

## Designing a Title Certificate for the Chinese 3D Cadastre

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# Outlines



**1 Title Registration in China**

**2 Analysis of Designing 3D Title Certificates**

**3 A 3D Paper Title Certificate**

**4 Case Study**

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# 'Property Law of the People's Republic of China'

**'Property Law of the People's Republic of China'** came into effect in 2007 which provides legal support for establishment of 3D cadastre in China.

**'Property Law' Article 136** says: the right to use land for construction (a kind of usufructuary right in China) may be established separately on the surface of, or above, or under the land. The newly-established right to use land for construction shall not damage the usufructuary right that has already been established.

- “property” mentioned in the ‘Property Law of the People’s Republic of China’ includes:
- **Immovable property** (also called real property):
  - the land and the buildings, fixtures, their affiliated facilities
  - natural resources owned by the state according to the law
  - ...
- **Movable property**:
  - other kinds of properties
- **‘Property Law...’ article 9**: the creation, change, transfer or elimination of the real right of a real property shall become effective after it is registered according to law

# Title Certificates in China

- Title certificates in China covers:
  - The title certificate of the land (4 kinds)
  - The title certificate of houses (3 kinds)
  - The title certificate of minerals
  - The title certificate of forests
  - The title certificate of marine fixtures
  - ...

# The Socialist System in China

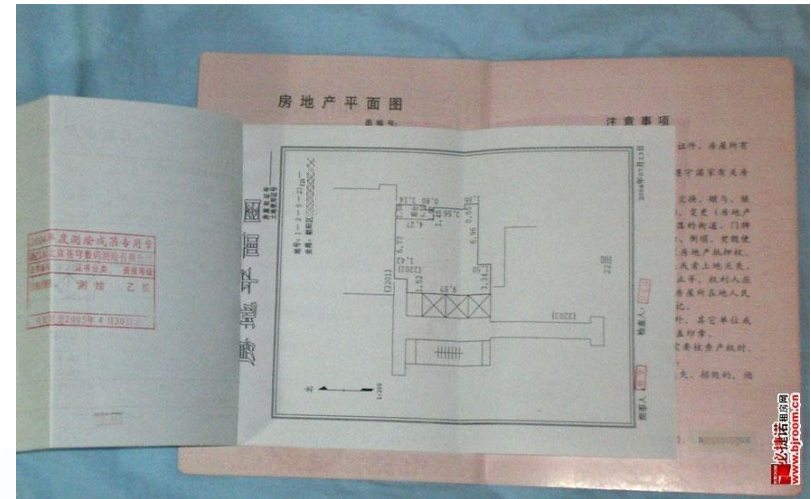
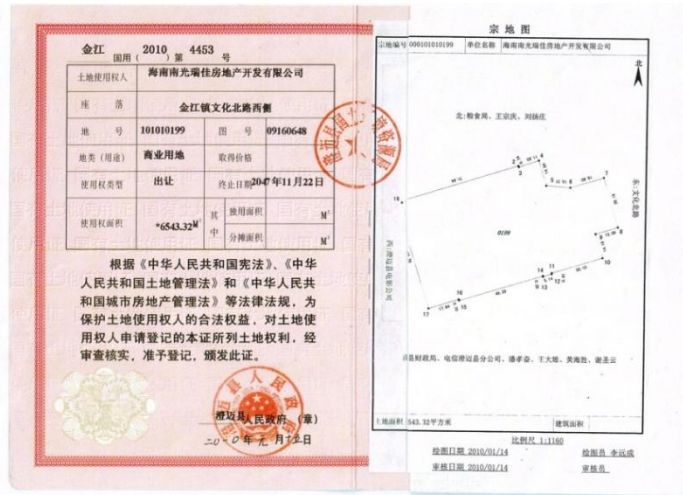
- In the primary stage of socialism in China, the state upholds the basic economic system under which the state ownership shall play a dominant role, and diversified forms of ownerships may develop side by side.
- So, most of the land belongs to the state, and collectively-owned land could be expropriated into state-owned land. Therefore, most of the citizens only have the right to use land.

# Land & House Certificates

- Certificates of Land Property:
  1. Certificate of State-owned Land-use Right, P.R.C.
  2. Certificate of Collective Ownership on Land, P.R.C.
  3. Certificate of Collective-owned Land-use Right, P.R.C.
  4. Certificate of Other Land-use Right, P.R.C.
- Certificate of House Property
  1. House Ownership Certificate, P.R.C
  2. House Joint Ownership Certificate, P.R.C.
  3. House Encumbrance Certificate, P.R.C.



- Before the joint registration
  - the title certificate of the land needed
  - the title certificate of the house needed.



- After the joint registration
  - the title certificate of real estate needed



# Need a 3D title certificate

- **“Property Law” article 146:** the right to use land for construction is transferred, exchanged, used as equity contribution or endowed, the buildings, fixtures and their affiliated facilities on the land shall be disposed of concurrently.
- **“Property Law” article 147:** In case where the buildings, fixtures and their affiliated facilities are transferred, exchanged, and used as equity contribution or endowed, the right to use land for construction occupied by the aforesaid buildings, fixtures and their affiliated facilities shall be disposed of concurrently.
- Registration and certification of real estates covers both land and houses which are closely related with each other.
- **A 3D title certificate** in stead of **a 2D title certificate** needed

# Objects in 3D Title Registration

- It is regarded that objects in 3D title registration should cover:
  - Real estate
  - Municipal facilities and public utilities (e.g. railway tunnels)
  - Underground pipelines and cables in the air
  - Underground garages and shopping malls
  - Historical monuments under protection
  - Geological structures (e.g. minerals, soil pollutants)
  - Natural resources (e.g. marine cadastre, forests)

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# The 3D Title Certificate

## **Contents of the 3D title certificate:**

- (1) Spatial shape of the 3D property object
- (2) Related property rights(3R) of the 3D property object
- (3) Spatial shape of the 2D land occupied by the 3D property object
- (4) Related property rights(3R) of the 2D land occupied by the 3D property object

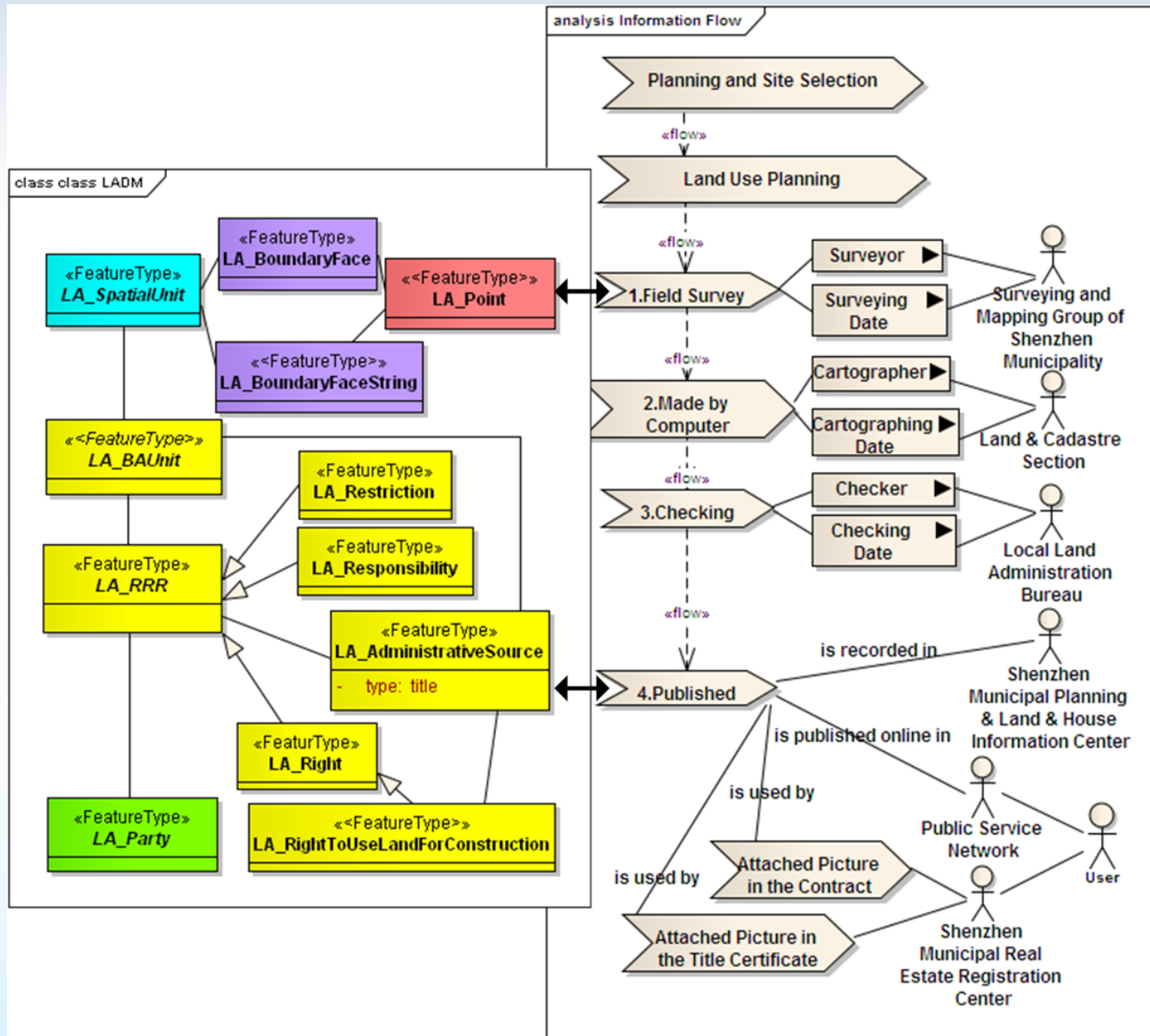
## **Two kinds of 3D property objects:**

-Physical space objects    -Right space object

In this paper, only take **leasing of the right to use land for construction in China (rely on right space objects)** for example:

A right to possess, use and seek proceeds from the land owned by the state, as well as entitled to make use of the land for constructing buildings, fixtures and their auxiliary facilities.

