Nevada.
— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.5. Waste-water treatment plant in Fiñana

— Population centre (municipality/province): Fiñana (Fiñana/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds and maturation lagoon.

— Work and equipment: earthworks, pre-treatment, peat beds, piping, maturation lagoon, surfacing, hut.

5.6. Collector sewer and urban sewage treatment plant project Ocaña-Doña María

— Population centre (municipality/province): Ocaña-Doña María (Fiñana/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.7. Waste-water treatment plant in Canjayar

— Population centre (municipality/province): Canjayar (Canjayar/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.8. Waste-water treatment plant in Ohanes

— Population centre (municipality/province): Ohanes (Ohanes/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: pre-treatment, peat bed, maturation lagoon.

— Work and equipment: collector sewers, pre-treatment, peat beds, maturation lagoon.

5.9. Collector sewer and urban sewage treatment plant project in Paterna del Río


— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.10. Collector sewer and urban sewage treatment plant in Laujar

— Population centre (municipality/province): Laujar de Andarax (Laujar de Andarax/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds.

— Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.11. Waste-water treatment plant in Fondón

— Population centre (municipality/province): Fondón (Berja/Almería).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: peat beds, maturation lagoon.

— Work and equipment: pre-treatment, collector sewers, peat beds, maturation lagoons.

5.12. Waste-water treatment plant in Trevelez

— Population centre (municipality/province): Trevelez (Trevelez/Granada).

— Protected area: Parque Natural de Sierra Nevada.

— Treatment system: aeration, sedimentation, sludge recirculation and thickening.

— Work and equipment: separate collector sewers and treatment plant.
5.13. Waste-water treatment plant in Pechina

- Population centre (municipality/province): Pechina (Pechina/Almería).
- Protected area: Parque Natural de la Sierra Alhamilla.
- Treatment system: lagooning.
- Work and equipment: pre-treatment, anaerobic and aerated lagooning.

5.14. Waste-water treatment plant in Tabernas

- Population centre (municipality/province): Tabernas (Tabernas/Almería).
- Protected area: Paraje Natural Desierto de Tabernas.
- Treatment system: peat bed.
- Work and equipment: collector system, peat bed system.

5.15. Waste-water treatment plant in Sorbas

- Population centre (municipality/province): Sorbas (Sorbas/Almería).
- Protected area: Paraje Natural Karst en Yesos de Sorbas.
- Treatment system: peat bed.
- Work and equipment: collector system, peat bed system.

5.16. Waste-water treatment plant in Puente de la Cerrada

- Population centre (municipality/province): Puente de la Cerrada (Cazorla/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: sedimentation-digestion and bacterial bed.
- Work and equipment: reception chamber and by-pass, grease separation chamber, sedimentation-digestion basin and bacterial bed.

5.17. Waste-water treatment plant in Valdecazorla

- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: sedimentation-digestion and bacterial bed.
- Work and equipment: inlet chamber and by-pass, grease separation chamber, sedimentation-digestion basin and bacterial bed.

5.18. Waste-water treatment plant in Veracruz

- Population centre (municipality/province): Veracruz (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.19. Waste-water treatment plant in Solana de Torralba

- Population centre (municipality/province): Solana de Torralba (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.20. Waste-water treatment plant in El Molar

- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.21. Waste-water treatment plant in Donadio

- Population centre (municipality/province): Donadio (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
— Treatment system: biological treatment with extended aeration.
— Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.22. Waste-water treatment plant in Aldeaquemada
— Protected area: Paraje Natural Cascada de Cimbarra.
— Treatment system: biological treatment with extended aeration in two lines.
— Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.23. Waste-water treatment plant in Chilluevar
— Population centre (municipality/province): Chilluevar (Chilluevar/Jaén).
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.

5.24. Waste-water treatment plant in Orcera
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.

5.25. Waste-water treatment plant in Segura de la Sierra
— Population centre (municipality/province): Segura de la Sierra (Segura de la Sierra/Jaén).
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: bacterial bed and forced aeration.
— Work and equipment: pre-treatment, primary sedimentation basin, bacterial bed, forced aeration.

5.26. Waste-water treatment plant in Génave
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: bacterial bed.
— Work and equipment: solids removal, grease, stabilisation tank, biological treatment and secondary sedimentation.

5.27. Waste-water treatment plant in Fuente Segura
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.

5.28. Waste-water treatment plant in La Matea
— Population centre (municipality/province): La Matea (Santiago Pontones/Jaén).
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.

5.29. Waste-water treatment plant in Benatae
— Population centre (municipality/province): Benatae (Benatae/Jaén).
— Protected area: Parque Natural de Cazorla, Segura y Las Villas.
— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.


5.30. Waste-water treatment plant in Hornos


— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.


5.31. Waste-water treatment plant in Huesa

— Population centre (municipality/province): Huesa (Huesa/Jaén).

— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: bacterial bed.

— Work and equipment: pre-treatment, anaerobic lagoons, bacterial bed.

5.32. Collectors and waste-water treatment plant in Cortijos Nuevos

— Population centre (municipality/province): Cortijos Nuevos (Segura de la Sierra/Jaén).

— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: extended aeration.

— Work and equipment: pre-treatment, aeration, secondary sedimentation, sludge thickener and drying beds.

5.33. Collector sewers and waste-water treatment plant in Hinojares

— Population centre (municipality/province): Hinojares (Jaén).

— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: extended aeration.

— Work and equipment: reception unit, solids removal, grease removal, anoxic chamber, aeration unit, sedimentation, thickener.

5.34. Waste-water treatment plant in Santo Tomé


— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: extended aeration.

— Work and equipment: inlet unit, solids removal, grease removal, anoxic chamber, aeration unit, sedimentation, thickener.

5.35. Waste-water treatment plant in La Iruela

— Population centre (municipality/province): La Iruela (La Iruela/Jaén).

— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: biological treatment with extended aeration.

— Work and equipment: pre-treatment, compact tank for biological treatment, disinfecting unit and sludge tank.

5.36. Waste-water treatment plant in Arroyo Frío

— Population centre (municipality/province): Arroyo Frío (La Iruela/Jaén).

— Protected area: Parque Natural de Cazorla, Segura y Las Villas.

— Treatment system: physico-chemical treatment.


5.37. Waste-water treatment plant in Huelma


— Protected area: Parque Natural de Sierra Mágina.

— Treatment system: extended aeration.

— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.
5.38. Waste-water treatment plant in Pegalajar
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.39. Waste-water treatment plant in Bedmar
— Population centre (municipality/province): Bedmar (Bedmar/Jaén).
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pumping, pre-treatment, extended aeration, disinfecting and sludge thickening.

5.40. Waste-water treatment plant in Jimena
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.41. Waste-water treatment plant in Úbeda
— Population centre (municipality/province): Albanchez de Úbeda (Albanchez de Úbeda/Jaén).
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.42. Waste-water treatment plant in Jódar
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.43. Waste-water treatment plant in Cambil
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.44. Waste-water treatment plant in Carchelejo
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.45. Waste-water treatment plant in Torres
— Population centre (municipality/province): Torres (Torres/Jaén).
— Protected area: Parque Natural de Sierra Mágina.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.46. Building of collector sewers and treatment plants
— Population centre (municipality/province): Castril, Fuente Vera and Las Almontaras (Castril/Granada).
— Protected area: Parque Natural de la Sierra de Castril.
— Treatment system: biological treatment using rotating biological contactors and Imhoff tanks.
— Work and equipment: desander, degreaser, Imhoff tank, biocylinders, secondary sedimentation basin and reservoir.

5.47. Waste-water treatment plant in Alcalá de los Gazules
— Protected area: Parque Natural de los Alcornocales.
— Treatment system: percolating filter.
— Work and equipment: pre-treatment, anaerobic lagoons, percolating filter, secondary sedimentation.

5.48. Waste-water disposal for Pozo del Camino and la Redondela
— Population centre (municipality/province): Isla Cristina (Isla Cristina/Huelva).
— Protected area: Paraje Natural Marismas del Río Carrera.

5.49. Waste-water treatment plant in Aracena
— Protected area: Parque Natural de la Sierra de Aracena.
— Treatment system: bacterial bed.
— Work and equipment: pre-treatment, anaerobic lagoons, bacterial bed, secondary sedimentation basin.

5.50. Waste-water treatment plant for Jabugo, Los Romeros and El Repilado
— Protected area: Parque Natural de la Sierra de Aracena.
— Treatment system: extended aeration.
— Work and equipment: pre-treatment, primary sedimentation, biological reactor, secondary sedimentation.

5.51. Waste-water treatment plant in Cumbres Mayores
— Population centre (municipality/province): Cumbres Mayores (Cumbres Mayores/Huelva).
— Protected area: Parque Natural de la Sierra de Aracena.
— Treatment system: peat bed.
— Work and equipment: pre-treatment, anaerobic lagoons, peat bed.

5.52. Waste-water treatment plant in Cortegana
— Population centre (municipality/province): Cortegana (Cortegana/Huelva).
— Protected area: Parque Natural de la Sierra de Aracena.
— Treatment system: peat bed.
— Work and equipment: pre-treatment, anaerobic lagoons, peat bed.

5.53. Waste-water treatment plant in Cañada de Cañepla
— Population centre (municipality/province): Cañada de Cañepla (María/Almería).
— Protected area: Parque Natural de Sierra Cabrera-Bedar, Sierra María y Alhamilla.
— Treatment system: peat bed.
— Work and equipment: pre-treatment, peat beds, maturation lagoon.

5.54. Waste-water treatment plant in Piar de Abajo
— Population centre (municipality/province): El Piar de Abajo (El Piar de Abajo/Almería).
— Protected area: Parque Natural de Sierra María-Los Vélez.
— Treatment system: physical-chemical treatment.
— Work and equipment: pre-treatment, sedimentation, digestion.

5.55. Waste-water treatment plant in Bédar
— Population centre (municipality/province): Bédar (Bédar/Almería).
— Protected area: Parque Natural de Sierra Cabrera-Bedar, Sierra María y Alhamilla.
— Treatment system: peat bed.
— Work and equipment: pre-treatment, peat beds, maturation lagoon.
6. **Objectives:**

This project aims to comply with the Spanish national plan for waste-water treatment, established for the transposition of Council Directive 91/271/EEC and the provisions of the Andalusian environment plan relating to waste-water treatment and the preservation of protected areas.

The specific aims of the project are:

— to provide the above population centres with secondary waste-water treatment. This involves installing a treatment capacity of 1 224 m$^3$/h,

— to equip these population centres with collector systems, involving the construction of 62 918 metres of collector sewers,

— the above measures will protect natural waterways and considerably improve the health levels of the areas they cover, directly benefiting a present population equivalent of 143 520.

The main parameters of the results to be obtained can be seen in the following tables:

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7. **Work schedule:**

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<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<tbody>
<tr>
<td>Main work</td>
<td>1.2.1997</td>
<td>31.12.1999</td>
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</table>

8. **Economic and social cost-benefit analysis:**

A cost-benefit analysis has been carried out for each project on the basis of the following assumptions:

- working life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = between 6% and 3%.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged,
- re-use of treated water.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

An analysis of the various indicators obtained from the economic analysis of the group of projects shows a positive present discounted value for all discount rates applied.

The internal rate of return (IRR) is 17.6%, demonstrating the environmental benefits of these projects, in view of how little revenue is generated by the re-use of the treated water.

9. **Environmental impact analysis:**

This group of projects improves the quality of water by providing treatment facilities to municipalities which lack them or expanding and improving existing facilities. It also permits water to be re-used for ecological purposes in certain cases. The group of projects is therefore coherent and consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project helps protect those environmental resources for which the protected areas were legally declared such from pollution from the waste water discharged by the population centres covered by the measures. It thus protects the quality of water resources and how they are used and significantly improves the quality of the environment.

In particular, the project makes a significant contribution to public health and safety by considerably reducing the level of pathogens in the population environment. By improving the quality of water resources, the channelling and treatment of waste water also contributes to the propagation and diversification of aquatic life, and thus also life in general.

The planned measures are both preventive (permitting the elimination of elements which directly threaten the environment and public health and safety) and palliative (permitting the recovery of natural waterways currently affected by urban waste which the project aims to eliminate).
10. **Cost and assistance:**

Total cost: ECU 25 906 239

Eligible cost (after 14 May 1997): ECU 25 868 323

Rate of assistance: 80%

Cohesion Fund grant: ECU 20 694 658

Breakdown of cost by project (in ECU):

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost</th>
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<tbody>
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<td>Bayarcal</td>
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<td>Hornos</td>
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<tr>
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<td>Cortijos Nuevos</td>
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**Total** 25 868 323
### ANNEX

#### FINANCING PLAN

**Project No:** 97/11/61/031

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<td>100</td>
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(1) **Total eligible cost of project.**
PROJECT No: 97/11/61/032

1. **Name:**

Waste-water disposal for the catchment areas of the Guadarrama and Pantueña rivers and expansion of the waste-water treatment plants at Aranjuez and Algete in the Autonomous Community of Madrid.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Canal de Isabel II

3.2. **Address:** C/ Santa Engracia, 125
28003 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Autonomous Community of Madrid
Municipalities: Villaviciosa de Odón, Boadilla del Monte, Torrelodones, Galapagar, Mahadahonda, Aranjuez, El Escorial, Algete, Villalbilla, Torres de la Alameda, Loeches

5. **Description:**

Building of three new waste-water treatment plants, expansion of four treatment plants and construction of collector sewers. The group of projects is made up of the following measures:

5.1. **New waste-water treatment plant at Boadilla del Monte**

Building of a pump station and a force main to the new waste-water treatment plant. The work involves:

1. A pump station consisting of four 250 kW pumps each with a throughput of 780 m$^3$/h.

2. 1 400 m of ductile iron pipes with a 600 mm diameter for the force main.

3. Treatment plant with coagulation-flocculation physical-chemical treatment and a biological process using activated sludge at average loading.

Specifically, the waste-water treatment plant will consist of the following:

- Solids reception chamber with retaining bars and a bivalvular scraper.

- Solids removal through three screened channels for coarse solids and three for fine solids, two of which will have a mechanical cleaning system; effluent weir for waste water extraction from solids removal unit.

- Compact grit and grease removal units, with vertical pumps for grit removal; air flotation unit; grit-washing mechanism.

- Mixing-flocculation of reagents for chemical precipitation, one line.

- Separation of flow to primary sedimentation into five channels: two sealed for this phase, two for primary sedimentation, and one by-pass; two circular primary sedimentation basins, 19 m in diameter.

- Biological treatment with aeration in two 3 250 m$^3$ tanks; secondary sedimentation in two 24 m diameter basins equipped with scrapers.

- Extraction of sludge from the primary and secondary sedimentation basins; differentiated thickening of excess primary and secondary sludge; a gravity thickener 12 m in diameter and a floater 9 m in diameter.

- Thickened sludge pump and anaerobic digestion in a 2 500 m$^3$ tank; sludge heating system; storage and thickening of digested sludge consisting of a 240 m$^3$ post-thickener.

- Dewatering of sludge and removal of dewatered sludge; extraction of digestion gas and storage in a gasometer consisting of a 560 m$^3$ floating 0-bell; gas supply network for the sludge-heating circuit heaters and unit for burning off excess gas.

- Computer systems for data collection and plant management.

- Service facilities such as water, waste-water disposal, electricity, etc.

- Buildings to house solids reception and removal, chemical reaction processes, laboratories, technical management and administration, etc.
5.2. New waste-water treatment plant at Villaviciosa de Odón

Building of a pump station, a force main to the new waste-water treatment plant. The work involves:

1. A pump station consisting of four 160 kW pumps each with a throughflow of 533 m$^3$/h.

2. 1 250 m of ductile iron pipes with a 500 mm diameter for the force main. A 1 700 m gravity sewer with class D reinforced concrete pipes, 1 000 mm in diameter.

3. Treatment plant comprising a biological process using activated sludge at low loading, including nitrification and pre-denitrification phases using an anoxic area at the head of the reactor.

Specifically, the waste-water treatment plant will consist of the following:

– Solids reception unit equipped with retaining bars and a bivalvular scraper.

– Removal of fine solids through three systems, two of which are equipped with a mechanical cleaning system.

– Sedimentation and extraction of grit in two aerated-type grit and grease removal units.

– Two low-load biological reactors with an anoxic zone at the head and sludge stabilisation; secondary sedimentation in two circular basins.


– Service facilities such as water, waste-water disposal, electricity, etc.

– Buildings to house solids removal, laboratories, technical management and administration, etc.

5.3. New waste-water treatment plant at Torrelodones-Galapagar

Building of a new waste-water treatment plant and sewers to convey waste water to the plant. The work involves:

1. 1 750 m of sewers and collector sewers.

2. 2 450 m of force mains.

3. Treatment plant with a biological process using activated sludge with elimination of nutrients and sludge stabilisation.

Specifically, the waste-water treatment plant will consist of the following:

– Reception unit for coarse solids equipped with mechanically cleaned bars, followed by fine solids removal using mechanically cleaned screens.

– Grit and grease removal in two aerated units.

– Primary sedimentation basins with flocculant and coagulant proportioning.

– Biological treatment with secondary sedimentation.

– Sludge thickening; anaerobic digestion; dewatering; hopper for storage of dewatered sludge; system for recycling digestion gas for use.

– Service facilities such as water, waste-water disposal, electricity, telephone lines, etc.

– Buildings to house solids removal, laboratories, technical management and administration, etc.

5.4. Expansion of waste-water treatment plant at Arroyo de El Plantio

Expansion of waste-water treatment facilities:

– Building of a third primary settling unit.

– Conversion of the aerobic digestor to a biological reactor.

– Building of a third secondary settling unit.

New sludge treatment facilities:

– New sludge line with sludge stabilisation by oxygen injection.

– Building of a thickener.

– Building of a centrifugal unit to increase dewatering capacity.

5.5. Expansion of waste-water treatment plant at Aranjuez

Expansion of waste-water treatment facilities:

– Building of a third primary sedimentation basin.

– Conversion of the aerobic digestor to a biological reactor.

– Building of a third secondary settling unit.
New sludge treatment facilities:
- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.6. Expansion of waste-water treatment plant at Los Escorialés

Expansion of waste-water treatment facilities:
- Building of a third primary sedimentation basin.
- Conversion of the aerobic digestor to a biological reactor.
- Building of a third secondary sedimentation basin.

New sludge treatment facilities:
- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.7. Expansion of waste-water treatment plant at Algete

Expansion of waste-water treatment facilities:
- Building of a third primary sedimentation basin.
- Addition of another unit to the biological reactor.
- Building of a third secondary sedimentation basin.

New sludge treatment facilities:
- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.8. Sewer from Villalbilla, Torres de la Alameda, Loeches to the Velilla de San Antonio waste-water treatment plant

This project concerns the conveyance of waste water from four municipalities via collector sewers and sewers to the Velilla de San Antonio waste-water treatment plant. The following collector sewers are used:

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>12 310</td>
</tr>
<tr>
<td>500</td>
<td>7 796</td>
</tr>
<tr>
<td>600</td>
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<tr>
<td>800</td>
<td>8 463</td>
</tr>
<tr>
<td>Total</td>
<td>33 535</td>
</tr>
</tbody>
</table>

The sludge produced in the treatment planned in items 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7 must be treated and disposed of in a controlled tip or used in agriculture, in accordance with Directive 86/278/EEC.

6. Objectives:

The aim of the measures in this group of projects is to provide facilities to treat waste water discharged in the catchment areas of the Guadarrama and Pantueña rivers and to increase the treatment capacity of the plants in the municipalities of Aranjuez and Algete in the Autonomous Community of Madrid.

The group of projects complies with Directive 91/271/EEC, which sets 31 December 2000 as the deadline for construction of collector sewers and treatment plants in municipalities of more than 15 000 inhabitants equivalent.

