ΣΥΜΒΟΥΛΟΙ ΠΟΛΕΟΔΟΜΙΑΣ – ΚΥΚΛΟΦΟΡΙΑΣ – ΠΕΡΙΒΑΛΛΟΝΤΟΣ
PLANNING – TRANSPORT AND ENVIRONMENTAL CONSULTANTS

NON-TECHNICAL SUMMARY OF A SUPPLEMENTARY DOCUMENT REGARDING THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE CONSTRUCTION OF A RETENTION POND AND OVERFLOW CHANNEL IN THE POLEMIDIA AREA

Λεωφ. Κέννεντυ 70, Γρ. 203, 1076 ΛΕΥΚΩΣΙΑ
70 Kennedy Av., Office 203, 1076 NICOSIA,
TEL: +357 22 518556/7, FAX: +357 22 511739
e-mail: info@alaplanning.com
www.alaplanning.com

CONTENTS

1. NON-TECHNICAL SUMMARY

1.1 Introduction

This Environmental Impact Study examines storm water drainage solutions for the Western Limassol Area and in particular the Limassol West (LMW) drainage basin as defined by the Sewerage Board of Limassol – Amathus (SBLA) "Master Plan", and it is supplementary to the "Environmental Impact Assessment Study for the construction of the Link Road from Limassol Port to the Limassol-Paphos Motorway" July 2004 by the firm Environmental Management Consultants and A. F. Modinos & S. A. Vrahamis.

That particular study is supplementary to the "Supplementary Environmental Impact Assessment Study for Options for Drainage Projects which will take place alongside the construction of the link road from Limassol Port to the Limassol-Paphos Motorway" Parts A and B which were drawn in September 2007 and February 2008 respectively, by MWH&I Consultants. The final choice described in PART 2 of the supplementary EIAS consists of a combination of aspects of the various options, for which and Environmental Impacts Assessment Study has already been carried out in PART 1. The difference in the final choice which is proposed in PART 2 of the Study is the addition of an earthen channel which will convey small quantities of water into the Akrotiri Salt Lake in extreme conditions of intense rainfall (1 in 25 years).

In January 2008, the consultants MWH&I also completed a Hydrological Study which proposes a 3.5 hectare earthen retention pond in the Ipsona / Polemidia area, in the same area proposed by the Storm Water Drainage Master Plan (2003).

It is worth noting that the impact from constructing an earthen retention pond for an area of 11.7 hectares in the same area, have already been examined in the Environmental Impact Assessment Study which was drawn up in March 2007 by the firm Nikolaidis and Associates.

This supplementary document concentrates on and examines the impact from the construction of the earthen pond which is referred to frequently in the Environmental Study by Nikolaidis and Associates. Also, based on the final decision to construct and operate an open earthen channel, its impact on the environment are examined in more detail.

1.2 Description of the Project

1.2.1 Retention Pond

The retention pond will be constructed at Polemidia and will cover an area of approximately 3.5 hectares. Two locations have been examined (Area A and Area B), one being the same location where a large (11.7 hectare) retention pond was proposed by Louis Berger Consultants in the "Storm Water Drainage Master Plan" (2003) which was drawn up on behalf of the SBLA. The final location (plots 315, 318 and 173 – Area B) of the retention pond proposed by this Study has been decided following consultation and meetings with the Geological Survey Department, the Public Works Department, and the SBLA, and after Geotechnical Analysis of the two proposed locations.

1.2.2 Earthen Channel

The channel (a section of which will be a closed conduit with a diameter of 1,000 – 1,200 mm, and the remainder an open channel about 2.8m wide and 1.2m deep) will be able to divert water into the Akrotiri Salt Lake, as an overflow system for the proposed retention pond which will be created in the Polemidia area. The construction details of both the concrete conduit and of the open channel which will be made from natural stone encased in gabions, will allow water to percolate into the ground along the entire route, which may replenish groundwater (SUDS details). The course of the channel examined as part of the hydrological study was determined after an on-site visit to the area.

1.3 Impacts from not carrying out the work

The impacts faced by a significant section of the residents and users of the wider area which are due to the absence of an integrated storm water collection and management system can be placed in the following categories:

- Economic impact on private properties from the damage brought about by severe rainfall.
- Possible impact on public health from various microbiological pollutants being carried into homes and workplaces.
- Possibility of causing accidents when using road transport.
- Damage and losses to public infrastructure of the urban environment

1.4 Assessment of Environment Impact during Construction

1.4.1 General

The most common impacts created during the construction of projects of this type are as follows:

- Increased noise levels and dust during the construction.
- Problems using the road network.
- Problems created by depositing and transporting earth when carrying out the earth-moving works.
- Impact on the biological environment.
- Other impacts related to the peculiarities of the area being studied.

