

WASTEWATER DEPARTMENT CITY OF MANNHEIM



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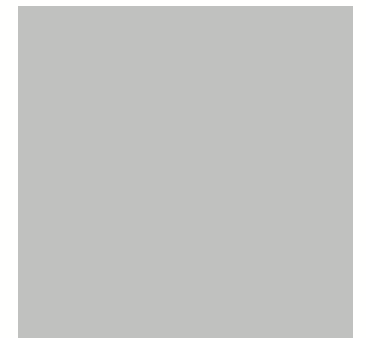
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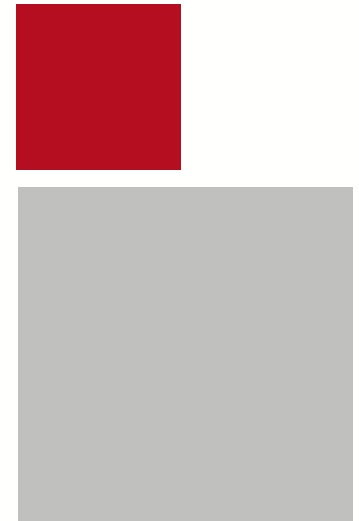
KEY DATES

Foundation	1997-01-01
Employees	240
Fixed assets	367 Mio. €
Investment	11,9 Mio. €
Quality and Environmental Management System Certified according to EN ISO 9001 / EN ISO 14001	since 2003-01

