


Exploration Beyond Expectation 

Geo-Carte

Radar Technology Pvt. Ltd.



Problem



Unknown distribution network of underground pipeline in India

Damage of pre-existing underground utilities during laying of new ones

Leakage in buried water and sewage pipelines leading to contamination

Degradation of road network due to poor drainage condition

Reduced efficiency of ballast cleaning machine due to buried unwanted scrap

Unexplored locations for Archaeological excavations

Objective



To introduce a non-destructive subsurface exploration method, which leads to



Optimization

Prevention

Correct Layout

Cost Effective

**Time
Efficient**

**Effective &
Reliable**

Introduction to GPR



Ground Penetrating
Radar (GPR)

Non Destructive subsurface exploration technique

Works on the principle of Electromagnetic waves

Waves are reflected from the boundary of dielectric contrast

Hyperbolic reflections across the target

Depth of penetration ranges from few cm to 12-14 m

Trade off between frequency and resolution

Weak signals in case of wet clayey soil

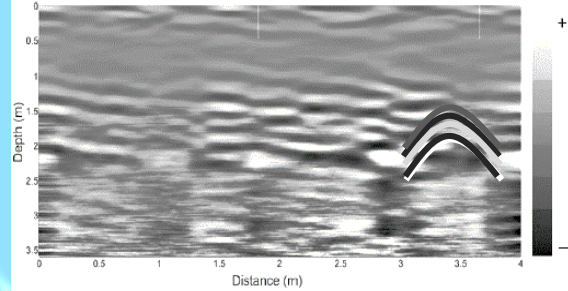
Current Limitation



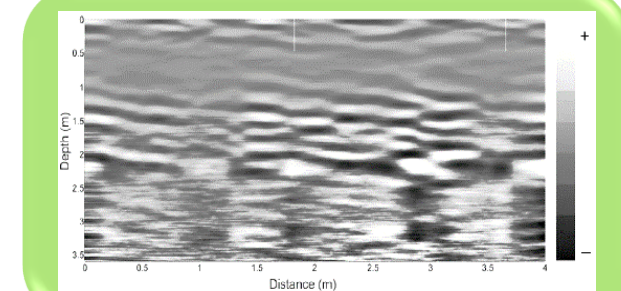
antenna →



Investigated Site



Expected Results



Actual Results Obtained

Fails to provide satisfactory result in case of weak signals

Low dielectric contrast, wet clayey soil, conductive medium

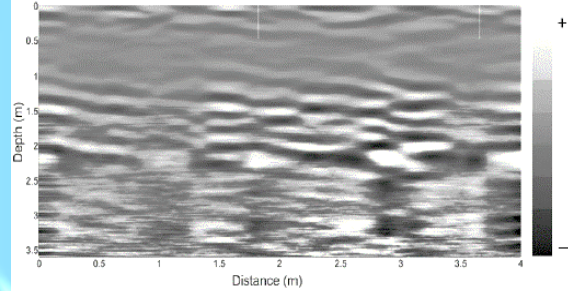
Our Developed Technology



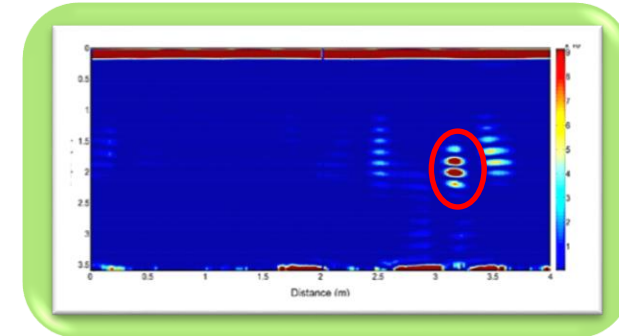
antenna →



Investigated Site



Conventional Output



Improved Output

Advanced T-F analysis & better interpretation for weak signal data

Enhanced Resolution of subsurface profile

Satisfactory results even in high salt content & wet clayey soils

Benefits



Prevent underground utility damage during trenching/tunnelling



Map unrecorded network underground utility



Leak detection in underground pipelines



Roads inspection to avoid accidents due to poor construction practices



Mapping underneath sinkholes leading to huge road accidents



Locate under ballast obstructions leading to increased BCM efficiency



Locate potential locations for excavation in archaeological sites

Competitive Edge



Reliable and efficient

Satisfactory results despite high salt content & wet clayey soils

Enhanced image resolution over conventional methods

Advanced analysis and better interpretation

Effective data and reliable outputs in all site conditions

Customised services and products for specific purpose

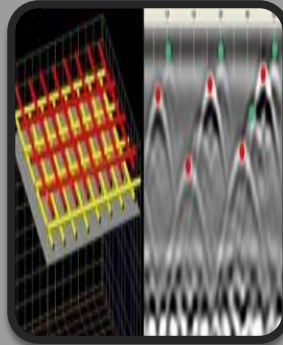
Applications



Utility Mapping



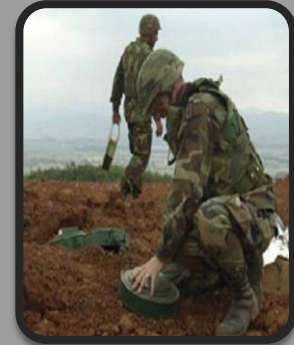
Road & Highway Inspection



Concrete Structure
Inspection



Archaeological Investigation



Other Applications

- To map water pipelines, sewage lines, gas pipelines, electrical cables, underground storage tanks

- To inspect the highway cross-section
- For bridge deck evaluation
- For railway ballast evaluation

- To locate voids and cracks in concrete structures
- For slab thickness measurement

- For mapping archaeological features to plan the digging for exploration and preservation purpose

- For landmine detection
- For ground water table mapping
- For mineral exploration

About Geo-Carte



Incubated at IIT Gandhinagar

Our Esteemed Clients



Clientele We Serve

Feedback from Our Customers




केंद्र प्रमुख
Central Railway
रिज़वान अहमद
सहायक विभागाध्यक्ष (संरचना)
RIZWAN AHMAD
Sr. Divisional Engineer (R)


संकेत संख्या
संकेत संख्या

संकेत संख्या (संकेत) का उपयोग
कराया गया है।
Office of the
Divisional Railway Manager (Works),
Chhatrapati Shivaji Terminus,
Mumbai-400 001.
P&T (C) 022 2260279 (Office) : 06302
Mobile : 9828173004

संकेत संख्या/Date संकेत संख्या 22.01.2017

संकेत संख्या/Ref. No. : BD.W.APP.GENL.

Dear Sir,

I am writing this letter as a note of appreciation for your excellent solution to the prevailing problem of poor efficiency of ballast cleaning machine during maintenance work in Indian Railways. Your developed mechanical system was efficient for the movement of machine over the railway track. We had tried to detect these under ballast obstructions non-destructively by other companies using other means, but they failed to fulfil the purpose. I am really pleased with your knowledge and expertise in GPR.

Great service makes your customers feel that you care about developing a long-term relationship that means more than just making a sale.

I would love to recommend your company to anyone who needs underground scanning services in the future. Keep up the good work.


RIZWAN AHMAD


TRENCHLESS
ENGINEERING SERVICES PVT LTD
10/11/2017

Dear Mr. Sir,

We appreciate the service extended by GeoCarte for underground utility mapping non-destructively at Dabey. Your efforts during field work in challenging site conditions are really appreciated. The results of the survey identifying the underground utilities helped us in planning and safely completing our project without damage to utilities.

The technique looks promising for underground utility mapping. I would like to congratulate GeoCarte and wish them all the best for their future endeavours.

We look forward to continuing to work together.

For Trenchless Engineering Services Pvt Ltd


Suresh Kumar
Manager


Capstone
GEO CONSULTANTS
AN ISO 9001:2008 Certified Company
CIN - U74210TG2010PTC011870
No. CGCL/ADMIN/01/2016-17/076

Capstone Geo Consultants (India) Private Limited
101 & 102, Sri Krishna Nilayam, 12-13, 67th St, No. 13,
Kistna Colony, Tarnaka, Hyderabad, Telangana - 500 017.
Tel: +91 9000 655 206, 9000 656 206
e-mail: info@cgcl.in, web: www.cgcl.in

Date: 16th Jan' 2017

To Whom So Ever It May Concern

In recognition of the devotion and timely execution of a survey for archaeological investigation we **Capstone Geo Consultants (India) Private Limited** would like to extend our sincere gratitude to **Geo Carte Radar Technology Private Limited**.

The services rendered by Geo Carte are greatly acknowledged and we would look forward to work with them in future.

