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FIG WORKING WEEK 2023

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Protecting
Our World,
Conquering
New Frontiers

3D Cadastral Practices in Different Cities in China

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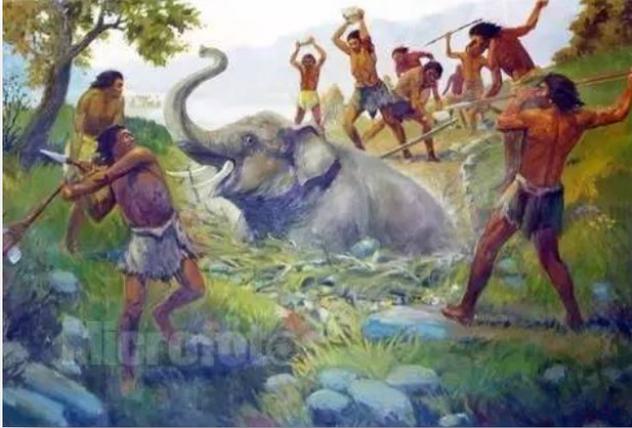
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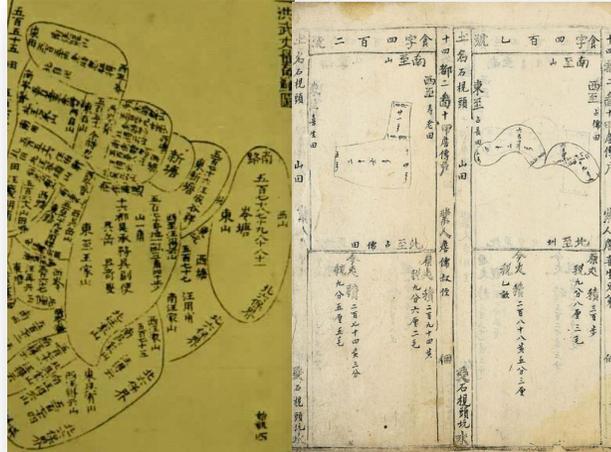
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Background | • Development of cadastre



The formation of land consciousness

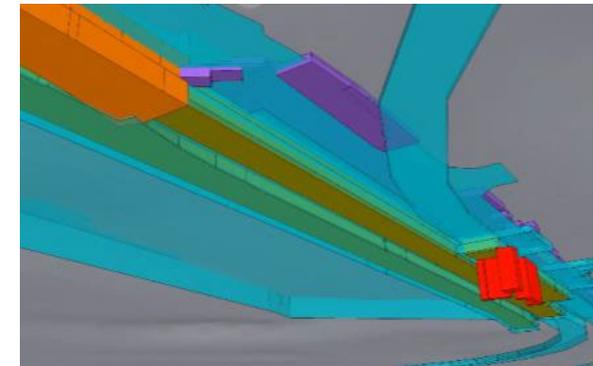
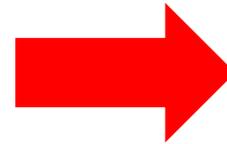
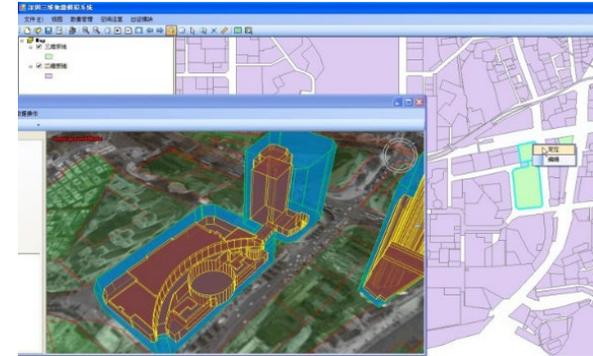


The Cadastral Register of the Ming Dynasty

Two basic questions:
Where? Whose?

