

CASE HISTORY

REINFORCED SOIL WALL

FOR

MONSOON PALACE, AAMBY VALLEY

Project Description

Project : Reinforced Soil Wall for Monsoon Palace, Aamby Valley.

Owner : **Mr. Anjum G. Bilakhia,**
Plot No. 219, 221 to 226,
Half Acre Area,
Village-Devgar, Taluka-Mulshi,
North Lake at Aamby Valley City,
Lonawala, District -Pune.

Contractor : M/s Spectrum Engineers, Vadodara.

Architect : **M/s Prabhakar B Bhagwat,** Landscape Architects & Environmental Planners,
Ahmedabad.

Product : TechGrid Uniaxial Geogrid TGU
(Knitted & Polymer Coated Polyester Geogrid with CE Mark, BBA Certification
& IRC Approved)

Manufacturer: TechFab (India) Industries Ltd.



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Salient Features of the Project

Facing Area: 4500.00 Sqm

Length of Stretch: 300.0 m

The Challenge

Monsoon Palace is being built by Mr. Anjum G. Bilakhia at Half Acre Area, Village-Devgar, Taluka-Mulshi, North Lake at Aamby Valley City, Lonawala, District -Pune.

The Palace is surrounded by hilly terrain and running streams. Due to high embankments and steep slopes of basically murrum soil, it was necessary to have a retaining wall for reinstatement purposes. Since these walls were outer walls surrounding the monsoon palace, the client and architect was willing to have an aesthetic and viable solution compared to the conventional solution of RCC wall.

Reinforced Soil Wall provides an aesthetic as well as an economical solution for the retention of earth / slopes as compared to the conventional RCC Wall. Reinforced Soil Wall can accommodate differential settlement which RCC wall can't withstand and gets distressed with cracks.

With consideration to the techno-economics of the project, the client/architect decided to award the project to TechFab India Industries Ltd.

The Solution

TechFab (India) Industries Ltd suggested the use of TechGrid Uniaxial Geogrid TGU of Ultimate Tensile Strength varying from 40 KN/m to 250 KN/m. These Polyester Uniaxial Knitted Geogrids are used as primary reinforcements to the existing steep slopes. Geomembrane was provided below the top drain to prevent any ingress of precipitation or runoff water. Design of Reinforced Soil Wall was done by considering the maximum possible vehicular load and other surcharge loads as per the IRC. ReSSA 3.0 Software was used to carry out the Global Stability Check for the designed Rein forced Soil Wall.

By giving this solution of Reinforced Soil Wall, client has developed extra land of around 2 acres.

TechGrid Geogrid TGU Series are manufactured from superior grades of polyester filament yarn with high tenacity, high tensile modulus, low creep and low shrinkage. TGU Series are Uniaxial

Geogrids with high strength in the machine direction and are suitable for soil reinforcement applications requiring strength primarily in one direction. Products are available with machine direction strengths ranging from 40 KN/m to 250 KN/m.

Yarns with high molecular weight (> 25,000) and low carboxyl end groups (< 30) are used to ensure durability of the Geogrids used in permanent structures. The knitted grid is then given high quality polymeric coating using a specially formulated PVC compound. The coating completely saturates and envelops the polyester yarn bundles forming a protective cover enhancing - dimensional stability of the Geogrid, resistance to installation damage and protection from the environment.

TechGrid Geogrid TGU Series for Soil Reinforcement

Inclusion of TechGrid Geogrid TGU Series transforms a compacted fill into a coherent composite material. When the soil strains in response to applied loads, tensile forces are generated in the Geogrid because of the excellent interaction between the Geogrid and soil. The tensile forces developed in the reinforcement keeps the reinforced soil mass in stable equilibrium.

Long-term Design Strength

Design of the Geogrid reinforcement is based on the long-term design strength, i.e., the minimum assured strength of the reinforcement at the end of the design life of the structure.

The long-term design strength (T_D) is calculated as follows:

$$TD = \frac{Tult}{RFcr RFid RFd}$$

Where:

