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

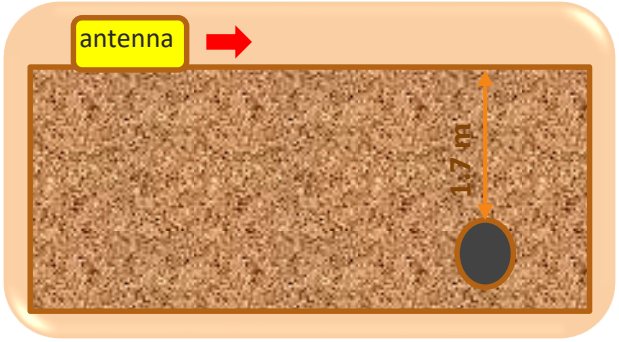
To introduce a non-destructive subsurface exploration method, which leads to

Introduction to GPR

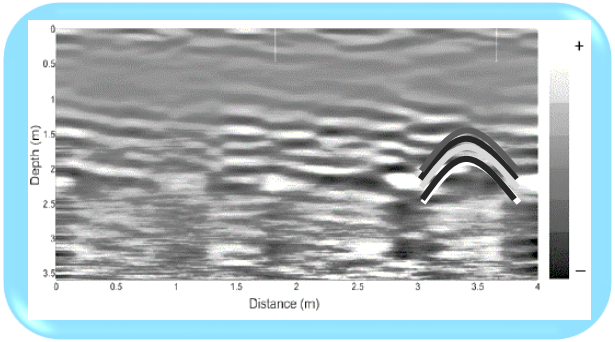
Ground Penetrating Radar (GPR)

- 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

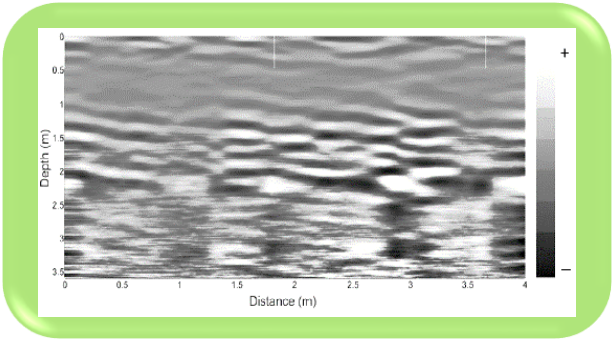
Current Limitation



Investigated Site



Expected Results

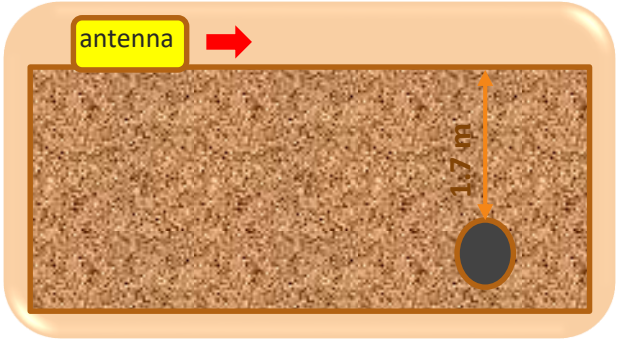


Actual Results Obtained

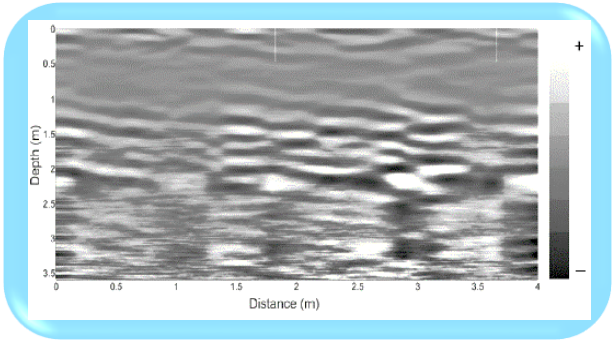
Fails to provide satisfactory result in case of weak signals

Low dielectric contrast, wet clayey soil, conductive medium

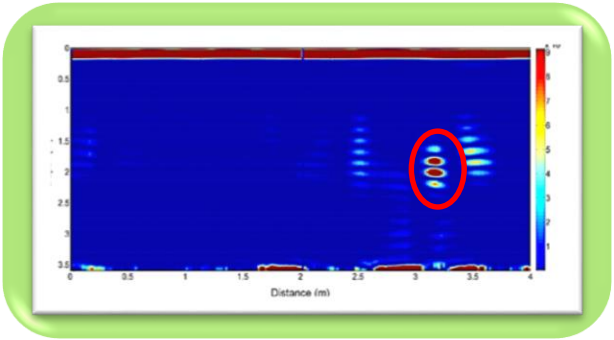
Our Developed Technology



Investigated Site



Conventional Output



Improved Output

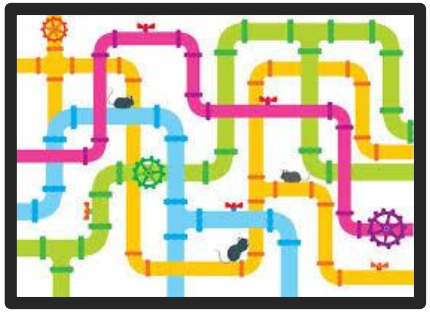
Advanced T-F analysis & better interpretation for weak signal data

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

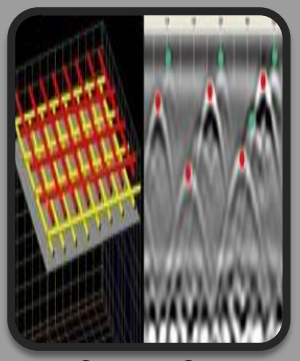
Applications

Utility Mapping

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

Road & Highway Inspection

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



Concrete Structure Inspection

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

Archaeological Investigation

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

Other Applications

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

About Geo-Carte

Incubated at IIT Gandhinagar

Our Esteemed Clients

Reliance Industries Limited

Indian Railways
Lifeline to the nation...

Capstone GEO CONSULTANTS
INNOVATION PERFORMANCE QUALITY

Aimil

Arvind Infrastructure

Somnath Trust

Trenchless

AAM

atec
Anandjiwala Technical Consultancy

Clientele We Serve

- Government Organization
- Construction Companies
- Utility Companies
- Transportation Infrastructure Agencies
- Archaeological Departments
- Defence Agencies