For Capstone Geo Consultants (India) Private Limited


Dr. Suman K Handal
Managing Director



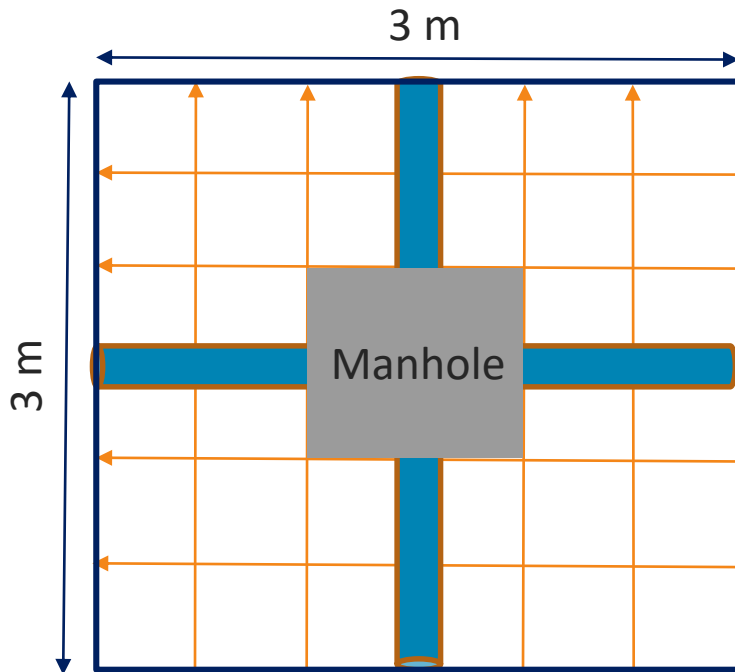
GeoCarte's Few Success Stories



UTILITY MAPPING OVER CONCRETE SURFACE

AT IIT VGEC CAMPUS

3-D Data Collection

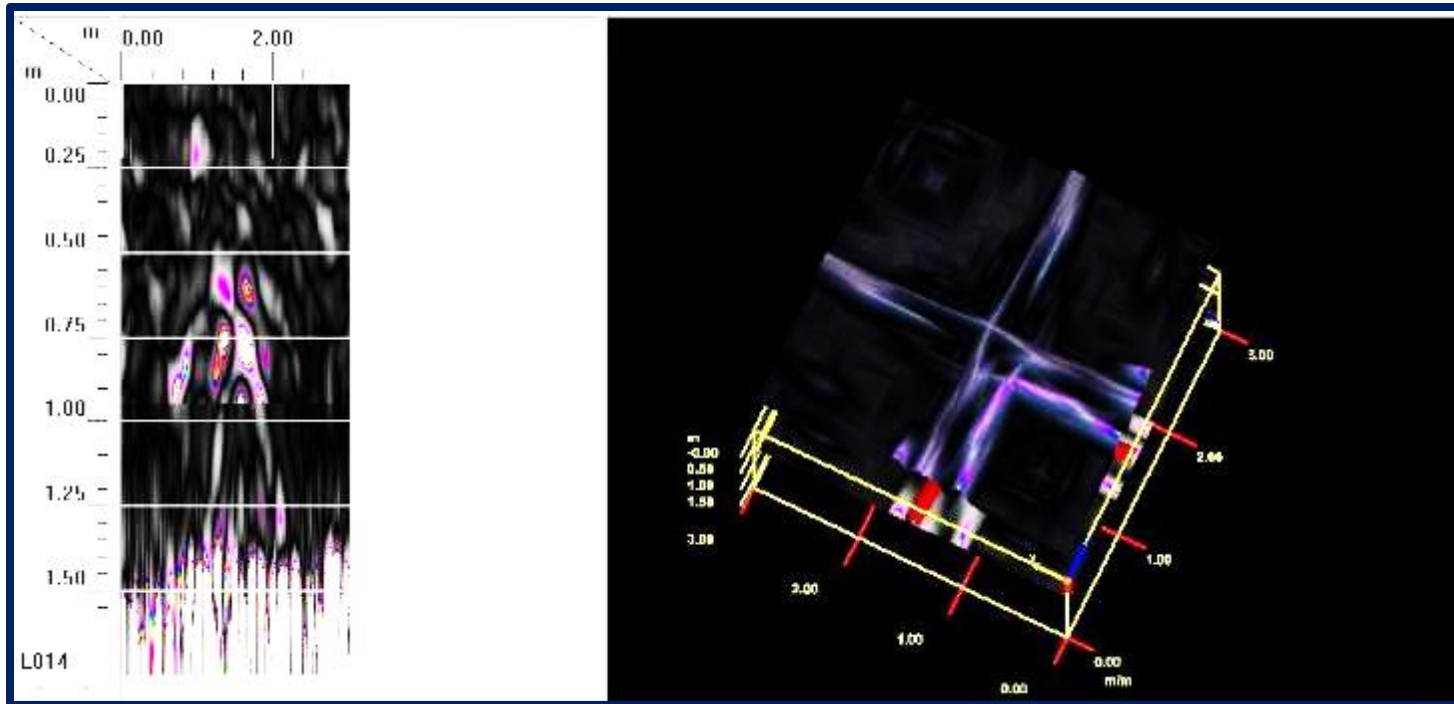


Data was collected over and around the manhole in an area of 3m X 3m in a grid

Grid spacing of 0.5m

Using 400 MHz antenna

Output Results



Captured the clear features of pipes crossing at 0.5 m depth was after post-processing



UTILITY MAPPING

AT DAHEJ



Why survey was required?