Cadastral registration plays an important role in promoting the land system and ensuring national taxation

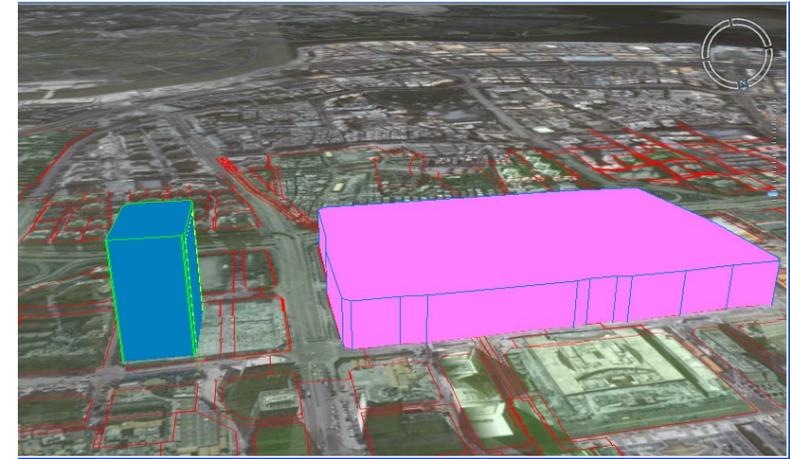
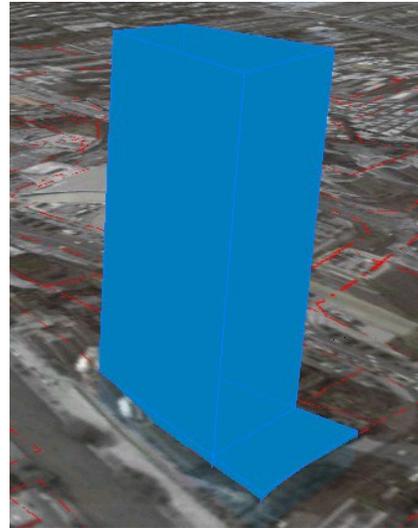
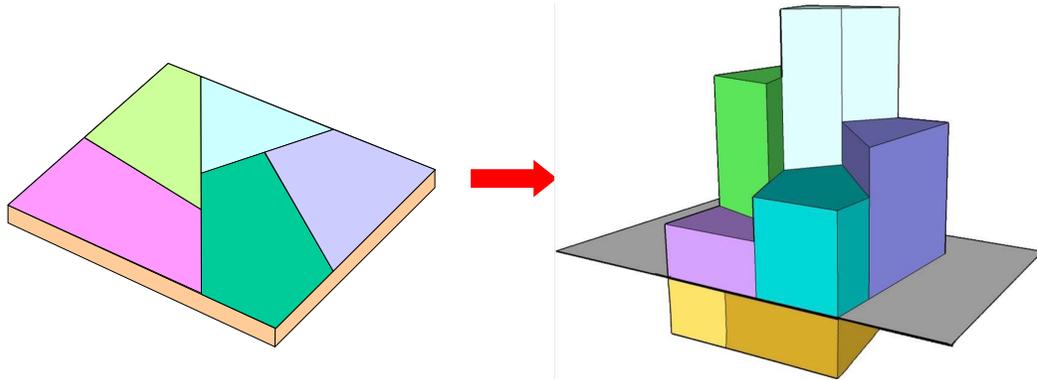
Background | • Three-dimensional construction



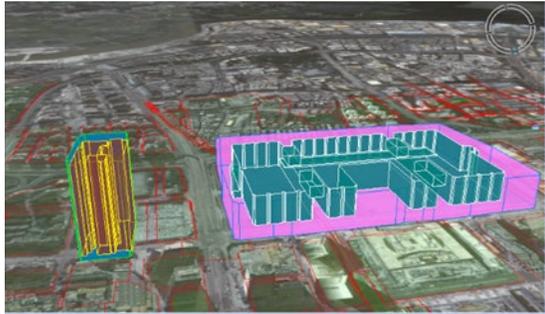
Land management model with three dimensional cadastral as the core

Background | • 3D property unit

Minimum Unit for 3D Cadastral Registration



Background | • significance



On July 7, 2020, China State Council mentioned in the Notice NO.96 that “3D land management model with 3D cadastre as the core” should be replicated and popularized nationwide



Shenzhen “From 0 to 3D”



