CEPC CIVIL ENGINEERING

Zhe Jiang Hu Zhou **Site**

2020.1

one of the CEPC representative sites

华东勘测设计研究院有限公司
HUADONG ENGINEERING CORPORATION LIMITED

CONTENTS

1 Zhe Jiang Hu Zhou Site Introduction

2 Civil Engineering

3 Ground supporting facilities & Science City

4 Summary

Site location

Zhe Jiang Hu Zhou Site

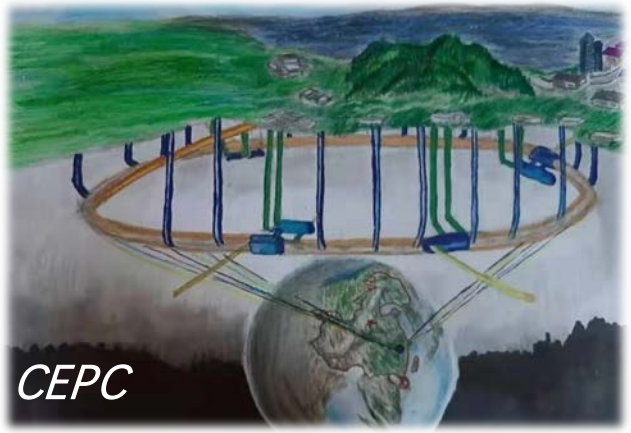
- *Is located in the center of the Yangtze River Delta*

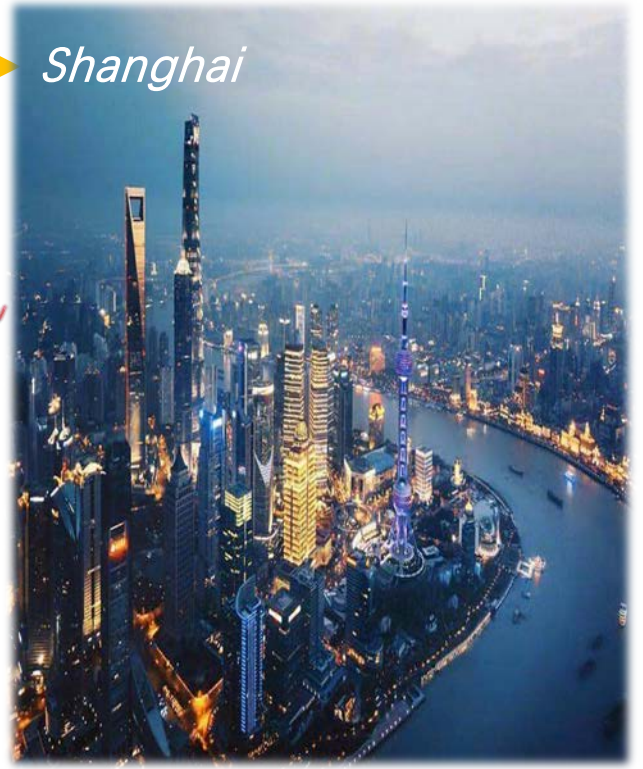
- This area covers nearly 350,000 square kilometers and has a population of nearly 200 million
- This area is one of the six internationally recognized world-class city clusters
- This area is also an important international gateway to the asia-pacific region

And to be more precisely, the site

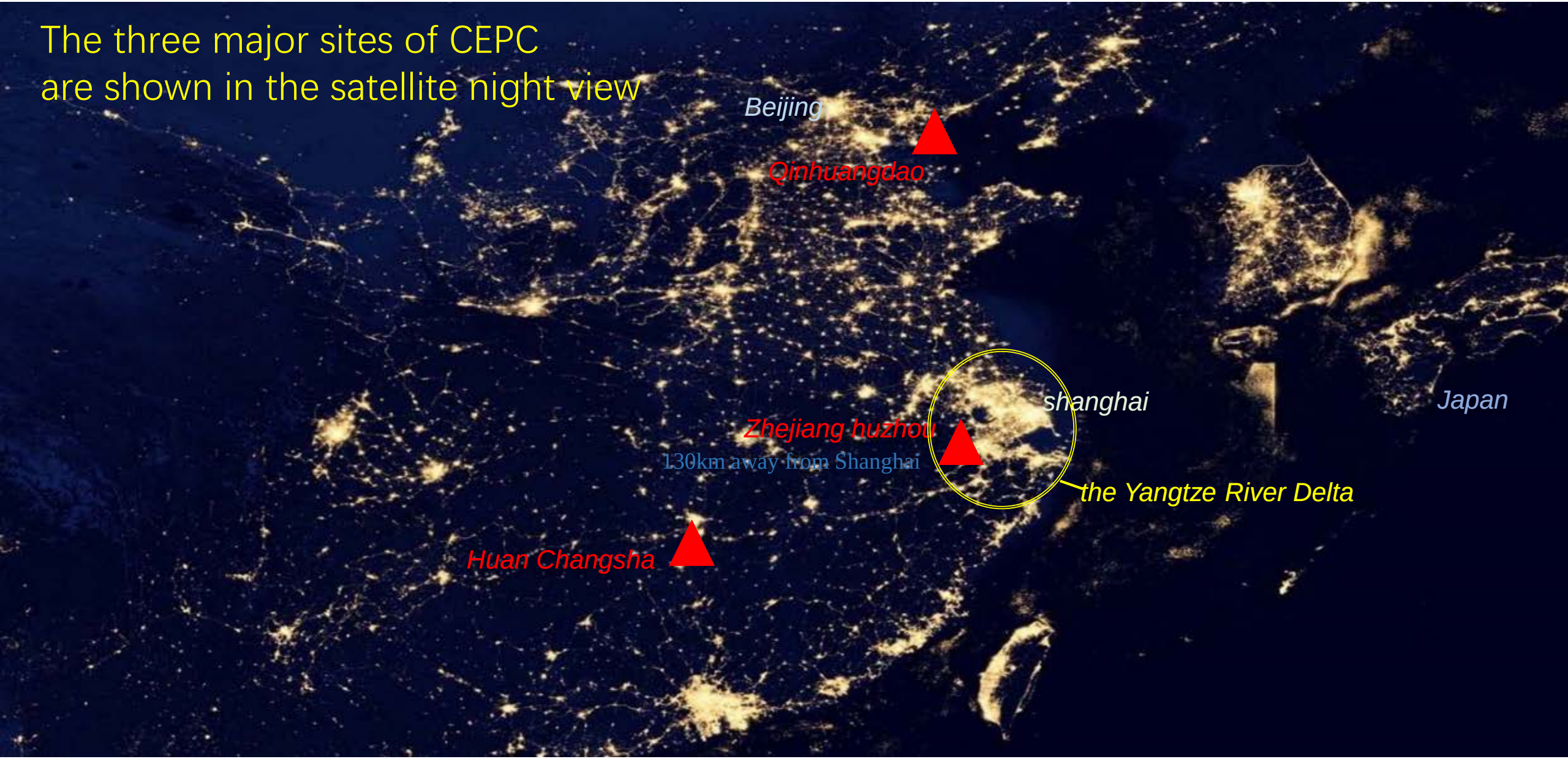
- *Is Located in zhejiang province*

- **One of the four provinces of the Yangtze river delta**
- It ranks fourth among China's 34 provincial-level administrative regions in terms of GDP





Site location



Get some geographic and economic information about these sites

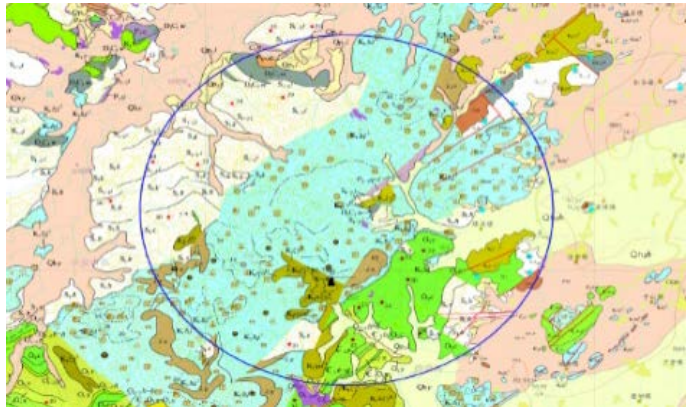
Site location

The advantages of *Zhenjiang huzhou site* Can be summarized as follows

- **Has good engineering construction conditions**
- **Has good scientific research conditions**
- **Has good living conditions**

such as:

Flat Terrain

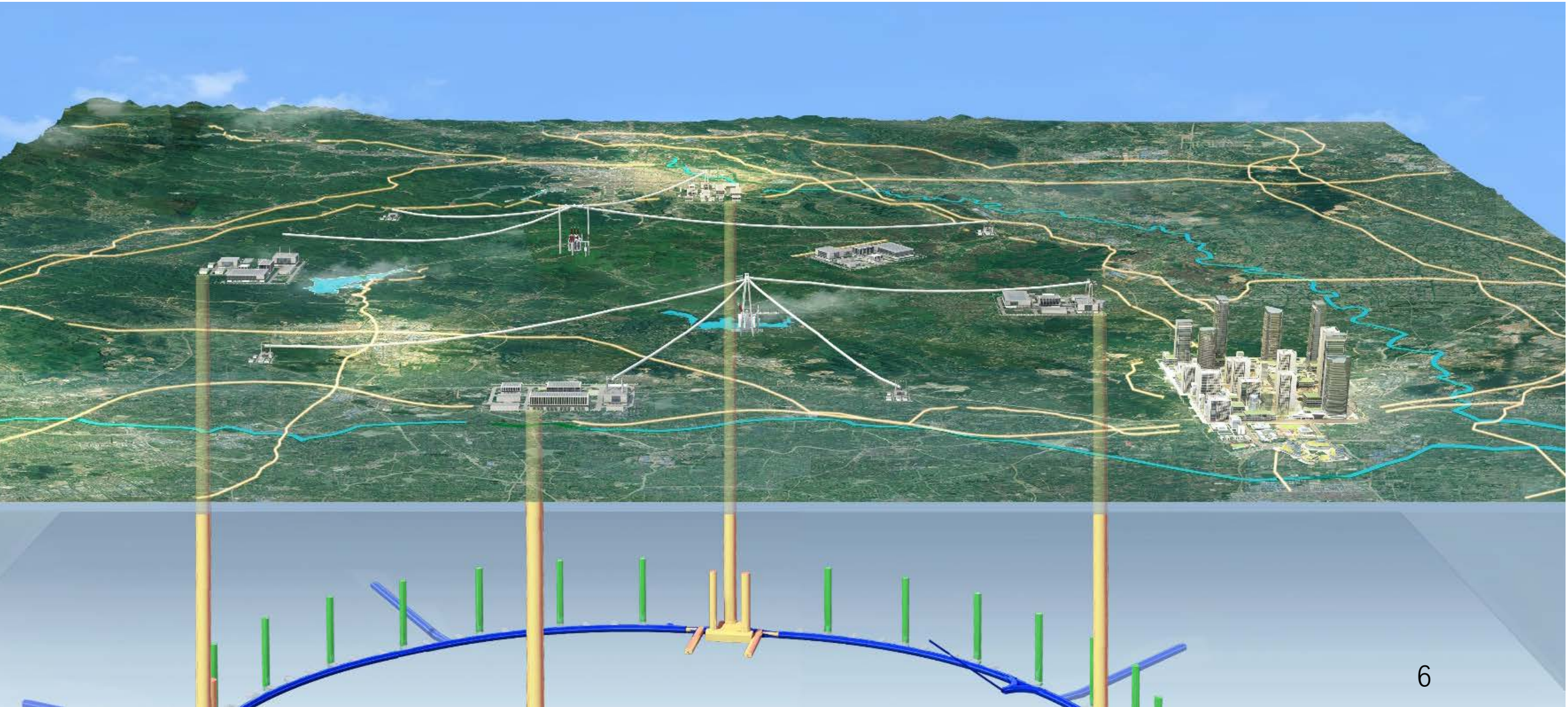


Favorable Geological Condition

Sufficient Energy & Abundant Water Source

Site location

This is the Real terrain situation of Zhejiang Huzhou site



Site location

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- **Has good scientific research conditions**
- **Has good living conditions**

1.The Yangtze River Delta which the site located

Is getting more and more like a province

and has gathered the huge industry, the talented person, the science and technology superiority

In 2019, China's GDP will exceed $14 trillion

And The Yangtze River Delta accounts for 23% of China’s GDP

On December 6.2019, the state council information office held a press conference to introduce < the outline of the plan for the integrated development of the Yangtze river delta region>

Site location

The advantages of *Zhenjiang huzhou site* Can be summarized as follows

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- **Has good scientific research conditions**
- **Has good living conditions**

1. *The Yangtze River Delta which the site located*

- has abundant funding for scientific research
- has strong reserve of scientific research power
- has strong industrial support

Research and development investment :

in this region , r&d costs account for one-third of the country's total , almost **$ 90 billion** every year.

R&d intensity in the Yangtze river delta reaches 3%,

For comparison: the United States is 2.8%.

Site location

The advantages of [1]*Zhenjiang huzhou site* Can be summarized as follows

- **Has good engineering construction conditions**
- **Has good scientific research conditions**
- **Has good living conditions**

This can be represented as

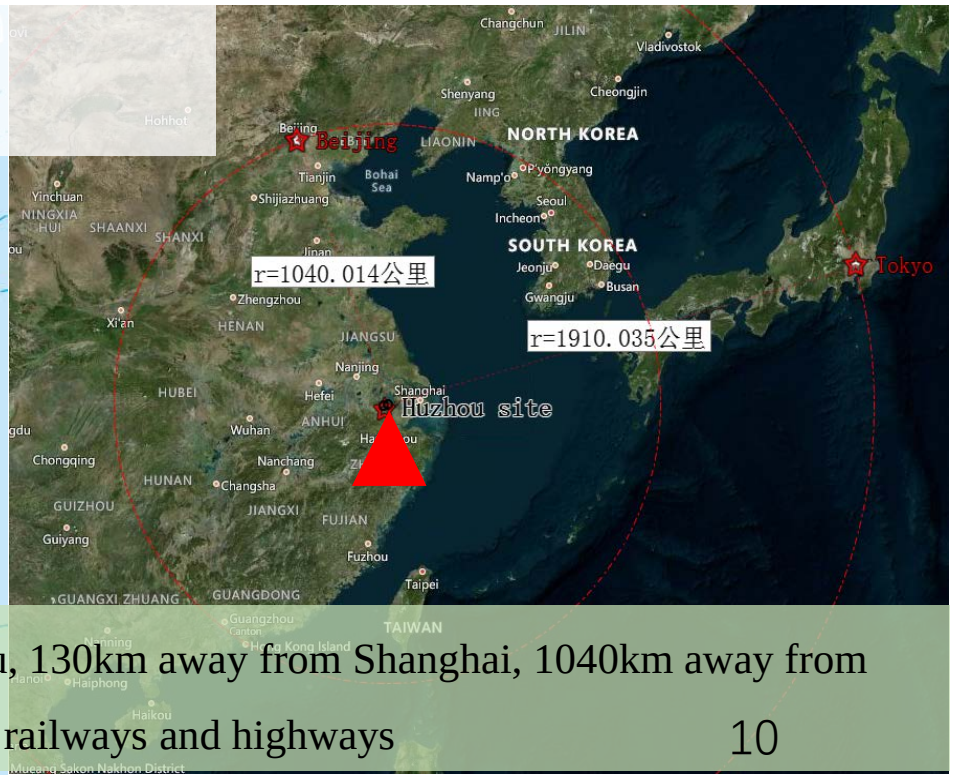
- Abide by international rules
- Safe and Livable
- Easily accessible

Huzhou city which the site located has won the United Nations prize for best habitat in 2012

Site location

The advantages of *Zhenjiang huzhou site* Can be summarized as follows

- **Has good engineering construction conditions**
- **Has good scientific research conditions**
- **Has good living conditions**
  - Abide by international rules
  - Safe and Livable
  - Easily accessible



Convenient transportation The Zhe Jiang Huzhou site is 75km away from Hangzhou, 130km away from Shanghai, 1040km away from Beijing and 1910km away from Tokyo. It has a national first-class airport , and Extensive railways and highways

CONTENTS

1 Hu Zhou Site Introduction

2 Civil Engineering

3 Ground supporting facilities & Science City

4 Summary

Civil Engineering （Zhe Jiang Hu Zhou ）

during the CEPC TDR

In October 2019,
we have already finished the first phase of geological survey

drill core of Zhenjiang Hu Zhou site

CEPC-SPPC 项目湖州场址TDR

第一阶段工程地质勘察主报告

工程编号：

CEPC TDR

On Engineering geological survey of the first stage

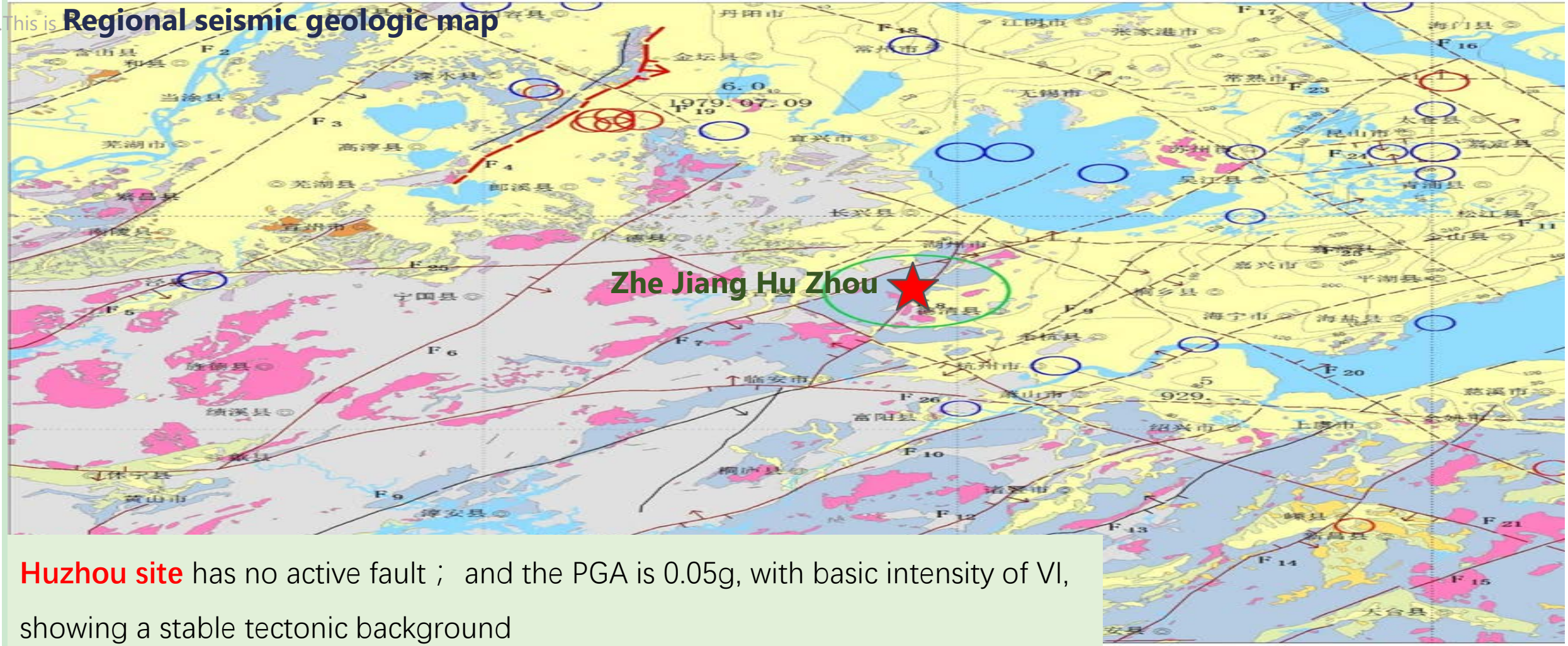
(Zhejiang Hu Zhou Site)