Encountered unknown pipe during tunneling

To avoid encounter of other such pipe in further execution

To design new layout of the pipe preventing damage of pre-existing lines

Survey Specifics



Total area scanned is around 33,00 m², 3 road crossings

3D data collection

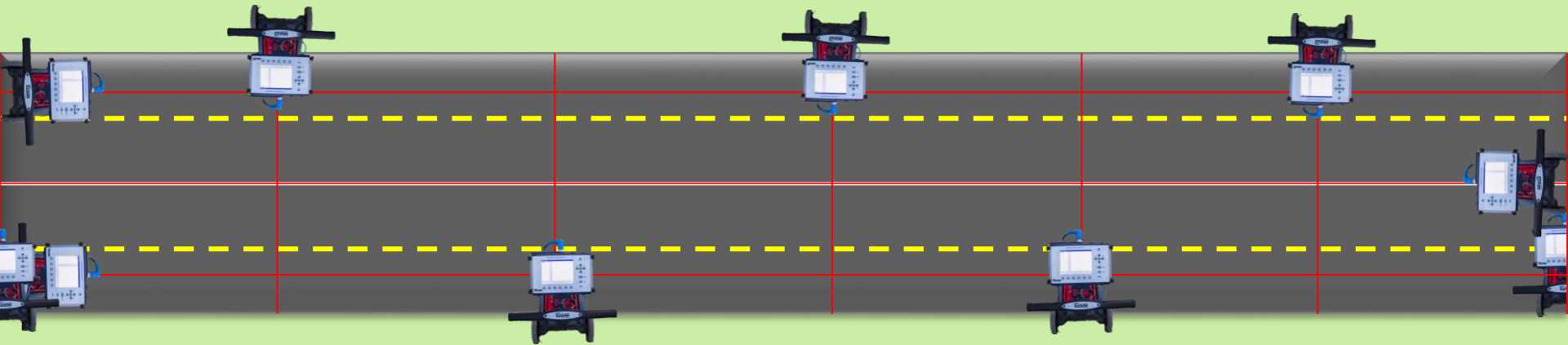
Antenna used 200 MHz

Grid spacing varying from 2 to 3 m

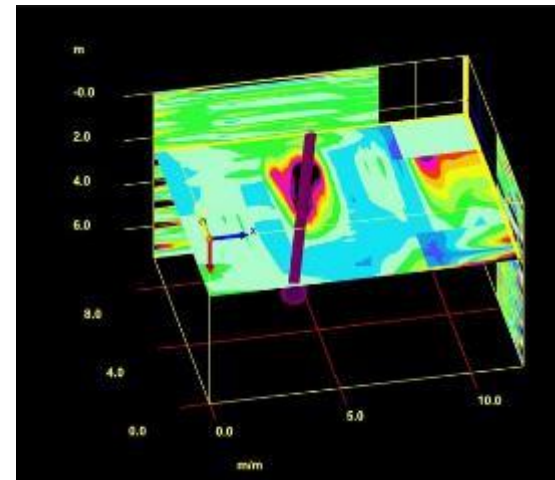
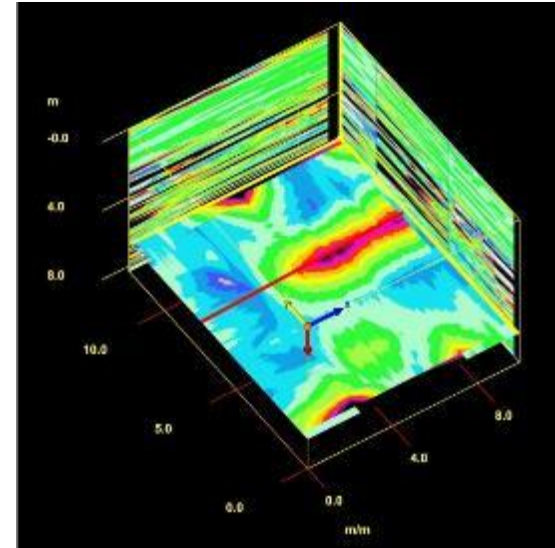
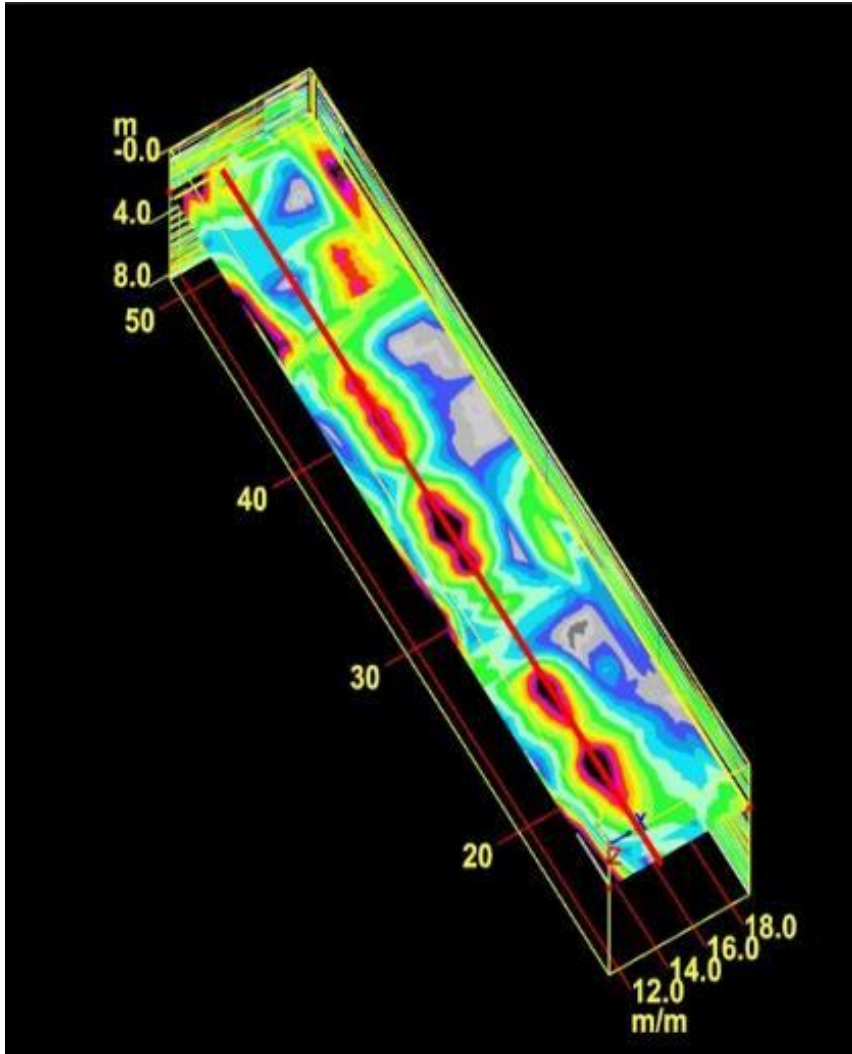
Maximum accessible area was covered in rectangular fashion



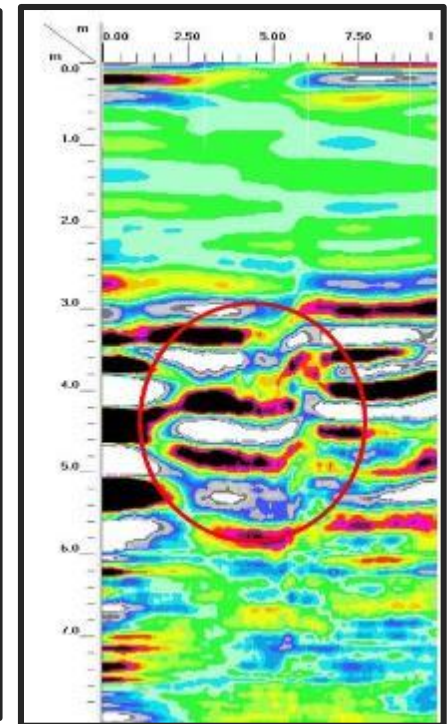
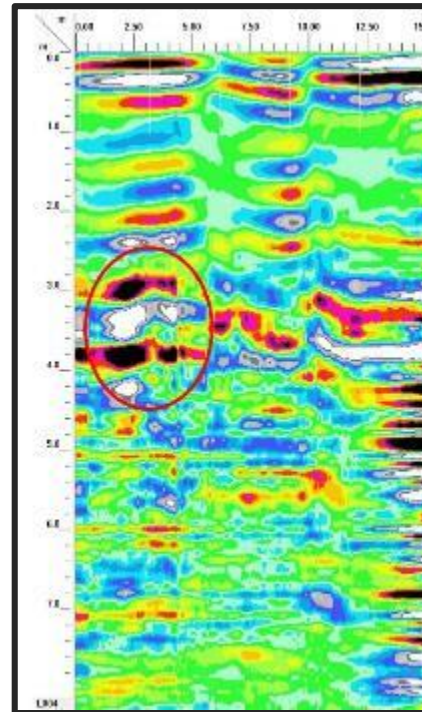
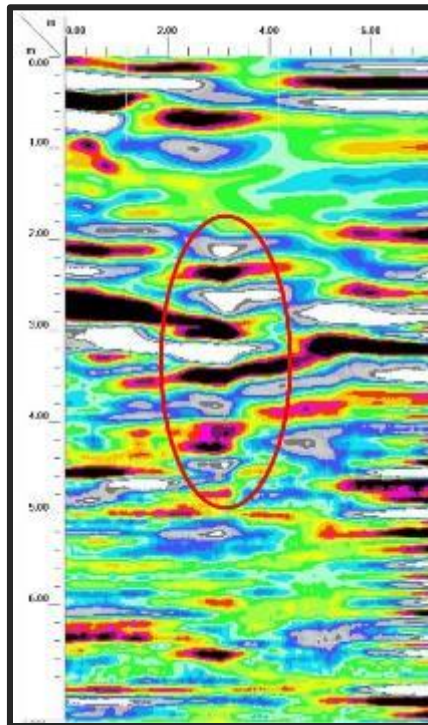
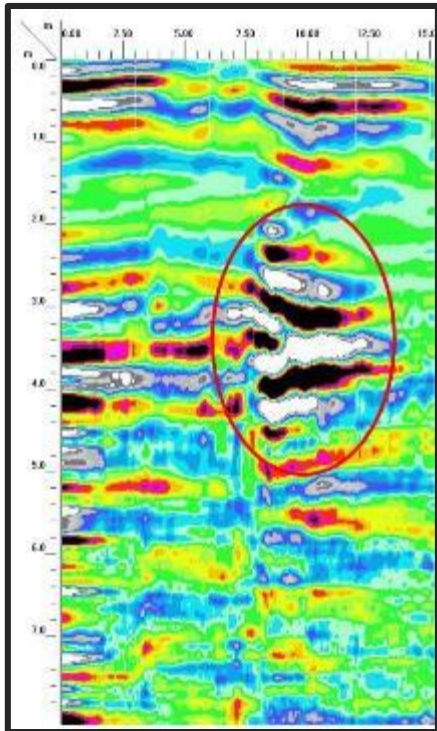
Data Collection



