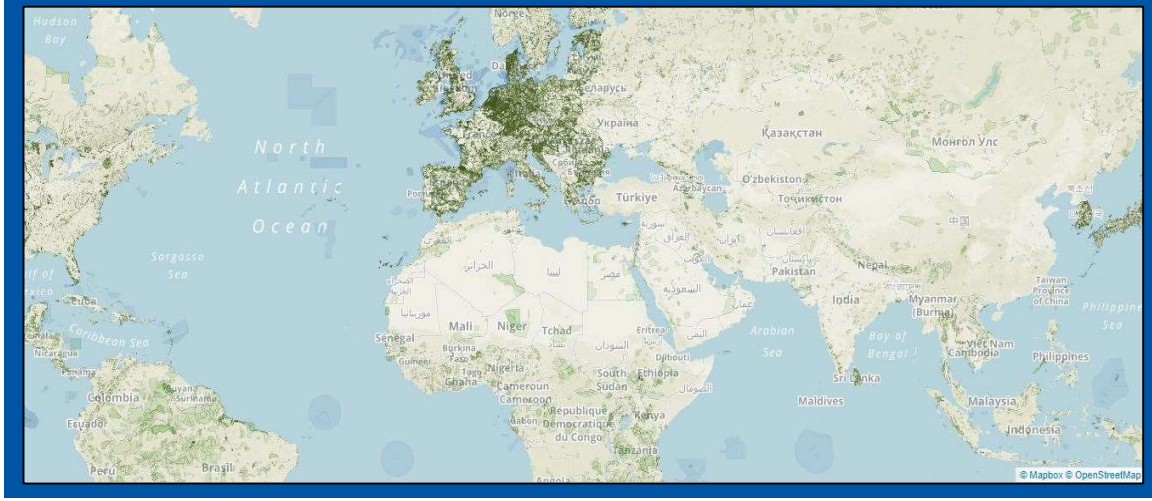
EBRD COVID-19 Resilience Framework - Environmental and Social Assessment Training Programme

GIS and Spatial Data Management



June 2020

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Introduction

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Introduction

Geographic Information Systems (GIS), geospatial technology and spatial data can support an environmental and social assessment process, helping to identify how a Project could interact with environmental and social receptors.

Key benefits:

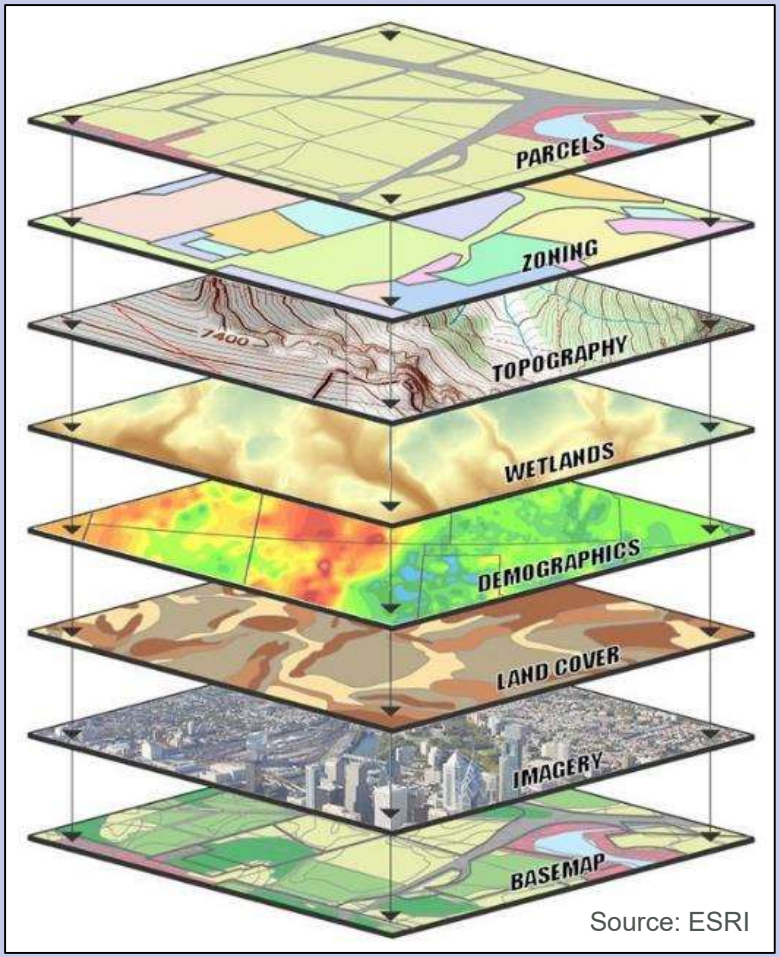
- Collate and assess datasets during Task 1
- Identify key environmental and social receptors
- Assist planning of Task 2 site visits
- Incorporate field data including GPS enabled field photos
- Present ESDD findings using GIS analysis and illustrated maps

GIS Overview

GIS provides a database of geospatial information layers, viewable through a digital and interactive map. The power behind GIS lies in the quality of data and analytical tools that can be used.