# Information Flow Showing the Parties Involved



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# A 3D Paper Title Certificate

- For a 3D paper title certificate, it can be printed on paper when finished, and all spatial information and property right information is recorded on it.
- A 3D paper title certificate = the main picture + the auxiliary picture
- for the main picture, it is designed to show relatively comprehensive spatial shape of the 3D property object.
  - (1) a perspective similar to the axonometric perspective
  - (2) the wire-frame mode
  - (3) the hidden-line technology



- For the auxiliary picture, it is designed for further description of the spatial shape of the 3D property object from different perspectives.

(1) three standard projection views, the front view, the side view, the top view.

(2) spatial relationships between the 3D parcel and the surrounding objects

-Surrounding homogeneous geographical objects (e.g. nearby parcels)

-Surrounding heterogeneous geographical objects (e.g. the terrain, nearby roads)

# Implementation

(1) Manufacturing of the 3D paper title certificate based on C/S structure

- Oracle 10g as the database
- ESRI ArcGIS Engine v9.3 as the visual interface
- .Net Framework 3.5 as the core development framework
- DLL(Dynamic Linking Library)

(2) Publishing of the 3D paper title certificate based on B/S structure

- Oracle 10g as the database
- ESRI ArcGIS Server v9.3 as the visual interface for publish
- IIS(Internet Information Server) v6.0 as both web server and application server

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# Case 1

## Underground Parking Lot of Houhai Center

(already leased, 3D paper title certificate presented online

<http://www.szpl.gov.cn/tdzpg/landpic.aspx?exchangeId=20110406001>)

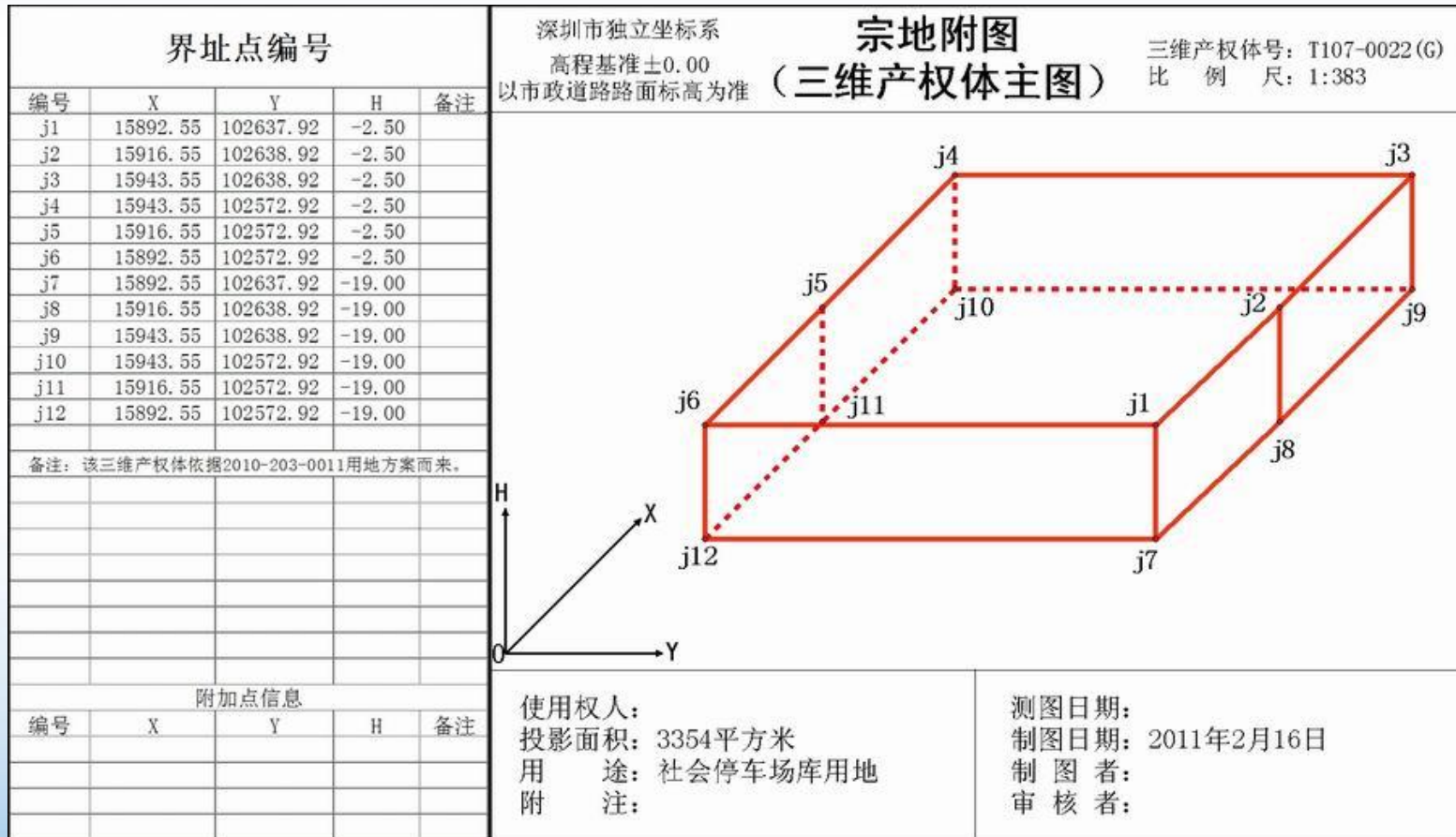


Fig. The Main Picture

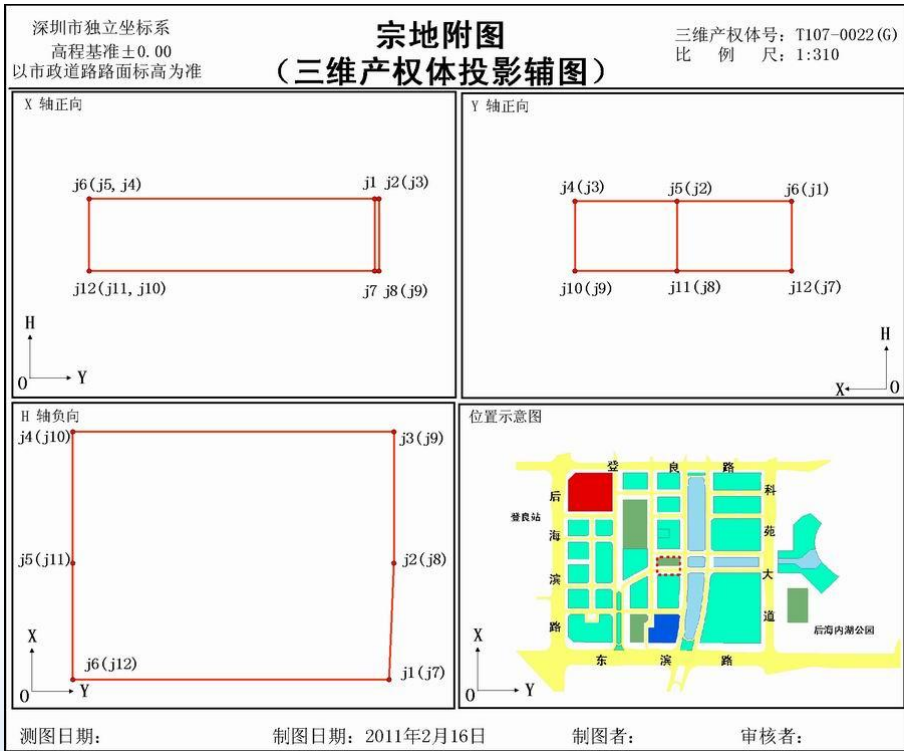


Fig. The Auxiliary Picture

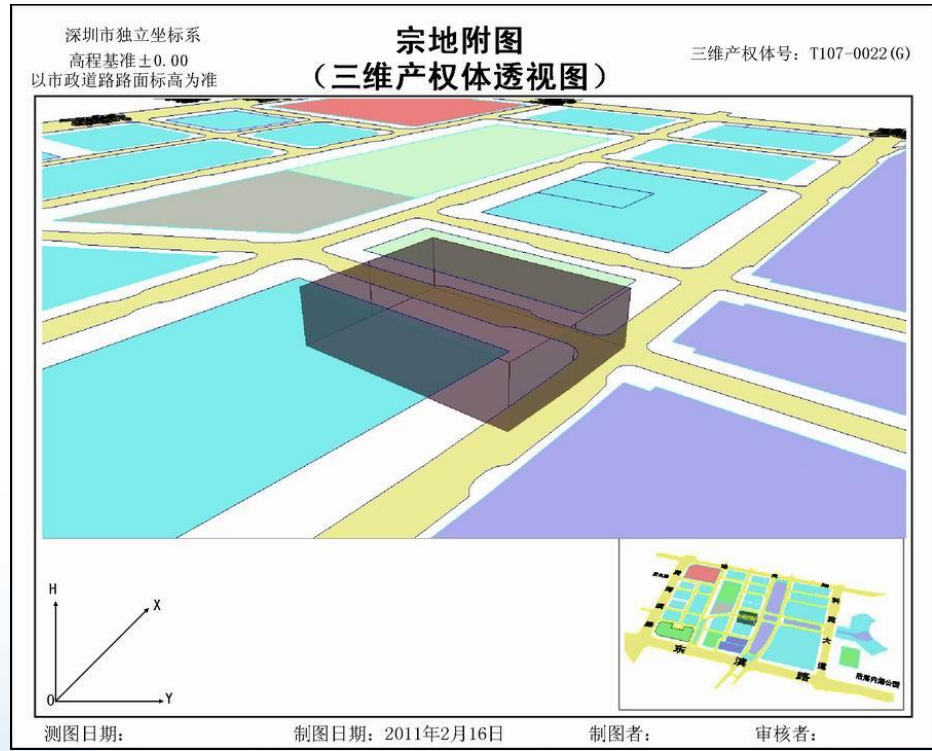
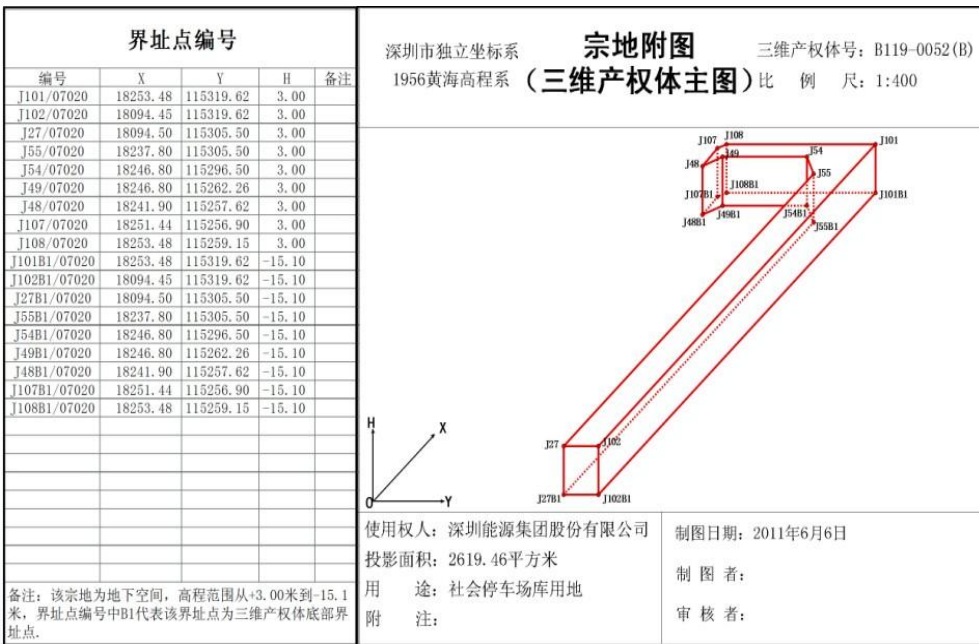


