Sida Evaluation 01/19

Sewer Pipe Network Renovation Project in Sopot, Poland

Olle Colling

Department for Central and Eastern Europe

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Summary

This report presents the findings of the evaluation of the sewer pipe network renovation project in Sopot, Poland, financed by Sida.

Sopot is a town by the Baltic Sea, located between the towns of Gdynia and Gdansk. Sopot has a tradition as a well-known major beach resort in Poland, in particular for the over four kilometres of sandy beaches. However, due to increased pollution, the sea became unfit for swimming. In 1990, the first democratically elected municipal council decided to restore Sopot as a bathing resort. The primary objective of the city administration was to improve the water quality of the sea. This would restore the sea resort profile of Sopot and consequently enable economical recovery and development based on the primary potential, the tourism industry.

In 1992, contact was made with PULS *Planerad Underhållsservice AB* ("PULS"). An agreement was negotiated (financed by the Municipality). PULS carried out cleansing, TV-inspection and, together with the utility staff, carried out repairs of some sections of pipes.

During the initial phase, it was recognised that major efforts would be required in the sewer networks in order to reach the objective of opening of all beaches. Given the limited financial resources available within the Municipality, a search for external financing was initiated and Bits, later Sida, were identified as donors.

The project has been implemented in five phases.

- Phase I–III: Survey and TV-inspection, flushing and cleansing of 20 km of sanitary sewers and 45 km of storm sewers. Also root cutting, documentation and a priority action plan for the entire networks. Repairs and reconnections of illicit sewers carried out by Sopot's own staff. Carried out 1994–96. Bits/Sida financed SEK 4.9 million.
- Phase IV: Introduction of VABAS computerised network registration system to compile data collected and enable registration for the whole town. Carried out 1996–99. Sida committed 1.05 million in financing.
- Phase V: Rehabilitation through no-dig technology, by lining a storm sewer in the main throughfare with polyester stocking and one section by cracking. Carried out during 1998. Planned for a total length of 1440 metres. Reduced to 920 metres due to worse than anticipated conditions. Sida financed 3.8 million SEK.

All phases have been carried out by PULS together with sub-consultants, in cooperation with the Municipality.

The purpose of this evaluation is to assess if the objectives of the project, terms of reference and contracts has been fulfilled and in accordance with Sida policy for cooperation with Poland.

The principal objective of the Project, opening of all the beaches for swimming has been achieved. During the phased implementation of the project, a gradual opening of the beaches became possible, with all open from the bathing season of 1997. Consequently, the summer tourists are returning in increasing numbers. Two million visitors were recorded in the year 2000.

The support by Sida was coherent with the policy in relation to the cooperation with Poland.

The lengthy period of repeated presence by PULS and their sub-consultants have had a positive effect on the municipal staff and in particular the management of the water and wastewater utility. The on-the-job training in maintenance, survey and inspections, as well as no-dig sewer rehabilitation technology has had a sustainable effect on the organisation. This is demonstrated by the continued work in this field by the utility based on local financing with works and services carried out by Polish contractors. The Municipality has supported the project with allocation of resources as well as financing of repairs and rehabilitation work on an annual basis, so far to an accumulated expenditure equivalent to 50–60 million SEK.

All agreements financed by Sida where consultancy contracts, with PULS as the consultant. This type of contract was appropriate for Phase I–III and Phase IV, as the services were predominantly consultancy. However, the services in Phase V were execution of works and should have been contracted as such. The Contract was insufficient in terms of liability and insurance. The model of contract documents should reflect the type of services or works to be carried out.

Procurement has not been based on competitive tendering procedures. Unit prices have apparently only been reviewed by external expertise at one occasion. In the absence of competitive bidding, a minimum of independent expert review of scope of work, resource allocation and prices should have been applied prior to decisions for financing been taken.

PULS resource allocation, together with Malmö and Helsingborgs Va-verk, project management, staff allocation, equipment and materials appears to have been appropriate to the services and works in Phase I–III and V. The services and works were carried out within budget and time allocations.

The decision by Sida to finance Phase II and III assumed PULS to survey and inspect 128 km of sewers. The reporting by PULS indicates that they actually carried out about 65 km. However, there is no indication of a discrepancy between obligations in scope of services compared to the volume of work actually carried out. It appears more likely that the total length given in the internal Sida document is based on a misunderstanding.

The introduction of VABAS computerised registration system (Phase IV) was justified in order to compile the information of the sewer systems gathered during the survey and inspection activities. However, given the organisational split between the operational units for the two systems, and the recruitment policy for the day-to-day operation of the system itself, a sustainable result of the system is doubtful. PULS have not fulfilled their contractual obligations for the VABAS system and the assurances for supportive actions in 1999 have not been attended. Although the Project has been considered finalised by PULS and Sida, obligations remains to be fulfilled, including the requirements for a Final Report, once the outstanding issues have been taken care of.

The no-dig rehabilitation through lining with flexible fodder and cracking carried out in Phase V was successful despite worse then expected conditions. The introduction of the technology has enabled rehabilitation of a critical section of storm sewers, improved the environmental situation at the outlet to the sea, and demonstrated the use of no-dig sewer rehabilitation technology to the extent that the municipal utility procure and apply the technology for new sections after completion of the Swedish financed services.

In conclusion, the objective of opening of all beaches for swimming in order to restore Sopot as a prime bathing resort expressed a political, public and commercial demand. In order to achieve the goal, a multi-stage development was necessary, based on a comprehensive assessment and inspection, priority actions in terms of cleansing and repairs, followed by substantial rehabilitation works of the most critical sections of the sewer network. The lessons learned from the success of this staged development are several:

- The project has been driven by local demand, expressed in a democratic process.
- The local administration has provided a dedicated support to the project, allocating appropriate resources during implementation.
- Local financing has been made available on an annual basis;
- The support of Sida financed the necessary know-how not available locally and was provided at the occasions when the needs were unfolded by efforts demonstrated in previous phases. The sustained effort was instrumental to the success.

Within the overall picture of success, there are some lessons learned that would further enhance the possibility of success in other projects and programmes:

- Procurement routines should comply with the general guidelines adopted by Sida. Independent experts should review scope of work, resource allocations and prices, in particular if contracts are negotiated without a competitive procurement process;
- The model of contract documents should reflect the type of services or works to be carried out. Consultancy services as well as supply and construct type of contracts should be based on Sida standard or internationally accepted contract models;
- Sida routines for follow-up and control that the obligations of financing are fulfilled should be enforced.

1 Programme Context

1.1 The Development Context of the Project

The Department for Central and Eastern Europe, Sida-East, within Swedish International Development Cooperation Agency (Sida) deals with the support to the countries in transition, based on the guidelines established by the Swedish Government.

The overall objectives of Swedish cooperation with the countries of Central and Eastern Europe are:

- To promote common security;
- To deepen the culture of democracy;
- To support a socially sustainable economic transition; and
- To support an environmentally sustainable development.

All cooperation with Poland is to be conducted based on the objectives and should also consider a gender perspective.

In the environmental field, support has been focused on investment and technical assistance for a number of wastewater projects, in some cases within the framework of the Baltic Sea Joint Comprehensive Programme (JCP).

Financing of environmental projects in Poland commenced in 1992 through Bits, (later integrated into the new Sida) and has encompassed a considerable number of projects. Major investment projects includes sewage treatment plants in Koszalin, Nowy Targ and Czajka-Warsaw, while technical assistance has been provided for such projects as feasibility study for solid waste disposal in the Gdansk Region, maritime monitoring, river basins monitoring and forecasting systems, an environmental training centre in Lodz, studies and designs for sewage treatment plants in Szczecin, Pruszkow, Koszalin, Nowy Targ and other towns in Poland.

Technical support has been provided for five phases of sewage network improvement in Sopot, constituting a cooperation comprising consultancy, computer software, training, as well as physical inspection, cleaning and rehabilitation works.