Chongqing



Shenyang



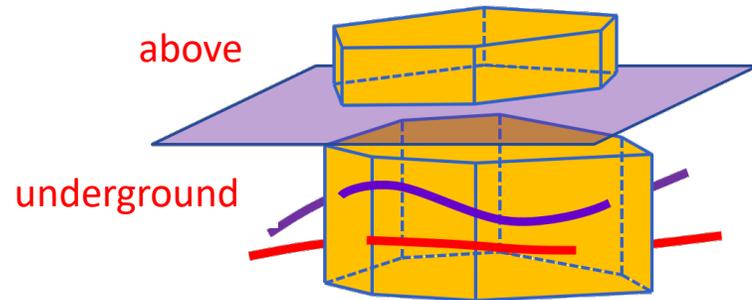
Guangzhou

To demonstrate the importance of 3D cadastral planning for supporting 3D control of national land space in different types of cities

Mountain City Management | • Chongqing

The Civil Code stipulates that the right to use construction land can be established on the **surface, above or underground** of the land.

The expression of 3D spatial elements of urban buildings requires a clear indication of the positional relationship between 3D spatial buildings and the surface.



Positional relationship



Difficult to define the surface

Mountain City Management | • Chongqing



School

road

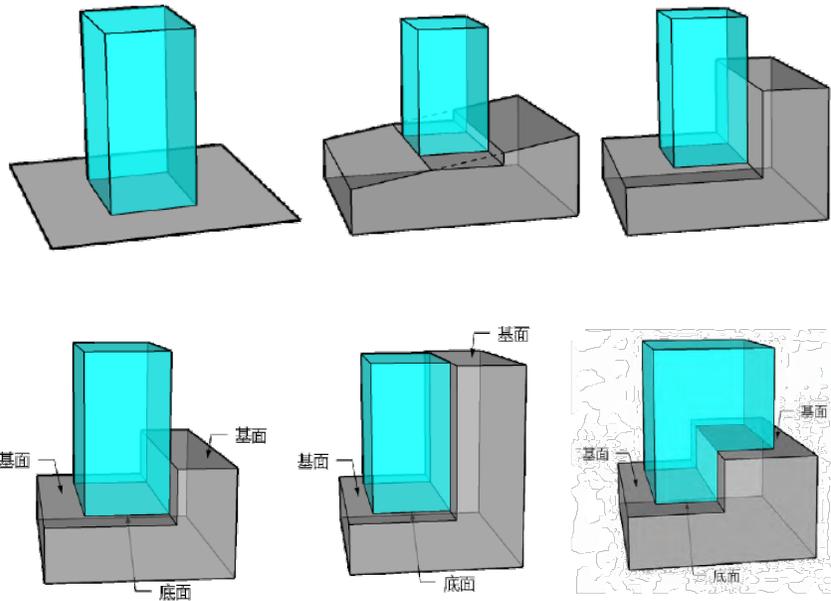
road

Government departments

the buildings and the surfaces are located at different levels

Mountain City Management | • Chongqing

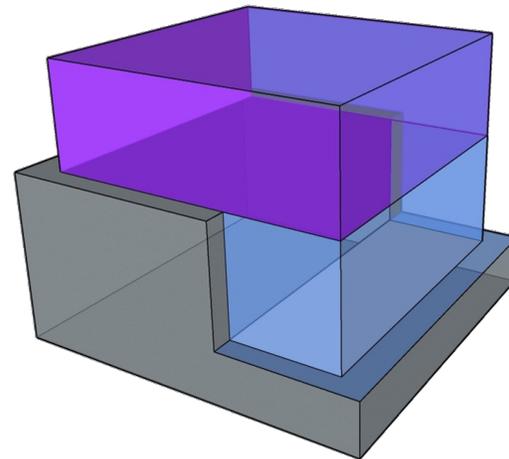
Directly display the positional relationship between 3D property unit and terrain



The relationship between 3D property unit and terrain

Traditional management mode:

- Unclear spatial description
- Unclear expression of spatial ownership



- School
- Government organs
- Terrain

Avoiding the complex relationship between the building projection surface and the ground surface

