



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Success Factors for a Digital Twin of Subsurface Utilities - Experiences from the Comparison of Singapore and Zurich

Juerg LUETHY, Switzerland

Andreas WIESER, Switzerland

Victor KHOO, Singapore

Contact: juerg.luethy@zuerich.ch

ORGANISED BY



PLATINUM SPONSORS



GEOSA
General Authority for Surveying
and Geospatial Information





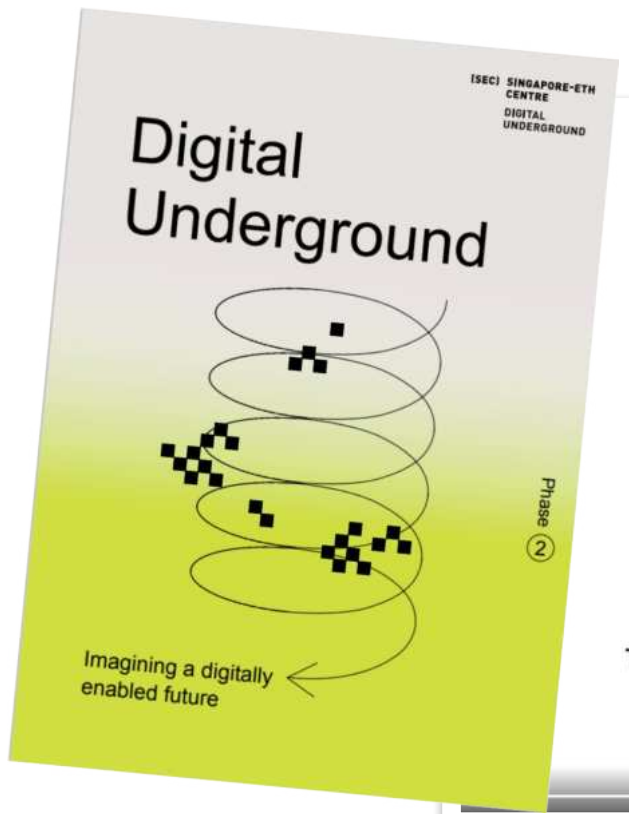
FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Setting the scene



Find out more about the project online at www.digitalunderground.sg and www.duconnect.org

SLA
SINGAPORE LAND AUTHORITY

(SEC) SINGAPORE-ETH CENTRE

ETH zürich

Stadt Zürich

The Digital Underground project was strongly supported by contributions from various agencies, institutions, companies, and individuals