These projects will also:
- contribute to urban development in the Guadarrama catchment area, where the new waste-water treatment plants will serve a present population equivalent of 205 000, with a further 45 000 present population equivalent served by expanding existing waste-water treatment plants.
- Contribute to urban development of the municipalities of Aranjuez and Algete by providing waste-water treatment for a further present population equivalent of 50 000 by expanding the existing treatment plants.
- to convey sewage discharged in the Pantueña catchment basin to the existing waste-water treatment plant in Velilla de San Antonio.
<table>
<thead>
<tr>
<th>Present population (inhabitants)</th>
<th>Boadilla del Monte</th>
<th>Villaviciosa de Odón</th>
<th>Torrelodones-Galapagar</th>
<th>Arroyo el Plantio</th>
<th>Aranjuez</th>
<th>Los Escoruelos</th>
<th>Algete</th>
<th>Villalbilla, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 000</td>
<td>40 000</td>
<td>60 000</td>
<td>60 000</td>
<td>50 000</td>
<td>12 000</td>
<td></td>
<td></td>
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</tbody>
</table>

| Present population equivalent (p.e.) | 60 000 | 120 000 | 60 000 | 90 000 | 75 000 | 32 000 |
| Design population                  | 60 000 | 120 000 | 60 000 | 90 000 | 75 000 | 32 000 |
| Design population equivalent (p.e.)| 85 000  |         |        |        |        |        |

| Total average BOD5 on entry (mg/l) | 240 | 262 | 200 | 300 | 186 | 300 | 325 |
| Total average BOD5 on exit (mg/l)  | <25 | <25 | 25  | <25 | <25 | <25 | 30  |
| Total average SS on entry (mg/l)   | 300 | 306 | 200 | 360 | 257 | 350 | 400 | 516 |
| Total average SS on exit (mg/l)    | <35 | <35 | 38  | <35 | <35 | <35 | <35 | <35 |
| Average daily volume of water (m³/day) | 15 000 | 30 000 | 15 000 | 15 000 | 30 000 | 18 750 | 8 000 |
| Industrial waste (%)               | 20  |      |     |     |     |     |     |

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<tr>
<td>Main work</td>
<td>1.10.1997</td>
<td>30.9.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- working life of the treatment plants = 20 years,
- residual value = 35 %,
- discount rate = 7 %.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are:

- internal rate of return = 26 % for the group of projects,
- internal rate of return = Boadilla 18%; Villaviciosa 18%; Torrelodones 23%; El Plantio 29%; Aranjuez 25%; Los Escoruelos 30%; Algete 63 %, Villalbilla, Torres and Loeches outfalls 48 %.

9. **Environmental impact analysis:**

The group of projects in question is intended to improve the quality of the waste water discharged in the catchment areas of the Guadarrama and Pantueña rivers and increase the capacity of the treatment plants in the municipalities of Aranjuez.
y Algete. The group of projects is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The measures as a whole comply with the plan for the collection and treatment of waste water of the Autonomous Community of Madrid (1995—2005), which aims to improve the quality of water and river ecosystems by full compliance with both the requirements and deadlines laid down for the treatment of urban waste water in Directive 91/271/EEC.

10. Cost and assistance:

Total cost: ECU 28 518 203

Eligible cost (after 14 May 1997): ECU 28 518 203

Rate of assistance: 80%

Cohesion Fund grant: ECU 22 814 562

---

ANNEX

FINANCING PLAN

Project No: 97/11/61/032

(in ECU)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
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<td>28 518 203</td>
<td>100 22 814 562 80</td>
<td>5 703 641 20 5 703 641</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/035

1. **Name:**

   Integrated waste-treatment plant at Rubí (second phase).

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria M.E.H.

   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Generalitat de Cataluña Departamento de Medio Ambiente Junta de Residuos

   3.2. **Address:** Provenza 204-208 08036 Barcelona

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Catalonia

5. **Description:**

   This is the second phase of a project in the same location already financed by the Cohesion Fund.

   This phase involves installing an anaerobic digestion plant and a thermolysis plant to treat waste from Rubí and Sant Cugat del Vallès and expanding the tipping area.

   **Anaerobic digestion plant**

   The anaerobic digestion plant will have facilities for pre-treatment and anaerobic biological treatment of organic material.

   **Pre-treatment:**

   The organic fraction resulting from grading has a high moisture content (dry matter content of 20 to 30 %) with little structural material; it is stored in a 200 m³ pit.

   The waste is taken from the pit by conveyor belt to a mill for fine grinding. The ground waste is sorted wet in a tank specially designed to separate out non-biodegradable material, which is then transported to the thermolysis plant.

   Organic material is biodegraded in two stages, by hydrolysis and methanisation.

   Anaerobic digestion comprises the following:

   — **Weighing machine:** Entry and registration point for the organic fraction to be treated in the digestion plant.

   — **Unloading and feeding point:** Point where the organic fraction from selective waste collection is deposited.

   — **Sorting drum:** Separates bulky fragments or products arriving at the plant.

   — **Metallic separator:** Any impurities in the organic fraction (plastic, metal, etc.) are separated manually. The waste is then passed through a magnetic separator which removes any iron.

   — **Grinding:** The organic fraction is homogenised by grinding.

   — **Mixer:** The ground material is mixed with (mainly recirculated) water.

   — **Digestors:** These are used to methanise the organic fraction. The sealed containers are lagged to maintain optimum fermentation conditions.

   — **Biogas line and gasometer:** The biogas produced in the digestors is stored for subsequent use.

   — **Compressor and pressurisation:** Pressurisation and compressor systems ensure proper combustion.

   — **Steamheater and co-generator:** The plant is equipped to co-generate energy by burning biogas. The motors produce electricity and residual heat. The electricity is used in the plant (lighting, motors, pumps, etc.) and the heat is used to heat the mix and keep the digestors at a constant temperature.

   — **Separation of phases (solid-liquid):** This consists of various mechanical equipment to separate digested solids from water.
— Process water tanks: The effluent from separation is stored and re-used for the mix.

— Feeder-conveyor belt: The converted and separated solids are stored for subsequent use as fertilisers in the municipality (parks and gardens) and in the plant itself (garden area).

Thermolysis plant

Thermolysis is chemical degrading by the cracking of organic compounds (decomposition of hydrocarbons). It can be applied to both the perishable fraction of waste and plastic, paper, wood, etc. It consists of heat treatment at between 450 and 550°C at atmospheric pressure in a rotating reactor.

Thermolysis transforms the material into a powdered fuel with a calorific value similar to that of lignite. Metals and glass mixed in with the organic material are not transformed during treatment, merely heated. As the treatment does not involve combustion, metals are not oxidised. This is the difference between thermolysis and incineration.

Thermolysis is usually combined with a co-generation unit, i.e. a facility which converts the gases distilled and fuel produced in the thermoliser into energy.

In the Rubi thermolysis facility, the coarse waste fraction will be mass treated after grading.

A storage unit will be installed between the grading and thermolysis areas to contain any waste that cannot be treated in the event of 24-hour breakdown.

The waste will be finely ground and homogenised in a grinder or mill for transportation by the thermolysis equipment. A grapple or bivalvular scraper will extract the waste from the storage area at the rate of processing and place it on a conveyor belt for transportation to the mill.

The waste will be dried prior to treatment, to reduce the moisture content to around 15%. Drying will be done by air heated by thermal exchange with the fumes from the distillation gases of the thermoliser.

The ground and dried waste will be treated for about two hours in the thermoliser.

A solid product extractor will extract the resultant fuel for subsequent refinement. This will include separation of metals by flotation and chlorine retention. These materials will then be re-used independently.

A vacuum pump will extract the distillation gases from the thermoliser, which will be filtered and then condensed if condensable, or burned if not.

Condensed water from cleaning will be treated by osmosis and ion exchange.

The plant will consist of:

— a reception pit for the waste mass,
— a mill for grinding the waste,
— a storage hopper for the milled waste,
— a drier,
— a thermoliser,
— a unit for purification of gases distilled by thermolysis,
— a settling unit for solids from thermolysis,
— a grading/re-use unit for settled metals and glass,
— a washing unit for solids from thermolysis,
— a co-generation unit,
— a water treatment unit.

Tipping area

The area will be sealed with an impermeable lining and equipped with a system to collect leachates, a leachate basin and all the features required for proper operation of the facility.

The tip will equipped to receive waste from the thermolysis and anaerobic digestion processes and other waste from Rubí and environs suitable for disposal there.

6. Objectives:

This project provides advanced waste treatment facilities and completes the facilities for the proper treatment of waste initiated by the first phase of the project.
The anaerobic digestion plant has a design capacity of 23 000 tonnes/year. Assuming that the organic fraction entering the plant has a dry matter content of between 30 and 35%, the following by-products will be obtained:

- biogas: 10%,
- non-biodegradable material: 10%,
- compostable organic material: 40%,
- waste water: 40%.

A 6 500 m² site is needed for plant, which will have a nominal power of 1 000 kW.

50% of the energy produced as net biogas will be consumed in plant operation.

The thermolysis plant has a design capacity of 20 000 tonnes/year and will need a 2 375 m² site. Nominal power will be 750 kW.

Thermolysis allows waste to be converted into a carbon compound similar to lignite known as carbor, which can be used as a source of energy or as a solid material. Gas, water and hydrocarbons are also produced in smaller quantities. These secondary products are recirculated in the process. The carbor is used as an energy source in the treatment facilities themselves.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>1.9.1997</td>
<td>30.11.1998</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

Economic analysis has been carried out for a 20 years period.

It is based on the following assumptions:

- Investment costs; operating costs are not considered since the relevant local taxes levied on households by the councils of Rubí and Sant Cugat will cover these costs exactly.
- Quantifiable benefits:
  - reduction in the use of land for tipping by reducing the volume of waste, with a subsequent reduction in tip cleaning costs and leachate treatment;
  - no expenditure on transport to dump.

Other social benefits may be added to these which are difficult to quantify, such as prolonging the working life of the tip, reducing petrol consumption and atmospheric pollution.

The internal rate of return is 11%.

9. **Environmental impact analysis:**

1. The plant will minimise the space needed for tipping while recycling and re-using waste.

Given that the organic fraction entering the anaerobic digestion plant has a dry matter content of between 30 and 35%, the following by-products will be obtained: biogas, non-biodegradable materials, compostable organic material, waste water. A further aim is the safe disposal of all waste which cannot be recycled or re-used, by means of heat treatment which converts the waste into a carbon compound similar to lignite, which can be usable as an energy source or a solid material.

2. Leachates will be treated in appropriate facilities.

10. **Cost and assistance:**

| Total cost: | ECU 10 015 951 |
| Eligible cost (after 14 May 1997): | ECU 10 015 951 |
| Rate of assistance: | 80% |
| Cohesion Fund grant: | ECU 8 012 761 |
### ANNEX

#### FINANCING PLAN

Project No: 97/11/61/035

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<td>8 012 761</td>
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</table>

\(^1\) Total eligible cost of project.
PROJECT No: 97/11/61/037

1. Name:

   Watercourse restoration and forestry rehabilitation of Arás-Biescas torrent (first stage).

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaría (MEH)

2.2. Address: Paseo de la Castellana, 162 28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General de Conservación de la Naturaleza Subdirección General de Política Forestal

3.2. Address: Gran Vía de San Francisco, 4 28005 Madrid

4. Location:

4.1. Member State: Spain

4.2. Region: Aragon

5. Description:

There have been several works projects in recent years to control this torrent. The correction system for the watercourse, designed to prevent flooding, failed to cope with the adverse weather conditions of August 1996, which had a heavy material and human cost.

The restoration project is intended to bring the correction system back into operation, but this time the dimensions of the work will be calculated on the basis of a flow volume which reflects the current situation. This is a two-stage project. The first stage, which is presented for financing, comprises the urgent works and structures needed to ensure basic safety in view of the flood risk. The second stage, which will be implemented later, will complete the correction of the watercourse through the ravine.

The first stage comprises the following:

1. Drafting of the full correction project;

2. Implementation stage: correction of the watercourse in the bed of the Arás ravine:

   — repair and improvement of existing pipeline;

   — construction of a floodway to deflect water resulting from exceptionally heavy rainfall into the spillway;

   — adaptation of the spillway or overflow pipe to accommodate exceptionally large flows;

   — construction of three floodbanks and two sills with the following functions:

   — bank I: retention, buffer surface, directing water flows to the spillway and overflow pipe,

   — bank II and sill IIa: closure and retention of bed load,

   — bank III and sill IIIa: retention, consolidation of banks;

   — repair and reinforcement of seven floodbanks damaged by exceptionally high water;

   — rock filling at four points on the waterway for the protection and consolidation of embankments;

   — further work:

   — general cleaning and removal of bed load,

   — enhancement of environment and landscape,

   — access to structures.

6. Objectives:

The purpose of the project is to correct the watercourse in the Arás ravine, in the commune of Biescas. It is intended to reduce the risk of flooding in the debris cone of the ravine, which could damage the roadway and even lead to retention of the waters of the Gallego, thus endangering the population of Biescas.

Another objective of this project is to reduce bed load and suspended load, thus preventing sedimentation in the Sabiñánigo reservoir,
with gradual reduction of its capacity, while at the same time improving water quality. In other words, the project is also intended to improve water resource management in terms of both quality and quantity.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

The benefits of this type of watercourse and forest restoration work are to be found in their long-term benefits to society, especially in this case, where the objective of the project is to restore a catchment area where serious floods occurred in August 1996 with disastrous consequences for the inhabitants.

The costs and benefits of the project are as follows:

- investment costs,
- quantified benefits:
  - reduced risks of flooding;
  - reduced loss of forest soil;
  - reduced silting of reservoirs;
  - increased general welfare.

The internal rate of return is 9.5%.

9. **Environmental impact analysis:**

The objective is to reduce the risk of flooding caused by exceptionally high rainfall, thus protecting people and amenities. At the same time, the project is intended to improve flow regulation and water quality, and to prevent silting of reservoirs.

10. **Cost and assistance:**

Total cost: ECU 7 209 372

Eligible cost (after 23 May 1997): ECU 6 722 740

Rate of assistance: 85%

Cohesion Fund grant: ECU 5 714 329

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**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/037

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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<td>6 722 740</td>
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<td>5 714 329</td>
<td>85</td>
</tr>
</tbody>
</table>

(*) Total eligible cost of project.
PROJECT No: 97/11/61/038

1. **Name:**

Waste management in the Canary Islands, first phase.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Conserjería de Política Territorial de Canarias
Viceconsejería de Medio Ambiente

3.2. **Address:** C/Tomás Morales, nº 3
35003 Las Palmas de Gran Canarias

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Canary Islands

4.3. **Municipality:** Arico, Las Palmas de Gran Canarias, Gáldar-Guía

5. **Description:**

1. Environmental complex for the treatment of solid urban waste in Arico, Tenerife; the group of projects comprises the following:

   (a) Pressing plant: comprising three 40 tonnes/h presses with sufficient capacity to cope with the solid urban waste sent to Arico. The principal objective is to reduce the volume of waste deposited at the Arico tip, thus increasing its working life and at the same time reducing the production of leachates. The amount of volatile waste will also be reduced.

   (b) Extension of the existing Arico tip: the work will include a series of measures to divert the run-off from the Guasiegue gully by means of a channel and a rubble dam, new entrances, preparation of land (clearance and installation of a drainage system) and a leachate management system (reservoir, pumps and pressure pipes).

   (c) Inactivated-waste tip: the work will include preparing the land for the tip, sealing the ground and installing a drainage system, a leachate reservoir and pumping equipment.

   (d) Waste storage area: a partly enclosed covered area for the selective collection of domestic refuse, with access for lorries and space for the storage of recyclable material in bays with access for loading and unloading. The area will also have a baling press fed by a conveyor belt with a hopper and grab bucket.

2. Salto del Negro Environmental Complex (Gran Canaria). This will involve the following series of projects:

   (a) Improvement and extension of the Salto del Negro tip: various measures intended to turn the existing tip into an environmental complex capable of receiving, in addition to solid urban waste, inactivated waste, hospital waste, inert waste, etc. and housing the installations necessary for storing reusable materials.

   (b) Inactivated-waste tip: preparation of the tip area, sealing the ground and installation of a drainage system, a leachate reservoir and pumping equipment. The tip, similar to the Arico environmental complex, will take industrial waste whose composition permits it to be classified as urban waste or which is no longer toxic or hazardous following suitable treatment.

   (c) Selective collection storage area: a partly enclosed covered area for the selective collection of domestic refuse, with access for lorries and space for the storage of recyclable material in bays with access for loading and unloading. The area will also have a baling press fed by a conveyor belt with a hopper and grab bucket.

The Salto del Negro and Arico environmental complexes will not accept toxic or hazardous waste. Hospital waste (non-hazardous) will receive special treatment, as will disposal of leachates.
3. Guía-Gáldar Transfer Centre (Gran Canaria)

The centre will be located near the northern highway between the municipalities of Gáldar and Sta María de Guía in Gran Canaria on 6 000 m² of land designated for industrial use and will comprise the transfer centre itself, waste-loading and unloading areas, access roads, etc.

The only infrastructures necessary for operation of the centre are an electricity supply, lighting, telephone lines and access roads.

The planned transfer centre will be of the fixed type with a hopper and stationary compactor equipped with a handling system for 38/40 m³ capacity containers permitting empty containers to be loaded without the need for container-handling vehicles, thus increasing the system’s capacity. The handling system will also be suitable for selective collection since it will be able to handle specific containers for different types of waste which will then be filled by a single compactor.

Hazardous waste will be transferred immediately to special treatment centres and will not be stored.

6. Objectives:

The principal aims of the project are:

— the disposal of solid urban waste which cannot be recycled, thus preventing uncontrolled tipping, damage to the landscape and the pollution of land and water,

— suitable treatment for industrial waste which can be considered as urban waste and waste which must not be treated with solid urban waste,

— disposal of industrial waste from the toxic and hazardous waste inactivation plants,

— reduction of the cost of transporting solid urban waste.

Quantified objectives:

<table>
<thead>
<tr>
<th></th>
<th>Arico</th>
<th>Salto del Negro</th>
<th>Gáldar-Guía</th>
<th>Group of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population affected</td>
<td>685 000</td>
<td>725 000</td>
<td>37 000</td>
<td>1 410 000</td>
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<tr>
<td>Solid waste (t/year)</td>
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<tr>
<td>Industrial waste which may be treated as urban waste (t/year)</td>
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<td>5 000</td>
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<td>Inactivated waste (t/year)</td>
<td>5 000</td>
<td>6 000</td>
<td>11 000</td>
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</tr>
</tbody>
</table>

The purpose of the series of projects is to attain the objectives described in the previous section via the construction of environmental complexes complying with current Community rules and providing separate areas for different types of waste (urban and inactivated industrial waste and non-toxic, non-hazardous industrial waste whose physical characteristics make it unsuitable for treatment together with urban waste).

Each project aims to attain the said objectives by means of controlled tipping on each island, extending the existing tips on Tenerife and Gran Canaria and creating storage areas for recyclable materials collected at recycling points.

The Tenerife and Gran Canaria environmental complexes will each have a suitable area for non-toxic, inactivated industrial waste from CEPSA and Unelco.

The transfer centre will considerably reduce and rationalise the cost of transporting solid urban waste from the densely populated north-western part of Gran Canaria.
7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<tbody>
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8. **Assessment of costs and socio-economic advantages:**

The cost-benefit analysis gives an internal rate of return of 9% for the group of projects as a whole.

The IRR for the Arico environmental complex is 9%, for Salto del Negro, 7% and for the Gáldar-Guía Transfer Centre, 4%.

The analysis took account of the following:

- a working life of 15 years,
- investment, operating and maintenance costs,
- income from charges and the sale of recyclable materials,
- prevention of pollution of land,
- improvement of the landscape,
- reclamation of land,
- reduction of pollution,
- savings on transport costs.

9. **Environmental impact analysis:**

The principal objectives laid down in Article 130R are the preservation, protection and improvement of the environment and the protection of human health. The aims pursued by this group of projects are closely linked to the objectives concerned in that they will contribute to the disposal of solid urban waste and industrial waste, both that which can be treated together with urban waste and special industrial waste.

The Fifth Programme lays down a three-stage outline strategy for waste-management policy: reducing the production of waste, recovering the waste produced and the safe disposal of that waste. These projects contribute to the achievement of this latter objective via the creation or extension of environmental complexes, thus preventing the dispersion of waste and contributing to the conservation and protection of the environment and the efficient management of waste in the Canary Islands.

