

MINISTRY OF AGRICULTURE,  
NATURAL RESOURCES AND ENVIRONMENT

WATER DEVELOPMENT DEPARTMENT

**ANNUAL REPORT 2014**

## V. WATER DEVELOPMENT DEPARTMENT

### 1. INTRODUCTION

**1.1.** The Water Development Department (WDD) is responsible for implementing the water policy of the Ministry of Agriculture, Rural Development, Natural Resources and Environment with the aim of providing effective protection, rational development and sustainable management of the water resources in Cyprus.

The enforcement of the Integrated Water Management Law (79(I)/2010) on 15 November 2010, opened up new horizons but also presented new challenges for the Department. According to the Law, the integrated management of water is assigned to the WDD, in the framework of the Government general Water Policy, as determined by the Council of Ministers.

The ratification of the above Law by the Parliament of Cyprus, constitutes a historical development, as it addresses the problem of fragmented responsibilities and powers regarding water management among various Departments, which resulted in waste of resources, isolated handling of problems and ultimately in the inability to exercise an integrated, rational and effective management of all water resources.

The vision of the WDD is the sustainable development, protection and management of the water resources with the aim to secure adequate quantities of good quality water for all uses, in the framework of a modern, flexible and effective organisation.

In this context, the competencies of the Department cover a wide and varied range, including the following:

- a) Collection, quality control, processing, analysis, classification and recording of hydrological, hydro-geological, geotechnical and other data, which are necessary for:
  - i) The protection and improvement of the qualitative and quantitative status of the surface and ground water bodies and
  - ii) The study, maintenance and safety of development projects.
- b) Feasibility studies, design, implementation, operation and maintenance of infrastructure projects, such as, dams, ponds, irrigation, water supply and sewerage networks, water treatment plants, wastewater treatment and re-use plants, as well as desalination plants.
- c) Cultivation of water saving awareness among consumers.

**1.2** The main objectives of the WDD for 2014 were the following:

- a) Satisfy the water needs of all uses to the maximum extent possible
- b) Promote the efficient use of water resources

- c) Safeguard the quality and protect the water resources and aquatic environment
- d) Enhance the efficiency and effectiveness of the services provided by the Department, focusing on better public service

**1.3** The total water storage in Dams on 1/1/2014 was 158.4MCM or 54.4% of the total dam capacity and within April, the total storage decreased to 134.2MCM or 46% of the total dam capacity, due to low inflow from January to April.

The total inflow in the dams during the calendar year 2014 was only 12.9MCM, which was the second worst inflow since 1990 with 12.0MCMmcm, compared with 41.8MCMmcm of the previous year (2013). The rainfall during the period October 2013 – September 2014 was only 315 mm or 65% of the average rainfall.

The maximum water storage in the dams of Southern Conveyor Project (SCP) was 81.1MCM or 44.4% of the capacity on the 1/1/2014 and in April the total storage decreased to 60.9MCM or 33.4% of the total dam capacity. The total water allocated for irrigation to the farmers at SCP areas, was 29MCM compared with 40MCM in 2013.

Table 9 in the Annex indicates the water consumption for domestic and irrigation purposes from all Government Water Works.

**1.4** WDD focuses on strengthening national, regional and international cooperation to address common challenges in the field of water management and the enhancement of knowledge in research and development of innovative technologies by promoting partnerships.

In this context, during the visit of the President of the Republic to Qatar on 27 January 2014, a Memorandum of Understanding on cooperation in the field of sea water desalination and waste water treatment and reuse was signed between Cyprus and Qatar.

At the same time, the Department follows the developments regarding the initiative "Union for the Mediterranean - Water", which sets the guidelines for a long term water strategy in the Mediterranean region.

The activities of the Department per thematic unity during 2014 were as follows:

## **2. MONITORING OF WATER RESOURCES/DATA PROCESSING**

**2.1** The collection, quality control, processing and analysis of hydrological and hydrogeological data for groundwater and surface water resources continued, as well as the study of hydrological topics for the planning and implementation of water projects, the control of groundwater and river abstraction, , the monitoring of water pollution and the provision of expert advice on water use.

**2.2** With respect to the monitoring of surface water quantity, the activities in the field of stream-flow monitoring included measurements at 56 hydrometric stations out of which 51 are equipped with mechanical water level recorders and another two stations with a radar type sensor. During 2014, as part of the modernization of hydrometric stations, seven additional telemetry systems were put into operation in order to monitor the stations from the central offices of the WDD. Thus at the end of 2014, 19 hydrometric stations were monitored using a telemetry system. Regarding the quantitative monitoring of groundwater, during 2014, measurements of groundwater levels were recorded from more than 1000 observation boreholes, for the National Groundwater and WFD Monitoring Programmes. The frequency of measurements ranges from twice a year to six times a year. For a number of boreholes, the ground water levels are monitored continuously using data loggers.

With respect to spring flow monitoring, during 2014, 8 more springs were added to the relevant monitoring network which now accounts 67 springs. The spring discharges are measured once per month. Sporadic measurements were taken at additional springs also.

**2.3** Regarding the qualitative monitoring of water resources, the implementation of the monitoring programme of water (rivers, lakes/reservoirs, groundwater) in accordance with Article 8 of the Water Framework Directive 2000/60/EC (WFD) continued this year as well as the implementation of National groundwater monitoring programmes. As part of these programmes, the following were systematically monitored: 52 points on rivers, 15 reservoirs (the dams of Klirou-Malounta and Tamassos were added), 95 boreholes as part of the WFD monitoring programme and 45 boreholes as part of the National groundwater monitoring programmes. For monitoring within the WFD, 193 water samples were collected from rivers, (the number of samples is lower than those from 2013, due to lack of flow in some rivers during 2014), 66 samples were collected from reservoirs and 173 samples from groundwater. In the context of biological classification of aquatic systems, a contract for the analysis of samples of biological quality element "phytoplankton" in water reservoirs has been completed. During 2014, 46 samples of phytoplankton were collected from reservoirs at different depths utilizing a boat.

**2.4** During 2014, the implementation of the National Monitoring Programme of the small reservoirs, continued, in collaboration with the District Offices of the Department. This network now includes 23 water reservoirs. All

of these reservoirs were sampled for physicochemical parameters three times a year. In the ten largest water reservoirs of the island, regular (twice per week) measurements of surface water temperature are carried out, in order to detect possible stratification development on time.