Data driven excavation and construction

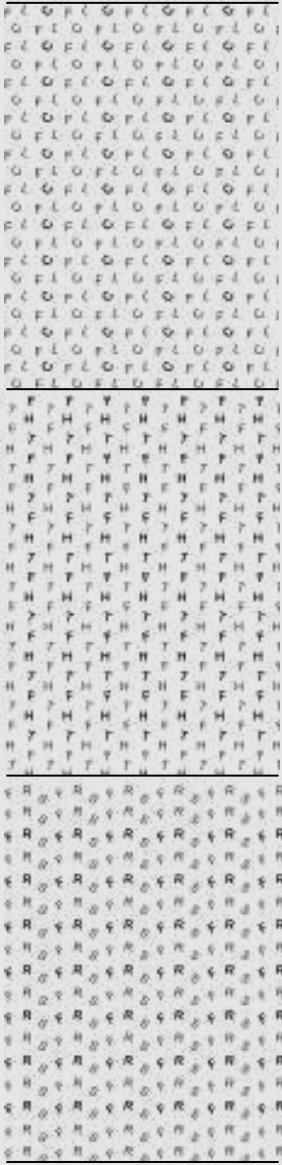
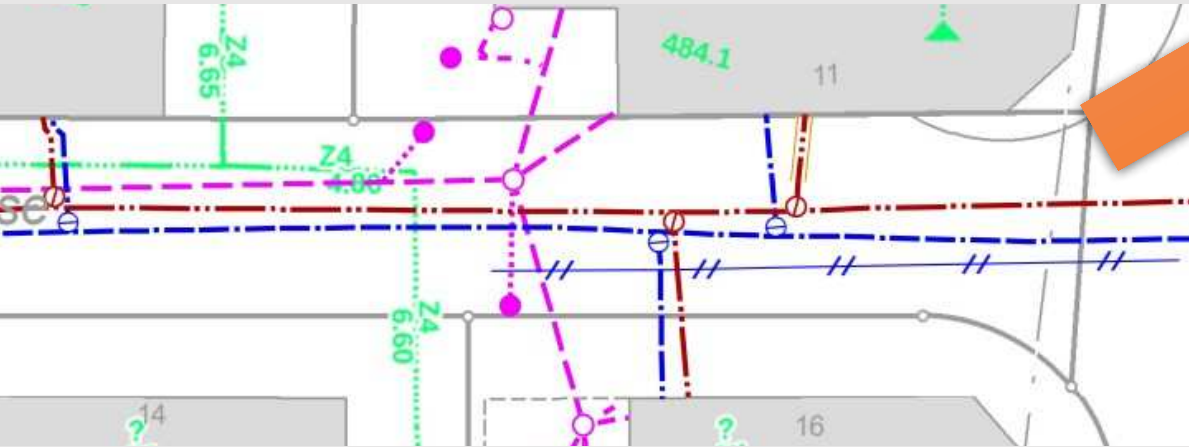
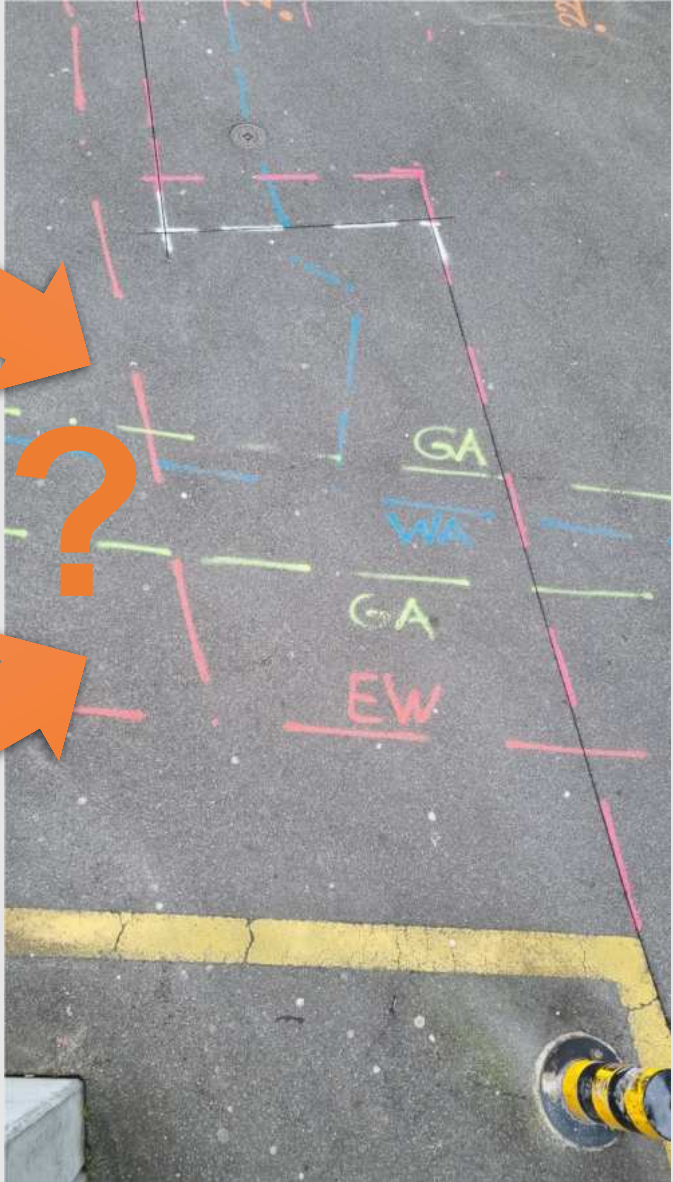




FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Current process for planning and construction in Singapore