The majority of these impacts are temporary and confined to the period when the construction work is being carried out.

The overflow conduit will be laid down after the required excavation work. The excavated rubble will be put back once the pipeline is in place. Additional rubble will be used in the landscaping of the open channel. The overflow channel will be constructed from natural stone encased in gabions so no particular impacts are envisaged during the construction of this part of the channel.

The following is a summary of the most significant impacts:

1.4.2 Noise

The construction work and construction-site activities will directly result in an increase in noise-levels in the neighbouring area. Increased levels of noise-pollution will be observed for the duration of the earth-moving work (excavations to alter the level of the ground) and during the laying out of access roads.

1.4.3 Air Quality

A negative impact which is expected to worsen current air quality at a local level during the construction work for the Planned Project, is the increase in dust levels while the earth-moving work is being carried out.

Measures which can be taken to reduce the amount of dust released into the air include:

- Rubble which is removed could be taken away from the construction site and dumped at approved locations.
- Spraying the soil

Thus, by taking the above measures, and because of distance, residential areas are not expected to be affected.

1.4.4 Biological Environment

The course of the overflow channel is surrounded by trees. In this case, the outcome is that the effect on the existing trees are minimal, but that more private land will be expropriated. As a consequence, on the one hand there will be minimal disturbance of the biological environment but, on the other hand, a financial burden on the project's Contractor.

1.4.5 Impacts on Society

The nature and scale of the Planned Project and the related auxiliary infrastructure required for its construction and operation overall (upgrading the storm water management and collection system) is such that a small increase in business for the construction and related industries, with the ensuing positive economic impact, will result from the planned construction.

1.5 Assessment of the Environmental Impact During Operation

1.5.1 General

The operation and maintenance of the storm water retention pond is expected to have a mostly positive impact on the immediate and wider environment of the area under study, as well as on broader social aspects. The most significant impacts are focused on the protection of the man-made environment from severe flooding events, as the operation of an integrated storm water collection and management system is expected to minimize any negative impacts.

1.5.2 Benefit to Society

It is believed that the operation of the storm water retention pond will have a positive impact on the whole spectrum of public infrastructure in the areas which will be served by the storm water retention pond, and so it is expected to be of significant positive benefit to society.

The completion of an integrated storm water collection and management system will significantly limit the flooding problems that arise during heavy rainfall, and which have a significant negative impact on the wider area of western Limassol.

1.5.3 Noise

It is expected that an increase in noise levels will be observed during periodic maintenance work on the storm water retention pond.

It is estimated that the above-mentioned maintenance works will increase noise levels to 95-100 dB(A), depending on the type of machinery used. The change in noise levels because of work to maintain the Planned Project will disturb wildlife in the ecosystems which will be created in the area of the pond. The extent of the negative impact will depend on the duration of the work, which is expected to be only a few days, and on what method is used for the maintenance work.

1.5.4 Hydrology and Quality of Processed Storm Water

The operation of the Planned Project is expected to have a positive impact on the hydrological characteristics of the affected area. The most significant are:

- Collection and management of storm water with the result that flooding events will be prevented.
- Improvement and monitoring of the quality of storm water (given that certain measures are implemented).
- Possible replenishment of the subterranean aquifer.
- Creating of an area where the biological environment can develop, particularly the region's bird-life. In this case, at times when the pond contains 9,000 m^3 of water.

It must, however, be noted that the operational success of the storm water retention and management system relies heavily on the measures which will be taken to maintain the quality of the storm water at levels which are acceptable in the proposed management system.

1.5.5 Creation of Solid Waste and Residues

During operation of the Planned Project it is expected that, at the exit of the storm water sewer, there will be a build-up of waste which has been carried by the storm water via the sewers and which will be trapped by the grilles at the point where it empties into the pond.

If regular pond maintenance work to remove the built-up waste is not carried out, then it is believed that there will be negative repercussions on the functioning of the system, caused by problems with poor water flow, such as foul smells and malfunctioning of the connecting and overflow pipes.

1.5.6 Biological Environment

By implementing simple measures to manage the pond rationally so that the negative impacts (build-up of waste in the pond's sub-basin, problems with poor circulation of the storm water within the pond) are limited, the pond will constitute a significant development project in storm water management, and possibly the development of the biological characteristics of the wider area.