**2.5** WDD continued monitoring the groundwater quality in two areas (an area west of Limassol and Potamia- Ayios Sozomenos area) in order to fulfill the WDD obligation to the Department of Environment regarding the monitoring of groundwater quality in areas that are, or will be irrigated with treated effluent. A sampling operation involving collection of water samples from 4 boreholes for each area was carried out. .

**2.6** In the framework of implementing the National Programmes and the programmes under Directive 2000/60/EC for qualitative and quantitative monitoring of groundwater, the evaluation and revision of the monitoring network continued. The analysis of the monitoring programmes results continued and the following studies were completed: 1) review of the chemical status of the groundwater bodies for the 6-year period of 2008 to 2013, 2) review of the quantitative status of the groundwater bodies for the 6-year period of 2008 to 2013, and 3) The report “Review of the chemical status of the groundwater bodies for the 6-year period of 2008-2013” was prepared. The study regarding the review, revision and reclassification of the groundwater bodies which includes the review of the quantitative status of the groundwater bodies was completed and a report prepared as required by Article 5 of the Framework Water Directive 2000/60/EK (WFD).

**2.7** Regarding hazardous substances (e.g. pesticides, insecticides, heavy metals, etc.), the concentrations from 29 river sites and from 11 water reservoirs was examined and evaluated.

**2.8** All quantitative and qualitative monitoring results of rivers, reservoirs, groundwater and springs are imported into the Department’s Hydrogeological database (CYMOS) and submitted to the Eionet-WISE network of the European Environment Agency.

**2.9** The monitoring of the quality of potable water from boreholes and springs used by communities, continued. During 2014, the number of these boreholes and springs were about 500. From this year’s chemical analyses of potable water quality for the communities, more than 61 parameter values, specified in the Directive 1983/98/EC, were exceeded. In cases where the parameters exceeded occur on the single water supply source of a community, the relevant authorities were notified by telephone within 24 hours. In other cases (more than one source of water supply) the relevant authorities are notified in writing.

**2.10** The grace period for submitting an application to the Director for registration and licensing of wells which were not in use, or constructed before the entry into force of the Integrated Water Management Law (79 (I)/2010), (on November 15, 2010) without having secure the necessary by the repealed Law permit for drilling or constructing a well/ borehole, expired on January 31,

2014 with the exception of farmers ended on 30 June 2014. The Water Development Department (Competent Authority for licensing all water retention works as well as water abstractions etc.) has established procedures for (a) commissioning a borehole into disuse and (b) demolishing a borehole. Field checks are carried out by WDD staff, for the detection of unlicensed boreholes or wells, and if permit conditions are implemented.

**2.11** During 2014, 2435 applications were evaluated nationally for borehole drilling permits, 1778 of which were for legalizing non-licensed boreholes. All applications are recorded in a database that was developed specifically for this purpose. Since the Integrated Water Management Law entered into force on 15 November 2010, 3637 new applications have been received, 6405 applications were for legalizing non-licensed boreholes. 122.000 borehole permits were received by the District Offices nationwide, those which show activity (request for change of the pumping, permit limit, transfer water to other plots, new application for drilling in the block, etc.) are also recorded in the database. At the end of 2014, the database contains more than 31.500 boreholes with more than 47.700 applications of different types. Due to the high workload in examining applications for legalizing unlicensed boreholes, during 2014 the monitoring of the water meter readings was carried out on about 300 boreholes only.

**2.12** During 2014, more than 50 warning letters were issued regarding the compliance with the terms of borehole drilling permits and water abstraction permits. Also through the Attorney General, 8 cases, of which 1 was a case involving a drilling rig operator, were taken to court. Also 3 letters of intension to reduce the issued water extraction limit were issued.

**2.13** During 2014, 15 applications for granting of a drilling rig operator license were examined nationwide.

**2.14** The Division of Hydrometry continued to investigate citizen complaints (by telephone or in writing) for excessive use of water from boreholes in residential gardens, as well as possible water pollution in rivers and dams.

**2.15** With respect to monitoring diversions of water from rivers, a nationwide campaign was carried out and identified more than 340 cases. During 2014 historical records from maps showing diversions for the Nicosia district have been digitized. Due to staff shortage, only the Nicosia District has set up a 2-person team that records active diversions from rivers for monitoring and/or licensing.

**2.16** The campaign, which is carried out in cooperation with the Cyprus Fire Brigade, in order to identify unprotected wells so as to close them or to take measures for the safety of animals and people, continued during 2014.

**2.17** The study for the establishment of criteria and guidelines for the design of protection zones for potable water supply reservoirs was completed. Four different types of protection zones for each of 13 such reservoirs (2 of which are considered for future use) were established in accordance with the Water

Protection and Management Laws 2004 to 2012 (European Water Framework Directive 2000/60/EC). The delineation of the Distant and the Close Protection Zones for the 13 dams, which was carried out in accordance with the established criteria and with the use of a GIS, was also completed. The measures to be taken/ observed within the protection zones required to secure the protection of the drinking water reservoirs against pollution were codified and communicated to all relevant Departments, Services and Agencies. Action Plans concerning measures to be taken for the protection of the water from existing pollution pressures for 7 out of the 13 reservoirs were prepared. The Action Plans for the remaining six reservoirs will be prepared by the Division of Hydrology and Hydrogeology of WDD.

**2.18** Thematic maps concerning the activities of the Department, those of other Departments, Organizations and Consultant Engineers, were prepared, e.g. maps for the positioning of water projects, networks and monitoring stations for ground and surface water bodies etc.

**2.19** Isopiezometric digital maps (groundwater levels) were prepared for the coastal aquifers of Paramali Kokkinokhoria, and Akrotiri for different periods.

**2.20** The representation of the Department in the Environmental Impact Assessment Committee and the Quarry Licensing Committee continued.

**2.21** Examination of applications concerning waste management in the framework of consultations with the Department of Environment, (responsible for the issuance of waste discharge permits in the context of implementing the Soil and Water Pollution Control Law).

**2.22** Sample taking for chemical and microbiological water tests at Polemidhia Dam, Athalassa Dam and Ovgos River, before and after the period recycled water was discharged in them. These results can be viewed on the Department's website.