The purpose of this evaluation is to analyse if the objectives of the project in Sopot were fulfilled. The evaluation is also focusing on the process of the project and whether or not the project was managed in a professional way. Lessons learned into future activities are also included.

1.2 The Project History

Sopot is a town by the Baltic Sea, located between the towns of Gdynia and Gdansk. The social and economic foundation of Sopot is built on two main components; as a residential area for commuters working in Gdynia and Gdansk, and as a beach resort. The standard of living is reported to be among the highest in Poland, with a very stable population of about 45 000 inhabitants. (The three towns of Gdynia, Sopot and Gdansk together have a total population of over one million).

Sopot has a more than 100-year tradition being a major beach resort. The town is well known in Poland, in particular for the over four kilometres of sandy beaches. However, due to increasing pollution, the sea became unfit for swimming and for a period of some 15 years, the public was prohibited from bathing. In 1990, the first democratically elected municipal council decided to restore Sopot as a bathing resort.

In 1992, the municipal management of Sopot approached their twin-city Karlshamn in order to seek advice on reduction of pollution leading to opening up of the beaches for swimming. Through this, contact was made with PULS *Planerad Underhållsservice AB* ("PULS"), being recommended as having considerable experience in inspection and rehabilitation of sewer systems. Representatives of PULS were subsequently invited to Sopot for an assessment of the situation.

Sopot has a network of 85 km of sanitary sewers and 48 km of storm sewers. The storm water drains into the sea through 14 outlets along the beaches. The sanitary sewage is pumped to a sewage treatment plant in Gdansk.

The main problem in Sopot was wastewater overflowing into the storm sewer network, with drains leading into the sea. The pipes were partly in poor shape, being to a varying degree blocked in many places. A commonplace solution to blocked sanitary sewers had been to construct a connection to the storm sewer system, discharging directly to the sea, instead of removal of the blockage. In addition, some wastewater house connections had illicit discharge to the storm sewer system.

Regular sampling and analyses of the water along the beaches showing consistent high levels of coli, indicating human excreta, consequently not allowing for opening the beaches to the public for swimming.

Following an initial assessment by representatives of PULS and the water and wastewater utility organisation in Sopot, immediate requirements for action were identified in sewers along the main street, Monte Cassino. An agreement was negotiated and PULS carried out cleansing, TV-inspection and, together with the utility staff, carried out repairs of some sections of pipes. The Municipality of Sopot financed the work carried out.

During the initial phase, it was recognised that major efforts would be required in order to substantially improve the situation and subsequently a plan was drawn up for this purpose. Given the limited financial resources available within the Municipality, a search for external financing was initiated and eventually Bits was identified as a potential donor.

The first three phases of support with Swedish financing, with the first phase commencing in 1994, comprised studies of the sewage disposal network, assessing the condition of the network, including the need for maintenance and rehabilitation. The Swedish contribution was 5 058 000 SEK, with work completed in 1996. The principal aim of the support was to create possibilities for swimming in the sea. In addition, two other objectives were identified, to secure the supply of ground water and to provide basis for the dimensioning of a planned expansion of the town's sewage treatment facilities.

Phase IV, introduction of a computerized register system (VABAS) for storing of all data provided during previous phases of the project, as well as to facilitate the storing and processing of the overall sewer system information, in order to provide a cost efficient tool for daily operation of the sewer system. Phase IV commenced in 1997 with a budget of SEK 1 050 000.

Phase V, renovation of parts of the sewage pipe network, with the objective of rehabilitation of a critical section of the storm sewer network as well as transfer of knowledge in refurbishment of pipe network without excavation of trenches, was carried out during 1998. The budget was SEK 3 970 000.

PULS with their sub-consultants, assisted by personnel from the municipal organisations, with the Municipality of Sopot as beneficiary, have carried out all phases of the project.

Each phase is further elaborated on in the following sub-sections.

1.3 Project Phases I – III

As a result of the work carried out during 1992, a proposal for a first phase was developed and agreed with Bits for financing. The primary objective of the city administration was to improve the water quality of the sea in order to allow for swimming. A clean sea for swimming would restore the sea resort profile of Sopot and consequently enable economical recovery and development based on the primary potential, the tourism industry. In addition, it would enhance the social well being of the community. A gradual recovery of the beach sections was foreseen, as the rehabilitation of the sewer network progressed.

The purpose of Phase I (POL1181) was to map and survey the sewer systems to the extent that an overall assessment of the condition and maintenance requirements could be made. The budget of the Swedish component was SEK 3 154 000.

In order to assess the total maintenance requirements in the sanitary sewer network, a number of representative sections were selected, representing sewers of similar condition in a larger area in the drainage system.

The tasks performed by PULS reportedly covered survey and TV-inspection of 20 km of sanitary sewers and half the storm sewer network. In addition, some immediate problems were solved through root cutting and flushing. The work was carried out during 1994 and 1995. The survey and inspection indicated that the storm sewer network was in a poor condition while the sanitary sewers were in a better state, mainly requiring regular maintenance. A main finding of the survey was that the sanitary wastewater flow to the beach was due to faulty joints and pipes and illicit connections between the sanitary and storm sewer systems.

The survey and inspection was carried out in close co-operation between PULS and the personnel of Sopot water and wastewater utility. Much of the inventory and control of house connections was carried out by the local staff.

During the survey and inventory, all illicit connections to the storm sewers were eliminated and the replacement of a section of sewers in the main street was carried out. Also sedimentation/grit traps at the outlets of the storm sewers to the sea were cleaned out and improved. An action plan for additional rehabilitation works was prepared by PULS and agreed as a basis for the planning.

The actions taken during 1994–95 improved the water quality to the extent that 60% of the beaches could be opened for swimming during the 1995 season.

Based on the results of the first phase and need for further inputs, a request for additional financing was submitted covering Phase II and III. Sida decision 138-96 of 1996 05 22 approved a budget of 1 562 000 SEK for Phase II and 342 000 SEK for Phase III.

The objective of the additional phases was to carry out additional survey of the storm sewers in order to reach an assessment of the total condition and maintenance and rehabilitation requirement.

The Sida decision was based on the following base data:

- Phase I (completed) 80 km inspected
- Phase II, minimum 40 km of pipes,
- Phase III, supplementary work on 8 km of pipes partly inspected in 1992.

It is further stated in the decision that the total sewer network has a length of 133 km, out of which 5 km were inspected in 1992.

The work was to cover three drainage areas with maintenance plans to be developed for each area with the following main inputs:

1. Updating of existing pipe network drawings. Including control of location of pipes, condition and position identification codes. To be carried out by Sopot staff, supported by PULS.
2. Hydraulic assessment. Calculation of design flow data. By Sopot staff.
3. Flushing of sewers. Flushing by means of PULS high capacity flushing and suction vehicle.
4. TV-inspection of the network and inspection of manholes. By PULS.
5. Physical inspection of connections to the sanitary as well as the storm sewers. Mainly to be carried out by Sopot staff.
6. Documentation of the inspections. TV-inspections documented on videocassettes and graphical documentation on network drawings.
7. Development of an action plan by Sopot staff and PULS jointly.
8. Preparation of an investment plan, including order of priorities.

According to the Sida decision, the objectives would then be accomplished: to secure the supply of ground water, to create possibilities for swimming and to provide basis for the dimensioning of a planned expansion of the town's sewage treatment facilities.

As a result of phase II, a complete action plan for network rehabilitation and information for the design of a sewage treatment plant was to be provided.

After completion of phase III, all design data for a treatment plant would be available. Also a good basis for planned and regular maintenance of the networks would have been prepared. This would enable a less expensive planned maintenance compared to acute repairs.

1.4 Project Phase IV

During the execution of phases I to III, a considerable volume of data of the sewer systems was collected and compiled, including such information as location, size, material and result of TV-inspections. The data was recorded on drawings, minutes of inspection, tables and written notes. A computerised data register system would provide a possibility to compile, store and develop data and make easy access possible for the day-to-day operation and maintenance.