Fig. The Perspective Picture

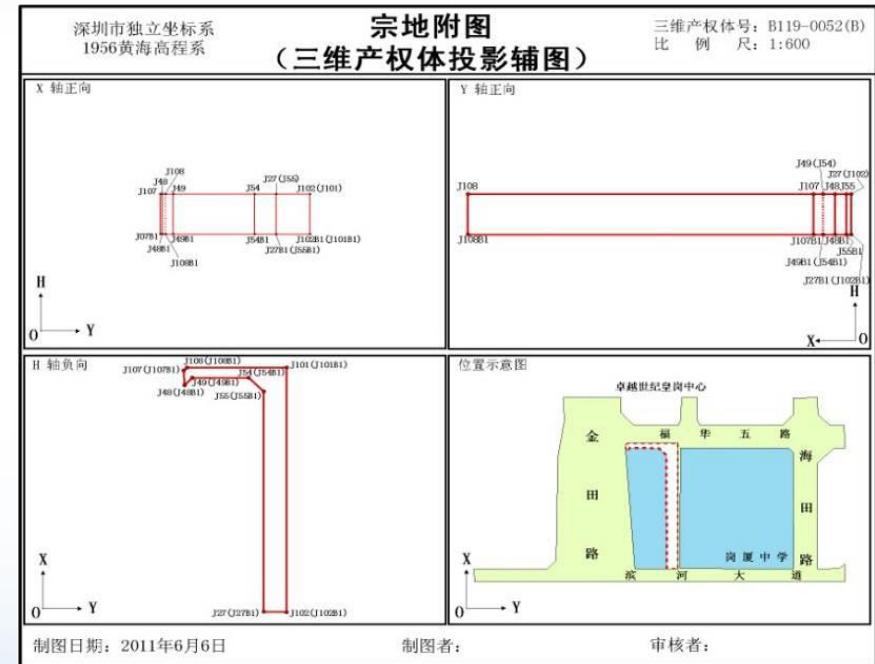
# Case 2

## An Underground 3D Parking Lot (The Underground Parking Lot of the Energy Building)



深圳市规划和国土资源委员会

Fig. The Main Picture



深圳市规划和国土资源委员会

Fig. The Auxiliary Picture

# More Cases

Tab.6 Analysis of Right Space Objects of Several Typical Buildings in Shenzhen, China<sup>4</sup>

Name <sup>4</sup>	Node Number <sup>4</sup>	Edge Number <sup>4</sup>	Face Number <sup>4</sup>	Body Number <sup>4</sup>	Timer in C/S / ms <sup>4</sup>	Time in B/S / ms <sup>4</sup>
FengShenTing(bazaar) <sup>4</sup>	516 <sup>4</sup>	799 <sup>4</sup>	350 <sup>4</sup>	36 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Excellence Century Center <sup>4</sup>	84 <sup>4</sup>	138 <sup>4</sup>	64 <sup>4</sup>	6 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Convention & Exhibition Center <sup>4</sup>	108 <sup>4</sup>	186 <sup>4</sup>	82 <sup>4</sup>	5 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Underground Parking Lot <sup>4</sup>	18 <sup>4</sup>	27 <sup>4</sup>	11 <sup>4</sup>	1 <sup>4</sup>	>1000 <sup>4</sup>	<100 <sup>4</sup>
Luohu Railway Station <sup>4</sup>	48 <sup>4</sup>	72 <sup>4</sup>	30 <sup>4</sup>	3 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Metro from Laojie to Guomao <sup>4</sup>	582 <sup>4</sup>	891 <sup>4</sup>	328 <sup>4</sup>	14 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Power Supply Bureau <sup>4</sup>	16 <sup>4</sup>	28 <sup>4</sup>	16 <sup>4</sup>	3 <sup>4</sup>	>3000 <sup>4</sup>	<100 <sup>4</sup>
WanXiangCheng(i.e. The MixC) <sup>4</sup>	50 <sup>4</sup>	75 <sup>4</sup>	31 <sup>4</sup>	3 <sup>4</sup>	>3000 <sup>4</sup>	<100 <sup>4</sup>
ZTE Building <sup>4</sup>	81 <sup>4</sup>	130 <sup>4</sup>	58 <sup>4</sup>	6 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>
Hongkong-Shenzhen Western Corridor <sup>4</sup>	515 <sup>4</sup>	807 <sup>4</sup>	289 <sup>4</sup>	7 <sup>4</sup>	>4000 <sup>4</sup>	<100 <sup>4</sup>

# Other Cases

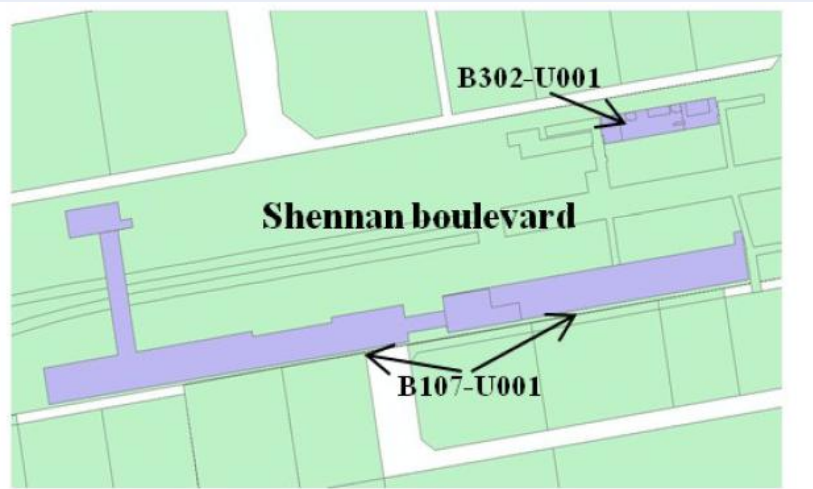


Fig. 2D Parcel

Case  
Fengshengting(bazaar)