**2.23** Sample taking for chemical and microbiological analyses: a) from the Limassol and Larnaka coastal waters before and after the discharge of recycled treated wastewater in the sea, b) of recycled treated wastewater to be used for irrigation and c) water drilling in areas irrigated with recycled treated wastewater. These results can be viewed on the Department's website.

**2.24** Quality checks on new monitoring programme data before their input into the WDD hydrological and hydrogeological database, CYMOS, their input into the database as well as quality checks on CYMOS data continued.

### **The Protection of River Riparian Areas**

**2.25** Within the scope of the implementation of the Integrated Water Management Law 2010 to 2012, which prohibits any form of intervention in rivers and riparian areas without the approval of the Director of the WDD the following work was carried out:

- Review/evaluation and preparation of reports regarding the impact of proposed development projects e.g. parks, golf courses, landscaping projects, parcelation of land, changes in existing town planning zoning, Natura 2000 areas, etc. on the hydromorphology, the environment and the capacity for safe discharge of flood flows of rivers and riparian areas for 64 cases and 3 Environmental Impact Assessment studies.
- With regards to the reviewing WDD policy of applications for projects/works that impact rivers and riparian areas: i) The review and updating of the WDD policy regulations was completed, ii) The criteria for approval and the assessment methodology were established thus ensuring transparency and just and impartial treatment of the applications and iii) the work for the preparation of the report and the assessment methodology “flow charts” which expedite the procedures continued.
- Review/assessment and preparation of assessment reports for 20 hydrological/hydraulic and flood studies sent by District Offices, local authorities, other governmental departments etc. The study defining the criteria and the methodology for the delineation of river protection zones for inclusion in the town planning zones of the Urban Development and Rural Development Plans under review was completed.
- Delineation of river protection zones in accordance with the established methodology and with the use of a GIS, for inclusion in the town planning zones of 3 Development Plans: 1.Larnaka/ Pervolia, 2.Pano & Kato Lefkara and 3. Marathasa.
- Assessment and submission of comments regarding the river protection zones for two regions (Germasogeia and Agios Ioannis Agros) which were proposed within the framework of the new amendment of the Rural Development Plan
- The advisory role of WDD in meetings with topics regarding i) the protection of rivers and riparian areas, ii) the prevention of floods and iii) the protection of people, property and the environment from flooding continued.

## **Drought Management Plan**

**2.26** Within the scope of the implementation of the Drought Management Plan the following work was carried out:

Processing and analysis of relevant information and data, calculation and interpretation of the 5 monthly and annual drought indices essential for the timely activation of the prescribed management measures to effectively address droughts and water scarcity conditions.

## **Water Balance**

**2.27** Estimation of nation-wide available water resources which is essential information for rational and sustainable water resources management.



### **3. IMPLEMENTING THE EUROPEAN ACQUIS**

**3.1** Throughout 2014, important work has been carried out on the harmonization and monitoring of various obligations and requirements of the European Union. The Department also participates in various Working Groups / Steering Committees / Advisory Groups both in Cyprus and abroad in order to ensure effective implementation.

#### **Directive 2000/60/EC**

**3.2** In the context of implementing the Water Framework Directive 2000/60/EC (WFD) in Cyprus, WDD completed the 1<sup>st</sup> River Basin Management Plan for the period 2009-2015, in collaboration with the relevant governmental departments.

The management plan includes the Program of Measures (97 Basic and 56 Supplementary), the Drought Management Plan and the Revision of Water Policy Report.

**3.3** Within the scope of the implementation of the Programme of Measures of the River Basin Management Plan (WFD) the coordination, implementation/supervision and assessment of the effectiveness of the measures aiming for their revision/update was carried out.

**3.4** Within the scope of the implementation of Article 5 of the WFD for the new WFD 6-year cycle, the following work was carried out:

- Assessment, review, spatial redefinition and re-characterization of groundwater bodies based on the results of the monitoring programmes regarding the qualitative and quantitative status of groundwater over the 6-year period 2008 to 2013.
- Preparation of the report “Reassessment, Review, and Re-characterization of the Groundwater Bodies in Cyprus - Article 5 of the Water Framework Directive 2000/60/EC» for submission to the E.U.
- A new typology of rivers was developed in which rivers were classified and spatially delineated by the flow regime that is in rivers with continuous, intermittent (non-continuous) and ephemeral flow respectively.

**3.5** As part of the preparation of the 2<sup>nd</sup> River Basin Management Plan for the period 2015 to 2021, a Public consultation for the Review of Significant Water Management Issues in Cyprus began on June 6, 2014 for a period of six months and ended on December 6 2014. On November 3 2014, public consultation was initiated on the Review of Significant Water Management Issues in Cyprus. A revision for the Article 5 of the Framework Directive was also started.

**3.6** In the context of implementing the Programme of Measures of the Water Framework Directive 2000/60/EC, WDD carries out the Project for the construction of a Waste water Treatment Plant which will accept Domestic Septage, Industrial Wastewater, surplus sludge and leachate at the Vati area. This project is implemented under the Cooperation Programme between Switzerland and the Republic of Cyprus.

#### **Directive 91/271/EEC**

**3.7** During 2014, the implementation of the National Implementation Programme for the Directive 91/271/EEC for Urban Wastewater Treatment in settlements with equivalent population over 2,000 continued.

**3.8** The implementation programme for sewerage projects in suburban agglomerations with population equivalent greater than 2000 continued. The projects were carried out by the Urban Sewerage Boards on behalf of the Water Development Department. WDD is responsible for the follow up of the contracts.

**3.9** WDD provided technical advice to the Sewerage Boards regarding problems faced for the sewerage and wastewater treatment problems in rural communities with a population equivalent of less than 2000.

#### **Directive 2007/60/EC**

**3.10** Work on the implementation of the European Directive on Floods, 2007/60/EC, and the corresponding Cyprus Laws, continued. Specifically:

- The work on the study and the preparation of Flood Hazard Maps and Flood Risk Maps for the 19 areas identified as areas for which exists potential significant flood risks (Flood Risk Regions) was completed.
- A study regarding flood hazards and flood risks in the area of Paralimni Lake was carried out and Flood Hazard Maps and Flood Risk Maps for the area were prepared.
- The studies' outcomes were submitted to the E.U.
- The public was informed on the subject and the studies' outcome through the media, articles in newspapers and magazines, conferences and through the Department's website.
- The Terms of Reference for the development/establishment of a Flood Risk Management Plan for the 19 Flood Risk Regions were amended and incorporated into the tender documents "Provision of Consultancy Services for the Preparation of the second Cyprus River Basin Management Plan within the framework of the implementation of Directive 2000/60/EC and for the Development of a Flood Risk Management Plan within the framework of the Implementation of Directive 2007/60/EC."
- Hydrological assessment of areas that have been affected by floods within 2014.
- Management and updating of the floods database.