Geographic data can be displayed and managed using the following types of datasets:

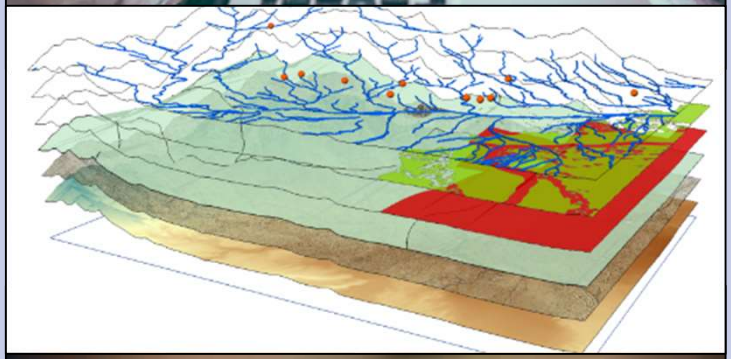
- Raster i.e. satellite imagery, elevation
- Vector - attributed points, lines, polygons, representing surface features, i.e. community locations (points), utilities (lines) or protected areas (polygons)
- Non-spatial data - text, tables, or field photographs that can be included based upon location information available



Source: ESRI

GIS and Data Management

- Compile and analyse geographic information
- Collate and assess multiple spatial datasets collected over time
- Manage huge amounts of data within a single centralised database
- Analyse data driven by the study requirements
- Improve decision making and project planning
- Support site visit selection and field surveys
- Visualise outcomes and clearly communicate findings to users and stakeholders
- Provide an archive of project data for future projects



Task 1 – Review of existing documentation

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Task 1 – Review of existing documentation

- Request GIS data from the Client
- Define the study area
- Desktop review for publicly available data:
  - Conduct internet searches, identify freely available datasets, maps and photographs
  - Document information from existing reports
  - Download freely available sources of satellite or aerial imagery
  - Query recognised global database sources, such as the Integrated Biodiversity Assessment Tool for protected areas
  - Obtain data from National sources: administrative boundaries, infrastructure, population

Define the study area:

- Project footprint
- Project area of influence (defined in ESIA)
- Associated facilities
- Hydrological catchments and network
- Administrative boundaries and communities
- Any known sources of indirect or cumulative impacts

Task 1 – GIS Data Sources

Project information: Client data, Project footprint, associated facilities, study area

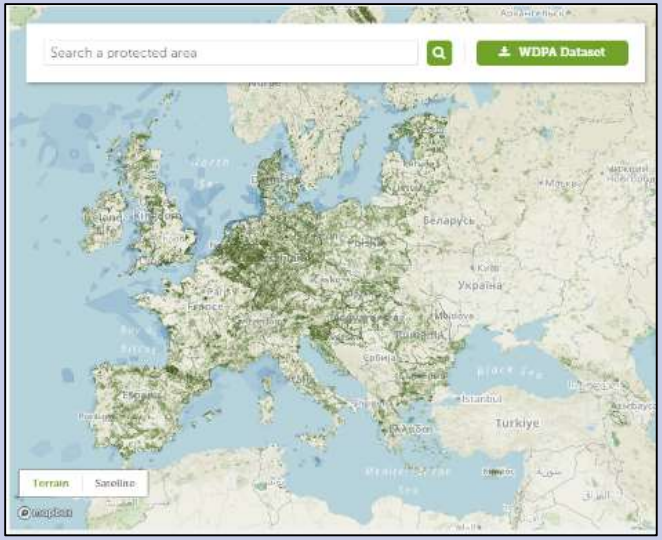
Basemaps: topographic or other maps, imagery from satellite, aerial or drone:

- Google Earth, imagery available through GIS software providers
- freely available satellite imagery such as Sentinel-2 (10m resolution) or elevation (SRTM DEM)
- commercially available imagery

Population and infrastructure: administrative boundaries, populated places, public infrastructure, land use, agriculture

