

Application of Drones in Urban Development

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Reinventing Urban Development Through Emerging Tools & Techniques

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Night view of Shimla Town, Himachal Pradesh, India



Understanding the Drone Ecosystem



Hardware

- Agriculture Spraying & Mapping
- Delivery Systems
- Drone Platforms
- Drone-In-A-Box
- Helicopter
- Recreational
- VTOL Fixed Wing
- Fixed Wing
- Safety & Security
- Lighter-Than-Air
- Passenger Drones
- Counter Drones
- Components & Systems
 - Cameras, Imaging & Video System
 - Launch & Recovery Systems
 - Propulsion & Power
 - Navigation & Guidance Systems
 - Data Communication

Software

- Flight, Fleet & Operation Management
- Open Source Infrastructure, SDK
- Navigation, CV and AI
- UTM, LAANC Suppliers
- Data Analytics, Workflow, CV and AI
- Photogrammetry
- 3D Modelling

Services

- Drone-As-A-Services
- Delivery
- Mapping & Surveillance
- Drone Show Providers
- Education, Simulation & Training
- System Integration, Engineering and Advisory
- Maintenance
- Suppliers, Retailers
- Test Sites
- Market Research & Consulting
- User Groups, Networks
- Media, News, Blogs & Magazines
- Podcast
- Insurances
- Marketplaces
- Shows, Conferences and Events
- Coalitions, Organizations & Initiatives

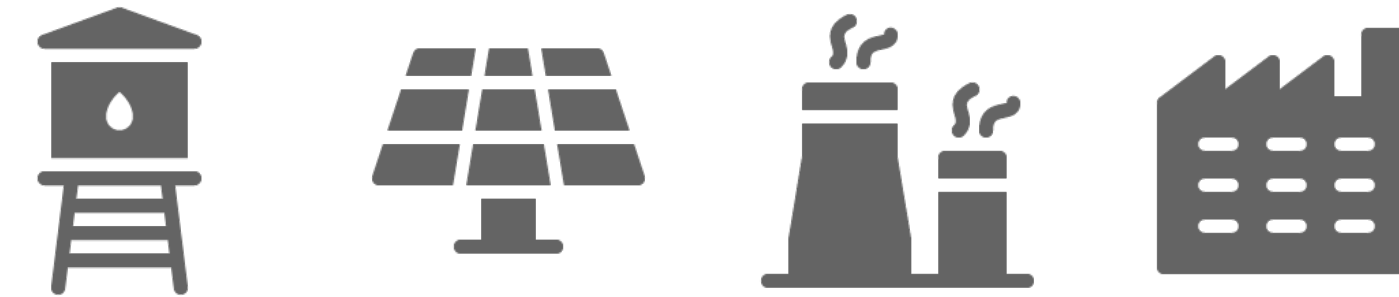
Challenges at an Urban Environment

Waste & Pollution



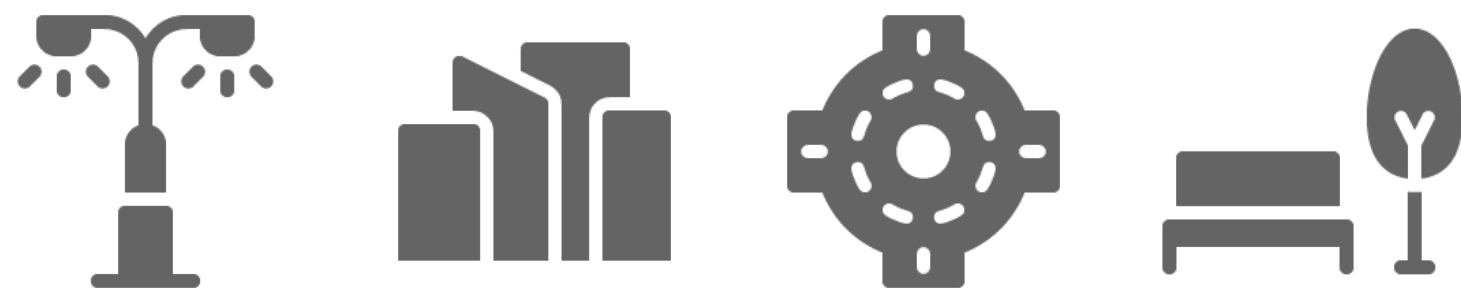
Identification of accumulated Solid Waste, Untreated discharges, major sources of air pollution, untreated discharges in the river.

Infrastructure



Issues arising due to inadequate or old Infrastructure - Water, Power, Energy and local industry like manufacturing, coal fired power generation, blast furnace etc

Knowledge of the City



Road Condition and Layout, Street Furniture Assets like Street Lights, As Built Layout of Buildings, Parks and more.

Future Plan & Road Map Viability



Cities of the future need to develop livability indexes as they compete to attract the citizens of the future. As city managers aim to make and create more liveable, walkable and comfortable places of stay, knowledge of the as-built environment becomes critical.



1 Canal at Link Road, D N Nagar Metro in Andheri (W), Mumbai, India



2 Canal at Bhogal when walking from Nizamuddin to Ashram on Mathura Road, New Delhi, India

Can I swim in this?



Picture of a Street Lamp Post outside my home at Salt Lake, Kolkata, India at 11 PM

Will I be able to show my son stars?



Pictures of Poles on Main Road ner Gandhi Maidan, Patna



Adjoining Canal Area submerged due to spillover from canal during Cyclone Amphan 2020