## **Community Initiatives**

**3.11** The implementation and management (including time and financial planning, preparation of budget and absorption forecasts, progress monitoring and preparation of reports, observing procedures and regulations for the co-financed projects) of four (4) co-financed sewerage projects, namely the Astromeritis – Peristerona - Akaki Complex, Athienou Municipality, Solea Complex and Kokkinochoria Complex continued.

**3.12** Furthermore, the Water Development Department submitted to the Directorate General for European Programmes, Coordination and Development, comments for the preparation of the Operational Programme for Competitiveness and Sustainable Development 2014-2020 and proposed projects for co-funding under the European Structural and Investment Funds during the new programming period 2014 – 2020.

## **Co-financed Project by the Swiss Confederation**

**3.13** Under the Cooperation Programme between the Swiss Confederation and the Republic of Cyprus the co-financed project for the construction of a treatment plant for domestic septage, industrial wastewater, surplus sludge and leachate at Vati area continued. In this context in 2014 WDD proceeded with the evaluation of Tenders related to the "Design, build and operation for 10 years of the wastewater treatment plant". This project is funded with 85% by the Swiss Confederation.

## **4. ANNOUNCEMENT OF COMPETITIONS**

**4.1** The Tenders and Contracts Division is responsible for the preparation of the Tender Documents, the publication of the Contract Notice, the provisions of the Tender Documents, the provision of Clarifications and additional Information on the Tender Documents, the announcement of the tender evaluation results, the Award of Contract and the invitation to sign the Agreement, the preparation of the Contract Documents and the publication of the award of Contract.

**4.2** Three Mini Competitions were announced for the supply of ductile iron pipes and pipe fittings for the following Projects:

- Supply of ductile iron pipes and pipe fittings to replace part of the Stavrovouni-Nicosia pipeline Phase A. Supply of ductile iron pipes and pipe fittings to replace part of the Stavrovouni-Nicosia pipeline Phase B. Supply of ductile iron pipes, pipe fittings and polyethylene sleeving for the water supply of the Eastern area of Limassol from the Limassol Water Treatment Plant.

Preparation of Tender Documents and call for Tenders for the supply of electromechanical equipment for the execution of Departmental Projects such as:

- Stainless steel pipes, pipe fittings and hydraulic valves.
- Submersible pumps, submersible motors, air compressors, electrical panels, electromagnetic and mechanical water flow meters, electrical motors, rotary pumps. Cast iron and polyethylene liner pipes and fittings for the water supply of the Eastern area from Limassol Water Treatment Plant.

**4.3** Preparation of tender documents and announcement of tender procedures for the supply of the following materials:

- 150 metric tons of Liquid Sodium Hypochloride (NaOCl) for the operation of the Sewage Treatment Plant of Paralimni-Ayia Napa.
- 700 metric tons of sodium chloride (Pure Refined Vacuum salt) for Tersefanou, Asprokemmos, Chirokitia and Kornos Water Treatment Plants.
- Manufacture of pump jackets and supply and installation of an electronic electromagnetic device for water softening unit for the community of Amiantos.

**4.4** Preparation of tender documents and announcement of tender procedures for the provision of the following Services:

- The provision of consultancy services for the preparation of the 2<sup>nd</sup> River Basin Management Plans of Cyprus for the implementation of Directive 2000/60/EC and for the preparation of flood risk management plans for the implementation of Directive 2007/60/EC,
- Operation and Maintenance for 5 years of the Sewage Treatment Plant and the Pumping Station in the community of Pelendri,  
Operation and Maintenance for 5 years of the Sewage Treatment Plant, the Irrigation pipe System of recycled water and maintenance of the sewage pipe systems at Frenaros army camp, hire / exploitation of the canteen at the head offices of the Water Development Department.

**4.5 Preparation of tender documents and announcement of tender procedures for the Provision of Civil Engineering Services, as follows:**

- One (1) Civil Engineer for the implementation and Supervision of construction of Sewerage Collection Network at Derinia.

**4.6 Preparation of tender documents and announcement of tender procedures for the construction of the following projects (Works):**

- Construction of Sewerage Collection Network at the coastal area of Sotira Municipality and additional works at Frenaros community,
- Operation and Maintenance for 5 years of the Sewage Treatment Plant and the Pumping Station at Pelendri Community,
- Operation and Maintenance for 5 years of the Sewage Treatment Plant, the recycled water irrigation system and maintenance of the sewage pipes at the Frenaros Army Camp,
- Construction of the Sewerage Collection Network at Sotira Municipality,
- Construction of the Sewerage Collection Network at Liopetri,
- Design, Build and Operate for 20 years of the Achna Sewage Treatment Plant and Associated Works,
- Repair works, maintenance and upgrading of the Kouris Pumping Station,
- Construction of Sewerage Collection Network at Xyloimbou and Ormidia– Additional Works, and
- Design, Build and Operate for 10 Years of the Treatment Plant for Domestic Septage, Industrial Wastewater, Surplus Sludge and Leachate at Vati Area.

**4.7 The Tenders and Contracts Division supervises the tender procedures followed by the District Offices and the Divisions of the Department, which use the Simplified and Negotiation procedures for the acquisition of materials, such as electromechanical equipment, electromagnetic water meters, pumps,**

electrical panels, stainless steel pipes and fittings, gate valves, butterfly valves, etc and for the lease of machinery for the execution of the various projects of the Department.

**4.8** The Tenders and Contracts Division has trained Officers of the District Offices and the Divisions of the Department on issues relating to the preparation of tender documents and announcing of Competitions using the Simplified and Negotiation procedures, through presentations and the publication of relevant forms, as well as on issues related to ordering materials through the electronic system of the Treasury of the Republic.