Natural features: land cover and vegetation, hydrological features, habitats, landforms, soils, natural hazards

Protected and sensitive areas: UNESCO World Heritage Sites, Ramsar Wetlands, Natura 2000, National Parks, Key Biodiversity Areas, Important Bird Areas



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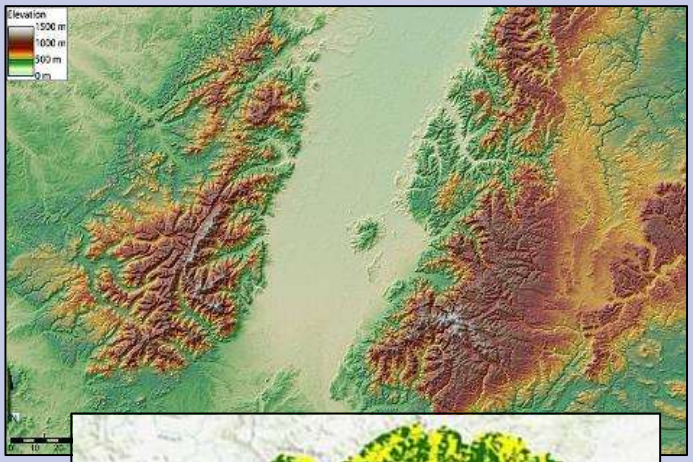
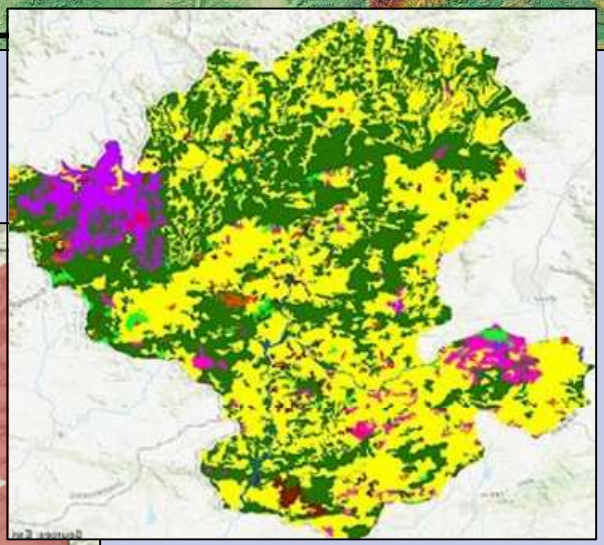
Task 1 – GIS Data Management & Presentation

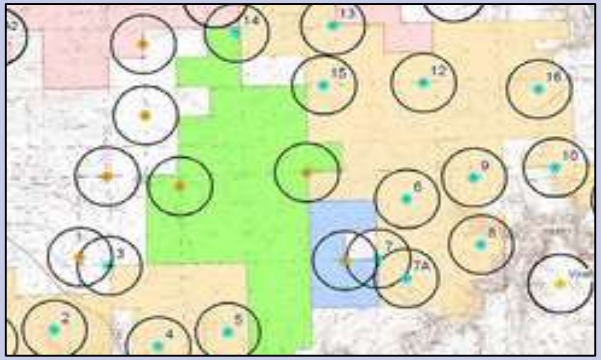
Data Management:
- Data review, assessment, verification and storage

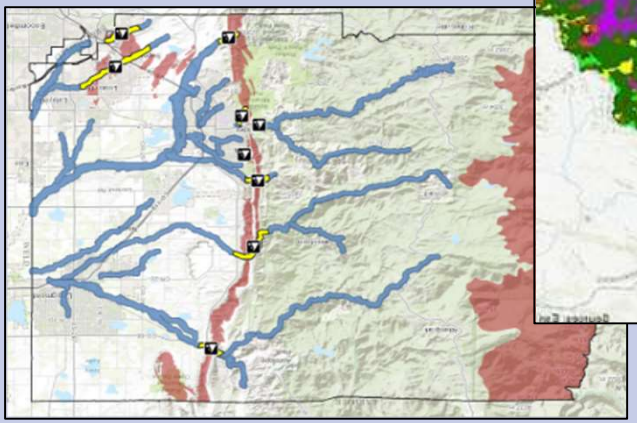
Data Analysis:
- Further analysis and interpretation of data/imagery

Data Presentation:
- GIS maps prepared to illustrate the key findings from Task 1:
  - Physical footprint of the Project, associated facilities
  - Existing infrastructure within the study area
  - Key environmental and social receptors that have been identified