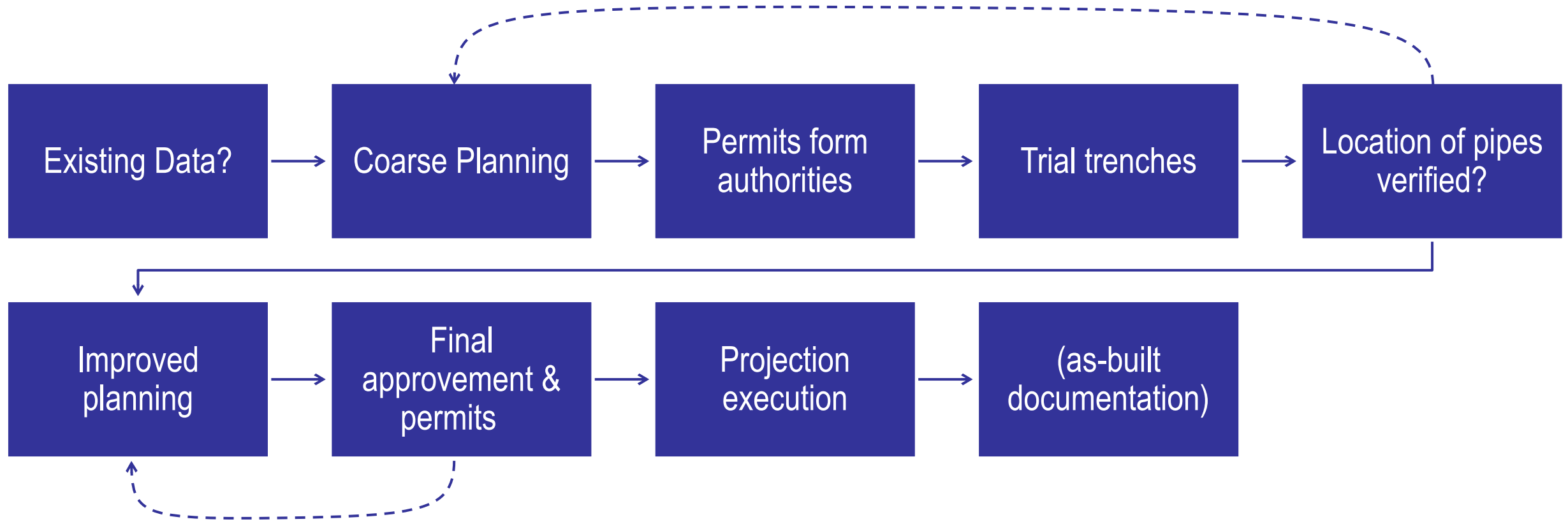




FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Process in Singapore – example of trial trench