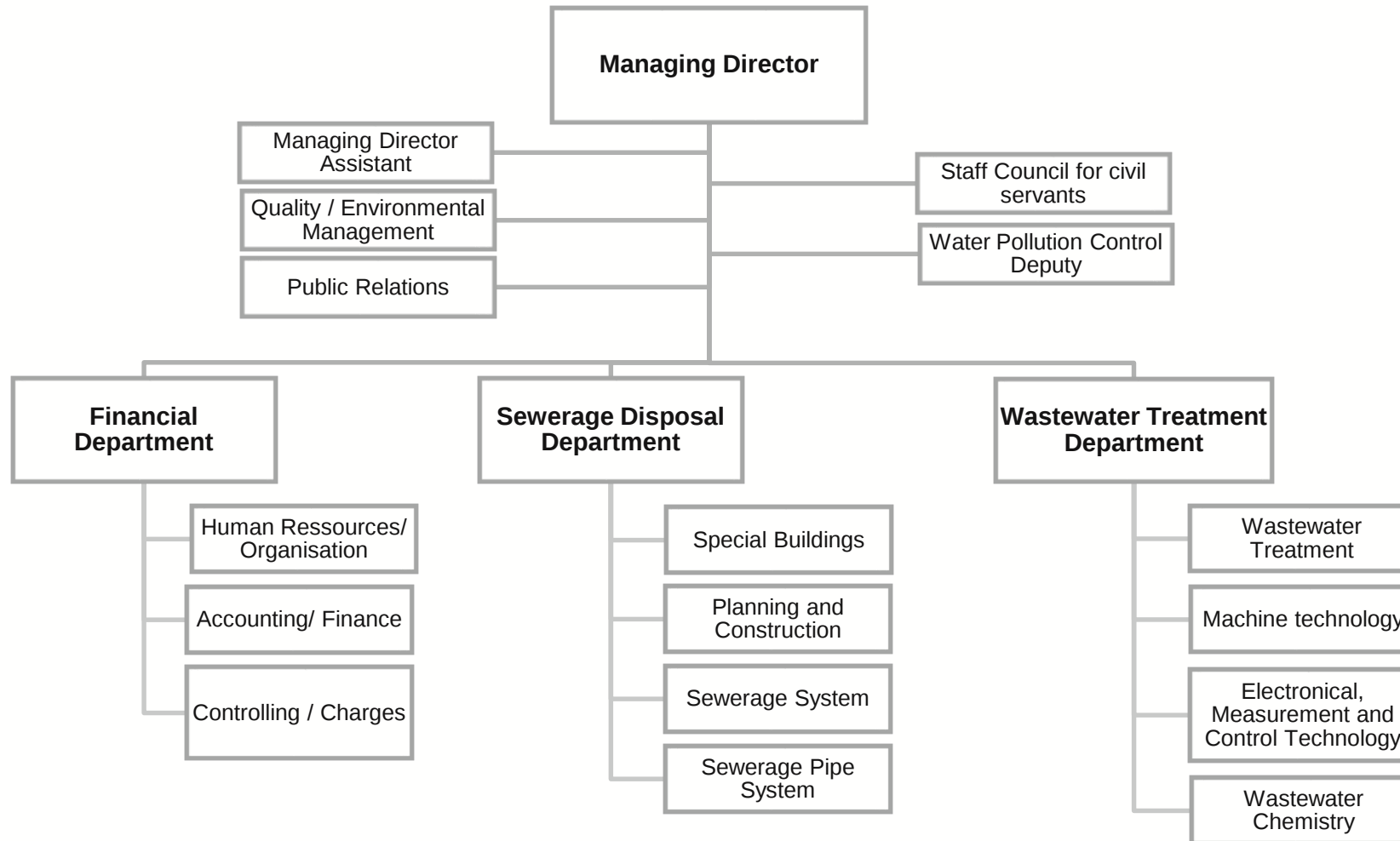


KEY DATES

Sewage treatment plant	725.000 population equivalents (design size) approx. 90.000 m ³ flow of wastewater per day
Sewage system	843 km (without house connection sewers) combined discharge 38 pumping stations 32 lifting equipments
Rain-/storm water treatment	8 overflow basins 8 storm water retention tanks 15 storage capacities of sewer 2 rainwater infiltration facilities
Retention volume in total	approx. 170.000 m ³