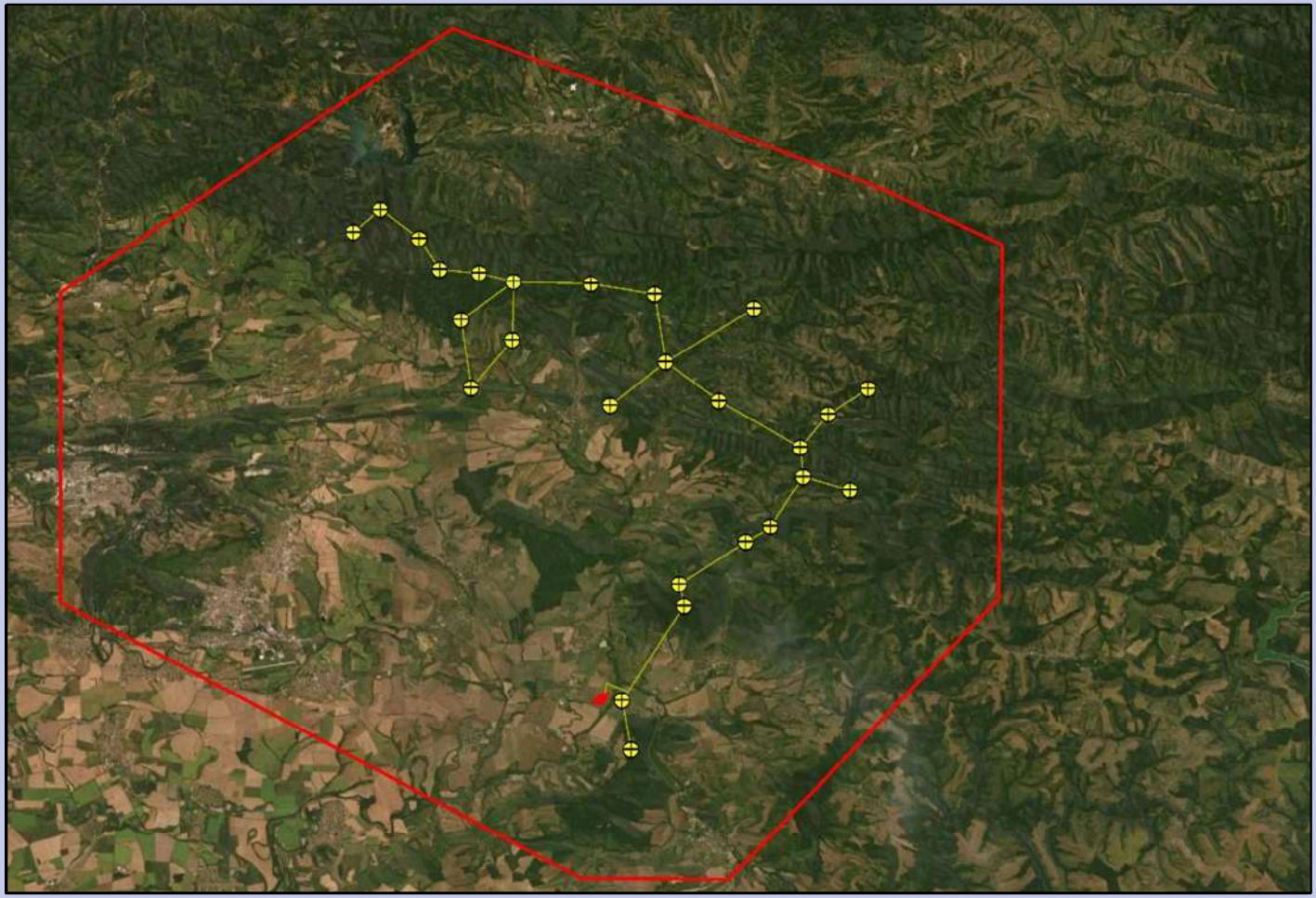




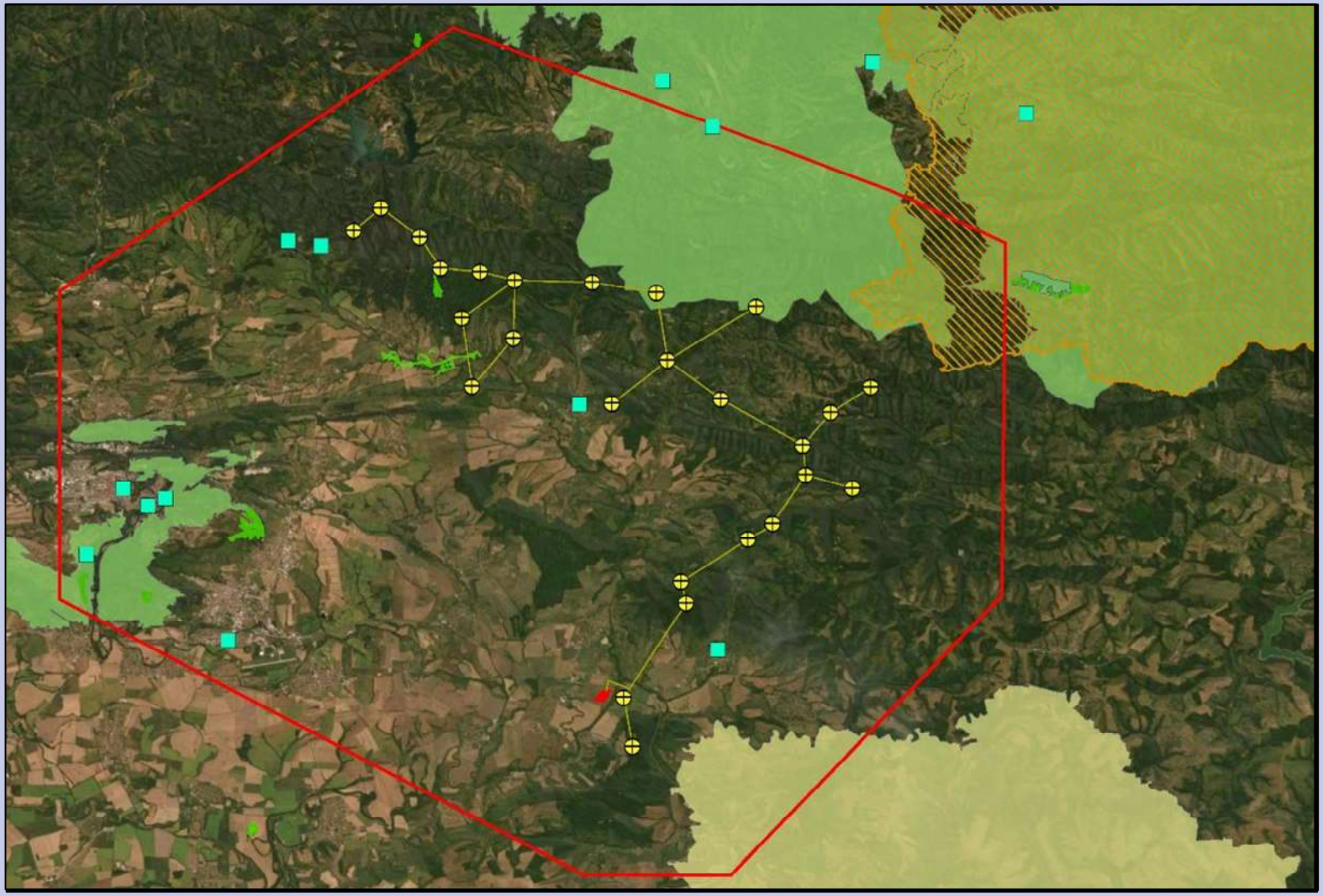




Task 1 - Case Study – Defining the Study Area



Task 1 - Case Study – Source E&S Data



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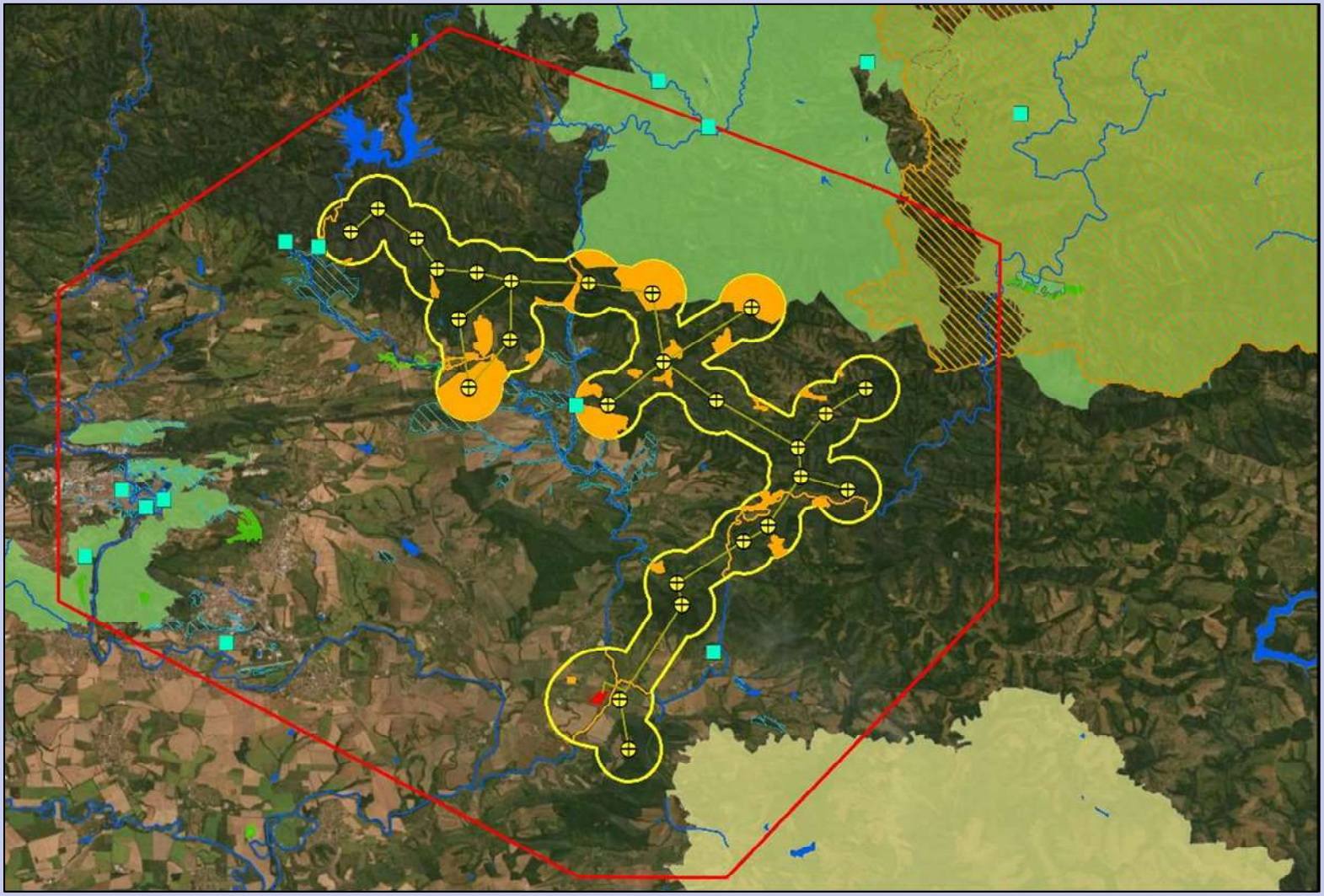
Task 1 - Case Study – GIS Analysis



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Task 2 - Site visit and discussions

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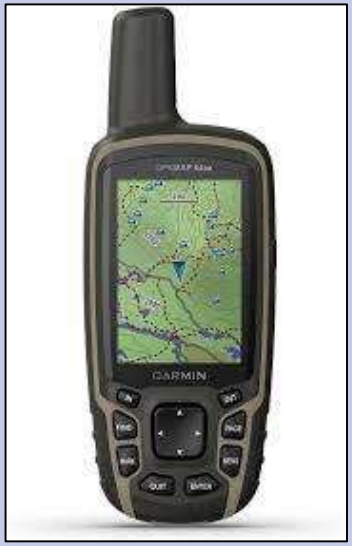
Task 2 – Site visit and discussions

GIS should be a key component of site visits and field surveys to:

- Identify the areas that need to be inspected
- Develop both hardcopy and digital mapping (Map Book) that can be used in the field for navigation and data recording purposes
- Harness technology for field data capture using GPS, mobile mapping applications or drones.

Site visits should use a variety of technology, including GPS enabled cameras, mobile devices and mobile mapping applications.