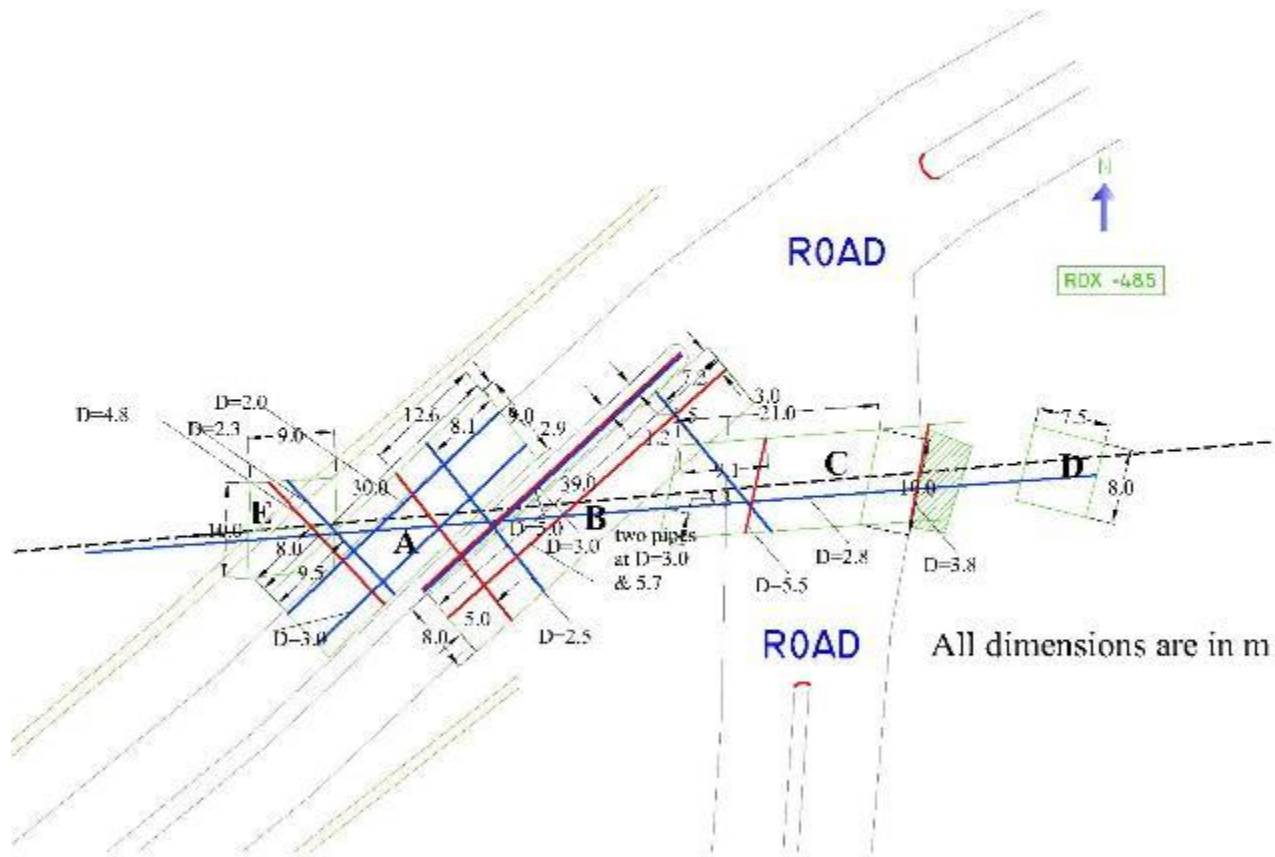
3D subsurface view



2D subsurface profiles



Output Result



Site-1



UTILITY MAPPING

AT DAHEJ SEZ 2



Why survey was required?



To ensure a clear stretch of 30 m width along longitudinal direction

To avoid encounter of other across pipes during installing new utility

To design new layout of the pipe preventing damage of pre-existing lines

Details of Investigated Area



Site Location- Dahej SEZ-2, Gujarat

Surrounded by petro-chemical industries

Challenging for data collection



2D subsurface profiles



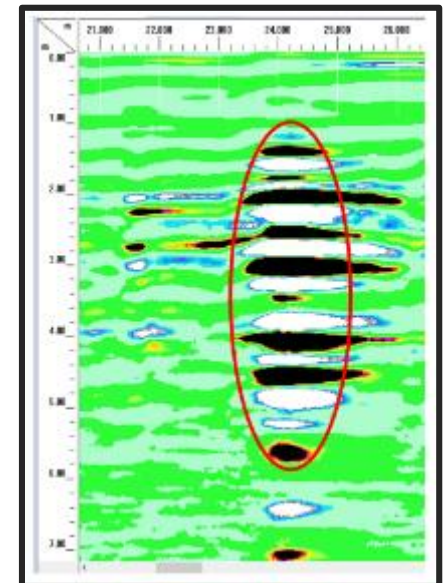
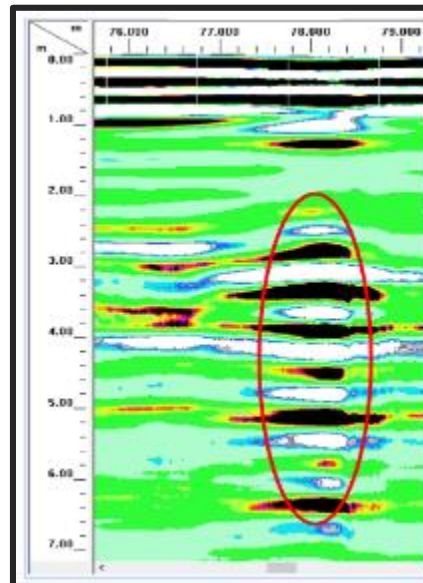
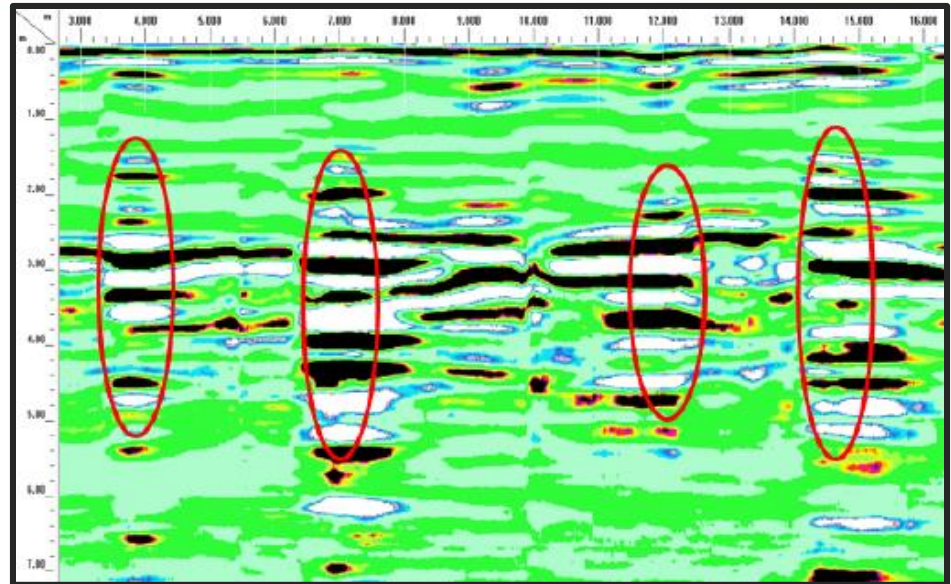
Total area scanned is around
24000 m²