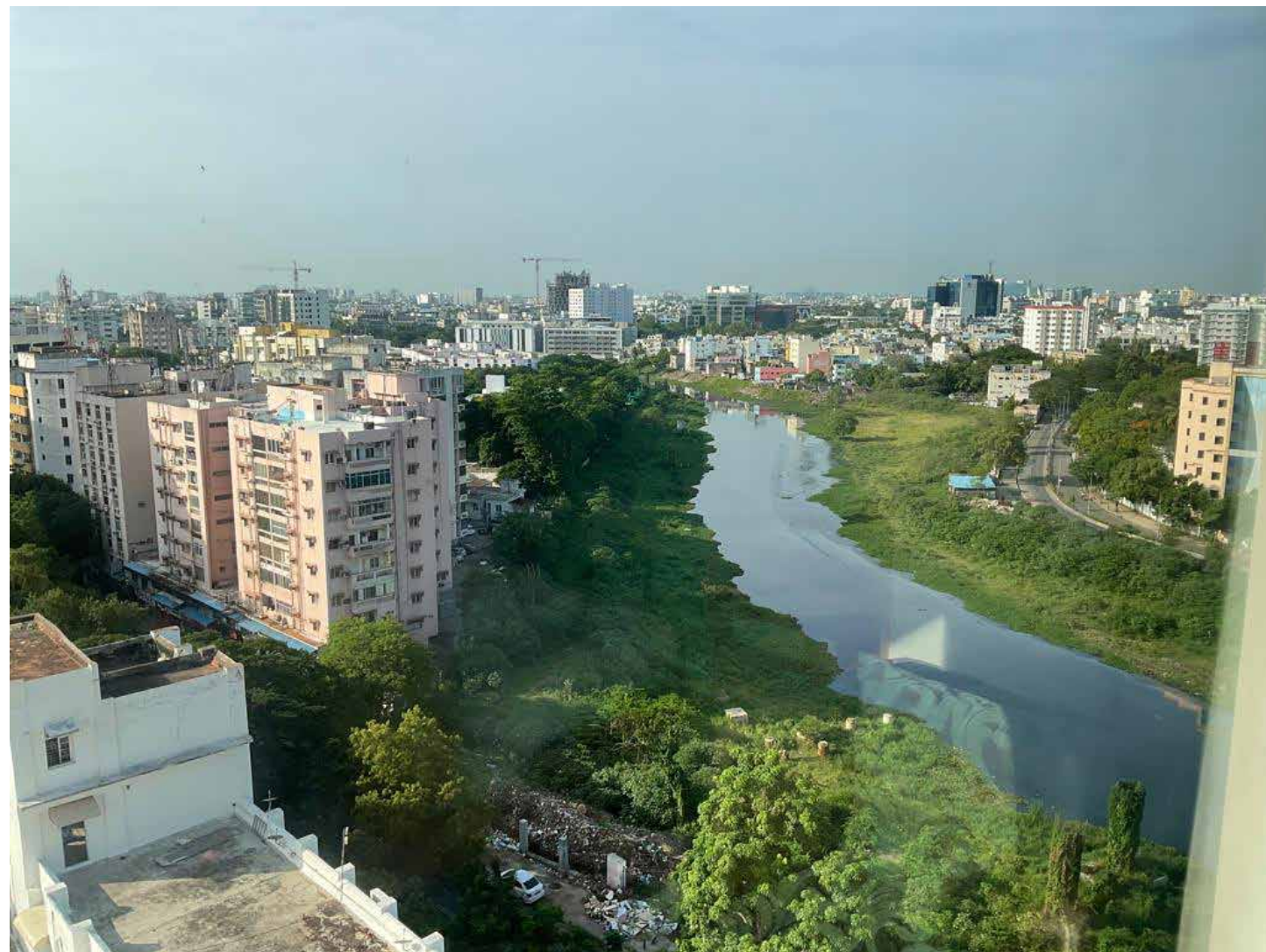


1 Common Play and Study Area below Flyover in Lower Parel on Senapati Bapat Marg



2 Tennis Court at Gudalur Cosmopolitan Club, Nilgiris, India

Where can this be replicated?



1 Opposite Hotel Radisson at Egmore, Chennai, India



2 Old steel structure of a possible cable tray? Off Western Express Highway, Mumbai, India

Can this be repurposed or developed?

What get's measured get's managed.

Drones for Urban Environment



Drone Fleet

Surveillance, spraying or delivery - mission specific drones



Command Control Center Software

What makes the magic happen - Take Off!