## **5. STUDIES AND EXECUTION OF WATER PROJECTS**

### **5.1. Studies completed in 2014**

- 1.** Completed by negotiation procedures the "Expansion of the Study Due Environmental Impact Assessment for the Souskious dam including a research report provided for in Article 4.7 of the WFD (2000/60 / EC)."
- 2.** A study was completed for the pipeline conveying recycled water from the Wastewater Treatment Plant of West Limassol to the existing irrigation network.
- 3.** A study was carried out for the Solea Irrigation Network (temporary solution)
- 4.** A study was implemented for the temporary water supply to the communities Alambra, Pera Chorio and Nisou.
- 5.** A study was carried out for replacing a section of Stavrovouni - Nicosia pipeline.
- 6.** Completed the review of the economic analysis for the conveyance of Recycled Water at Nicosia - Nicosia Eastern Projects (Sewage Treatment Plants of Vathia Gonia and Mia Milia).
- 7.** A study was completed for the pipeline connecting the Vathia Gonia new recycled water storage tank, with the pumping pipeline from Nicosia Sewage Treatment Plant.
- 8.** A study was completed for a reinforced concrete water tank of 1.200m<sup>3</sup> capacity for Tembria's irrigation scheme.
- 9.** Completed the coordination for the Services Agreement Contract, for the Final Design of Solea Irrigation Project concerning the Construction Phase of the Project and the Defects Liability period.
- 10.** Completion of the review of the Feasibility Study of the works for Larnaca Recycled Water Scheme.
- 11.** Completed the Feasibility Study for the recycled water distribution project from the Anthoupolis Waste Water Treatment Plant (Nicosia Sewerage Board).
- 12.** Completed the Environment Impact Assessment, in accordance with Article 14 of Law N.140 (I) / 2005, for the Mia Milia Sewage Treatment Plant recycled water storage tanks at the Vathia Gonia.

13. Completed the Preliminary Environmental Impact Assessment in accordance with Article 14 of Law N.140(I)/2005, for the recycled water distribution, from the Anthoupolis Waste Water Treatment Plant.
14. Completed the extension of the Appropriate Environmental Impact Assessment for the Souskious Dam, including the research report provided for Article 4.7 of the WFD (2000/60EC).
15. The pipeline connection between Vassilikos Desalination Plant and Southern Conveyor was completed.
16. Completion of the Hydraulic Study for the revision of Irrigation Project for Kokkinochoria and integration of the Tower Xylofagou region in the irrigated areas.
17. Kouris pumping station was maintained, repaired and upgraded.
18. The defect liability period (final acceptance) of sewerage collection networks in the Communities of Xylophagou and Xylymbou-Ormideia, was completed.

## **5.2 Projects completed in 2014**

1. Domestic water supply for various communities: Replacement of the existing conveyor pipeline, existing network, supply and installation of water meters and chlorination units, installation of hydrants for fire fighting purposes, installation of devices for the reduction of scale in the pipework and pumping stations.
2. Repair, maintenance and upgrading of the building of Kouris Pumping station.
3. Annual maintenance of all Irrigation networks. The works include internal and external cleaning of water tanks, preventive maintenance in water supply points, repair works on water meters valves and networks.
4. Cleaning, maintenance and installation of aeration systems (if necessary) for dams.
5. The electromechanical works necessary for the construction, refurbishment and maintenance of various pumping stations, diversions, main conveyors, liquid chlorination units, disinfection-sterilization ultraviolet systems and power generators (stand-by) of all the Water Treatment Plants, dams and sewage treatment plants.
6. Extension of telemetry system.
7. Completion of the participation in the research programme, “Solar – Thermal Production of Water and Electricity” (Inter Boundary Cooperation Greece – Cyprus 2007 – 2013 Programme). The programme’s aim was the construction of a small scale experimental co-generation unit which utilizes solar energy for the simultaneous production of water and electricity.

## **5.3 Studies in progress**

1. Hydraulic studies for the irrigation networks of Evrychou Flasou, Linou and Katydata Communities as part of the Solea Irrigation Project.
2. Review of the hydraulic study for irrigation network in Lympia consolidation area. Final design from the Land Consolidation Department is expected.

3. Ongoing review of the hydraulic study of irrigation network in Aradippou consolidation area. The final decision for the construction of a Sewage Treatment Plant in the Municipality of Aradippou is pending.
4. Revision of the hydraulic studies for the construction/ installation phase of pipelines conveying desalinated water from the Vassilikos desalination plant (EAC) to Larnaca - Nicosia and Limassol.
5. Consultations with the Municipalities of Greater Nicosia Area and government departments for future utilization of recycled water from both the Anthoupolis Urban Waste Water Treatment Plant and from Vathia Gonia Waste Water Treatment Plant.
6. Ongoing consultations with Meneou-Dromolaxia Municipality, Tersefanou, Klavdia Communities and Government Departments regarding future users of recycled water from the Larnaka Wastewater Treatment Plant.
7. Preparation of a Feasibility Study for the water supply of Nicosia Western Communities with desalinated water from the Vassilikos Desalination Plant. This pipeline will be used as an alternative water supply solution in case of a serious problem of either the Larnaka / Dhekelia Desalination Unit or Tersefanou.
8. Ongoing infrastructure works connecting EAC Vassilikos Desalination Plant with the Khirokitia Tank and pumping potable water to Nicosia.
9. Preparation of the Terms of Reference and Tender Documents for the construction of Anthoupolis Recycled Water storage tank.
10. Preparation of Hydraulic Study and preparation of Construction Plans and Bill of Quantities for conveying recycled water from the Anthoupolis water storage tank to irrigated areas.
11. Preparation of Terms of Reference and Tender Documents for the Design and Construction of Tersefanou Dam and Recycled Water.
12. Coordination of the service contract for the Final Study of Vathia Gonia Recycled Water Storage Tank (construction phase of the project).
13. Design and Build of the Astromeritis Sewage Treatment Plant and Associated Works.