二〇一九年九月

Civil Engineering （Zhe Jiang Hu Zhou ）

1.This is

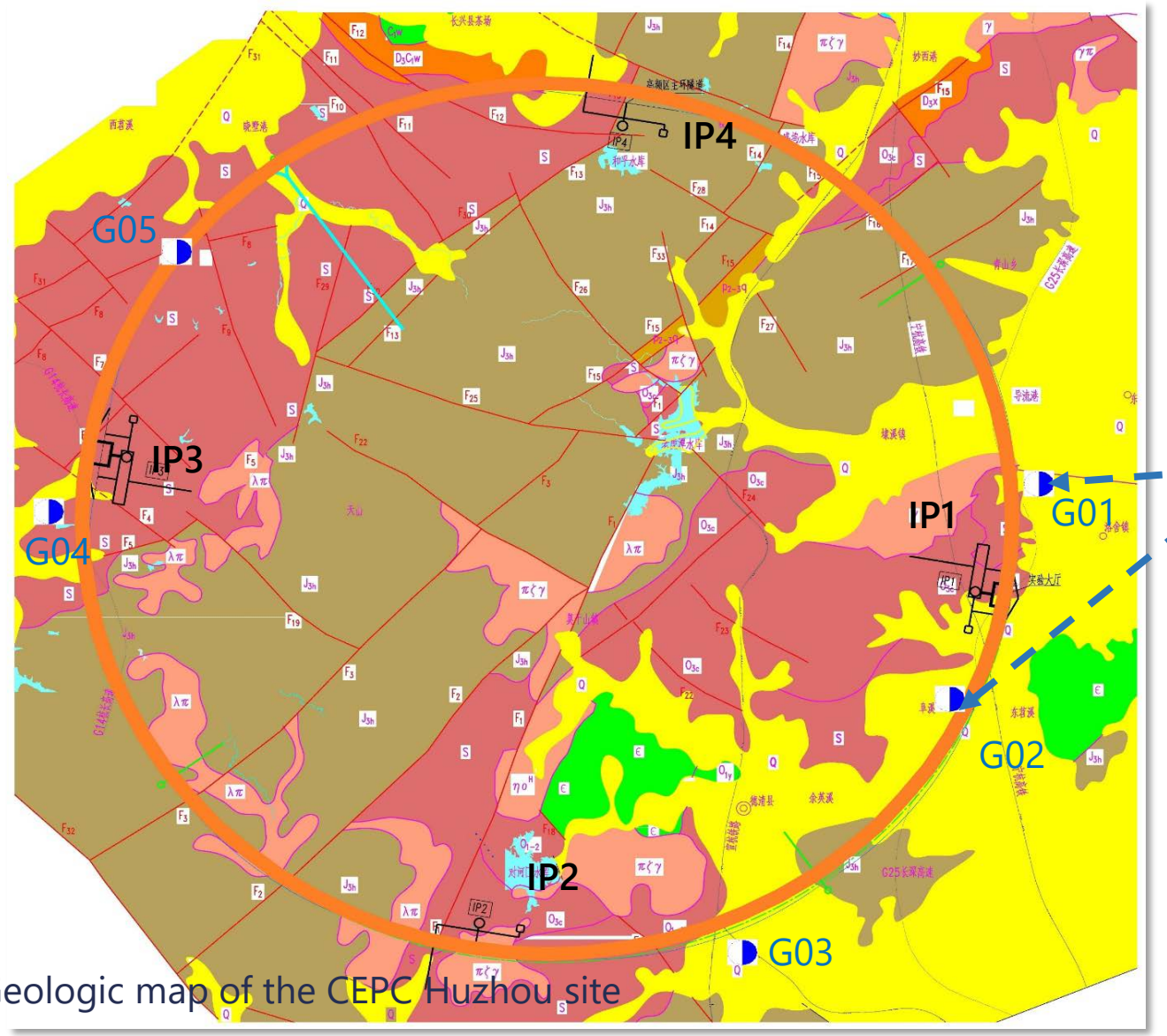
Regional seismic geologic map



Huzhou site has no active fault； and the PGA is 0.05g, with basic intensity of VI, showing a stable tectonic background

Civil Engineering （Zhe Jiang Hu Zhou ）

In the first phase of geological survey



Geologic map of the CEPC Huzhou site

G04钻孔奥陶系砂岩部分岩芯（IP3）
The Ordovician sandstone cores in G04 hole (IP3)

2.The work is include 6 survey holes and Geophysical prospecting work，and so on

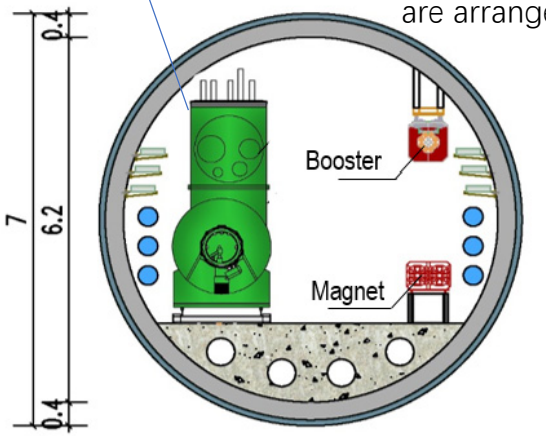
Q	第四系 the Quaternary
J_{3h}	侏罗系熔结凝灰岩 Welded tuff of the Jurassic
D_3C_{1W}	泥盆系砂岩类 Sandstone of Devonian
S	志留系砂岩类 Sandstone of Silurian
O	奥陶系砂岩类 Sandstone of Ordovician
€	寒武系灰岩 Limestone of Cambrian
	花岗岩 Granite