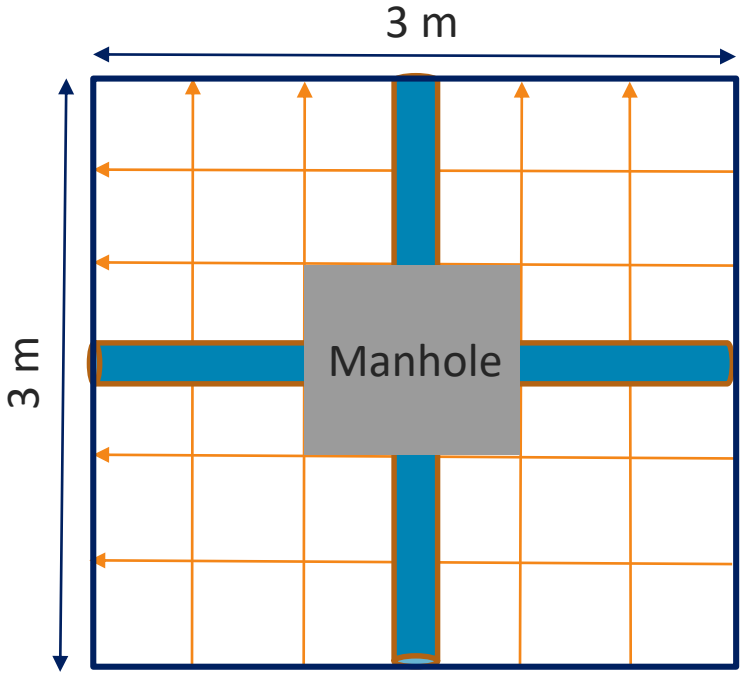
Feedback from Our Customers

GeoCarte's Few Success Stories

UTILITY MAPPING OVER CONCRETE SURFACE

AT IIT VGEC CAMPUS

3-D Data Collection

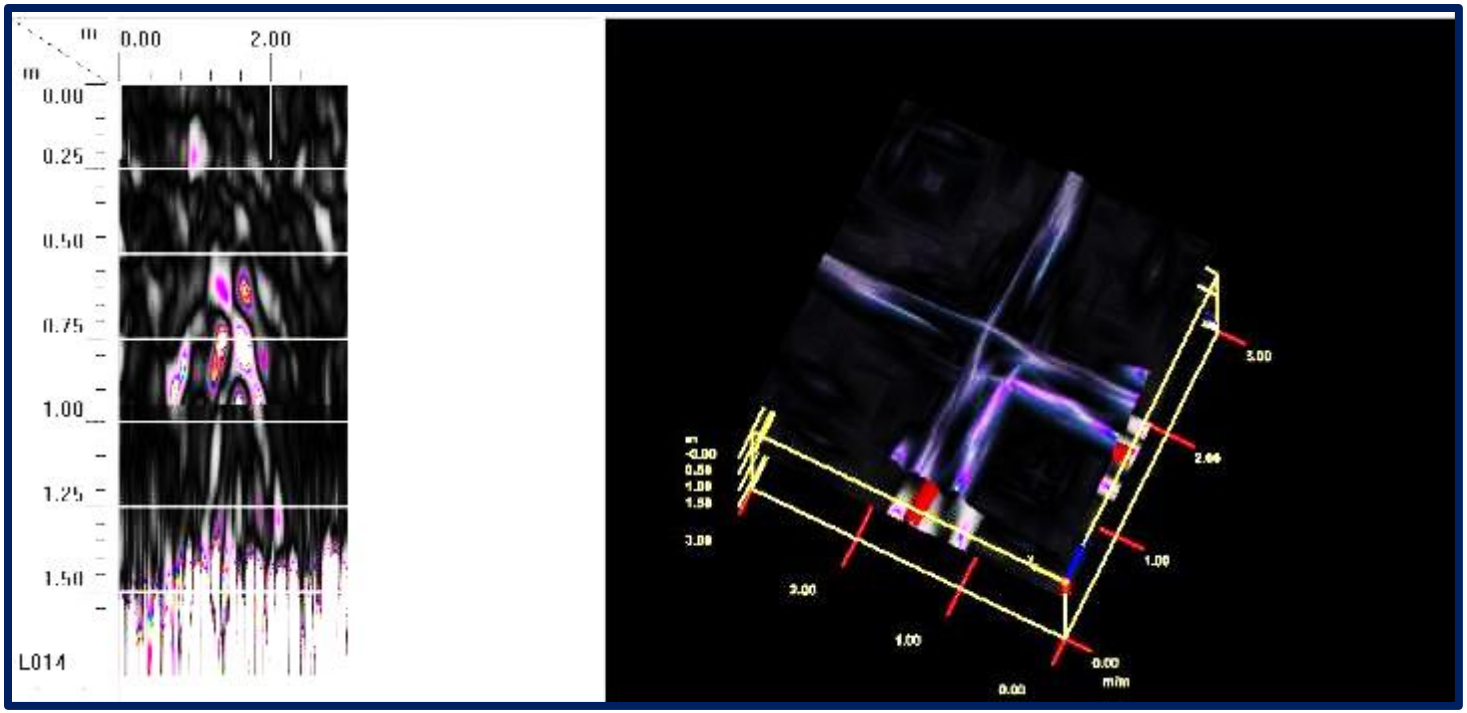


Data was collected over and around the manhole in an area of 3m X 3m in a grid

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

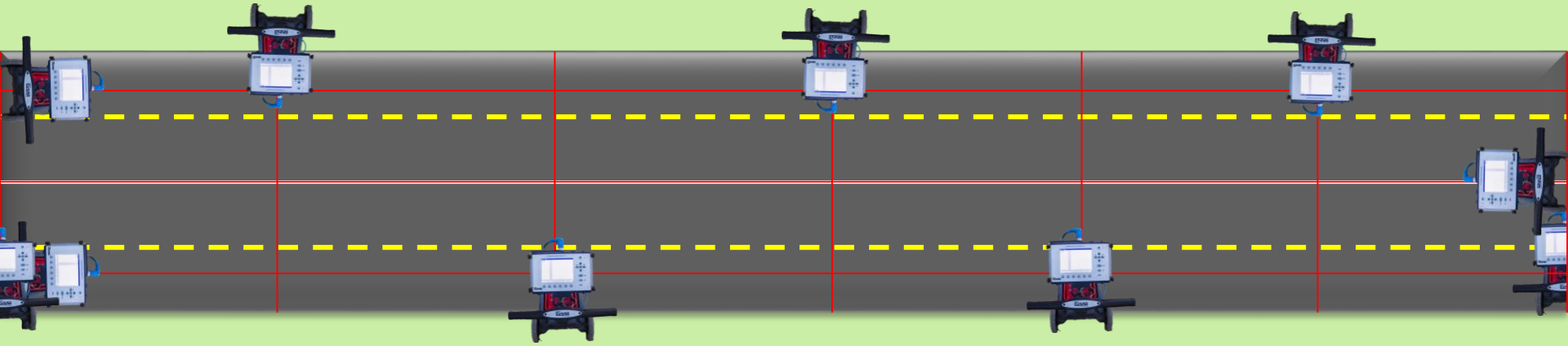
To avoid encounter of other such pipe in further execution

