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1.- GENERAL DESCRIPTION

ALFESTAL engineering, is a Spanish engineering and private equity consulting, independent from suppliers and builders.

ALFESTAL engineering was born to develop their work in the field of structural and geotechnical engineering, at all stages of the life of structures, including the technical advice and assistance.

Customers are the priority of ALFESTAL engineering, private and public. The constant updating and constant innovation let us offer customized solutions based on the latest technology.

Members and partners have been involved in engineering ALFESTAL different projects, allowing them to face any new challenge.

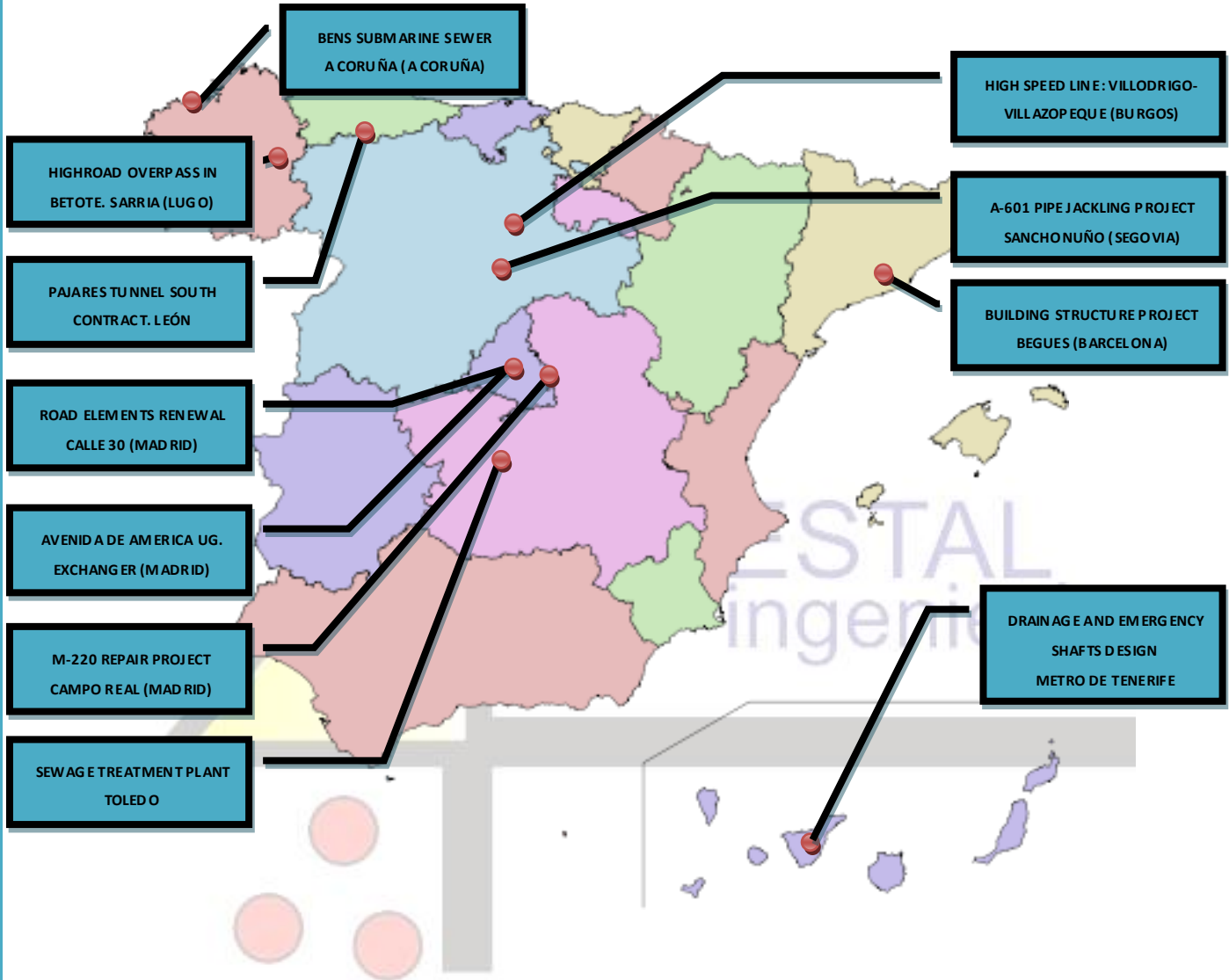
In just three years, since its founding in 2009, ALFESTAL engineering is a leading civil engineering companies emerging in Spain, both in the preparation of studies and projects and in providing technical assistance to the works in Spain and abroad. Since its inception, has worked with many public and to private organizations and construction companies.