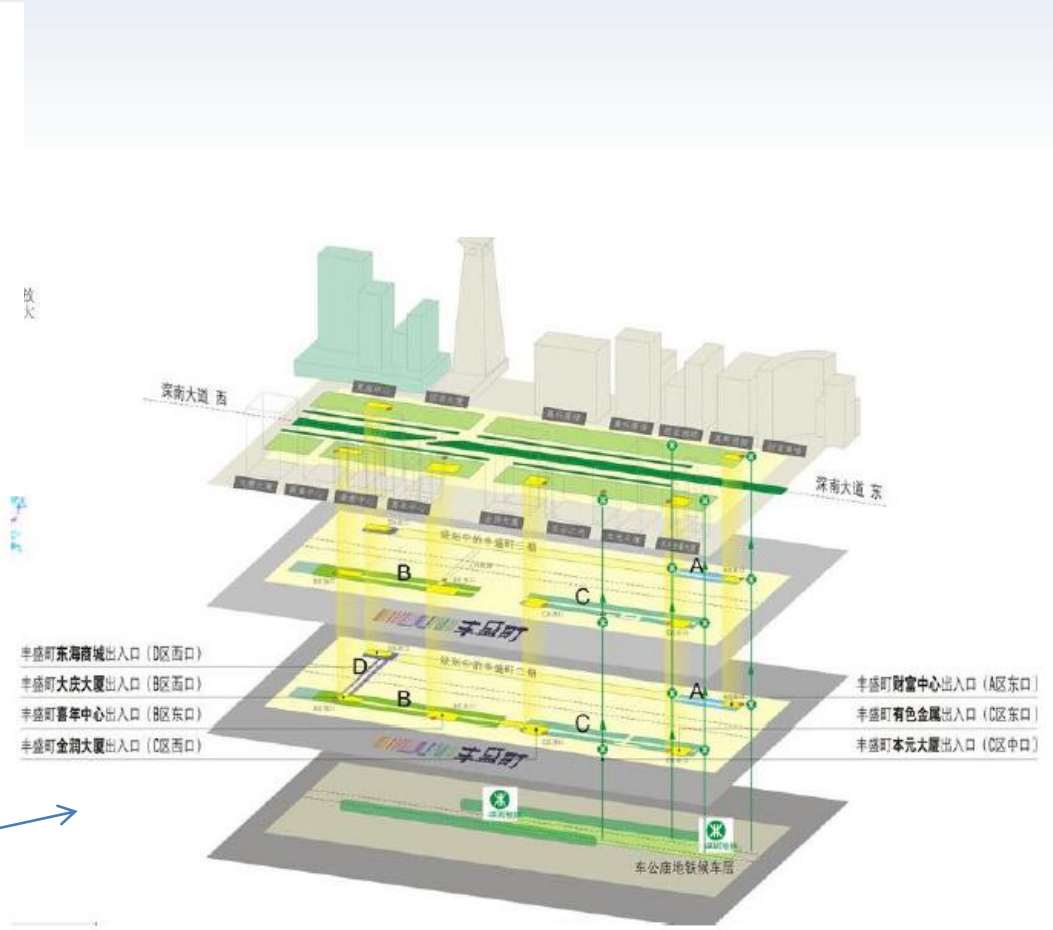


Fig. A Multiple-layer of Land Space Use





Fig. Overview Image

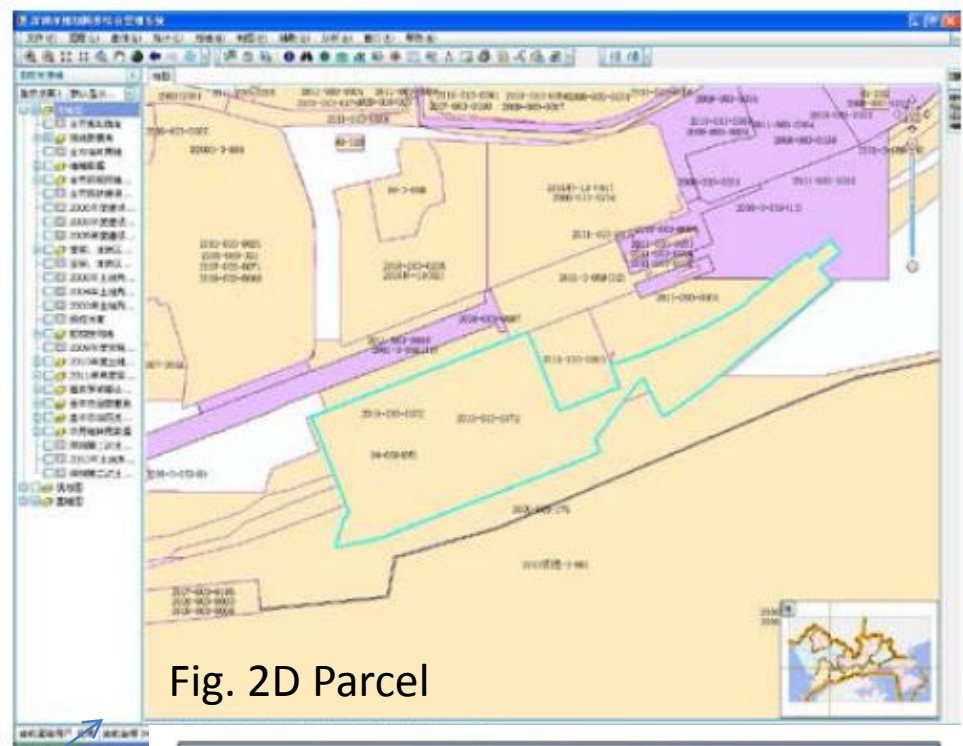


Fig. 2D Parcel

Case  
Tanglangshan



Fig. Vertical Division of Construction



Fig. An Arch over the Municipal Road

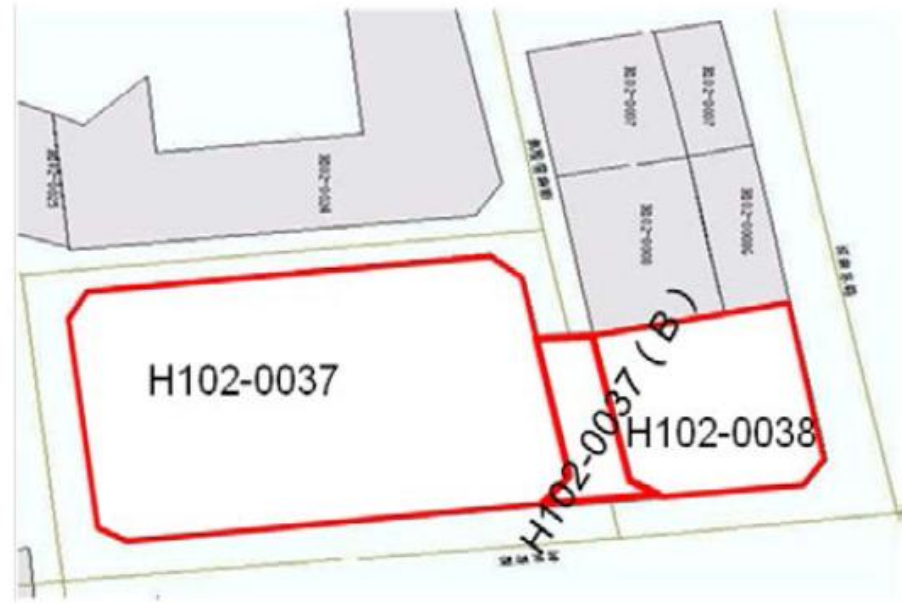


Fig. 2D Cadastral Map

**Case  
WanXiangCheng(the MixC)**

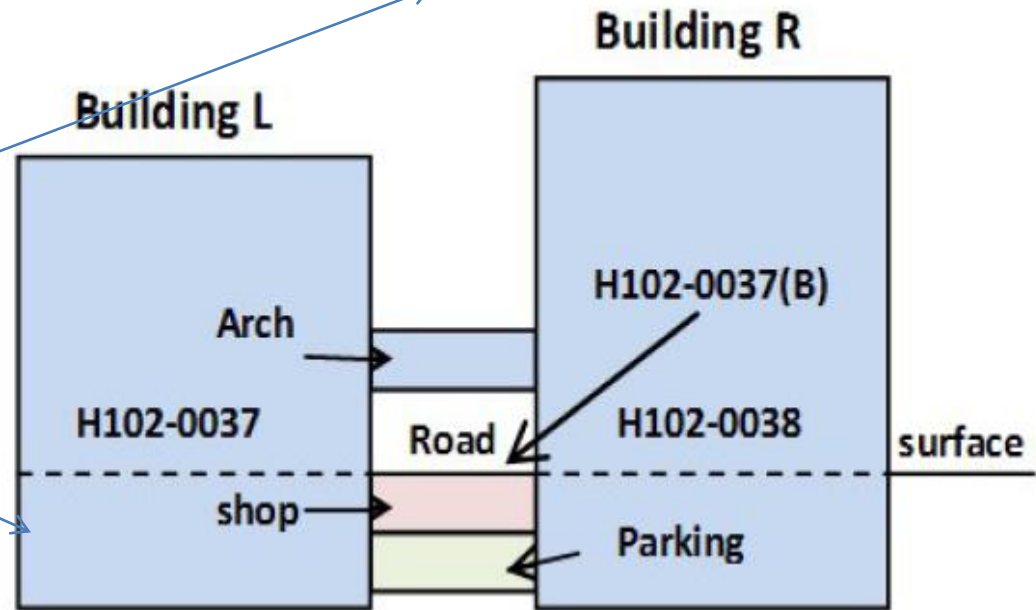


Fig. Profile of the Building

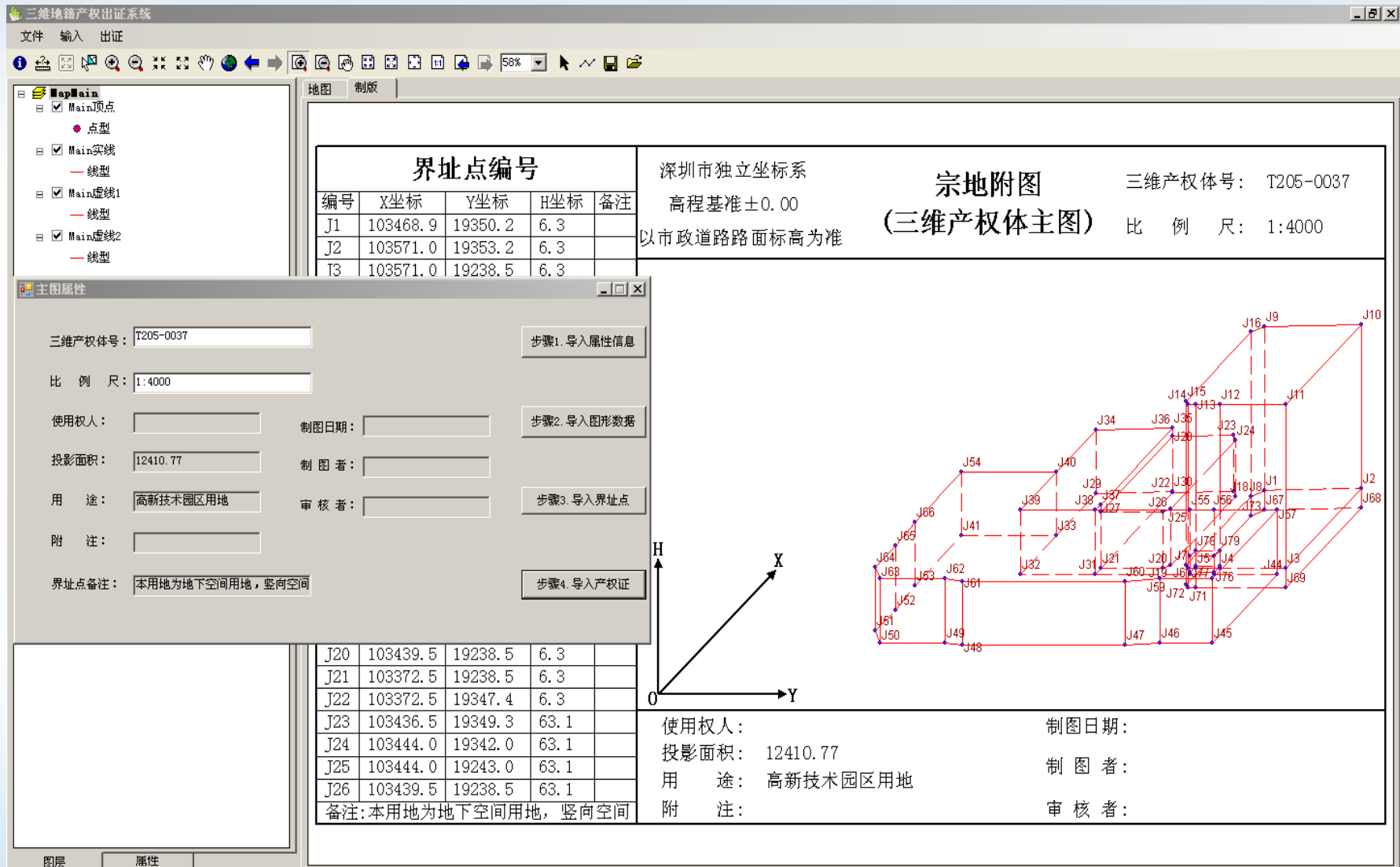


Fig. Manufacturing Interface of the Main Picture of the Building of Zhongxin Telecom Equipment(ZTE)