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

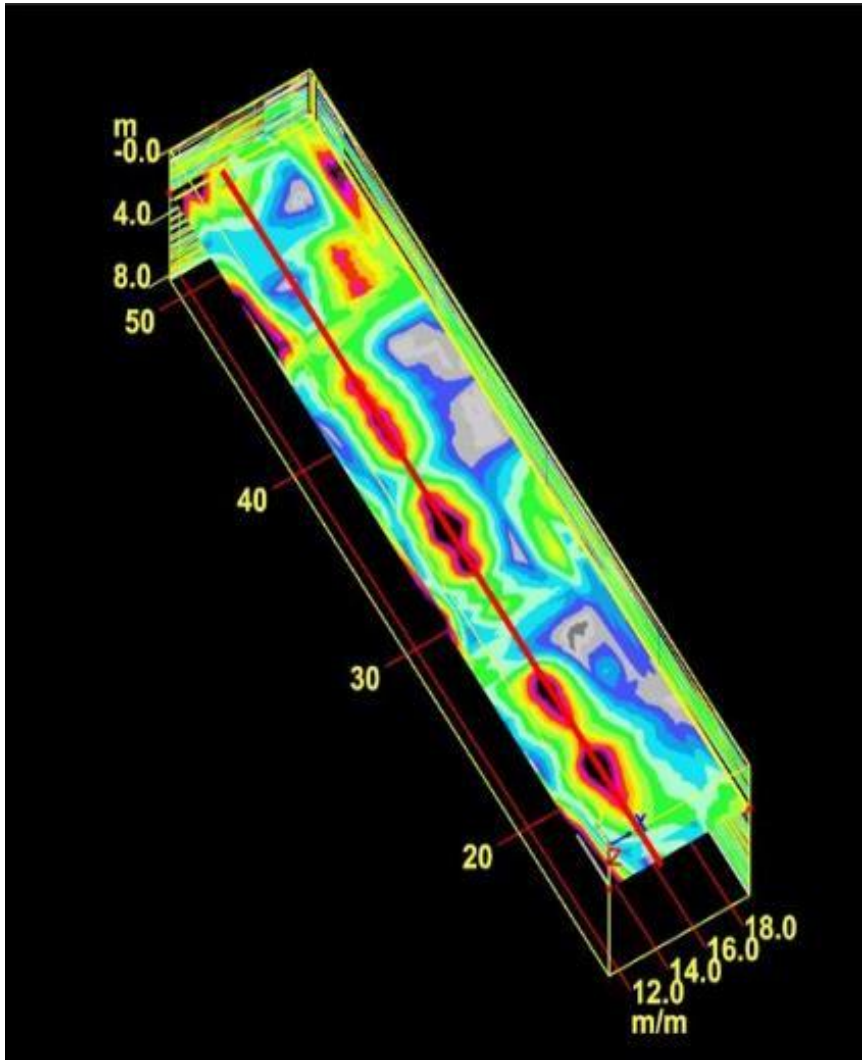
Survey Specifics

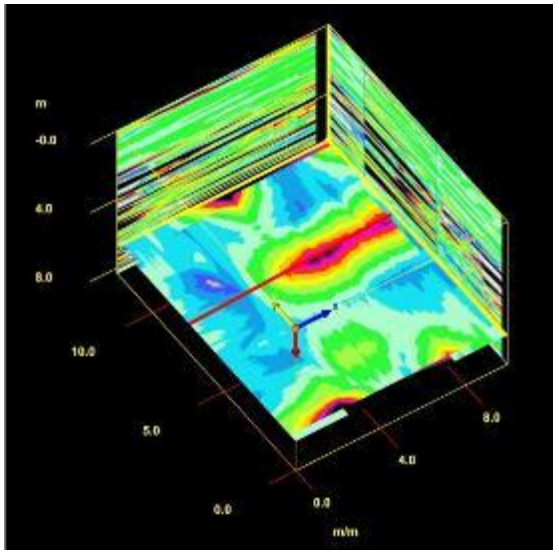
- Total area scanned is around 33,00 m^2, 3 road crossings
- 3D data collection
- Antenna used 200 MHz
- Grid spacing varying from 2 to 3 m
- Maximum accessible area was covered in rectangular fashion