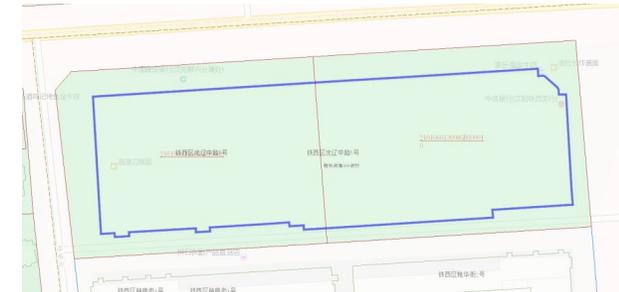
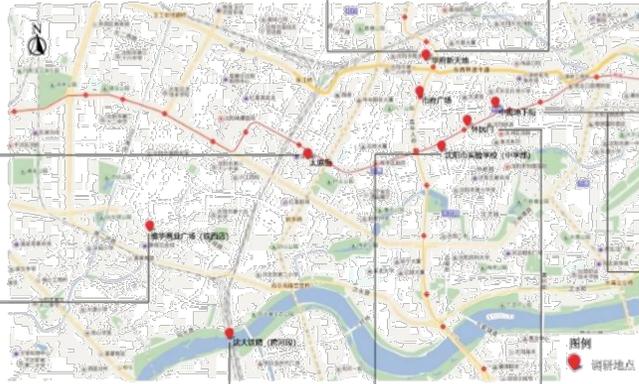
Issues left over from history |

- Inconsistence between the buildings and the land

Shenyang



Buildings and structures should be registered together with the land they are attached to, maintaining the consistency of the rights subject.

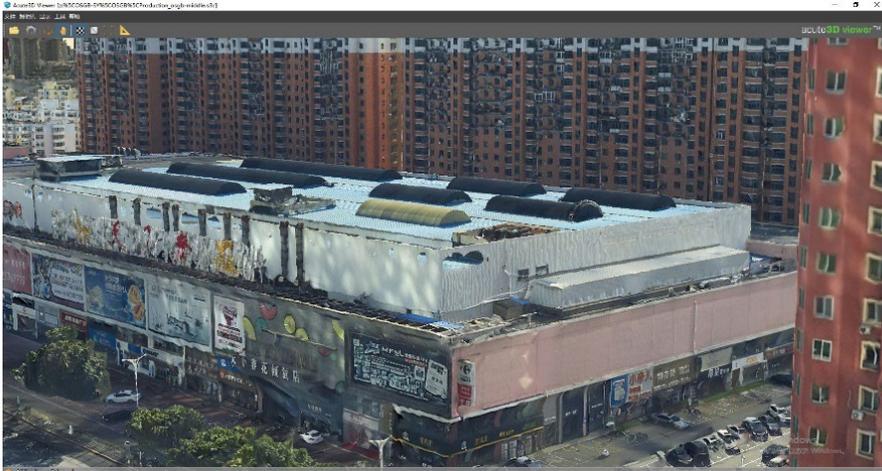


Inconsistency between buildings and land

Inconsistent rights holders

Issues left over from history | • Case

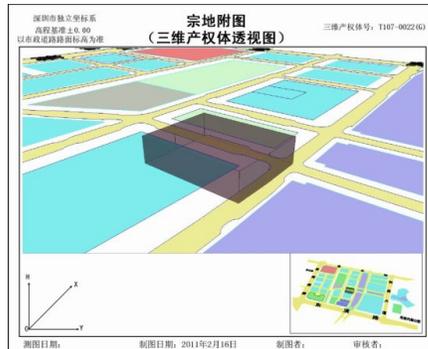
Inconsistent rights holders



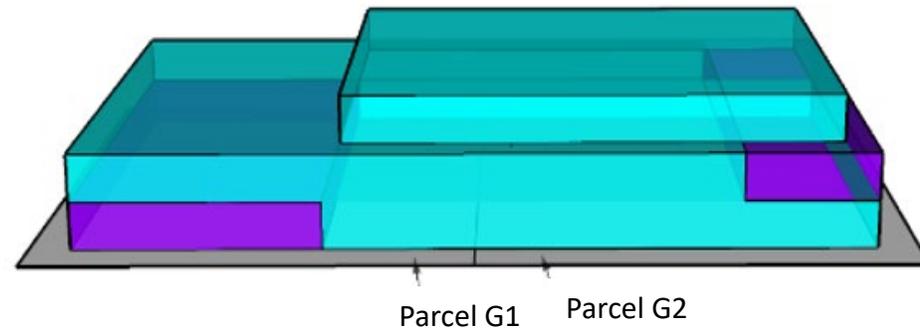
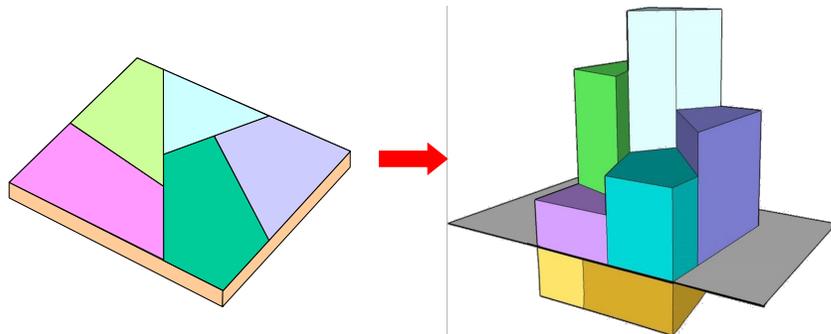
Schematic diagram of the current situation of the commercial square