Associated Software & Hardware

Parts of the components with which the Jigsaw is complete



Droneport

From where the drones depart and arrive



Operations Team

The most important part of the Call Centre

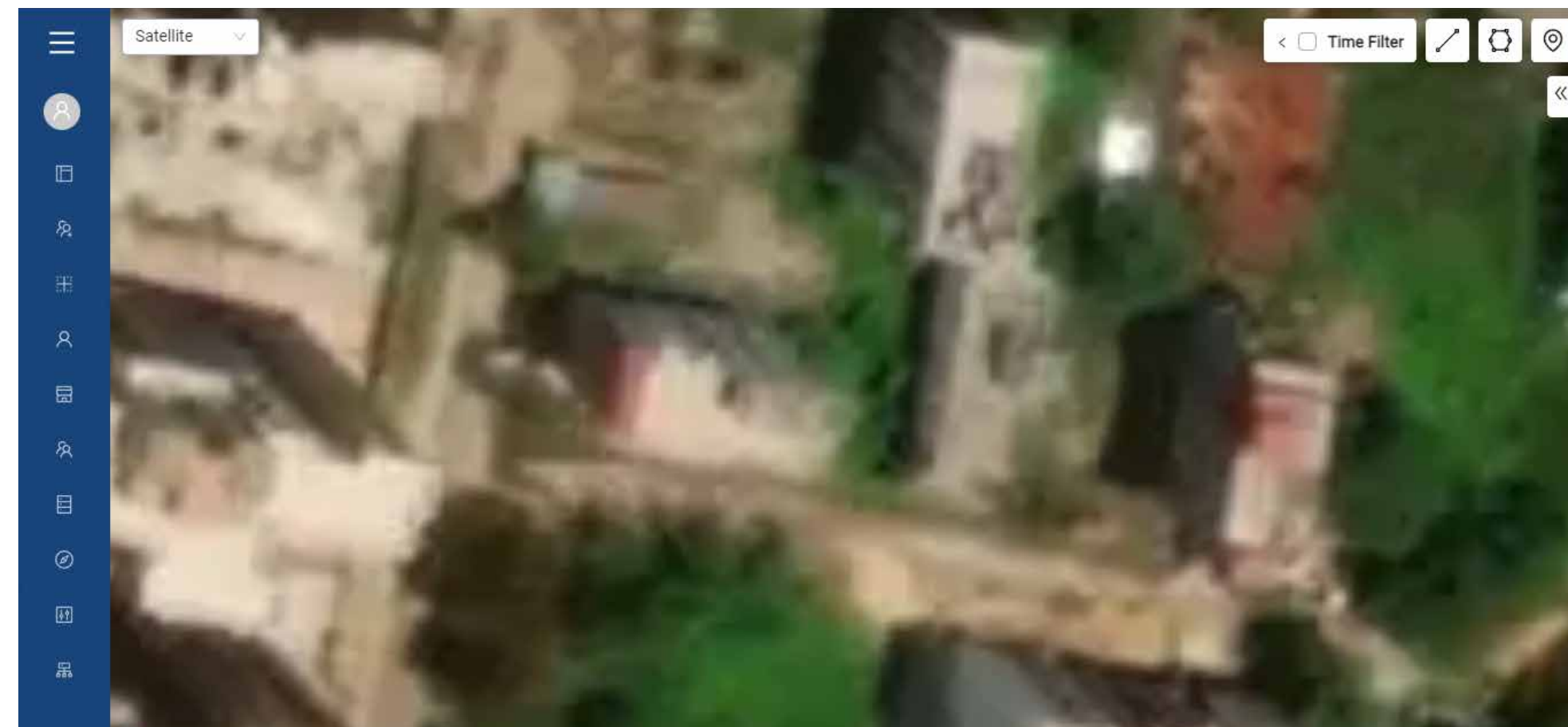
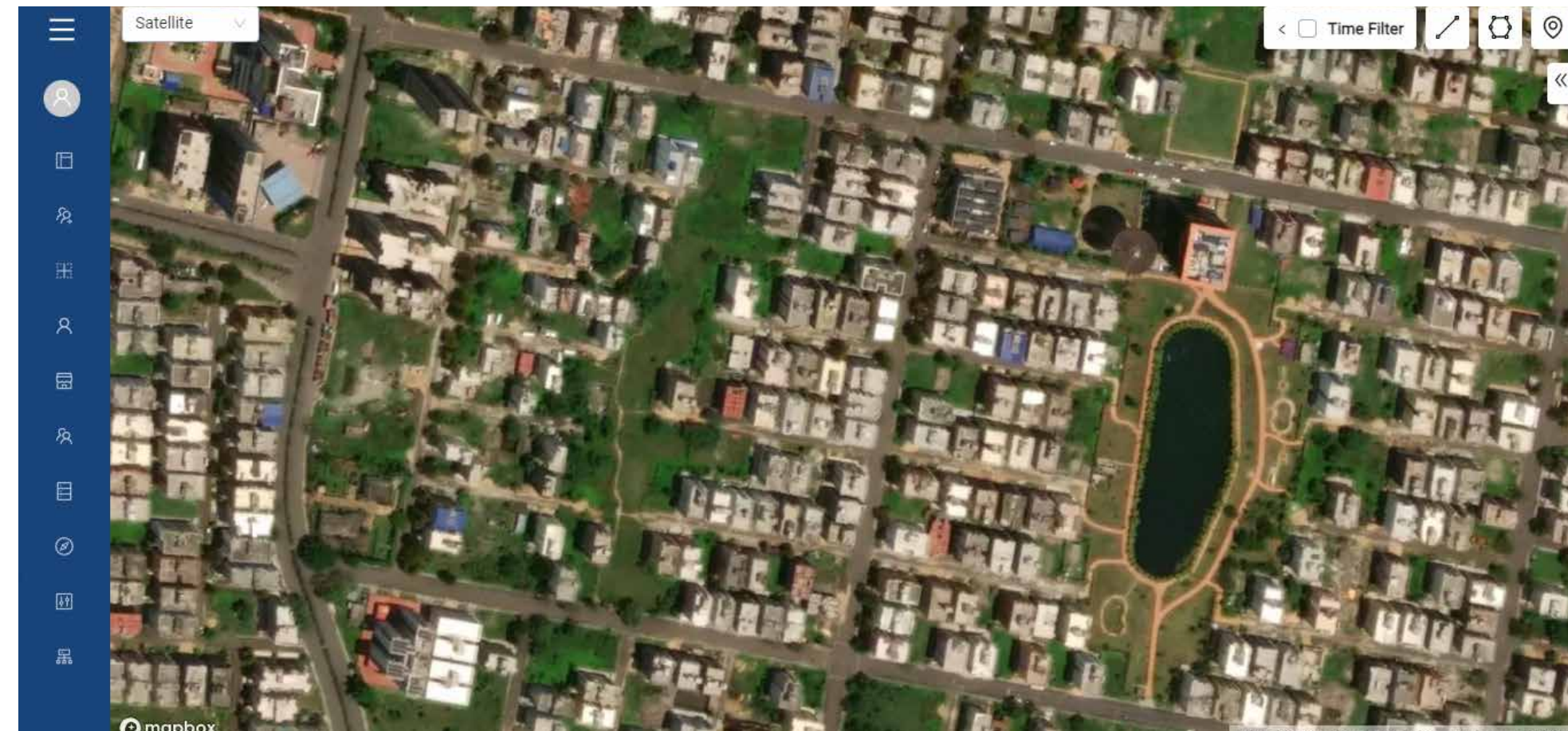


Urban Space Drone Adoption Maturity Map for Next 7 Years - 2030

	Level 1	Level 2	Level 3	Level 4	Level 5
Drone Use Cases	Video Surveillance by Law Enforcement Agencies, Civic Officials, Real Estate, Events Industry	Aerial Mapping and Analysis of Aerial Data along with GIS Database Creation	Announcements, Thermal Inspections, Night Time Surveillance and Mapping	Flower Dropping, Drone Light Shows, Air Sound and Light Pollution Monitoring	Cargo and Passenger Transportation Gardening, Sweeping, Cleaning, etc
Drivers for Adoption	Transparency Visual Appeal Situational Awareness	Transparency Visual Appeal Situational Awareness	Excitement Visual Appeal Transparency Situational Awareness	Excitement Visual Appeal Transparency Situational Awareness	Infrastructural Shortage & Congestion Manpower becoming Expensive Transparency

Based on Personal Experiences of Operating Drones in India, Operating a dedicated Urban Geography Centric Drone Call Center for the City of Newtown, Kolkata, India