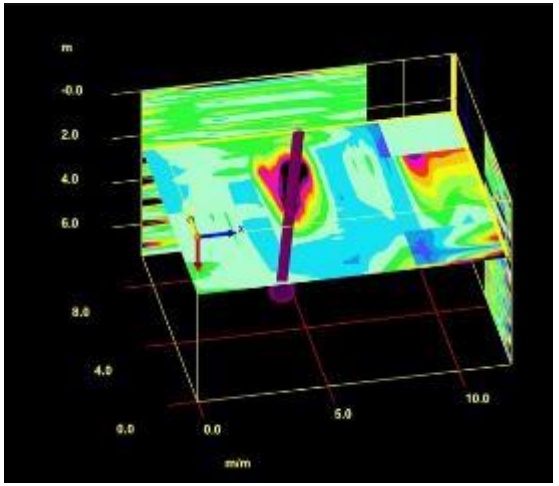
Data Collection



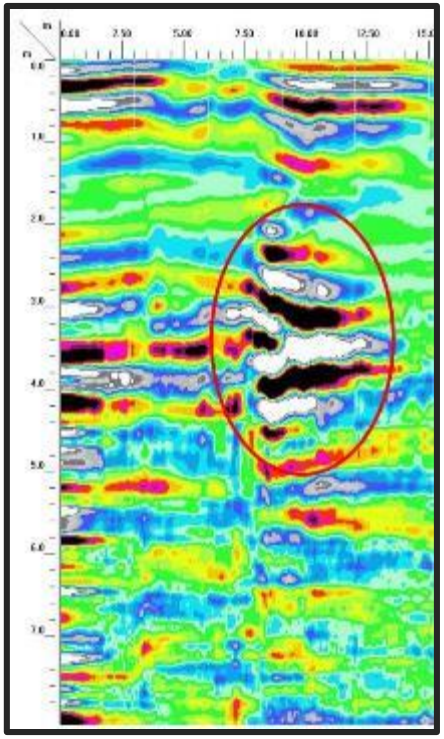
3D subsurface view

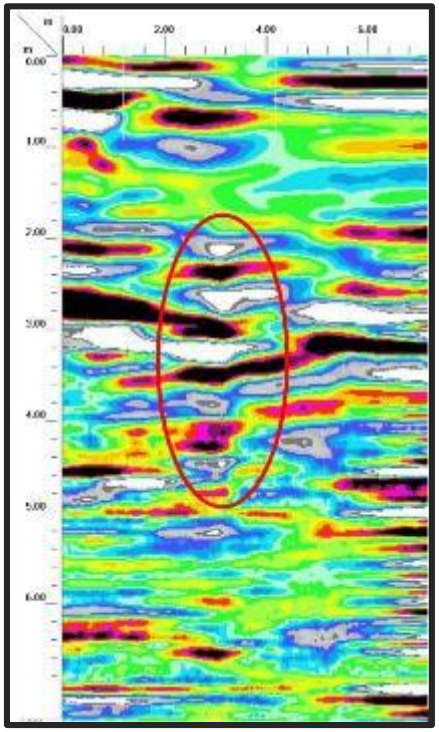


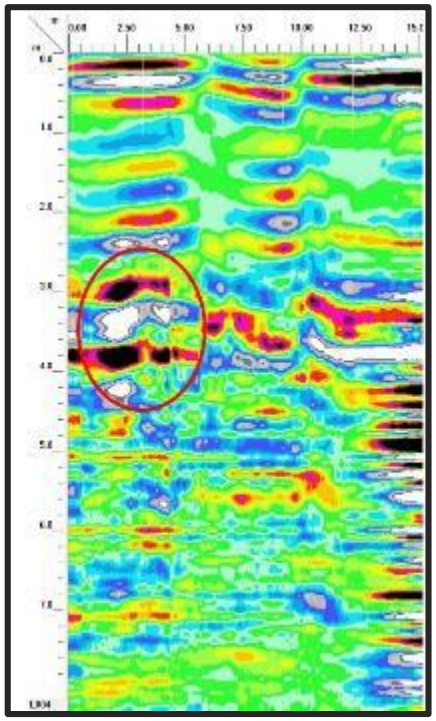


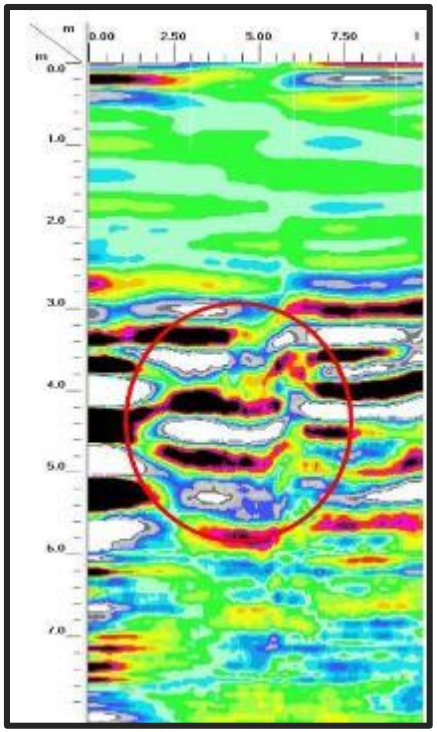


2D subsurface profiles

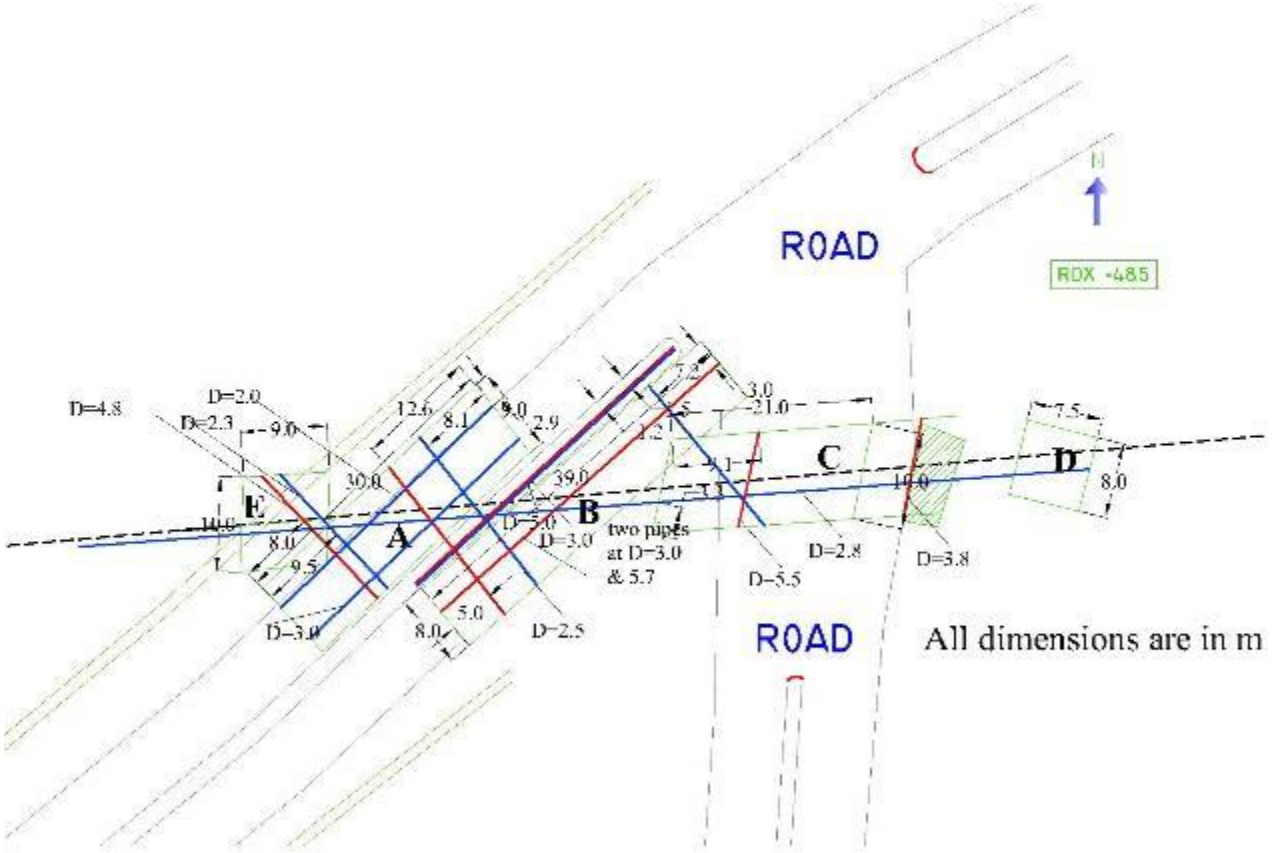








Output Result



Site-1

3

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

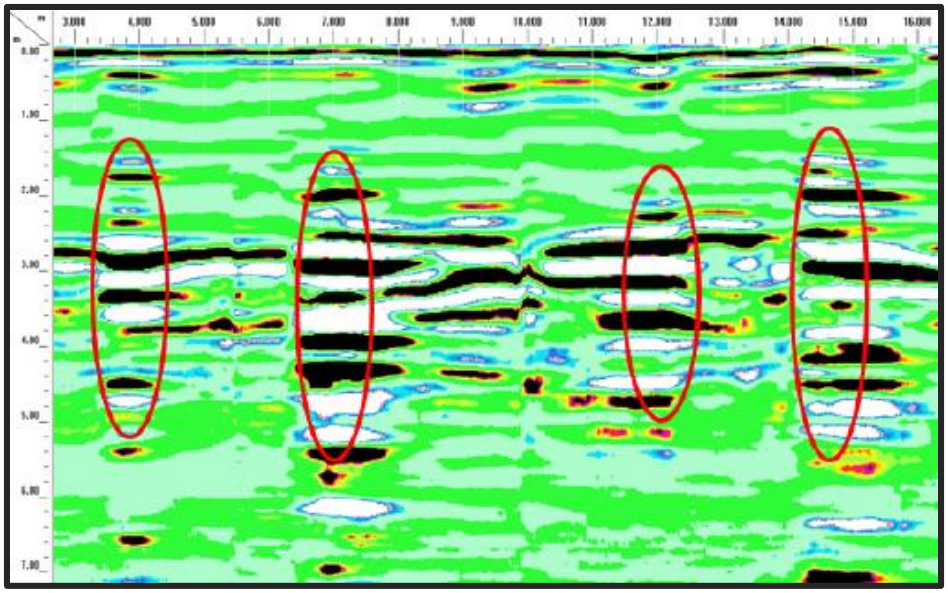
Total area scanned is around 24000 m^2

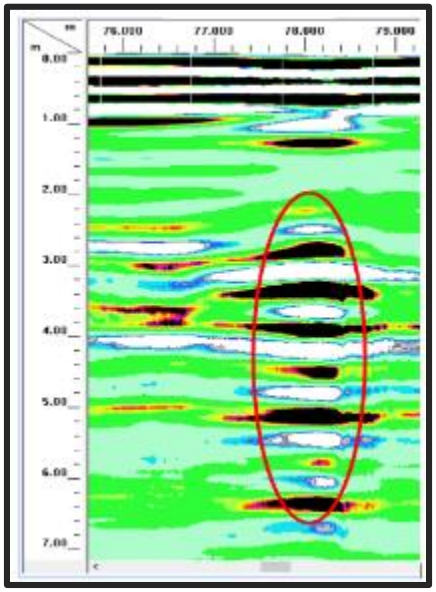
2D data collection

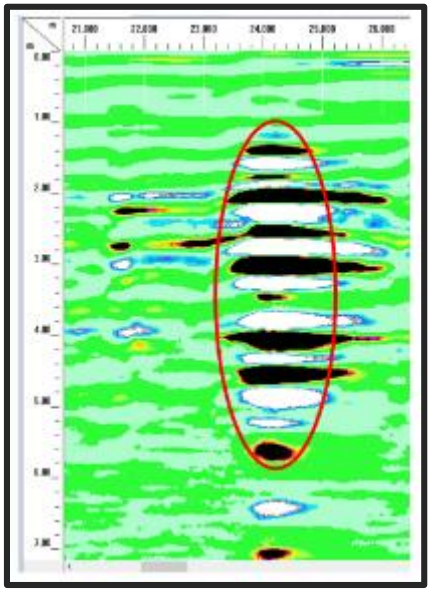
Antenna used 200 MHz