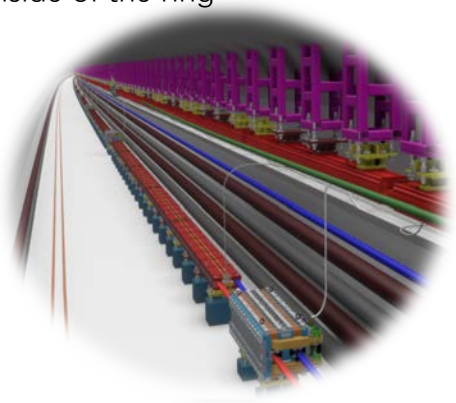
Civil Engineering

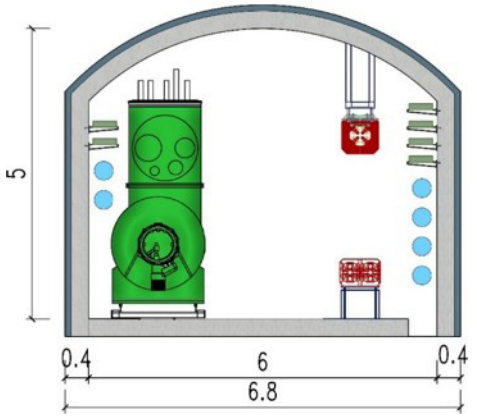
Layout of main underground caverns

Outside of the ring
Reserved space for the SPPC equipment

the CEPC equipment
are arranged Inside of the ring

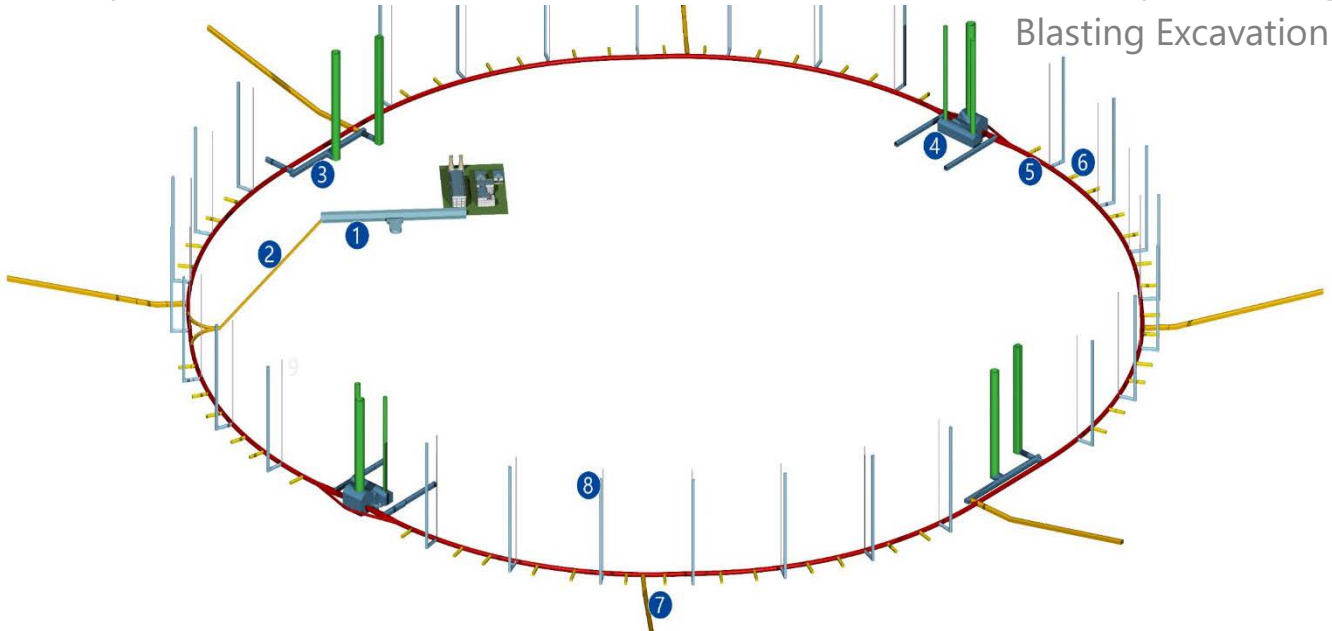






Circular Cross Section form
apply to TBM Excavation Method

Inverted U-shape Cross section
apply to Drilling and
Blasting Excavation Method



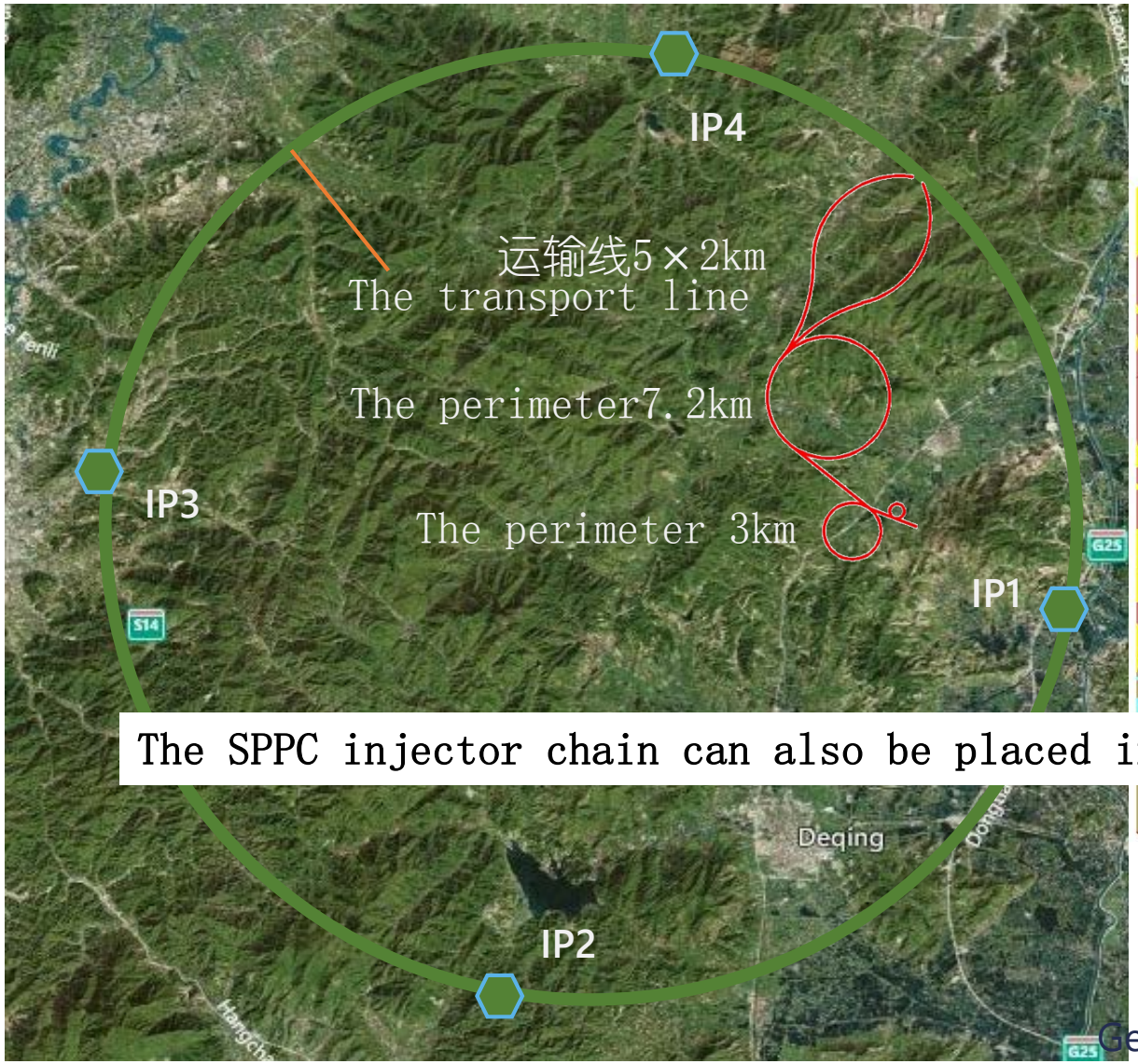
3.the Main Ring has Divided into several sections

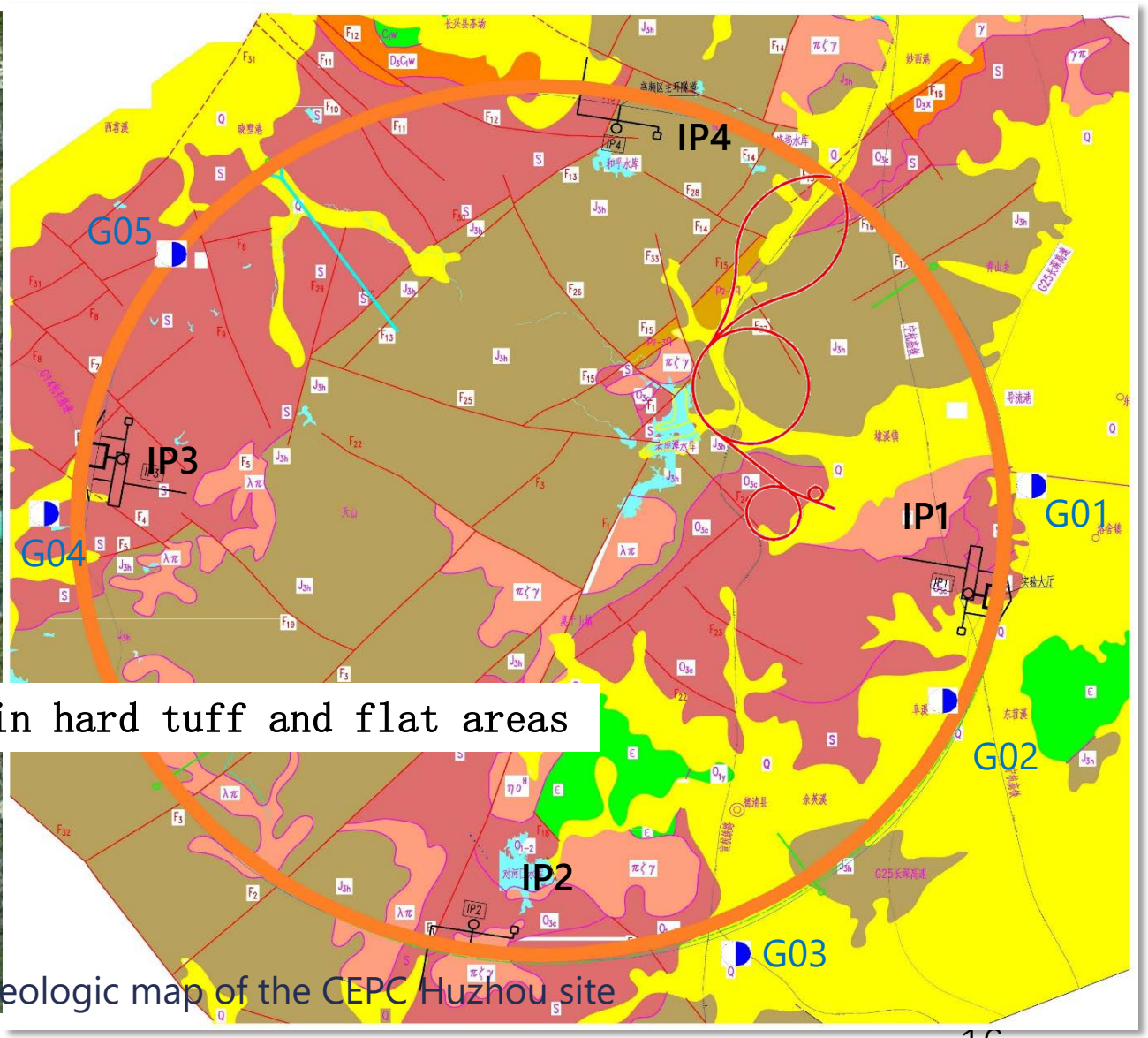
Main Caverns	Length km	Note
Interaction Region (IR)	3.365	Experiment Hall×2
Curved Line Segment 1	10.193	×4
Straight Line Segment LSS1	1.234	×4
Curved Line Segment 2	10.149	×4
RF Region	3.500	×2
Length of the Main Ring	100.034 km	
Linac Segment	2.548	×1