ORGANISATION

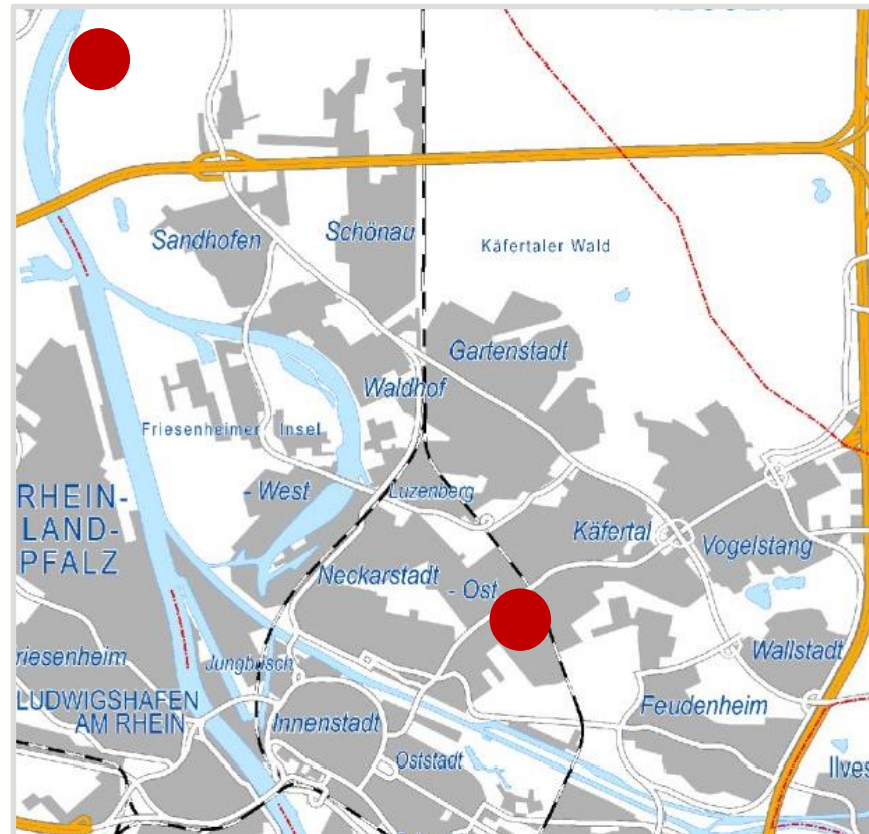


LOCATIONS AND EMPLOYEES

Wastewater treatment

154 employees

Karl-Imhoff-Straße 50
68307 Mannheim

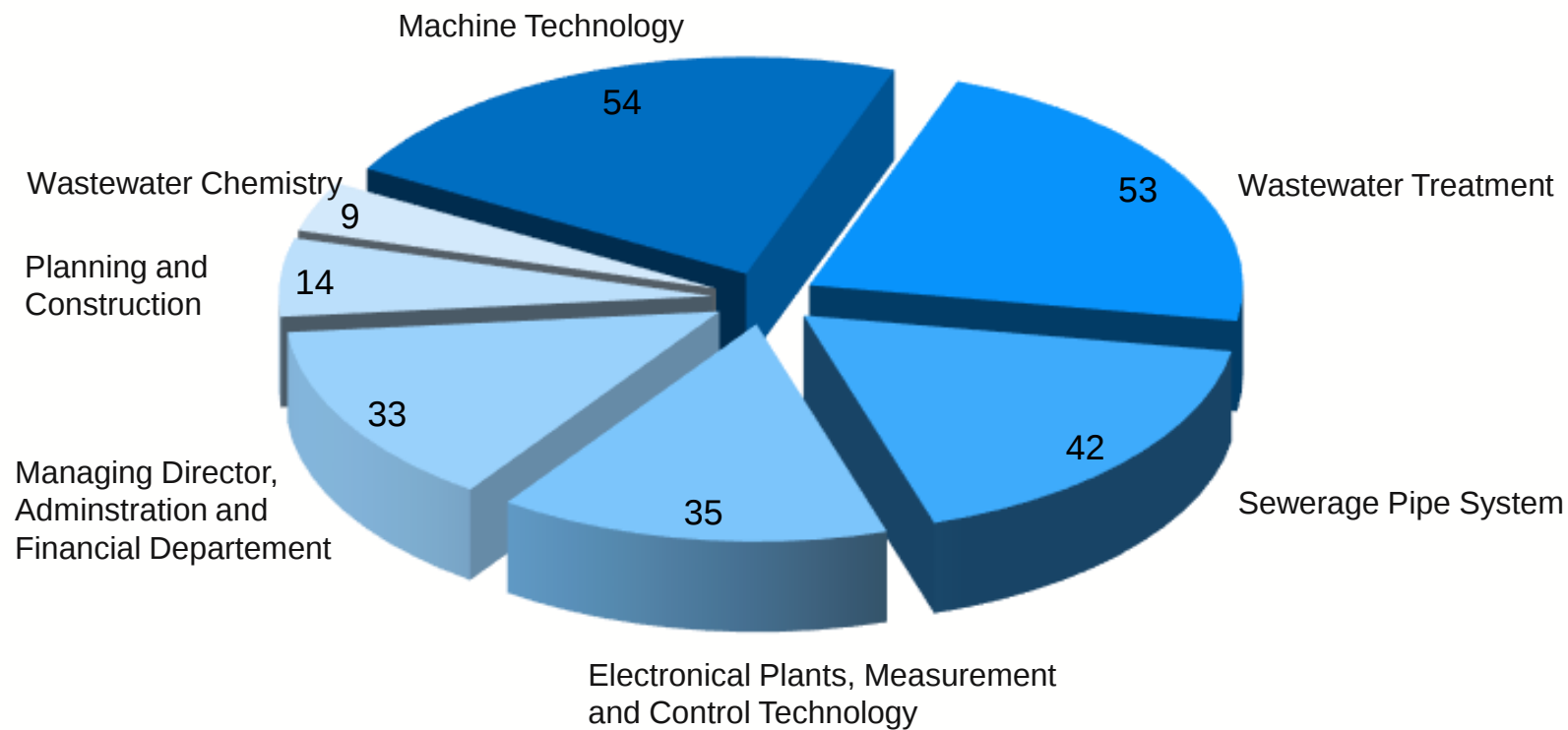


Sewerage disposal and administration

86 employees

Käfertaler Straße 265
68167 Mannheim

DISTRIBUTION OF STAFF



Employees in total: 240

WASTEWATER CHARGES AND EXPENSES

Sewage fees

Per cubic metre of delivered drinking water 1,68 €

Rain water fees

Per square metre and year of drained surface 0,81 €

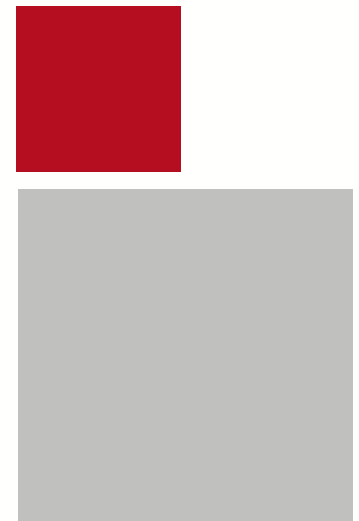
