

INGENIEURBÜRO LOPP

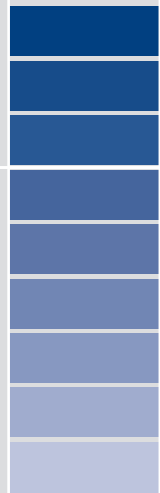
Sewage disposal

Sewage discharge

Sewage treatment

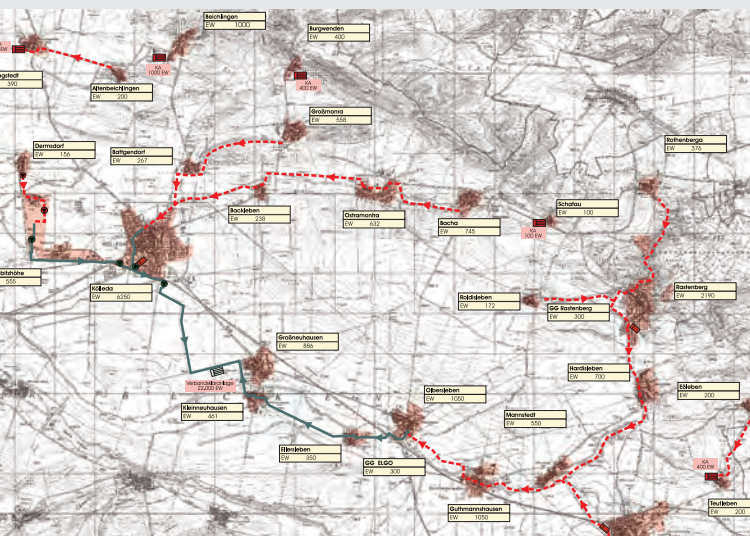
Sludge treatment

Special structures



Sewage discharge

Drainage projects



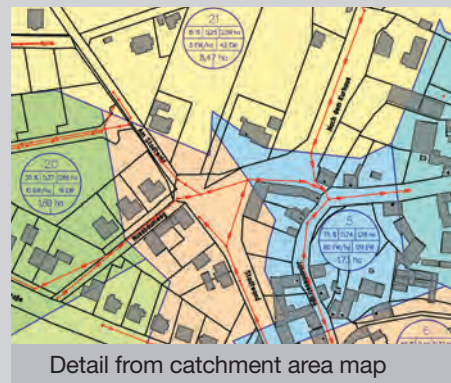
General drainage scheme for FINNE Sewage Association

- 17.5 km pressure pipes, DN 80 – 300
- 29.1 km connecting collectors DN 200 – 500
- 14 sewage pumping stations, 6 – 187 l/s
- Stormwater overflow and retention basins, 50 – 5,000 m³
- Central Waste Water Treatment Plant (WWTP) for 32,000 inhabitants (final capacity)
- 6 individual WWTPs, 150 – 1,200 PE (population equivalents)



Local drainage strategy for the town of Rastenberg with comparison of different options

- Selection of drainage system: mixed or separate (including modifications)
- Deciding the rehabilitation steps
- Hydraulic sewer calculation



Detail from catchment area map

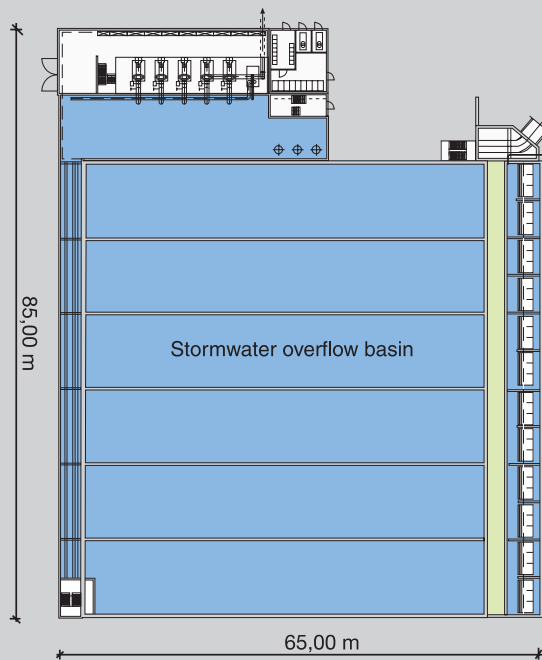


Design – tendering – quality control

- Strategies for sustainable and economical solutions
- Health and safety coordination
- Cost controlling
- Quality control