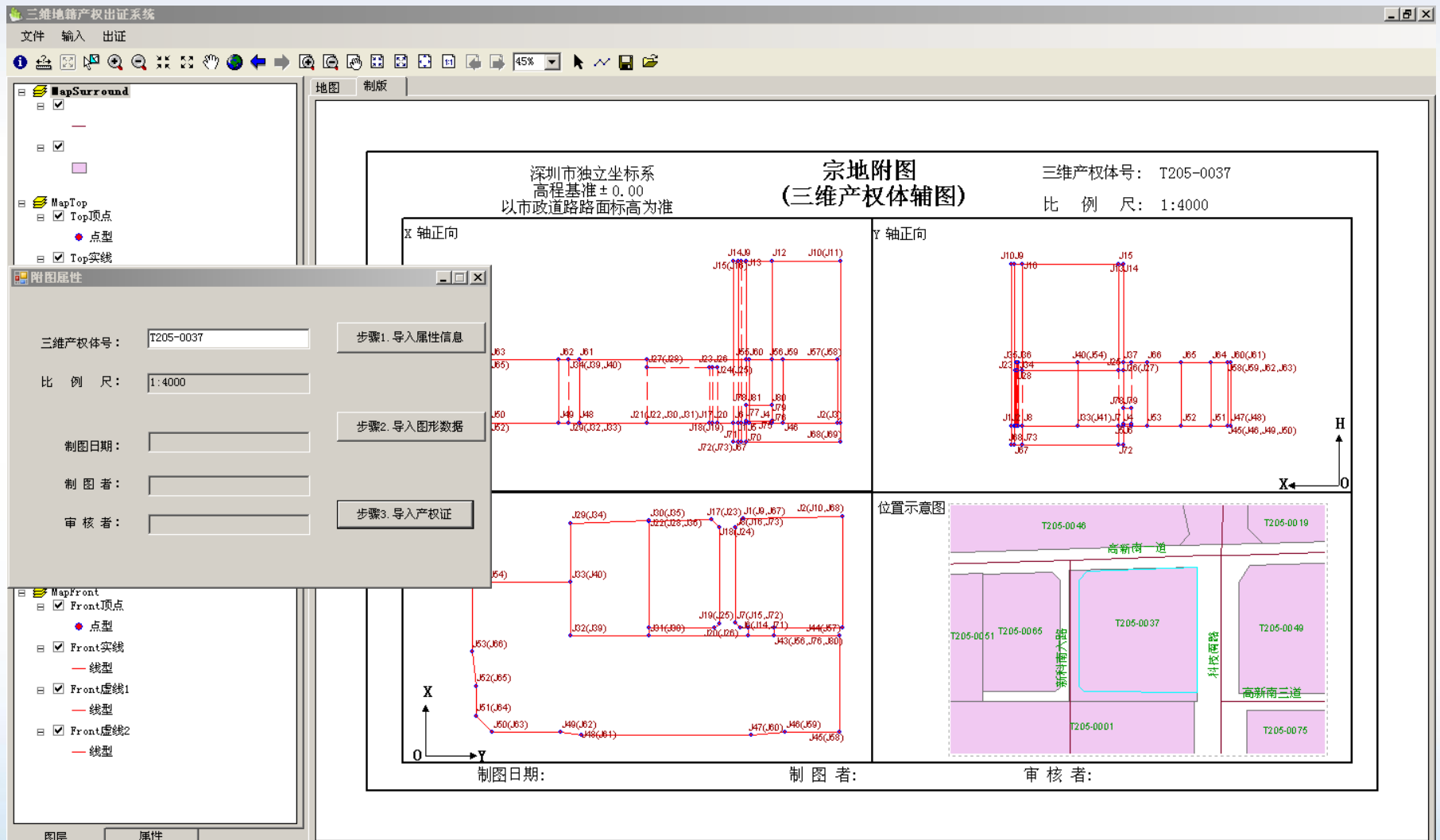


Fig. Manufacturing Interface of the Auxiliary Picture of the Building of Zhongxin Telecom Equipment(ZTE)

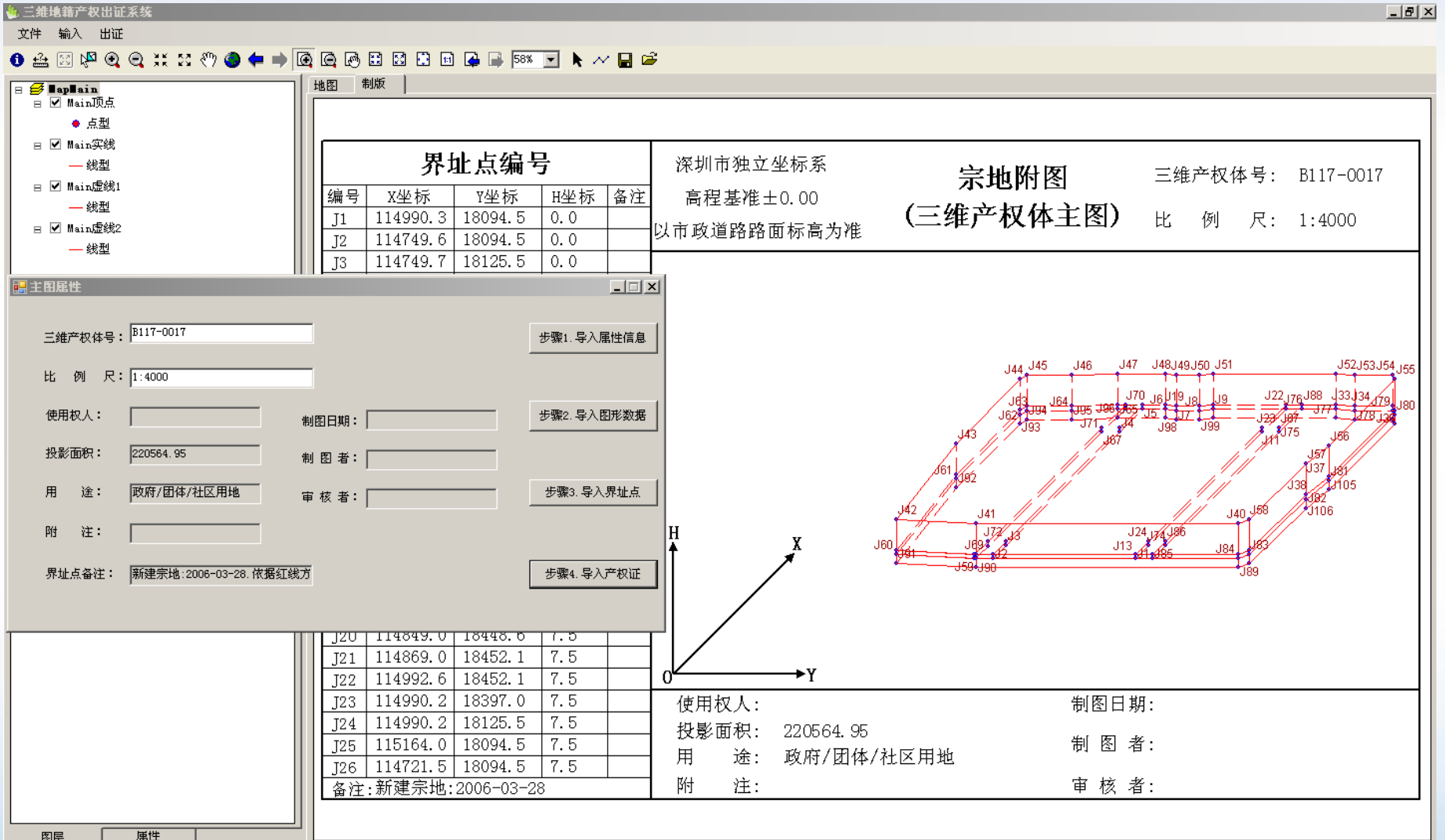


Fig. The Manufacturing Interface of the Main Picture of Convention & Exhibition Center