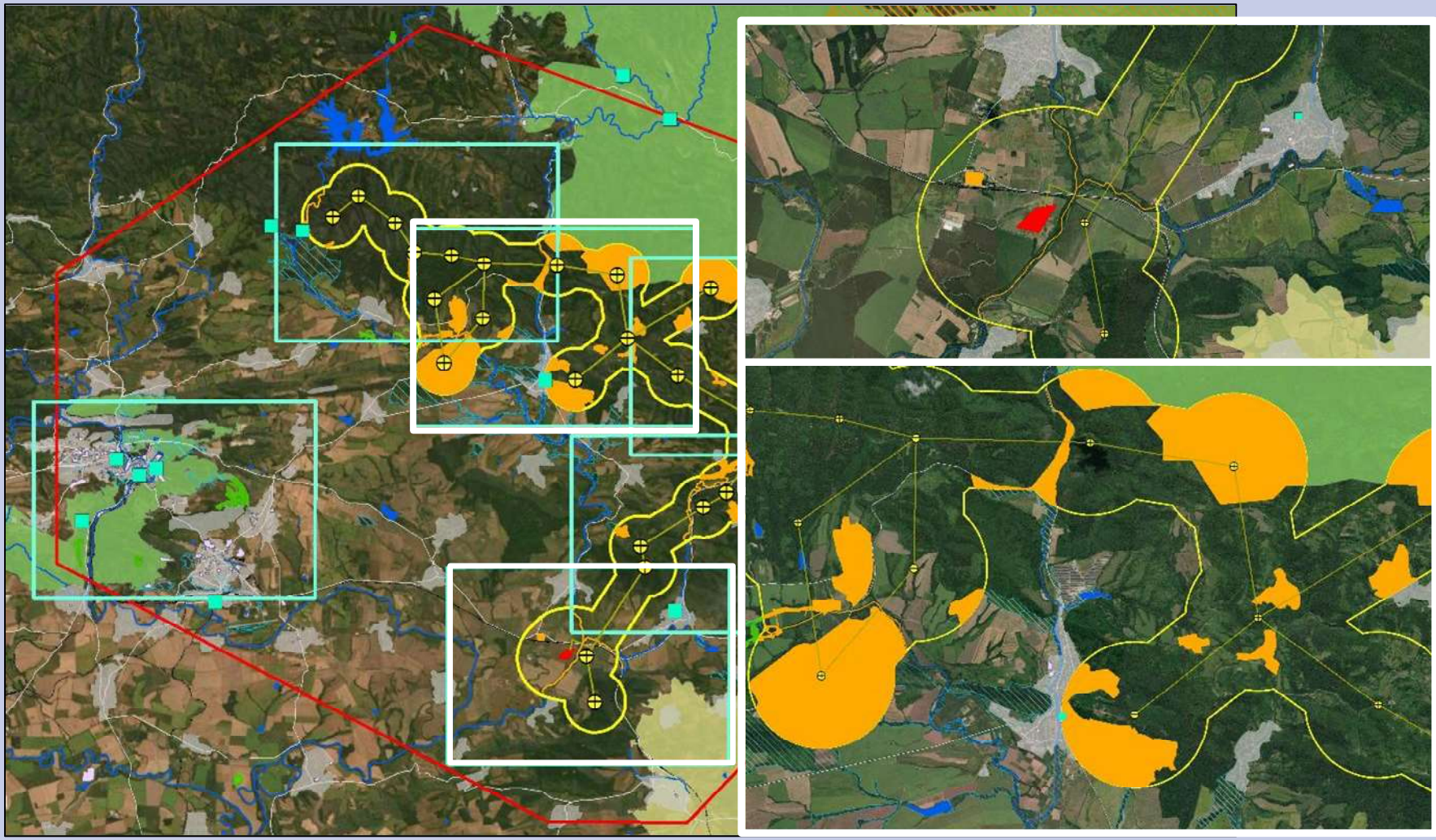


Task 2 – Site visit and discussions

GIS data and maps should be loaded into the mobile device / app in advance of the site visit to:

- Locate yourself and nearby Project features
- Identify and navigate to locations of interest
- View the compass directions on interactive maps
- Track routes taken
- Record field notes whilst referencing map position
- Record locations of stakeholder engagement
- Take field photographs that are geotagged
- Use basic map functionality such as the measurement of distances and areas