Data was collected along the accessible transects

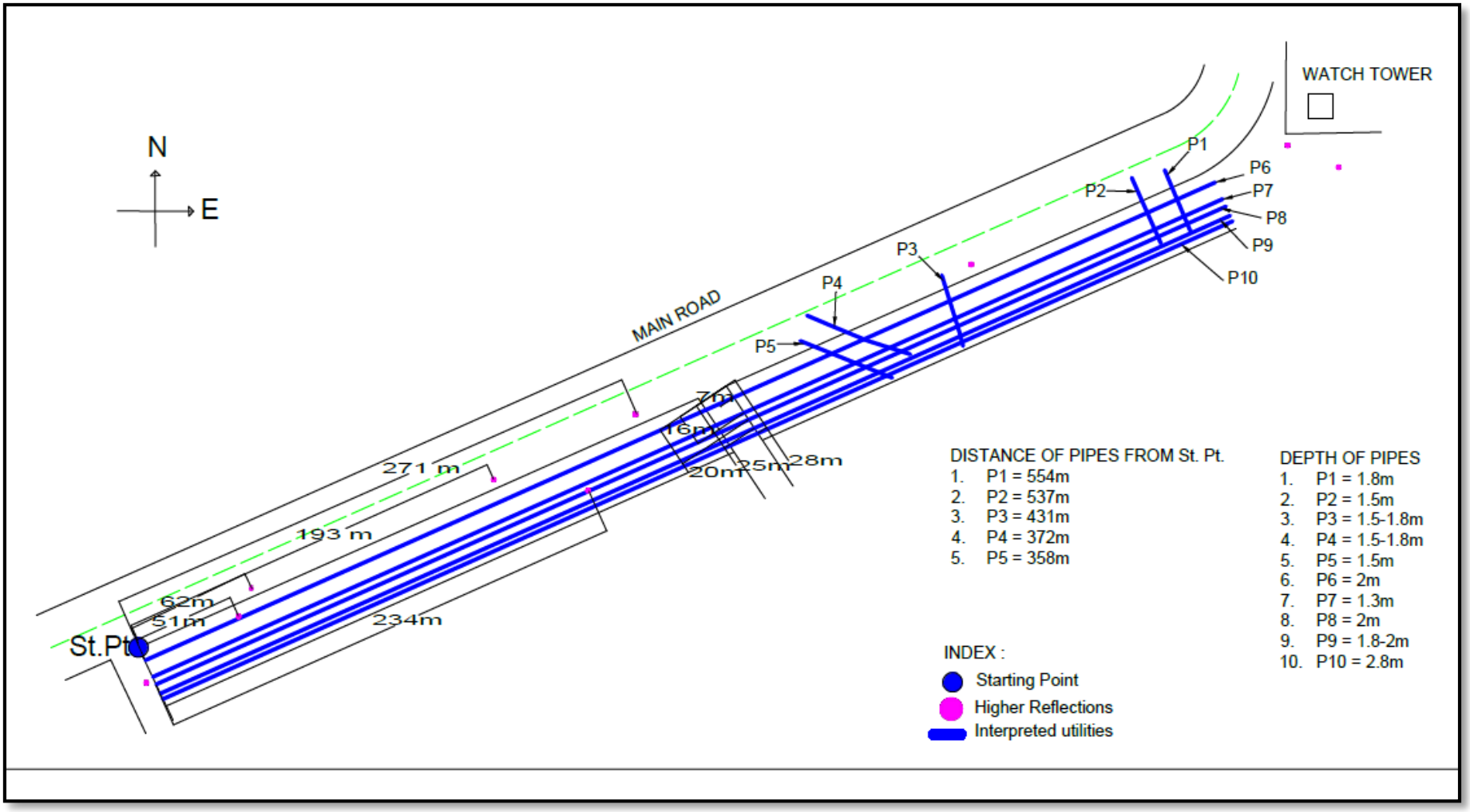
Detected 5 utilities along the road and 5 utilities across the road







Output Result



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VOID DETECTION UNDER ROAD

AT DAHEJ

Survey Specifics

Total area scanned is around an Acre

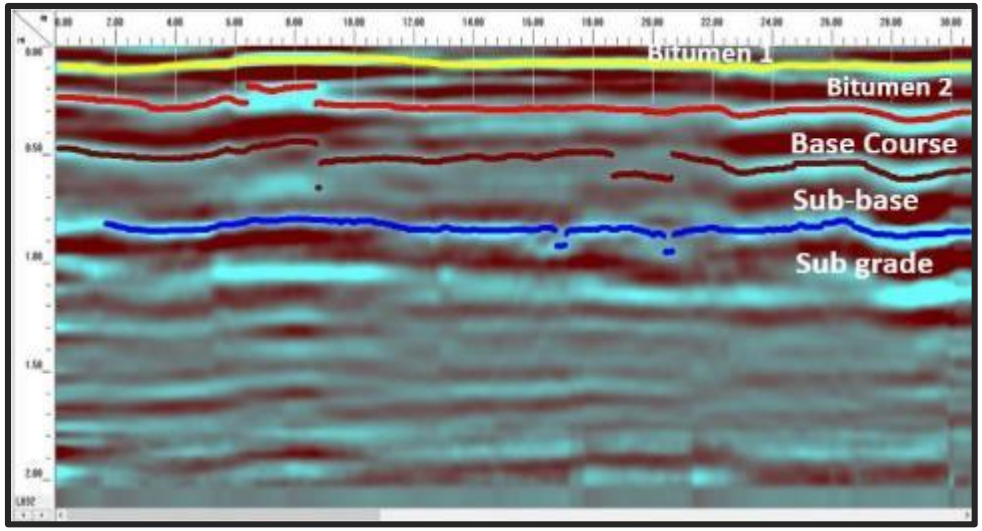
3D data collection

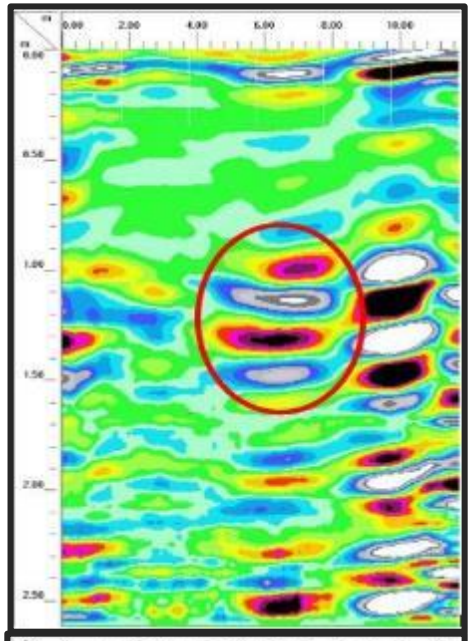
Antenna used 400 MHz to cover depth of 2.5 to 3m

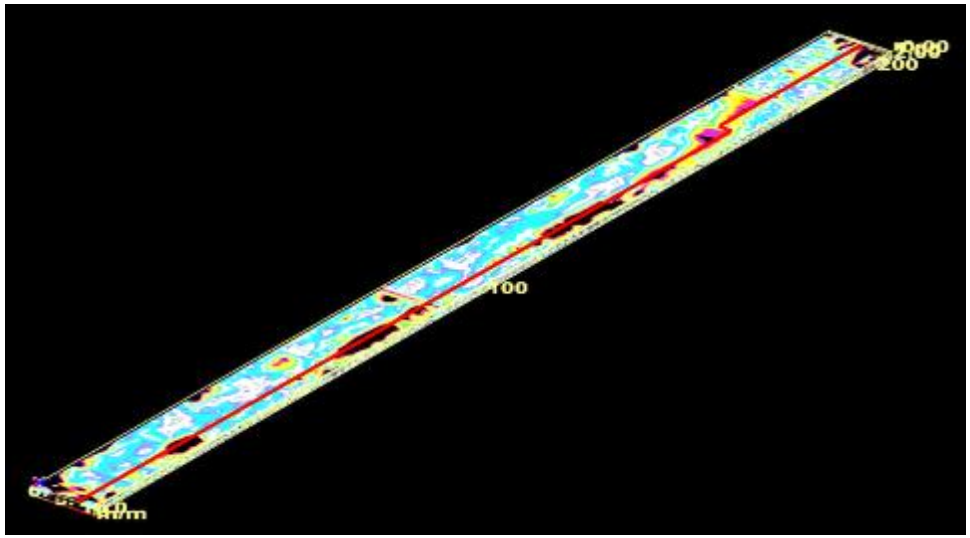
Grid spacing of 3 m

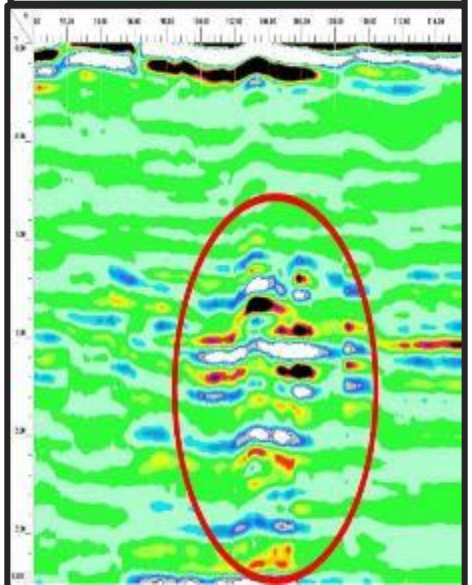
Maximum accessible area was covered in rectangular fashion