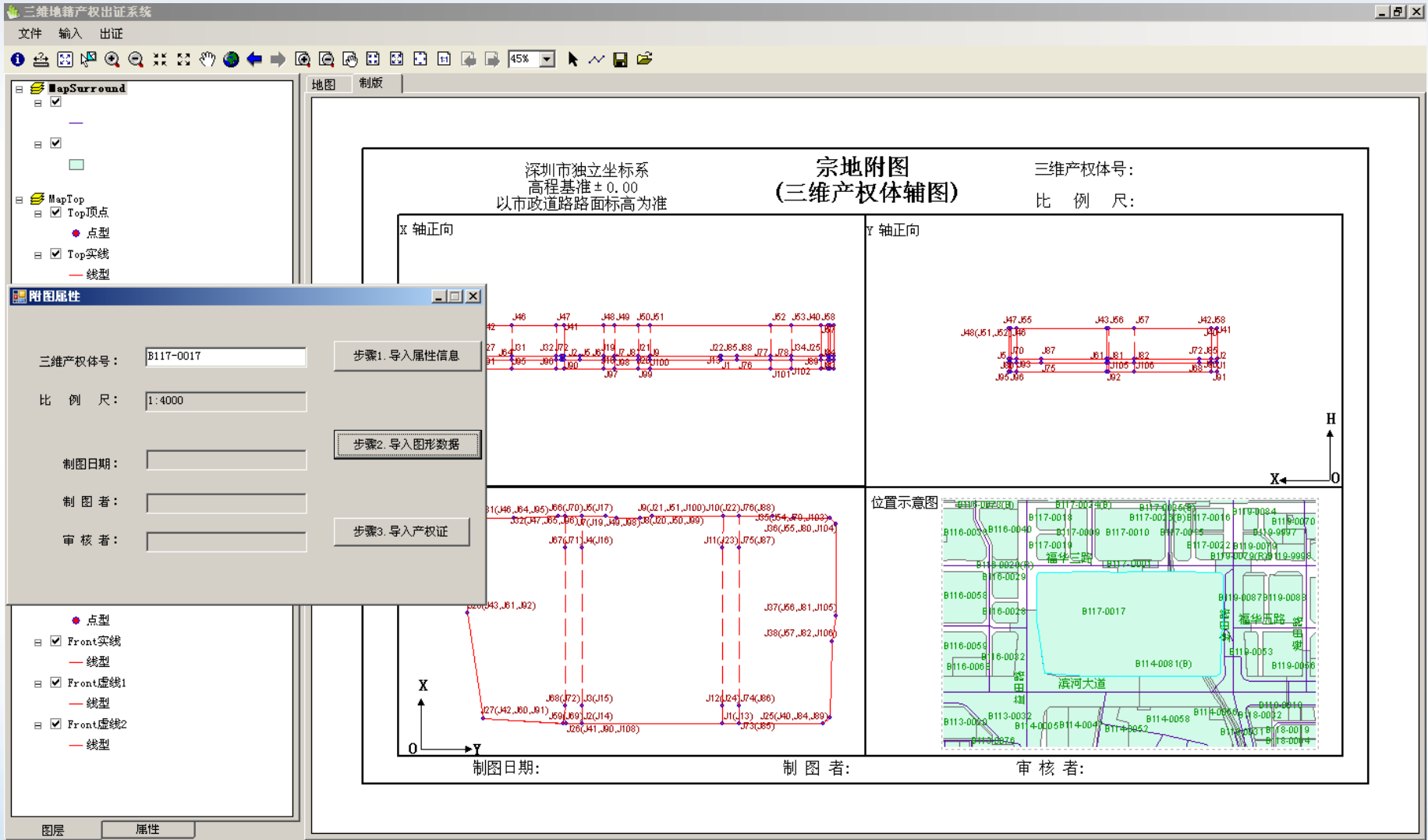


Fig. Manufacturing Interface of the Auxiliary Picture of Convention & Exhibition Center

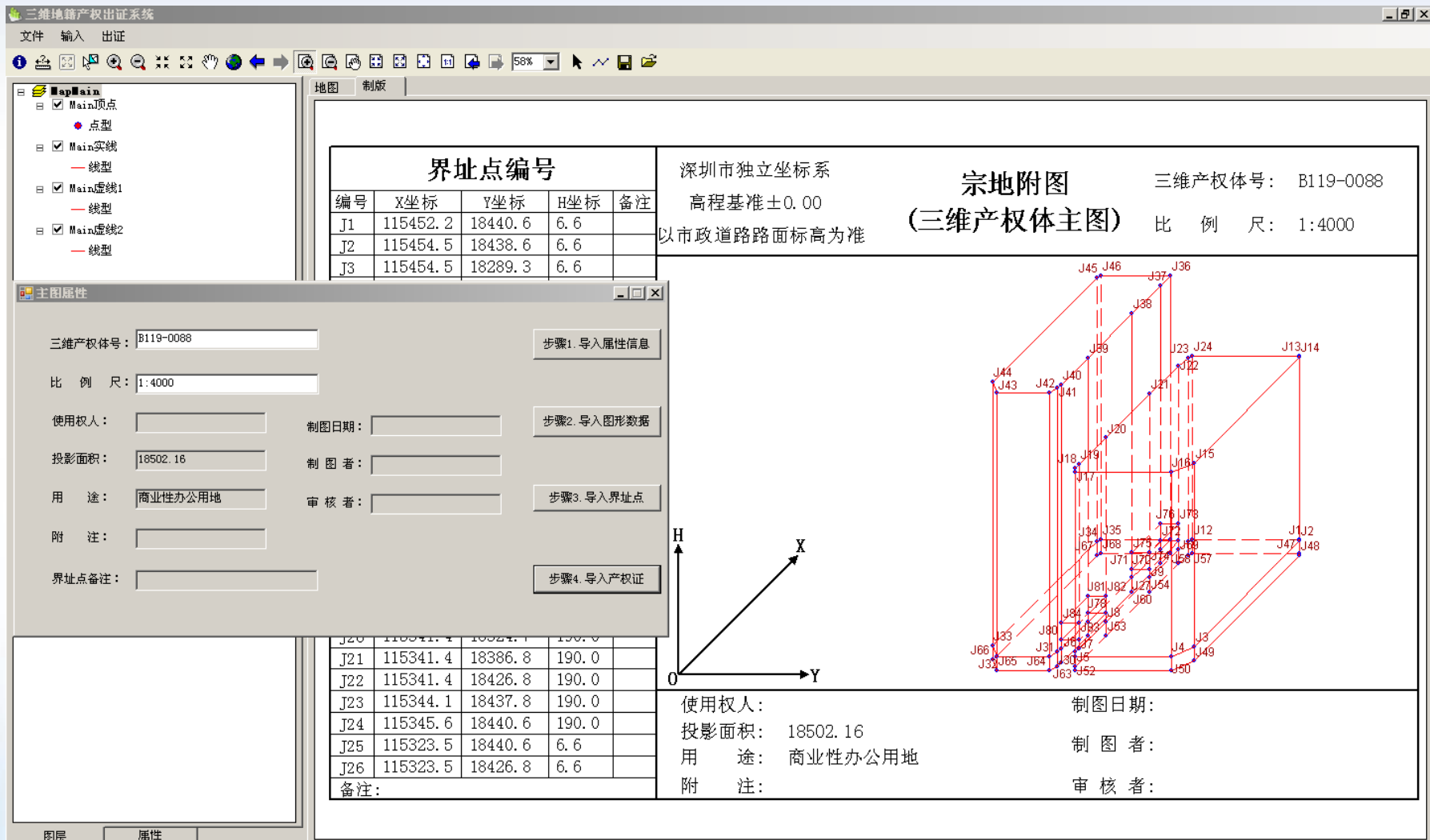


Fig. Manufacturing Interface of the Main Picture of Excellence Century Center

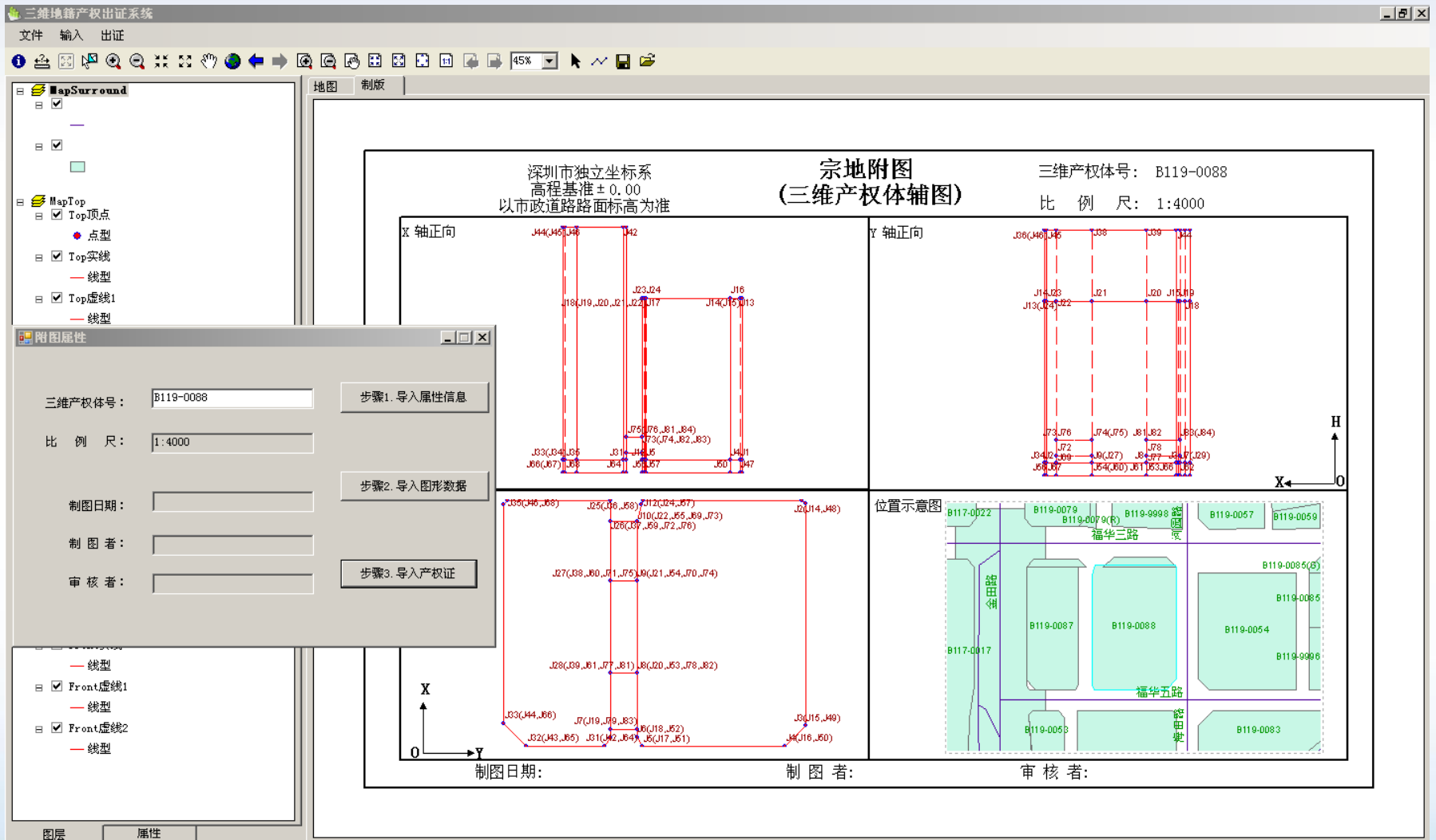


Fig. Manufacturing Interface of the Auxiliary Picture of Excellence Century Center



