
A Report On

**Vertical Soil-Rock Strata Detection, Soil Testing, Groundwater Depth
Estimation of Laal Maidan Site, Mumbai**

for Urban Greening Initiative



Submitted To

Youth for Unity and Voluntary Action (Yuva)
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Site : Lal Maidhan, Mankhurd

Central Location Latitude 19.0501 and **Longitude** 72.8113



Map 1: Actual site and surrounding situation of Lal Maidhan site

This site is located on the plain topography which covered by three elevated buildings from all sides. Few entry space and open side from eastern side are supportive for natural air ventilation. Currently there is cement layer in upper soil surface which not allowed to water for natural water percolation process. Hence, water logging is noticed at same place.

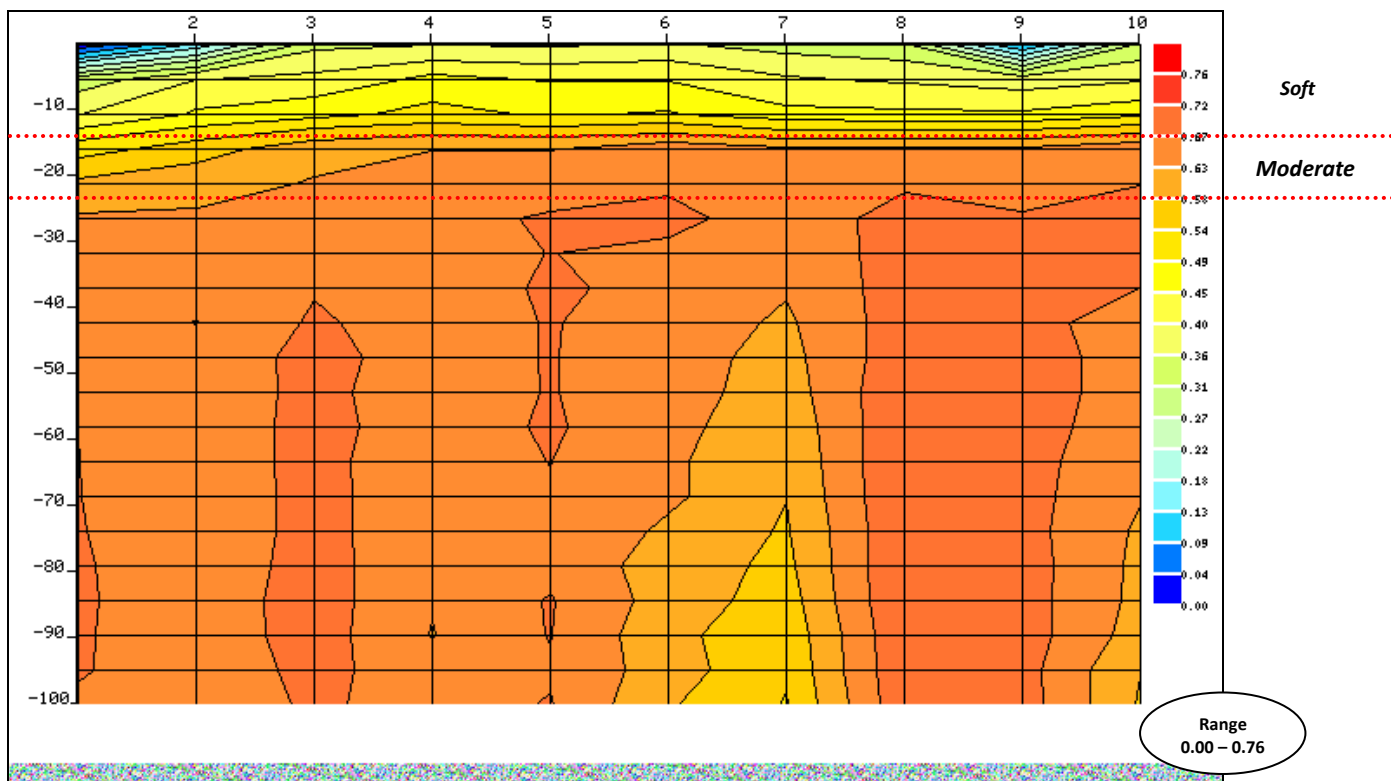
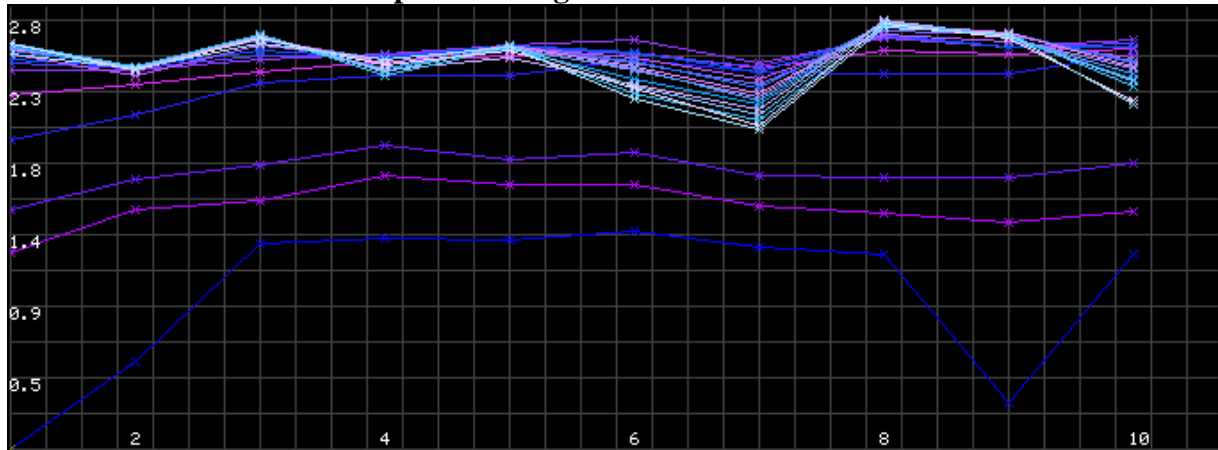
General Soil Readings at Field Sample