Issues left over from history | • Case

Support real estate registration for "consistent real estate, parcel and land space"

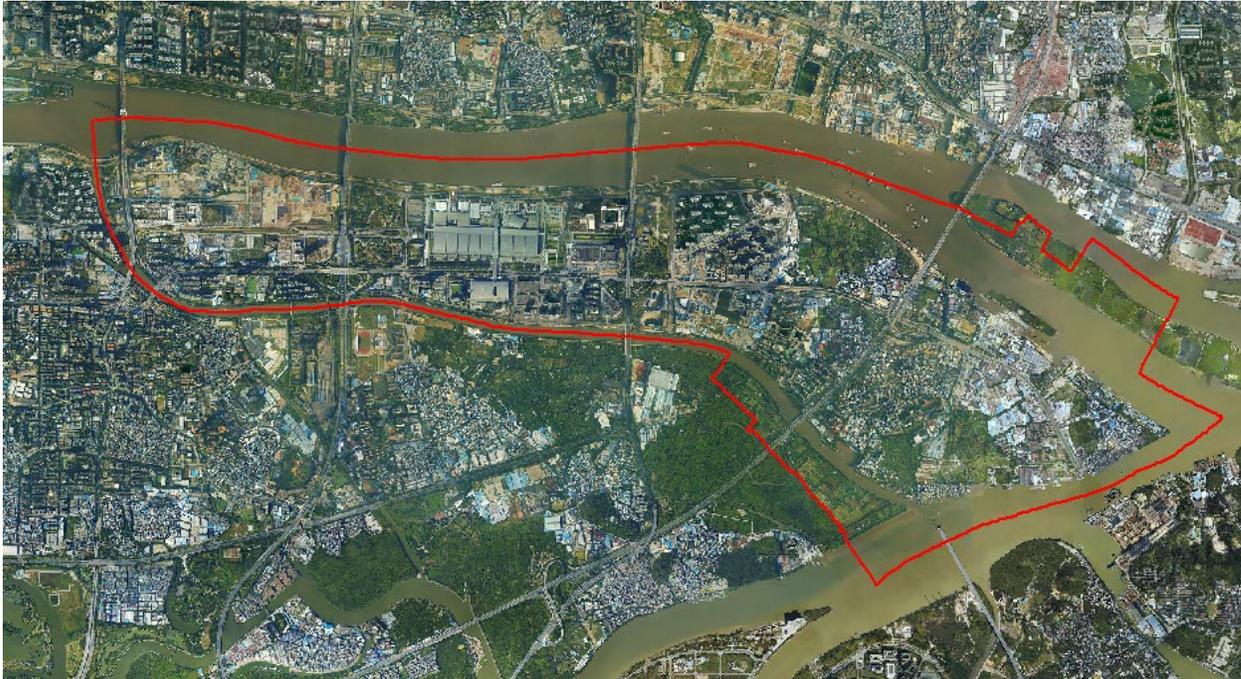


The 3D cadastral object is no longer limited to land, but also be extended to real estate.