PULS together with Malmö VA-verk and Helsingborgs Va-verk submitted a request for financing to Sida in May 1996 for the purpose of introduction of a computerised registration system in Sopot based on a budget amount of 1 114 800 SEK. The services were procured without a competitive tendering procedure, as the phase IV was a direct continuation of the previous assignment.

The request for financing was officially submitted by the Polish Ministry of Environmental Protection, Natural Resources and Forestry in November 1996. Sida decided (decision 302-96) on 1996 12 02 to support the Phase IV with a budget of SEK 1 050 000. The services were to commence in January 1997 and be completed in December 1999.

The introduction of the computerised register system was considered to be essential to serve as a model for other towns within and outside Poland.

VABAS, a computerised register system developed in Sweden and utilized by a considerable number of Swedish water and wastewater utilities was selected as a reliable and well proven system. VABAS has been developed with focus on storage and editing of information relating to operation, maintenance and renewal of municipal water and sewer networks. Different parts of the register are adopted to such data base information as:

- Register of all components in the system;
- Register of inspections;
- Register of reported disturbances; and
- House connections.

It is further possible to connect the system to different types of geographical mapping systems (GIS) for graphical presentation of data.

The services were planned to be executed in two stages;

Stage 1:
- Selection, collection and systematisation of the existing data; and
- Establishment of the data register including registration of information.

Stage 2:
- Transformation of the organisation to suit the new approach to operation and maintenance;
- Development of the system for several work stations and routines for the multi-user system; and
- Application of the planning model for drainage or other selected areas.

Resources for the services were to be drawn from the water and wastewater utility organisations in Malmö and Helsingborg. The establishment of the VABAS system was to be carried out by Enator Västerås AB.

The output of Phase IV was expected to be:

- All data from the previous phases recorded in the system; and
- The municipality of Sopot would be able to work according to the same principles as utilized in a Swedish plan for maintenance, potentially saving 20–30% of the cost of operation and maintenance.

Budget:

Stage 1 Main Components	**SEK**
License VABAS software in Polish	395 000
Seminar, support, follow-up; fees 668 h	309 000
Reimbursable	113 000
Total Stage 1:	817 000
Stage 2 Main Components	
Change of organisation, expansion to multiple user system, planning models; fees 320 h	176 000
Reimbursable	57 000
Total Stage 2:	233 000
Total Budget	**1 050 000**

The budget for the introduction of the system was based on PULS experience of the personnel in Sopot as well as the experience of Helsingborg water and wastewater utility in their introduction of the system. Compared to the proposal, the agreed budget was modified through the omission of hotel from the budget, as this was to be financed by Sopot.

The assistance was requested through official channels, both directly by the Municipality of Sopot and by the Ministry of Environment Natural Resources and Forestry.

The Agreement for the services between the Municipality of Sopot and PULS was signed on March 18, 1997, indicating that the services should commence in January 1997 and be completed in December 1999.

1.5 Project Phase V

The highway between the cities of Gdynia and Gdansk runs through Sopot. During the inventory in previous phases, a stretch of 1 400 metres of storm sewer located in the street was identified as being in a particularly poor condition. Conventional method of closing the street, open excavation with replacement of the existing pipes with new pipes was considered a non-option, as it was essential to maintain the traffic flow in the main street.

The poor quality of this stretch of storm sewer was considered a major reason for inflow of sanitary wastewater into the storm water pipe, consequently conveying the mix of storm water and sanitary sewage to the sea. The area at the outlet from this storm sewer to the sea was still closed for swimming.

Rehabilitation of this stretch of sewer line was thus essential. In addition, introduction of a no-dig technology for the rehabilitation would enable an almost uninterrupted flow of traffic during the execution. An added benefit would be to introduce the pipe rehabilitation technology in Sopot and spread the knowledge about the technology to other water and wastewater utilities in Poland.

The scope of work comprised:

1. Selection of suitable sections of pipes to be rehabilitated;
2. Review of previous TV-inspections. Selection of methods and design;
3. Planning of work including inventory of manholes, connections etc;
4. Work distribution between Sopot and PULS;
5. Preparatory work prior to execution;
6. Selection of practical approach to the execution of work;
7. Actual rehabilitation work;
8. Seminar for invited municipalities in Northern Poland in connection with the execution of work; and
9. Control of work carried out by TV-inspection.

The rehabilitation was expected to include a relining of a test section with cracking tools with a length of 100 metres and polyester sleeves of a total length of 1 340 metres, ranging in size between 200 to 500 mm diameter.

The budget was SEK 3 968 700 agreed with Sida (decision 47/98 of 1998 02 11). The work was planned to commence in March 1998 and be completed before the tourist season, starting June 1, 1998.

During the inventory and preparation for the rehabilitation work, the storm sewer was found to be in an even worse condition than assessed during the TV-inspection in previous phases. The pipe section was not circular and was also in need of additional flushing. The adaptation of the polyester stocking would become more complicated due to the state of the pipe and the strength of the lining had to be increased. The budget was recalculated and PULS proposed to reduce the length of rehabilitation by polyester stocking from 1 340 metres to 855 metres. This change was accepted by the Municipality of Sopot and by Sida. The time schedule was adjusted for completion later during 1998.

Budget:

Main Components	**Original budget SEK**	**Revised budget SEK**
Selection, planning, preparation; fees, 408 h	189 600	189 600
Seminar; fees 64 h	32 000	32 000
Follow-up TV-inspection; 16 h	13 600	13 600
Cleaning and TV-inspection; 130 h		138 000
Sub-total fees	235 200	373 200
Relining with polyester stocking, (1 340 m, reduced to 855 m)	2 937 500	2 709 300
Connections; (140, reduced to 105)	490 000	367 500
Cracking, 100 m	270 000	270 000
Travel, 6 return trips	36 000	36 000
Allowance		8 550
Transport		25 000
Sub-total works and travel	3 733 500	3 416 350
Total Budget	**3 968 700**	**3 789 550**

2 Evaluation Methodology

2.1 Purpose and Scope of Work

The purpose of this evaluation is to assess if the objectives of the project, as expressed in the terms of references and in the contracts with the Municipality of Sopot, were achieved and in accordance with the Sida policy for cooperation with Poland.

The Terms of Reference for the evaluation is enclosed as *Appendix 1.*

The evaluation should focus on the last phase of the project (Phase V) but also analyse the impact of the previous phases, the coherence between the different phases and if lessons learned in the beginning of the project were regarded in the planning and implementation of the latter phases.

The Scope of Work has its emphasis on the following issues in relation to the Project:

- Whether or not the objectives of the contract and the terms of references were fulfilled and expected goals achieved;
- If there were any deviations, and if so provide descriptions, from the objectives or scope of work of the Swedish firm(s) identified in the evaluation, and the reasons thereof;
- Description of the systems, structures and processes leading up to a successful project with goals well achieved, if that was the case. Emphasis to be put on project management, coordination and procurement of labour and goods;
- Whether or not the process of hiring the Swedish firm(s), procurement of goods, invoicing and payments were handled with professionalism, in concurrence with established routines and in a cost-effective manner;
- Had Sida been given relevant information and documentation and had the project been carried out in accordance with the signed contract;
- If the project was relevant to the needs of Poland and the region of Sopot;
- If the project had any sustainable effects on the environment, and if so, which?
- How the target groups of the project, including the people in the region were involved;
- Whether or not the Project became the "pilot project" it was meant to be, and in this respect if other municipalities copy the project in any respect.

2.2 Approach and Methodology

The evaluation has been formulated after study of documentation provided by Sida, and to some extent by PULS and the municipal authorities of Sopot; after interviews with Sopot municipal staff, including the water and wastewater utility, as well as after former project management of PULS and some of their sub-consultants.