2D data collection

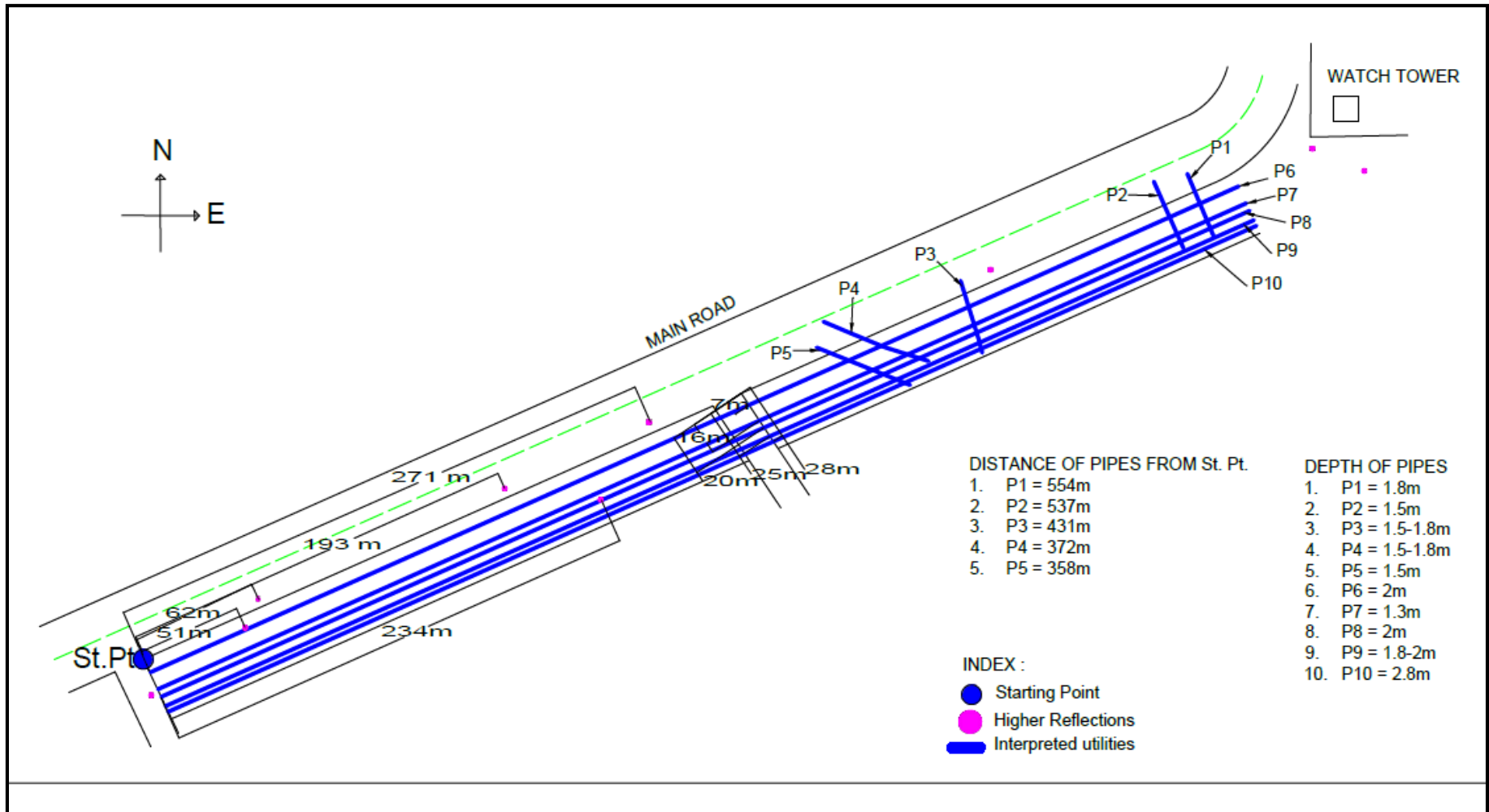
Antenna used 200 MHz

Data was collected along the
accessible transects

Detected 5 utilities along the road
and 5 utilities across the road



Output Result





VOID DETECTION UNDER ROAD

AT DAHEJ



Survey Specifics



Total area scanned is around an Acre

3D data collection

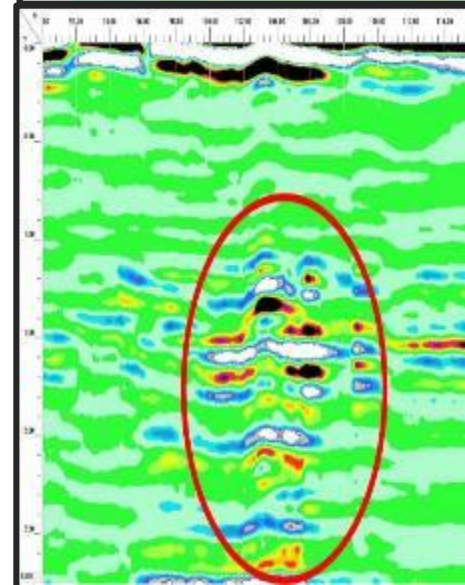
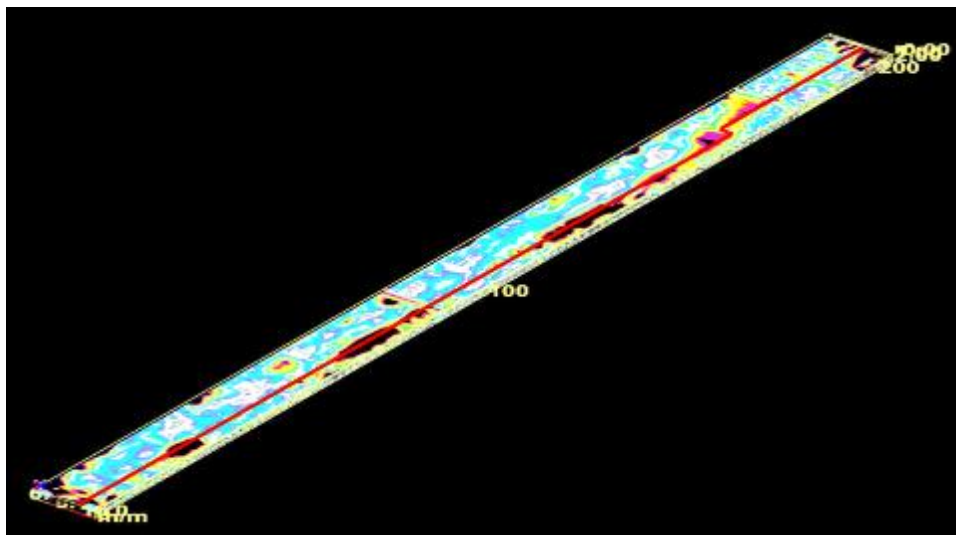
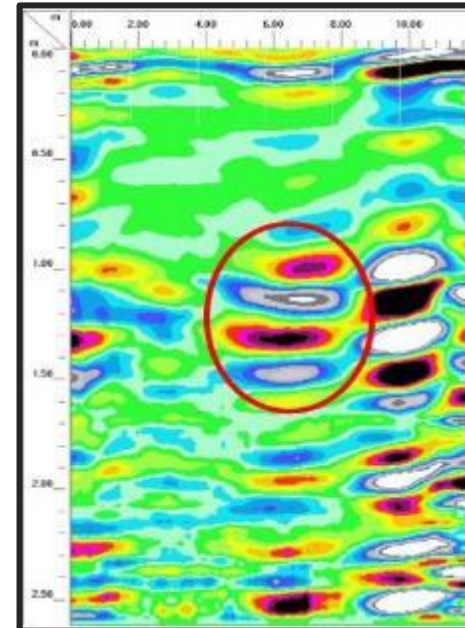
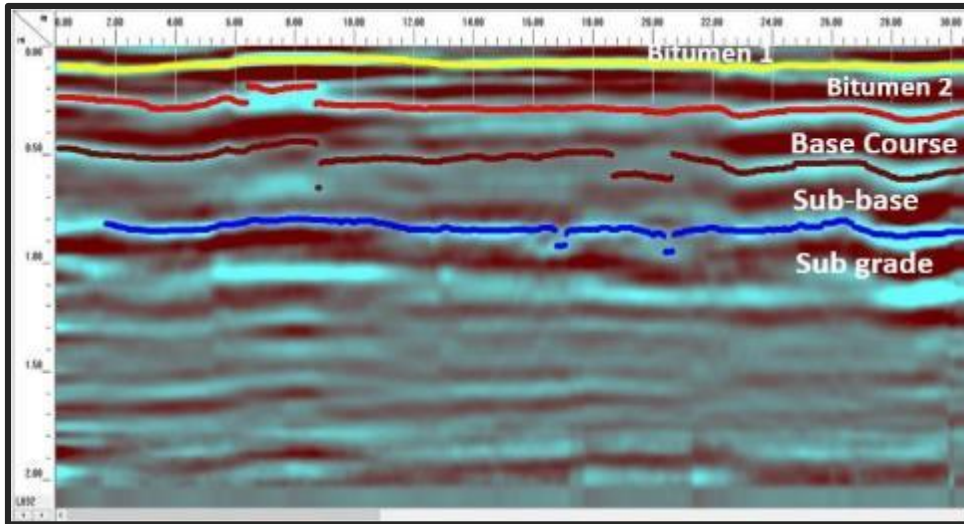
Antenna used 400 MHz to cover depth of 2.5 to 3m

Grid spacing of 3 m

Maximum accessible area was covered in rectangular fashion



2D & 3D subsurface view





RAILWAY BALLAST INVESTIGATION

AT GANDHINAGAR AND CST MUMBAI



Purpose of the survey



To explore the applicability of GPR for railway ballast investigation

To map all the possible obstructions in ballast, e.g. cables, rail pieces, etc.