Special structures

Stormwater overflow basin at Dresden-Kaditz Waste Water Treatment Plant



Pumping station at the stormwater overflow basin in Dresden-Kaditz

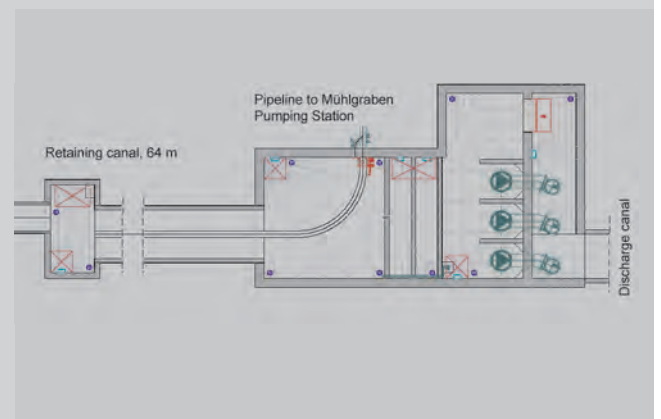
- 24,000 m³ capacity
- 9 m³/s pumping station (maximum flow)
- 6 chambers
- Photovoltaic plant: 190 kWp installed capacity

Kölleda stormwater retention basin



- 60 ha impermeable area
- 5,000 m³ capacity
- 40 m long
- 35 m wide
- 8 m deep

Kölleda retaining canal



- 16.90 ha impermeable area
- 536 m³ retaining volume
- DN 2200
- 64 m long

Waste Water Treatment Plants

Sewage treatment in Germany



Grossneuhausen Association WWTP

Capacity: 32,000 PE
Cost: € 6.7 million
Planning/construction: 1993 – 1996

- Aeration basin
Diameter: 33 m
- Secondary sedimentation basin
Diameter: 18 m
- Mobile sludge dewatering
- Simultaneous sludge stabilisation



Bad Frankenhausen WWTP

Capacity: 13,000 PE
Cost: € 4.1 million
Planning/construction: 1997 – 2000

- 2 combined basins
(aeration and secondary sedimentation)
Diameter: 33 m
- Dewatering centrifuge
- Simultaneous sludge stabilisation



Weissensee WWTP

Capacity: 12,000 PE
Cost: € 5.3 million
Planning/construction: 1991 – 1994

- 2 aeration basins
Total volume: 3,844 m³
- 2 secondary sedimentation basins
- Simultaneous sludge stabilisation
- Filter press 30 – 40 % DS

Sewage treatment abroad



Site map

Izmir Güzelbahçe WWTP (Turkey)

Capacity: 108,000 PE
Cost: € 11 million
Tender Design: 2001 – 2002

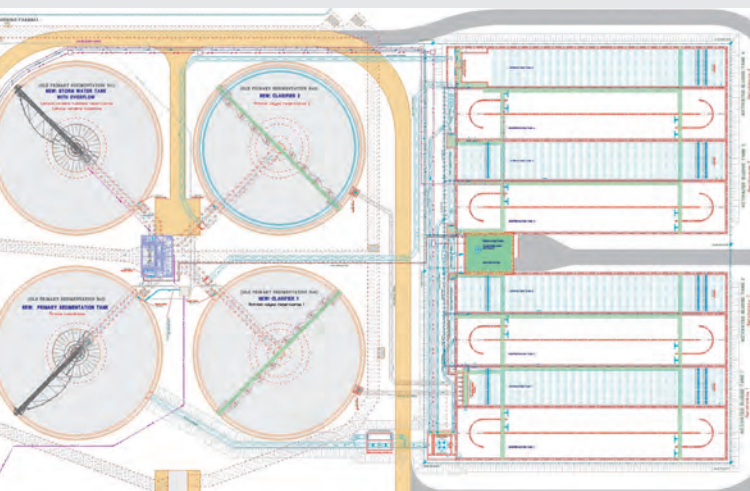
- New plant
- 3-stage cascade denitrification
- Aeration basin: 31 x 62 m
- Rectangular secondary sedimentation basin: 18 m x 30 m with lamellar separators



Azov WWTP (Russia)

Capacity: 130,000 PE
Cost: € 17 million
Conceptual planning: 2005 – 2006

- Complete rehabilitation of mechanical-biological sewage treatment
- Addition of anaerobic sludge stabilisation and biogas recycling



Kaunas WWTP (Lithuania)