Income (Wastewater Charges) 61,2 Mio. €

Material costs 12,7 Mio. €

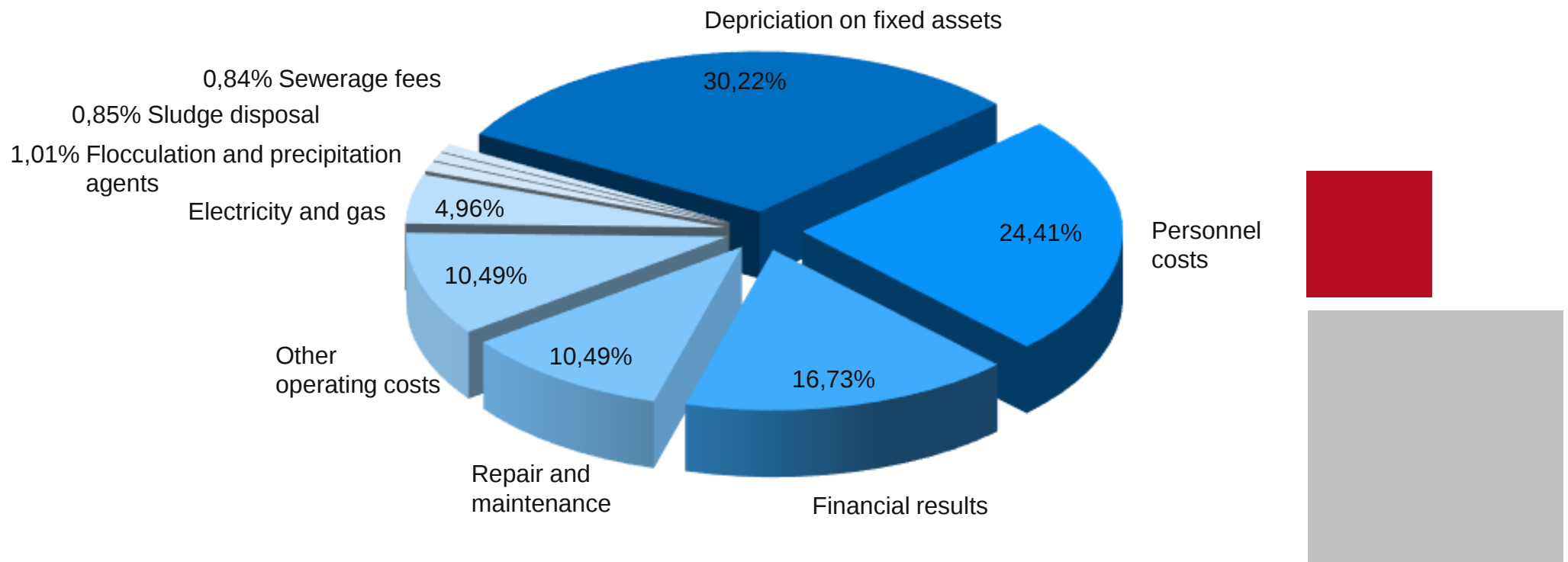
Personnel costs 15,0 Mio. €

Depreciations 18,6 Mio. €

Financial result 10,3 Mio. €



EXPENSE DISTRIBUTION



SEWERAGE DISPOSAL

Sewerage system length

843 km under the responsibility of EBS Mannheim

Year of sewerage system construction

Since 1876

Sewer section

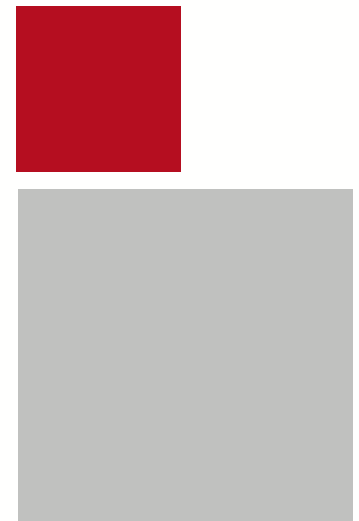
250 – 5.200 mm

Canalized area

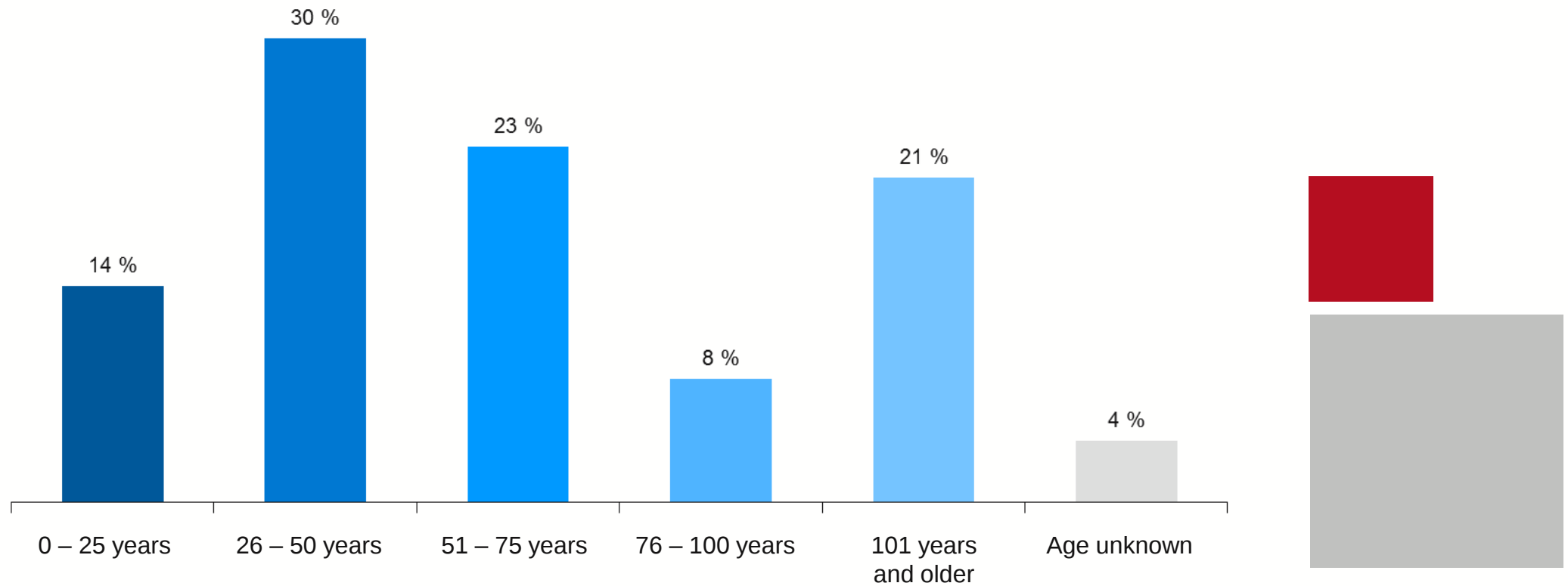
approx. 7.100 ha