To improve the efficiency of the Ballast Cleaning Machine (BCM)

Survey Specifics



3 Stretches of length 100m was considered for the survey

Buried 9 targets at approximate depth of 0.2 to 0.3 m

Customized cart was developed for smooth movement over the railway track



Used 900 MHz antennae for less penetration with higher resolution

Three profiles were collected to cover the width of the track

Improved resolution of the targets with advanced analysis

Output Results

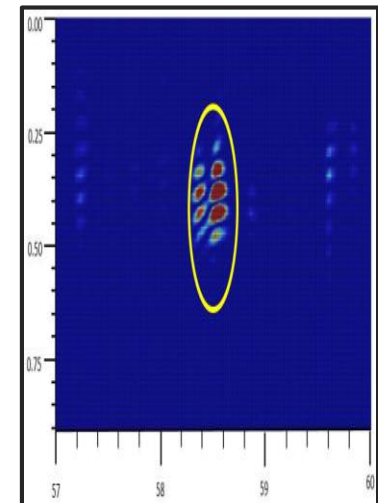
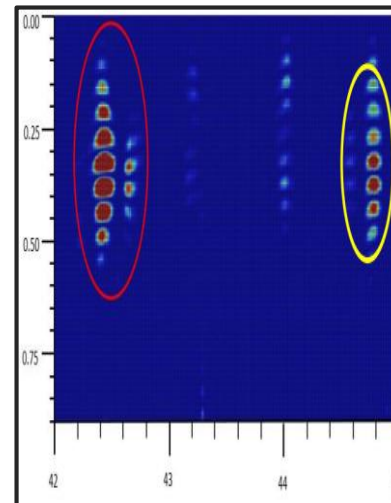
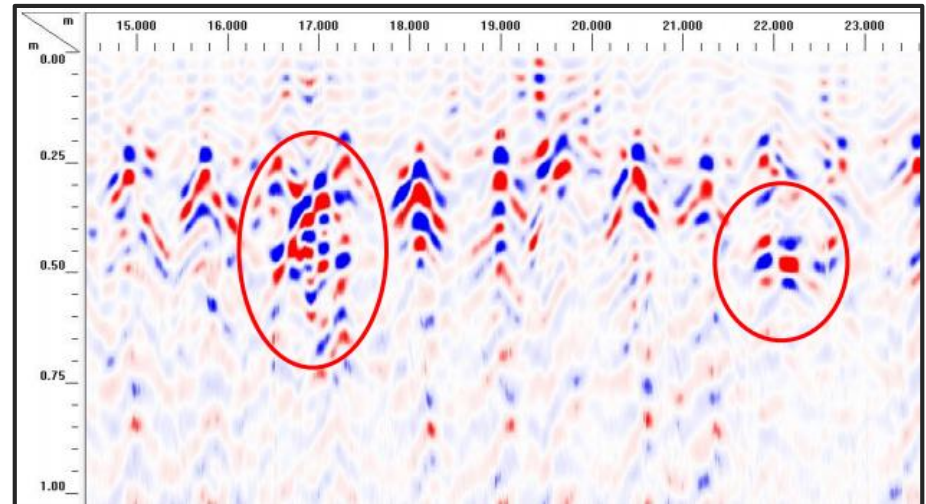


8 out of 9 buried targets could be located by conventional method

3 extra targets were located by advanced analysis method

Total 12 targets were detected

Resolution is enhanced by advanced analysis





ARCHAEOLOGICAL INVESTIGATION

AT KADAPA



Details of Investigated Area

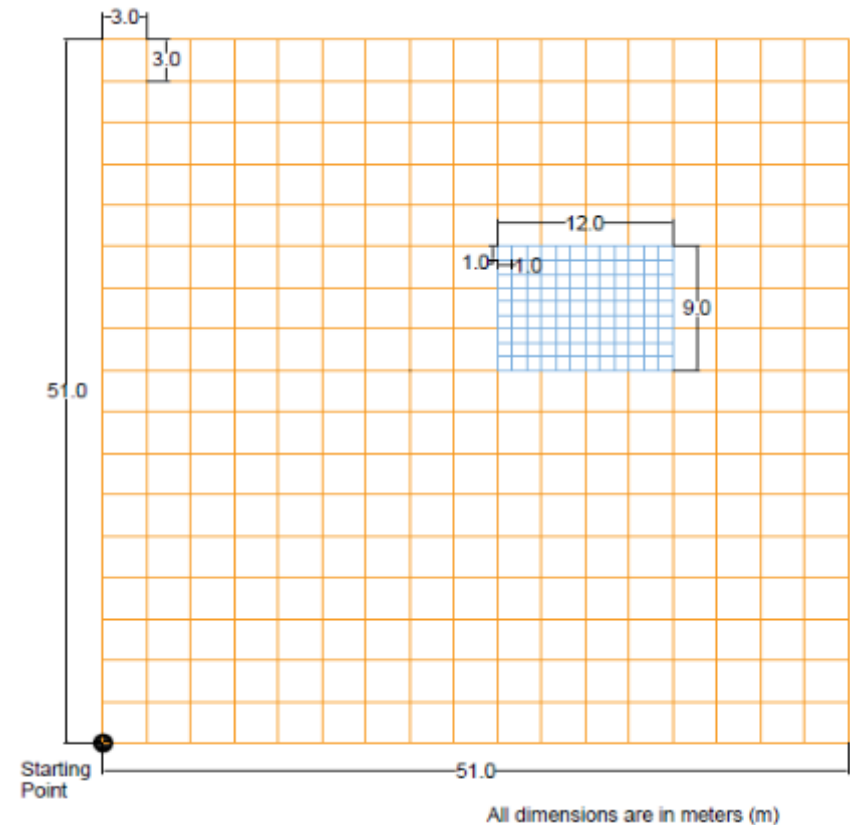


Total area covered is around 1 Acre

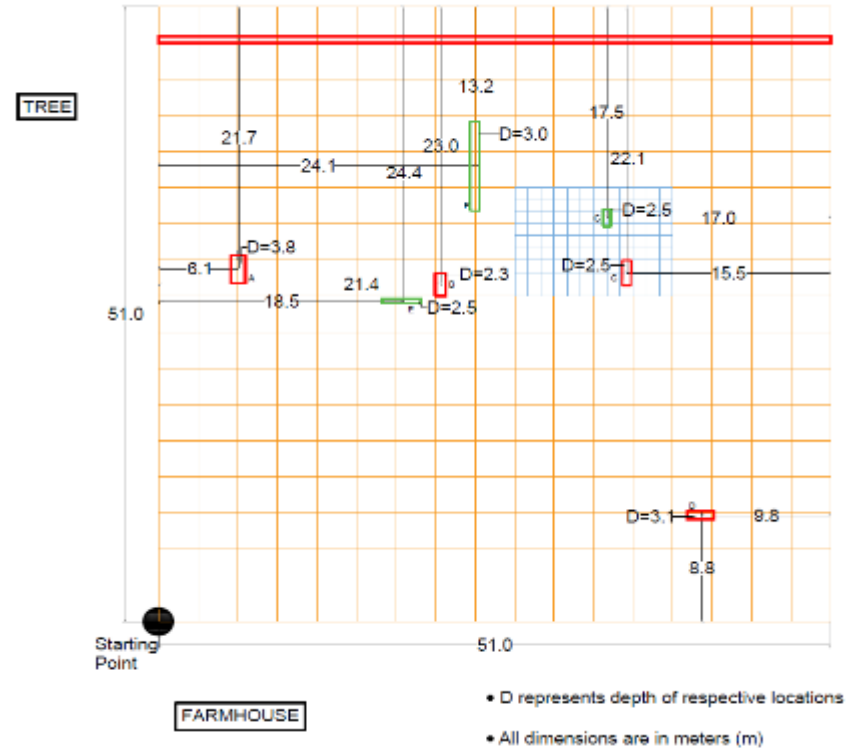
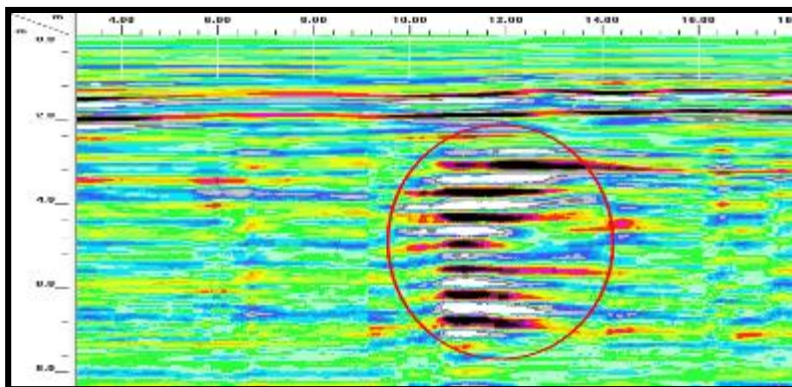
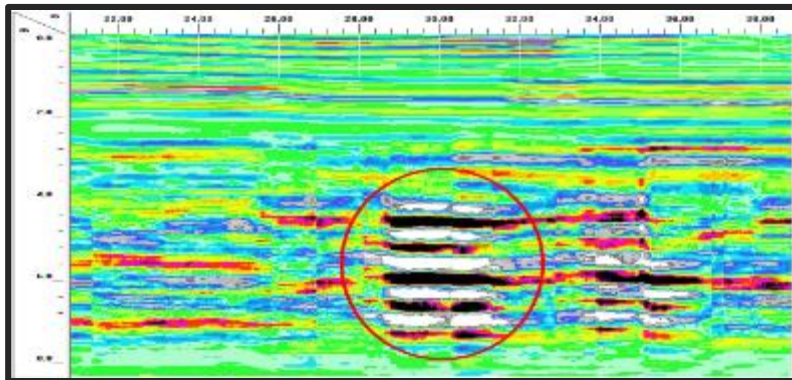
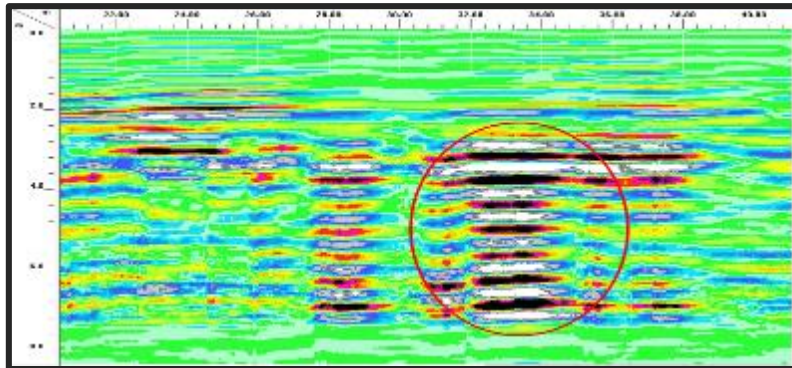
Expected area was covered in rectangular fashion