Commercial square

Future planning and construction | • **Guangzhou**



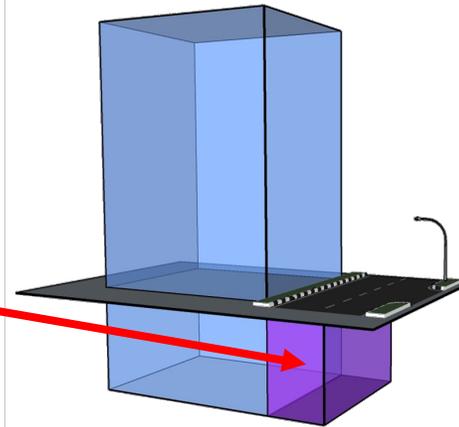
Intensively and economically use land
new CBD in Guangzhou.

Future planning and construction | • **Guangzhou**

Underground and surface have different usage rights

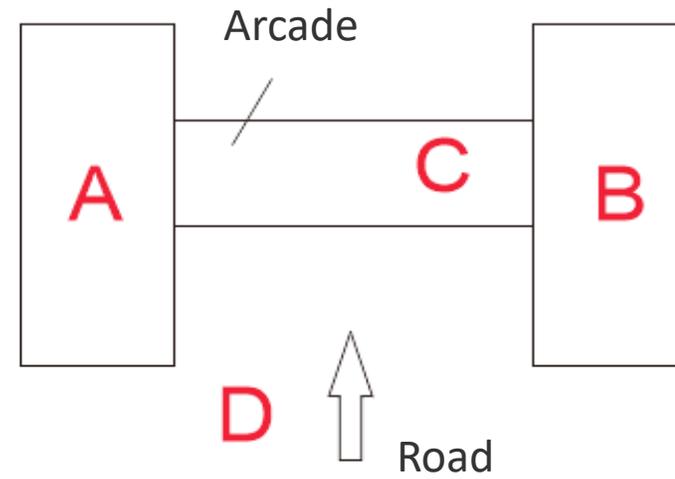
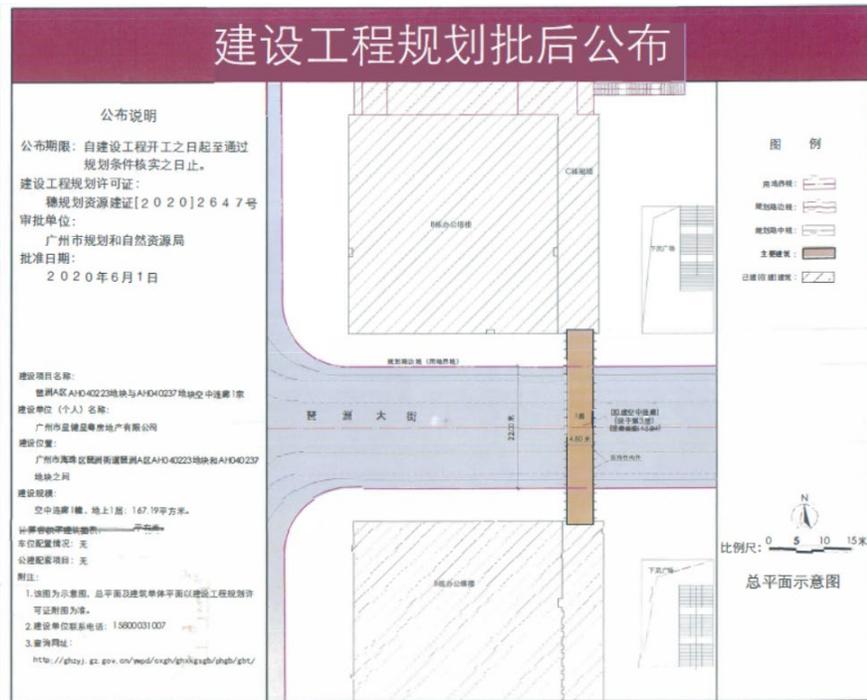


10-1 Parcel



Land use planning of the parcel

Future planning and construction | • **Guangzhou** Arcade and surface have different usage rights



Schematic model of aerial corridor

Engineering planning diagram of aerial corridor

Future planning and construction | • Guangzhou Above and surface have different usage rights



