



#### CONNECTIONS

Pipes are connected through pre-cast manholes installed along the pipeline.

These manholes are tailor-made to suit each configuration.

They are prepared and numbered in the factory before they are moved to site.



#### LIFTING STATION

The pipe is a gravity line and therefore may reach unwanted depths.

Lifting stations are built to raise the water into shallower manholes and then forwarded to the sewage treatment plant by gravity again.



#### DUCTILE IRON PIPES

Ductile iron pipes were used to deliver the flow to the Sewage Treatment Plant (STP).

Air valve chambers are provided.

#### EXCAVATION WORKS

Long reach boom excavators were used to dig and backfill trenches and to form larger pits to accommodate big manholes.



#### SEWAGE MAINS

Haya is the government organization that regulates, builds, and operates the effluent waste water system in Muscat and was lately mandated to extend its activities to the whole country.

A large sewage treatment plant was built in the densely populated areas of Seeb, Maabella, and Al Khod.

Sarooj was commissioned to build the sewage main that brings collected waste water into the plant.

The pipeline route was carefully examined and was eventually approved by concerned authorities.

The GRP pipes were manufactured in Oman as well as the manholes which were designed and tailored for the project.

Deep excavations were carried out in two tiers for safety reasons in order to mitigate the risks of material collapsing into the trench.

The excavated materials are composed of alluvial deposits which were screened on site to produce bedding and fill materials.

Micro-tunnelling was used to cross a dual carriageway in the vicinity. The site was cleared and restored to its original state.

Sarooj carried out the construction of smaller diameter sewage mains and house connections.

#### CONCRETE SURROUND

In Wadi areas, the pipeline had to be encased in concrete before final backfill.

In some cases, gabion mattresses were used to avoid surface scouring of the pipeline.