The projects comply with the following Directives:

- Directive 75/442/EEC of 15 July 1975, on waste, and amendments thereof,
- Directive 91/698/EEC of 12 December 1991, on hazardous waste, and amendments thereof,

10. **Cost and assistance:**

<table>
<thead>
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<th>Total cost: ECU 16 775 992</th>
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<td>Eligible cost (after 23 May 1997): ECU 16 775 992</td>
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<td>Cohesion Fund grant: ECU 13 420 794</td>
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### ANNEX

**FINANCING PLAN**

Project No: 97/11/61/038

<table>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/039

1. **Name:**
   Waste-water treatment in the Canary Islands.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

   2.2. **Address:** Paseo de la Castellana, 162, 28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Consejería de Obras Públicas Viviendas y Aguas, Gobierno Autónomo de Canarias

   3.2. **Address:** Edificio de usos múltiples, Las Palmas de Gran Canaria

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Canary Islands

5. **Description:**

   Group of three projects concerning the treatment and re-use of waste water in order to eliminate the negative environmental effects of discharging waste water and to reduce removal from the aquifer, which is heavily over-exploited.

5.1. **General collector sewers to carry waste water in the Orotava valley (Tenerife)**

   The project involves the construction of the infrastructure for the disposal and re-use of waste water in the Orotava Valley and the laying of general collectors, mostly along the same route as the pipelines carrying treated water for re-use.

   The parts of the project to be implemented are:

   - receiving basin for sewage from all the general collector sewers in the valley, including the necessary screens;
   - basin for treated waste water: facility for storing waste water treated by the plant, which will serve at the same time to provide suction for the pumping units;
   - pump station: to pump treated water to the La Zamora equalising basin;
   - delivery from the treatment plant to La Zamora: double pipeline to carry treated water from the treatment plant to the equalising basin to be located at La Zamora (Los Realejos);
   - La Zamora equalising basin: double basin for equalising the flow pumped from the treatment plant and acting as the point of departure for re-use lines;
   - westward line: pipeline over 12 400 m to carry treated waste water from the Orotava valley to the Icod district, feeding into the La Tabona distribution reservoir;
   - La Tabona distribution reservoir: a control structure to be located in the municipality of La Guancha, below the La Tabona reservoir;
   - general collector for Los Realejos: gravity sewer, mostly running along the same route as the re-use lines, for collecting waste-water from the urban centre of Los Realejos.

5.2. **Expansion and improvement of the waste-water treatment plant at Guía-Gáldar (Gran Canaria)**

   The Guía-Gáldar waste-water treatment plant was commissioned in 1989. The plant cannot cope with the additional flow of waste water now coming to it from new settlements, so the existing facilities are to be expanded and improved.

   Expanding the plant will require the installation of a new water treatment line to treat a through flow of 3 000 m³/day. This will include new primary and secondary settling basins, adaption of the aerobic digestors to serve as reactors, installation of an anaerobic sludge digestor and improvements to the plant's existing facilities and equipment. Tertiary treatment facilities will be installed with a capacity of 1 000 m³/day, with two equalising tanks for untreated and treated water, and the offshore outfall will be expanded.

   This will involve the installation of:

   - four basins (including the two settling basins),
— 2 000 m of polyethylene pipeline with a diameter of 400 mm,
— 10 units of electromechanical equipment.

5.3. **Expansion and improvement of the waste-water treatment plant for south-west Gran Canaria**

The waste-water treatment plant for south-west Gran Canaria was commissioned in 1990. The population explosion in this district means that the plant can no longer treat the volumes of waste water coming to it. Hence the need to expand and improve it.

Expanding the plant will require the installation of a new water treatment line to treat a through flow of 6 000 m³/day, including expanding the inlet structure, a structure for distributing the flow for primary treatment, two aeration tanks or reactors, two primary settling basins, two secondary settling basins, a new sludge thickening basin and expansion of the gasometer, sludge dewatering facilities and additional facilities and structures, including an extension to the offshore outfall.

This will involve the installation of:
— seven basins (including the settling basins, reactors and thickening basin),
— 700 m of pipeline with a diameter of 800 mm,
— 20 units of electromechanical equipment

6. **Objectives:**

The aims vary according to the project:

General collector sewers to carry waste water in the Orotava valley: the aim is to bring the waste water generated by various settlements dispersed throughout the valley to the treatment plant and to build a system to distribute treated water for re-use in the neighbouring districts. The measure will benefit 100 000 inhabitants.

Expansion and improvement of the waste-water treatment plant at Guía-Gáldar: the aim is to enable the existing plant to meet the increased needs of the area and to provided it with tertiary treatment for 1 000 m³/day. The corresponding lifting capacity is also planned, as is the installation of a 3 000 m³ equalisation basin, to benefit 50 000 inhabitants.

Expansion and improvement of the waste-water treatment plant for south-west Gran Canaria: the aim is to increase the treatment capacity of the existing plant to meet the needs of the increased population. Installation of tertiary treatment facilities will mean that almost all the waste water can be re-used for agriculture. The measure will benefit 100 000 inhabitants.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project planning</td>
<td>1.2.1997</td>
<td>1.10.1997</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis was made for a working life of 18 years using the following factors:

— investment costs. The operating and maintenance costs will be covered by a treatment tax paid by users,
— environmental benefits:
  — improved water quality, valued in economic terms by the pollution load of the effluent, measured in pollution units,
  — re-use of the treated water will mean an equivalent volume will not have to be taken from the over-exploited aquifer. Economic evaluation of this saving takes account of the intrinsic value of water taken from the aquifer.

The internal rate of return for the set of projects is 11%.

9. **Environmental impact analysis:**

The projects will lead to the re-use of 19 000 m³/day of water, with a reduction of the same volume in the extraction from the aquifer. This allows maximum use to be made of available resources, at the same time as preventing the pollution of ground and surface water by providing treatment for 21 000 m³/day of waste water.
The projects are included in the national waste-water treatment plant, the water quality plan for the Canary Islands and the island hydrological plans, all aimed at complying with Directive 91/271/EEC.

Sludge from treatment must be taken to a controlled tip or used in agriculture in accordance with Directive 86/287/EEC.

10. **Cost and assistance:**

| Total cost: | ECU 13 337 339 |
| Eligible cost (after 23 May 1997): | ECU 13 337 339 |

Breakdown of cost (in ECU):

1. Collectors, Orotava valley, Tenerife 6 079 904
2. Guía-Gáldar treatment plant, Gran Canaria 2 721 538
3. South-west Gran Canaria treatment plant 4 535 897

---

**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/039

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>%</td>
<td>3=2/1</td>
</tr>
<tr>
<td>1997</td>
<td>1 201 562 1 201 562</td>
<td>100</td>
<td>961 250</td>
<td>80</td>
</tr>
<tr>
<td>1998</td>
<td>7 209 373 7 209 373</td>
<td>100</td>
<td>5 767 498</td>
<td>80</td>
</tr>
<tr>
<td>1999</td>
<td>4 926 404 4 926 404</td>
<td>100</td>
<td>3 941 123</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>13 337 339 13 337 339</td>
<td>100</td>
<td>10 669 871</td>
<td>80</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/040

1. Name:
   Supply and treatment of water on the Mediterranean coast of Andalusia.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria

2.2. Address: Paseo de la Castellana, 162
               28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General de Obras Hidráulicas

3.2. Address: Avda. República Argentina 43,
              2º y 3a
              41011 Seville

4. Location:

4.1. Member State: Spain

4.2. Region: Andalusia

5. Description:

The planned measures are grouped into three projects:

(a) A distribution reservoir in Marbella for the supply of water to the western Costa del Sol (Malaga).

(b) Pipeline from the Casasola dam to the supply line for the drinking-water treatment plants at El Atabal and Pilones.

(c) Water supply and waste-water disposal and treatment for the municipalities of the association of municipalities of the Costa Tropical de Granada. This project will be implemented jointly with other measures covered by a single contract for the management of water supply and waste-water disposal and treatment for the Costa Tropical de Granada and all relevant works. The project includes five treatment plants, two supply measures, and seven disposal measures.

The main work to be carried out for each project is described below:

5.1. Distribution reservoir in Marbella (Malaga)

The project includes:

— building a semi-subterranean reinforced concrete distribution reservoir for treated water, with a capacity of 20 000 m³;

— installing a 600 mm diameter ductile iron pipeline from the general supply system for the western Costa del Sol to the reservoir;

— installing 700/800 mm diameter ductile iron pipeline from the reservoir to the distribution network;

— works relating to the outlet, drainage and emptying of the reservoir and associated work (electricity, service repairs, etc.).

5.2. Casasola-Pilones Pipeline (Malaga)

The project involves installing a pipeline from the Casasola dam to the supply canal for the left bank of the Guadalhorce river, with an overall length of 9 587 m and a diameter of 1 500 mm, except for the first 200 m, which will have a diameter of 1 000 mm. Work includes building a valve house and installing control systems, remote control and power supply.

5.3. Water supply and waste-water disposal and treatment for the Costa Tropical de Granada

This project consists of 14 measures involving treatment plants, water supply and waste-water disposal.

5.3.1. Treatment plants

(1) WASTE-WATER TREATMENT PLANTS AT LA HERRADURA AND CARCHUNA-CALAHONDA

Type of treatment: biological.

The main treatment phases include:

(a) intake unit (settling pond),

(b) solids removal (one mechanical line with a screen, one manual line with a rack),

(c) grit and grease removal (fine bubble diffusers),

(d) flow measurement,

(e) biological reactor with nitrification/denitrification,
(f) aeration system,
(g) secondary sedimentation (two units),
(h) dephosphatation (two lines),
(i) sludge handling (removal, thickening, pumping, dewatering, storage),
(j) other facilities (air network, drinking water, odour treatment; septic pond intake).

(2) CASTELL DE FERRO WASTE-WATER TREATMENT PLANT

Type of treatment: biological, extended aeration at low loading.

The main treatment phases include:
(a) removal of coarse solids (two units),
(b) screening,
(c) grit removal (two static units),
(d) grease removal (one unit),
(e) biological reactor (extended aeration, four turbines),
(f) secondary sedimentation (two units),
(g) disinfecting,
(h) sludge handling (removal, gravity thickening, band filter dewatering),
(i) other facilities (power supply, drinking water, etc).

(3) ALBUÑOL WASTE-WATER TREATMENT PLANT

Type of treatment: biological.

The main treatment phases include:
(a) removal of coarse solids (one unit),
(b) screening (one unit),
(c) grit removal,
(d) secondary sedimentation (one unit),
(e) dephosphatation (one line),
(f) service work (power supply, controls).

(4) VELEZ DE BENAUDPALLA TREATMENT PLANT

Type of treatment: peat bed.

The main treatment phases include:
(a) channel for solids removal,
(b) grit/grease removal (double unit),
(c) peat screen; six basins with three layers:
  — 50 cm of peat,
  — 15 cm of sand,
  — 15 cm of gravel,
(d) collector to the river,
(e) associated work (service hut, access road, etc.).

5.3.2. Water supply

(1) SUPPLY BRANCH PIPELINE TO MOTRIL AND TORRENUEVA (PHASES I AND II)

(a) Mains pipeline: from the Molvizar reservoir to the Salobreña and Almuñécar branch pipeline.
  — Diameter: 1 000 mm.
(b) Mains pipeline: from the Salobreña-Almuñécar branch pipeline to the Motril and Torrenueva branch pipeline.
  — Diameter: 700 mm.
(c) Pipeline to Motril:
  — Diameter: 500 mm.
(d) Pipeline to Torrenueva:
  — Diameter: 400 mm.

(2) PHASE II OF THE MOLVIZAR PLANT

This phase expands the supply capacity by 100 000 inhabitants by the design year, with a planned supply of 250 litres per inhabitant per day.

This measure involves extending the filtering area of the treatment building to accommodate new filters, connecting these to the existing system and expanding the compressed air facilities, power supply and central control system.

5.3.3. Waste-water disposal

(1) CONVEYANCE OF WASTE WATER TO THE TREATMENT PLANT AT LA HERRADURA

— Pumping: four groups of pump-motor units.
— Pipeline: 3 400 m of 350 mm diameter.
— Minor work.
CONVEYANCE OF WASTE WATER TO THE TREATMENT PLANT AT CARCHUNA-CALAHONDA

— Four force mains, including 17 pumps of varying power and associated piping.
— Length: 4 807 m; diameter: 100 to 350 mm.

WASTE-WATER DISPOSAL FOR CARCHUNA AND LA CHUCHA

Includes 6 946 m of 300 mm diameter piping and 2 pumps.

OFFSHORE OUTFALLS

Three new outfalls are to be build (Calahonda, Melicena and Los Yesos) and four pump stations are to be overhauled.

Main features:

(a) Carchuna-Calahonda outfall
— Land outfall: length: 1 557 m; diameter: 450 mm.
— Offshore outfall: length: 600 m; diffusers: 2475 mm diameter discharge spouts.

(b) Melicena outfall
— Length: 700 m.
— Diameter: 160 mm.

(c) Los Yesos outfall
— Length: 600 m.
— Diameter: 160 mm.

(d) Renovation of the pump stations at Castillo de Barrios, La Mamola, La Rabita and El Pozuelo.

The following renovation work will be carried out on each station:
1. Installation of self-cleaning rack.
2. Renovation of structure.
3. Overhaul and improvement of electro-mechanical equipment.

WASTE-WATER PIPELINE TO THE CASTELL DE FERRO TREATMENT PLANT

1 640 m of piping and two pumps.

ALBUÑOL SYSTEMS

(a) Drainage systems: 16 297 m of piping with diameters of between 200 and 300 mm.
(b) Supply systems: 8 600 m of piping with diameters of between 63 and 110 mm.

CENTRALISING WASTE FROM JETE, LENTEJIL, LOS GUJARES AND MOLVIZAR

Includes 2 436 m of 300 and 400 mm diameter piping.

6. Objectives:

This group of projects provides water supply and waste-water treatment infrastructure to a number of locations on the Mediterranean coast of Andalusia affected by both heavy tourist development and low rainfall.

These circumstances aggravate the water shortage throughout Andalusia, which calls for more efficient management of water resources and installation of costly infrastructure which cannot be paid for solely by the affected municipalities.

The previous section describes how each measure fits into the general strategy, relating either to the distribution, quantity and quality of water supplied to the population (supply measures), or the conveyance and treatment of waste-water and protection against environmental pollution (waste-water disposal networks, treatment plants and outfalls).

The specific aims of each project are presented in the following table:

<table>
<thead>
<tr>
<th>Project</th>
<th>Inhabitants served</th>
<th>Supply (m³/day)</th>
<th>Treated (m³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marbella distribution reservoir</td>
<td>55 000</td>
<td>13 750</td>
<td></td>
</tr>
<tr>
<td>Casasola-Pilones pipeline</td>
<td>600 000</td>
<td>50 000</td>
<td></td>
</tr>
<tr>
<td>Costa Tropical Granada</td>
<td>300 000</td>
<td>25 000</td>
<td>18 550</td>
</tr>
</tbody>
</table>
The main parameters of the treatment plants in the project for the Costa Tropical de Granada are presented in the following table:

<table>
<thead>
<tr>
<th></th>
<th>La Herradura</th>
<th>Carchuna-Calahonda</th>
<th>Castell de Ferro</th>
<th>Albuñol</th>
<th>Velez de Benaudalla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present population</td>
<td>43 000</td>
<td>17 800</td>
<td>8 500</td>
<td>2 500</td>
<td>2 400</td>
</tr>
<tr>
<td>Present population equivalent (p.e.)</td>
<td>43 000</td>
<td>17 800</td>
<td>8 500</td>
<td>2 500</td>
<td>2 400</td>
</tr>
<tr>
<td>Design population</td>
<td>51 000</td>
<td>21 000</td>
<td>10 000</td>
<td>4 000</td>
<td>4 000</td>
</tr>
<tr>
<td>Design population equivalent (p.e.)</td>
<td>51 000</td>
<td>21 000</td>
<td>10 000</td>
<td>4 000</td>
<td>4 000</td>
</tr>
<tr>
<td>Total average BOD5 on entry (mg/l)</td>
<td>435</td>
<td>300</td>
<td>250</td>
<td>300</td>
<td>240</td>
</tr>
<tr>
<td>Total average BOD5 on exit (mg/l)</td>
<td>&lt;35</td>
<td>&lt;35</td>
<td>&lt;20</td>
<td>&lt;35</td>
<td>&lt;120</td>
</tr>
<tr>
<td>Total average SS on entry (mg/l)</td>
<td>342</td>
<td>350</td>
<td>200</td>
<td>250</td>
<td>200</td>
</tr>
<tr>
<td>Total average SS on exit (mg/l)</td>
<td>&lt;35</td>
<td>&lt;35</td>
<td>&lt;25</td>
<td>&lt;35</td>
<td>&lt;35</td>
</tr>
<tr>
<td>Average daily volume of water (m³/day)</td>
<td>9 000</td>
<td>5 250</td>
<td>2 500</td>
<td>1 500</td>
<td>1 000</td>
</tr>
<tr>
<td>Industrial waste (%)</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
</tr>
</tbody>
</table>

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>March 1993</td>
<td></td>
</tr>
<tr>
<td>Main work</td>
<td>March 1997</td>
<td>December 1999</td>
</tr>
<tr>
<td>Operational phase</td>
<td>January 2000</td>
<td></td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the following basis:

- utility value of the infrastructure = 20 years,
- net book value = 0,
- discount rate = 6%.

The following asset factors were considered:
- sanitation tax,
- evaluation of the improvement in supply to the population (savings in expenditure on alternative sources in the event of supply problems),
- financial estimate of the environmental benefit of reducing the pollution loading of discharge in the case of disposal and treatment projects,
- revenue from re-use of treated water.

The following deficit factors were considered:
- initial investment,
- operating and maintenance costs.

The results obtained are positive from a financial and environmental point of view.

- Internal rate of return = 22.49%  
- Present discounted value = ESP 10 431 million.
Environmental impact analysis:

1. The group of projects improves the management of water resources and water quality by providing sewer systems and treatment facilities to municipalities which lacked them. The group of projects is a coherent one and contributes to achieving the objectives of Article 130R of the EC Treaty and the Fifth Community programme of policy and action in relation to the environment and sustainable development.

The population of the (mostly coastal) municipalities covered by the projects sometimes trebles in summer, making it difficult to guarantee water supply. The negative effects of waste-water discharge into the sea must also be reduced as much possible. This and the question of environmental impact are of great importance for the development of tourism in the area and thus for its socio-economic development.


2. Effluent must receive secondary treatment before it is discharged through the Calahonda outfall. Discharge with primary treatment only will permitted provided a study is carried out on dispersion in the discharge area, with positive results, and provided the area is identified as a less sensitive area in accordance with Directive 91/271/EEC.

Cost and assistance:

Total cost: ECU 23 848 825
Eligible cost (after 23 May 1997): ECU 20 482 791
Rate of assistance: 80%
Cohesion Fund grant: ECU 16 386 233

ANNEX

FINANCING PLAN

Project No: 97/11/61/040

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>3=2/1</td>
<td>4</td>
</tr>
<tr>
<td>1997</td>
<td>4 552 370</td>
<td>4 552 370</td>
<td>100</td>
<td>3 641 896</td>
</tr>
<tr>
<td>1998</td>
<td>9 488 458</td>
<td>9 488 458</td>
<td>100</td>
<td>7 590 767</td>
</tr>
<tr>
<td>1999</td>
<td>6 441 963</td>
<td>6 441 963</td>
<td>100</td>
<td>5 153 570</td>
</tr>
<tr>
<td>Total</td>
<td>20 482 791</td>
<td>20 482 791</td>
<td>100</td>
<td>16 386 233</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/041

1. **Name:**
Conveyance and treatment of waste water for Oja-Tirón, Rioja, in Spain.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Desarrollo Autonómico, Administraciones Públicas y Medio Ambiente Dirección General Calidad Ambiental.

3.2. **Address:** Prado Viejo, 62bis 26071 Logroño, La Rioja

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Rioja

5. **Description:**

The project involves the construction of collector sewers and a treatment plant for residential waste water from the different communities discharging into the Oja and Tirón rivers which flow into the river Ebro.

**Collector sewers**

Two collectors are planned, the first covering a distance of 13 720 m from Cuzcurrita to Haro, via Tirgo, Cihuri and Aguciana and the second running for 12 078 m from Bañares to Cihuri, collecting sewage from Castañares de Rioja and Casalarreina. The two collectors will intercept at Cihuri, carrying the sewage from all the urban settlements in the area. As the sewage flow increases, the collector will increase in diameter, from 300 mm through 400, 500 and 600 to 800 mm.