Sr. No	Site	Moisture	Light	Range
1	Lal Maidhan (Actual)	3	200	Moisture: 1-10
2	Lal Maidhan (Outside)	5	250	Light: 0-2000

Results: All the range of Moisture and Light are normal and suitable for plantation.



Lal Maidhan – 100 meter depth scanning



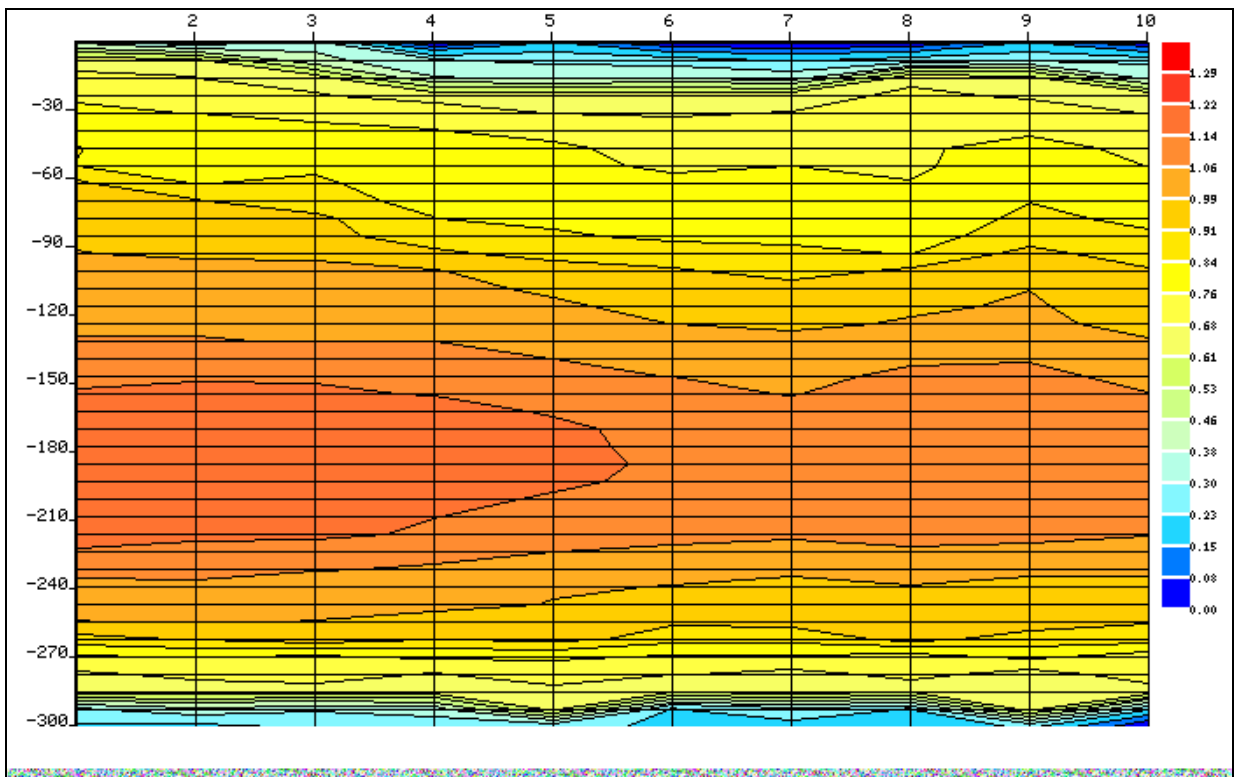
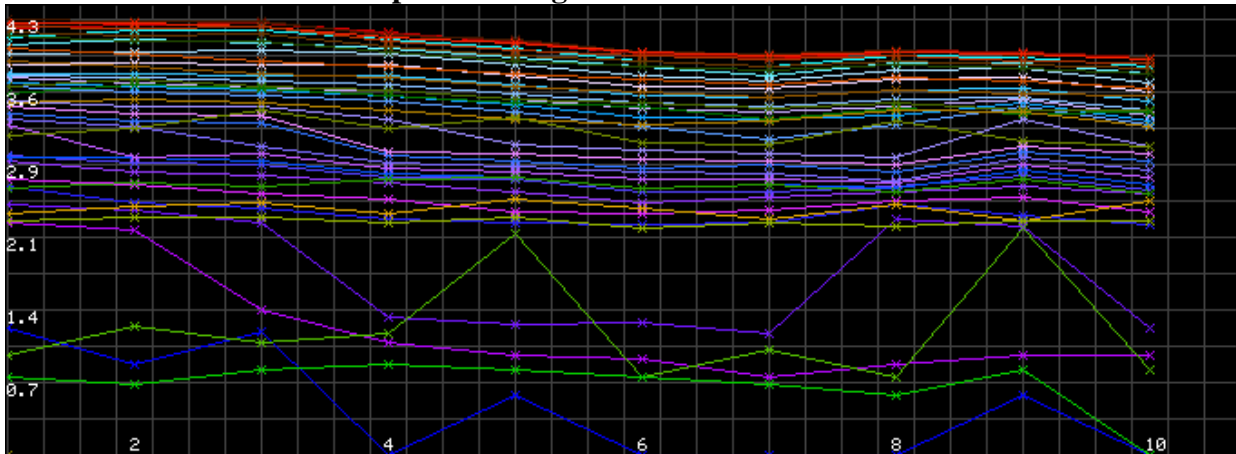
At Lal Maidhan site considering Approx. 2000 m² area two lines are scanned for detail underground soil-rock profiles detection. One is from west to east direction scanning upto 300 m depth and second is from north to south direction scanning upto 100 m depth (Map 1).