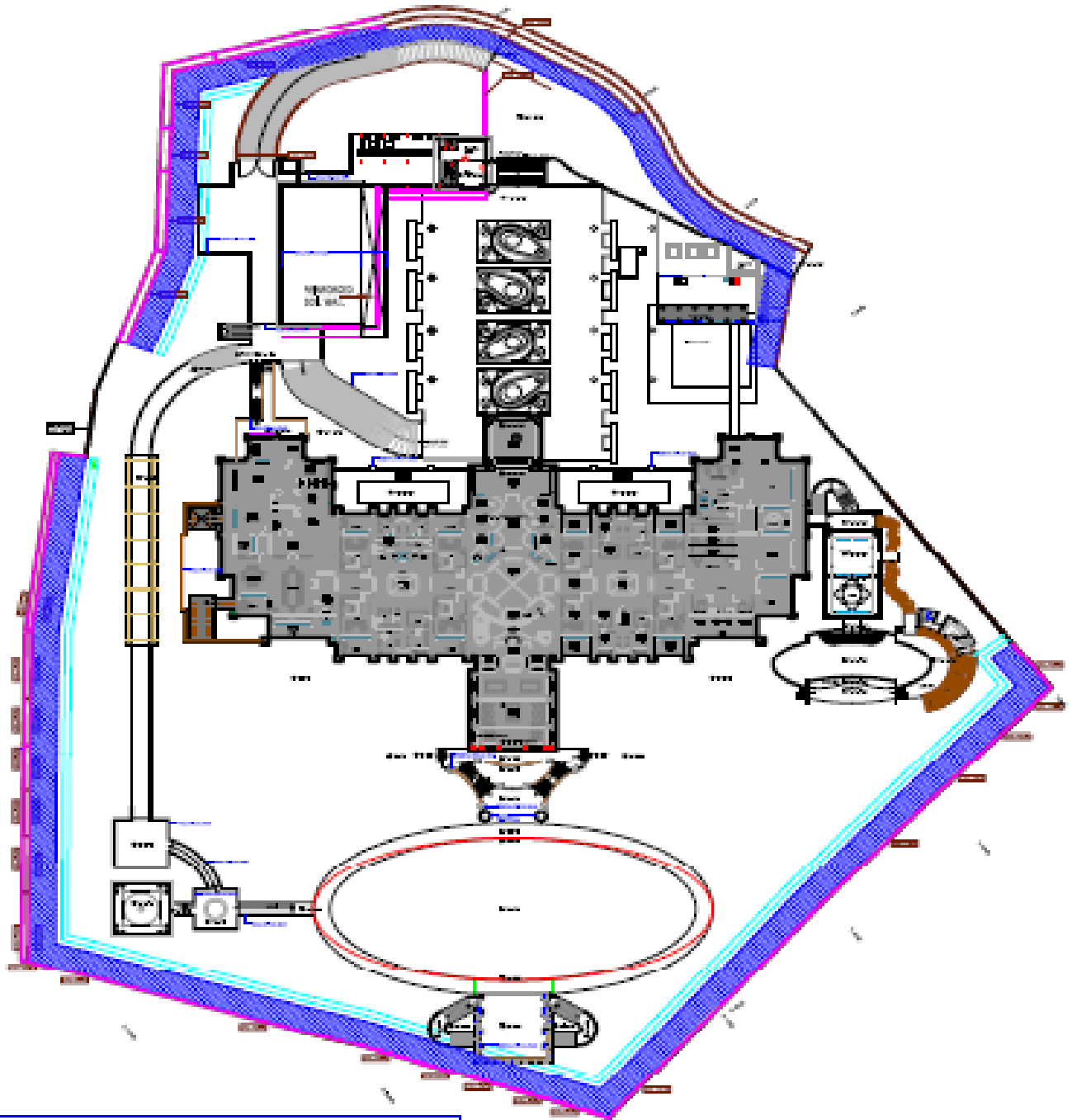
Tult = Peak ultimate tensile strength (MARV) as per ASTM D 6637

RFcr = Reduction factor for creep;

RFid = Reduction factor for installation damage

RFd = Reduction factor for durability

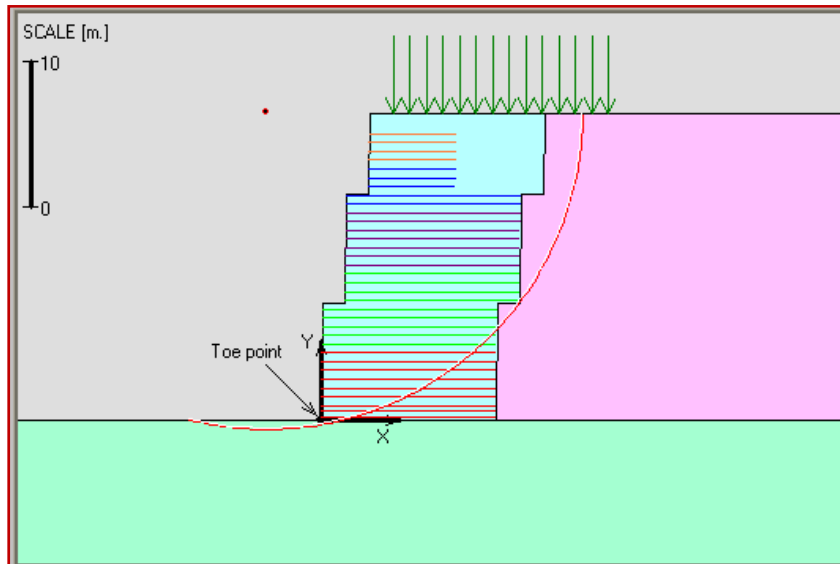
Please find below the plan and Design Analysis report carried out for Reinforced Soil Wall:



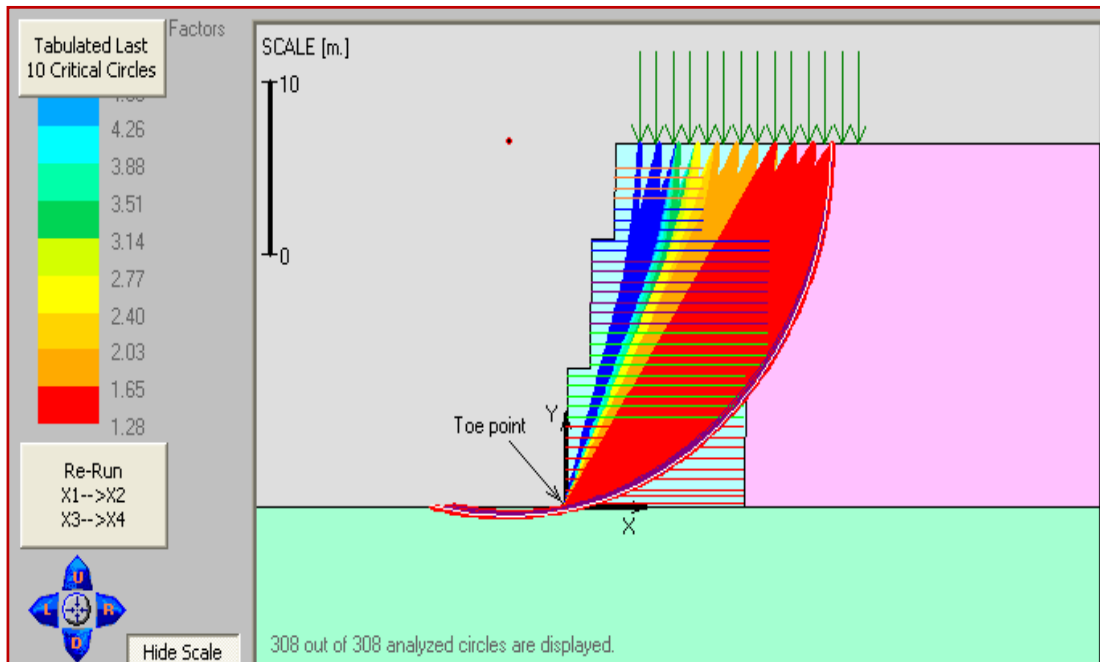
LEGEND
— REINFORCED SOIL WALL

Plan Showing Location of Reinforced Soil Wall for Slope Protection

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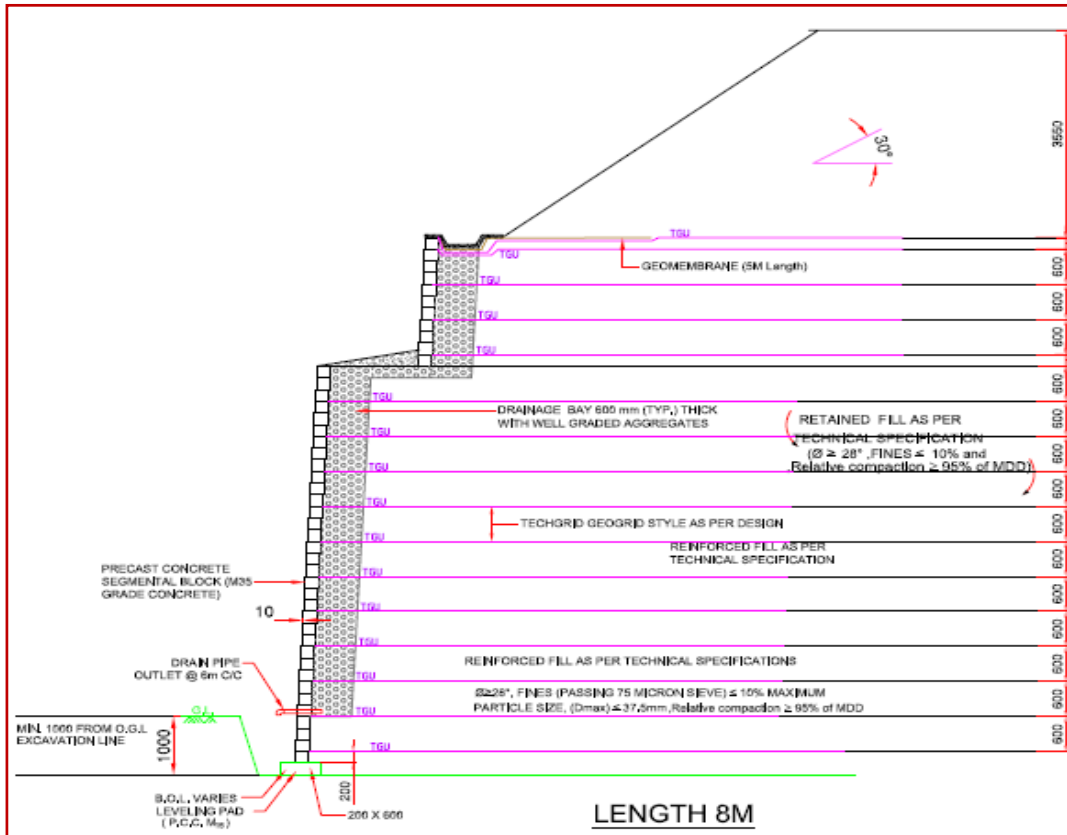