**Treatment plant**

A biodisc process has been chosen. Waste water from the municipalities will arrive at the treatment plant via two collectors fitted with spillways to restrict access to the plant to a maximum of five times the average flow.

**Water treatment:**

— grit chamber with bar screen to keep back the coarsest solids,

— four submersible pumps,

— two sand traps,

— two primary settling basins,

— biological treatment consisting of two lines of biodiscs, each with four stages,

— secondary sedimentation in two circular basins.

Plans have been made to expand the water-treatment capacity by adding more primary and secondary settling basins.

**Sludge treatment:**

— two covered gravity thickening basins,

— aerobic digestion,

— 120 m³ storage basin with mixer,

— dewatering units.

6. **Objectives:**

The project will contribute to the objectives of the sanitation law. Because of the area’s strategic position in the region, the project will have a very positive impact on improving the quality of water resources.

<table>
<thead>
<tr>
<th></th>
<th>High season</th>
<th>Low season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>32 000</td>
<td>16 000</td>
</tr>
<tr>
<td>Average flow (m³/hour)</td>
<td>333</td>
<td>167</td>
</tr>
<tr>
<td>Peak flow (m³/hour)</td>
<td>584</td>
<td>312</td>
</tr>
<tr>
<td>SS concentration (mg/l)</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>SS loading (kg/day)</td>
<td>2 880</td>
<td>1 440</td>
</tr>
<tr>
<td>BOD concentration (mg/l)</td>
<td>260</td>
<td>260</td>
</tr>
<tr>
<td>BOD loading (mg/l)</td>
<td>2 080</td>
<td>1 040</td>
</tr>
</tbody>
</table>
The values on exit are:

- SS loading (kg/day) 35 ppm
- BOD concentration (mg/l) 25 ppm
- Dryness of sludge 25%

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of land</td>
<td>15.12.1997</td>
<td>15.2.1998</td>
</tr>
<tr>
<td>Main work</td>
<td>1.1.1998</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. Assessment of costs and socio-economic advantages:

The cost-benefit analysis was made for a period of 20 years, this being the average life span of treatment plants. The following parameters were taken into account:

- costs: investment, operation and maintenance,
- benefits:
  - sanitation tax,
  - estimate of the environmental benefits of treating the waste water discharged into public water courses and the subsequent improvement in water resources.

The internal rate of return is 0.066%.

9. Environmental impact analysis:

The installation of a conveyance system and treatment plant for waste water will have an appreciable impact in improving water resources, both surface water (the rivers Oja, Tirón and Ebro) and ground water (the local aquifer).

The project meets the requirements of Directive 91/271/EEC and the planned measures are preventive, since they concern the correction of water pollution caused by municipalities discharging waste water into public water courses.

10. Cost and assistance:

Total cost: ECU 11 114 849

Eligible cost (after 23 May 1997): ECU 11 114 849

Rate of assistance: 80%

Cohesion Fund grant: ECU 8 891 879

ANNEX

FINANCING PLAN

Project No: 97/11/61/041

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(1)</th>
<th>Total public expenditure</th>
<th>Cohesion Fund</th>
<th>National authorities</th>
<th>Private sector</th>
<th>Community loans</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
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<td>3=2/1</td>
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<td>252 696</td>
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<td></td>
<td>202 156</td>
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<td>5 431 077</td>
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<td>5 344 862</td>
<td>80</td>
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<tr>
<td>Total</td>
<td>11 114 849</td>
<td>11 114 849</td>
<td>100</td>
<td></td>
<td>8 891 879</td>
<td>80</td>
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</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/042

1. **Name:**
   Water-supply facilities in various towns in the Autonomous Community of Castile-Leon.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Consejería de Medio Ambiente y Ordenación del territorio
   3.2. **Address:** Nicolás Salmerón, 5 47071 Valladolid

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Autonomous Community of Castile-Leon

5. **Description:**
   There are six groups of projects.

5.1. **Facilities for the supply of water to Segovia**
   These involve the following projects:

5.1.1. Rancho El Feo
   Three supply conduits from Puente Alta, Valsain and La Aceveda to the Rancho El Feo drinking-water treatment plant.
   Rancho El Feo drinking-water treatment plant, comprising a chamber for dosing reagents, two 13 m diameter sedimentation tanks, four 30 m² open filters, one 10 000 m³ reservoir and disinfection facilities using sodium hypochlorite and chlorine gas (pre- and postchlorination). The plant will be fully automated with central measurement of all variables.
   Definition of the work necessary to supply water to the towns of Peñas de Erizo, Parque Robledo and Quitapesares from the regulating reservoir.

5.1.2. San Ildefonso, La Granja
   A pumping station and pressure conduits from the Pontón Alto Dam to the El Cuadrado Reservoir.

5.1.3. Mancomunidad de la Atalaya
   A pumping station and pressure conduits from the Pontón Alto Dam to the drinking-water treatment plant. Construction of the Atalaya drinking-water treatment plant.

5.2. **Joint facilities for the supply of water to the Cerrato Sur and Alto Pisuerga Districts.**

5.2.1. Cerrato Sur
   85 m² intake well in the River Pisuerga and installation of pumps.
   Pressure conduits from the well to the drinking-water treatment plant.
   Drinking-water treatment plant: 150 m³ sedimentation tank, filtration system and 1 200 m³ reservoir for the storage of treated water.
   Pumping station on the site of the drinking-water treatment plant with three pumps each with a capacity of 20,8 l/s at 30 m).
   Head reservoir.

   Principal distribution network for the towns of Alba de Cerrato, Cevico de la Torre, Cevico Navero, Vertavillo, Valle de Cerrato, Villaconancio, Cubillas de Cerrato, Población de Cerrato and Hérmedes de Cerrato. Gravity conduits will be used except in the case of Hérmedes de Cerrato which will require two reservoirs and a pumping station.

5.2.2. Alto Pisuerga
   The work will involve the construction of various catchment and distribution systems:
   Supplies to Caleda, Vañes, Rabanal, Valsadornin and Gramedo:
   — construction of two small dams on the Villar stream for intake,
   — conduit 1 056 m long to the existing Celada Reservoir,
   — conduit 2 140 m long from the Celada Reservoir to Rabanal,
   — three branch conduits 522 m, 2 780 m and 2 328 m long.

   Supplies to Porquera de los Infantes and Villallano from Camesa:
   — distribution conduit from the Camesa Reservoir to the towns of Villallano and Porquera de los Infantes (total of 4 949 m of conduit),
— construction of a 30 m³ reservoir in Villallano and a 120 m³ reservoir in Porquera.

Supplies to Llanillo and Mundilla from Peña La Yedra:
— intake at the Peña La Yedra spring,
— 2 503 m of conduit to a 60 m³ reservoir for the use of both towns,
— distribution conduits to the towns of Llanillo (1 259 m) and Mundilla (1 703 m).

Supplies to Cillamayor:
5 280 m of conduit from the existing Matamorosca Reservoir to the Cillamayor Reservoir.

Supplies to Revilla de Pomar:
construction of a catchment dam and 1 360 m of conduit.

Supplies to Puentetoma from Fuentecaliente:
1 740 m of conduit.

Supplies to Villaescusa de las Torres:
construction of a small dam, a 16 m³ reservoir and conduit.

Supplies to Corvio, Quintanilla de las Torres, Canduela, Corralejo and Villavega de Aguilar:
construction of collecting ditches and improvements to the existing supply systems.

5.3. Facilities for the supply of water to the Upper Oca Valley (drinking-water treatment plant and conduit from the Alba Reservoir to Bureba District)

Conduit from the existing Alba Reservoir to the town of Briviesca. 25 km of 300 mm diameter ductile steel piping.

Treatment plant with a treatment capacity of 120 l/s. Sedimentation tank, filters with air and water backwashing, filtered water reservoir, treated water reservoir, dewatering of sludge on drying beds.

Branch supply conduits to the various towns in the Upper Oca Valley (21 800 m).

5.4. Facilities for the supply of water to Medina del Campo and Olmedo in the Valladolid area

The work involves the following:
— construction of a dam on the River Adaja (84.5 m),
— pumping unit (pumps with a capacity of 220 m³/h at 20 m),
— drinking-water treatment plant with a capacity of 8 850 m³/day consisting of a plate-type sedimentation tank, a gravity sand filter with air and water backwashing and installations for the recirculation and dewatering of sludge from the sedimentation tank,
— pumping to the Medina del Campo Reservoir; 6 676 m of 350 mm diameter piping. Pumping to the Olmedo Reservoir; 4 433 m of 200 mm diameter piping,
— reservoirs for treated water at Medina del Campo (8 550 m³) and Olmedo (1 852 m³),
— transport under gravity to the existing distribution systems in Medina (11 266 m of 500 mm diameter piping) and Olmedo (3 108 m of 300 mm diameter piping).

5.5. Facilities for the supply of water to areas on the left bank of the River Tormes (Reservoir in ‘La Pinilla’, Salamanca)

Construction of a rectangular, two basin regulatory reservoir of 65 000 m³ capacity in reinforced concrete faced with lightened, prestressed reinforced concrete sheets.

A high-level 1 000 m³ capacity reservoir to supply areas higher up.

Rectangular control building attached to the reservoir which will contain the pumps (four-unit pumping station), control valves, control panel, etc.

Distribution network: 171 m of 150 mm to 400 mm diameter piping; 267 m of 500 mm diameter piping; 162 m of 700 mm to 800 mm piping; 379 m of 900 mm piping.

Supply of electricity, site development, lighting, landscaping, etc.

5.6. Facilities for the supply of water to the districts of La Serrezuela and Cuerda del Calvitero

La Serrezuela

Two networks will be installed, in the upper and lower areas.

Upper area

Construction of a 200 000 m³ capacity reservoir on the Pasaderas stream in the Zapardiel basin.
20 874 m of 63 mm to 250 mm diameter PVC and polyethylene piping to supply Zapardiel de Cañadad, Martínez, Arevalillo, Aldealabad de Mirón, Mercadillo and Narrillos del Alamo in the Province of Ávila.

Lower area

Construction of a dam on the River Agudín in the municipality of Pascualcobo to create a 400 000 m³ capacity reservoir.

34 485 m of 63 mm to 250 mm diameter polyethylene and PVC piping to supply Pascualcobo, San Miguel de la Serrezuela, Diego Alvaro and Carpio Medianero in Ávila and Chagarcía Medianero, Horcajo Medianero, Valjimena, Sanchopedro de Abajo, el Tomillar and Larodrigo in Salamanca.

Cuerda del Calvitero

Construction of a 92 000 m³ capacity reservoir on the Carteseja stream in Becejas. 26 650 m of 50 mm to 200 mm diameter ductile steel piping.

6. **Objectives:**

The aim of the group of projects is to improve water-supply infrastructures in various parts of the Autonomous Community of Castile-Leon in order to guarantee adequate supplies of quality drinking water.

The detailed objectives are given below:

<table>
<thead>
<tr>
<th>Project No: 97/11/61/042</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current population (habitants)</td>
<td>56 471</td>
<td>6 914</td>
<td>9 875</td>
<td>23 781</td>
<td>8 145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design population (habitants)</td>
<td>59 720</td>
<td>26 472</td>
<td>12 442</td>
<td>35 250</td>
<td>71 620</td>
<td>9 796</td>
<td></td>
</tr>
<tr>
<td>Supply m³/day (volume of reservoir)</td>
<td>17 916</td>
<td>830</td>
<td>6 118</td>
<td>3 733</td>
<td>10 575</td>
<td>66 000</td>
<td>2 449</td>
</tr>
<tr>
<td>Current daily consumption (l/hab.)</td>
<td>200</td>
<td>120</td>
<td>180</td>
<td>245</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design daily consumption (l/hab.)</td>
<td>300</td>
<td>250</td>
<td>300</td>
<td>300</td>
<td>250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water source: surface, well, etc. Reservoir Surface Surface Reservoir Surface Surface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.5.1993</td>
<td>28.2.1997</td>
</tr>
<tr>
<td>Purchase of land</td>
<td>1.3.1995</td>
<td>31.7.1997</td>
</tr>
<tr>
<td>Main work</td>
<td>1.5.1997</td>
<td>31.12.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis was carried out for a period of 25 years, considered to be the working life of the facilities.

The cost-effectiveness of the group of projects was calculated by calculating cash flows on the basis of the difference between the following costs and benefits:

- costs: investment costs; operating costs were not included because these will be covered by the charges paid by users;
- benefits: income during droughts (in certain cases only) and the social benefits, expressed in terms of per capita income, deriving from the guarantee of adequate water supplies to permit an acceptable and sustainable level of development.

The internal rate of return for the group of projects is 11.85 %.
9. **Environmental impact analysis:**

Through a rational utilisation of natural resources, the group of projects will help satisfy the drinking-water requirements and protect the health of the populations concerned. It will permit the social and economic development of the area while protecting the environment.

10. **Cost and assistance:**

**Total cost:** ECU 38 360 346

**Eligible cost (after 27 May 1997):** ECU 38 360 346

**Rate of assistance:** 80%

**Cohesion Fund grant:** ECU 30 688 277

**Breakdown of costs (in ECU):**

- Segovia: 7 191 594
- Cerrato-Pisuerga: 6 883 621
- Alto Oca: 3 828 843
- Medina-Olmedo: 9 146 583
- Salamanca: 5 197 336
- Serrezuela: 6 112 369

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ANNEX

**FINANCING PLAN**

Project No: 97/11/61/042

**Year** | **Total cost** | **Total public expenditure** | **Cohesion Fund** | **National authorities** | **Other** | **Private sector** | **Community loans**
--- | --- | --- | --- | --- | --- | --- | ---
| Year | 1=2+11 | 2=4+6+10 | 3=2/1 | 4 | 5=4/2 | 6=8+9 | 7=6+2/3 | 8 | 9 | 10 | 11 | 12=11/1 | 13
| 1997 | 6 924 749 | 6 924 749 | 100 | 5 539 800 | 80 | 1 384 949 | 20 | 1 384 949 | | | | |
| 1998 | 15 876 858 | 15 876 858 | 100 | 12 701 486 | 80 | 3 175 372 | 20 | 3 175 372 | | | | |
| 1999 | 15 558 739 | 15 558 739 | 100 | 12 446 991 | 80 | 3 111 748 | 20 | 3 111 748 | | | | |
| Total | 38 360 346 | 38 360 346 | 100 | 30 688 277 | 80 | 7 672 069 | 20 | 7 672 069 | | | | |

(1) Total eligible cost of project.
1. Name: Waste-water treatment facilities for different settlements in Castile-León.

2. Body responsible for the application:
   2.1. Name: Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
   2.2. Address: Paseo de la Castellana, 162, 28071 Madrid

3. Body responsible for implementation:
   3.1. Name: Consejería de Medio Ambiente y Ordenación del territorio
   3.2. Address: Nicolás Salmerón, 5, 47071 Valladolid

4. Location:
   4.1. Member State: Spain
   4.2. Region: Castile-León

5. Description:
   The following projects are included:
   5.1. Waste-water treatment plant for the city of Zamora
   The Junta of Castile-León and the municipality of Zamora plan to finance the final collector sewers to the future treatment plant.
   The treatment plant involves activated sludge treatment at low load, comprising:
   Water treatment, three lines:
   — pump station,
   — aerated sand and grease removal,
   — three circular primary settling basins (1 333 m³),
   — three biological reactors (3 960 m³ each) with an anoxic area of 1 510 m³,
   — three secondary settling basins with a diameter of 33 m.
   Sludge handling:
   — primary sludge thickener,
   — secondary sludge thickener/float,
   — anaerobic digestor,
   — belt filter press for dewatering.

5.2. Waste-water treatment plants in the catchment area of the Carrión river
Various different types of treatment are planned, in three subprojects:
   Treatment plant at Guardo and additional work at the plant at Velilla del Río Carrión
   Construction of the treatment plant at Guardo, using activated sludge at half load, and additional work at the plant at Velilla del Río Carrión.
   Treatment plants at Dueñas and Saldaña
   Includes installation of the outfalls and construction of the Dueñas treatment plant using biofilm (biodiscs). Treatment comprises preliminary treatment, primary sedimentation, biological treatment using biodiscs and disinfection using chlorine. Sludge handling comprises thickening and dewatering, with anaerobic digestion.
   Construction of the Saldaña treatment plant, with biodiscs and secondary sedimentation.
   Treatment plants at Paredes de Nava and Frómista
   The Paredes de Nava plant will involve treatment by activated sludge at half load. The Frómista plant will have an Imhoff tank with a bacterial bed.

5.3. Waste-water treatment plants in protected areas
This measure comprises the following subprojects:
   Sierra de Gredos
   Construction of collector sewers.
   Covers 19 villages served by various waste-water treatment systems comprising glass fibre modules, settling basins, bioreactors and clarifiers. The extracted sludge is dewatered before being taken to the tips at Barco de Ávila (for the settlements in the northern watershed) and at Arenas de San Pedro (for the settlements in the southern watershed).
**Picos de Europa**

Overhaul, cleaning and improvement of 15 existing small waste-water treatment systems. Construction of 13 new treatment systems comprising a coarse grit chamber, fine screening, Imhoff tank, two bacteria beds and a clarifier. Sludge handling will be carried out at the Riaño treatment plant.

**Sierra de Urbión**


**Cañon del Río Lobo**

Water treatment for 12 settlements. Construction of collector sewers. Repair, expansion and construction of treatment plants. Two types of treatment:

- Imhoff tank with bacteria bed,
- settling tank-digester with biodiscs and secondary settling tank.

Sludge handling will be carried out at the San Leonardo de Yagüe facilities.

5.4. **Waste-water treatment plants for the Eresma river**

Waste-water treatment in various settlements in the Eresma catchment area.

Two projects have priority:

**Treatment plant at Coca**

Construction of collector sewers. Treatment plant using extended aeration.

**Treatment plant at El Espinar**

Construction of collector sewers. Treatment plant using extended aeration.

6. **Objectives:**

This group of projects aims at providing waste-water treatment facilities for various municipalities in Castile-León which discharge into the Duero river.

The projects all comply with Directive 91/271/EEC.

The quantified objectives are:

<table>
<thead>
<tr>
<th>Project No: 97/11/61/043</th>
<th>Zamora</th>
<th>Carrión river</th>
<th>Protected areas</th>
<th>Eresma river</th>
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</thead>
<tbody>
<tr>
<td>Present population (inhabitants)</td>
<td>65 610</td>
<td>39 288</td>
<td>68 924</td>
<td>16 000</td>
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<tr>
<td>Present population equivalent (p.e.)</td>
<td>80 000</td>
<td>51 074</td>
<td>89 602</td>
<td>21 266</td>
</tr>
<tr>
<td>Design population (inhabitants)</td>
<td>83 307</td>
<td>63 192</td>
<td>110 860</td>
<td>20 180</td>
</tr>
<tr>
<td>Design population equivalent (p.e.)</td>
<td>124 000</td>
<td>82 150</td>
<td>114 119</td>
<td>32 245</td>
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<tr>
<td>Total average BOD5 on entry (mg/l)</td>
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<td>300</td>
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<td>Total average BOD5 on exit (mg/l)</td>
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<td>&lt; 25</td>
<td>&lt; 25</td>
<td>&lt; 25</td>
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<tr>
<td>Total average SS on entry (mg/l)</td>
<td>354</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Total average SS on exit (mg/l)</td>
<td>&lt; 30</td>
<td>&lt; 35</td>
<td>&lt; 35</td>
<td>&lt; 35</td>
</tr>
<tr>
<td>Average daily through-flow of water (m³/day)</td>
<td>22 244</td>
<td>14 300</td>
<td>13 440</td>
<td>8 506</td>
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<tr>
<td>Industrial waste (%)</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>10</td>
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7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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</thead>
<tbody>
<tr>
<td>Preparation of project</td>
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</tr>
<tr>
<td>Purchase of land</td>
<td>1.10.1995</td>
<td>1.10.1997</td>
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</table>

8. **Assessment of costs and socio-economic advantages:**

The financial analysis is based on a discount rate of 6% and a working life for facilities and plant of 24 years, as well as:

- investment costs: operating costs were not taken into account since these will be offset by the waste-water treatment tax paid by users once the facilities start operating;

- benefits: account was taken of the environmental benefits of improving water quality. No market price can be attached to such benefits, so shadow prices have had to be used. Calculations are based on the financial value of the difference in the polluting load of the discharge, measured in pollution units, before and after treatment in the treatment plants. In one case, account was taken of the benefit from the re-use of treated water.