A possible negative impact, which is expected to be observed during periods when there is water in the pond, is the possibility of the presence of mosquitoes.

The following mitigation measures are recommended:

- The managers of the Planned Project (SBLA) should implement a spraying programme. It is recommended that the spraying should use insecticides which are fully biodegradable and environmentally friendly.
- A meticulous regime should be put in place to clear the pond of any solid materials that end up there.

1.6 Conclusions

Based on the findings, the researchers consider that the planned project will have an overall positive outcome for the area being studied.

NON-TECHNICAL SUMMARY OF THE SUPPLEMENTARY ENVIRONMENTAL IMPACT ASSESSMENT FOR OPTIONS FOR DRAINAGE WORKS WHICH WILL TAKE PLACE ALONGSIDE THE CONSTRUCTION OF THE LINK ROAD FROM LIMASSOL PORT TO THE LIMASSOL-PAPHOS MOTORWAY (PART B)

CONTENTS

Comment [Dave Bind1]: Thi s is incorrectly recorded as 1.1.1 in the index and main text of the original, and has been corrected. All other 3rd-level subsections in the source text are also labelled incorrectly and have been corrected in both the index and the text.

2. NON-TECHNICAL SUMMARY

1.1 Introduction

This Study examines and analyses the ***final solution*** which has been put forward for drainage of storm water in the Western Limassol Area and in particular the Limassol West (LMW) drainage basin as defined by the Sewerage Board of Limassol – Amathus (SBLA) "Master Plan", as set out after consultation with the relevant authorities.

It should be noted that this study (PART 2) is a supplementary and integral part of the "Supplementary EIAS for Options for Drainage Projects which will take place alongside the construction of the link road from Limassol Port to the Limassol-Paphos Motorway (PART 1)".

The overall study into the storm water drainage concerns the water from the western area of Limassol, rainwater from the new road which is to be constructed, rainwater from Miltonos Street which is located to the west of the primary road under construction, as well as rainwater from the southern area of Zakaki.

Currently, the rainwater from Miltonos Street (MLT drainage basin) is conveyed by the pipeline under Miltonos Street into Makria Lake. The final plan for the drainage of Miltonos Street makes provision for it to be conveyed to the sea via an open channel. This drainage system and the outflow into the sea were covered by an Environmental Survey in 2002, and they do not form part of the present study.

The final solution described in this study consists of a combination of aspects of the various options have already undergone an Environmental Impact Assessment Study in PART 1 of this study. The difference in the final solution which is proposed in PART 2 is the addition of an earthen channel which will convey small volumes of water, in extreme conditions of intense rainfall, into the Akrotiri Salt Lake. For this reason, PART 2 of this study concentrates on and analyses the environmental impacts of the construction and operation of this open channel and its overflow into the Akrotiri Salt Lake.

In addition to the construction works which have already been described in PART 1 of the study, an earthen channel (approximately 2.8m wide and 0.7m deep) will be constructed, which will be able to channel water into the Akrotiri Salt Lake, as part of an overflow system which is to be constructed at the proposed pond in the Polemidia area,

Below is a summary of the most significant environmental impacts during the construction and operation of the earthen channel.

1.2 Assessment of the Environmental Impact During Construction

1.2.1 Physical Environment

Air Quality

The most significant negative impact, which is expected to worsen current air quality during the construction works for making the proposed earthen channel, is the increase of dust levels while earth-moving work is being carried out.

Measures which can be taken to reduce the release of dust into the air include:

2. Rubble which is removed could be taken away from the construction site and dumped at approved locations.
3. Spraying the soil
4. Fencing the construction site – wherever possible – with a fine mesh.

Thus, by taking the above measures, and because of the distances in involved, residential areas are not expected to be affected.

It should be pointed out that, if the earth-moving works are carried out during the winter months, the quantity of dust released into the air will be lower than in the summer months.

It is estimated that the airborne pollutants released by vehicles and machinery will not be significant enough to have any negative impact on air quality.

Creation of Solid Waste

The main impacts from the creation of spoil are the following:

- Visual impact at the dump site.
- Effects on the biological environment of the wider area.
- Increased levels of dust and noise during the moving and off-loading stage.

The estimated quantity of spoil from the earthen channel is 8,000 m^3.