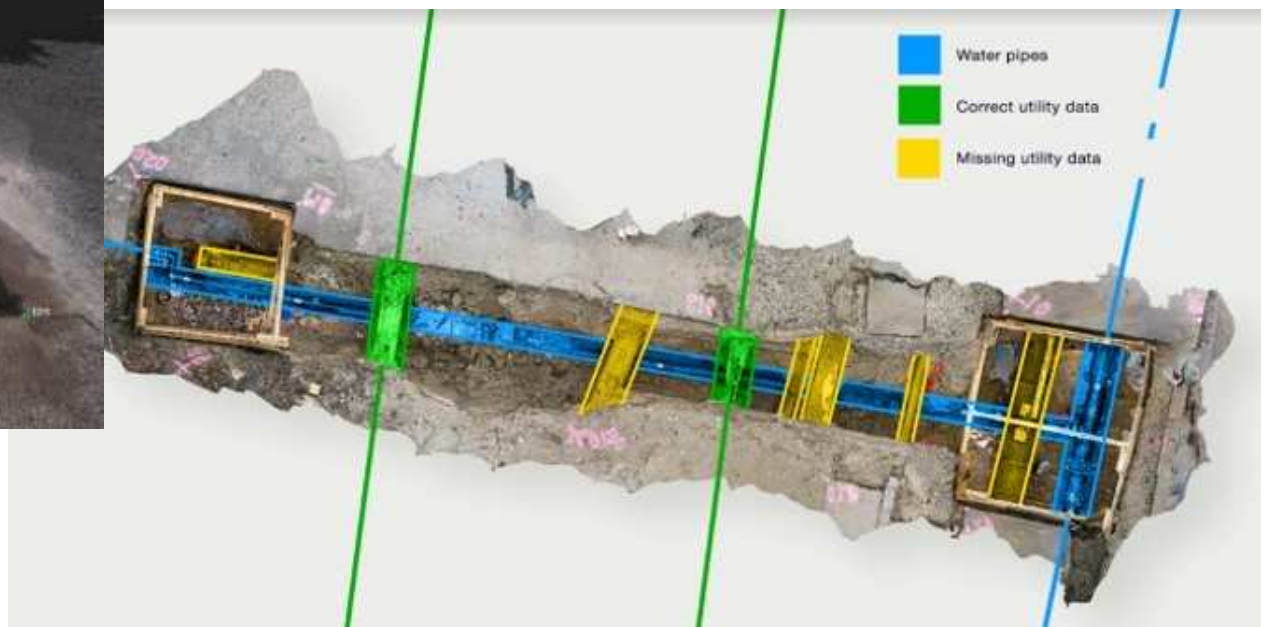
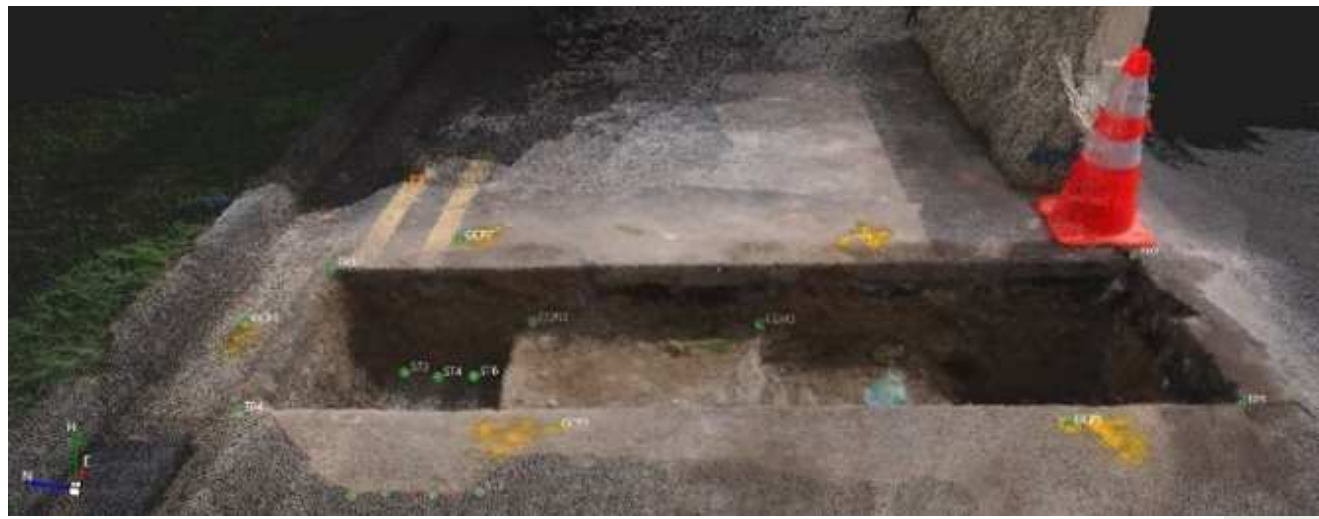