The internal rate of return obtained for the group of projects is 6.7%.

9. **Environmental impact analysis:**

All the projects meet the following environmental objectives:

- preservation, protection and improvement of the quality of the environment,
- sustainable management and prudent and rational use of water resources,
- integrated pollution control,
- water management,
- improvement of the quality of the environment and protection of human health,
- management of treated sludge for possible use in agriculture.

10. **Cost and assistance:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Total cost</td>
<td>ECU 34 334 312</td>
</tr>
<tr>
<td>Eligible cost (after 27 May 1997)</td>
<td>ECU 34 035 295</td>
</tr>
<tr>
<td>Rate of assistance</td>
<td>80%</td>
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<tr>
<td>Cohesion Fund grant</td>
<td>ECU 27 228 236</td>
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Breakdown of cost (in ECU):

<table>
<thead>
<tr>
<th>Plant type</th>
<th>Cost (ECU)</th>
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<tbody>
<tr>
<td>Zamora treatment plant</td>
<td>10 423 891</td>
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<tr>
<td>Carrión river treatment plants</td>
<td>7 971 654</td>
</tr>
<tr>
<td>Treatment plants for protected areas</td>
<td>10 237 104</td>
</tr>
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<td>Treatment plants for Eresma river</td>
<td>5 402 645</td>
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<td>Total</td>
<td>34 035 295</td>
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### ANNEX

### FINANCING PLAN

Project No: 97/11/61/043

<table>
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<td>3=2/1</td>
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<td>1997</td>
<td>4 474 651</td>
<td>4 474 651</td>
<td>100</td>
<td>3 579 721</td>
</tr>
<tr>
<td>1998</td>
<td>15 371 931</td>
<td>15 371 931</td>
<td>100</td>
<td>12 297 545</td>
</tr>
<tr>
<td>1999</td>
<td>14 188 713</td>
<td>14 188 713</td>
<td>100</td>
<td>11 350 970</td>
</tr>
<tr>
<td>Total</td>
<td>34 035 295</td>
<td>34 035 295</td>
<td>100</td>
<td>27 228 236</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/61/044

1. Name:
Treatment centres for solid urban waste and sealing of tips in Castile-Leon.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. Address: Paseo de la Castellana, 162 28071 Madrid

3. Body responsible for implementation:

3.1. Name: Consejería de Medio Ambiente y Ordenación del Territorio

3.2. Address: Nicolás Salmerón, 5 47071 Valladolid

4. Location:

4.1. Member State: Spain

4.2. Region: Castile-Leon

5. Description:

The following projects are included:

5.1. Building of a treatment centre and six transfer stations for solid urban waste in the province of Zamora

Treatment centre

The treatment centre will be located in the El Montero area. When choosing the site, account was taken of hydrogeological factors affecting the protection of surface and subterranean aquatic environments and environmental considerations relating to the site's location. The centre will consist of the following areas:

- Service area: office buildings, work bays, lecture hall for environmental training and a building to house the workshop and warehouse;
- Recycling area: reception area with an unloading hopper, conveyor belts, sizing drum, magnetic separator, primary and secondary sorting, containers for storing selected materials and engine control centre;
- Composting area: conveyor belt carrying organic material from the recycling area, grading area, composting beds, sizing and refining units and storage tower;
- Disposal of discarded material: the tip will be waterproofed with high density polyethylene geomembrane 2 mm thick. Once the sheet has been spread, it will be covered with 50 cm of earth from the preparatory earthworks for the tip. A drainage system will be installed at the bottom of the tip to collect leachates and channel them into a basin.

The facility will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced.

A 200 m³ collection point for bulky waste and two 3 000 m³ leachate basins will be built.

The Zamora treatment centre will receive solid urban waste from the transfer stations listed below. The planned waste capacity is 1 500 000 m³.

Transfer plants

These will be located in the following municipalities: Bermillo de Sayago, Castrogonzalo, Gallegos del Río, Palacios de Sanabria, San Martin de Valderaduey and Toro.

The transfer plants will have the following features:

- general infrastructure and services, with all buildings and infrastructure required for operation and one closed and one open container each with a capacity of 40 m³;
- transfer area:
  - compacting system: one compactor with a capacity of 50 t/hour,
  - feeder hoppers,
  - wind screens,
  - container transport: two semi-trailers and a tractor will be used to transport containers from the transfer plants to the treatment centre,
- loading and unloading platforms,
- access to platforms.
5.2. Building of a treatment centre and four transfer stations for solid urban waste in the province of Segovia

The project includes preparation of the tip in the municipality of El Espinar.

Treatment centre

The treatment will be located in the municipality of Los Huertos.

When choosing the site, account was taken of hydrogeological factors affecting the protection of surface and subterranean aquatic environments and environmental considerations relating to the site’s location.

The centre will consist of the following areas:

— service area with office buildings and infrastructure required for the operation of the centre;
— recycling area: a reception area with an unloading hopper, conveyor belts, sizing drum, magnetic separator, primary and secondary sorting, containers for storing selected materials and an engine control centre;
— composting area: conveyor belt carrying organic material from the recycling area, grading area, composting beds, sizing and refining units and storage tower;
— disposal of discarded material: the tip, once prepared, will be waterproofed with a flexible high-density polyethylene geomembrane 2 mm thick. Once the sheet has been spread it will be covered with 50 cm of earth from the preparatory earthwork for the tip. A drainage system will be installed at the bottom of the tip to collect leachates channel them into a basin.

The tip will have a surface area of 100 000 m²

The facility will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced.

Waste will be selected mechanically, then ground and dumped in the tip.

The controlled tip in Segovia will receive solid urban waste from the transfer stations listed below.

The treatment centre will have a waste capacity of 1 250 000 m³.

Transfer plants

These will be located in the following municipalities: Boceguillas, Cantalejo, Cuéllar and Nava de la Asunción and will comprise the following:

— general infrastructure and services, with all buildings and infrastructure required for operation, closed containers of 40 m³ and open containers of 30 m³;
— Transfer area:
  — compacting system: one compactor with a capacity of 50 t/hour,
  — feeder hoppers,
  — wind screens,
  — container transport: two semi-trailers and one tractor will be used for transporting containers to the tip,
  — loading and unloading platforms,
  — access to platforms.

It is also planned to adapt the tip in the municipality of El Espinar, by improving access ways, sealing the parts of the tip that are full, installing rainwater drains, gas vent chimneys and piping, carrying out earthworks and providing an enclosure.

5.3. Building of infrastructure for the treatment of solid urban waste in three districts of Castile-León

Waste treatment centre in Palencia

The waste treatment centre in Palencia will convert the present high-density tip into a centre equipped with the latest waste-recycling technology.

The present tip will be sealed and any biogas produced will be re-used. A waste selection plant will be installed and a small area of the tip prepared for waste which cannot be recycled.

The chosen system combines the selective collection of particular materials contained in the waste (paper, cardboard, glass, metal, plastic, etc.) with separation, in the sorting plant, for subsequent use. Organic material may be composted or disposed of in a controlled tip adjoining the recycling plant.

Features of the project:

— the present tip will be sealed and replaced by a selection plant;
— at the same time, selective collection campaigns will be launched;
— the present area will be adapted: a raised area will be built in which waste will be treated for the next two years until the expansion sites are
put into use. Once the planned final elevation has been reached, the area will be closed and the biogas produced by the fermentation of the waste will be treated using a vertical gas release system;

— the treatment centre will be expanded to increase its capacity and to include the following facilities:

— a system for the collection and treatment of leachates, comprising two basins and a pre-treatment plant,

— a two-hectare section to be waterproofed with flexible high-density polyethylene geomembrane and protected by additional ground covering. A drainage system will be installed to collect leachates, as well as a run-off ditch.

*Treatment centre at Cevico de la Torre (Palencia)*

This treatment centre uses controlled tipping. The project was fully prepared by 1995 but has not been implemented due to lack of available funds.

The project is located on a nine-hectare site donated by the community it serves, and is made up of tips for the disposal of urban waste and industrial waste which can be considered as urban waste, both completely waterproofed with high-density polyethylene sheeting. It is equipped with leachate drainage systems and a leachate pit, lanes, a service area with weighing machine, gas release chimneys, a reinforced concrete pit for animal remains, offices, machinery bays and an enclosure around the entire site.

*Treatment centre at Quintanilla de Onésimo (Valladolid)*

A controlled tip is to be built at a site known as ‘Los Cruceros’, in an old limestone quarry.

The work involves:

(a) preparing the operational area, which includes all buildings and infrastructure required for the operation of the centre;

(b) preparing the tip site:

— preparing the tip; enclosure ditch;

— waterproofing the tip area with a flexible high-density polyethylene geomembrane;

— installing a pit and basin for leachate storage;

— installing a drainage system to collect and channel leachates;

— installing interior access.

(c) improving the access road to the tip and expanding it to a width of five metres with 0,50 m verges.

The three facilities described will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced so they can be eliminated by recirculation, failing which they will be conveyed to the nearest treatment plant.

5.4. *Sealing of uncontrolled tips in Castile-Leon*

This project involves sealing uncontrolled tips for solid urban waste and reclaiming contaminated sites. It includes 15 measures located in municipalities which already have waste management procedures. Once a controlled treatment centre is in place, the uncontrolled tip is sealed, closed and reclaimed.

The project includes the following measures:

— sealing of tips in Aranda de Duero, Medina de Pomar, Espinosa de los Monteros, Roa, Hontangas, Torresandino, Villalba de Duero and Gumiel de Hizán, all in the province of Burgos;

— sealing of tips in La Adrada, Piedralaves, Casillas, Casavieja and Arenas de San Pedro, in the province of Avila;

— sealing of tips in Iscar and Pedrajas de San Esteban, in the province of Valladolid.

The operations necessary for sealing are:

— piling waste for subsequent depositing in a pit,

— digging a waste pit or dump,

— levelling and compacting the clay layer and laying high-density polyethylene sheeting,

— collecting and treating leachates with proper equipment for this type of waste,

— installing gas release chimneys,

— levelling, compacting and reclaiming the affected area,

— cleaning the area,

— replanting and reafforesting on sites where this is considered appropriate.
6. **Objectives:**

- To create a structure for managing solid urban waste which will resolve current problems.
- To reduce the number of uncontrolled tips.

The quantified objectives of the group of projects are:

**Building of a treatment centre and transfer stations for solid urban waste in the province of Zamora**

This measure will meet the needs of a population of 211,213 and manage 78,397 tonnes of waste each year.

**Building of a treatment centre and transfer stations for solid urban waste in the province of Segovia**

Building a treatment centre in the environs of Segovia, upgrading the El Espinar tip and creating four transfer stations will meet the needs of 149,653 inhabitants and provide annual treatment of 50,000 tonnes of waste.

**Building of infrastructure for the treatment of solid urban waste in three districts of Castile-Leon**

Building treatment centres in Palencia, Cevico de la Torre and Quintanilla de Onésimo will meet the needs of three districts in Castile-Leon with a total population of 128,948. The centres will manage an annual total of 45,681 tonnes of waste.

**Sealing of uncontrolled tips in Castile-Leon**

The 15 measures making up this project will reclaim areas affected by uncontrolled tipping. Sealing the tips will improve the environment in the affected municipalities.

406,617 m$^3$ of solid urban waste will be treated and 129,933 m$^2$ of land reclaimed.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>1.1.1997</td>
<td>30.11.1999</td>
</tr>
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</table>

8. **Assessment of costs and socio-economic advantages:**

The cash flow for 10 years was calculated on the basis of the benefits identified and the total cost of the project, including the internal rate of return (IRR) and present discounted value, based on a discount rate of 6.5%.

The IRR is 19.25%.

The environmental benefits from soil and water protection have been estimated in financial terms. Revenue to cover operating costs can be obtained through indirect taxation.

9. **Environmental impact analysis:**

- Integrated control of the pollution generated by uncontrolled tipping of solid urban waste (100%).
- Prevention of waste production.
- Health protection: the treatment of solid urban waste is centralised and controlled, avoiding uncontrolled tipping or unsuitable waste treatment.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th>Total cost:</th>
<th>ECU 21 004 906</th>
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<tbody>
<tr>
<td>Eligible cost (after 27 May 1997):</td>
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<tr>
<td>Rate of assistance:</td>
<td>80%</td>
</tr>
<tr>
<td>Cohesion Fund grant:</td>
<td>ECU 16 485 906</td>
</tr>
</tbody>
</table>

Breakdown of cost (in ECU):

1. Zamora treatment centre    7 305 578
2. Segovia treatment centre   5 690 463
3. Treatment centres for three districts 4 654 236
4. Sealing of tips            2 957 106

Total 20 607 382
### ANNEX

**FINANCING PLAN**

Project No: 97/11/61/044

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
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<th>Community loans</th>
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<td>3=2/1</td>
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<td>1 120 005</td>
</tr>
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<td>4 121 476</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/045

1. **Name:**

Selective waste-collection centres in the main cities of Castile-Leon.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Medio Ambiente y Ordenación del territorio

3.2. **Address:** Nicolás Salmerón, 5
47071 Valladolid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Castile-Leon

5. **Description:**

This group of projects concerns 23 selective collection centres for municipal waste. All the projects are the same, and can be described together.

— Two centres will be built in each of the region’s main cities: Ávila, Burgos, León, Palencia, Salamanca, Segovia, Soria, Valladolid and Zamora (18 centres).

— One centre will be built in each of the following municipalities (with more than 20,000 inhabitants): Aranda de Duero, Medina del Campo, Miranda de Ebro, Ponferrada and San Andrés del Rabanedo (five centres).

The collection centres will be located on land provided by the local authorities, with an approximate area of 3,000 m². Each plot will be enclosed by a perimeter fence with access gates. Each enclosure will be divided into areas for different uses:

Area for public use:
— area for large containers,
— area for small containers.

Operations area for the centre.

Control buildings and amenities.

Each centre will consist of the following:
— a billboard with the logos of the financing bodies,
— access,
— enclosure,
— paving with rain-water drainage,
— control buildings and amenities,
— area for large containers: debris, tyres, bulky waste,
— area for small containers: paper, board, glass, batteries, used motor oil, vegetable oil, solvents, paint, fluorescent lights, car batteries, used clothing, medicines,
— electrical and sanitary facilities,
— interior signs,
— furniture,
— green areas,
— weighing machine.

6. **Objectives:**

— To establish a collection centre for every 100,000 inhabitants and a centre in municipalities with more than 20,000 inhabitants.

— To encourage the selective collection of certain materials, normally disposed of in tips, which can be recycled or which require safer disposal which does not endanger the environment or public health.

— To encourage recycling and re-use, and to obtain raw materials and energy from certain types of waste.
## Collection centres

<table>
<thead>
<tr>
<th>Collection centres</th>
<th>Number</th>
<th>Inhabitants</th>
<th>Tonnes of waste treated (per year)</th>
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<td>Ávila</td>
<td>2</td>
<td>50 015</td>
<td>3 350</td>
</tr>
<tr>
<td>Burgos</td>
<td>2</td>
<td>166 732</td>
<td>11 170</td>
</tr>
<tr>
<td>León</td>
<td>2</td>
<td>147 780</td>
<td>9 900</td>
</tr>
<tr>
<td>Salamanca</td>
<td>2</td>
<td>167 316</td>
<td>11 210</td>
</tr>
<tr>
<td>Segovia</td>
<td>2</td>
<td>55 551</td>
<td>3 720</td>
</tr>
<tr>
<td>Soria</td>
<td>2</td>
<td>33 436</td>
<td>2 240</td>
</tr>
<tr>
<td>Valladolid</td>
<td>2</td>
<td>334 820</td>
<td>22 490</td>
</tr>
<tr>
<td>Zamora</td>
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<td>66 017</td>
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</tr>
<tr>
<td>Aranda de Duero</td>
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<td>30 431</td>
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<tr>
<td>Medina del Campo</td>
<td>1</td>
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<td>1 350</td>
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<tr>
<td>Miranda de Ebro</td>
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<td>36 761</td>
<td>2 460</td>
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<td>Ponferrada</td>
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<td>San Andrés del Rabanedo</td>
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### 7. Work schedule:

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<td><strong>3.11.1999</strong></td>
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### 8. Assessment of costs and socio-economic advantages:

The economic and financial analysis was carried out for a period of 11 years, based on the following:

- investment costs,

- benefits from minimising waste and from recycling glass, paper and board, plastics and metals.

Environmental benefits include savings in energy and raw materials, reduction of the volume of waste to be disposed of in tips, separation of hazardous domestic waste and prevention of uncontrolled tipping.

The internal rate of return is 14.7%.

### 9. Environmental impact analysis:

The centres will contribute to reducing the number of tips and recycling the resources otherwise disposed of there, thereby attaining the objectives of the relevant Community Directives. They will also help control the pollution caused by uncontrolled tipping of waste.

### 10. Cost and assistance:

<table>
<thead>
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<th>Total cost:</th>
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<td>Rate of assistance:</td>
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ANNEX

FINANCING PLAN

Project No: 97/11/61/045

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<td>10 363 473</td>
<td>10 363 473</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/046

1. **Name:**
Solid urban waste treatment plants and sealing of tips in Andalusia.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
                  28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Consejería de Medio Ambiente Junta de Andalucía
   3.2. **Address:** Pabellón Nueva Zelanda, Avda. de las Acacias s/n
                   Seville

4. **Location:**

   4.1. **Member State:** Spain
   4.2. **Region:** Andalusia
   4.3. **Province:** Granada, Córdoba, Huelva, Jaén and Seville

5. **Description:**

   The group of projects involves building two treatment plants to recycle and compost solid urban waste, expanding the treatment capacity of a plant in Villarrasa (Huelva) and sealing and reclaiming disused areas and sites formerly used for uncontrolled tipping of solid urban waste in various municipalities in the Autonomous Community of Andalusia which no longer permit this.

5.1. **Building of a plant at Alhendín**

   **(Granada)**

   The plant will have sufficient capacity to service a total of 29 municipalities in La Vega and Valle de Lecrín and another group of municipalities served by the transfer stations at Granada, Alhama de Granada, Baza, Guadix, Huéscar, Iznalloz, Loja and Montefrío.

   The plant will comprise:

   A. Reception and storage area: 3 046 m³.

   B. Treatment area:

   1. Treatment line: travelling crane with hydraulic grappnel, line feeder for organic and inert matter, conveyor belt for bulky objects and organic matter, secondary sorting, electromagnetic separator, second sorting belt, unloading of rejected material, belt and packer for recovered material, paper, plastic and scrap metal.

   2. Compost line: spiral feeder and chain conveyor, screen, belt for removal of rejected material, densimetric separator with belt for removal of rejected material, exit belt to compost heap.

   3. Buildings: access control, service building, selection bay, workshop, garage, warehouse for recovered material: 2 197,1 m².

   4. Fermentation, maturation and drying park for compost: 13 700 m².

   5. Auxiliary tip (reserved area): 50 hectares.

5.2. **Building of Cordoba plant**

   The plant will serve the city of Cordoba.

   Main features of project:

   A. Reception and storage area: 3 736 m³.

   B. Treatment area:

   1. Treatment line: travelling crane with hydraulic grappnel, line feeder for organic and inert matter, conveyor belt for bulky objects and organic matter, secondary sorting, electromagnetic separator, second selection belt, unloading of rejected material, belt and packer for recovered material, paper, plastic and scrap metal.

   2. Composted line: spiral feeder and chain conveyor, screen, belt for removal of rejected material, densimetric separator with belt for removal of rejected material, exit belt to compost heap: two treatment lines and one refining line.

   3. Buildings: access control, service building, sorting bay, workshop-warehouse, garage, warehouse for recovered material: 2 276 m².

   4. Fermentation, maturation and drying park for compost: 8 300 m².

   5. Auxiliary tip (reserved area).
5.3. Expansion of Villarrasa Plant (Huelva)

This plant began operating in January 1995 and is an essential part of the waste treatment and disposal infrastructure in the province of Huelva, serving 30 municipalities. This project aims to correct problems which have arisen during this initial phase and will help to improve the plant’s operation, increase its productivity, and possibly double the total treatment volume.