Task 2 - Case Study – GIS Field Maps



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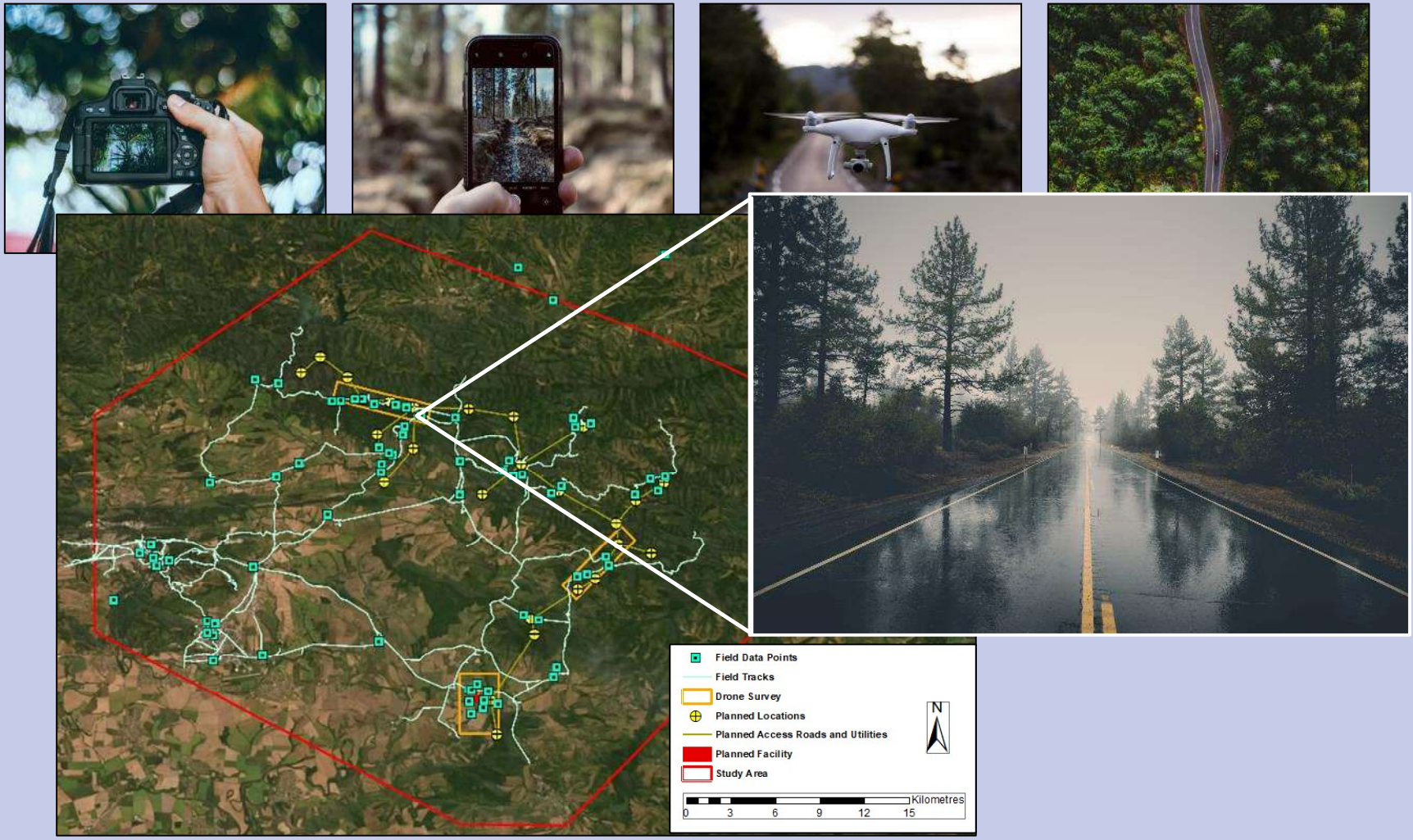
Task 2 - Case Study – Field Data



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Task 3 – Analysis and reporting using the EBRD format

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Task 3 – Analysis and reporting

GIS maps shall be prepared to support environmental and social assessment findings, in liaison with the relevant environmental and social specialists.

The maps may include:

- The Project's physical footprint, associated facilities and sources of cumulative impacts
- Environmental or social receptors including protected areas, as well as social data such as communities and public infrastructure
- Image analysis including land cover classifications, the outcome of habitat mapping, details of the calculated area of a feature which is directly impacted by the Project

GIS solutions support project reporting through provision of quantitative statistics, static maps and the development of interactive web maps and web applications.

Metadata

- Metadata is an essential component of managing GIS data
- Metadata provides essential information regarding the data source, time of data capture, validity, intended scale for use, copyright information and accuracy.

Summary of the use of GIS

- Identify GIS software and resources required
- Liaise closely with Client and Environmental and Social Specialists
- Identify the Project footprint and define a study area
- Undertake a desktop review for spatial data
- Verify data quality and undertake additional data analysis
- Support site visit planning and prepare field maps (Map Book)
- Deploy technology for field data collection, especially GPS photos
- Present results in illustrated map format
- Apply data management standards including completion of metadata

Prepared by Environmental and Social Advisory Services Limited (ESAS)
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