#### **5.4 Projects in progress**

1. Improvement Works for the storm water management in military camps.
2. Construction of water tanks, new pipelines, pumping stations, development of boreholes (where necessary) for the domestic water supply of various communities.
3. Construction of treated water reservoir at Vathia Gonia
4. The operation and maintenance of the Vathia Gonia Domestic and Industrial Sewerage Treatment Plant was undertaken by a private Contractor.
5. The electromechanical works necessary for the construction, refurbishment and preventive maintenance of various pumping stations, diversions, main conveyors, liquid chlorination units, disinfection-sterilization ultraviolet systems and power generators (stand-by) of all the Water Treatment Plants, dams and sewage treatment plants.
6. Operation and Maintenance of 19 Sewerage Treatment Plants and Sewerage Pumping stations at Military Camps and Communities of population



equivalent less than 10,000, and the Sewerage Treatment Plant at Menoyia Larnaca.

7. Operation and Maintenance of the Vathia Gonia Domestic and Industrial Sewerage Treatment Plant.

8. Contract Management for the refurbishment of Desalination Unit at Larnaca.

9. Approval of materials and supervision of the works for the construction of the Astromeritis Sewerage Treatment facilities.

10. Construction of the sewerage collection network at the Communities of Phrenaros and Acheritou.

11. Construction of sewerage collection networks at Sotira Municipality and the Community of Liopetri under the supervision of Public Works Department.

12. Coordination of 3 Civil Engineers employed for the implementation (Planning, Supervision and Inspection) of the three (3) co-financed sewerage projects, namely the Astromeritis-Peristerona-Akaki Complex, Athienou Municipality and Kokkinochoria Complex.

#### **Projects initiated in 2014**

1 Commencement of the Design, Build and Operate for 20 years Contract for the Athienou Sewage Treatment Plant and Associated Works.

2. Commencement of the Closed-Circuit Television Inspection (CCTV) in the sewerage networks of the co-financed Projects.

3. Commencement of the construction of sewerage collection networks at the Communities of Xylotymbou-Ormideia (additional works).

## **6. WATER MANAGEMENT OPERATION AND MAINTENANCE**

**6.1** The Department has the responsibility for the management, operation and maintenance of the water production and conveyance facilities that belong to the State. It is also responsible for the activities for the management and operation of Governmental Water Projects (GWPs) and in cooperation with other services and bodies, implements the current water policy. The GWPs consist of the governmental irrigation networks, which supply irrigation water to areas that are integrated in them, as well as the governmental water supply systems which supply potable water to the majority of the local Water Supply Authorities. Within the GWPs are included water installations such as Dams, Water Treatment Plants, Desalination Plants, governmental boreholes and pumping systems, water reservoirs, and pipelines that convey water from the production points to the irrigation areas or the water reservoirs of the Municipal and Communal Water Boards.

**6.2** The total potable water production in 2014 reached 77MCM, relative to 75MCM in 2013. The production of the Water Treatment Plants reached, 44.1MCM, in relation to 50.2MCM produced in 2013. The reduction in production was caused by a damage on the conveyance pipeline from the

Kornos Water Treatment Plant to Nicosia, that resulted in the suspension of the operation of Kornos Water Treatment Plant until the replacement of the defected pipeline. Arrangements were made so that all the consumers that were served by this pipeline to be served by the Tersefanou – Nicosia pipeline and the total water supply was covered by the Tersefanou Water Treatment Plant and the Dekelia and Vasilikos Desalination Units. The Chirokitia Water Treatment Plant ceased operation by the end of March 2014, due to low water reserves in the supply dams. In April 2014 the Action Plan of the WDD Water Treatment Plants was implemented to monitor the water quality from source (dams) to the final water treatment from the treatment units. In July 2014 the Klirou water treatment unit entered into operation and supplies potable water to Klirou Community and Tasos Markou army camp. The Tamasos refining unit entered into operation on October 2013 and supplies potable water to the Communities of Episkopio, Psimolofou, Pera Orinis and Kampia. Furthermore, all necessary measures are taken so that the mobile unit, for Arsenic removal from the Mammari Community borehole, is in operative condition, so as to be used when there is a need for additional water supply.

**6.3** During 2014 the management of the Desalination Plants, (Contract type BOOT), was continued for the three plants at Dekelia, Episkopi and Vasilikos. The total desalinated water production during 2014 was 32.8MCM in relation to 10.7MCM in 2013. The operation of the plants was in compliance with the requirements of the Contracts that allow the Department, to adjust the production of potable water based on the water reserves and the restrictions imposed by the economic crisis. It is also noted that, a Contract was awarded for the Larnaka's Desalination Unit renovation and its operation and maintenance for 25 years.

**6.4** During 2014, the total irrigation water supplied in areas irrigated by the Government Water Works reached 53mcm, of which 37.3MCM were obtained from dams, 6.5MCM from boreholes and 9.2MCM from tertiary treated recycled water.

**6.5** During 2014, the use of the computerized "Water Invoicing System" (WIS) program continued successfully through the online services of JCC smart. It was used for billing domestic and irrigation water supplied from the Government Water Projects (GWP). There was also monitoring of collection of the accounts in accordance with the applicable Law.

**6.6** During 2014, the collection of arrears for both domestic supply and irrigation purposes water from the Government works continued. Judicial procedures against debtors continued in collaboration with the Justice department of the Republic. Legal action has been taken to recover the cost due to the disposal of industrial waste in the Wastewater Treatment Plant of Vathia Gonia.

**6.7** During the year, WDD continued to manage with the problems of the individual Irrigation Divisions, in accordance with the State Aid Regulations.

**6.8** The evaluation of applications for planning permission for golf coursed regarding the water supply of these developments, as per the new decisions

of the Council of Ministers (dated 28/8/13 and 13/2/2014) as well as the evaluation of other water management issues within the jurisdiction of the Department. In this context the Department has also dealt with the assessment of environmental impact assessment reports.

**6.9** The Department was also responsible for the preparation of the water allocation scenarios, as well as for the implementation of these scenarios and the related irrigation water supply restrictions.

Daily water balance of all dams and daily reports for storage, inflow, releases and losses were prepared and distributed and also published on the WDD's website.

**6.10** The maintenance of the Southern Conveyor pipeline continued and inspections carried out of the various structures and equipment of the project to ensure its proper operation and safety.

## **7. MANAGEMENT OF INFORMATION TECHNOLOGY AND TRAINING**

**7.1** To ensure the continuous education of personnel within the Department, 8 courses were organised with 150 participants. The educational programmes and lectures mainly addressed Legislative and Communication issues.

**7.2** The monitoring of the Southern Conveyor Project was carried out through the use of the existing Telemetry System, which provides a continuous and overall view of the operation of Major Water Works and provides the capability to undertake any necessary repair actions.