Accelerator Region Caverns:

1. **Linac Segment**
2. **Transfer Line**
3. **Tunnel Complex of RF Region**
4. **Detector Region Caverns**
5. **Main Ring Tunnel**
6. **Auxiliary Tunnel**
7. **Access Tunnel**
8. **Shaft for Access and Cable**

Add SPPC injector chain





The SPPC injector chain can also be placed in hard tuff and flat areas

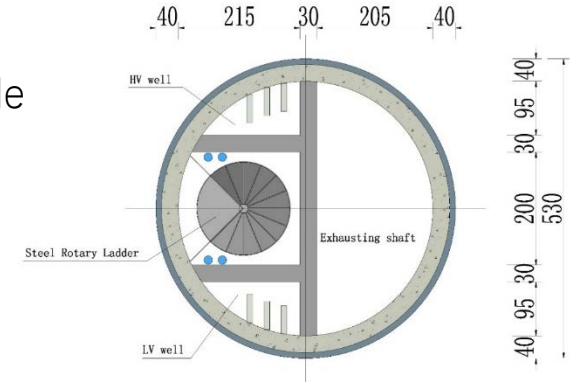
Geologic map of the CEPC Huzhou site

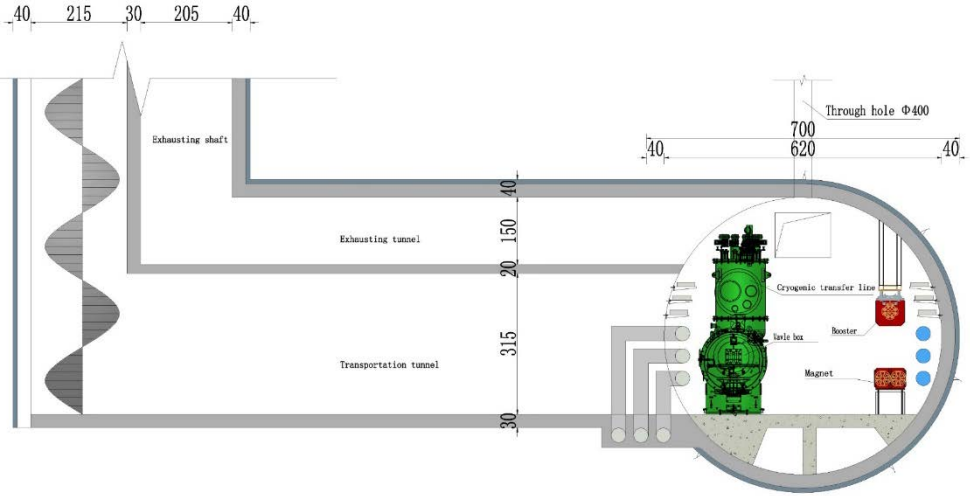
Civil Engineering

some features about Auxiliary and traffic tunnels

1.Shaft for access and cable

1 Every 3 kilometersmile

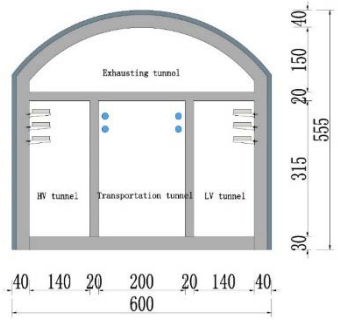


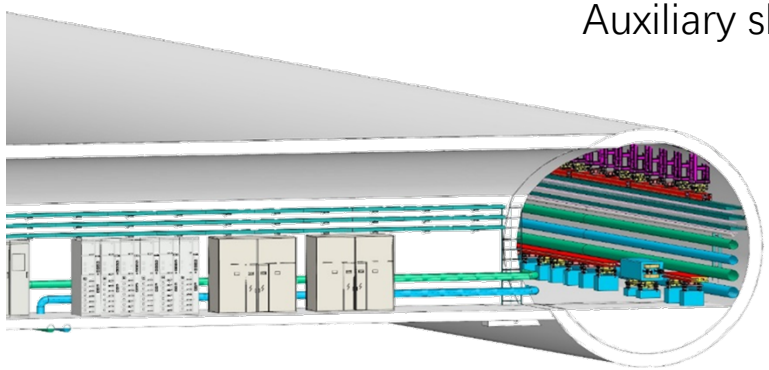


2. Auxiliary short tunnel

1 Every 1 kilometersmile

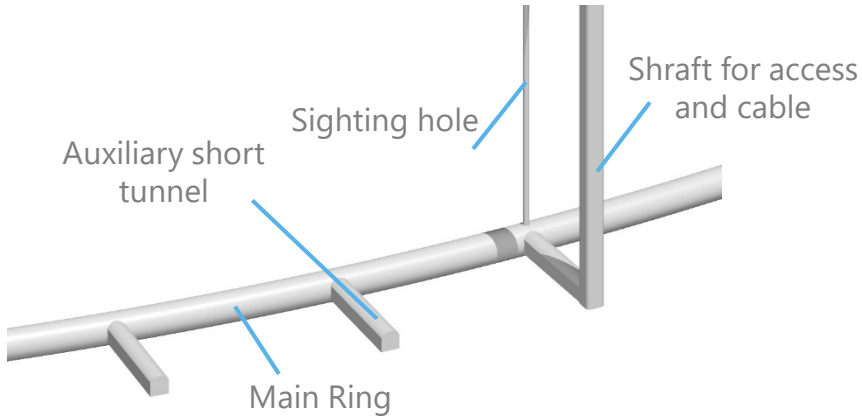
Caverns	Length m	Note
Shaft for access and cable	70 h	5.3×5.3
Auxiliary short tunnel	74.3	6.0×5..55