ReSSA 3.0 Software -Global Stability Analysis

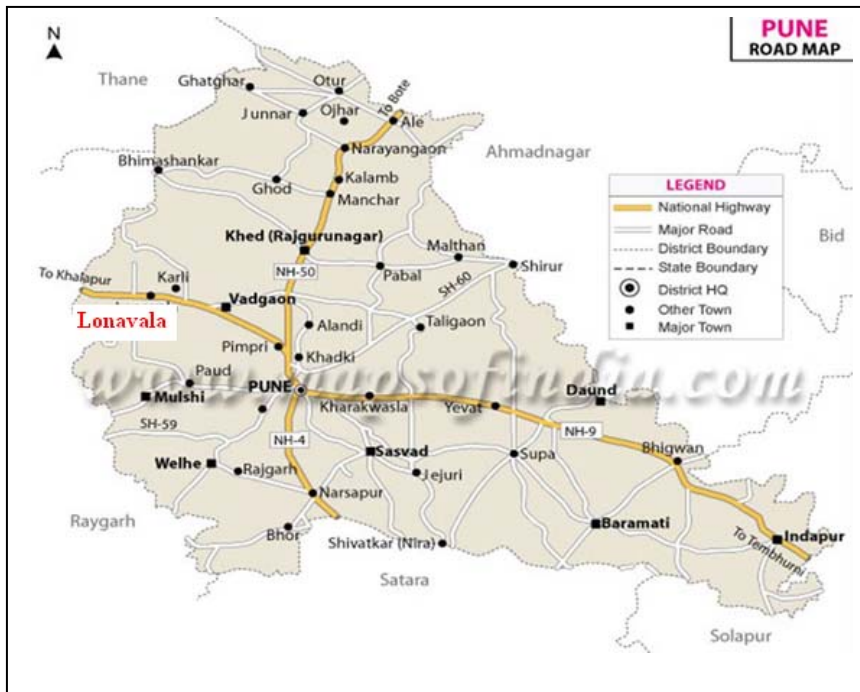


ReSSA 3.0 Software -Factor of Safety Map for Global Stability Analysis

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Typical Cross Section of Reinforced Soil Wall for Slope Protection



Road Map of Pune, Maharashtra, India

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Design, drawings and the use of TechFab India Industries Ltd's TechGrid Uniaxial Geogrid TGU for Reinforcement of existing steep slopes were approved in principle by the Client / Architect of the project.

Execution

Based on the approval given by the Client / Architect for the suitability of the design and drawings as given by TechFab India Industries Ltd, the execution work was awarded to the contractor M/s Spectrum Engineers. Modular Blocks were used as facia to support the reinforced / back fill. Since modular blocks are relatively smaller in size, they are easy to cast and are able to follow the curve profile as and when required. The execution was carried out stage wise as per the design and drawings furnished by TechFab India Industries Ltd.

Applications of TechGrid TGU:

- Reinforced Soil Retaining Walls
- Steep Slopes

Benefits of TechGrid TGU:

- Used as reinforcing medium.
- High Tensile Strength ranging from 40 KN/m to 250 KN/m
- Low creep and low shrinkage
- Highly durable & resistant to acids & alkalis present in soil

The project was successfully completed in March 2012.

For further details kindly contact:

TechFab India Industries Ltd.
711/712, Embassy Centre,
Nariman Point, Mumbai - 400021
Phone: 022-2287 6224/6225 Fax: 022- 2287 6218
Email: anant@techfabindia.com
Web: www.techfabindia.com