Main features of the project:

1. Repair and surfacing of access road to the auxiliary tip (1 500 m long, 7 m wide).

2. Work on tip: rainwater drainage, collection and piping of leachates, impermeable sealing for tip.

3. New treatment line: travelling crane with multi-valve grapple, separation line feeder, sizing drum, improvement of power supply system (fine solids line, electromagnetic separator, conveyor belt to maturation park; unloading belt from grading line, electromagnetic separator, belt to containers of paper, glass, plastic matter, etc.).

4. Expansion of sorting buildings (99 m³).

5. Expansion of fermentation park (3 500 m²).

Covering of fermentation area (10 500 m²).

5.4. Sealing of Córdoba solid urban waste tip

The tip is located on a site known as ‘El Lobatón’, on the N-432 highway between Badajoz-Granada.

A protective barrier will be installed in the tip as a corrective measure against the possible escape of leachates, together with piping and a reception tank to permit proper treatment and disposal. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described for the previous tip.

5.5. Sealing of Granada solid urban waste tip

The tip is located near the Viznar road 10 km from Granada.

It is planned to cover an area of 35 000 m² with a 0,6 to 1 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will be covered with a second layer of between 0,20 and 0,25 m of topsoil and planted with native species.

A protective barrier will be installed in the tip as a corrective measure against the possible escape of leachates, together with piping and a reception tank to permit proper treatment and disposal. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described for the previous tip.

5.6. Sealing of Motril solid urban waste tip (Granada)

The tip is located in the municipality of Motril near the Pontes ravine on a lane 1—2 km from the population centre.

It is planned to cover an area of 35 000 m² with a 0,5 to 0,8 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will also be covered with a second layer of between 0,20 to 0,25 m of topsoil and planted with native species.

A 300 m stretch of stream will be pipelined as one of a number of corrective measures to prevent the escape of leachates. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described at point 5.4.

5.7. Sealing of solid urban waste tips in the Province of Jaén

The measure covers 11 tips situated in the municipalities of Alcalá La Real, Alcaudete,
Huelma, Jódar, Mancha Real, Pozo Alcón, Quesada, Torre del Campo, Torredonjimeno, Valdepeñas de Jaén and Villanueva del Arzobispo.

The tips are generally located close to the population centres.

It is planned to cover an area of 60 000 m² with a 0.5 to 0.8 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will also be covered with a second layer of between 0.20 and 0.25 m of earth and planted with native species.

Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described at point 5.4, depending on the requirements of each case.

6. Objectives:

General aims

A. Solid urban waste treatment plants

1. Main aim:

   More efficient solid urban waste treatment in order to:
   - minimise end production of waste
   - encourage waste recycling and re-use.

2. Secondary aims:
   - to eliminate uncontrolled tipping,
   - to re-use recycled material as raw materials and save energy,
   - to improve the environment generally.

B. Sealing of tips

1. Main aim:

   - to seal and reclaim areas used to tip solid urban waste,
   - to eliminate pollution risks and negative side-effects on the surrounding area and the environment,
   - to collect and control leachates and prevent their production where possible,
   - to carry out drilling and other measures to make safe any gases accumulating in waste mass.

2. Secondary aim:

   - to implement measures provided for in the territorial master plan for the management of waste in the Autonomous Community of Andalusia,
   - to reclaim and improve affected areas or return them to their natural state,
   - to drain and maintain all affected areas and maintain natural sites.

This group of projects continues the efforts of the Autonomous Community of Andalusia to eliminate uncontrolled tipping of solid urban waste, reclaim affected areas and return them to a natural state.

Specific objectives

6.1. Specific objectives of the Alhendín (Granada) Plant

In addition to the general objectives outlined above, this project has the following objectives:

(a) proper management and treatment for an estimated 157 000 tonnes/year of solid urban waste, with annual selective recovery of 30 152 tonnes of glass containers, 1 108 tonnes of plastic containers, 3 500 tonnes
of scrap metal, 30 152 tonnes of paper/cardboard; production of 25 127 tonnes/year of organic fertiliser in the form of compost.

(b) Once the plant is operational, all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.2. Cordoba Plant

In addition to the general objectives outlined above, this project has the following objectives:

(a) proper management and treatment for an estimated 115 000 tonnes/year of solid urban waste, with annual selective recovery of 2 800 tonnes of glass containers, 1 000 tonnes of plastic containers, 4 200 tonnes of scrap metal, 2 800 tonnes of paper/cardboard; production of 28 000 tonnes/year of organic fertiliser in the form of compost.

(b) Once the plant is operational all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.3. Villarrasa Plant (Huelva)

In addition to the general objectives outlined above, this project has the following objectives:

(a) proper management and treatment for an estimated 108 000 tonnes/year of solid urban waste, with an annual selective recovery of 2 160 tonnes of glass containers, 756 tonnes of plastic containers, 3 546 tonnes of scrap metal, 2 160 tonnes of paper/cardboard; production of 20 520 tonnes/year of organic fertiliser in the form of compost.

(b) Once the plant is operational all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.4. Sealing of Cordoba solid urban waste tip

The relevant basic data are:
- Area reclaimed 190 000 m²
- Volume of treated waste 140 000 m³
- Area sealed with clay-like material 50 000 m²

6.5. Sealing of Granada solid urban waste tip

The relevant basic data are:
- Area reclaimed 160 000 m²
- Volume of treated waste 130 000 m³
- Area sealed with clay-like material 60 000 m²

6.6. Sealing of Motril solid urban waste tip (Granada)

The relevant basic data are:
- Area reclaimed 70 000 m²
- Volume of treated waste 40 000 m³
- Area sealed with clay-like material 25 000 m²

6.7. Sealing solid urban waste tips in Jaén Province

The relevant basic data are:
- Area reclaimed 193 000 m²
- Volume of treated waste 75 000 m³
- Area sealed with clay-like material 60 000 m²

6.8. Sealing of solid urban waste tips in Seville Province

The relevant basic data are:
- Area reclaimed 127 250 m²
- Volume of treated waste 67 500 m³
- Area sealed with clay-like material 60 000 m²

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>
8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out based on the following assumptions:

— working life of the project: 20 years,
— investment, maintenance and operating costs,
— reduction of pollution,
— reclamation and improvement of areas affected by solid urban waste,
— savings in expenditure on urban waste management by recycling recoverable material,
— savings in raw materials, organic fertiliser and energy.

The internal rate of return for the group of projects is 11.69%; the IRR for the individual plants is: Alhendín: 9.9%; Villarrasa: 9.8%; Córdoba: 9.3%; the IRR for tip closures is: Córdoba: 17.08%; Granada: 17.37%; Motril: 19.4%; Javea: 17.5%; Seville: 17.7%.

9. **Environmental impact analysis:**

Implementation of the project will achieve the following environmental aims:

— control of soil, water and atmospheric pollution,
— environmental improvement in urban areas,
— improvement of public health,
— improvement in integrated management of urban waste,
— reduction in consumption of energy and natural resources.

10. **Cost and assistance:**

Total cost: ECU 24 488 856

Eligible cost (after 27 May 1997): ECU 24 488 856

Rate of assistance: 80%

Cohesion Fund grant: ECU 19 591 085

---

**ANNEX**

**FINANCING PLAN**

**Project No:** 97/11/61/046

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (£)</th>
<th>Public expenditure</th>
<th>National authorities</th>
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(1) Total eligible cost of project.
1. **Name:**
   General system of pumps and collector sewers, treatment plant and outfall for the coastal area of the municipality of Lluchmayor (Balearic Islands).

2. **Body responsible for the application:**
   
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   
   2.2. **Address:** Paseo de la Castellana, 162
   28071 Madrid

3. **Body responsible for implementation:**
   
   3.1. **Name:** Dirección General de Obras Hidráulicas (Ministerio de Medio Ambiente)
   
   3.2. **Address:** Paseo de la Castellana, 67
   28071 Madrid

4. **Location:**
   
   4.1. **Member State:** Spain
   
   4.2. **Region:** Balearic Islands
   
   4.3. **Municipalities:** Lluchmayor

5. **Description:**
   This project involves building a general system of collector sewers and pumps, a waste-water treatment plant and an outfall in the municipality of Lluchmayor (Balearic Islands).

   The plant will have sufficient capacity to treat both the current level of discharge and the level estimated for the design year (2015), producing effluent within permissible limits in accordance with Directive 91/271/EEC for discharge into the sea.

5.1. **Collector sewers and pumps**
   
   a) **Branch pipelines**
   
   Building of 6.5 km of branch pipelines, ranging in diameter from 125 to 500 mm, connecting the population centres of Sun Dorado, Bahía Grande, Bahía Azul, Sa Torre, Delta Maioris and El Arenal with the main collector sewer.

   b) **Main collector sewer**
   
   The main collector sewer starts at pump station No 1, situated at km 10 on the Cabo Blanco main road next to the Bahía Grande development. Seven more sections of piping, four of which are force mains and the remainder gravity sewers, lead from this point to a manhole near the site where treatment plant is to be built. The branch line will run from this manhole. Total length is 8.2 km with diameters of the various sections ranging from 200 to 500 mm.

c) **Pump stations**

   It is planned to build 13 pump stations comprising 18 pumps and 13 reserve pumps.

5.2. **Outfall**

   The effluent from the new waste-water treatment plant will be discharged into the sea through a newly-built outfall consisting of two parts: the first running from the plant to the sea (terrestrial outlet); the second underwater, running from a regulating well on the beach and ending 1500 m from the shore at a depth of 22 m.

   For the effluent from the plant to reach the terrestrial outfall it will have to cross the depression created by the Son Veri stream. A pump station is therefore planned inside the treatment plant to pump the effluent across the depression through a force main. A fibre-cement gravity pipeline of 700 mm diameter will run 1621 m from that point to the 7.5 m high regulating well located 180 m from the beach.

   This well will regulate the flow of the effluent on its way to the diffusers of the underwater outfall, ensuring that the facility functions properly by preventing unwanted fluctuations caused by variations in the flow from the treatment plant.

   The marine outfall, which will start at the regulating well, will be made of high density polyethylene piping 710 mm in diameter and will run 1681 m to the diffusers.

5.3. **Waste-water treatment plant**

   The treatment plant will contain the following facilities:

   **Water treatment**
   
   - Intake and by-pass with manually cleaned rack for very large solids.
   
   - Removal of solids through two channels with mechanically cleaned screens and a third
by-pass or emergency channel with a manually cleaned rack for medium-sized solids.

- Aerated grit and grease removal (one unit).
- Biological reactor (two units).
- Secondary gravity sedimentation (three units) with pumping of floating matter to pre-treatment.
- Tertiary treatment with the addition of polyelectrolytes, filtering through open sand beds (three units) and chlorination with bleaching soda.
- Recovery of treated water using (2 + 1) centrifugal horizontal pumps.

**Sludge line**

- Pumping of recirculated sludge using (3 + 1) submersible pumps.
- Pumping of excess sludge to aerobic digestion in summer and thickening in winter, using (2 + 1) submersible pumps.
- Aerobic digestion with aeration.
- Gravity thickening of sludge (three units).
- Pumping of thickened sludge in recirculation to digestion.
- Chemical treatment using polyelectrolytes and dewatering by centrifugation (two units).
- Storage of dewatered sludge in hopper.

6. **Objectives:**

The planned treatment plant is part of the Spanish Government’s national waste-water treatment plan (1995 – 2005), the basic criteria of which are:

- to complete drainage and treatment infrastructure in compliance with Directive 91/271/EEC,
- to reduce pollution loading to comply with the quality objectives for coastal bathing water and/or re-use of treated water.

The main technical parameters relating to the population to be covered and the quality of water to be obtained are:

<table>
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<tr>
<th>WASTE-WATER TREATMENT PLANT AT LLUCHMAYOR</th>
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<td>Design population equivalent (p.e.)</td>
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<td>Total average SS on entry (mg/l)</td>
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<tr>
<td>Total average SS on exit (mg/l)</td>
</tr>
<tr>
<td>Total average daily volume of water (m³/day)</td>
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<tr>
<td>Industrial waste (%)</td>
</tr>
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</table>

Other basic goals to be achieved are:

- good ratio of costs to objectives,
- use of systems with optimal performance,
- balance between initial investment and maintenance costs,
- ease of operation,
- low maintenance costs,
- pleasing aesthetic design of facility,
- minimisation of nuisance from noise and odour in the vicinity of the plant.

7. **Work schedule:**

<table>
<thead>
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<th>Category of work</th>
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<th>Completion</th>
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8. **Assessment of costs and socio-economic advantages:**

Cost-benefit analysis has been carried out based on the following assumptions:

- working life of the treatment plant = 20 years,
- residual value of the plant = 0,
- discount rate = 6%.
The following asset factors were considered:
— water rates or charges,
— financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:
— initial investment,
— operating and maintenance costs.

The results obtained are:
— internal rate of return = 2.33%.

Other benefits which must be taken into account have not been included in the above estimates as they are difficult to assess:
— increase in the well-being and quality of life of the local population,
— contribution to maintaining the quality of local beach areas, of importance to tourism.

9. **Environmental impact analysis:**

1) This project reduces the level of pollution in waste water before it is discharged into coastal waters or can leach into aquifers. The project is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development. The re-use of treated water will also help alleviate the acute water shortage affecting the Balearic Islands.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding possible ecological problems in coastal areas which could even affect human health) and palliative (reducing the level of pollutants in waste water produced by a large population and reducing pollution in coastal waters).

2) The planned collector sewers must be connected to a treatment plant before they are put into operation.

3) The sludge from the treatment plant must receive treatment suited to its composition in accordance with the Community Directives on waste treatment. Sludge for agricultural use must meet the conditions laid down in Directive 86/278/EEC.

10. **Cost and assistance:**

<table>
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<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Total public expenditure</th>
<th>Cohesion Fund</th>
<th>National authorities</th>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/055

1. Name:
Collector sewers and waste-water treatment plant for Novelda and Monforte del Cid and collector sewers and waste-water treatment plant for Sueca.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria

2.2. Address: Paseo de la Castellana, 162 28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General de Obras Hidráulicas (Ministerio de Medio Ambiente)

3.2. Address: Paseo de la Castellana, 67 28071 Madrid

4. Location:

4.1. Member State: Spain

4.2. Region: Valencia

4.3. Municipalities: Novelda and Monforte del Cid; Sueca

5. Description:

5.1. Collector sewers and waste-water treatment plant for Novelda and Monforte del Cid

This project concerns the works needed to construct the collector sewers and waste-water treatment plant for Novelda and Monforte del Cid (Alicante) and the treatment facilities needed to obtain effluent which meets the requirements of Directive 91/271/EEC, for both current volumes and those forecast for 2016, before it is discharged into the Vinalopó river.

General description of the project:

- Works for the collection of sewage from the above-mentioned municipalities. Collector system, pumps and spillways.

- Waste-water treatment plant for the municipalities of Novelda and Monforte del Cid.

- Works to return treated water to the Vinalopó river.

- By-pass and interconnections for proper functioning of the system.

5.1.1. Sewer system, pumps and spillways

(a) Pipeline from Novelda:

- Length: 1 730 m
- Diameter: 700 mm.

(b) Pipeline from Monforte del Cid:

- Diameter: 300 mm.

5.1.2. Waste-water treatment plant for Novelda and Monforte del Cid

Water treatment

- coarse solids removal 1 unit
- spillway 1 unit
- pumps 3 units
- discharge and supply chamber for waste water from Monforte del Cid
- screening of fine solids 3 units
- by-pass channel with a manually cleaned screen 1 unit
- spillway for excess flow 1 unit
- aerated desanding and degreasing 2 units
- sand sorter 1 unit
- oil and grease concentrator 1 unit
- flow meter (Parshall flume) 1 unit
- distribution chamber and primary treatment bypass 1 unit
- primary sedimentation 2 units
- biological treatment with nitrification-denitrification 2 units
- secondary sedimentation (clarification) 2 units
— effluent disinfecting chamber 1 unit
— reservoir for treated water 1 unit
— connection to general bypass and discharge into the Vinalopó river 1 unit

Sludge treatment
— pumping of excess sludge (1 + 1) unit
— recirculation of activated sludge (2 + 1) unit
— gravity thickening 1 unit
— pumping of sludge for dewatering (1 + 1) unit
— dewatering of sludge (1 + 1) unit
— pumping of dewatered sludge for storage 1 unit
— sludge storage hopper 1 unit

5.2. General collector sewers and waste-water treatment plant for Sueca

The waste-water treatment plant for Sueca will be able to treat both the current volume of waste and the volume forecast for the design year up to permissible limits in accordance with Directive 91/271/EEC before discharging into the receiving river.

5.2.1. General collector sewers

Work includes:
— localised work in urban Sueca
— perimeter sewer east of Sueca
— diversion of Los Arboles irrigation ditch
— diversion of current collector sewer
— perimeter sewer west of Sueca
— outlet to the treatment plant.

5.2.2. Waste-water treatment plant for Sueca

Water treatment
— coarse solids removal 1 unit
— screen for removal of large debris 1 unit
— initial lifting pump 3 + 1 unit
— screening 2 units
— screening bypass 1 unit
— desanding-degreasing 2 units
— flow meter 1 unit
— spillway 1 unit
— biological treatment in oxidation ditch 2 units
— secondary settling basin 2 units
— chlorination 1 unit

Sludge treatment
— recirculation of activated sludge 3 units
— removal of sludge from secondary settling basins 2 units
— sludge thickening by gravity 1 unit
— polyelectrolyte sludge conditioning
— dewatering of sludge on filter belt press 2 units

Buildings
— building for pumping and solids removal
— control building
— blower house
— processing building

Other facilities
— drinking water network
— irrigation network
— drainage network
— security and control systems

6. Objectives:

The planned waste-water treatment plants are part of measures included in the national waste-water plan (1995—2005) of the Spanish Government, the main aims of which are:
— to complete the waste-water removal and treatment infrastructure in compliance with Directive 91/271/EEC;
— to reduce the pollution level in the Vinalopó river in order to meet the quality objectives for bathing water on the Mediterranean coastline and in the Albufera region.

The main technical parameters concerning population and water quality are:

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<th>Novelda and Monforte del Cid treatment plant</th>
<th>Sueca treatment plant</th>
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<tr>
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9. **Environmental impact analysis:**

1) The project is intended to reduce pollution in the waste water from the towns concerned before it is discharged into the receiving rivers and can seep into aquifers. The project is a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies with the obligations set out in Directive 91/271/EEC, and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream from the towns concerned, which might even affect human health) and palliative (reducing the pollution loading of waste-water from large towns and the flow of discharge into the receiving rivers).

2) The planned collector sewers must be connected to a treatment plant before they are put into operation.

3) Sludge from the treatment plants must be treated according to its composition in accordance with the Community directives on the treatment of waste. Sludge intended for use in agriculture must meet the requirements of Directive 86/278/EEC.

10. **Cost and assistance:**

Total cost: ECU 11 661 111

Eligible cost (after 17 July 1997): ECU 11 661 111

Rate of assistance: 85 %

Cohesion Fund grant: ECU 9 911 944
## ANNEX

### FINANCING PLAN

**Project No:** 97/11/61/055

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(1) Total eligible cost of project.
PROJECT No: 97/11/61/058

1. Name: Desalination plant for Almería.

2. Body responsible for the application:
   2.1. Name: Dirección General de Análisis y Programación Presupuestaría (M.E.H.)
   2.2. Address: Paseo de la Castellana, 162
                 28071 Madrid

3. Body responsible for implementation:
   3.1. Name: Ayuntamiento Almería
   3.2. Address: Plaza de la Constitución s/n
                 04003 Almería

4. Location:
   4.1. Member State: Spain
   4.2. Region: Andalusia

5. Description:
   Construction of an inverse osmosis desalination plant for sea water with a production capacity of 50 000 m³/day, as a public works concession.

   The water will be produced by seven lines, each with a capacity of 7 050 m³/day.

   The plant will consist of the following:
   — intake and pumping of sea water,
   — pre-treatment,
   — pressure filtration,
   — inverse osmosis,
   — high-pressure pumping,
   — energy recovery,
   — internal equalisation tank, 38 000 m³,
   — exit pump,
   — force mains and pipelines over a total length of 12 134 m ranging in diameter from 250 to 600, 700 and 800 mm,
   — external equalisation tank, 55 000 m³,
   — ancillary works.