Data was collected using 200 and 100 MHz antenna

3D data collection in grid at spacing of 3 m with dense grid at expected location



Output Results



Observed 4 target locations and a linear feature representing wall kind reflections



ARCHAEOLOGICAL INVESTIGATION

AT DHOLAVIRA



Details of Investigated Area



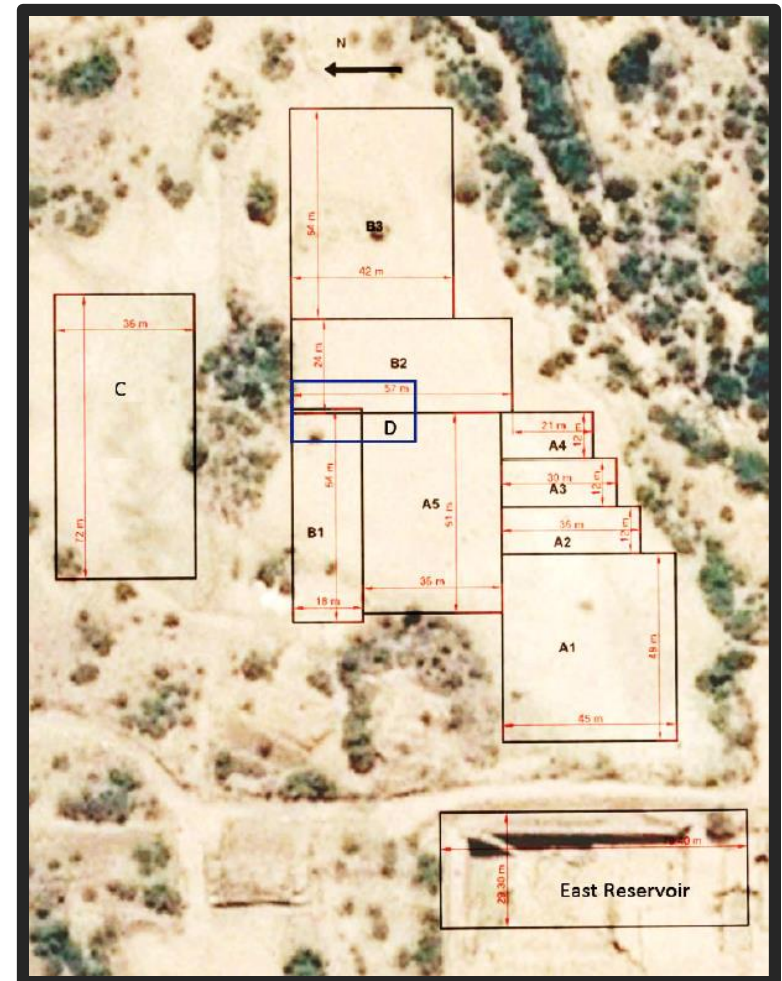
Situated at Khadirbet in Bhachau Taluka of Kutch District, in the state of Gujarat.

Total area covered is 12276 m²

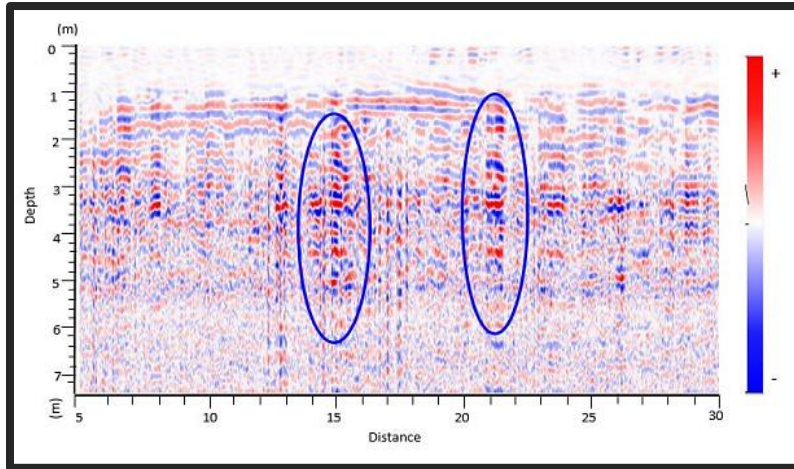
Maximum accessible area was covered in rectangular fashion