Capacity: 560,000 PE
Cost: € 16 million
Tender Design: 2003

- New biological purification stage (63,000 m³, 4 aeration basins each 90 m x 30 m x 6.5 m)
- Expansion of sludge treatment
- Rehabilitation of mechanical sewage treatment and sludge dewatering

Waste Water Treatment Plants

Sludge treatment

Study on reducing sewage sludge

Jena Central WWTP

The following methods of reducing sewage sludge at Jena Central WWTP were assessed:

1. Modifying the sewage treatment operation
2. Disintegration of excess sludge (disintegration of part flow)
3. Solar and low-temperature (partial) drying of dewatered sludge
4. Aerobic-anoxic post-treatment of digested sludge
5. Removing excess sludge from the digestion process



Effects of modifying sewage treatment on sludge treatment

	Sludge handling	Volume to be thickened	Degree of degradation caused by digestion	Solid matter accumulating
Reducing the sludge index	++	++	0	0
Minimising the foam fraction	+	+	+	+
Minimising precipitant	0	+	0	+
Reducing solid matter in aeration basin	0	+	+	0
High age of sludge	0	+	-	0

Study on the exploitation of sewage sludge

Study on the joint thermal exploitation of sewage sludge in Thuringia

The sewage associations JenaWasser, Orla (Pössneck) and Saale-Rudolstadt as well as Weimar Sewage Utility are currently disposing dewatered sewage sludge from their nine WWTPs in composting systems for usage in agriculture and/or landscaping. However, this method of disposal is becoming increasingly limited.

In a feasibility study designed to explore the estimated costs of thermal exploitation at the central sewage plant in Jena-Zwätzen, a number of different methods were compared and examined regarding licensability.

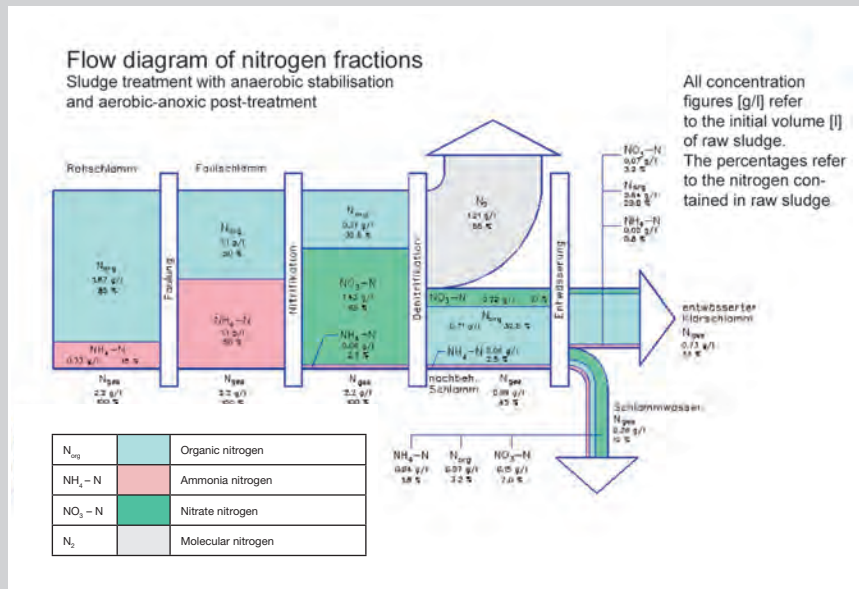
Association	Dewatered sewage sludge [to/a]
JenaWasser Association	13,000
Weimar Sewage Utility	7,400
Saalfeld-Rudolstadt Association	7,100
Orla Sewage Association	2,800
Summe	30,300



Research

Using aerobic-anoxic post-treatment to improve the material characteristics of sewage sludge

Under suitable processing conditions, the aerobic-anoxic post-treatment of digested sludge reduces the level of both solids and nitrogen. Moreover, it improves degradation, which apart from improving dewatering characteristics also enables the digestion period to be shortened, cutting the operating costs of the sewage plant.



Energy optimisation

Sewage sludge treatment and incineration plants are currently being investigated with a view to energy optimisation.

We are involved in intensive R&D regarding the disposal of sewage sludge. We regard decentralised sewage sludge incineration as extremely promising. As well as reducing the volume of sewage sludge, thermal treatment can be used to generate electrical and thermal energy.