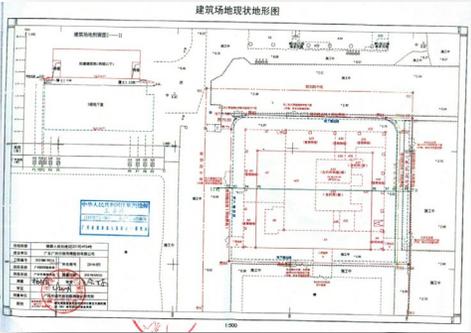
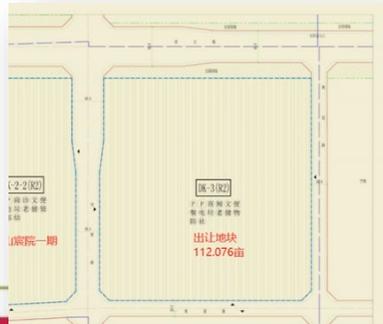
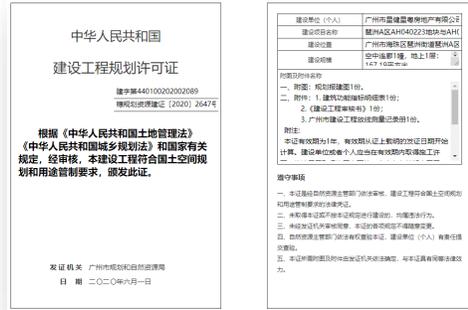
site selection

Land supply

Construction Engineering Planning Permit

Completion acceptance

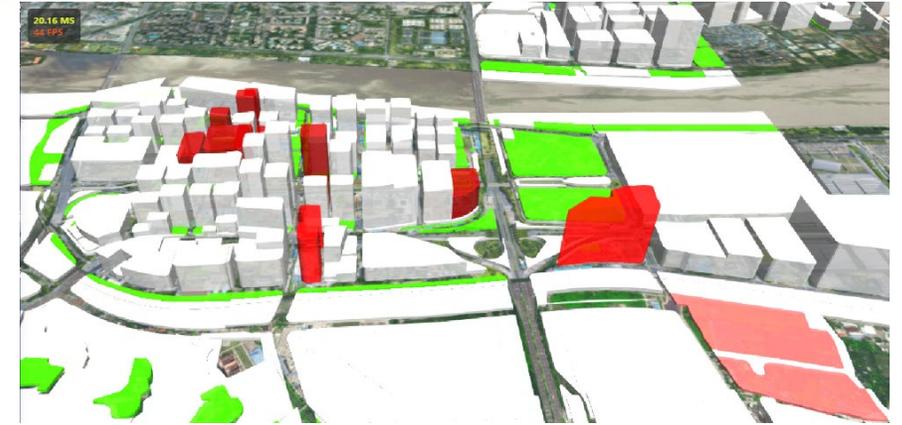
real estate registration



Future planning and construction | **3D planning**

The Challenge of Regulatory Detailed Planning:

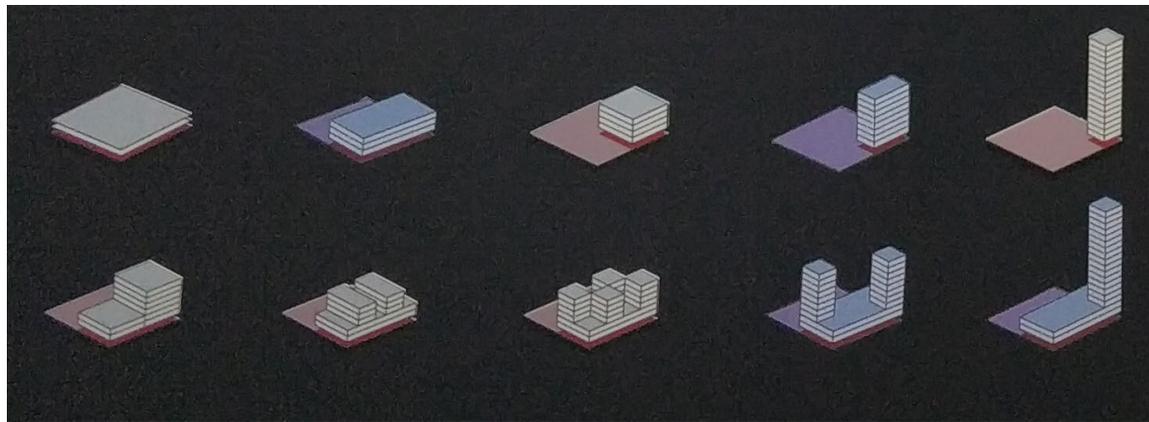
- Land type
- Plot ratio
- Building property line