**7.3** The WDD hardware & software infrastructure includes over 500 network connected devices, such as personal computers, printers, scanners and other network peripherals. The entire engineering personnel and almost all of the technical and clerical staff have access to the internal network files of common use, as well as to the Internet and email services.

**7.4** Technical support of hardware and software systems was provided on a daily basis throughout the offices of the Department.

**7.5** The WDD website is updated on a daily basis. The website includes information on water resources, environmental laws and studies, the Water Framework Directive 2000/60/EC, the Floods Directive 2007/60/EK and other informational material. Communication with the department is made available to the public via email. According to data from the Department of Information Technology Services, approximately 11.000 individuals visit the website every month.

**7.6** Upon the completion of the 1<sup>st</sup> Phase of the project "Introduction / Supply / Customisation / Development and Operation of an integrated Geographic Information System (GIS)" the Department proceeded, in October 2014, with the implementation of the 2<sup>nd</sup> Phase of the project "Implementation of a

Maintenance Management System (MMS)". The project will contribute greatly to the efficient operation and maintenance of the Departments assets and will have a significant positive impact on the proper and comprehensive maintenance of all assets. The infrastructure available from the first phase of the project (and in particular the Network Management subsystem) will provide the basis for the introduction of the MMS. The system will cater for the unique and specific requirements of maintaining the Departments assets and address the particular maintenance requirements of different network elements such as routine (cleaning), preventive (service), reactive (fixing leaks, repairs, replacements) and proactive (relining, rehabilitation, replacements) maintenance.

**7.7** Furthermore, in 2014 the "Implementation of an Integrated Quality Management System (IQMS) to incorporate interoperability between the existing Laboratory Information Management System (LIMS) and Geographical Information Systems (GIS)" project was launched. This project aims towards the advancement of network (water, sewage, recycled water) water quality measurements through the association, communication and interoperability between GIS and LIMS software. This subsystem is an integral part of an integrated Geographic Information System (GIS) owned by WDD, which facilitates and thus enhances the operation, management and maintenance of the Departments water distribution network.

**7.8** Additionally, within 2014 digitisation and data capturing of WDD assets proceeded in accordance with the digitisation plan. Data capturing focused on the digitisation of the Main Conveyors (Water Supply, Irrigation & Recycled Water) along with distribution networks under WDD responsibility.

**7.9** Interdepartmental training in the use and maintenance of the WDD hydrological and hydrogeological database, CYMOS, for both Basic Users and Power Users continued as part of the Department's efforts to decentralize WDD work.

## **8. DEVELOPING WATER SAVING AWARENESS**

**8.1** In the context of intensifying efforts for the creation of water saving awareness among the public, during 2014 the WDD organised and participated in the following events:

a) The annual event at the headquarters of the Department within the framework of the World Water Day with the theme "water...drops of life" in collaboration with the Primary Education of the Ministry of Education and Culture.

b) Event in an Elementary School for the World Water Day.

c) Cooperation with other Organisations, participation in Festivals organized by primary schools, Municipalities, environmental organizations, radio stations, etc.

d) Award event competition writing results story award in cooperation with the Water Boards and the Primary Education of the Ministry of Education and culture, with the theme "Creative with water" on cultivating water consciousness.

e) Lectures to organized groups.

f) Preparation of informative articles from WDD officers for the AGROTIS Magazine, radio and television, as well as in the daily press.

**8.2** In addition, WDD participated in exhibitions and other events, concerning water saving.

## **9. SAFEGUARDING QUALITY**

**9.1.** During 2014 the process for the accreditation of WDD laboratories (Tersefanou and Limassol) was completed. The process of the final evaluation of the Laboratories by the Cyprus Organization for Standardization CYS-CYSAB was successfully completed and its results are expected in April 2015.

### **Quality monitoring of drinking water**

**9.2.** During 2014, more than 17.119 physicochemical tests were carried out on 2.458 water samples and more than 6.,240 bacteriological tests on 1.560 water samples. The chemical and bacteriological tests were performed for the following Water Quality Monitoring Programmes:

- Desalination Plants of Dhekelia, Vasilikos EAC and Episkopi in accordance with the terms of the respective contracts.
- Cyprus Potable Water Network according to Cyprus Law 87(I)/2001 for the quality of water used for human consumption.
- Water Treatment Plants of Tersefanou, Kornou, Chirokoitias, Lemesou, Kannaviou and Asprokremmou according to Cyprus Law 87(I)/2001 for the quality of water used for human consumption.
- Water-Treatment Plants of Tamasou and Klirou according to Cyprus Law 87(I)/2001 for the quality of water used for human consumption.
- Community Boreholes and Springs of Nicosia, Limassol, Larnaca, Famagusta and Paphos District according to Cyprus Law 87(I)/2001 for the quality of water used for human consumption.
- Ezousas Aquifer enrichment program according to Water Framework Directive 2000/60/EC.

- Polis Chrysochous and Paphos underwater chloride salts monitoring program.
- Minor Dams, according to Water Framework Directive 2000/60/EC.
- Major Springs of Nicosia district, according to Water Framework Directive 2000/60/EC.

In order to improve the water quality, two new control methods were introduced:

- Tersefanou laboratory applied the method for measuring manganese with the technique of emission spectrometry (ICP-OES).
- Limassol laboratory applied the method for detecting microcystins with a Neogen reader device, 321 plus. During 2014, more than 200 tests were carried out.

### **Monitoring of recycled treated wastewater quality**

**9.3** The collection of samples for Chemical and microbiological analyses continued, toxicity tests and metal ion analyses of samples from 33 Wastewater Treatment Plants, and from the Wastewater Treatment Plants of Sewerage Boards of Nicosia, Larnaca, Limassol, Paphos and Paralimni - Ayia Napa. Of 473 samples, 4093 parameters were analyzed.

**9.4** Sample taking for chemical and microbiological water tests took place at the Polemidhia and Athalassa Dams, before, during and after the period recycled water was discharged in them.