三维地籍产权出证系统

文件 输入 出证

MapMain

- Main顶点
  - 点型
- Main实线
  - 线型
- Main虚线1
  - 线型
- Main虚线2
  - 线型

地图 制版

界址点编号				
编号	X坐标	Y坐标	H坐标	备注
J1	120288.1	19374.0	12.0	
J2	120353.4	19384.3	12.0	
J3	120337.6	19297.1	12.0	

深圳市独立坐标系  
高程基准±0.00  
以市政道路路面标高为准

**宗地附图**  
(三维产权体主图)

三维产权体号: H102-0016(G)  
比例尺: 1:4000

主图属性

三维产权体号: H102-0016(G) 步骤1. 导入属性信息

比例尺: 1:4000

使用权人: 制图日期: 步骤2. 导入图形数据

投影面积: 2143.9 制图者: 步骤3. 导入界址点

用途: 绿地 审核者: 步骤4. 导入产权证

附注: 界址点备注:

J20				
J21				
J22				
J23				
J24				
J25				
J26				
备注:				

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投影面积: 2143.9 制图者:  
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附注:

图层 属性

Fig. Manufacturing Interface of the Main Picture of  
Power Supply Bureau

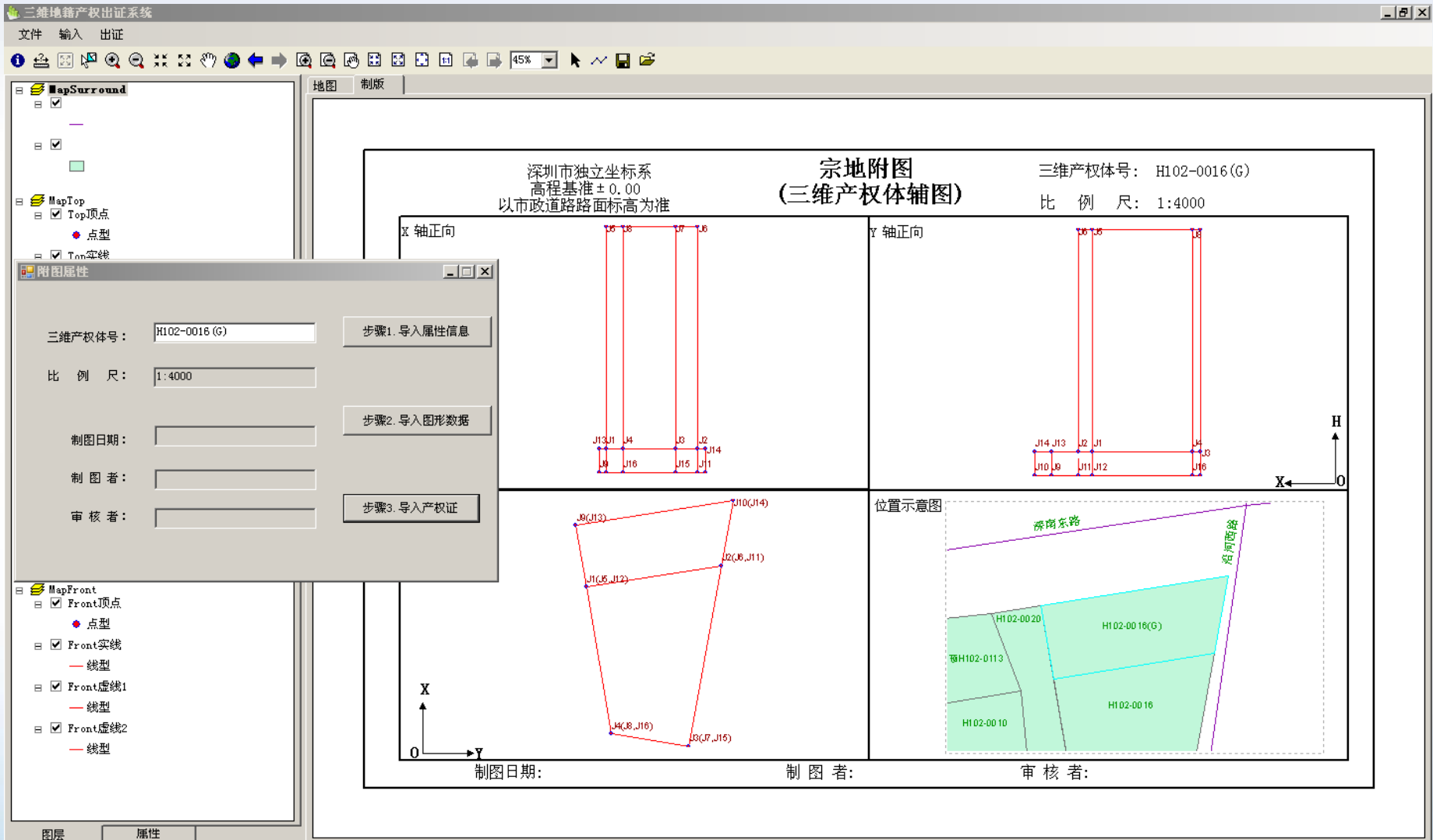


Fig. Manufacturing Interface of the Auxiliary Picture of  
Power Supply Bureau

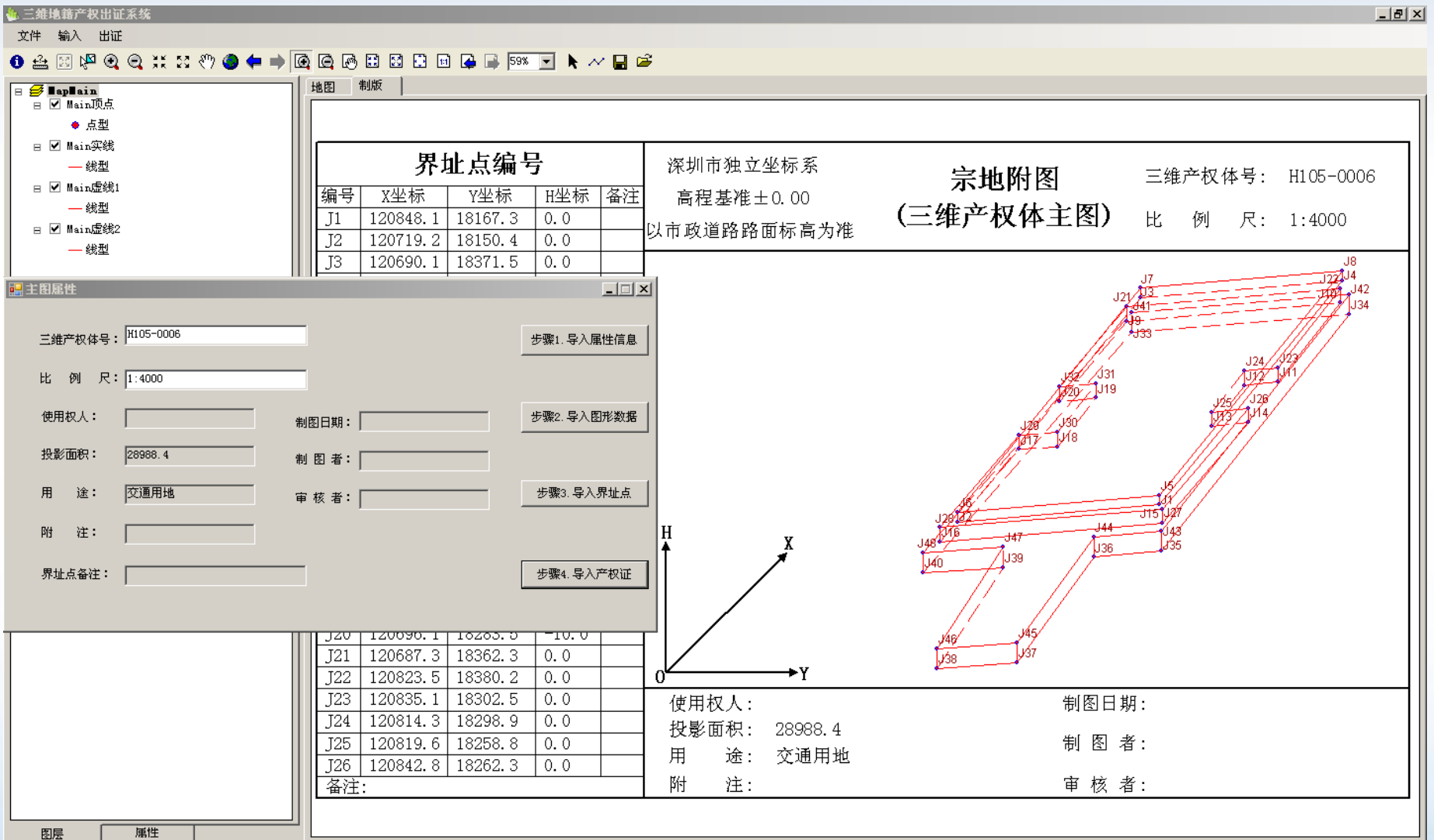


Fig. Manufacturing Interface of the Main Picture of Luohu Railway Station