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

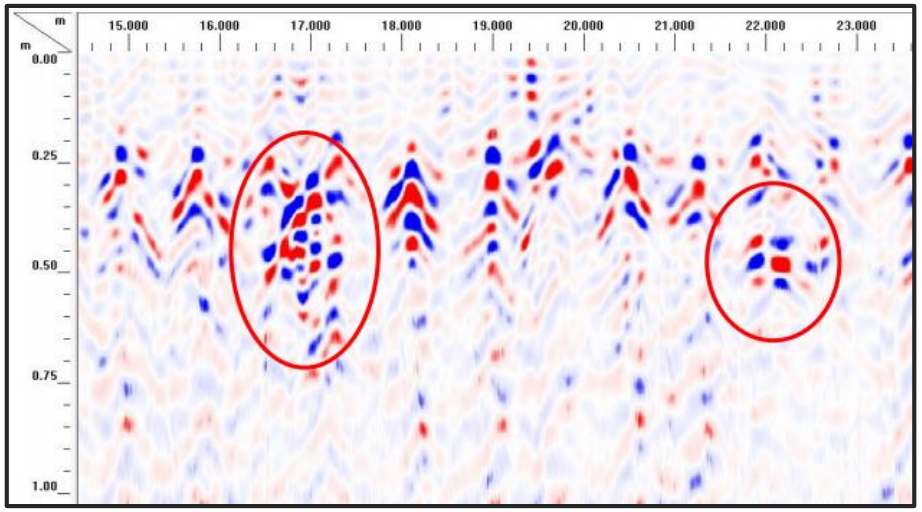
Output Results

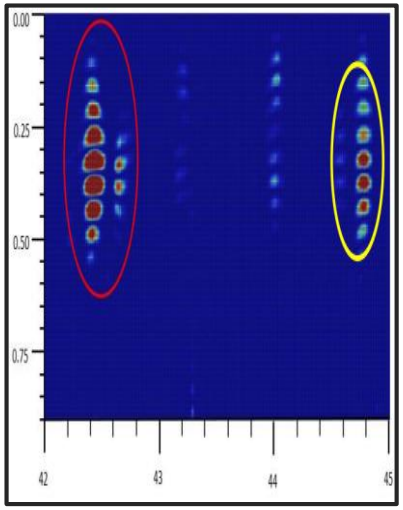
8 out of 9 buried targets could be located by conventional method

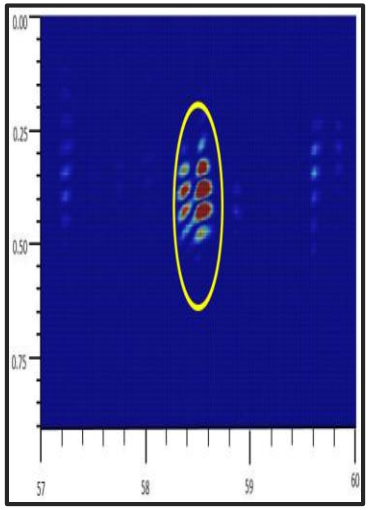
3 extra targets were located by advanced analysis method

Total 12 targets were detected

Resolution is enhanced by advanced analysis







ARCHAEOLOGICAL INVESTIGATION

AT KADAPA

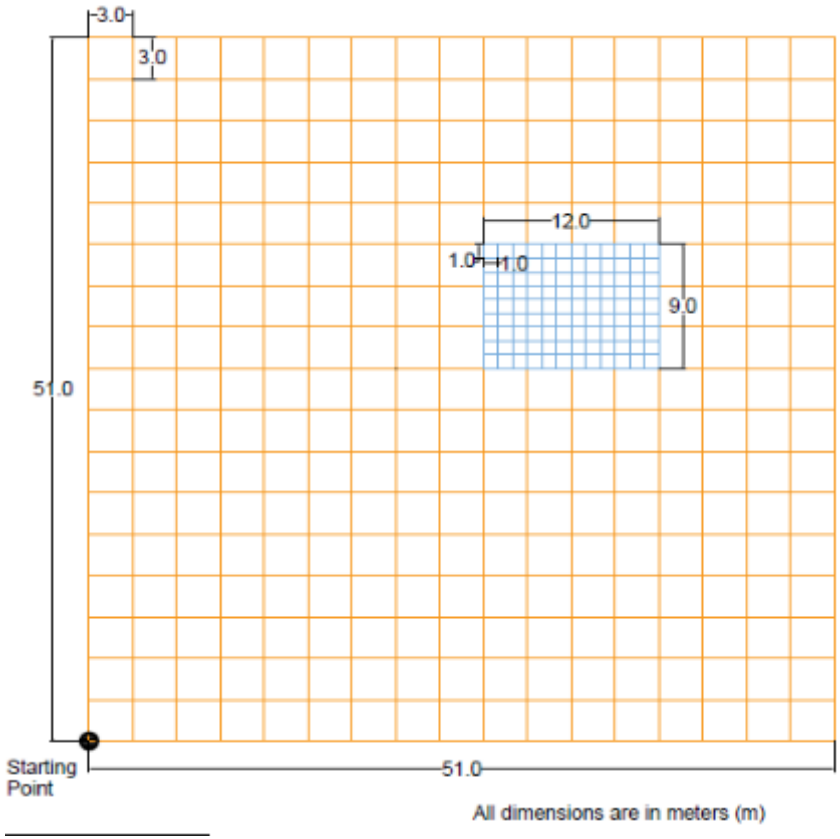
Details of Investigated Area

Total area covered is around 1 Acre

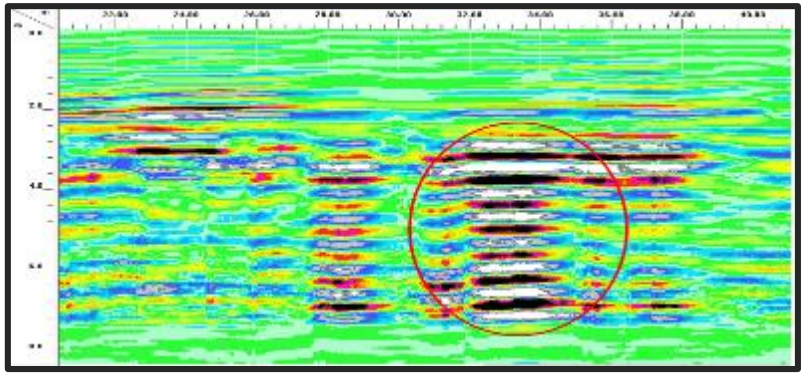
Expected area was covered in rectangular fashion