A list of persons interviewed is enclosed as *Appendix 2.* A list of the documents used in the evaluation is enclosed as *Appendix 3.*

A mission to Sopot was made February 5 and 6, 2001. Meetings were held with representatives of the municipal organisation as well as the water and wastewater utility organisation.

On March 9, 2001, a visit was made to Malmö Stad Kommunteknik, currently the employer of the former project manager of PULS as well as also the employer of the former sub-consultant for Vabas. Interviews were held with both persons.

A separate interview was made with Dr Peter Stahre of Malmö Va-verk (by telephone).

The two Area Managers, primarily dealing with the project at Sida, are currently both stationed at Swedish Embassies abroad. One of them, Jonas Bergström, was possible to reach with a copy of the draft version of the Evaluation Report. His comments have been received and considered.

The draft version of the Report has also been subject to review by Sopot water and wastewater utility, Sida as well as the former key project personnel, with comments received considered as considered appropriate.

Olle Colling of Colling Water Management AB was appointed by Sida to perform the evaluation.

2.3 Limitations

The evaluation report covers the services carried out by PULS Project Phases I–V in Sopot.

3 Findings

3.1 General

The principal objective of the Project, opening of all the beaches for swimming has been achieved. The results from analyses of regular sampling during the last years provide proof of the improvement.

When the project commenced, all beaches were closed. In 1990 the first democratic municipal council decided to restore Sopot as a major beach resort. The objective to provide a clean sea for swimming would restore the sea resort profile of Sopot and consequently enable economical recovery and development based on the primary potential, the tourism industry. In addition, it would enhance the social well being of the community.

During the phased implementation of the project, a gradual opening of the beaches became possible, with all open from the bathing season of 1997. Consequently, the summer tourists are returning in increasing numbers. Two million visitors were recorded in the year 2000.

An independent institute is continuously carrying out sampling and analysis of the bathing water. Since 1997, only one sample resulted in a pollution level unfit for bathing.

The improved marine environment is the result of restoration of key portions of the separate sewer systems in Sopot, in which the storm sewers drains into the sea from 14 drainage areas, while the sanitary sewers are connected to pumping stations, in turn pumping the wastewater to the sewage treatment plant in Gdansk.

3.2 Coherence with Policy and Decisions

The overall objectives of Swedish cooperation includes support to an environmentally sustainable development, support to a socially sustainable economic transition as well as to deepen the culture of democracy. The project was given priority by the first democratically elected municipal council in Sopot, is of significant economic value to the society, and results in a considerable improvement of the environmental situation. With the direct link between improved water quality in the Gdansk Bay and the return of the tourists, the economic benefit of the project is obvious. Overall the project fulfils the objectives in relation to democracy, economic transition and environmentally sustainable development.

The requirement of all cooperation to reflect a gender perspective is somewhat difficult to translate into the execution of the project and the results. Male and female staff have been engaged in the water and wastewater utility and in the PULS organisation, including on executive and specialist levels; albeit not in equal numbers. The tangible results of the project are neutral in a gender perspective.

The project has been carried out with the provision of technology and know-how not available in Poland at the time of implementation. The Swedish firm and the sub-consultants engaged are well known in the corresponding field of activities in Sweden. However, they had no past experience from projects outside Sweden.

The staged development of the activities gradually unwinding the problems of the networks and systematic cleaning, flushing, TV-inspecting, repairing and disconnecting faulty connections between the systems; followed by a computerised registration, ending with rehabilitation of a section by introduction of no-dig sewer rehabilitation technology; has provided an unusual sequence of events within the framework of obligation of one company. PULS has performed services and contracting, imple-

menting installation and training of computer software system, implemented rehabilitation of sewers, conducted seminars; all based on consultancy contracts.

Decisions for financing by Sida have been based on project support documentation and budgets provided by PULS. Separately, the municipal authority has for each phase forwarded an official request for support to Sida. In each of those cases, the Ministry of Environmental Protection, National Resources and Forestry have supported such requests.

The services have not been procured on a competitive basis, nor have the pricing nor scope of work been subject to independent expert evaluation prior to decisions as regards financing (save for unit prices at one occasion). The justification in the Sida decisions has been a reference to PULS already being involved in the project and carried out the first Phase with good results.

3.3 Findings in Respect of Project Phases I – III

The Phase I services were carried out during 1994 and 1995. The objective was to survey the sewer system in order to achieve a total assessment of the condition of the network and the required maintenance.

Based on a model developed by Malmö Va-verk, a number of typical pipelines were selected based on an assessment of the selected pipelines having similar properties and condition as other sections of pipes in the same area. The selection was made from technical and local considerations based on such selection criteria as: sections with reported repeated disorder or breakdowns, sections prone to overflows, sections within the old town, in residential areas, in streets with heavy traffic, and in gardens and parks. The selection criteria were established by PULS, while the actual selection of typical pipelines was made by the water and sewerage utility.

The work carried out on the selected pipelines was reportedly as follows:

- High pressure flushing and sediment removal of about 20 km of sanitary sewers 200–350 mm diameter;
- TV-inspection of 20 km sanitary sewers;
- Root cutting in 300 metres of pipes;
- Inspection of a substantial number of house connections (made by municipal staff);
- Revisions of existing maps;
- Documentation of the inspections on records and videotapes.

The conclusion from the flushing and suctioning of sediment was in general that gravel and deposits in the sanitary sewers was a limited problem. However, in intercepting mains along the shoreline, there were sections with major problems in respect of sludge and sediment deposits, and in addition, sections of low points filled by deposits. In one particular area in the main street through Sopot, the sanitary sewers had only 30–40 percent capacity due to deposits and thus having a very low capacity. In some areas roots from trees have entered the pipelines, preventing a fee flow, trapping sediments and also making cleaning of pipes difficult.

The predominant pipe material in the sanitary sewer system is vitrified clay, although in a few areas cast iron is used. Vitrified clay is an excellent pipe material for sanitary sewers showing no evidence of surface degradation. The pipes are, however, brittle and prone to cracking during installation or jointing of connecting pipes. The actual damage to the pipes was reported less significant. All cast iron pipes were reported to show damage to the surface.

The overall result of the inspection and survey of the sanitary sewers gave a clear indication of requiring less rehabilitation works compared to the storm sewers. The predominant problems encountered are related to maintenance and the need for preventive maintenance programmes, such as regular flushing of sections of the sanitary sewer network and cutting of roots in some areas.

Although the survey and TV-inspection of the sanitary sewer network was carried out to a length of 20 km out of the total of 85 km including house connections, the selection of representative sections of pipes based on the criteria given above, the selective method is considered to provide a cost-effective method of an assessment of the total sanitary sewer network.

About 25 km, out of a total length of 48 km of storm sewers were also surveyed and TV-inspected. The findings clearly indicated that the storm sewer network based on concrete pipe material, was in a poor condition and would require major rehabilitation work. It was also established that the major single reason for untreated sewerage reaching the sea along the beaches was the illicit connections of sanitary sewers to the storm sewer network.

Based on the survey and inspections, identifying illicit connections and other repair and maintenance requirements, actions were taken by the Sopot staff carrying out the most prioritised remedies. Major work was carried out in respect of the illicit connections as well as considerable re-laying of pipes in the main Monte Cassino Street.

The cooperation between PULS and the municipal authorities, including the water and sewerage utility, appears to have been close and with mutual support as well as considerable work carried out by the local staff, implying a substantial on-the-job training and transfer of know-how. Planning, recording and physical work was done in cooperation and/or in liaison between the parties.

Also other target groups were reported to be involved or influenced by the project. School children were engaged to clean open drains and small streams from solid waste. The Municipality procured waste bins distributed along streets and the beach, all in order to improve the local environment and reduce dumping into open drains or sewers. The physical appearance of the pressure jetting and suction unit from PULS operating in Sopot reportedly created a major interest of the public in the work with a positive impact illustrating that the political decision was followed by direct action and results.

Of the total budget amount of SEK 3 154 000, a total of SEK 3 103 600 was disbursed in Phase 1.