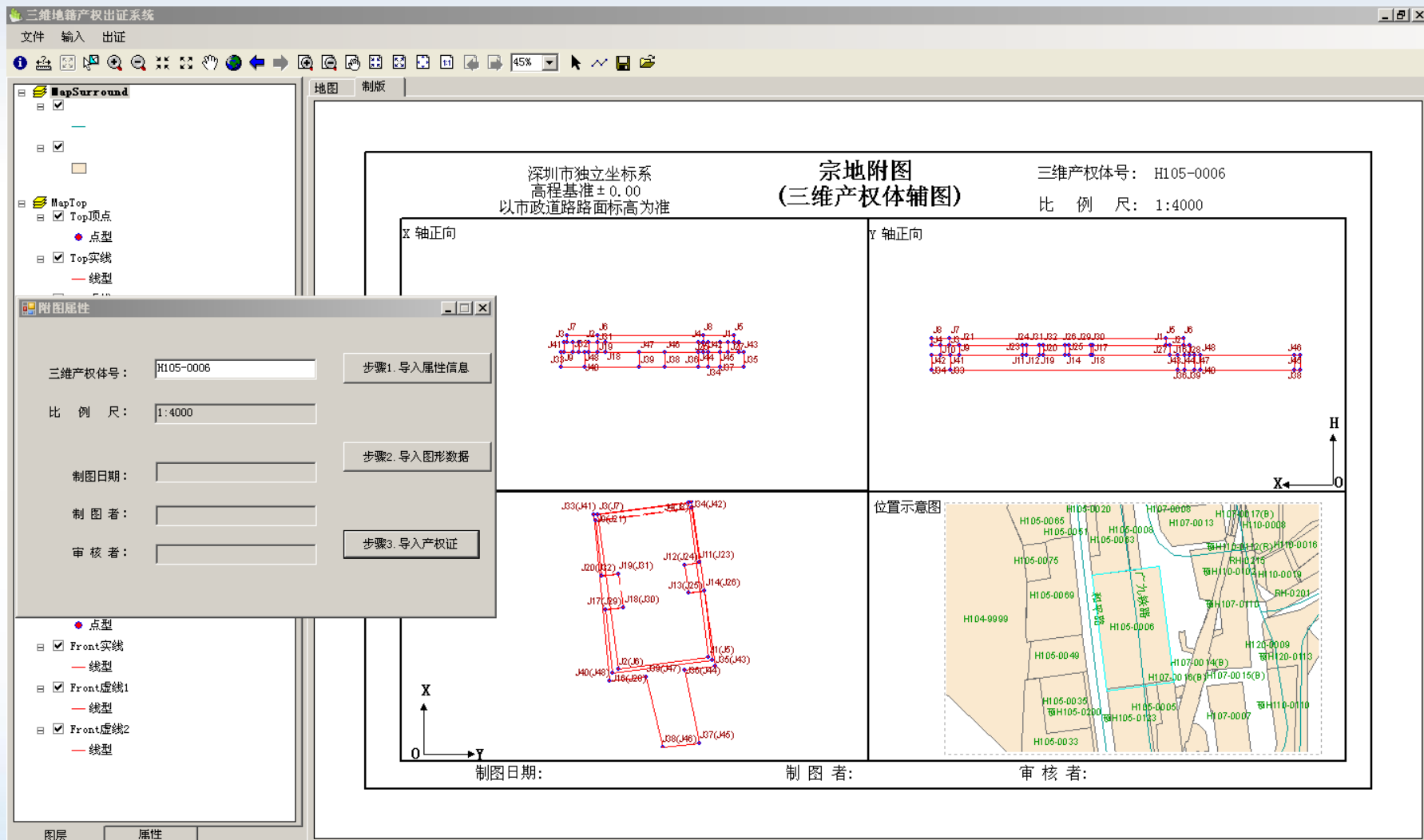


Fig. Manufacturing Interface of the Auxiliary Picture of Luohu Railway Station

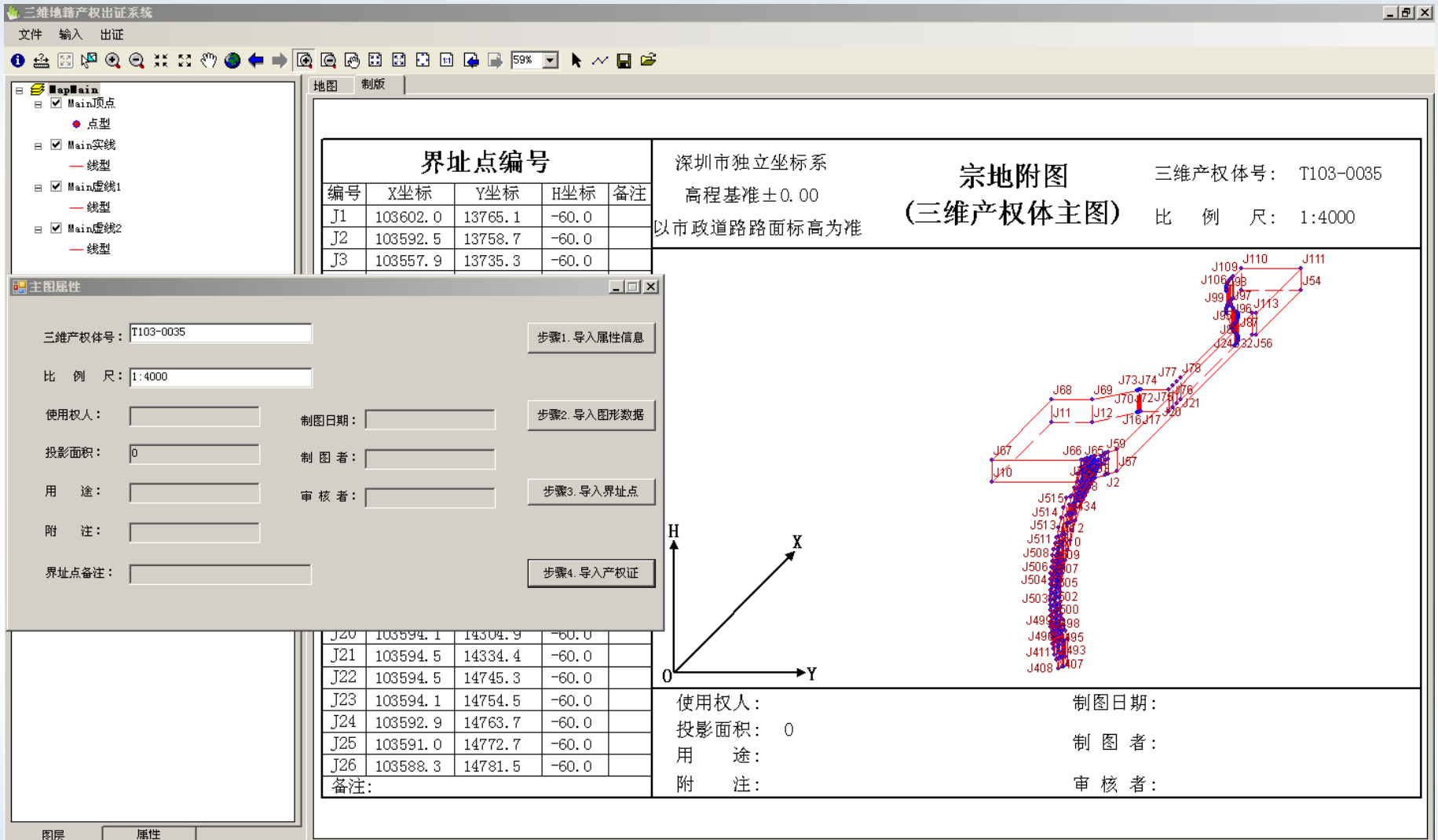


Fig. Manufacturing Interface of the Main Picture of Hongkong-Shenzhen Western Corridor

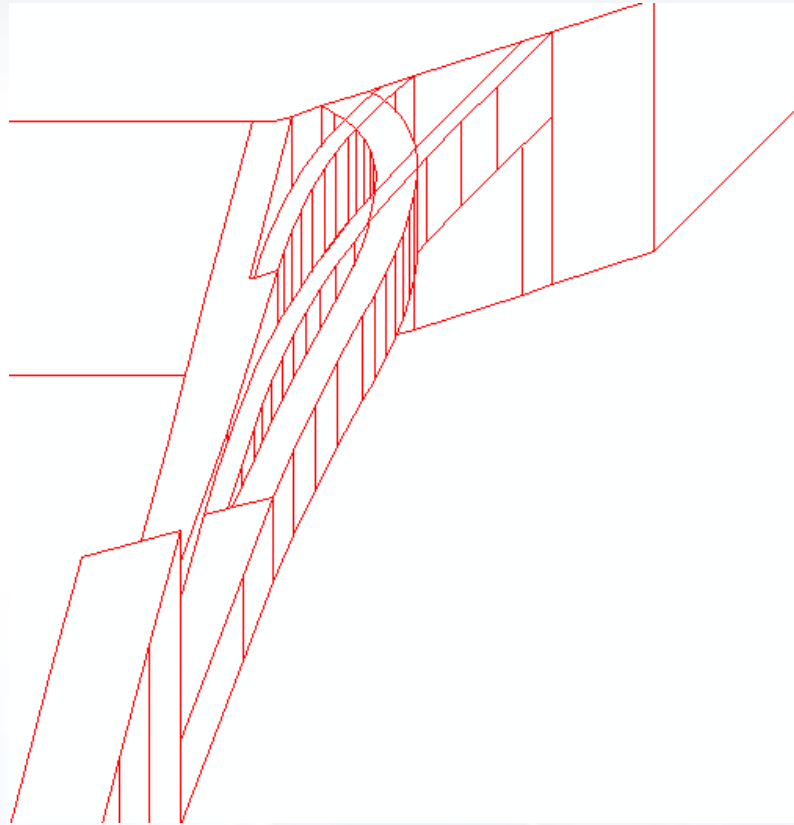


Fig. A SnapShot of the Main Picture of **Hongkong-Shenzhen Western Corridor**

# Conclusion

- Design purposes have been elaborated mainly from the perspective of laws.
- Design process has been elaborated mainly from the perspective of organizations.
- Design principles and design contents have been analyzed mainly from the perspective of technologies.
- And a detailed 3D title certificate (3D paper title certificate) is designed.
- Practice shows that, the strategy to combine three orthographic views with the surrounding map to express the spatial shape of the 3D property object is beneficial to 3D title registration.

Thank you