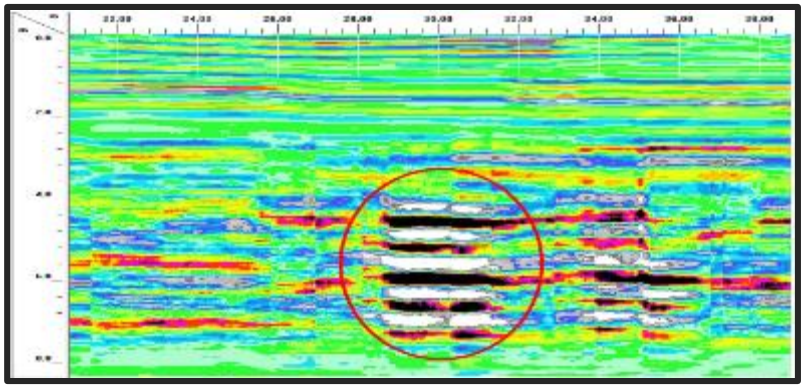
Data was collected using 200 and 100 MHz antenna

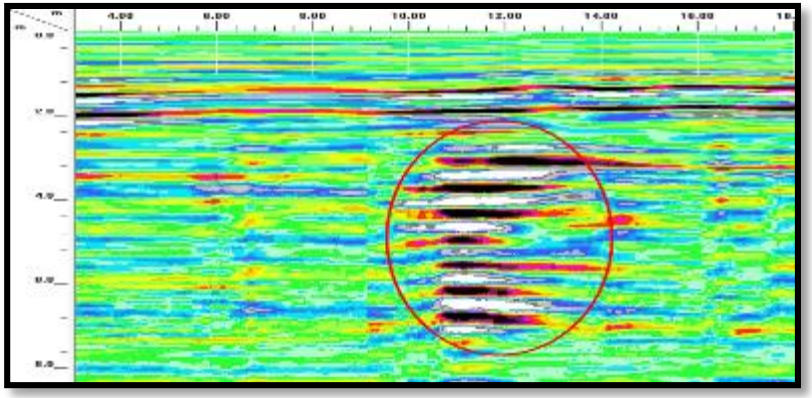
3D data collection in grid at spacing of 3 m with dense grid at expected location

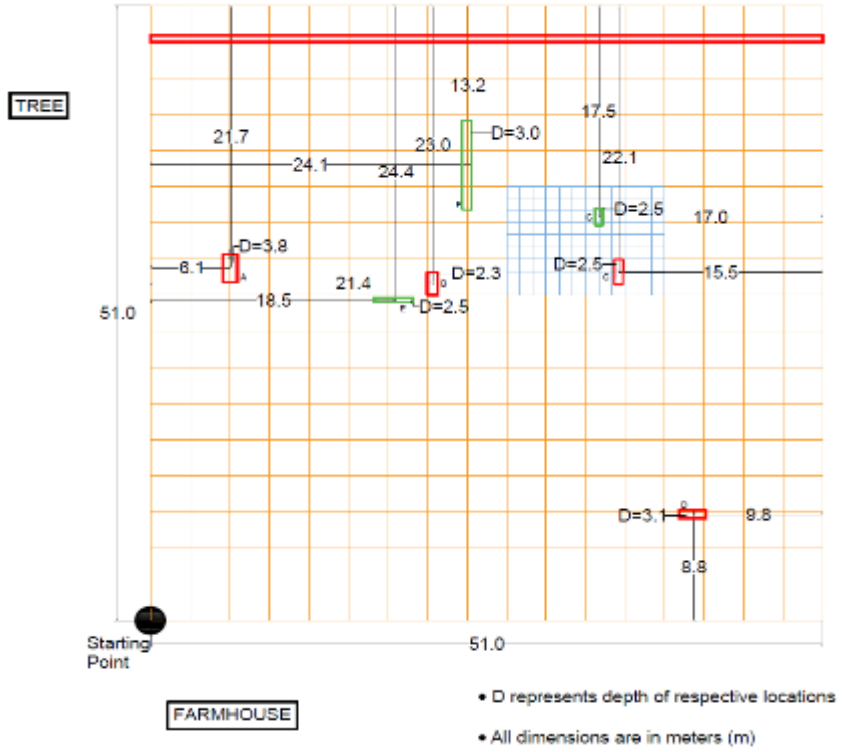


Output Results









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

7

ARCHAEOLOGICAL INVESTIGATION

AT DHOLAVIRA

Details of Investigated Area

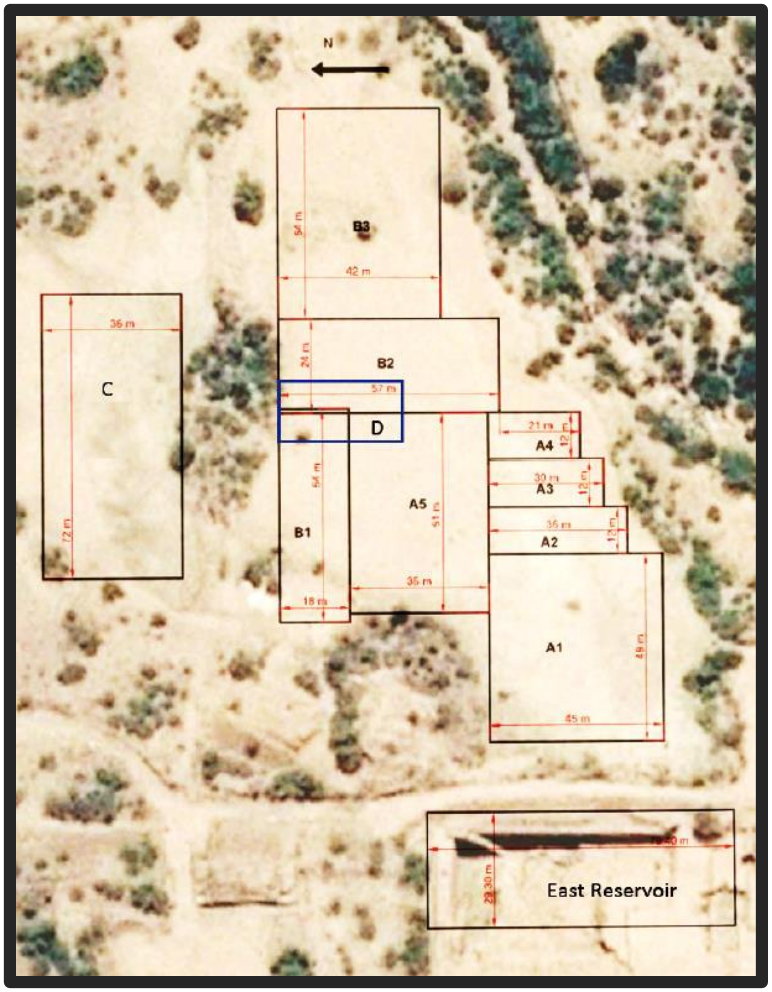
Situated at Khadirbet in Bhachau Taluka of Kutch District, in the state of Gujarat.

Total area covered is 12276 m^2

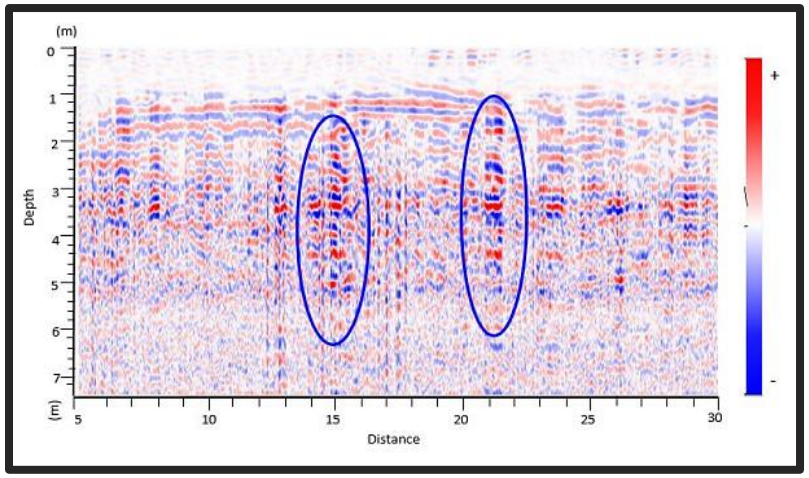
Maximum accessible area was covered in rectangular fashion