The results and findings of Phase 1 lead to a demand for further survey and inspection of the remaining sections of the storm sewer network in order to clarify the condition, locate illicit connections and obtain data for prioritised repairs and maintenance. The remaining total length was about 20 km.

A request to Sida for financing by the Municipality was supported by a letter from the Ministry of Environmental Protection, Natural Resources and Forestry.

The documentation as regards actual contents of the proposal appears incomplete and difficult to follow. This difficulty is reflected in the Sida decision 138-96. The internal Sida document refers to Phase I as including inspection of 80 km of sewers, while the reporting of PULS indicate 45 km (20 km sanitary and 25 km storm sewers) having been inspected. It further refers to the planned Phase II to include a minimum of 40 km of sewers with an additional 8 km of complementary inspection in the Monte Cassino section. However, the documentation from PULS refers to a need to survey and inspect a length of only 20 km.

In total, PULS reports having surveyed and inspected about 65 km of sewers in Phase I-III while the decision of Sida is based on 128 km of sewers.

The Agreement signed in June 1996 contains four clauses on half a page, covering: parties to the contract, a statement that flushing, TV-inspection, etc should be carried out as part 2 and 3 to a price of 1 904 000 SEK, work commencing in May 1996, and that the whole project will be financed by Sida.

The results and effects of the Sida financed assistance was (in addition to the specified length of sewers) also that the following objectives should be achieved:

- Create possibilities for swimming and bathing along all beaches in Sopot;
- Secure the groundwater resources through prevention of seepage of sewage causing bacteriological pollution;
- Establish design criteria for a planned extension of the wastewater treatment.

The first objective has been achieved, the total length of 4.5 km of beaches have been opened for swimming and bathing.

Seepage to the coastal groundwater indirectly influencing the water quality of the Sea has been substantially reduced through the project. However, the phrasing of securing the groundwater resources is misleading. The water supply to Sopot is based on two well fields, both at a distance and upstream of the urban area.

Establishment of design criteria has not been made through the project. No sampling or flow measurements have been part of the project. However, significant benefits have been achieved in the sense of reduction of storm water inflow to the sanitary sewer system, thus reducing the total sewage flow pumped to the treatment plant in Gdansk.

The survey and inspection in Phase II and III was completed during 1996. As in the previous phase, the storm sewers were almost clogged with sediments. Even mines and grenades from World War II were found in the network, understandably slowing the pace of work considerably. The TV-inspection shows evidence of damage to the surface, roots and broken pipes as well as sections of pipes almost completely destroyed by corrosion.

As a result of the improvements, about 70 percent of the beaches in Sopot were open to the public in 1996 and with the work carried out during the later part of the year, the ambition was to be able to open all beaches during 1997. This achievement was later confirmed. Also the pollution to the groundwater along the beaches has been reduced considerably.

The total budget for Phase II and III was SEK 1 904 000 while actual disbursement was SEK 1 817 351.

3.4 Findings in Respect of Project Phase IV

The Agreement for the services was concluded in March 1997, although the services were required (according to the Agreement) to commence already in January 1997, with completion in December 1999. However, not only was PULS called upon to commence the services prior to the effective date of the Agreement, the first invoice related to the Phase IV actually included services carried out during the period July 1996–15 March 1997, to a total amount of 460 000 SEK. Almost half of the work was apparently carried out prior to the effective date of the Agreement – and was accepted for payment by Sida.

The application for financing to Sida was in addition to PULS also signed by representatives of Helsingborgs VA-verk and Malmö Va-verk. The Agreement, signed by PULS includes Tekniska förvaltnin-

gen VA-verket Helsingborg and Malmö Va-verk as responsible for the co-operation. The VABAS software was procured from Enator-Tekis.

The main bulk of planning and translation of the VABAS programme took place during the second half of 1996 and beginning of 1997. A test version of the translated programme was installed in Sopot in February 1997.

A first seminar in Sopot was carried out in March 1997. In addition to representatives of Sopot, also water and wastewater utility representatives of Gdynia, Gdansk and other towns in the region participated. Representatives of PULS, Tekis, Helsingborg and Malmö conducted the seminar.

A study visit by representatives of Sopot, visiting Malmö and Helsingborg, took place in May 1997.

During 1997 the installation of the programme, with adjustment to the situation in Sopot and start up of compilation and registration of data was carried out. In parallel, local staff was trained in the use of the programme during several training seminars on location. Up to the end of 1997, about 70 percent of the budget had been spent.

Within the obligations of the Agreement, Sopot was to procure the required computer and auxiliary equipment. This was done accordingly with the basic computer software being Windows 95. During the installation of the VABAS software, the interface between the programmes became a considerable problem and was only resolved in the second half of 1998 with the installation of a new version of VABAS, adopted to Windows 95. The change led to the requirement of modifications of some files and manuals, to be carried out during 1999.

During 1998, in addition to the installation of the new version of VABAS, also collection and recording of data was carried out. During the year, the progress slowed down due to repeated change of personnel in Sopot. This also affected the training process. The total volume of work carried out by PULS in 1998 appears to have been very limited, with only a total of 90 hours invoiced.

During 1999, the system specialist provided some support with a meeting in December 1999 as a last visit. At that time a number of issues were agreed to be acted upon by PULS/Enator. However, despite the items agreed upon, nothing was done or communicated from Sweden. Sopot sent a reminder by letter in February 2000 with a copy to Malmö Va-verk. No reply was received. The issues pointed out in the letter was:

1. PULS/Enator to make corrections in the VABAS programme in respect of:
   - All user stations have the same access to all data. Should be differentiated;
   - Difficulties in recording new sewers;
   - No direct access to the file from the main menu.

2. PULS/Enator to deliver a fully interactive installation programme for the network version on CD Rom.

3. PULS should deliver a Final Report for the approval.

In addition to the above, the water and wastewater utility also bring forward the following criticism:

- The system is not fully translated, some headings and text is still in Swedish;
- The polish language in the user manual is poor to the extent that some parts are not possible to use.

The complaints as regards the language is difficult to assess and comprehend. The Polish born VABAS expert made the translation, responsible for the installation of the system, training and support. She

reportedly spent much time in doing the translation as well as conveying the actual meaning during the training.

In comparison with the Time and Activity Schedule enclosed to the Agreement, the two core activities indicated for 1999 have not been carried out:

– Evaluation of the program and possible correction;
– Finishing seminar with final report.

The support work actually carried out during 1999, including the December 1999 visit has not been invoiced. There is no Final Report or Final Invoice.

The objective of Phase IV was to establish a computerised register system in order to enable possibilities to efficiently manage planned and preventive maintenance, for which Sopot should become a model for other towns within and outside Poland.

The output of Phase IV was expected to be:

- All data from the previous phases recorded in the system; and
- The municipality of Sopot would be able to work according to the same principles as utilized in a Swedish plan for maintenance, potentially saving 20–30 % of the cost of operation and maintenance.

The objective of Phase IV has in a strict sense been achieved in as much as a computerised register system has been established. However, although this provides the possibility for efficient management, the key question is whether the system is utilised accordingly in a sustained manner.

Although altogether ten staff members have received basic training, one staff member is assigned to operate the system, adding information inputs and keeping the system updated. However, the Utility employ junior computer trained persons for this task, persons that are still receiving higher education and apparently choose the job in order to get some references and short term engagement in between courses or awaiting better paid computer related employment elsewhere. During the implementation of the programme, three persons have come and gone and the latest had been engaged for five weeks at the time of the visit for the evaluation.

Not all data of the existing networks have been compiled into the system; some 80 to 90 percent were believed to have been subject to registration. As regards the actual outputs or utilisation of the system, the only application was said to be for building permits. No use was made for preventive or planned maintenance. Registration of disturbances showed only one record during 2000. The rehabilitation work carried out in Project Phase V had not been recorded. These were some indicators of a low utilisation of the system.