Connection to sewerage system

99,9 %

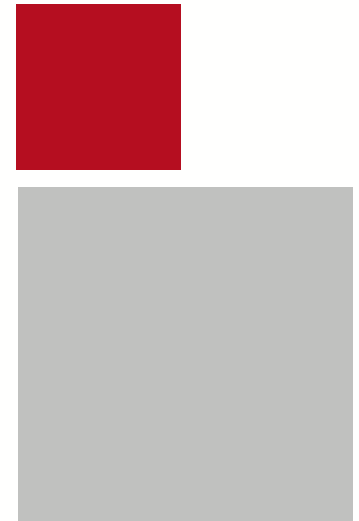


AGE STRUCTURE OF SEWERS



SEWERAGE SYSTEM INSPECTION

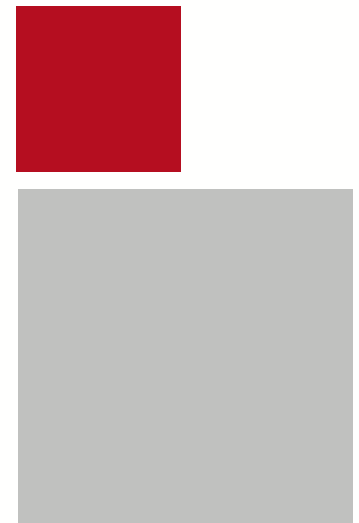
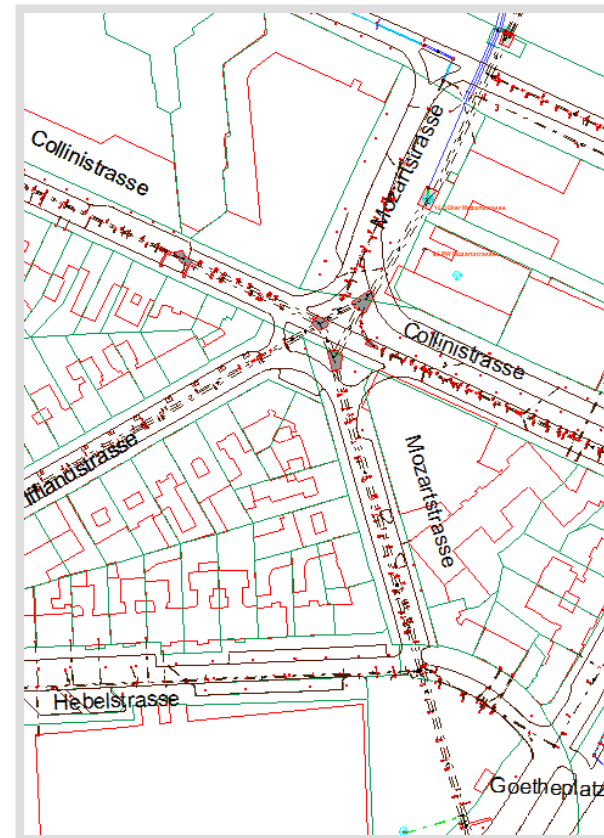
Digital based on TV examination (since 1986)	92,7 %
Analog based on walking through	7,3 %
Examination in total	100 %



SEWER DATABASE

Administration of the sewer inventory data for the whole urban area

- Survey data (channel geometry and topography)
- Data from the TV-Inspection – Gathering of the sewer conditions
- Gathering of the house connections (noozles)
- Special buildings
- Hydraulic performance of the sewer system
- Indirect discharge
- Data of the plants



RENOVATION AND CONSTRUCTION OF SEWER

Length in total of

repaired sewer:

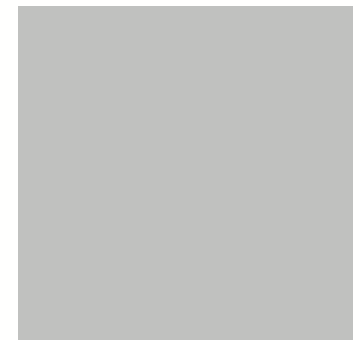
approx. 4,5 km

renovated sewer:

approx. 1,5 km

renewed sewer:

approx. 1 km



WASTEWATER TREATMENT PLANT

Operation

- 1973 Wastewater treatment plant
- 1986 Filtration
- 1999 New biological plant
- 2016 Fourth treatment stage (removal of pharmaceuticals, etc.)