From any of the offered services, ALFESTAL engineering adds value to their projects, finding the best solutions and saving costs, schedule and quality. The main objective of the company is to achieve customer satisfaction by offering personalized service on every project.

Our staff, specialized in structures, underground tunnels, has an excellent reputation in the world of Spanish and international engineering, product of years of professional experience in their areas of work.

Currently the company staff is close to 15 professionals in civil engineering between employees and partners. Civil and Industrial engineers, Architects, Geologists ...

During these years, we have developed our business in many parts of Spain and outside Spain demonstrating our versatility and ability in many engineering fields. Some of the locations of our projects are in the following maps.

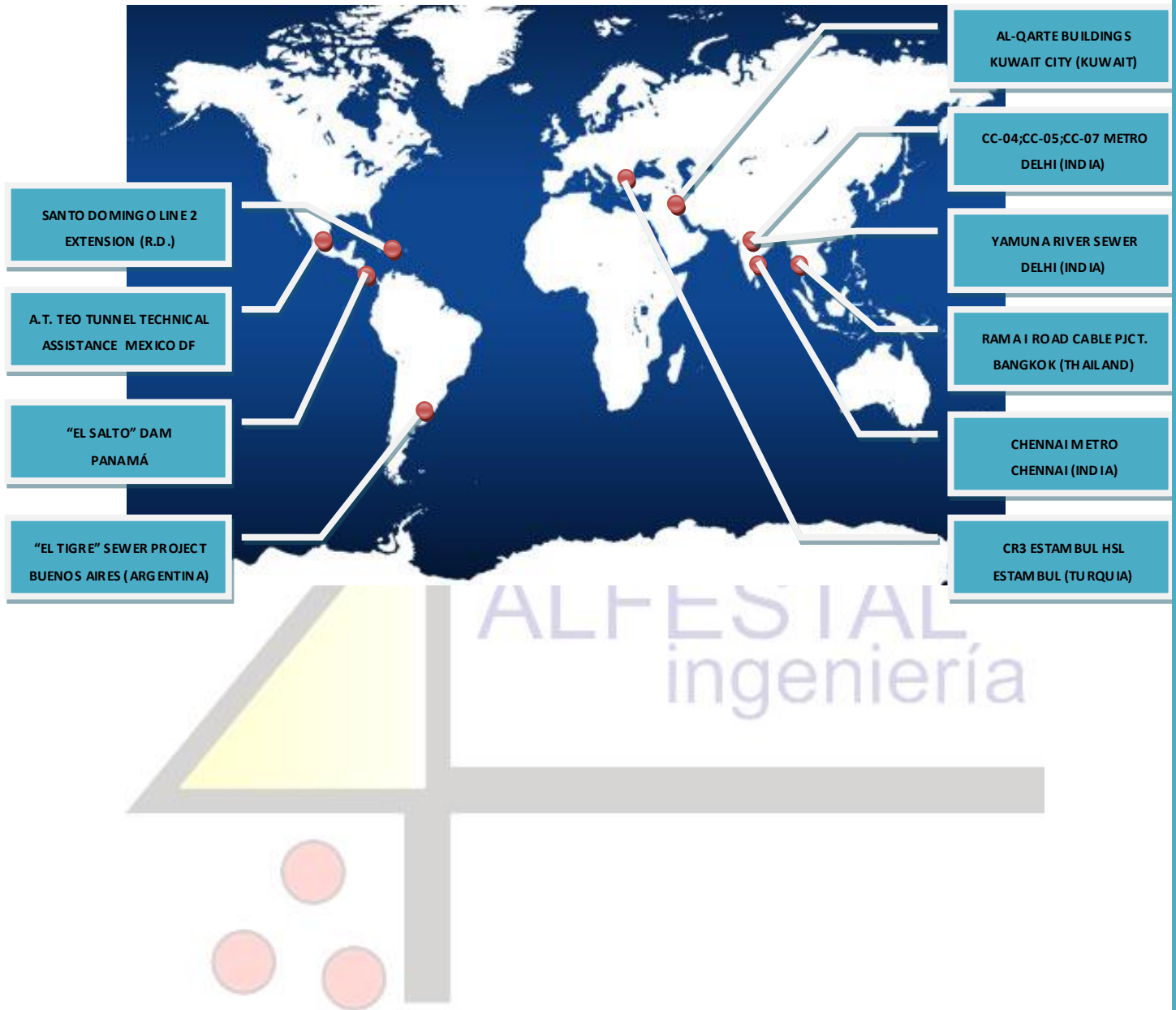




MICROTUNNEL BROCHURE

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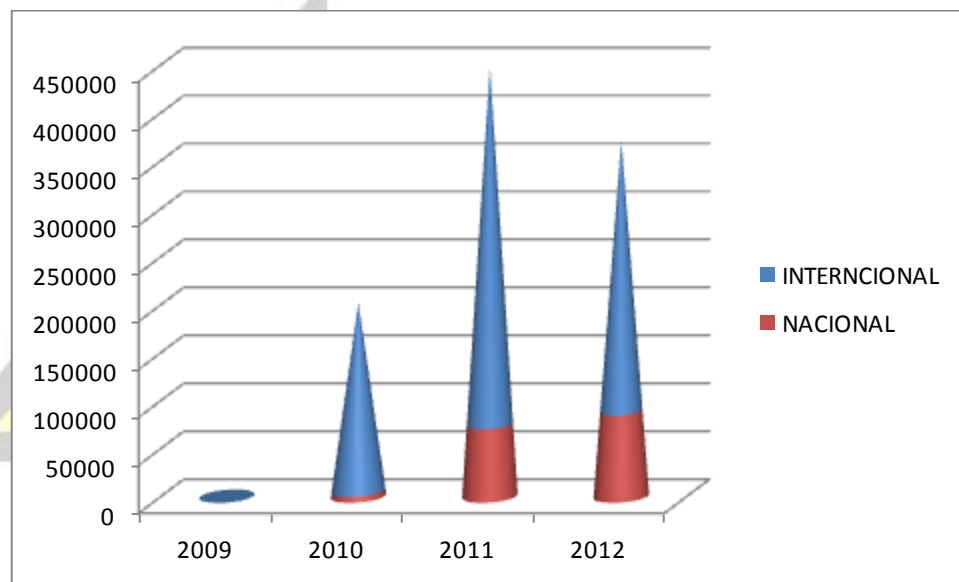
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2.- OPERATIONS SUMMARY

The evolution of turnover of the company since 2009, which is the date of birth of the company, is set out in the table and chart:

	2009	2010	2011	2012
TOTAL	0.00 €	195.265,50 €	371.932,71 €	281.251,36 €
NATIONAL	0.00 €	6.165,50 €	75.362,00 €	89.135,12 €
INTERNATIONAL	0.00 €	189.100,00 €	296.570,71 €	192.116,24 €







3.- ALFESTAL AND MICROTUNNELLING

Micro tunneling is a process that uses a remotely controlled Micro tunnel Boring Machine (MTBM) combined with the pipe jacking technique to directly install product pipelines underground in a single pass. This process avoids the need to have long stretches of open trench for pipe laying, which causes extreme disruption to the community. Micro tunneling has been used to install pipe from 0,3 to 3,00 meters in diameter..

Micro tunnelling was developed by the Japanese in the early 1970's to replace open sewers in urban areas with underground gravity sewers. Although originally designed for gravity sewer construction, micro tunnelling installations include underground crossings of highways, railroads, runways, rivers, and environmentally sensitive areas for a variety of utilities. This process has also been used to install plant intakes and outfalls. Micro tunnelling is also used in the pipe arch technique of supporting large underground openings with an arch or roof made up of small tunnels.