Results of both scans are **best suited for garden development** and these are the findings:

1. Profile scan for 100 m depth shown **soft soil strata upto 14 m** and moderate upto 22 m.
2. There is an **underlying aquifer at scan 7 number**.
3. Probable **groundwater yield for same site is 1100 to 1400 (lph)** at scan 7 number.
4. There is **horizontal linearity in sub-surface soil layers in upper section upto 22 m**.
5. **No massive hard rocks** detected in upper sub-surface.



Lal Maidhan – 300 meter depth scanning



Recommendation:

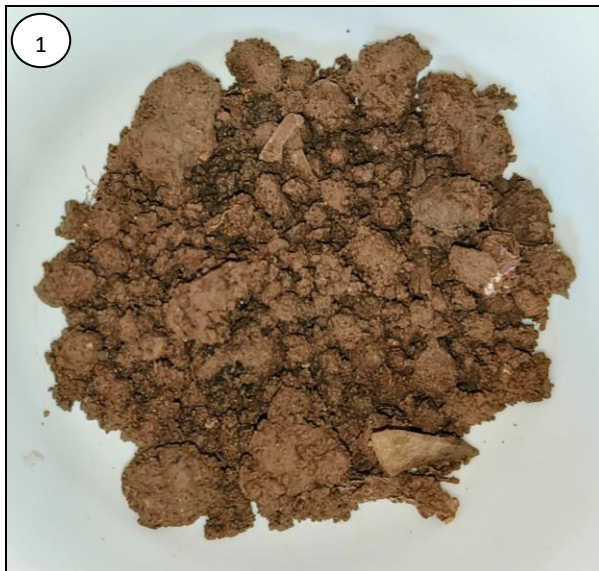
- Surveyed Lal Maidhan site soil and vertical soil-rock starta are feasible and supportive for plantation work and further green space development.
- The range of scanning is 0.00 to 0.76, thus the soil strata detected which will supportive for plantation work as well as groundwater recharge.
- The depth of soils is found upto 14 m (Lal Maidhan) sites.