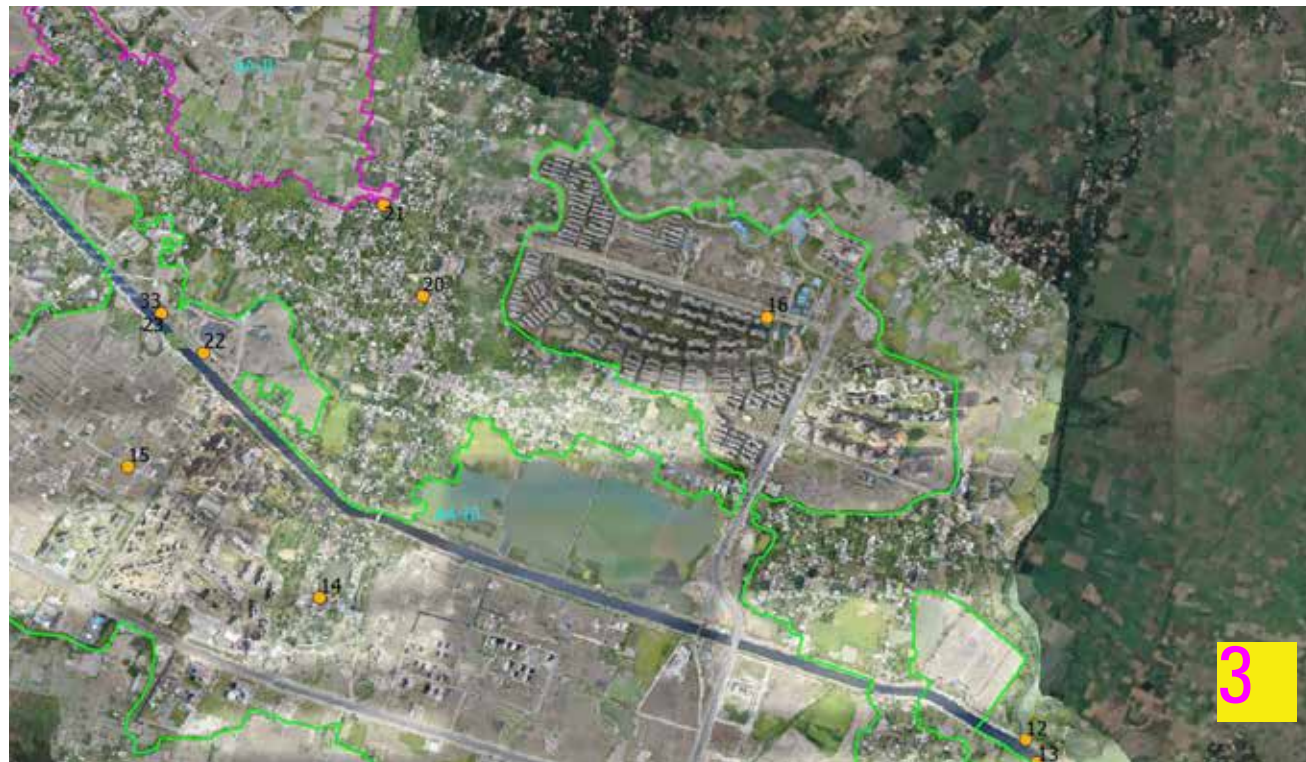
Satellite Imagery vs Drone Aerial Imagery - Resolution



Satellite Data

Drone Data

Map Preparation & Analysis



1
Master Plan Preparation -
Superimposition with Existing/
Proposed Plans to help provide critical
information to City Planners

2
Tree Count for ascertaining green
cover and decide on future action

3
Zoning Analysis of Land

4
Study of planned and unplanned
growth to prepare a master
infrastructure plan

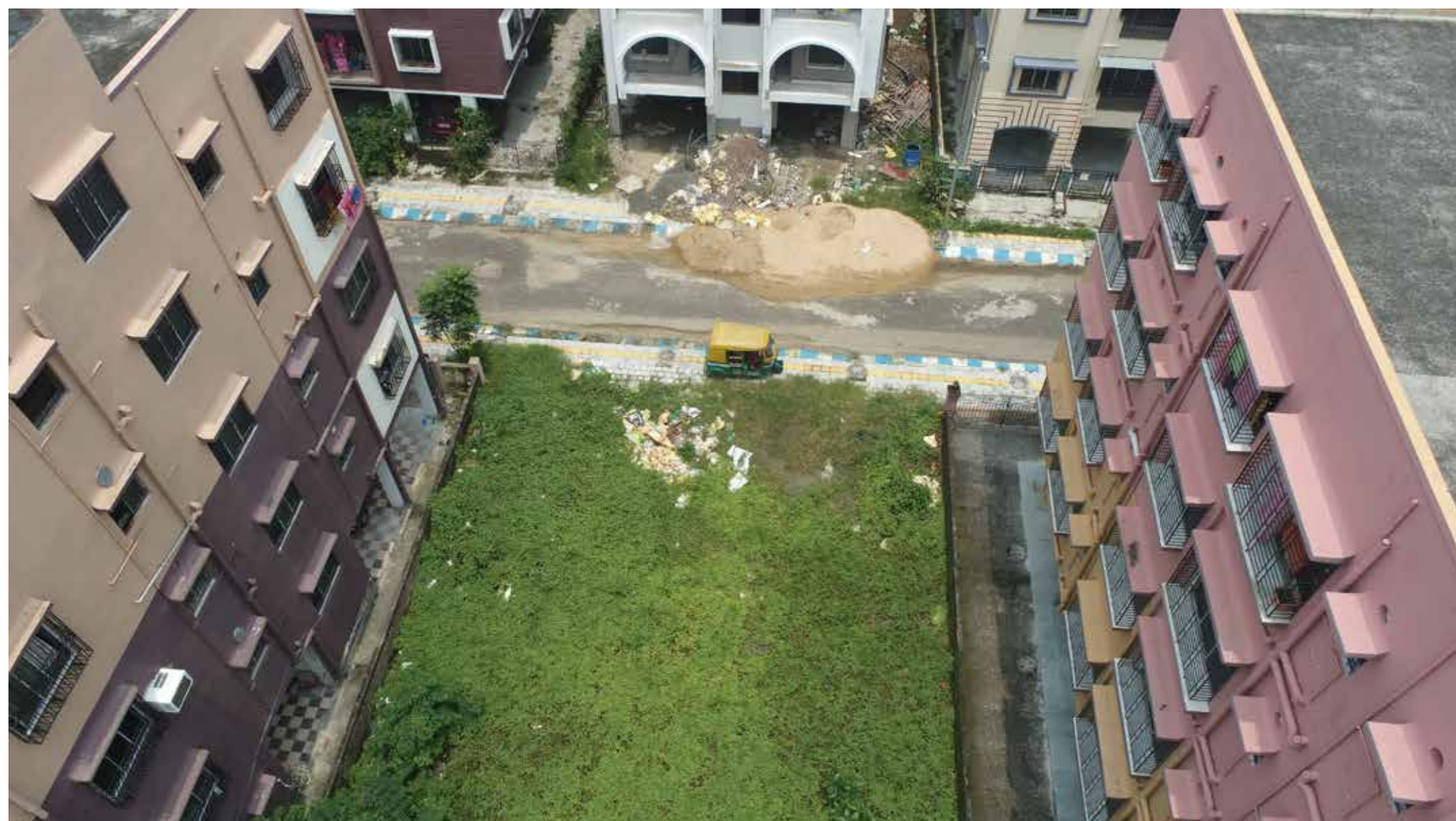
5
Construction Status Identification and
Measurement