As part of the underground engineering, **ALFESTAL engineering** has developed several projects in micro tunnelling field, both supply and sanitation networks terrestrial and submarine (emissaries) and other networks with other uses later. In this paper are presented below definitions and technical specifications of the most important projects undertaken by **ALFESTAL engineering** in micro tunnelling field.

The projects highlighted below are:

-  Hydraulic system of the new WWTP of Toledo. (Toledo, Spain)
-  Project execution of horizontal directional drilling in the PK 62 +125 of the A-601. (Segovia, Spain)
-  Cable Project pipe under the road Rama I. (Bangkok, Thailand)
-  Sanitation Project Yamuna River. (Delhi, India)

3.1.- Hydraulic system of the new WWTP of Toledo. (Toledo, Spain)

Acuasur, spanish national water agency, has constructed between March of 2012 and February of 2013 the expansion of the Estiviel water treatment plant that serves the city of Toledo.

The new treatment plant is designed for an average flow 36,000 cubic meters per day and a population of 270,000 habitants. It will also have advanced biological treatment and nutrient removal, which will meet the quality objectives of the Tagus River in sensitive areas.

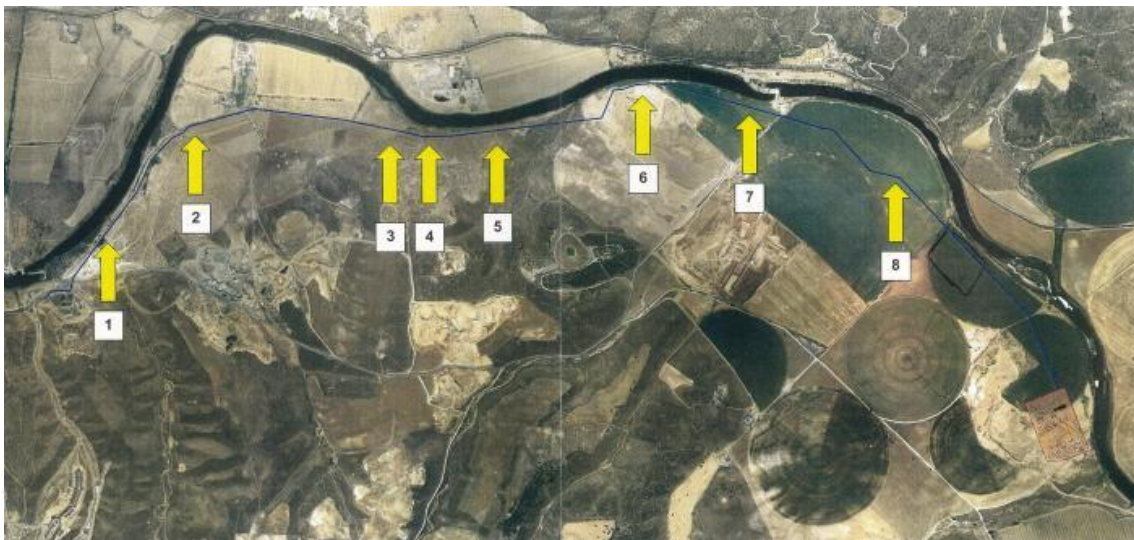


FIGURE 1.- WWTP Project alignment.

Within this performance is the construction of a collector that will have a length of about 7 km and take the current wastewater treatment plant to the new facility in Estiviel. The maximum transport capacity is more than 4 cubic meters per second.

Of these 7 kilometers, there are 1350 meters that have been excavated by EPB micro tunnelling machine.

The TBM has outer diameter 2.5 meters and 2 meters in diameter, weighing over 100 tons, provided by the company Sonntag Iberian. It also used beam detection system of caverns based GPR wave emission.

Thus, the breakthrough was progressively achieved and transmitting the pressure to the cutting head through the tubes themselves.