Main ring tunnel

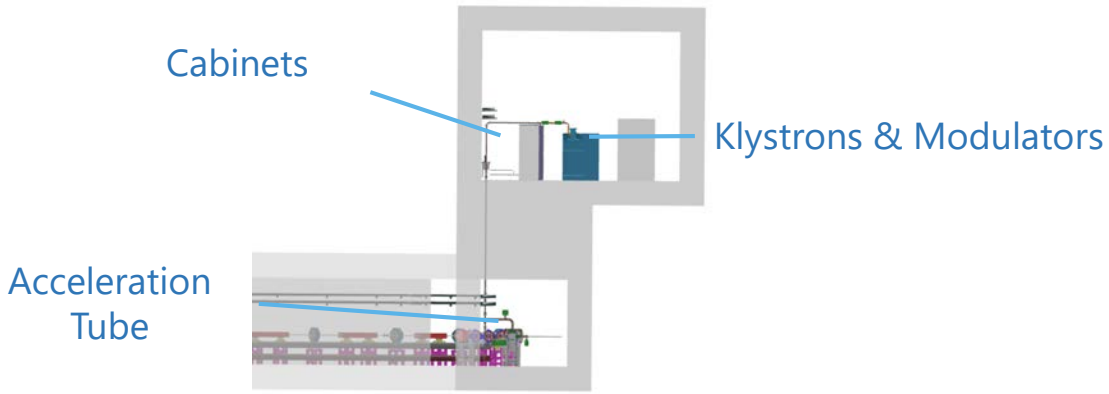
Auxiliary short tunnel

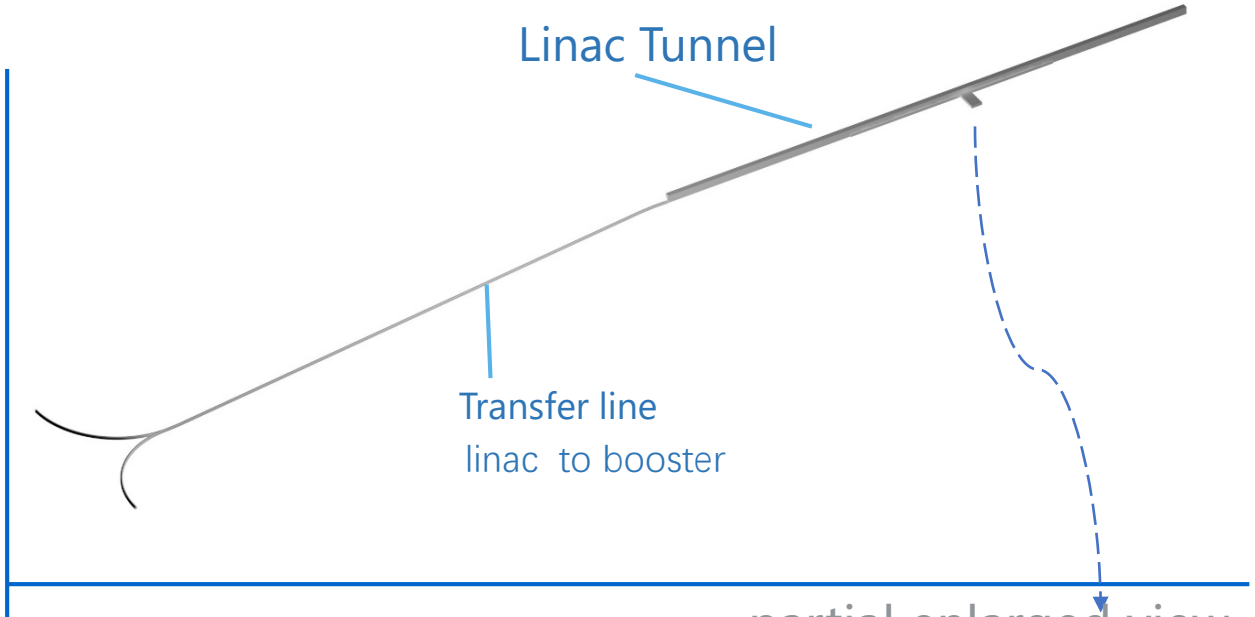


Civil Engineering

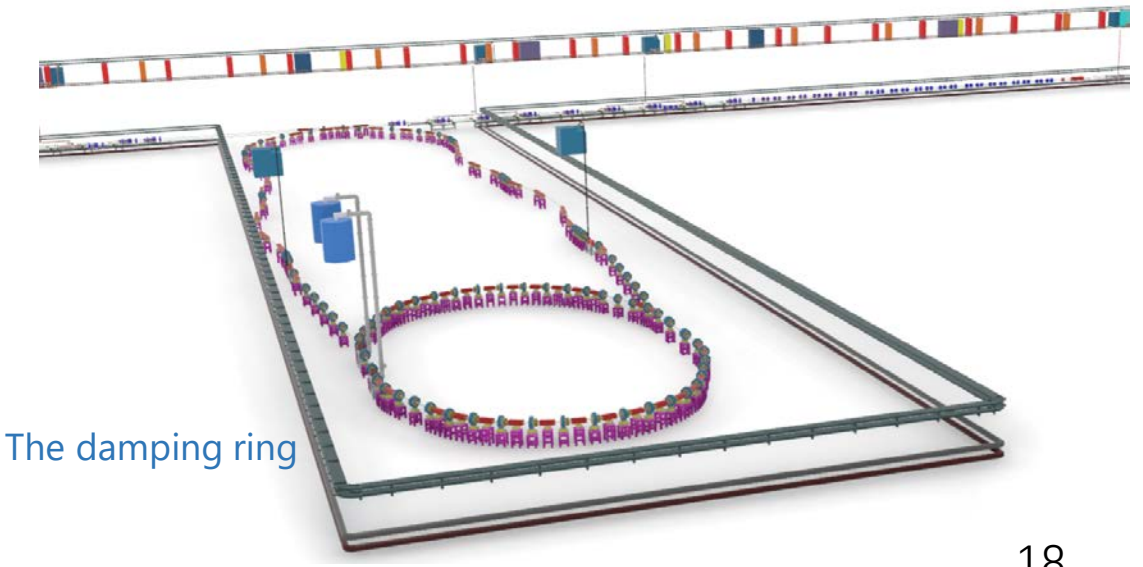
Linac segment

Cavern	Length / m	Note
Linac tunnel (ground section)	1,210	×1
Linac tunnel (expanded excavation section)	355	×1
Transportation tunnel (straight section)	1,070	×1
Transportation tunnel (curved section)	268	×2