Data was collected using 400 and 200 MHz antenna

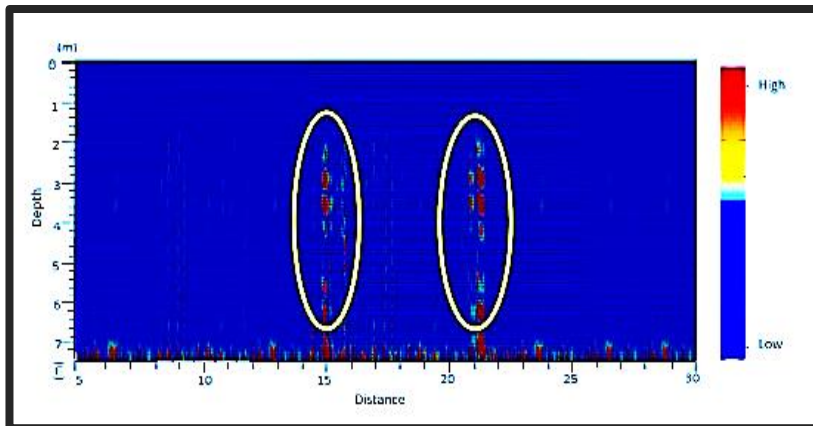
3D Data collection in grid



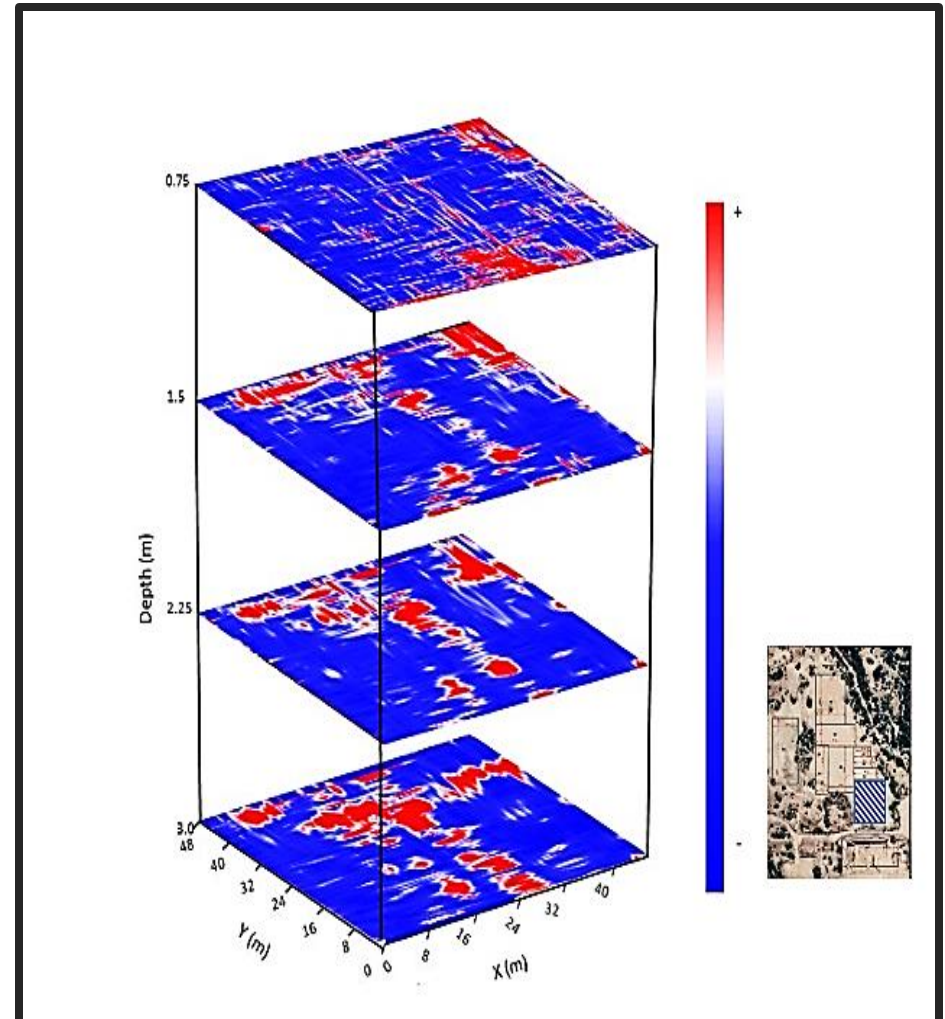
Output Results



Conventional Profile

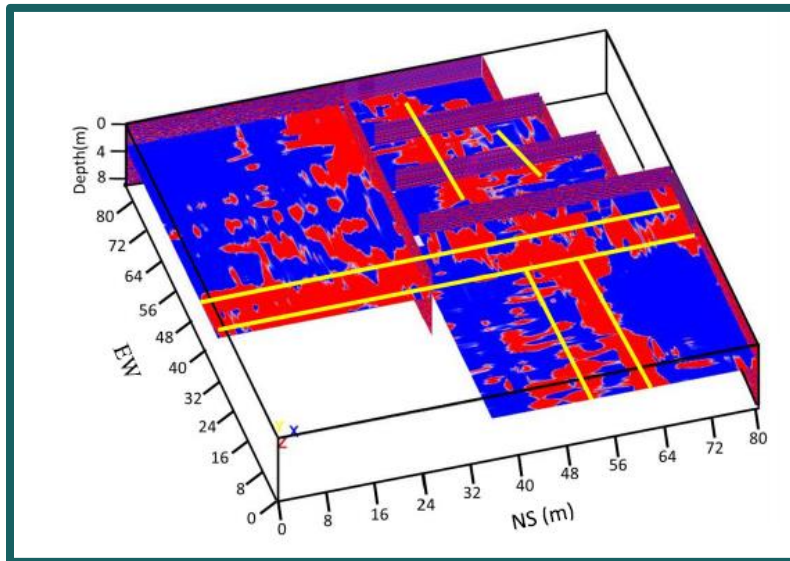


Improved Profile



3-D view at different depths

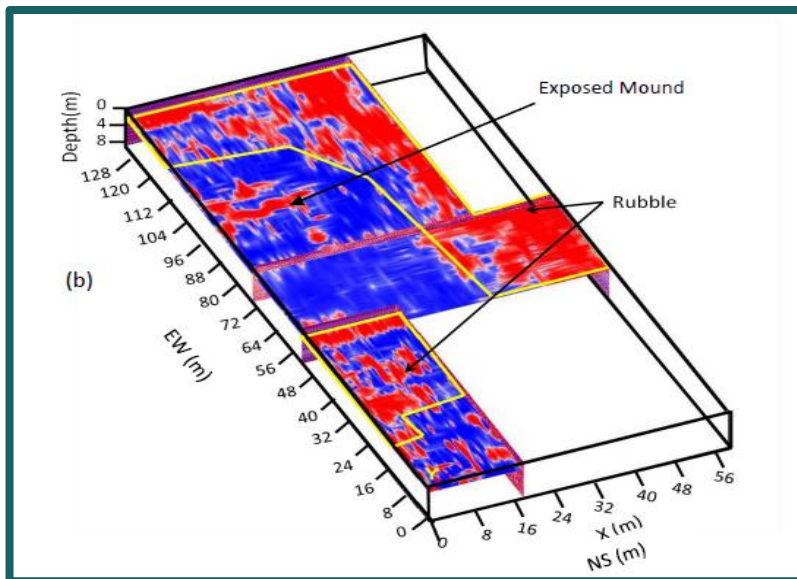
Output Results



3-D subsurface view of areas

Depth slice at a particular depth

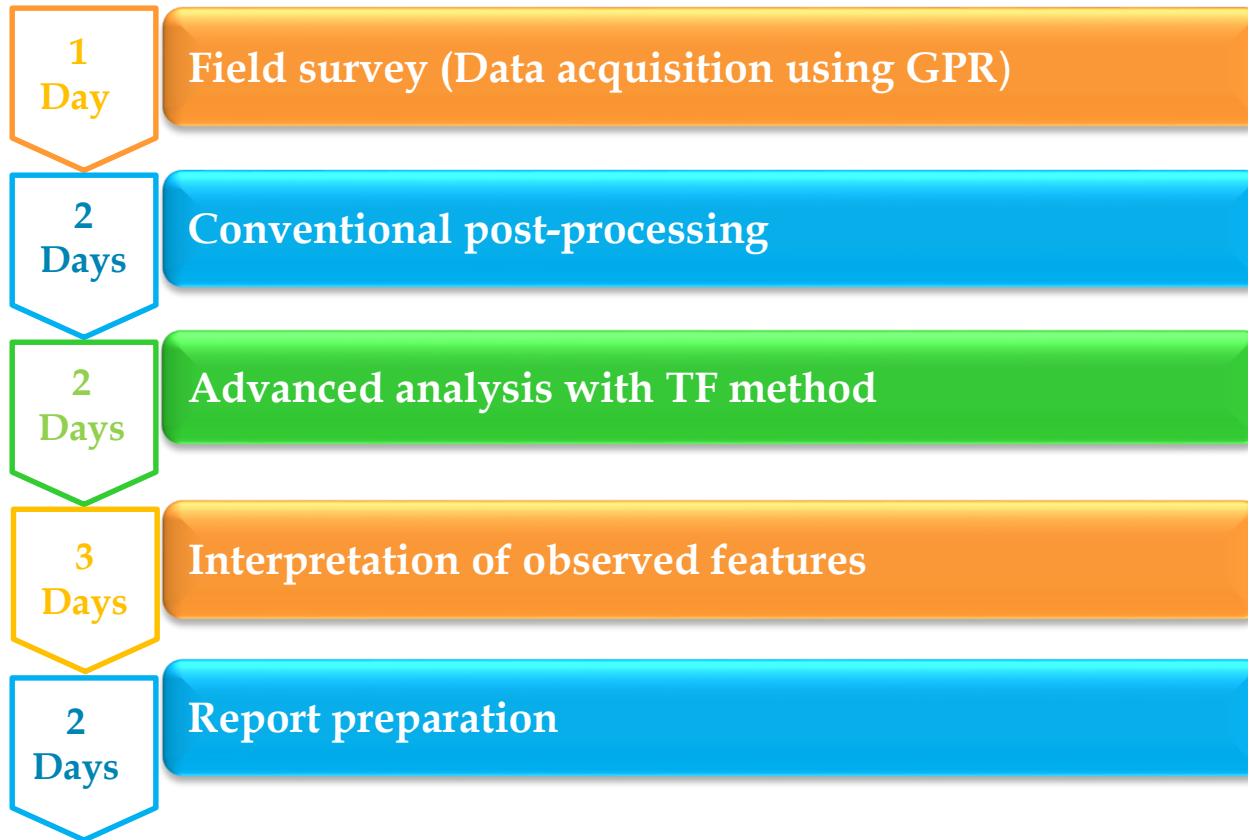
Observed features are marked



Time Demand



Average time requirement for the survey over either an area of 1 Acre or 5 km length of two lane road





Geo-Carte