Data was collected using 400 and 200 MHz antenna

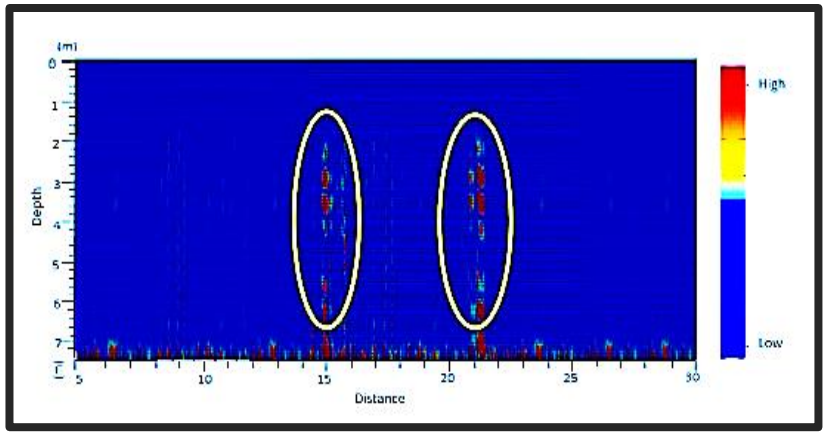
3D Data collection in grid



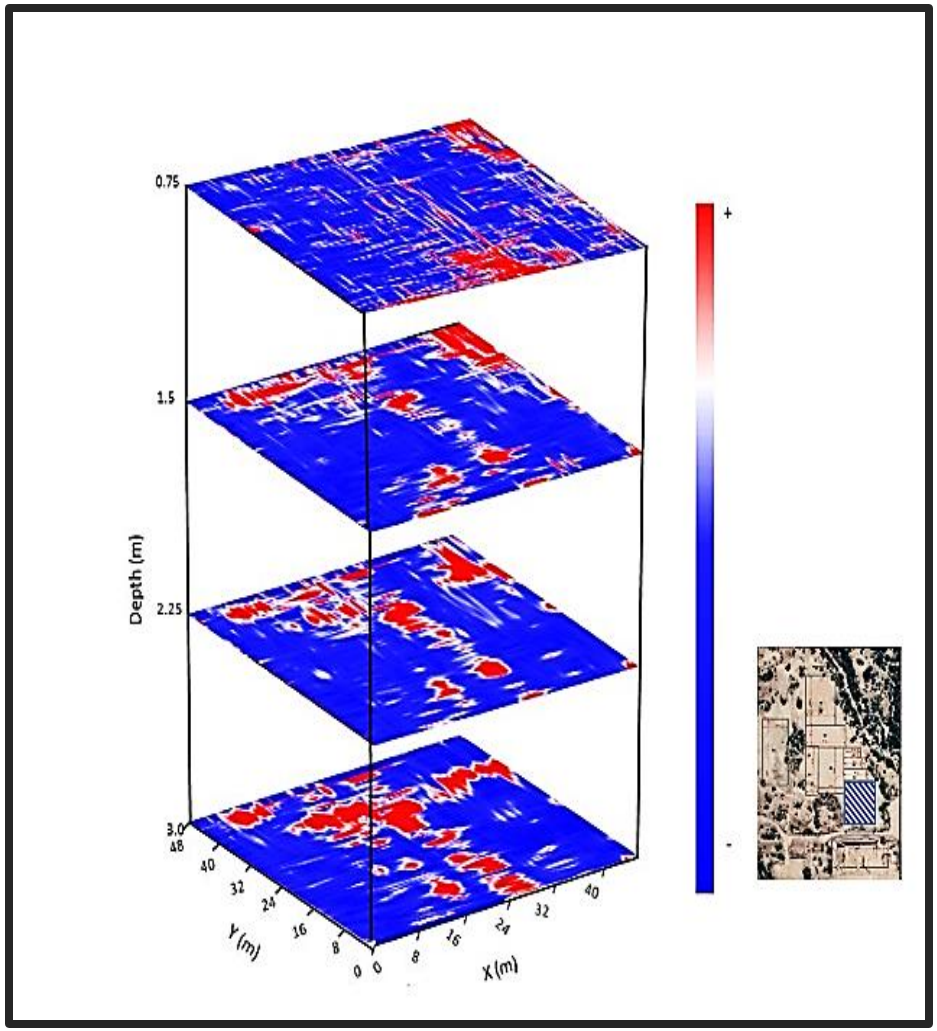
Output Results



Conventional Profile

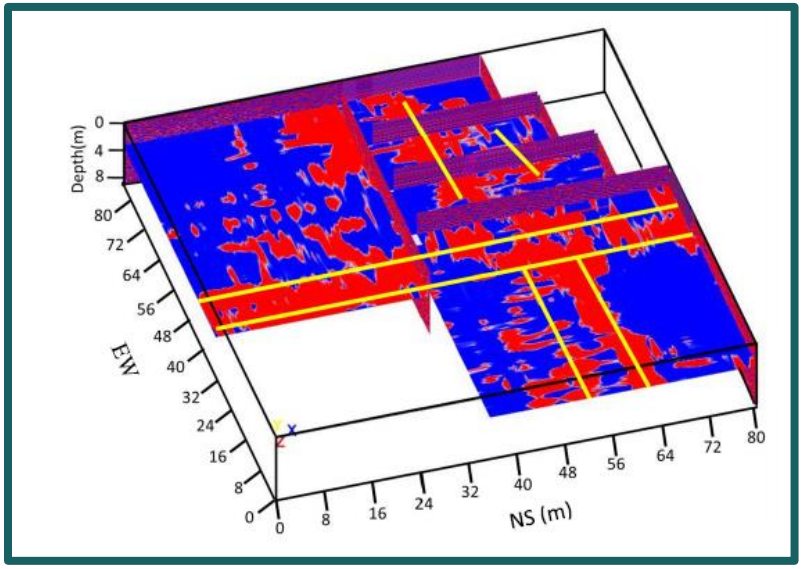


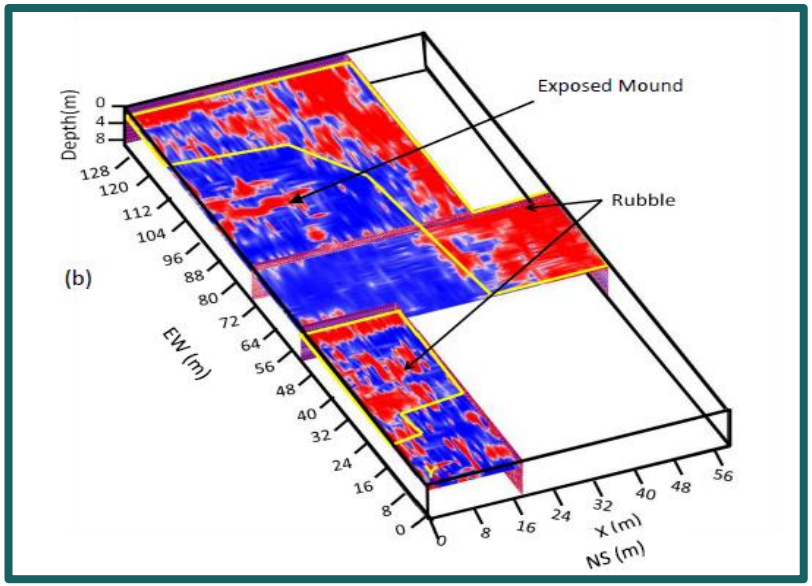
Improved Profile



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

1 Day	Field survey (Data acquisition using GPR)
2 Days	Conventional post-processing
2 Days	Advanced analysis with TF method
3 Days	Interpretation of observed features
2 Days	Report preparation

Geo-Carte