To what extent does the present situation depend on the remaining obligations of PULS? To some extent it enables the user to point in this direction as a reason for the limited activity in relation to the system. In reality, it is by no means certain that the system will be utilised in a sustained fashion, let alone to achieve any efficiency gains in planned preventive maintenance.

The situation is further complicated by the fact that a separate company runs operation and maintenance of the sanitary sewer system on contract with Sopot. The company is a joint venture between the Municipality of Gdansk and a French water company. They have their own system and have refused to procure a VABAS users license and thereby utilise the same system and information as the Sopot water and wastewater utility.

In conclusion, it is uncertain if the Polish VABAS system will be in practical use as intended in Sopot. The impact on other potential users in Poland during the seminars and demonstrations of the system to other municipal water and wastewater organisations have not resulted in any active demand.

Nevertheless, it is imperative that the outstanding obligations are fulfilled by PULS to the extent agreed upon in 1999. Assurance in this effect was given during the evaluation meeting in Malmö.

3.5 Findings in Respect of Project Phase V

During the survey and inspection of the sewer systems carried out in intervals during the period 1992–1996, the municipal authorities carried out substantial repairs and disconnections of illicit connections to the sanitary and storm sewer systems, and the erroneous connections between the systems. However, the Municipality did not have the resources or the competence in the no-dig sewer rehabilitation technology necessary to be applied in the rather extreme traffic situation in the highway. As a section of a major storm sewer had been identified to be in particularly poor condition in the main street, it was proposed that this should be renovated using a no-dig system. The poor status of the pipes were also considered to be the reason for the poor quality of the seawater downstream of the sewers, resulting in this stretch of beach still being closed for bathing.

No-dig technology, or more appropriate, trenchless technology is used instead of conventional trenching in situations when open excavations are unsuitable. Trenchless methods were developed in England some 30 years ago and have during the last 10 years become generally accepted in Sweden. A multitude of methods and materials have been developed. Some of the more commonly used internal lining methods are:

- Lining with short sections of pipes;
- Lining with continuous pipes (slip-lining);
- Lining with segments or panels;
- Lining with spiral-winded pipes;
- Lining with polyethylene or uPVC, as a new internal pipe;
- Lining with flexible fodder, (stockings) made of woven fabric and polyester or glass fibre. The technology reduces the internal diameter only slightly and can be applied without any excavation;
- Cement spray applications.

The method with lining with flexible fodder was chosen for the rehabilitation of the storm sewer in Sopot, based on an assessment of the problem and as a method with very little disturbance to the traffic flow. Inpipe Sweden AB is a manufacturer of flexible fodders. They became the supplier of the fodder and as such responsible for the design, material and strength considerations.

In order to demonstrate an alternative technology, one section was not rehabilitated with the lining method. Hydraulic or pneumatic cracking was used in which the existing pipe is demolished. The pipe is cut into pieces and at the same time a new pipe is pulled into its previous location. This provides equal, or more often, improved hydraulic capacity in the sewer.

The technology selected was in both cases appropriate to the situation in the storm sewer system in Sopot. Both the material used in the polyester fodder as well as the technology used have been well proven and are often the preferred options in similar situations in Sweden. Malmö Va-verk, supporting PULS in the Project, uses the technologies.

The priority to the chosen sections of the storm sewer system appears well justified as based on the survey and inspection carried out previously and to the fact that the remaining problem in relation to the sea water quality was located at the outlet area of this storm sewer pipe section.

Sida sent the offered unit prices for the lining proposal to Stockholm Water for price control. The comment was that the unit price for the actual lining appeared somewhat high, although this could be justified by the risk for work abroad and possibly by the rates including for flushing (as separate price for cleaning was not included).

Although the Phase V project component consisted of physical pipe rehabilitation works, the Contract (dated February 1998) was concluded with PULS to perform consultancy services. It would have been reasonable to expect an execution of physical works to be based on an appropriate contract. However, compared with a draft proposal, the final and signed version of the Contract included some articles in relation to insurance and guarantee of works. It was stated that the Consultant had a liability insurance of maximum 10 million SEK and potential damages was limited to this amount. A 24 months guarantee for the renovation works was included.

In comparison with internationally accepted conditions of contract for construction works, the liability obligations as well as the insurance coverage of the Contract were incomplete. A contractors insurance should normally cover; a) insurance for works and contractors equipment (also covering defects liability); b) insurance against injury to persons and damage to property (third party); and c) insurance for contractors personnel.

Defects liability clauses should normally include requirements in relation to remaining works and how defects should be remedied, methods to extend guarantee period, actions if contractor fail to remedy defects; and most of all, if a final payment should be linked to the expiry of the guarantee period, or if a final guarantee should be provided.

The Contract links the final payment to submission of a Final Report. This is common practice in consultancy assignments, although not appropriate in a construction contract, such as a relining work. Final payment should in a case such as this be disbursed based on an inspection after the guarantee period.

During the inventory and preparation for the rehabilitation work, the storm sewer was found to be in an even worse condition than assessed during the TV-inspection in previous phases. The pipe section in most immediate need for rehabilitation was not circular as well as requiring additional flushing. The adaptation of the polyester stocking would become more complicated due to the state of the pipe and the strength of the lining had to be increased. The budget was recalculated and PULS proposed to reduce the length of rehabilitation by polyester stocking from 1 340 metres to 855 metres. This change was accepted by the Municipality of Sopot and by Sida. The time schedule was adjusted for completion later during 1998.

The technical argument for the increase in strength of the lining appears well justified.

The unit price per metre of polyester lining was increased by 47% for the 500 mm pipe, 44% for the 400 mm pipe, 42% for the 300 mm pipe and by 22% for the 200 mm pipe. Also flushing and TV-inspection was added to the revised budget.

The revised budget with the considerable higher unit prices does not appear to have been subject to a new price control. The initial cost assessment by Stockholm Water stated, "If the existing pipe is in very poor condition, the unit price should be increased by about 10%." It is impossible at this stage to make any in-depth analysis of the relevance of the increased unit cost. However, in view of the assess-

ment by Stockholm Water, a discussion as regards the relevance of the new unit prices could have been expected, prior to acceptance.

Completion of the works carried out was recorded in Minutes of Meeting held on October 23, 1998. The total length of relining of 200, 300, 400 and 500 mm diameter stormwater sewers was 830 metres. Cracking was carried out to a total length of 92 metres of 250 mm diameter pipes. The Minutes confirms that the works were carried out in time. The final cost was recorded as SEK 3 685 094, compared with the revised budget SEK 3 789 550. (The original budget was

SEK 3 968 700). A Final Report approved by the Municipality of Sopot accompanied the Final Invoice to Sida.

The 24 months guarantee period was recorded to be valid until October 22, 2000. In conclusion, the Minutes concluded that the works were handed over in compliance with the Agreement and deemed completed accordingly.

The Minutes constitutes a proper record of a handing over of the works. No faults in the works have been recorded during the guarantee period.

Prior to completion of the lining work, a combined seminar and study visit was conducted providing both theoretical lectures and practical demonstration. An audience of some 50 persons from Sopot and nearby municipal water and wastewater authorities attended it.

The environmental objective with Phase V was fulfilled, as sampling and tests in the sea close to the outlet from the storm sewer indicate a clear improvement and reaching levels acceptable for swimming.

In addition to the physical improvements, the development of the technical competence has been greatly appreciated by the water and wastewater utility. The management is, as a result of the PULS assistance, on the job training and seminars, capable of procurement and supervision of contractors recruited for flushing and cleaning of sewers, TV-inspection, root cutting and other services; procured and implemented from time to time. Furthermore, the management also has the competence in no-dig sewer rehabilitation technology, which enables them to procure and monitor implementation of such contracts.

During the year 2000, a Polish contractor relined 540 metres of 500 mm diameter pipes in the main street. The technology has been spread rapidly in Poland in recent years with local contractors operating with different techniques under foreign license. Three tenders were received for the work. The total cost was 545 000 PZL, corresponding to about SEK 1 400 000. This equals about 2 600 SEK per metre, all-inclusive for connections, cleaning and inspection.