6
Existing Canal Infrastructure
identification and Study, Identify STP
sites for the future

7
Encroachment Identification

Endless use cases - Critical
Information to connect the past,
present and the future

Waste Identification in Blocks and Canals



Identify

- > Construction Debris
- > Solid Waste Accumulation
- > Canal Blockages

Audit

- > Waste Management contractors
- > Residential buildings
- > Before and After Surveys



Date of Survey:2022.03.23

Date of Survey:2022.07.30

Image 01



Image 02



Pond Register and Water Bodies Condition Monitoring



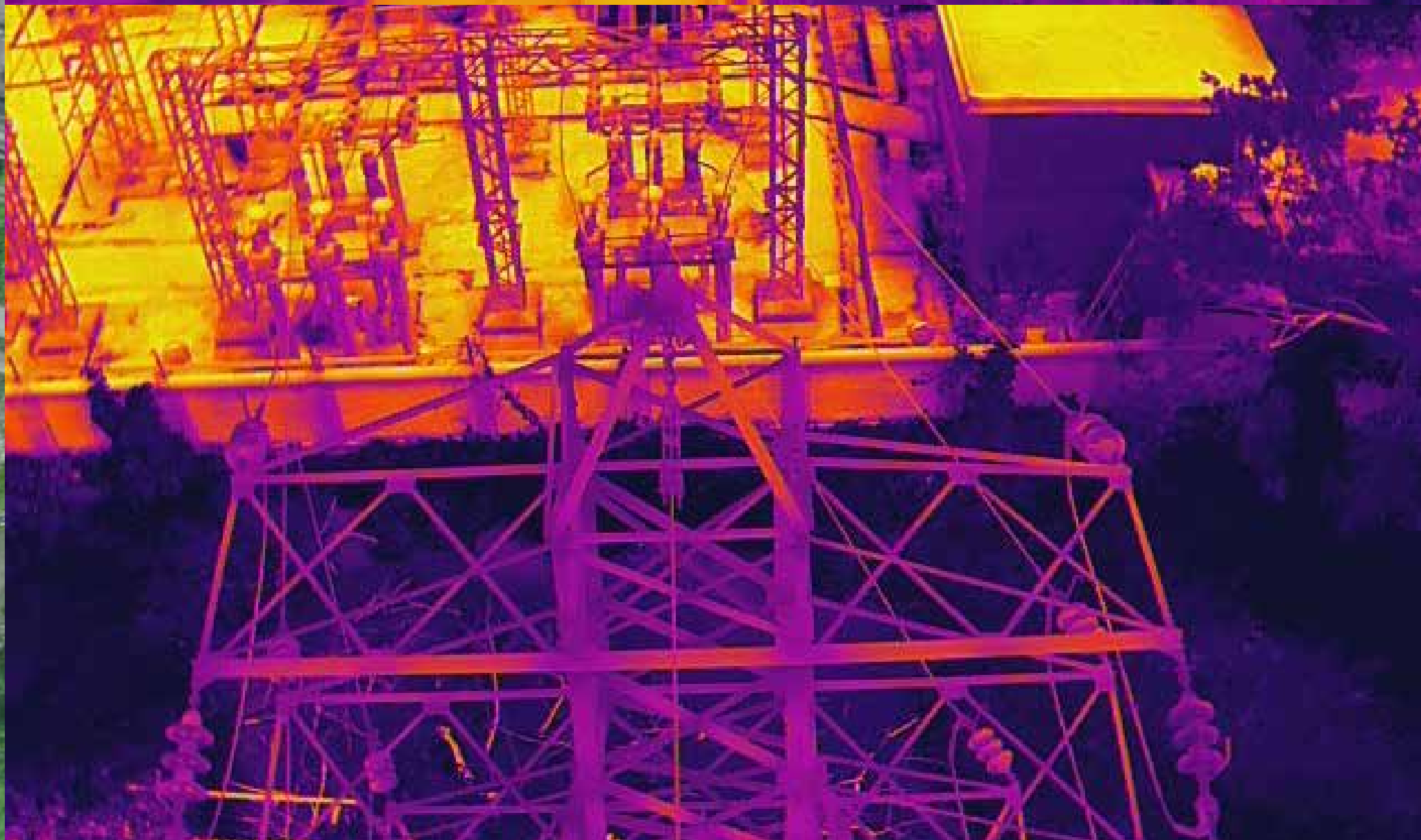
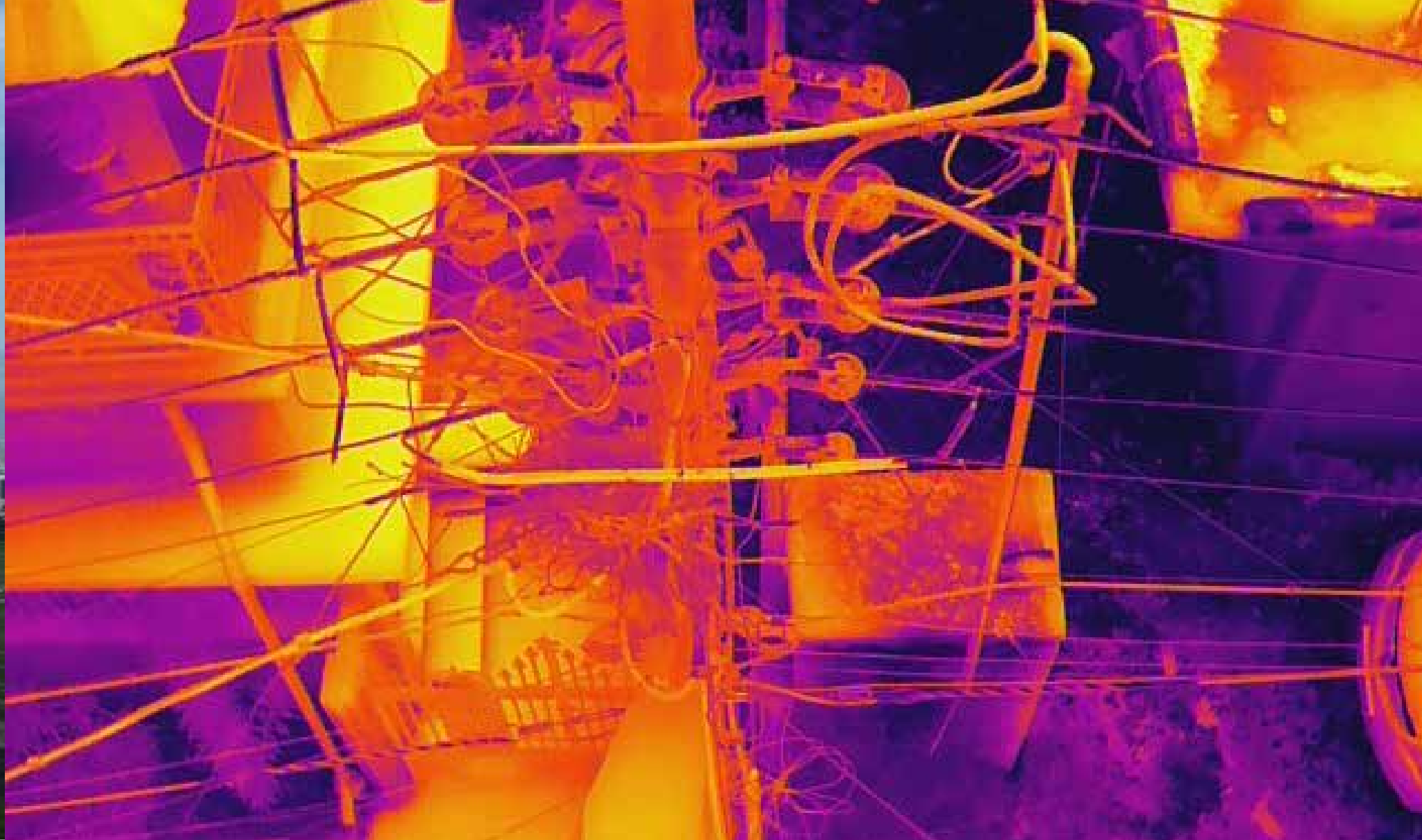
Identify