### **Safety and Health**

**9.5** In 2014, the Safety and Health Support Sector, applied the legislation on health and safety at work laws N33 (1) 1996-2011 for staff and third parties. Among others, the Sector conducted inspections in all the sites, facilities and premises of the Department and prepared reports. Furthermore, it coordinated 10 Safety Committees and organised courses on first aid and the use of a defibrillator, by an approved trainer and has provided for the training of personnel on health and safety issues. The Sector was also involved in the preparation of relevant specifications and contracts and provided the staff with all necessary personal protective equipment (PPE).

### **Internal Auditing**

**9.6** In 2014 due to Staff reduction, the Internal Auditing was not activated.

GOVERNMENT WATER WORKS 2014

TABLE 9

WATER WORKS-DAMS		Capacity M.C.M	Storage 01-01-14	Inflow 1/1-31/12/14	Water used 2014 M.C.M			
					Domestic	Irrigation	Recharge	Total
<b>1</b>	<b><u>SOUTHERN CONVEYOR PROJECT</u></b>							
1.1	<b><u>DAMS</u></b>							
	(i) Kouris	115,000	60,697	3,641	24,923	18,660		43,583
	(ii) Kalavassos	17,100	3,399	0,206	0,662	1,326		1,988
	(iii) Lefkara	13,850	3,543	0,139	1,235	0,161		1,396
	(iv) Dipotamos	15,500	3,825	0,332	0,473	0,428		0,901
	(v) Germasogeia	13,500	7,060	0,722	5,011	0,666		5,677
	(vi) Polemidia	3,400	0,822	0,155		0,499		0,499
	(vii) Arminou	4,300	1,807	3,981			2,900	2,900
	(viii) Achna	6,800	1,688	0,000		0,522		0,522
	<b>Total from Dams S.C.P.</b>	<b>189,450</b>	<b>82,841</b>	<b>9,176</b>	<b>32,304</b>	<b>22,262</b>	<b>2,900</b>	<b>57,466</b>
1.2	Nicosia Boreholes-Domestic use							0,000
1.3	Germasogeia Boreholes-Domestic use				0,401			0,401
1.4	Kouris Delta Boreholes-Domestic use				2,287			2,287
1.5	Krasochria boreholes-Domestic use							0,000
1.6	Limassol Boreholes- Irrigation					2,645		2,645
1.7	Vasilikos Desalination				11,937			11,937
1.8	Dekelia Desalination				15,351			15,351
1.9	Episkopi Desalination				5,510			5,510
1,10	Recycle Water East and West of Limassol					5,053		5,053
	<b>Total Southern Conveyor Project</b>				<b>67,790</b>	<b>29,960</b>	<b>2,900</b>	<b>100,650</b>
<b>2</b>	<b><u>PAFOS PROJECT</u></b>							
2.1	<b><u>DAMS</u></b>							
	(i) Asprokremmos	52,375	43,369	1,076	7,010	6,670		13,680
	(ii) Kannaviou-Anarita water treatment plan	17,168	11,339	0,994	0,990	0,148		1,138
	(iii) Kannaviou-Kannaviou water treat.plan				1,322			1,322
	(iv) Mavrokolymbos	2,180	1,036	0,181		1,441		1,441
	<b>Total from Dams</b>	<b>71,723</b>	<b>55,744</b>	<b>2,251</b>	<b>9,322</b>	<b>8,259</b>	<b>0,000</b>	<b>17,581</b>
2.2	Boreholes & Diversions-Domestic WBP				1,579			1,579
2.3	Boreholes-Diarizos				0,523			0,523
2.4	Boreholes-High Areas				0,494			0,494
2.5	Boreholes-Ezousa and Recycle					3,874		3,874
2.6	Pafos Desalination							0,000
	<b>TOTAL PAFOS</b>				<b>11,918</b>	<b>12,133</b>	<b>0,000</b>	<b>24,051</b>
<b>3</b>	<b><u>CHRYSOCHOU PROJECT</u></b>							
3.1	<b><u>DAMS</u></b>							
	(i) Evretou	24,000	17,589	0,482		5,455		5,455
	(ii) Pomos	0,860	0,255	0,155		0,366		0,366
	(iii) Agia Marina	0,298	1,688	0,090		0,002		0,002
	(iv) Argaka	0,990	0,190	0,125		0,206		0,206
	<b>Total from Dams</b>	<b>26,148</b>	<b>19,722</b>	<b>0,852</b>	<b>0,000</b>	<b>6,029</b>	<b>0,000</b>	<b>6,029</b>
3.2	Boreholes -Irrigation							0,000
	<b>TOTAL CHRYSOCHOU</b>				<b>0,000</b>	<b>6,029</b>	<b>0,000</b>	<b>6,029</b>
<b>4</b>	<b><u>Nicosia District</u></b>							
4.1	<b><u>DAMS</u></b>							
	Xyliatos	1,430	0,601	0,125		0,350		0,350
	Vizakia	1,690	0,791	0,004		0,247		0,247
	Kalopanayiotis	0,363	0,363	0,525		0,169		0,169
	Lymbia	0,220				0,007		0,007
	<b>Total from Dams</b>	<b>3,703</b>	<b>1,755</b>	<b>0,654</b>	<b>0,000</b>	<b>0,773</b>	<b>0,000</b>	<b>0,773</b>
4.2	Recycle Water-Vathia Gonia					2,192		
4.3	Recycle Water-Anthoupoli					0,664		
<b>5</b>	Recycle Water-Larnaca					1,304		
	<b><u>SOURCES - TOTALS</u></b>	<b>291,024</b>	<b>160,062</b>	<b>12,933</b>				
	<b><u>DAMS</u></b>				<b>41,626</b>	<b>37,323</b>	<b>2,900</b>	<b>81,849</b>
	<b><u>BORHOLES</u></b>				<b>5,284</b>	<b>6,519</b>		<b>11,803</b>
	<b><u>DISALINATION</u></b>				<b>32,798</b>			<b>32,798</b>
	<b><u>RECYCLE WATER</u></b>					<b>9,213</b>		<b>9,213</b>
	<b>TOTALS</b>	<b>291,024</b>	<b>160,062</b>	<b>12,933</b>	<b>79,708</b>	<b>53,055</b>	<b>2,900</b>	<b>135,663</b>

NOTE: From Germasogeia boreholes 5,011 mcm used for domestic, while the recharged from Germasogeia dam was 5,412 mcm.  
Water transferred from Kouris dam to Achna dam 0.201 mcm and from Arminou dam to Kouris dam 0,863 mcm