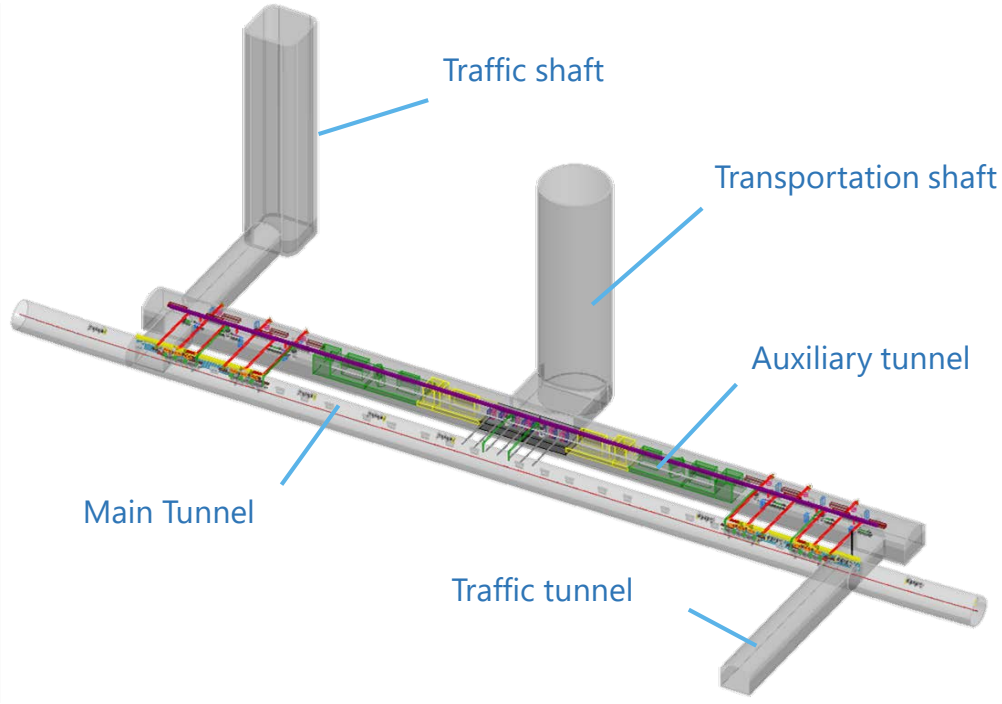




partial enlarged view

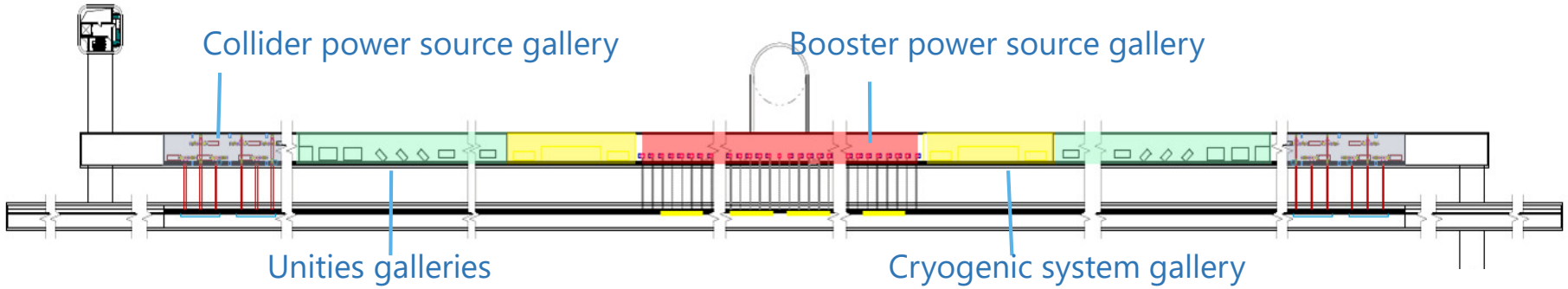


Civil Engineering

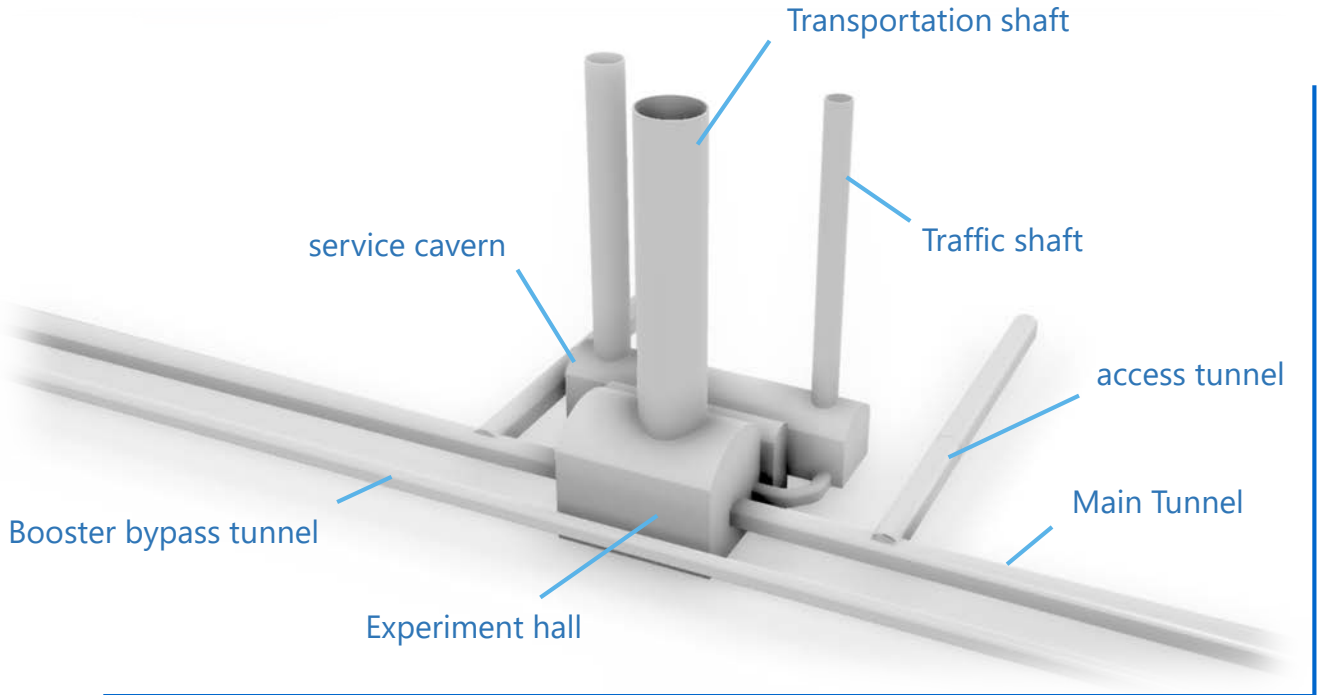


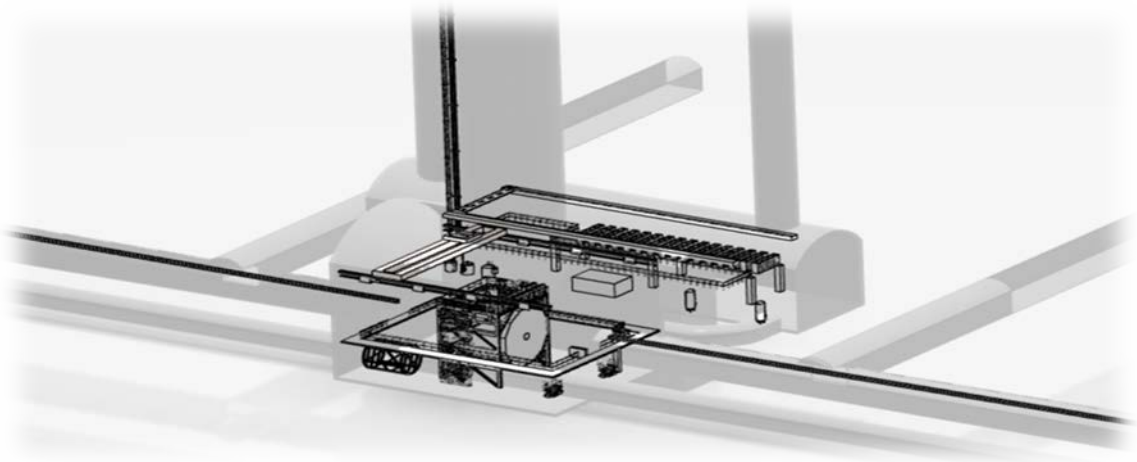
RF region

Cavern	Size (L×W×H) /m	Note
Auxiliary tunnel	1,950×8×7	×2
Main tunnel	3,500×6×5	×2
Transportation shaft	15×70	×2
Shaft for access, cable and HVAC	70×10×10	×2
Traffic tunnel	1,200×88×7.5	×2



Civil Engineering





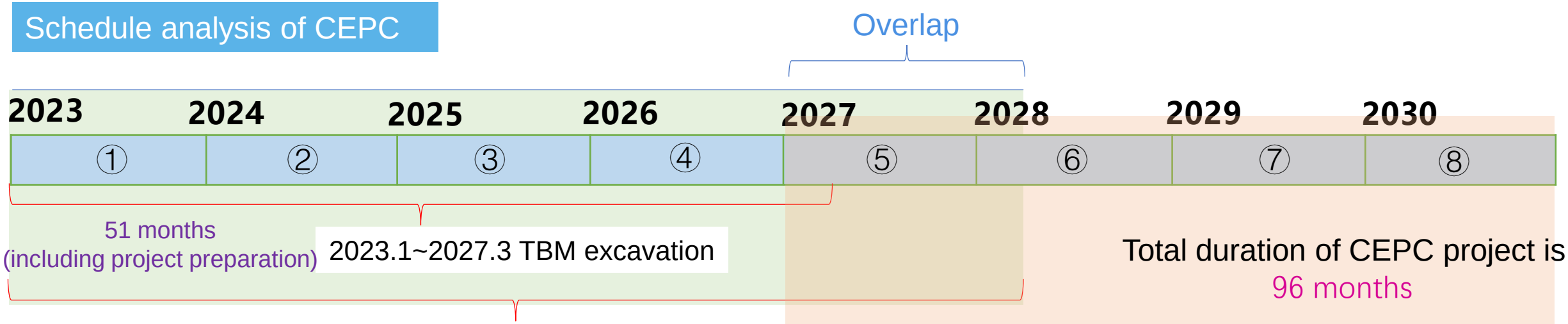
Interaction Region (IR)

Cavern	Size (L×W×H) /m	Note
Experiment hall	39.4×20.4×31	×2
Service cavern	101.4×20×26.2	×2
Booster bypass tunnel	1,679×3.5×3.5	×4
Dual electron beam tunnel	1,659.3× (6~11.4) ×5	×4
Traffic tunnel for IR	1,200×7.5 ×7.5	×2
Shaft for access, cable and HVAC	70×10×10	×2

高压交流电（High Voltage Alternating Current）

Civil Engineering

Schedule analysis of CEPC



1.CEPC production Including civil works and installation of physical equipment. It will begin in 2023 and end in 2030, The total duration of CEPC project is 96 months.

2.The total civil works period is 63 months.

3.The total installation period of physical equipment is 48 months

4. The Overlapping period of civil works and equipment installation is 15 months

CONTENTS

1 Hu Zhou Site Introduction

2 Civil Engineering

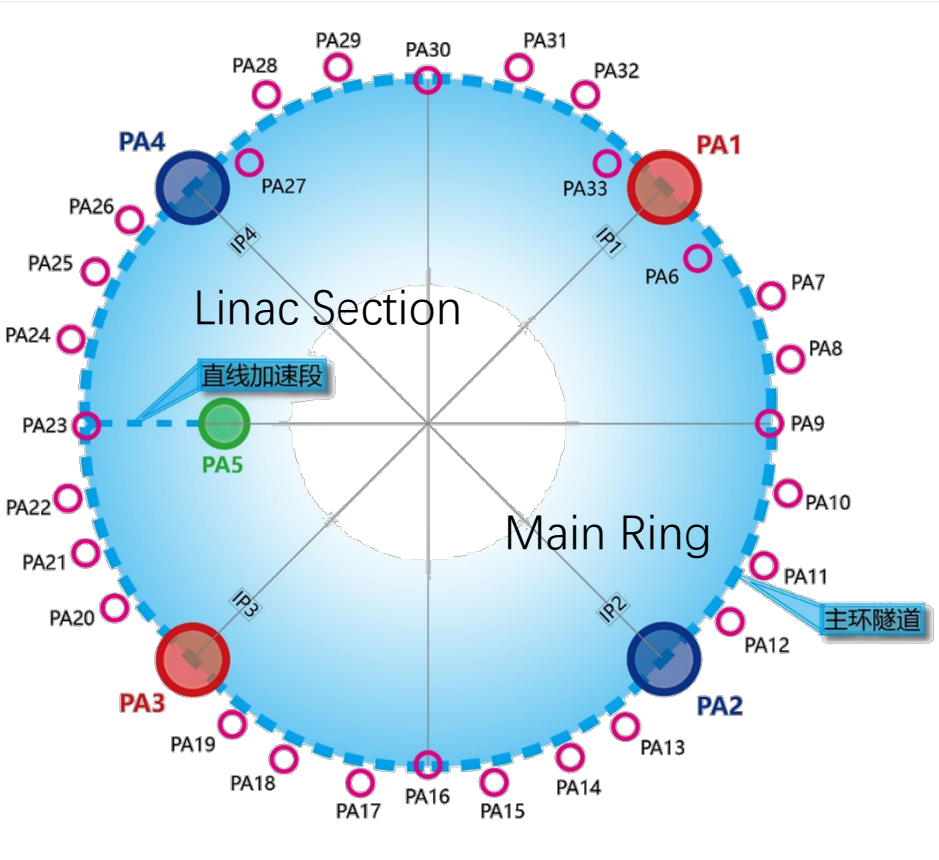
3 Ground supporting facilities & Science City

4 Summary

Ground supporting facilities & Science City

Surface Buildings

Layout of CEPC Surface Buildings



PA1	PA3	Interaction Region（IR）Surface Buildings
PA2	PA4	IR Region Surface Buildings
PA5		Linac Surface Buildings
PA6~PA33		Shaft for Access and HVAC Surface Buildings