- > Existing Water Bodies
- > Condition of Water Bodies
- > Encroachments
- > Status of Beautification Works

Plan

- > Beautification Works
- > Activity to make the Water Body from a Cost to a Revenue

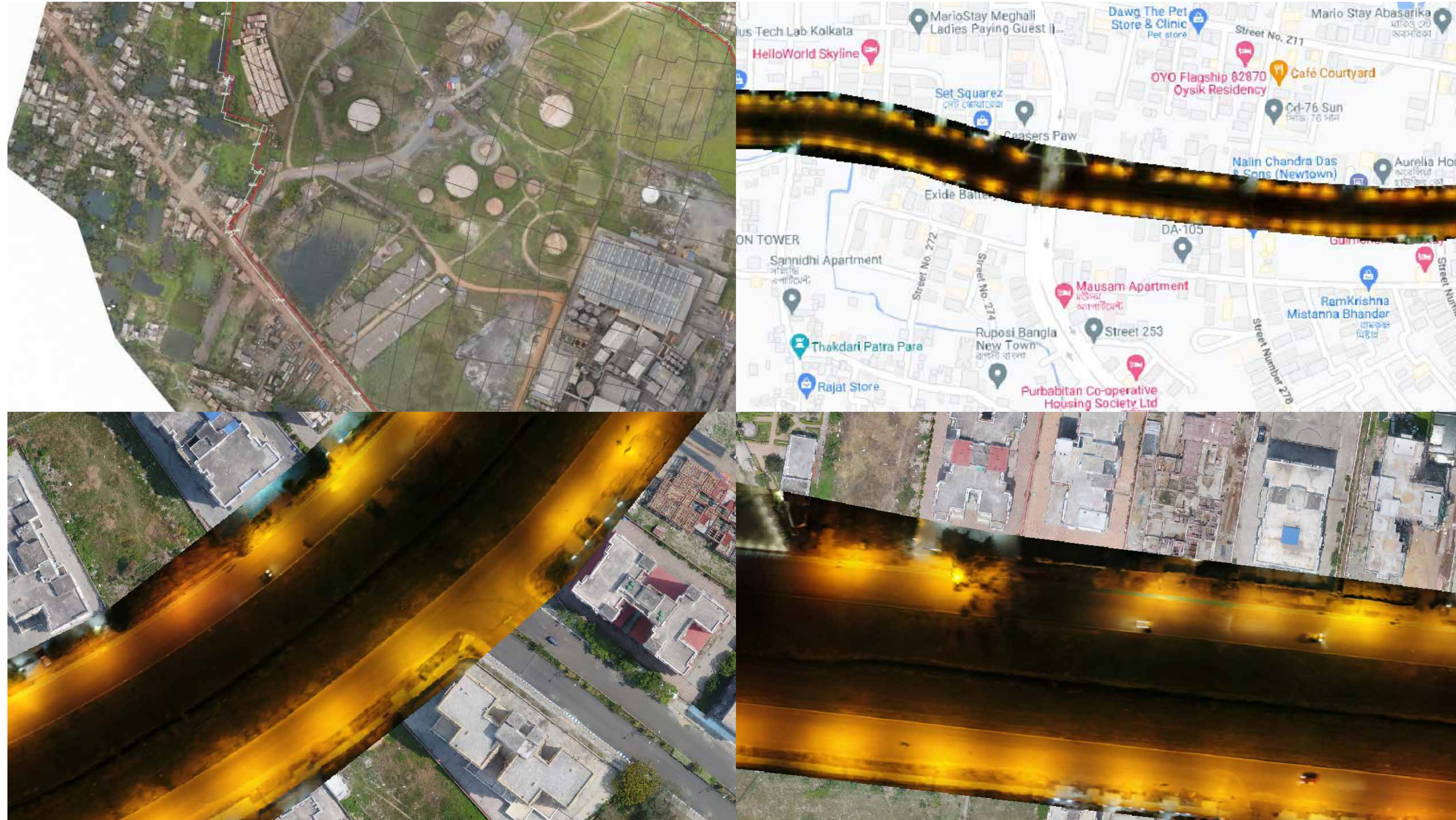
Compliances for Building Development and Electrical Infrastructure Thermal Monitoring



Transparency

- > Sanction of Proposed Building Plan by Authorities
- > Sanction by Respected Committee in respective State Level Impact Assessment Committee of Pollution Control Board for Consent to Establish and Consent to Operate
- > Sanction by State Real Estate Regulatory Authority
- > Disbursement by Bank to Persons availing Loan by Transparent Real Data
- > Sanction by Fire Department by verifying Approach Road of Fire Engine, Ledges and clear roof
- > Issuance of Completion Certificate
- > Property Tax Enhancement by Municipal Development Authority by Regular Aerial Data as Part of Workflow - Identify illegal construction
- > Thermal Inspection of Solar Assets, Electrical LT and HT Network