During this year, 1 000 metre of 300 mm diameter pipe is planned to be relined. The cost is included in the overall budget for investments in water and sewers for 2001 of about 5.2 million SEK.

During the period from 1992 when the rehabilitation and repair works were introduced, the Municipality estimates that they have spent an equivalent to 50 to 60 million SEK in the sewer networks rehabilitation programme.

4 Conclusions and Recommendations

4.1 Conclusions

The following conclusions are made as a result of the evaluation:

1. The principal objective of the Project, opening of all the beaches for swimming, has been achieved. When the project commenced, all beaches were closed. In 1990 the first democratic municipal council decided to restore Sopot as a major bathing resort. The objective to provide a clean sea for swimming would restore the sea resort profile of Sopot and consequently enable economical recovery and development based on the primary potential, the tourism industry. In addition, it would enhance the social well being of the community. During the phased implementation of the project, a gradual opening of the beaches became possible, with all open from the bathing season of 1997. Consequently, the summer tourists are returning in increasing numbers. Two million visitors were recorded in the year 2000.

2. The support by Sida was coherent with the policy in relation to the cooperation with Poland. The first democratically elected municipal council established the principal objective of the project. The Project was of main economic value to the town directly linked to an improved marine environment. The project thus satisfies the policy in relation to democracy, economic transition and environmentally sustainable development.

3. The lengthy period of repeated presence by PULS and their sub-consultants have had a positive effect on the municipal staff and in particular the management of the water and wastewater utility. The on-the-job training in maintenance, survey and inspections, as well as no-dig sewer rehabilitation technology has had a sustainable effect on the organisation. This is demonstrated by the continued work in this field by the utility based on local financing with works and services carried out by Polish contractors.

4. Knowledge from the early phases of the Project, in which the sewer systems were surveyed and inspected in a staged fashion, identifying the main problem areas in the networks and their causes, was utilised by the utility, with improvements, repairs and reconnections carried out in parallel. The information compiled was transferred to a register system, albeit with some problems in relation to the implementation and sustainability, and finally a fifth phase was carried out with rehabilitation of the most crucial sections. The coherence between the phases has been satisfactory.

5. The total Swedish contribution has been about SEK 9.5 million. Procurement has not been based on competitive tendering procedures. (Bits initially managed the Swedish financing, where negotiated contracts were common practice). Unit prices have apparently only been reviewed by external expertise on one occasion. Competitive tendering procedures would have required preparation of terms of reference and other documentation by an independent consultant. As PULS already had a competitive advantage from the pre-project assignment in Sopot, the outcome of a tender might still have been in their favour. Nevertheless, it should most likely have resulted in more appropriate contract documents and a verification of costs. In the absence of competitive bidding, a minimum of independent expert review of scope of work, resource allocation and prices should have been applied prior to decisions for financing been taken.

6. The Municipality has supported the project with allocation of resources as well as financing of repairs and rehabilitation work on an annual basis, so far to an accumulated expenditure equivalent to 50–60 million SEK.

7. The agreements between the Municipality and PULS have gradually become more sophisticated. The first Agreement on record included four clauses filling half a page, while the last Contract had 12 clauses spreading over six pages. All agreements where consultancy contracts, with PULS as the consultant. This was appropriate for Phase I-III and Phase IV, as the services were predominantly consultancy. However, the services in Phase V were execution of works and should have been treated as such. The Contract was insufficient in terms of liability and insurance.

8. PULS resource allocation, together with Malmö and Helsingborgs Va-verk, project management, staff allocation, equipment and materials appears to have been appropriate to the services and works in Phase I–III and V. The services and works were carried out within budget and time allocations.

9. The decision by Sida to finance Phase II and III assumed PULS to survey and inspect 128 km of sewers. The reporting by PULS indicates that they actually carried out about 65 km. However, there is no indication of a discrepancy between obligations in scope of services compared to the volume of work actually carried out. It appears more likely that the total length given in the internal Sida document is based on a misunderstanding.

10. The introduction of VABAS computerised registration system (Phase IV) was justified in order to compile the information of the sewer systems gathered during the survey and inspection activities. The system has the potential to be used for the complete system and be a part of a preventive maintenance approach to the sanitary and storm sewer systems. However, given the organisational split between the operational units for the two systems, and the recruitment policy for the day-to-day operation of the VABAS system itself, a sustainable result of the system is doubtful.

11. PULS have not fulfilled their contractual obligations for the VABAS system and the assurances for supportive actions in 1999 have not been attended. Although the Project has been considered finalised by PULS and Sida, obligations remains to be fulfilled, including the requirements for a Final Report, once the remaining issues have been taken care of.

12. The no-dig rehabilitation through lining with flexible fodder and cracking carried out in Phase V was successful, despite worse then expected conditions. The introduction of the technology has enabled rehabilitation of a critical section of storm sewers, improved the environmental situation at the outlet to the sea, and demonstrated the use of a no-dig sewer rehabilitation technology to the extent that the municipal utility procure and apply the technology for new sections after completion of the Swedish financed services.

13. The Project has been beneficial to Sopot and the region, given the sustainable results from the inspections, cleaning, repairs and reconnections, systematic approach to maintenance and to the introduction of trenchless technology for rehabilitation of sewers. To what extent the achievements have been applied in other municipalities is uncertain. The use of no-dig rehabilitation technologies is becoming common in Poland with a number of Polish contractors mastering the technology based on foreign licenses. This development might have been to some extent accelerated by the Sopot project. VABAS register system, although translated into Polish paid for in the project, has not been in demand and as far as known no efforts are made to market the system in Poland.

4.2 Recommendations

The following recommendations are made as a result of the evaluation:

1. Procurement should comply with the general guidelines adopted by Sida. Informal purchasing and single source procurement are accepted under special circumstances. In such cases, it is recommended that independent experts be engaged to review scope of work, resource allocations and prices.

2. The model of contract documents should reflect the type of services or works to be carried out. Consultancy services should be based on Sida or FIDIC model agreements. Supply and construct type of contracts should be based on internationally accepted contract models such as FIDIC Conditions of Contract for Design-Build and Turnkey, Conditions of Contract for Plant and Design, Building and Engineering Works, or the Conditions of Contract for Construction.

3. Routines for follow-up and control of final reporting and invoicing needs to be established or, if in existence, to be enforced.

4. PULS obligations in relation to Phase IV of the Project should be fulfilled in accordance with the Sida conditions of financing, the Contract and as agreed between the parties in 1999. (For details, reference is made to Section 3.4 of this Report).

5 Lessons Learned

The objective of opening of all beaches for swimming in order to restore Sopot as a prime beach resort expressed a political, public and commercial demand. In order to achieve the goal, a multi-stage development was necessary, based on a comprehensive assessment and inspection, priority actions in terms of cleansing and repairs, followed by substantial rehabilitation works of the most critical sections of the sewer network. The lessons learned from the success of this staged development are several:

- The project has been driven by a demonstrated local demand, expressed in a democratic process;
- The local administration has provided a dedicated support to the project, allocating appropriate resources during implementation;
- Local financing has been made available on an annual basis;
- The support of Sida financed the necessary know-how not available locally and was provided at the occasions when the needs were unfolded by efforts demonstrated in previous phases. The sustained effort was instrumental to the success.

Within the overall picture of success, there are some lessons learned that would further enhance the possibility of success in other projects and programmes:

- Procurement routines should comply with the general guidelines adopted by Sida. Independent experts should review scope of work, resource allocations and prices, in particular if contracts are negotiated without a competitive procurement process;
- The model of contract documents should reflect the type of services or works to be carried out. Consultancy services as well as supply and construct type of contracts should be based on Sida standard or internationally accepted contract models;
- Sida routines for follow-up and control that the obligations of financing are fulfilled should be enforced.

