



City Drainage

*City drainage and
rainwater husbandry*



Drainage planning

Environmental protection serves the protection and retention of natural habitats. During this process, waterways pollution in city areas due to sewage systems and sewage treatment works is often in the public eye.

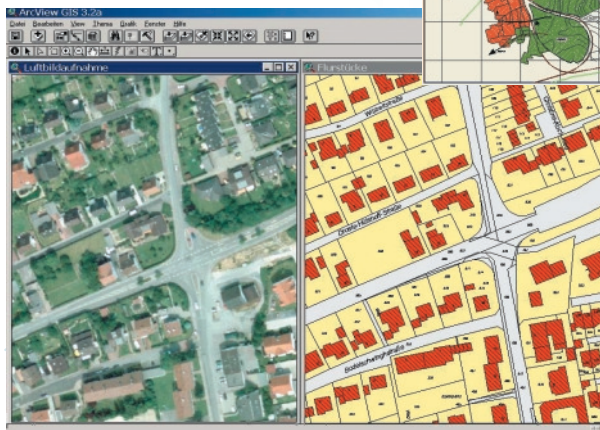
The aim is to prevent the introduction of unpolluted rainwater runoff into the waste water drainage network and to decrease the introduction of polluted rainwater runoff into waterways.

The task of drainage systems is to retain hygienic conditions in residential areas through the discharge of wastewater and the prevention of damage due to flooding during rainstorms. An additional task is limiting the discharge caused by rainfall into waterways out of combined drainage systems.

With the help of hydro-dynamic drainage network calculations and pollution load simulations, the multifarious interactions between drainage networks, sewage treatment works and waterways can be represented. The result is the presentation of a validated drainage concept for the necessary design and construction measures.

DAR engineers consistently work with the newest simulation programs.

- hydro-dynamic drainage network calculations
- pollution load simulations
- general drainage plans
- drainage provision plans
- rainwater treatment concepts



Rainwater husbandry

Previously, discharge of rainwater runoff as quickly and completely as possible was at the foreground of design thinking. Nowadays, water provision aims include the semi-natural handling of rain runoff which is to be kept separate from drainage systems when it is not carrying pollutants.

This is achieved in particular by measures for centralised retention and seepage in addition to delayed open discharge of rainwater runoff containing low pollution levels.



The following systems are implemented during the preparation of measures for rainwater husbandry by DAR's engineers depending on local conditions:

- area unsealing
- open discharge systems
- decentralised seepage ponds
- pond infiltration ditch systems
- retention and seepage systems

Drainage network husbandry

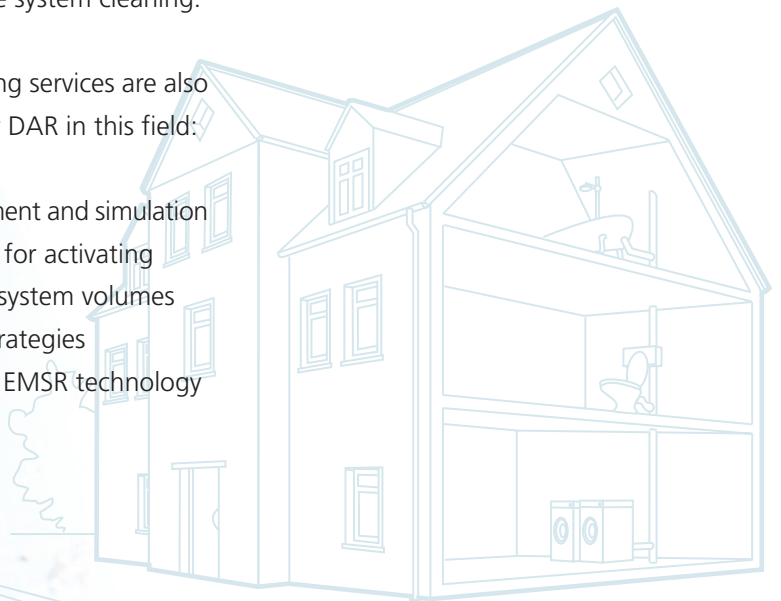
A large number of measuring devices are installed in the drainage system to monitor the function of all equipment included in the drainage network. This is an investment which pays off in the long-term, because control of the drainage network lowers the discharge freight in waterways and simultaneously increases flooding security.

Further benefits are achieved through the use of technical installations for retaining drainage water in order to activate additional drainage network storage volumes. Economic benefits inevitably result from volume savings in the rainwater retention basins required. In addition, such measures can create specific rinsing waves for drainage system cleaning.



The following services are also provided by DAR in this field:

- measurement and simulation
- measures for activating drainage system volumes
- control strategies
- design of EMSR technology



Rainwater treatment

In combined systems, rainwater runoff requiring treatment is discharged together with wastewater. Relief and storage structures are located in the drainage network to limit discharge to sewage treatment plants for both technical and economic reasons. The aim of combined water treatment

works is to minimise waterway pollution caused by rainwater runoff and to ensure that sewage treatment works efficiency is retained during storm water discharge.

Treatment works are also used in separated systems for the reduction of pollution loading in rainwater runoff. This is intended to facilitate later discharge seepage or to reduce pollutant introduction to waterways. Planted ground filter units are suitable in these cases.

Our range of services for design and implementation includes:

- rainwater overflow basins
- rainwater retention basins
- rainwater clarifiers
- ground filter units



DAR
Deutsche Abwasser-Reinigungs-Gesellschaft mbH
Ingenieurbüro für Umweltfragen
German Environmental Consultants

Waste water purification and sludge treatment

- Sewage treatment plants for cities, local authorities and industry with high purification performance
- Suspended solids removal
- Sludge treatment and dewatering

City drainage and rainwater husbandry

- Drainage planning
- Rainwater husbandry
- Drainage network husbandry
- Rainwater treatment

Drainage restoration

- Condition reports
- Drainage information systems
- Condition evaluation
- Defect repairs

Project management

- Organisation and coordination
- Quality control
- Framework scheduling
- Cost monitoring
- Technical controlling

Operational supervision

- Operation monitoring
- Equipment optimisation
- Breakdown strategies
- Training

Occupational safety

- Operation and instruction instructions
- Alarm and hazard defence plans
- Explosion protection zones and fire services plans
- Hazardous goods directory
- Hazard evaluation
- Health and safety coordination

Infrastructure measures

- Development
- Traffic and road planning
- Noise prevention measures
- Outdoor facilities/park areas

Water supply

- Reclamation
- Treatment
- Storage
- Distribution

Hydraulic engineering

- Retention measures
- Flood control
- Digital dyke logs
- Semi-natural waterway construction

Technical equipment

- Mechanical engineering
- Process engineering
- Instrumentation, drive and control engineering
- Works and erection planning

Analysis

- Water and waste water investigations
- Outside water surveys
- Wastewater land registry
- Oxygen enrichment experiments
- Expert reports



Wiesbaden office
Adolfsallee 27/29
65185 Wiesbaden
Germany

Telefon: +49/611/3 60 96-0
Telefax: +49/611/3 60 96-12
E-Mail: wiesbaden@dar.de

Berlin office
Reichsstraße 12
14052 Berlin
Germany

Telefon: +49/30/ 8 90 44-0
Telefax: +49/30/8 90 44-14
E-Mail: berlin@dar.de


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Zertifiziertes Managementsystem
nach DIN EN ISO 9001:2000

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