Mouza Map Superimposition for Land Pooling along with Night Time Mapping



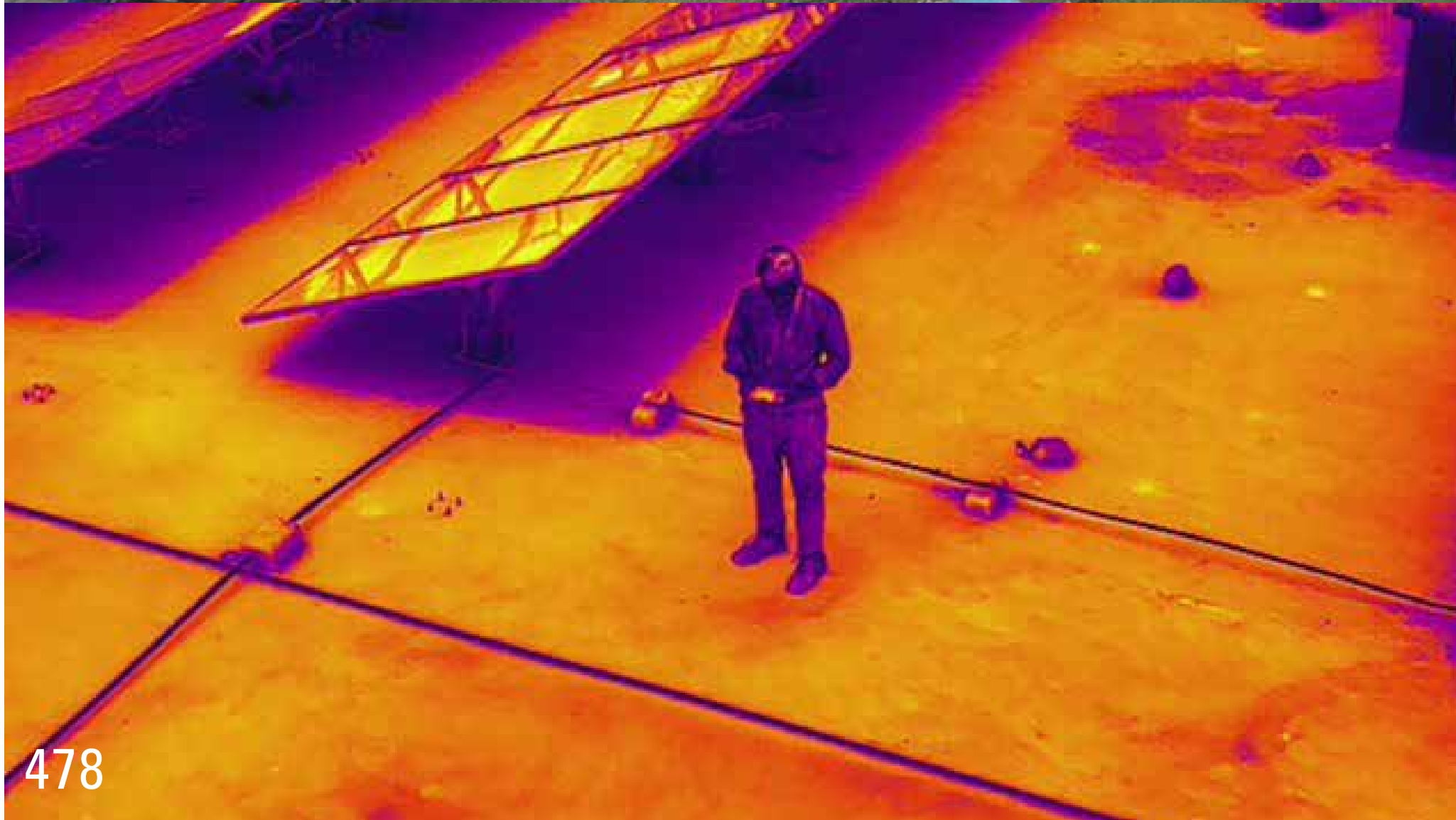
- > Mouza Map Superimposition on Orthographic Map to identify specific plots for acquisition/ right of way
- > Night time Orthographic Map Preparation and Surveillance
- > Identify Black Spots on Streets
- > Identify Light Pollution Spots
- > Car Parking of the City at Night
- > Understand behaviour mechanisms at Night

Improving Assisted Living - Improving Accessibility to public space



- > Identify clear usable footpath area for people with limited mobility - wheelchairs
- > Building Access for People with Limited Mobility
- > Public Spaces Design for People with Limited Mobility
- > Images of a Block being Analysed with superimposition of Drawings

1000+ Specific Insights for creating a City's Annual Calendar of Events



144
People Count and Trend Identification of specific area during different times of a day

278
Construction Debris Identification and Labour Hutment Identification on Vacant Land which may lead to Encroachment

478
Thermal inspection of Solar Panels Installed on Roof Top

852
Canal Condition Monitoring for identification of erosion of canal side embankment



Recreation facilities with Swimming, Squash, Football, Cricket, Kabaddi, Hockey and Gymnasium is a requirement. Land available is only 15,000 sq ft. What should be done?

Which sporting infrastructure should be setup?



Which roads should have a cycling track built to help burn 200 Calories in 1 circuit?

What should be the route of the cycling track?



Which buildings need to be rebuilt in the ward? Where can a Droneport be built?

Mumbai goes for Redevelopment of Dharavi.

Which areas are to be redeveloped?

