

**CHANNEL LINING USING TECHFAB METAL GABION MATTRESS AT
DRONAGIRI, NAVI MUMBAI, MAHARASHTRA**
NAVI MUMBAI, MAHARASHTRA, INDIA



CHANNEL LINING

Client:	Products used:
JNPT & CIDCO	• TECHFAB METAL GABION MATTRESS • TECHGEO NONWOVEN GEOTEXTILE
Contractors:	
THAKUR-MHATRE-KHARPATIL JV	
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2024

Project brief & Problem description:

Construction on soft ground area is a great challenge in the field of geotechnical engineering. Many engineering problems in the form of slope instability, bearing capacity failure or excessive settlement could occur either during or after the construction phase due to low shear strength and high compressibility of this soil.

Jawaharlal Nehru Port Trust (JNPT), India's premier container port, allocated 111 hectares of land at Dronagiri for resettlement and infrastructure development for project-affected persons from 12 villages impacted by port expansion.

At the eastern boundary of the 12.5% scheme in Dronagiri, an existing channel spans approximately 1.5 km. This channel requires proper channelization to effectively manage the given water discharge while ensuring slope stability and preventing soil erosion. The initial proposal suggested shaping the channel as per the designated cross-section and lining it with cement mortar. However, this approach presents significant technical challenges due to the marshy characteristics of the in-situ soil.

Marshy soils are highly compressible and prone to differential settlements, which can cause rigid lining systems, such as cement mortar, to develop cracks. These cracks compromise the structural integrity of the lining, leading to progressive failure over time. Additionally, the impermeable nature of mortar lining can trap pore water, resulting in increased pore pressure that further destabilizes the channel.

Hence, the channel needs to be lined with such a system which shall be flexible and porous in nature such that it can absorb differential undulations and prevent development of pore water pressure and exert a very light pressure on the weak insitu foundation soil.

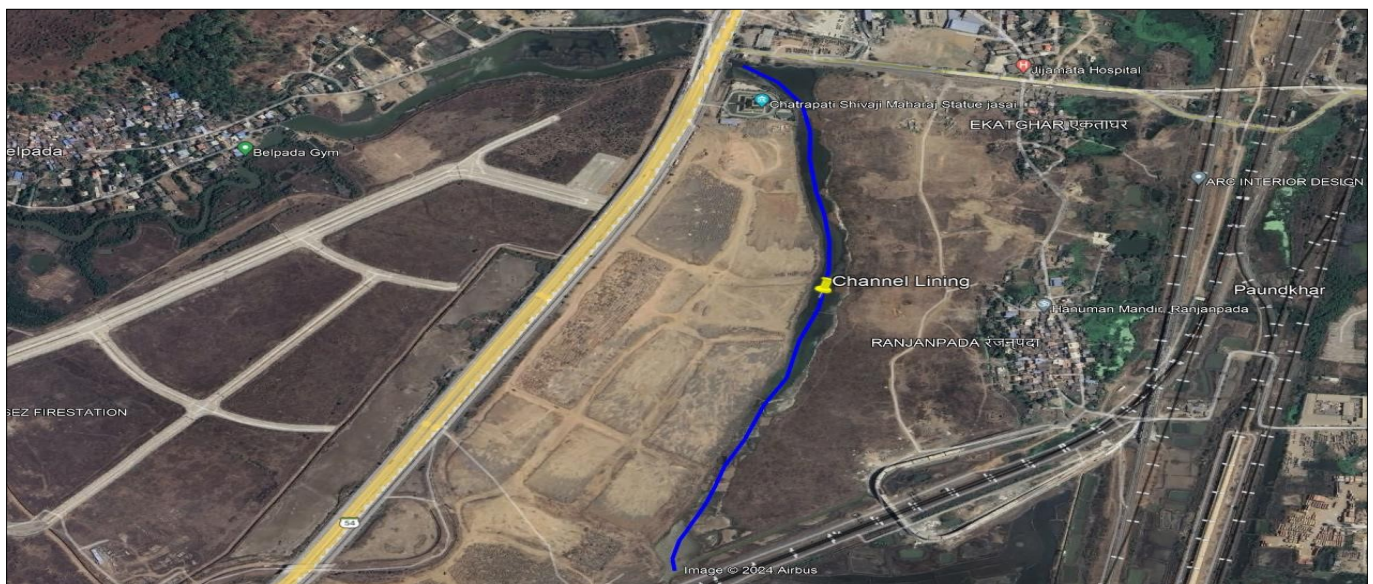


Photo 1 : The Channel Lining alignment



Photo 2 : Existing Channel

Solution Proposed:

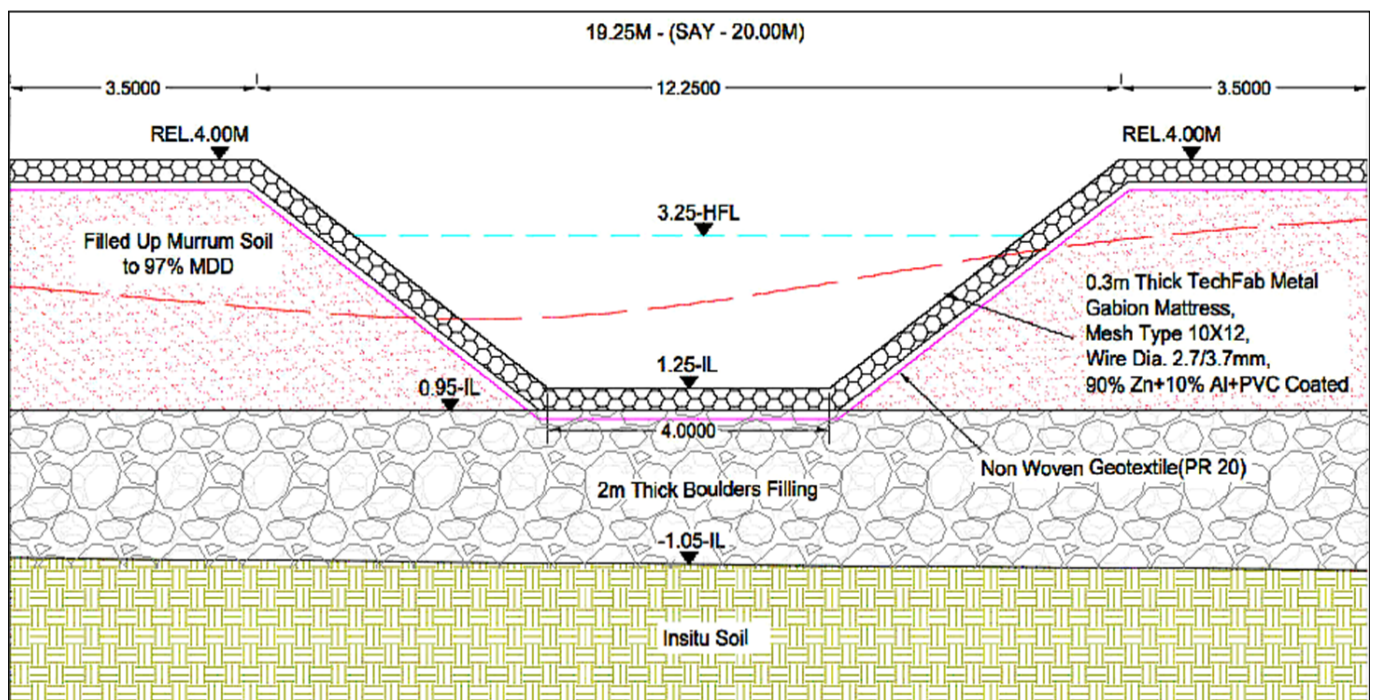
To address the challenges of this channel lining project, TechFab India proposed using TechFab Metal Gabion Mattresses as an alternative to mortar lining. We offered 0.3m thick gabion mattresses (10x12, Wire Dia. 2.7mm / 3.7mm, 90% Zinc+ 10% Al + PVC Coated) made of steel wire mesh filled with stones, providing a flexible and durable solution capable of withstanding soil settlement and water flow variations. Additionally, TechGeo nonwoven geotextiles, made from high-quality polypropylene staple fibers, were placed beneath the gabion mattresses to provide separation, filtration, and drainage functions, ensuring long-term durability and performance.

Due to the marshy nature of the soil and the loose topsoil at the channel bed, a 2m thick boulder filling layer was recommended before placing the gabion mattresses. This boulder layer, spanning a total width of 20m, provided a stable base for the side slopes of the channel, enhanced the bearing capacity of the foundation soil, and minimized settlements. Additionally, the design considered a traffic loading of 24 kPa on the crest of the channel, ensuring safe execution and long-term functionality.

Advantages of Gabion Mattress Lining Over Mortar Canal Lining :

- Compared to mortar canal lining, the construction of gabion mattresses is rapid and easy.
- Gabion mattress installation can be carried out using semi-skilled or unskilled labor.
- The flexible and porous nature of gabion mattresses allows them to absorb differential settlements and prevent the development of pore water pressure underneath.
- Gabion mattresses are more cost-effective than mortar canal lining.
- As compared to mortar canal lining gabion mattress are repairable easily.
- Gabion mattresses provide an environmentally friendly solution compared to mortar canal lining.

By implementing TechFab Metal Gabion Mattresses, the project ensured long-term channel stability, minimized maintenance needs, and provided an environmentally sustainable solution to water management challenges. Their ability to adapt to ground movement made them an ideal choice for marshy terrain, effectively addressing environmental and structural concerns.



Typical Cross Section Drawing



Photo 3 & 4 : During Construction Photographs



Photo 5 : Completed Structure

Conclusion:

The project was successfully completed, demonstrating the advantages of using TechFab Metal Gabion Mattresses over traditional cement mortar lining. This solution ensured durability, flexibility, and sustainability, addressing settlement issues while enhancing environmental integration. The project highlights TechFab India's commitment to innovative, cost-effective, and long-lasting geosynthetic solutions for infrastructure development.

For further details kindly contact :

TechFab India Industries Ltd.

46 & 47, Maker Chambers VI, Nariman Point, Mumbai - 400021

Tel: + 91- 22 - 2287 6224 / 6225

E: info@techfabindia.com

W: www.techfabindia.com