6. Objectives:
   The main objectives of the project are:
   — to supply 50 000 m³/day of drinking water to 155 000 inhabitants currently suffering from the effects of drought,
   — to build water-supply infrastructure of pipelines, pumping stations, tanks and ancillary facilities to permit sustainable growth of the city,
   — to improve the urban water supply,
   — to improve water quality,
   — to improve the health conditions and living standards of the population concerned,
   — to increase the availability of water by economising on and coordinating its use,
   — to improve the management and use of water.

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
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<tbody>
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8. Assessment of costs and socio-economic advantages:

   The economic and financial analysis was carried out for a period of 20 years. The costs taken into account were the investment costs and the cost of operating the plant and replacing equipment, valued at 6% of the investment.

   The following benefits were taken into account:
   — Availability of water, with guaranteed service. The value of water to the population in terms of all the benefits of greater availability and guarantee of service, increased satisfaction and a higher standard of living is calculated on the basis of its marked price.
   — Reduction of the over-exploitation of other water resources. This benefit was quantified using a unit price for the reserves of groundwater equal to the unit cost of dams or surface reservoirs.
An internal rate of return of 26.8% was arrived at on the basis of the above costs and benefits.

9. **Environmental impact analysis:**

The project will contribute to:

— the conservation, protection and improvement of the environment,

— the management of water resources.

The project is included in the preliminary designs for the hydrological plan for the catchment area and in the national hydrological plan, ensuring consistency with national water management strategy.

10. **Cost and assistance:**

Total cost: ECU 38 203 461

Eligible cost (after 24 July 1997): ECU 38 203 461

Rate of assistance: 85%

Cohesion Fund grant: ECU 32 472 942

---

**ANNEX**

**FINANCING PLAN**

Project No: 97/11/61/058

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Other</th>
<th>Private sector</th>
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<td>32 472 942</td>
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(1) Total eligible cost of project.
PROJECT No: 97/11/61/063

1. **Name:**

Desalination plant for Cartagena.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162

28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Obras Hidráulicas y Calidad de los Aguas

Ministerio de Medio Ambiente

3.2. **Address:** Pza San Juan de la Cruz s/n

28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Murcia

5. **Description:**

Construction of an inverse osmosis desalination plant for sea water with a production capacity of 65 000 m³/day of water from nine lines, each with a capacity of 7 295 m³/day. Public procurement will be carried out as a public works concession.

The plant will consist of the following:

- intake and pumping of sea water,
- pre-treatment,
- pressure filtration,
- inverse osmosis,
- high-pressure pumping,
- energy recovery,
- internal equalisation tank, 65 000 m³,
- exit pump,
- force mains and pipelines,
- lifting station carrying the water to the Nueva Canal de Cartagena,
- ancillary works.

6. **Objectives:**

- to supply 65 000 m³/day of drinking water to 200 000 inhabitants currently suffering from the effects of drought,
- to build water-supply infrastructure of pipelines, pumping stations, reservoirs and other ancillary facilities to permit sustainable growth of the city and its sphere of influence,
- to improve the urban water supply,
- to improve water quality,
- to improve the health conditions and living standards of the population concerned,
- to increase the availability of water by economising on and coordinating its use,
- to improve the management and use of water.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
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<tr>
<td>Main work</td>
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</tr>
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</table>

8. **Assessment of costs and socio-economic advantages:**

The economic and financial analysis was carried out for a period of 20 years. The costs taken into account were the investment costs and the cost of operating the plant and replacing equipment, valued at 6% of the investment.

The following benefits were taken into account:

- Availability of water, with guaranteed service. The value of water to the population in terms of all the benefits of greater availability and guarantee of service, increased satisfaction and a higher standard of living is calculated on the basis of its marked price.
- Reduction of the over-exploitation of other water resources. This benefit was quantified using a unit price for the reserves of groundwater equal to the unit cost of dams or surface reservoirs.
An internal rate of return of 32.1% was arrived at on the basis of the above costs and benefits.

9. **Environmental impact analysis:**

The project is included in the preliminary designs for the hydrological plan for the catchment area and in the national hydrological plan, ensuring consistency with national water management strategy. Its effect will mainly be to mitigate the damage caused by the drought of recent years, since the Spanish Government is obliged to attend to the urgent needs of the affected areas.

These measures will also make it possible to prevent situations of such serious water scarcity from arising in future.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th>Total cost:</th>
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<tr>
<td>Eligible cost (after 4 September 1997):</td>
<td>ECU 41 688 930</td>
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<td>Rate of assistance:</td>
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</tr>
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<td>Cohesion Fund grant:</td>
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ANNEX

FINANCING PLAN

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(^{(1)})</th>
<th>Public expenditure</th>
<th>Private sector Community loans</th>
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\(^{(1)}\) Total eligible cost of project.
1. **Name:**

   Alicante desalination plant.

2. **Body responsible for the application:**

   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

   2.2. **Address:** Pº de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**

   3.1. **Name:** Dirección General de Obras Hidráulicas y Calidad de los Aguas (MIMAM)

   3.2. **Address:** Pza San Juan de la Cruz s/n 28071 Madrid

4. **Location:**

   4.1. **Member State:** Spain

   4.2. **Region:** Autonomous community of Valencia

5. **Description:**

   Sea-water desalination plant using reverse osmosis, with a production capacity of 50 000 m³ per day. The plant comprises seven water production lines, each with a capacity of 7 215 m³ per day. The contract will be awarded in the form of a public works concession.

   The planned works involve:
   
   — sea-water intake and pumping,
   — pre-treatment,
   — pressure filtration,
   — reverse osmosis,
   — high-pressure pumping,
   — energy recovery,
   — 50 000 m³ internal regulation reservoir,
   — pumping out,
   — outflow,
   — related works.

6. **Objectives:**

   — to provide drinking water (50 000 m³/day) to 180 000 inhabitants of Alicante and neighbouring areas in the autonomous community of Murcia, adversely affected by drought;

   — to build a water supply network and several pumping stations, reservoirs and other related facilities to supply water and contribute to sustainable development of the town;

   — to improve the urban water supply;

   — to improve water quality;

   — to improve health conditions and quality of life for the population concerned;

   — to increase the availability of water through economical and coordinated use;

   — to improve water management and use.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
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<tr>
<td>Main work</td>
<td>1.4.1998</td>
<td>1.7.1999</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

   Economic analysis has been carried out for a 20-year period. Costs taken into account comprise investment costs, operating costs and the cost of replacing equipment, evaluated at 6% of the investment cost.

   The benefits of the project comprise the following:

   — a guaranteed available water supply. The value to the population of the water supply has been assessed, taking account of improved availability, guaranteed service, increased satisfaction and improved quality of life, on the basis of the highest European tariffs for untreated water (ESP 120/m³), in view of
the specific geographical and hydrological conditions of the area, especially the shortage of water and the tendency to overexploit ground water;

— reduction in overexploitation of other water resources. This benefit has been quantified on the basis of a unit price for ground water resources equal to the unit cost of artificial lakes or surface water reserves.

On the basis of discounted flows of the above costs and benefits, the internal rate of return (IRR) is 24.1%, and the net discounted value is equal to ESP 14 416 million, with a discount rate of 6%.

9. Environmental impact analysis:

By providing water in an area where the population is seriously affected by the acute shortage of water, and by contributing to establishing the basis for sustainable development, this project is consistent with the objectives set out in Article 130R of the EC Treaty and with the Community’s Fifth Action Programme for the environment. It meets the requirements of Community Directives relating to water quality.

The project fits in with the preliminary projects in the water resource plan for the catchment area and in the national plan; this ensures consistency with the national strategy on water resources. Its main purpose is to remedy the damage caused by drought in recent years, which has obliged the Spanish Government to provide for the immediate necessities of the population. But the measures should also help to prevent such serious situations arising again in the future.

10. Cost and assistance:

Total cost: ECU 41 579 856
Eligible cost (after 4 September 1997): ECU 41 579 856
Rate of assistance: 85%
Cohesion Fund grant: ECU 35 342 878

ANNEX

FINANCING PLAN

Project No: 97/11/61/064

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(1) Total eligible cost of project.
PROJECT No: 95/11/65/007

1. **Name:**

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Planificación
   2.2. **Address:** Paseo de la Castellana, 162
                  28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Dirección General de Infraestructuras de Transporte Ferroviario
   3.2. **Address:** Plaza de Sagrados Corazones 7
                  Madrid

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Aragon and Catalonia

5. **Description:**
   The project comprises the construction of the Calatayud-Rica and Zaragoza-Lérida sections (totalling 173 km) of the high-speed rail link from Madrid to Barcelona and the French border. This is one of the 14 transport priorities approved at the Essen European Council.

   This phase concerns only infrastructure work, i.e. up to completion of the track bed on the following sections:

   **Calatayud-Rica Subsection I A**
   The section runs from km 1+940 and follows the route of the preliminary project for about 9 km to finish at about km 10+740 of that preliminary project.

   The project is located in the municipalities of Saviñán and Morés in the province of Zaragoza. The largest works in this project are the tunnels:

   Tunnel 3:
   km 14+240 to 14+800  Length = 560 m

   Tunnel 4:
   km 16+060 to 16+934  Length = 874 m

   It also includes the following viaducts:

   Viaduct 1:
   km 10+770 to 11+131  Length = 361 m

   Viaduct 2:
   km 17+290,5 to 17+481,5  Length = 191 m

   **Calatayud-Rica Subsection I B**
   The section runs from km 10+940 and follows the route of the preliminary project for about 7 km to finish at about km 17+540 of that preliminary project.

   **LAV Zaragoza-Lérida Subsection I**
   These works extend over 15 km from the station of Miraflores at km 344+306 on the existing Madrid-Barcelona line via Caspe to 10 km before Puentes de Ebro. The whole section lies within the municipality of Zaragoza. The future route has planned as a straight line from the exit from the

   **LAV Zaragoza-Lérida Subsection II**
   The section covered by this project runs from around Purroy (the outskirts of Morés) to Salillas de Jalón. It provides a double track alternative to the existing route and is designed for high-speed running.

   The section runs from km 17+540 and ends at the Salillas de Jalón station (km 38+000), a total length of 20,460 km. The route runs north-east, in part following the river Jalón. The main structures include:

   Tunnels:
   Las Minas tunnel (at km 18) 310 m
   Villanueva de Jalón tunnel (at km 19) 1 020 m
   Torrecilla tunnel (at km 25) 890 m
   Los Cortados tunnel (at km 26,5) 330 m

   Viaducts
   Viaduct at km 18+2, 270 m long at the crossing of the Jalón river
   Viaduct at km 24+3, 300 m long at the crossing of Aranda river
tunnels at Miraflores station. However, the point of origin selected is the passenger building.

The main structures include:

Viaducts:
- between km 4+700 and km 5+230
- between km 6+980 and km 7+100
- between km 11+960 and km 12+180
- between km 13+020 and km 13+360
- between km 14+620 and km 14+840

**Zaragoza-Lérida Subsection II**

The works run from km 200 (equivalent to km 14+995,687 — end of subsection I) to km 217+565,537, a length of about 17,6 km.

From the beginning to km 206 where it crosses the Canal Imperial de Aragón the route runs west-east across difficult terrain.

The main structures in this area include:

Viaducts:
- Viaduct over the A-222
- Viaduct over the Val de Valdipuey
- Crossing over the Canal Imperial de Aragón
- Crossing over the future Fuente de Ebro by-pass on the N-232 at km 207-160
- Crossing over the Zaragoza-Tarragona railway line at km 208+030.
- Intersection with the present N-232 at km 207+634. A pergola-type bridge with a 16 m clear span is planned perpendicular to the road.
- Crossing over the N-II at km 215+828
- Crossing over the Fuente de Ebro, Quinto de Ebro and Pina de Ebro channels

**Zaragoza-Lérida Subsection III**

The project begins in the area between the intersections with the N-II and the A-2 motorway and links to the previous subsection (subsection II) at km 217+565,537.

The end of the project, which logically corresponds to the beginning of subsection IV, is at approximately km 58 of the A-2 motorway.

Subsection III is about 21,2 km long, ending at km 321+154,638. The most important works include:
- Viaduct over the A-2 motorway (km 301+695)

**Zaragoza-Lérida Subsection IV**

The route runs from km 400 to km 423+500, a total length of 23,5 km. The main works are intended to support the highest embankments between km 413+500 and km 423+460.
- Structure 1: km 419+074 to km 419+515
- Structure 2: km 421+219 to km 421+590
- Structure 3: km 423+008 to km 423+414

**Zaragoza-Lérida Subsection V**

The route runs for 20,6 km from the outskirts of Candanos. The main works are:
- one viaduct (of about 241 m) at km 514+715
- four bridges
- four overpasses
- six underpasses
- one 3 km tunnel (Hechiceras tunnel)

**Zaragoza-Lérida Subsection VI**

This project runs for about 17,1 km from near to the river Cinca, between Velilla de Cinca and Ballobar. The main works are:
- the Clamor viaduct (about 440 m)
- the Vall del Gallo viaduct (about 357 m)
- seven overpasses
- 18 underpasses.

**Zaragoza-Lérida Subsection VII**

This section runs for about 16 km from km 121 in the preliminary project after the crossing of the valley of the Vallmayá stream at Alcarrás and has only one large-scale structure, the bridge over the Canal de Aragón y Cataluña.

This bridge has three arches of 10 m, 15 m and 10 m respectively and a pre-stressed deck 1,6 m thick with four recesses 1,1 m in diameter.

**Bridge over the river Ebro**

This bridge is situated in the province of Zaragoza between Osera and Fuentes de Ebro. Its main dimensions are:
— Length: 330 m
— Width: 13,40 m
— Number of piles: 4
— Height of piles: 12 m

Zaragoza-Lérida. Bridge over the river Cinca

The works to be carried out are located in the province of Huesca over the river Cinca, in the municipalities of Ballobar and Zaidín, north of Fraga (near Lérida).

The main dimensions of the bridge are:
— Length: 830 m
— Total width of deck: 14 m
— Height of piles: (6,6 < h < 15,8) m
— Number of piles: 13.

6. Objectives:

Over Europe as a whole, high-speed rail travel is developing to offer a service different from that currently available, one which is more competitive and, by offering an alternative to air and road transport, able to capture a larger share of the passenger transport market. All these factors favour rail travel.

In the master plan for infrastructure, the Seville-Madrid-Barcelona-French border route is of central importance to high-speed rail travel in Spain.

Quantified objectives:

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<tr>
<th>Route</th>
<th>Current time</th>
<th>Future time</th>
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<td>1 h 35 min</td>
</tr>
<tr>
<td>Madrid — Lérida</td>
<td>4 h 35 min</td>
<td>2 h 00 min</td>
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<tr>
<td>Madrid — Barcelona</td>
<td>6 h 35 min</td>
<td>2 h 40 min</td>
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</table>

7. Work schedule:

<table>
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<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
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</tr>
</tbody>
</table>

8. Assessment of costs and socio-economic advantages:

Main indicators used:
— period of analysis: 20 years from the beginning of the works,
— proportion of international traffic: 6,85 %.

The socio-economic calculation includes direct costs and benefits (costs of preparation, construction and maintenance, time saved, running costs and changes in pollution).

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Unit cost</th>
<th>Total cost ESP million</th>
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<td>Changes in pollution</td>
<td>2 610</td>
<td>12,0</td>
<td></td>
</tr>
</tbody>
</table>

(1) (ESP/hour in 1990): passenger train for work, ESP 2 311; passenger train for leisure, ESP 1 346; car, ESP 2 650 and ESP 2 218; air, ESP 4 056 and ESP 2 404; coach, ESP 1 638 and 1 062.

Without the project, traffic is expected to increase each year by 1,79 % on day trains and 1,33 % on night trains.

With the project, traffic is expected to increase each year by 3,82 % on day trains and 0,97 % on night trains.

Discount rate chosen: 5 %.

The residual value is not taken into account.

Result of the analysis:
— net present value: 0,
— internal rate of socio-economic return: 5 %,
— cost/benefit ratio: 1.

9. Environmental impact analysis:

The environmental impact assessment carried out in accordance with Directive 85/337/EEC has been approved and it was decided to start work on 2 June 1995.

The proportion of the total cost which it is estimated will be required for measures to offset the environmental impact or protect the environment is 2,8 %.

10. Cost and assistance:

Total cost: ECU 410 147 354

Eligible cost (after 7 April 1995): ECU 403 828 201

Cost taken into account for calculating the aid (after deduction of revenue): ECU 343 253 971

Rate of assistance: 85 %

Cohesion Fund grant: ECU 291 765 875
## ANNEX

### FINANCING PLAN

Project No: 95/11/65/007

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
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<tr>
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<td>1=2+11</td>
<td>2=3+4+6+10</td>
<td>3=2/1</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
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<td>10</td>
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<tr>
<td></td>
<td></td>
<td>11</td>
<td>12=11/1</td>
<td>13</td>
</tr>
</tbody>
</table>

|      | 1995 | 608 320 | 517 072 | 85 | 439 511 | 85 | 56 011 | 11 | 56 011 | 21 550 | 4 | 91 248 | 15 |
|      | 1996 | 58 452 940 | 49 684 999 | 85 | 42 232 249 | 85 | 5 967 568 | 12 | 5 967 568 | 1 485 182 | 3 | 8 767 941 | 15 |
|      | 1997 | 159 090 772 | 135 227 156 | 85 | 114 943 083 | 85 | 16 085 894 | 12 | 16 085 894 | 4 198 179 | 3 | 23 863 616 | 15 |
|      | 1998 | 154 139 890 | 131 018 907 | 85 | 111 366 071 | 85 | 15 630 030 | 12 | 15 630 030 | 4 022 806 | 3 | 23 120 983 | 15 |
|      | 1999 | 31 536 279 | 26 805 837 | 85 | 22 784 961 | 85 | 3 748 593 | 14 | 3 748 593 | 272 283 | 1 | 4 730 442 | 15 |
|      | Total | 403 828 201 | 343 253 971 | 85 | 291 765 875 | 85 | 41 488 096 | 12 | 41 488 096 | 10 000 000 | 3 | 60 574 230 | 15 |

(1) Total eligible cost of project.
PROJECT No: 96/11/65/005

1. **Name:**
   Castilla motorway, Salamanca-Fuentes de Oñoro section, in Spain.

2. **Body responsible for the application:**
   
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
   
   2.2. **Address:** Paseo de la Castellana, 162
   28071 Madrid

3. **Body responsible for implementation:**
   
   3.1. **Name:** Dirección General de Carreteras Ministerio de Fomento
   
   3.2. **Address:** Paseo de la Castellana, 67
   28071 Madrid

4. **Location:**
   
   4.1. **Member State:** Spain
   
   4.2. **Region:** Castile-León

5. **Description:**
   
   This project involves the preparation of route plans and the construction of the Castile motorway from Salamanca to Fuentes de Oñoro, covering a distance of approximately 103,5 km.

   The project forms part of the trans-European transport networks in accordance with Parliament and Council Decision 1962/96/EC of 23 July 1996 and is included in the Infrastructure Master Plan for 1993—2007. Furthermore, the Salamanca-Fuentes de Oñoro section is part of the priority project linking Lisbon to the French border via Valladolid, which was approved at the European Council of Essen in December 1994. The project concerns the following sections:

   - Salamanca-Aldehuela de la Bóveda: 23,7 km
   - Aldehuela de la Bóveda-Martín de Yeltes: 25,2 km
   - Martín de Yeltes-Ciudad Rodrigo: 32,9 km
   - Ciudad Rodrigo-Fuentes de Oñoro: 21,7 km.

   The main dimensions to be analysed for the various possible alternatives are:

   - minimum radius 750 m
   - maximum gradient 4%.

   The standard sections will consist of:

   - a central reservation 13,00 m wide,
   - two carriage ways each 3,50 m wide,
   - hard shoulders 2,50 m wide outside and 1,00 m wide inside,
   - inner verge 1,00 m wide, outer verge 1,50 m wide.

   The project will be carried out on the basis of the studies done for the sections Salamanca to Martín de Yeltes and Martín de Yeltes-Fuentes de Oñoro.

6. **Objectives:**
   
   The main objective is to build a corridor connecting the Portuguese road network with the corridor to Irún and the French border.