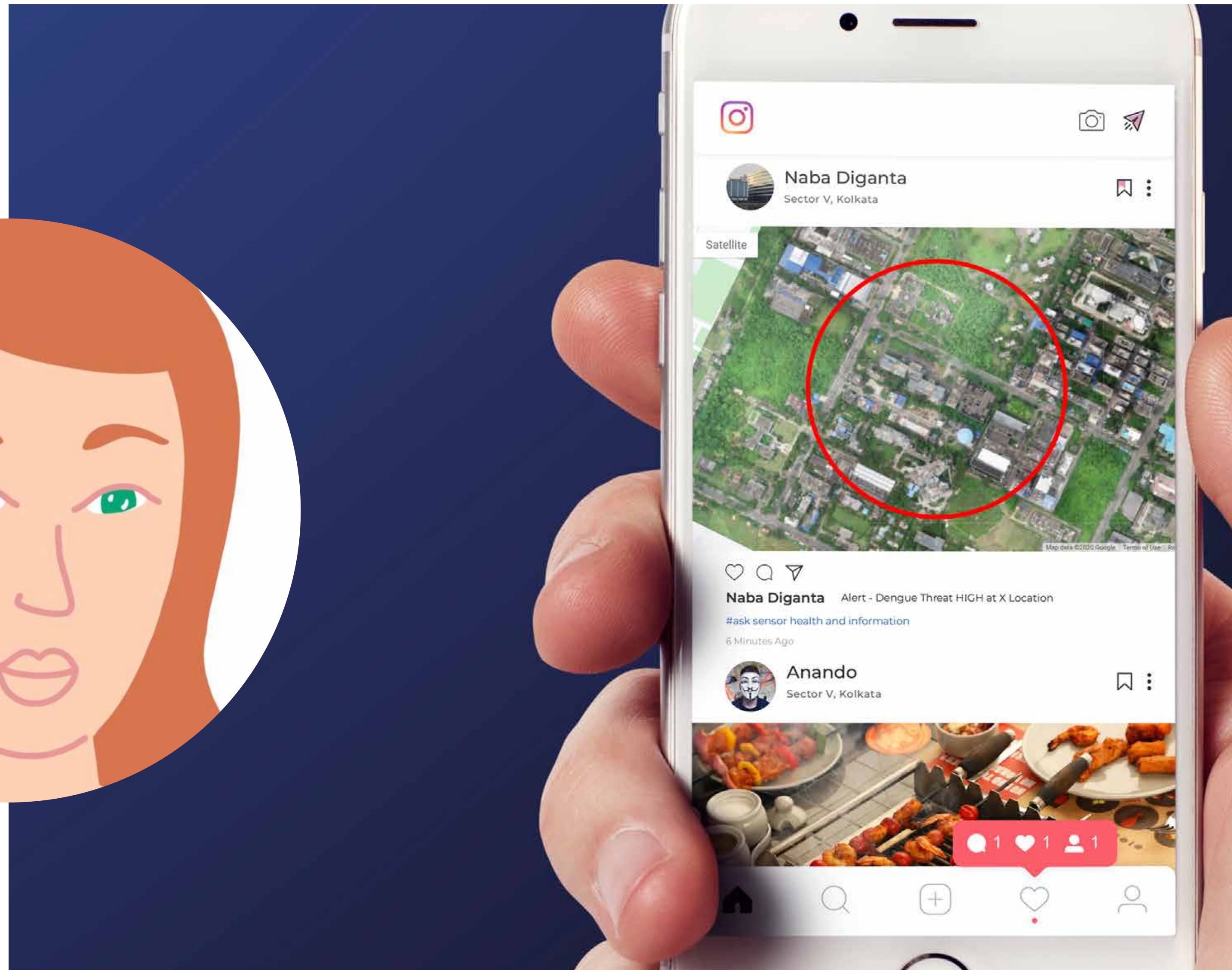


What design interventions can be taken for solving specific problem of traffic snarl?

Where should the flyover start and end?

Example

AI Guardian ARU to help answer complex questions?



Design Intervention to help increase the livelihood of villagers of a village?

Village Level Master Planning for 6 Lac+ Villages in India

More Use Cases

Homeland Security

Surveying & Mapping
Territorial Planning
Natural Resources Survey
Land Consolidation

Preservation of Cultural Relics

Archeological Reconnaissance
Protection
Restoration of Cultural Relic
Tourism Planning

Forestry

Forestry Inspection
Tree Count
Plant Investigation
Plant Identification
Yield Evaluation

Scientific Research & Education

UAV Teaching
UAV R&D
Subsidiary Product Development

Buildings

Building Information Management
Construction Monitoring
Bridge & Tunnel Design
3D Modelling

Aerial Photography

Film & Television
Autonomous Aerial Photography
Weddings & Major Events Coverage

Geology

Mining Exploration
Disaster warning, assessment and rescue
Mineral Exploration
Geological Mapping
Reserves Calculation
Mine Restoration

Firefighting

Forest firefighting
Firefighting in Study

Ocean

Maritime Patrol
Reef of surveying and mapping
Marine Ecology
Cargo Transportation

Traffic

Highway Patrol
Railway Inspection
Accident Site Investigation
Emergency Rescue
Road Settlement Monitoring

Security & Protection

Security emergency
Security Inspection

Animal & Plant Protection

Ecological environment monitoring
Species Investigation

City Planning

Dumpsite Management
Canal Maintenance Insights
Construction Activity Identification
Encroachment Identification
Progress Monitoring

Water Conservancy

Water monitoring
Dam deforestation observation
River Regulation

Electric Power

Power line stringing
Power line inspection
Electric power overhaul
Solar (PV) Photovoltaic Inspection

Agriculture

Soil remediation
Sowing seeds
Inspection
Plant Protection
Animal Husbandary Protection
Production Forecast

Village Planning

Village Community Planning
Village Asset Register
Biodiversity Register
Land Record Register
Drone Seeding & Spraying

Emergency Rescue

Fire Emergency
Flood Disaster
Earthquake
Environmental Protection
Epidemic
Geological Disaster

Logistics

Low Altitude transportation

Defense

Border Inspection
Reconnaissance
Target Drone
MIL

Town Planning

Town Planning
Community Center Development
Infrastructure Upgradation
Monitoring
Urbanisation Monitoring
Record Keeping

Thank You

About Kesowa

Who are we?

We are a team of borderless thinkers, collaborators, creators, who want to look forward and create futuristic products and solutions which make real impact.

Our First Customer

D&DDCC for Newtown Kolkata Development Authority



Newtown Kolkata, a satellite township aspires to provide its residents with impeccable quality of services in line to international counterparts with transparency. A Drone & Drone Data Call Centre was envisioned and setup in April 2021 to help improve governance with actionable insights.

An IGBC Gold Certified City, with best in class infrastructure, New Town's decision to setup and deploy the Drone & Drone Data Call Centre is in tune to it's vision to be a strategic thought leader for the world in years to come.

With ARU's deployment, the city can build a dedicated single repository of information which can become a factual single source of truth.



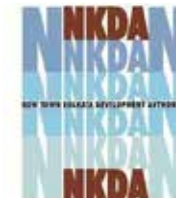
Commissioned
April 2021



IMPLEMENTATION PARTNER
FEDERAL SYNERGIES INDIA
PRIVATE LIMITED



SMART CITY SPV
NKGSSCL



MUNICIPAL BODY
NEWTOWN KOLKATA
DEVELOPMENT AUTHORITY