Flow of wastewater at dry weather conditions per day: approx. 90.000 m³

725.000 population equivalents (design size), approx. 50% from the industry



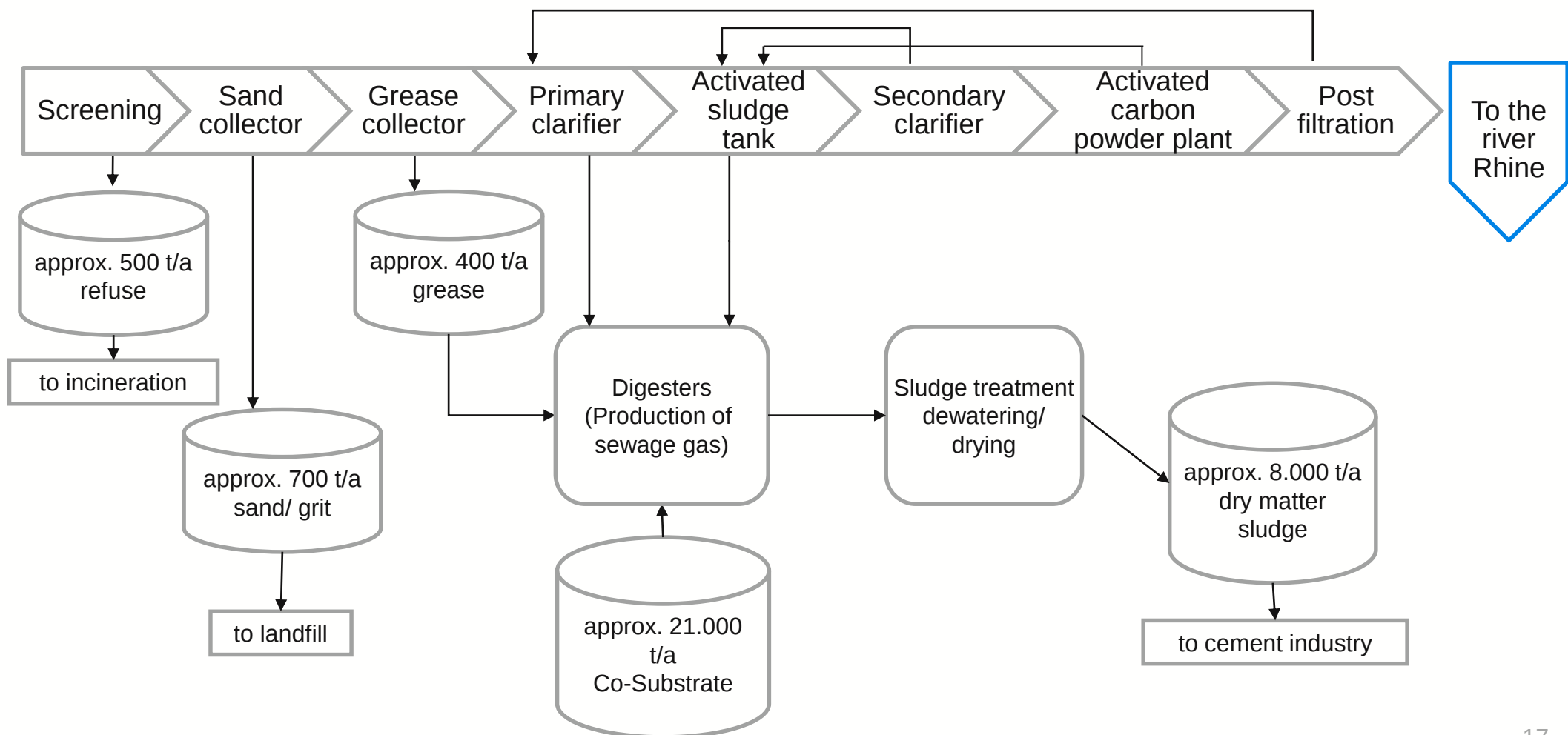
ENVIROMENTAL PERFORMANCE

		Raw waste water mg/l	Treated waste water mg/l	Effiency level %
Chemical oxygen demand	COD	781	22	97,2
Organic carbon in total	TOC	256	7,3	97,1
Nitrogen in total	N _{tot}	69	4,9	92,9
Phosphor in total	P _{tot}	9,7	0,1	98,9



MATERIAL BALANCE

Raw water: approx. 33 Mio. m³ flow of wastewater per year (approx. 90.000 m³ flow of wastewater per day)



RENEWABLE ENERGIES

Sludge treatment at the digesters

since 1973 Digesters

since 1996 Drying



To generate electricity and heat :

→ Co-generation plant

To generate heat :

→ Sludge drying

Photovoltaic and Waterpower

since 2007



To generate electricity:

→ Solarpanel on top of the filtration plant

→ Water wheel at the outlet to the rhine

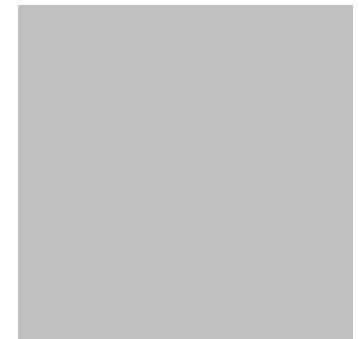
Supply of Co-Substrates

since 2012



To generate additional gas:

→ Co-Substrates will be supplying at the digesters in addition



Contact:
Stadtentwässerung Mannheim
Käfertaler Straße 265
68167 Mannheim
Phone: 0621 293-5210
Fax: 0621 293-5211
Mail: stadtentwaesserung@mannheim.de