They were placing the tubes in hydraulic rack and pushed until the tour was depleted cats in said frame, when it was collected and positioned

The study area is located on Quaternary detrital-terrigenous material extending along the river Tagus as it passes through the city of Toledo.

During the Neogene basin fill was endoreic conditions, in a system of inputs fed mainly on the edges of alluvial fans, who continue in the evaporite basin lacustrine materials, roof culminated in calcareous detrital series Moors.

Lithologic variation is large different compositions derived from sources areas and versatility of depositional systems.

PROJECT	TOLEDO WATER PLANT PIPE SYSTEM
Year	2012
Location	TOLEDO, SPAIN
Tunnel Length	1.700 M
Project Owner	ACUASUR
TBM Type	EPB – MTBM
Machine Diameter	2,500 M
Segment Lining	RC PIPES (1300)

TABLE 1.- WWTP pipe tunnel characteristics.



FIGURE 2.- Toledo WWTP MTB machine.

These materials are composed of continental sediments typical basin fill, distributed conglomerates to sands as move north where they begin to look like clay materials, marls and marly limestones

ALFESTAL engineering performed the geotechnical definition, the construction project, geotechnical advice and supervision tasks during the execution of the microtunnel stretch.

3.2.- Project execution of horizontal directional drilling in the PK 62 +125 of the A-601. (Segovia, Spain)

ALFESTAL engineering drafted the "Project Execution of Horizontal Directional Drilling in the PK 62 +125 of the A-601"

The work to be performed is the execution of a horizontal directional drilling in the PK 62 +125 of the Highway 601, by jacking polyethylene pipe diameter 630 mm, PN10, no steel jacketed directional drilling system and use of bentonite slurry.

Throughout the project is to define the method of construction to be used with a special emphasis on the conditions provided by the A-601 which is crossed and the relevant calculations regarding the pipeline working as a structural element. We assessed the possible alternatives for the implementation of the driving, so that the optimal system was running through the pipeline horizontal directional drilling without metal sleeve of a diameter of 750 mm maximum digging.

Once the excavation starts, the rods are introduced in the pilot hole as the drilling progresses from the machine control both the thrust and the rotation thereof angles of attack and release are related to the diameter of the pipe installing (located between 10% and 30% of the diameter) and the radius of curvature which allows the material they are made. In the present case the diameter of the pilot gallery is 140 mm. It was necessary, therefore, that the team has this ability to use hydraulic extraction



FIGURE 3.- Sanchonúño Sewer machine.

PROJECT	SANCHONUÑO SEWER
Year	2010
Location	SANCHONUÑO (SEGOVIA), SPAIN
Tunnel Length	105 M
Project Owner	BEFESA – ZARZUELA - SACYR
TBM Type	HORIZONTAL DRILLING MACHINE
Machine Diameter	1,500 M
Segment Lining	RC PIPES (1300)

TABLE 2.- Bens Outfall characteristics.

3.3.- Cable Project pipe under the road Rama I. (Bangkok, Thailand)

The Bangkok Rama-I cable Project is a set of small tunnels made by microtunnelling technology for the Metropolitan Electricity Authority of Bangkok.

The Metropolitan Electricity Authority of Bangkok (MEA) is a state enterprise under the Ministry of the Interior with responsibility for the distribution of electrical power. As part of a programme of improvement, reliability and expansion, the MEA instigated a project to install 230kV underground transmission lines to transfer power from Lardprao terminal station to Vibhavadi sub-station.

Situated in a river basin the sub-strata in Bangkok consist of unconsolidated marine sediments. A soft and medium clay layer exists at the ground surface to a depth of approximately 14-17m the first stiff clay layer with, a thickness of approximately 10 to 15m. This first stiff clay layer having low sensitivity and high stiffness was found appropriate to be the bearing layer for the drive and reception shafts with the tunnelling media being in medium clay. Below these clay layers lies the first Bangkok sand deposit with a thickness of 5 to 15m. The ground water condition of soft and medium Bangkok clay is hydrostatic starting from 1m below ground level.