3D Planning Box

The dimensionality upgrade method:

- Control indicators: expanding from 2D space to 3D space
- The expression form of elements: transforming from text, drawings, etc. to 3D Controllable Detailed Planning Box



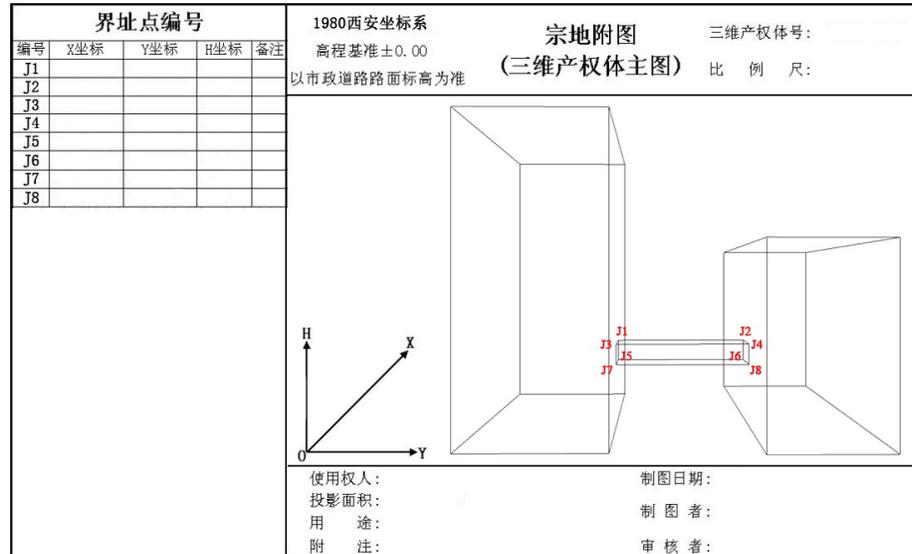
Different architectural spatial forms under the same plot ratio

Future planning and construction |
Real estate registration

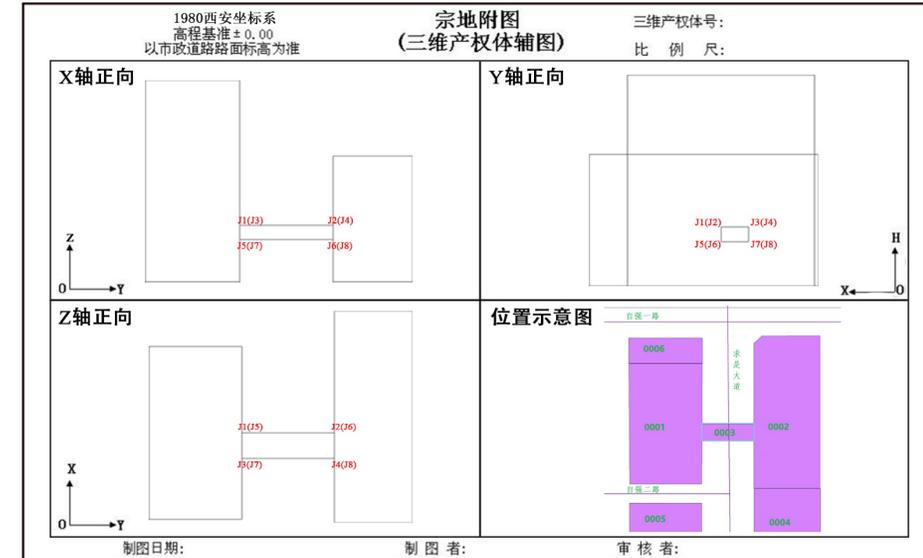
3D registration



Cross road corridor



The main image of the 3D property certificate



The auxiliary image of the 3D property certificate

Summary and Further Work

The importance of 3D cadastral management supporting 3D land space:

- It can directly display the positional relationship between 3D property unit and terrain.
- It can improve the unified real estate registration system of "real estate consistency".
- It effectively supports the transformation of the control mode from 2D to 3D in various stages of land management.



**Current situation
management of
mountain cities**

**Issues left
over from
history**



**Future
planning and
construction**



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Thanks !

YING Shen

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