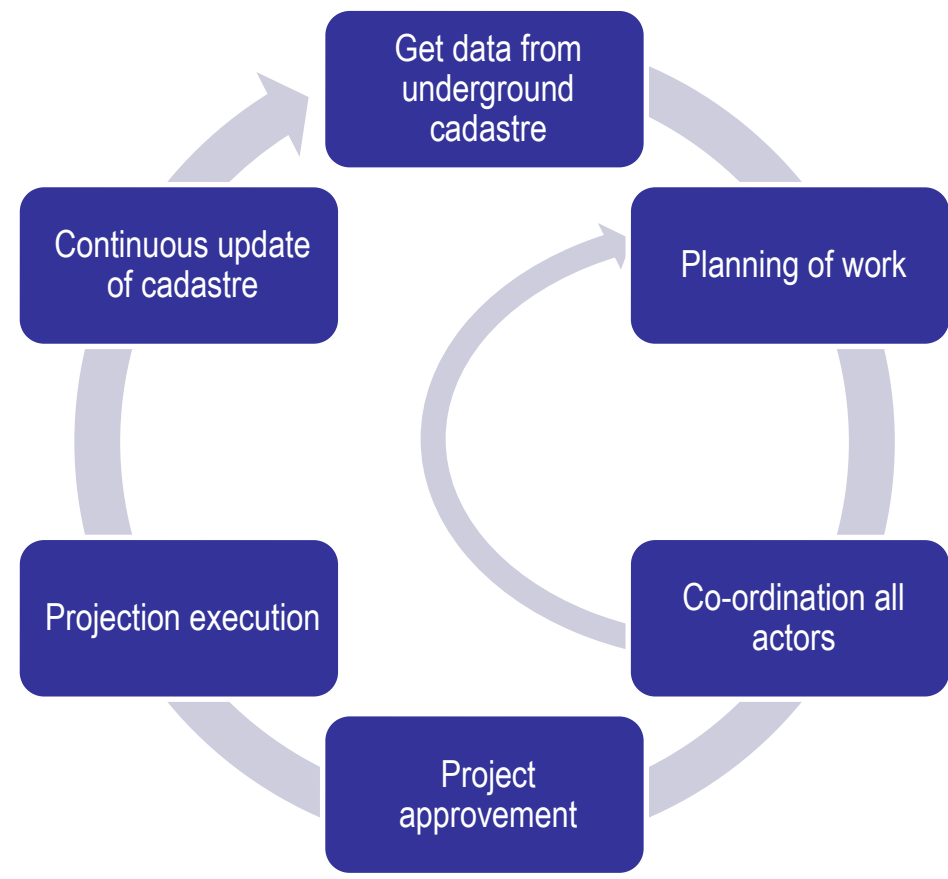
FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Current process for planning and construction in Switzerland



Key messages:

- People trust the data
- Data as integrated part of projects
- Cooperation between all actors
- Underground cadastre supports development towards digital building and construction (BIM)



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Key principles for multi-purpose cadastre in CH

- Responsibility for correct data for lies with asset owner
- Decentralized data maintenance and centralized access
- Financing of decentralized infrastructure through each asset owner, centralized infrastructure funded by government
- Open access to data for asset owners, their contractors and public agencies – most municipalizes provide access also to private individuals (like for property development)
- Any discrepancies between the data and reality to be reported in order to improve the data quality.



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Comparison, contextualisation and lessons learnt

- Lack of legal obligation in Singapore to collect (and provide) data on underground utilities: (some) asset owners do not want to voluntarily share information.
- Differences in construction and maintenance of a road:
 - The climate has a direct influence on the structure of the roadway (road bed, foundation, surface)
 - Opening a road for trial trenches much simpler in subtropical Singapore than in the harsher climate of Zurich.
 - In Zurich, a road must be completely and extensively renovated every 20 years – including renewal of infrastructure!
- Time constraints: In Singapore, roads with construction sites must be reopened at the start of rush hour. In Zurich, road closures or deviations due to construction sites usually last several weeks and the works are therefore easier to plan.
- Data access: perception of security situation is different - in Zurich, threat of open data is considered low.

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Conclusions and recommendations for a successful implementation of a digital twin of underground infrastructure

Governance and institution:

- Digital twin of the underground: supra-organisational product Strict (data) governance.
- Cross domain data → need for a leader overall quality, provider of the spatial data infrastructure (SDI).

Policy and legal:

- Special attention on data quality, data exchange (format, mechanism), data management and data security

Processes and standards:

- Process design must take into account the local planning and construction culture!

Capacity and Education

- Surveying techniques and understanding the purpose of the different assets to map them correctly.

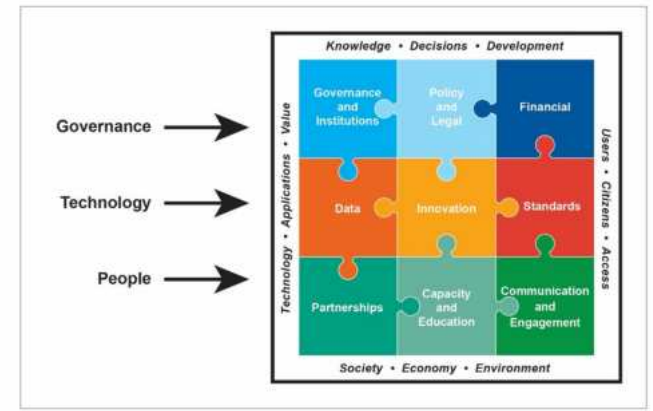




FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Commission 7

Cadastre and Land Management

Serving Society for the Benefit of People and Planet



ORGANISED BY



PLATINUM SPONSORS