1.2.2 Biological Environment

Flora

The impacts on the flora of the area during construction are described in PART 1 of this study. Some sections of the area's habitats may be cleared for the construction of the earthen channel, resulting in harm to various plant species (*Lotus cytisoides, Daucus glaber, Plantago maritima, Anthemis parvifolia).*

Fauna

The work to construct the earthen channel is expected to cause increased noise levels and disturbance in the area, with the result that various species of animals in the area will be impacted negatively.

1.3 Assessment of Environmental Impacts during Operation of the Planned Project

1.3.1 Physical Environment

Hydrology

In conditions of heavy rainfall (estimated at once every 25 years) storm water from the retention pond in the Polemidia area will overflow into the Akrotiri Salt Lake.

The volume of water that will be diverted towards the Salt Lake is estimated to be 2% of the Salt Lake's capacity. That volume will be further reduced before it reaches the Salt Lake because of absorption and percolation into the ground. It should also be noted that this water will overflow into the Salt Lake after it has been stored temporarily in the Polemidia retention pond, so the water quality is expected to be good.

Creation of Solid Waste and Residues

It is expected that various debris, which has either passed through the filtration grids or come from the surroundings, will build up in the open channel. For this reason, these materials should be cleared away during periods when there is no standing water so as to avoid visual pollution, and pollution of the water which might (once in 25 years) be diverted into the Salt Lake.

Impacts on the Aesthetics of the Area

The creation of an open earthen channel between the retention pond and the Salt Lake is expected to be visually detrimental to the area it passes through and, as the channel will be relatively large (3 metres across) it is expected that there may be safety issues for people in the area unless barriers are placed on either side of the bed.

1.3.2 Biological Environment

In periods of intense rainfall, it is expected that the storm water which will flow into the Salt Lake as an overflow from the retention pond may cause some disturbance to aquatic life.

A possible negative impact that is expected to be observed in periods of heavy rainfall, when there will be a build-up of water in both the pond and the open earthen channel (between the retention pond and the Salt Lake), is the foul smell and appearance of mosquitoes due to the stagnant water. This phenomenon is seen wherever there is a build-up of stationary water and causes a negative impact on public health in the wider area.

It should be noted, however, that there is only a small chance that there will be a build-up of standing water in the earthen channel because of absorption and percolation of the water into the ground as it heads to the Salt Lake.

In addition, a positive impact which the design of the proposed Project will bring about is the provision of the necessary infrastructure to create a wildlife habitat, such as nesting sites and plants in order to attract birds.

1.3.3 Man-made Environment

Impacts on Society

The greatest benefit to society will be the resolution of the flooding problem which has been observed for years in periods of high intensity rainfall and, as a result, the prevention of catastrophic damage to private and public property. The wider area of the study, where the drainage system is to be constructed, is considered to be a residentially and industrially developed area of Limassol with the result that the ground surface is covered by buildings and roads and materials which do not allow water to permeate the soil easily.

Also, with rational use of the storm water which will be collected, and its correct distribution and use for irrigation, the benefit will be even greater, especially taking into account the value of water in Cyprus and the new conditions resulting from the creation of golf courses, and the existence of agricultural land in the Greater Limassol area.

1.4 Mitigation Measures

The most significant measures which will have to be taken when the earthen channel is in operation mainly concern limiting the carriage of pollutants to the Salt Lake by the storm water, and the preservation of the storm water's quality. This can be facilitated by monitoring the places where pollution enters the water.

The most important measure concerns street cleaning, especially prior to periods of rainfall. Also, intensive cleaning of manholes and of the open earthen channel of the storm water drainage system has an immediate and positive effect on the quality of the storm water it conveys.

For the effective prevention of accidents and to contain pollutants released in the event of a possible spillage of toxic substances (such as fuel and lubricants) in the drainage basin, it is recommended that regulation systems (controlling inflow / outflow of storm water to the pond) be put in place. These should allow the spillage to be cut off in various sections of the containment tank, and prevent it from entering the Salt Lake. The necessary equipment with mobile pumps should also be available, in order to remove the polluted water from the control system.

The retention pond which is to be constructed in the Polemidia area will be used to store storm water, and also to reduce / remove pollutants from the stored storm water.

It is recommended that it be designed and operated using best practices, so that the pollutants are removed and water quality is improved. Also, it is recommended that the water which overflows into the Salt Lake should have BOD<30 mg/l and a suspended load <50 mg/l.

1.5 Conclusions

Based on the results, the researchers consider that the planned project will have an overall positive outcome for the area under study.