   The road network which makes up the C-14 corridor, to which the section in question belongs, is included in the Road Plan for 1992—2000, which provides for the Tordesillas-Salamanca-Fuentes de Oñoro section to be completed with a motorway.

   All this will form a major international route (E-80) including the N-I, the N-630 and the N-620. Long-distance traffic will thus be properly channelled between Irún and Fuentes de Oñoro, contributing to the continuity of European road routes.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
</table>

8. **Assessment of costs and socio-economic advantages:**

   Main indicators used:

   - current ADT (vehicles/day): 8 935, completion plus 20 years: 12 267,
   - estimated growth in traffic:
     - 1996-2000: 3,3 %
     - 2001-2010: 1,9 %
     - 2011: 0,8 %.

   The economic calculation includes direct costs and benefits (cost of drawing up the plan,
construction, maintenance time saving, accidents and running costs of vehicles).

Result of analysis:
— net present value (6%): ECU 79 million,
— internal economic rate of return: 8,9%,
— cost-benefit ratio: 1,4.

9. **Environmental impact analysis:**

Prior to implementation of the project, an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.
PROJECT No: 96/11/65/007

1. **Name:**

2. **Body responsible for the application:**
   
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
   2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid

3. **Body responsible for implementation:**
   
   3.1. **Name:** Dirección General de Carreteras Ministerio de Fomento
   3.2. **Address:** Paseo de la Castellana, 67 28071 Madrid

4. **Location:**
   
   4.1. **Member State:** Spain
   4.2. **Region:** Castile-La Mancha

5. **Description:**
   The Atalaya del Cañavate-Motilla del Palancar section is part of the Madrid-Valencia motorway which will be completed with the sections from Motilla del Palancar to Minglanilla and from Minglanilla to Caudete de las Fuentes.

   This project involves the construction of a section of motorway covering a distance of around 35 km. It runs from km 11 + 070 on the A-31 Levant motorway some 1 000 m north of Atalaya del Cañavate to km 35 + 009 at Motilla del Palancar. The standard cross section consists of two carriageways of 7 m with hard shoulders 1 m wide on the inside and 2,5 m wide on the outside, with the following interchanges, surfaces and structures:

   1. **Interchanges:** Atalaya del Cañavate Tébar Pozoseco
   2. **Roadbase and surfacing of the main roadway**
      - surface course of 6 cm S-20 bituminous mix
      - intermediate course of 6 cm G-20 bituminous mix
      - bituminous base of 13 cm G-25 bituminous mix
      - sub-base course of 25 cm ZA-25 artificial aggregate.

   3. Special structures
      - Viaduct over the Tajo-Segura diversion
      - Viaduct over the river Júcar
      - Viaduct over the river Valdemembra
      - Bridge for the Valencia-Madremebra
      - Bridge over the Madrid Alicante motorway
      - Bridge over the A-31 motorway
      - Overpass for the Valencia-Ciudad Real sliproad over the Madrid-Valencia sliproad at km 2 + 400.

   The road will run through the following municipalities: Atalaya, Tébar, Pozorrubielos, Cañadajuncosa, El Picazo, El Peral and Motilla del Palancar. The project is included in the master plan for the trans-European transport networks approved by Parliament and the Council.

6. **Objectives:**

   The main objectives are:

   - To connect the cities of Madrid and Valencia, with their many trade, industrial, agricultural and tourism links, by means of a high capacity, high quality motorway.
   - To eliminate the traffic bottleneck which now occurs.
   - To increase the accessibility of this part of Spain.
   - To complete the motorway network in accordance with the trans-European road network as included in the master plan for infrastructures (PDI).

   The most relevant aspect of the many benefits of completing this infrastructure is the improvement in road communications, which will improve the traffic flow and reduce travelling time:

   **Traffic flow:** the current speed of light and heavy vehicles is around 70 and 57 km/h respectively. Once this project is completed speeds will increase to 108 and 87 km/h respectively.

   **Time-saving:** the journey time on the Atalaya-Caudete section will be reduced by 24 minutes for light vehicles and 29 minutes for heavy vehicles.
7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
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<td>Operational phase</td>
<td>31.12.1999</td>
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</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis refers to the Atalaya del Cañavate-Caudete de las Fuentes section which includes the section concerned by this Decision. The following basic hypotheses were used:

- Traffic: normal increase in traffic from 1995—2000 is 3.3%, from 2001—11 is 1.9% and from 2011 on is 0.8%.
- General transport costs: the operating costs analysed included depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- – net present value: ECU 41,9 million,
- – cost-effectiveness ratio: 1,2.

9. **Environmental impact analysis:**

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment is 2,2%.

The protective and corrective measures to be taken to minimise the impact of the new road on the environment and the countryside are: landscaping of slopes, replanting, anchoring of plants, underpasses for wildlife, etc.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Eligible cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of land</td>
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<td><strong>Total</strong></td>
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<td>119 869 137</td>
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</table>

Total cost: ECU 120 173 358

Eligible cost (after 8 November 1996): ECU 119 869 137

Rate of assistance: 85%

Cohesion Fund grant: ECU 101 888 766
ANNEX

FINANCING PLAN

Project No: 96/11/65/007

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
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<td>101 888 766</td>
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<td>1999</td>
<td>119 869 137</td>
<td>119 869 137</td>
<td>100</td>
<td>17 980 371</td>
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</table>

(1) Total eligible cost of project.

PROJECT No: 96/11/65/008

1. **Name:**
Madrid-Valencia motorway: Minglanilla-Caudete de las Fuentes stretch.

2. **Body responsible for the application:**
2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda
2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**
3.1. **Name:** Dirección General de Carreteras
Ministerio de Fomento
3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid

4. **Location:**
4.1. **Member State:** Spain
4.2. **Region:** Castile-La Mancha

5. **Description:**
The stretch of motorway between Minglanilla-
Caudete de las Fuentes is part of the Madrid-
Valencia motorway, which also includes the Atalaya-Motilla and Motilla-Minglanilla stretches, for which Cohesion Fund financing has already been granted.

This stretch, of a total length of 30 128,199 m, runs east from its origin at KP 1+000, near CV-504 at Villapardo, 2 km from the urban centre of Minglanilla to KP 32+087,284, south-west of Caudete de las Fuentes, at the start of the by-pass.

The main works are described below.

- Typically, the cross-section comprises two 7 m carriageways, with 2,5 m external and 1 m internal hard shoulders, a 12 m central reservation between carriageways (except in a few exceptional cases), and a maximum incline of 6%.

The structure of the main carriageway will be as follows:

- 4 cm open-textured surface course,
- 8 cm binder course,
- 18 cm bitumen base course,
- 25 cm sub-base of artificial aggregate.
Intersections:
— Minglanilla restricted access point,
— restricted access point from the present N-III,
— Villagordo interchange,
— Jaraguas interchange,
— Venta del Moro interchange.

Viaducts and tunnels:
— Contreras reservoir viaduct (405 m),
— Istmo viaduct (850 m),
— Barranco de la Vid viaduct (305 m),
— Rabo de la Sarten tunnel (220 m).

Over the stretch, there will be four pedestrian overpasses and one overpass for the present N-III, six pedestrian underpasses, four slip road underpasses, and two underpasses for the present N-III.

Traffic flow studies show the need for an additional lane on the upgrade between KP 9+680 and KP 14+520 in the Madrid-Valencia direction, and between KP 12+480 and KP 6+980 in the Valencia-Madrid direction. These lanes will be on the inside of the roadway, next to the central reservation, since they are intended for fast vehicles.

In addition to the main works, two link roads to the N-III will be built on either side of the Contreras reservoir.

6. **Objectives:**

— to provide a high-capacity, high-quality road link between the two large conurbations of Valencia and Madrid, which maintain close relations in terms of commerce, industry, agriculture, tourism, etc.

— to remove the present bottleneck;

— to improve the accessibility of this part of Spain;

— to reinforce the motorway network.

Among the many advantages of this infrastructure work, the most important is the improvement of road communications, reflected in greater traffic fluidity and time-saving.

*Traffic fluidity:* at present, the average speed is about 57 km/h for light vehicles, and 70 km/h for heavy vehicles. This work will improve traffic fluidity, and raise these average speeds to 87 km/h and 108 km/h respectively.

*Time-saving:* it is estimated that light vehicles will save 12 minutes, and heavy vehicles 15 minutes.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.1.1993</td>
<td>31.12.1995</td>
</tr>
</tbody>
</table>

8. **Assessment of costs and socio-economic advantages:**

The economic analysis refers to the Atalaya del Cañavete-Caudete de las Fuentes stretch, which includes the stretch covered by this Decision. The analysis is based on the following main data:

— Traffic: the normal increase is 3.3% from 1995 to 2000, 1.9% from 2001 to 2011 and 0.8% from 2011 onwards;

— General transport costs: analysis of operating costs, including depreciation, maintenance, fuel, lubricants, journey length and accidents;

— Roadway geometry: analysis of the influence of the major geometric variables on the completion of the new infrastructure;

— Analysis of assumptions: normal, growth below normal, penalty for time value.

Main results:

— internal rate of return: 7.8%,

— present net discounted value: ECU 41.9 million,

— cost/benefit ratio: 1.2.

9. **Environmental impact analysis:**

Before implementation of this project, an environmental impact assessment was made in accordance with Directive 85/337/EEC.
Expenditure on measures to offset environmental effects or to protect the environment is estimated at 2.5% of total cost. Corrective and protective measures to reduce the environmental impact of the new road to a minimum mainly involve landscaping, in particular treatment of embankments and cuttings, plantations, wildlife and livestock crossings, spreading of topsoil, etc.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Eligible cost</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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<td><strong>121 077 472</strong></td>
</tr>
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</table>

Total cost: ECU 123 970 505

Total eligible cost (after 13 November 1996): ECU 121 077 472

Rate of assistance: 85%

Cohesion Fund grant: ECU 102 915 851

---

**ANNEX**

**FINANCING PLAN**

Project No: 96/11/65/008

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2+4+6+10</td>
<td>%</td>
<td>3=2/1</td>
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<td><strong>121 077 472</strong></td>
<td>100</td>
<td><strong>102 915 851</strong></td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 96/11/65/009

1. **Name:**
   Rías Bajas motorway. Benavente-Camarzana de Tera section.

2. **Body responsible for the application:**
   2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
   2.2. **Address:** Paseo de la Castellana, 162
   28071 Madrid

3. **Body responsible for implementation:**
   3.1. **Name:** Dirección General de Carreteras
   Ministerio de Fomento
   3.2. **Address:** Paseo de la Castellana, 67
   28071 Madrid

4. **Location:**
   4.1. **Member State:** Spain
   4.2. **Region:** Castile-León

5. **Description:**
   The main project is the Rías Bajas motorway which will link Benavente with Porriño and will cover a distance of approximately 300 km.

   This part of the project concerns the construction of a new section of motorway spanning about 30 km between Benavente and Camarzana de Tera. The road will have two carriageways, each 7 m wide, with hard shoulders 1 m wide on the inside and 2,5 m wide on the outside. The interchanges, surfaces and structures to be constructed are as follows:

   1. Interchanges: Benavente, at the beginning of the section
      - Villabrázaro (one side only)
      - Manganese la Polvorosa (one side only)
      - Quiruelas
      - Camarzana de Tera, at the end of the section.

   2. Roadbase and surfacing of the main roadway
      - 4 cm of draining surface course
      - 8 cm of intermediate course
      - 10 cm of bituminous base
      - 20 cm of cement-stabilised soil
      - 50 cm of selected soil CBR >20.

   3. Structures:
      - Viaduct over the river Orbigo
      - Viaduct over the Almucera arroyo
      - underpasses and overpasses.

   This project completes the Rías Bajas motorway which is part of the master plan of the trans-European transport network.

6. **Objectives:**
   The general aim is to fill in gaps in the road network and to smooth the flow of traffic, as well as to improve access to areas with poor infrastructure.

   The main objectives of this project are:

   1. to provide access to an especially remote and inaccessible area,
   2. to improve communications in the Galician hinterland,
   3. to fill in the motorway network,
   4. to smooth traffic flows and save journey time.

   Journey times over the 30 km will be reduced by 9,0 minutes for cars and 9,4 for heavy vehicles, their speeds being increased from 70 to 108 and from 57 to 81 km/h respectively.

7. **Work schedule:**

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of project</td>
<td>1.1.1993</td>
<td>31.12.1995</td>
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<tr>
<td>Main work</td>
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</tr>
</tbody>
</table>
8. **Assessment of costs and socio-economic advantages:**

The economic analysis refers to the Benavente-Orense section which includes the section concerned by this Decision. The following basic hypotheses were used:

- Traffic: ADT (vehicles per day): 6,805,
- ADT forecast: 3.3% in 1996—2000, 1.8% in 2001—2010 and 0.8% thereafter.
- General transport costs: the operating costs include depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- Internal rate of return: 8.6%,
- Net present value (discount rate 6%): ECU 154.3 million,
- Cost-effectiveness ratio: 1.3.

9. **Environmental impact analysis:**

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment (ecological landscape management and environmental monitoring) is 2.5%.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Eligible cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of land</td>
<td>3,018,066</td>
<td>2,987,282</td>
</tr>
<tr>
<td>Buildings and construction</td>
<td>50,008,752</td>
<td>50,008,752</td>
</tr>
<tr>
<td>Monitoring and supervision</td>
<td>2,414,453</td>
<td>2,414,453</td>
</tr>
<tr>
<td>Total</td>
<td>55,441,271</td>
<td>55,410,487</td>
</tr>
</tbody>
</table>

Total cost: ECU 55,441,271

Eligible cost (after 8 November 1996): ECU 55,410,487

Rate of assistance: 85%

Cohesion Fund grant: ECU 47,098,914

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**ANNEX**

**FINANCING PLAN**

Project No: 96/11/65/009

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost (1)</th>
<th>Public expenditure</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>% 3=2/1</td>
<td>4</td>
</tr>
<tr>
<td>1996</td>
<td>461,160</td>
<td>461,160</td>
<td>100</td>
<td>391,986</td>
</tr>
<tr>
<td>1997</td>
<td>14,637,621</td>
<td>14,637,621</td>
<td>100</td>
<td>12,441,978</td>
</tr>
<tr>
<td>1998</td>
<td>25,794,808</td>
<td>25,794,808</td>
<td>100</td>
<td>21,925,587</td>
</tr>
<tr>
<td>1999</td>
<td>14,516,898</td>
<td>14,516,898</td>
<td>100</td>
<td>12,339,363</td>
</tr>
<tr>
<td>Total</td>
<td>55,410,487</td>
<td>55,410,487</td>
<td>100</td>
<td>47,098,914</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.
PROJECT No: 97/11/65/001

1. Name:
   By-pass expressway for Las Palmas, Plaza de América — Nueva Paterna — Tamaraceite section.

2. Body responsible for the application:
   2.1. Name:
       Dirección Gral de Análisis y Programación Presupuestaria
   2.2. Address:
       Paseo de la Castellana, 162
       28071 Madrid

3. Body responsible for implementation:
   3.1. Name:
       Dirección General de Carreteras
       Ministerio de Fomento
   3.2. Address:
       Paseo de la Castellana, 67
       28071 Madrid

4. Location:
   4.1. Member State: Spain
   4.2. Region: Canary Islands

5. Description:
The overall project involves building an expressway to by-pass Las Palmas. The phase presented here for part-financing by the Cohesion Fund concerns the sections of the expressway from Plaza de América to Nueva Paterna and from Nueva Paterna to Tamaraceite (the section from Nueva Paterna to Jinamar is not included in this phase). The work has the following specifications:

   The standard section of the expressway consists of two carriageways 7 m wide. Each carriageway has two lanes 3,5 m wide, an inside hard shoulder of 1,5 m and an outside one of 2,5 m. The central reservation will be 11 m wide.

   The slabs in the structures on the expressway will have a width equal to three lanes of 3,5 m and an outside hard shoulder of 2,5 m. Only viaducts 5 and 6 will have four lanes 3,5 m wide where the entry and exit sliproads feed in at the Tamaraceite and Almatrice interchanges.

   The standard section for tunnels consists of three lanes 3,5 m wide with hard shoulders of 0,75 m and elevated 0,6 m. Total width will be 13,2 m.

   The project comprises 16 structures, three pedestrian overpasses, two viaducts, two cut and cover tunnels and 14 walls.

   Plaza de América — Nueva Paterna section
   The section is 4 128 m long and has four interchanges, including both ends:
   — Plaza de América at km 0 of the section
   — Roundabout No 1 at km 0+700
   — Escaleritas interchange at km 2+680
   — Nueva Paterna interchange at the end of the section, where the three sections comprising the by-pass expressway meet.

   Tamaraceite — Nueva Paterna section
   This section is 4 862 m long. It starts at km 9.5 on the c-813 with intersection No 1 and ends at the Nueva Paterna interchange described above. Three interchanges are planned:
   — at Toror, km 1+200
   — at Tamaraceite, km 3+160
   — at Almatrice, km 4+360
   The largest engineering structure planned is a 320 m long viaduct.

6. Objectives:
The general objective is to channel traffic which is currently entering the city of Las Palmas and tends to bring traffic to a standstill because of high density. The increase in capacity and speed will reduce journey time. In addition, the project will:

   — improve inner-city communications,
   — supplement the island’s main motorway network,
   — improve traffic flow and save time.

   The quantified objectives: journey times will be reduced by 9 minutes for cars and 7.9 minutes for heavy vehicles, their speeds being increased from 40 km/h to 90 and 76 km/h respectively on the initial stretch of 10.1 km and the final stretch of 9 km.

7. Work schedule:

<table>
<thead>
<tr>
<th>Category of work</th>
<th>Commencement</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main work</td>
<td>25.11.1996</td>
<td>31.12.1999</td>
</tr>
<tr>
<td>Operational phase</td>
<td>31.12.1999</td>
<td></td>
</tr>
</tbody>
</table>
8. **Assessment of costs and socio-economic advantages:**

The economic study was based on the following assumptions:

- Traffic (vehicles/day 1999): 34,078
- ADT forecast: 3.3% in 1996–2000, 1.8% in 2001–2010 and 0.8% thereafter.
- General transport costs: the operating costs include depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- internal rate of return: 43.6%,
- net present value (discount rate 6%): ECU 154.3 million
- cost-effectiveness ratio: 7.4.

9. **Environmental impact analysis:**

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment (ecological landscape management and environmental monitoring) is 1.3%.

10. **Cost and assistance:**

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Eligible cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings and</td>
<td>50 385 846</td>
<td>49 679 509</td>
</tr>
<tr>
<td>construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring and</td>
<td>1 621 252</td>
<td>1 621 252</td>
</tr>
<tr>
<td>supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>52 007 098</td>
<td>51 300 760</td>
</tr>
</tbody>
</table>

Total cost: ECU 52 007 098
Eligible cost (after 29 April 1997): ECU 51 300 760
Rate of assistance: 85%
Cohesion Fund grant: ECU 43 605 646

**ANNEX**

**FINANCING PLAN**

Project No: 97/11/65/001

<table>
<thead>
<tr>
<th>Year</th>
<th>Total cost(1)</th>
<th>Total public expenditure</th>
<th>Public expenditure</th>
<th>National authorities</th>
<th>Other</th>
<th>Private sector</th>
<th>Community loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=2+11</td>
<td>2=4+6+10</td>
<td>3=2/1</td>
<td>4</td>
<td>5+4/2</td>
<td>6+8+9</td>
<td>7=6/2</td>
</tr>
<tr>
<td>1997</td>
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<td>16 512 748</td>
<td>100</td>
<td>14 035 836</td>
<td>85</td>
<td>2 476 912</td>
<td>15</td>
</tr>
<tr>
<td>1998</td>
<td>22 517 383</td>
<td>22 517 383</td>
<td>100</td>
<td>19 139 776</td>
<td>85</td>
<td>3 377 607</td>
<td>15</td>
</tr>
<tr>
<td>1999</td>
<td>12 270 629</td>
<td>12 270 629</td>
<td>100</td>
<td>10 430 035</td>
<td>85</td>
<td>1 840 594</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>51 300 760</td>
<td>51 300 760</td>
<td>100</td>
<td>43 605 646</td>
<td>85</td>
<td>7 695 114</td>
<td>15</td>
</tr>
</tbody>
</table>

(1) Total eligible cost of project.