

# Main sewer

Contact grouting

## S.A.R. WASTEWATER EFFLUENT

RUEIL-MALMAISON - FRANCE



## Restoration of a main sewer by contact grouting



Zone 3

**A** monitoring survey of the SAR (the Sèvres - Achères-Rueil branch main sewer, 3.75m diameter) revealed evidence of substantial damage. Soletanche Bachy was contracted by SIAAP (the wastewater treatment authority for the Paris area) to carry out the contact grouting work to renovate the upstream part of the pipe. The work involved

CUSTOMER:	SIAAP
CONTRACTOR:	SIAAP
COMPANIES:	SOBEA-SADE-SOLETANCHE BACHY
DURATION OF WORKS:	OCTOBER 2008 - APRIL 2009

### MAIN QUANTITIES:

- 1,324m of structure grouted
- Over 8,000 drilling points
- 2,000m<sup>3</sup> grouted
- 1,500t of cement

some two kilometres of the structure, located in a residential district of Rueil-Malmaison, a Paris suburb.

**Method**

Contact grouting is carried out to fill the voids between the masonry and the soil (which in this case was either alluvia or Senonian chalk, depending on the zones). The grouting also produces a regeneration effect, through local treatment of the masonry and the soil in direct contact with the structure when there is high porosity. The grouting design was based on fans of 8 grout holes spread over 360° and at intervals of 1.25m, thereby producing a grid of 0.54 grout holes per square meter. The holes were drilled through the masonry, to a depth of about 60 to 70cm and the grout injected at low pressure in the "open holes". Grouting is carried out in two series of injections, if required, at 48 hours of interval. The acquisition and injection settings control system was driven by SPICE, Soletanche Bachy in-house developed software.

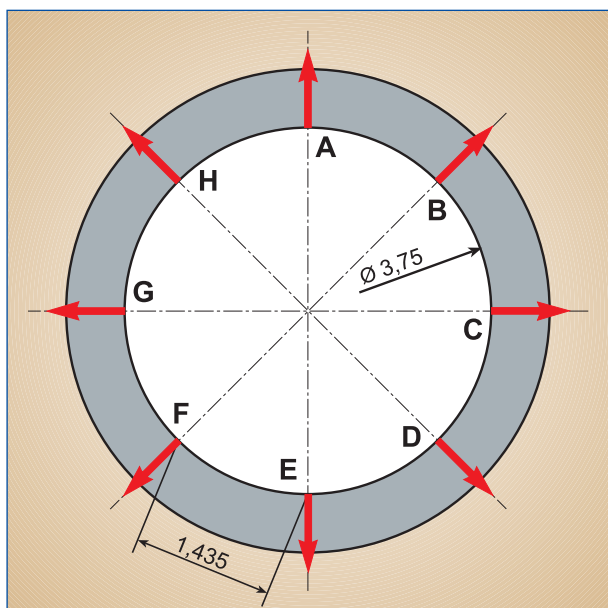


*The effluent channel is a confined space which meant additional protective material had to be worn, such as gas detectors and safety headphones to protect against the noise accentuation.*

**Work**

The injection work was carried out within the sewer, at a depth of 70m underground. The sewer was first emptied of all water, which meant deviating 320,000m<sup>3</sup> of wastewater and installing a duct within the SAR to carry the 20,000m<sup>3</sup> of wastewater which could not be deviated to the Achères plant. 8,000 grouting points, spread over 4 separate zones with a

total length of 1,324 metres, were drilled using pneumatic hammer drills. 3 work sites were needed for installing the grouting plants and the grouting pumps (soundproofed) as near as possible to the injection points, some of which, however, were over a kilometre from the pumps. This meant that a fluidifying agent had to be added to bring down grout viscosity and prevent blockage of the grout lines.



*Record coring. The grey areas are the grouted porous zones.*

*Contact grouting was carried out in fans of 8 grout holes spread over 360° and at intervals of 1.25m.*