By way of example, three different methods of sludge conditioning were examined and compared at Bottrop Central Sludge Treatment Plant:

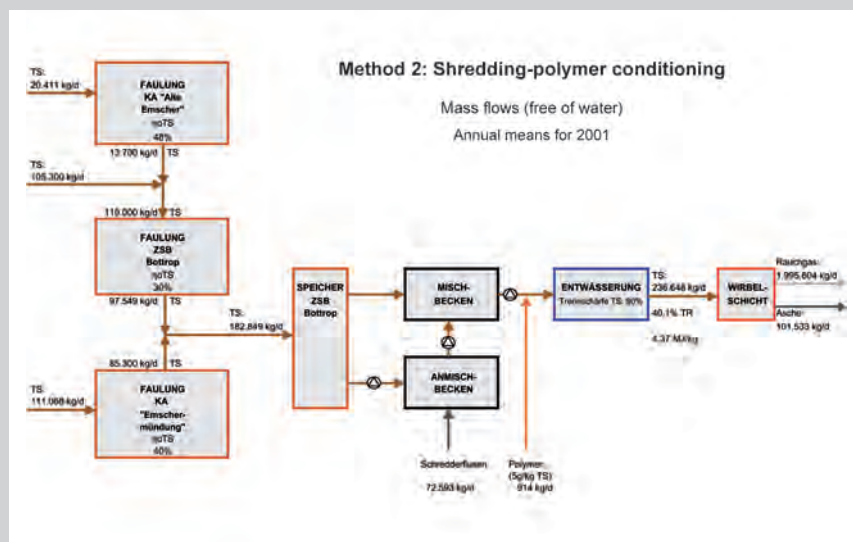
1. Charcoal-polymer conditioning • Dewatering using membrane filter presses • Fluidised bed mono incineration • Thermal power generation

2. Shredding-polymer conditioning • Dewatering using membrane filter presses • Fluidised bed mono incineration • Thermal power generation

3. Polymer conditioning • Dewatering using membrane filter presses and partial drying • Fluidised bed mono incineration • Thermal power generation

The study was carried out by a member of staff from LOPP in conjunction with the Departments of Domestic Water Industry and Processes & the Environment at Bauhaus University in Weimar.

Method 2 was found to result in the largest net amount of primary energy.



Reference projects

Sewage discharge

• Drainage systems

- Regional drainage systems
 - Finne Sewage Association, Sömmerda
 - Zemplin region (Slovakia)
 - Kindelbrück governmental community
 - Southern Ilm Valley Association

- Local drainage systems

<ul style="list-style-type: none"> – Artern – Bilzingsleben – Buttstädt – Ellersleben – Elsterberg 	<ul style="list-style-type: none"> – Großneuhausen – Kindelbrück – Kleinneuhausen – Kölleda – Kranichfeld 	<ul style="list-style-type: none"> – Olbersleben – Rastenberg – Weimar – Weißensee
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• Special structures

- Stormwater retention basins
 - Kölleda, DaimlerChrysler Industrial Estate
 - Kölleda, Kiebitzhöhe

- Retaining canals

<ul style="list-style-type: none"> – Kölleda – Elsterberg 	<ul style="list-style-type: none"> – Buttstädt – Kranichfeld 	<ul style="list-style-type: none"> – Weißensee – Rastenberg
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- Stormwater overflow basins

<ul style="list-style-type: none"> – Dresden – Kaditz – Bad Frankenhausen – Buttstädt 	<ul style="list-style-type: none"> – Kranichfeld – Kölleda – Elsterberg
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Waste Water Treatment Plants

• Sewage treatment

- Grossneuhausen Association WWTP
- Bad Frankenhausen WWTP
- Weissensee WWTP
- Kindelbrück WWTP
- Sewage filtration at Friedrichshafen WWTP (detailed design)
- Izmir Güzelbahce WWTP (Turkey)

• Sludge treatment

- Jena Central WWTP
- Weimar WWTP
- Arnstadt Association WWTP
- Central WWTP St. Augustin (detailed design)

INGENIEURBÜRO LOPP
 Planungsgesellschaft mbH
 Freiherr - vom - Stein - Allee 5
 D-99425 Weimar
 Germany

Fon: +49 - 3643 - 54 31-0
 Fax: +49 - 3643 - 54 31-50
 Email: weimar@lopp.de
 Internet: www.lopp.de

Branches:

D-04109 Leipzig
 Thomasiusstrasse 2
 Fon: +49 - 341 - 21 781-0
 Fax: +49 - 341 - 21 781-25
 leipzig@lopp.de

D-01067 Dresden
 Münzgasse 2
 Fon: +49 - 351 - 21 394-13
 Fax: +49 - 351 - 21 394-15
 dresden@lopp.de

Berlin
 Cottbus
 Halle