- Selected Lal Maidhan (Mankurdh) land space surface soil, and sub-surface soils is suitable for plantation and gardening work.
- Probable source of Groundwater yield also detected at this site.
- Required **depth of good quality soils found at this site** and it will support for sufficient growth of plantation due to scope for plants rooting.
- **Sufficient layers of soft soils are detected at this space** which consists of equal parts of sand, silt, and clay textures and can be considered as **loamy types of soils**.
- **Sufficient depth of soils** will be maintain perfect balance of water holding, nutrients, oxygen to reach plants' roots, and organic matter.

This site is recommended for plantation work as well as groundwater recharge work based on scientific resistivity field investigation survey of soil-rock strata and soil quality testing at laboratory.

1. Lal Maidhan Actual Site Current Soil



2. Lal Maidhan Outside Site Current Soil



At Lal Maidhan site outside soil was already added in available space, thus, the deep excavated soil sample (Sample 1 and 2) was collected to achieve the original soil results.



Physical Properties of Soil:

Sample 1: Aggregated type, prone to high permeability, slight loamy type of soil, fine soils, montmorillonite and calcareous based, average salinity, dense sand structure, sticky in nature.

Sample 2: Fine particles, silt mixed, cations like calcium Ca²⁺ and magnesium Mg²⁺ might be bind together, due to man-induced effect of excessive moving and handling of soil.

Sample	Soil Type	Soil Strata	Water Holding Capacity
3	Clay type	14 meter	Good
4	Silt, clay mixed		Good

Soil Analysis : Sample 1

S.No.	Parameter	Unit	Limit	Actual	Status
1	pH	-	0-14	7.2	<i>Basic</i>
2	Electrical conductivity (EC)	Microsiemen	1	4.02	<i>Less conductivity</i>
3	Organic Carban (OC)	%	1	0.299	<i>Low</i>
4	Calcium (Ca)	Meg/100 gm	-	280	<i>Medium</i>
5	Magnesium (Mg)	Meg/100 gm	-	220	<i>Medium</i>
6	Calcium carbonate (CaCO ₃)	%	-	Nil	-
7	Nitrogen (N)	Kgha-1	-	187	<i>Low</i>
8	Phosphorus (P)	Kgha-1	-	10.2	<i>low</i>
9	Potassium (K)	Kgha-1	-	290	<i>High</i>
10	Sulphur	%	10-50	42	<i>optimum</i>
11	Ferrous	ppm	2.5-5.0	2.5	<i>optimum</i>
12	Zinc	ppm	1.01-5.0	4.8	<i>Optimum</i>
13	Manganese	ppm	2.5-5.0	2.2	<i>Low</i>
14	Copper	ppm	0.2-2.5	0.1	<i>low</i>
15	Boron	ppm	<1	1	<i>Normal</i>
16	Molybdneum	ppm	-		ppm



Soil Analysis : Sample 2

S.No.	Parameter	Unit	Limit	Actual	Status
1	pH	-	0-14	6.8	<i>Acidic</i>
2	Electrical conductivity (EC)	Microsiemen	1	4.46	<i>Less conductivity</i>
3	Organic Carban (OC)	%	1	0.282	<i>Low</i>
4	Calcium (Ca)	Meg/100 gm	-	230	<i>High</i>
5	Magnesium (Mg)	Meg/100 gm	-	170	<i>High</i>
6	Calcium carbonate (CaCO ₃)	%	-	2.13	<i>Need</i>
7	Nitrogen (N)	Kgha-1	-	345	<i>Medium</i>
8	Phosphorus (P)	Kgha-1	-	16.4	<i>Medium</i>
9	Potassium (K)	Kgha-1	-	275	<i>High</i>
10	Sulphur	%	10-50	56	<i>High</i>
11	Ferrous	ppm	2.5-5.0	3.9	<i>Optimum</i>
12	Zinc	ppm	1.01-5.0	4.8	<i>Optimum</i>
13	Manganese	ppm	2.5-5.0	2.2	<i>Low</i>
14	Copper	ppm	0.2-2.5	0.2	<i>Optimum</i>
15	Boron	ppm	<1	0.9	<i>low</i>
16	Molybdneum	ppm	-		ppm

Results and Recomendation:

- All required parameters indicate the overall good quality of soils with enough water holding capacity (WHC) of soil.
- The rounder aggregates, clay, silty nature of present soils will allow water and air to move more easily around plants' roots.
- Sufficient depth of soil strata with required quality of soils suited for garden development for small, medium and high height plantation.
- Low organic carban (OC) in the current soil is suggest to addistion of natural fertilizers to increase the humas in the soil.
- Overall nature of soil is fit for all types of plantation work as well as groundwater recharge process at present location.