Appendix 1

Terms of Reference

1 Background

The main objective of the ongoing cooperation between Sweden and Central and Eastern Europe is to support the transformation towards democracy and Market economy. One of the main topics for cooperation is Environment and projects related to sustainable environmental development.

Every year Sida evaluates a number of projects, to be able to answer before the Government and the Swedish people. It lies within the obligations of Sida to evaluate Sida-financed projects with reference to efficiency, cost-efficiency and achievement of objectives. Within the cooperation with Central and Eastern Europe, the Swedish and the cooperating part are equally responsible for the outcome of the project.

The aim of this evaluation is to analyse if the objectives of the "Sewage disposal network in Sopot" were fulfilled. The evaluation should also focus on the processes of the project and describe whether or not the project was managed in a professional way. This to be able to bring lessons learned into future activities of similar kind.

There are no plans for a continuation of this project.

The project to be evaluated:

Decisions no: ÖST 47/98, ÖST 302/96 and ÖST 138/96
Reference no: ÖST-1995-0684

The project, which was implemented in five phases, started with a study of the sewage disposal network in Sopot. Based on this study, decisions were taken to support the introduction of a computerised register system and the renovation of the pipe network. The evaluation should focus on the last phase of the project (decision 47/98) but also analyse the impact of the previous phases, the coherence between the different phases and if lessons learned in the beginning of the project were regarded in the planning and implementation of the latter phases.

2 PURPOSE

The purpose of the evaluation is to assess if the objectives of the project, as expressed in the Terms of References and in the contracts with the Municipality of Sopot, were achieved and in accordance with the Sida policy for cooperation with Poland.

3 SCOPE OF WORK

- to find out whether or not the objectives of the contract and the Terms of Reference were fulfilled and expected goals achieved;
- to describe any deviations from the objectives or scope of work of the Swedish firm(s) identified in the evaluation, and the reasons thereof;
- to describe the systems, structures and processes leading up to a successful project with goals well achieved, if that was the case. Emphasise should be put on project management, coordination and procurement of labour and goods;

- to find out whether or not the processes for hiring the Swedish firm(s), procurement of goods, invoicing and payments were handled with professionalism, in concurrence with established routines and in a cost-effective manner;
- to find out if Sida was given relevant information and documentation and if the project was carried out in accordance with the signed contract;
- to find out if the project was relevant to the needs of Poland and the region of Sopot;
- to find out if the project had any sustainable effects on the environment, if yes – which?, if no – why?;
- to find out how the target groups of the project, including the people in the region, were involved?
- to find out whether or not this became the "pilot project" it was meant to be? Did other municipalities copy the project in any part? Did Sopot arrange any study visits for representatives from other parts of Poland? Any activities undertaken to spread project information?

4 METHODOLOGY AND REPORTING

The assignment includes interviews with the involved parties: PULS AB and the Water and Sewage Department of Malmö. The visit to Poland should include contacts with the Sopot Municipality and Water and Sewage Department. Apart from interviews, the evaluation should also include the technical parts of the project.

To collect the required material, the Consultant will review relevant project related documentation at Sida and interview the following parties involved:

- former and present desk officers at Sida: Jonas Bergström, Lars Oscar and Anneli Hildeman (to the extent that they are available);
- PULS AB Box 124, 245 22 Staffanstorp, Tel: 046-257850, Contact: Krister Carlsson.
- Malmö VA-verk, Henrik Smithsgatan 13, 205 80 Malmö, Tel: 040-341623, Contact: Peter Stahre.
- Tekis AB. Tel 040-341 786, 0708-645 899. Contact: Eva Kjellman.
- Sopot kommun: Urzad Miasta Sopotu, ul.Kosciuszki 25/27, 81-704 Sopot, Tel: 058-5510936, Contact: Jacek Karnowski.
- Sopot VA-verk: Zaklad Wodno-Kanalizacyjny, ul.Kosciuszki 25/27, 81-704 Sopot, Tel: 058-517253, Contact: Mariola Marchlewicz.

A visit to Skåne and a visit to Sopot, Poland should be included in the work schedule.

A draft report should be presented to Sida, PULS AB and Sopot by 2001-03-30. Any comments on the draft should be given to the Consultant, before 2001-04-17. The report should be written in English and be outlined in accordance with Sida Evaluation Report – A Standardized Format (Annex A) with a comprehensive Newsletter Summary in accordance with the enclosed guidelines (Annex B). Furthermore, the Sida Evaluation Data Worksheet (Annex C) should be filled in and returned to Sida. After having received comments from the parties concerned and Sida, the final report should be presented in five copies as well as in a diskette version, by 2001-05-02.

5 RESULTS AND RECOMMENDATIONS

The evaluation should in its conclusions present if the objectives of the project were fulfilled and also describe the processes, significant for this project. The evaluation could also include other recommendations, of relevance to Sida.

6 UNDERTAKINGS

The Consultant will be responsible for practical arrangements in conjunction with the mission to Poland.

When the Evaluation is through, the Consultant should be able to participate in a meeting with Sida, to present and discuss the report.

7 CONSULTANTS

For the task a person with experience of the water and sewage sector and of cooperation with Eastern Europe will be required.

8 TIME PERIOD

The evaluation should be carried out during the winter/spring of 2001, for a maximum of 3 weeks.

Appendix 2

List of Persons Interviewed

Name	Position	Organisation
Mr Cezary Jakubowksi	Deputy Mayor	Municipality of Sopot
Mrs Mariola Marchlewicz	Manager	Sopot Water and Wastewater Utility
Mr Maciej Daniszewksi	Deputy Manager	Sopot Water and Wastewater Utility
Mr Krister Carlsson	Managing Director, Malmö Kommunteknik. Formerly Project Manager, PULS	Malmö Kommunteknik
Mrs Ewa Kjellman	Utredningsingenjör, Malmö Kommunteknik. Formerly System Specialist VABAS, Tekis	Malmö Kommunteknik
Dr Peter Stahre	Director	Malmö Va-verk

Appendix 3

List of Documentation

1. Sida Beslut 138-96. Beslutsdatum 1996 05 22.
2. Agreement Sopot City Hall – PULS dated 1996 06 04.
3. PULS slutrapport första fasen. 1995 11 30.
4. PULS lägesrapport våren 1996. 1996 07 08.
5. PULS slutrapport Pol 1181 och 1182. November 1996.
6. PULS ansökan om utvidgning 1996 05 31.
7. Sida Beslut 302-96. Beslutsdatum 1996 12 02.
8. Agreement Municipal Board of Sopot – PULS dated 1997 03 18.
9. Rapport Vabas/Duf I Sopot Polen, February 1999.
10. Sida Beslut 47/98. Beslutsdatum 1998 02 11.
11. Contract Sopot Town Council – PULS, dated 1998 02 24.
12. PULS rapport över uppnådda resultat 1998 02 27.
13. PULS Final Report of Phase V dated 1998 10 23.
14. Various correspondence PULS – Sida
15. Various correspondence Sopot Municipality – Sida
16. Various correspondence Ministry of Environmental Protection, Natural Resources and Forestry – Sida.

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Department for Central and Eastern Europe

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Department for central and Eastern Europe

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Department for Research Cooperation

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Department for Central and Eastern Europe

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Department for Central and Eastern Europe

01/16 **Human Rights Training in Vietnam.** Carl-Johan Groth, Simia Ahmadi-Thosten, Clifford Wang, Tran van Nam
Department for Democracy and Social Development

01/17 **Swedish-Danish Fund for the Promotion of Gender Equality in Vietnam.** Shashi R. Pandey, Darunee Tantiwiranmanond, Ngo Thi Tuan Dung
Asia Department

01/18 **Flood Relief Assistance to the Water and Wastewatwer Services in Raciborz, Nysa and Klodzko, Southern Poland.** Olle Colling
Department for Central and Eastern Europe

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Fax: +46 (0) 8 690 92 66
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