One of our main clients, TERRATEC (TBM manufacturer) delivered a complete Tunnelling System composed of a Slurry MTBM, Slurry Transport System, Jacking Frame, Lubrication System and Separation Tank. In addition TERRATEC was contracted to provide the Engineers and Jacking Crew to assist the Contractor during the execution of the Tunnelling Works.

ALFESTAL engineering, made the revision of the Basic Project and the Construction Detailed and Definitive project, for TERRATEC. It included the re calculation of the starting and finishing shafts, reaction wall and definition of the pipe that is jacking and introduced in the hole made with the TBM.

PROJECT	RAMA I ROAD CABLE PROJECT
Year	2011
Location	BANGKOK, THAILAND
Tunnel Length	1.100 M
Project Owner	METROPOLITAN ELECTRICITY AUTHORITY
TBM Type	SLURRY MTBM
Machine Diameter	1.85 M
Segment Lining	RC PIPES (1850/1500/3000)

TABLE 3.- Rama I Road Characteristics.

3.4.- Sanitation Project Yamuna River. (Delhi, India)

In the month of July 2012, DS Construction was awarded two projects by the Delhi Jal Board for the design, construction and maintenance of interceptor sewers in the Yamuna River Sewer Project. This is an innovative sewage interceptor projects worth Rs 414 crores have been awarded on a cash contract basis and include a maintenance period of 11 years.

The project entails the installation of interceptor sewers of diameters 600 mm to 2400 mm using micro tunneling technology, as well as the design and construction of interceptor chambers and a sewage pumping station.

The project owner is The National Rivers Commission Directorate (NRCD) and is managed by the Delhi Jal Water Board and funded by the Japanese Bank for International Cooperation. These entities authorized the rehabilitation of the Ring Road Sewer, Bela Road Sewer, creation of the Wazirabard Road Sewer and Okhla sewer treatment plant and rehabilitation of the Keshopur Sewer Treatment Plant under the YAP-II project. Trenchless methods will be applied on the Wazirabad and Bela Road Sewer projects.



FIGURE 5.- Yamuna River Sewer MTBM.

One of our main clients, TERRATEC (TBM manufacturer) delivered a complete Tunnelling System composed of a Slurry MTBM, Slurry Transport System, Jacking Frame, Lubrication System and Separation Tank. In addition TERRATEC was contracted to provide the Engineers and Jacking Crew to assist the Contractor during the execution of the Tunnelling Works.



FIGURE 6.- MTBM Installation Process

ALFESTAL engineering, made the revision of the Basic Project and the Construction Detailed and Definitive project, for TERRATEC. It included the re calculation of the starting and finishing shafts, reaction wall and definition of the pipe.

PROJECT	YAMUNA RIVER SEWER PROJECT
Year	2012
Location	DELHI, INDIA
Tunnel Length	1.800 M
Project Owner	DS CONSTRUCTION – DELHI JAL BOARD
TBM Type	SLURRY MTBM
Machine Diameter	2.10 M
Segment Lining	RC PIPES (19651600/2500)

TABLE 4.- Yamuna River Sewer Characteristics.

4.-OTHER MINOR MICROTUNNEL REFERENCES

Other minor micro tunneling projects have been developed by ALFESTAL engineering, they are related below.

OTHER SEWER AND MICRO TUNNELING PROJECTS

PROJECT	YEAR	CLIENT	CONTACT DATA
Tender Project for the Lagares WWTP Outfall	2013	IDEON – ACCIONA (PRIVATE)	Empresa: IDEON Contacto: Daniel Lopez. Teléfono: +
Support the implementation of the Eastern Discharge Tunnel collector, Mexico DF. Including the displacement of a specialized consulting team.	2011	TERRATEC – ICA (PRIVATE)	Empresa: TERRATEC Contacto: Juan Parreño. Teléfono: +85 293 333 921
Tender Project for “El Tigre Sewer” in Buenos Aires	2010	TERRATEC (PRIVATE)	Empresa: TERRATEC Contacto: Juan Parreño. Teléfono: +85 293 333 921

TABLE 5.- Other Sewer and Micro Tunneling Project.