List of CEPC Surface Buildings

Surface building	Unit	Location							Total
		PA1	PA2	PA3	PA4	PA5	PA9,PA16 ,PA23,PA30	others	
Control and duty room	m^2	1200	300	1200	300	300			3300
Assembly hall	m^2	2500	800	2500	800				6600
Experimental hall	m^2	1500		1500					3000
Magnet hall	m^2			3000					3000
Computer lab	m^2	800		800					1600
Cryogenic System Room	m^2	600	4000	600	4000				9200
Condenser Water System Room	m^2	1200	1200	1200	1200	1200	800	800	28400
Air Compression System	m^2	150	150	150	150	150			750
Detector Air System Room	m^2	600		600					1200
Detector Power Supply Room	m^2	800		800					1600
Machine Shop	m^2	450	450	450	450	450			2250
220kV Substation	m^2			9600		9600			19200
110kV Substation	m^2	6000	6000	6000	6000		6000		48000
10kV Substation	m^2	400	400	400	400	400	400	400	13200
HVAC System	m^2	1000	600	1000	600	600	600	600	20600
Fire Pump Room	m^2	150	150	150	150	150	150	150	4950
Guardroom	m^2	100	100	100	100	100	30	30	1340
Total（building area）	m^2	17450	14150	30050	14150	12950	31920	47520	168,190
Total（Land area）	m^2	43173	34080	64872	34080	19320	59664	158400	413589

the civil works of CEPC also include ground buildings.The ground buildings are mainly used for auxiliary facilities, including cooling facilities, low temperature facilities, ventilation systems, air compression systems, power systems, transportation facilities, and so on And Total building area is 170 ,000 m2

Ground supporting facilities & Science City

the Surface Buildings Function Layout of Interaction Region

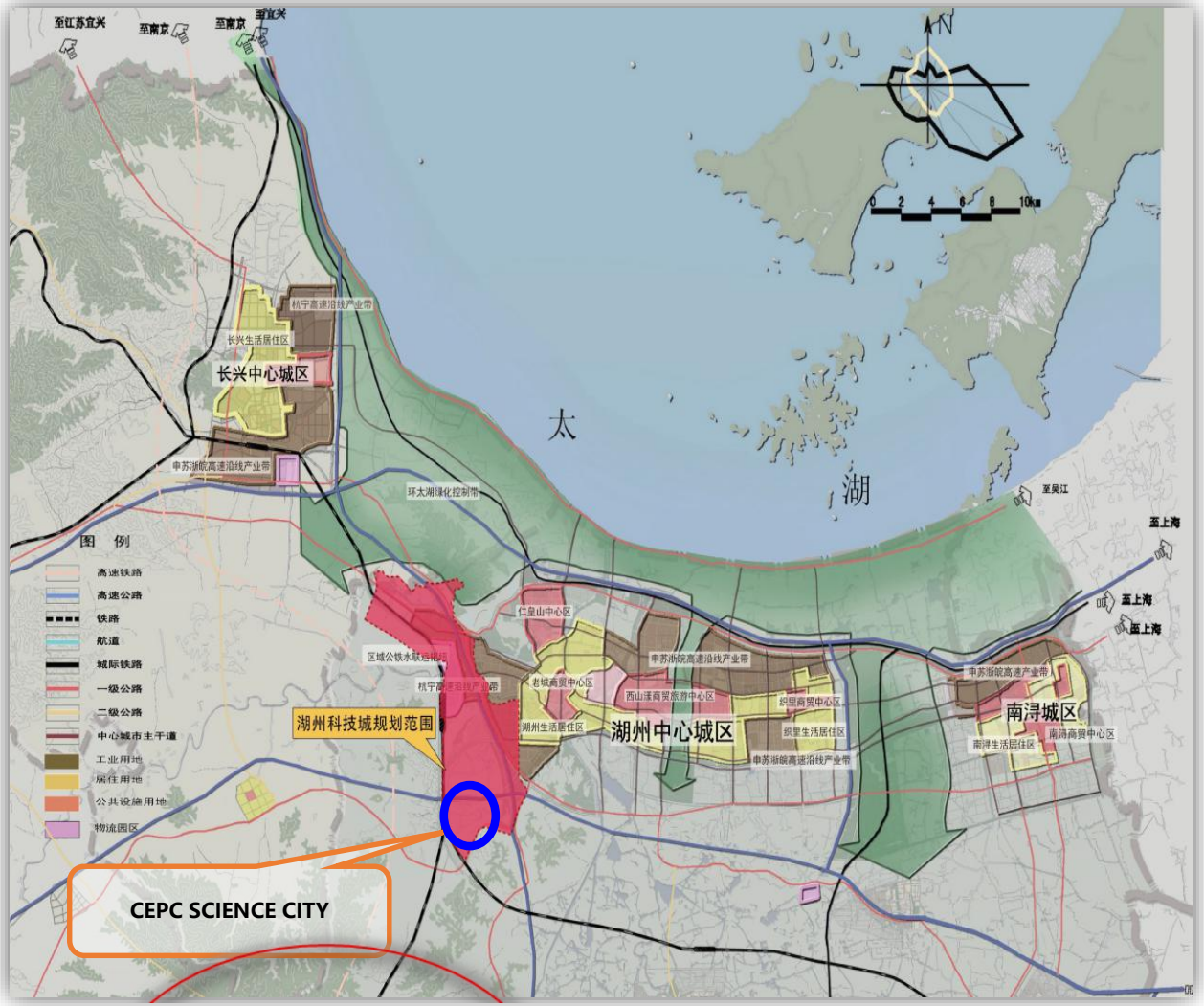
IR(Interaction Region, PA3)

Interaction Region PA3 Entrance Perspective Drawing

Interaction Region PA3 Street View Perspective Drawing

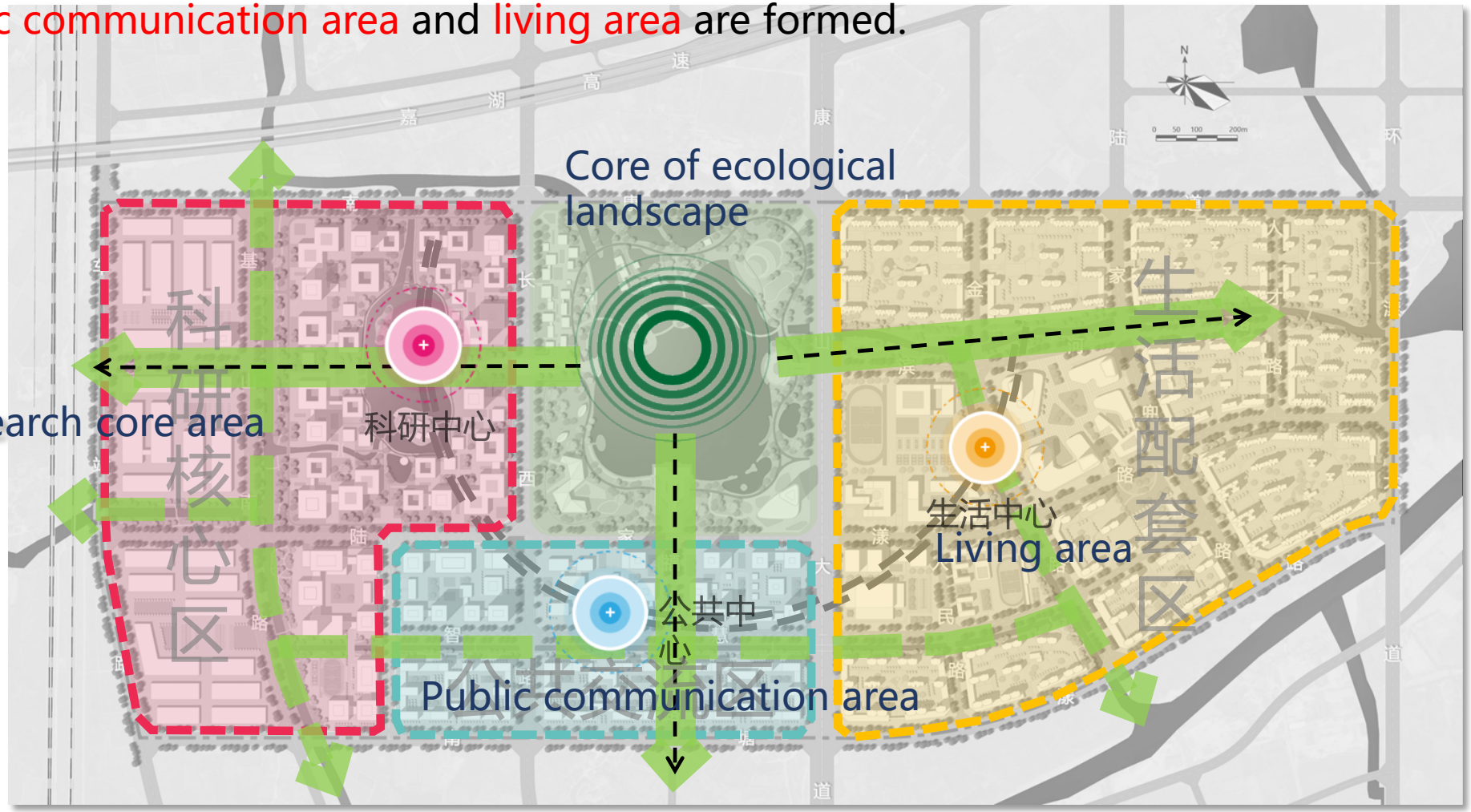
Science City Planning

CEPC science city is located in the southwest of Huzhou, south of Huzhou Scientific and Technological City, **5 kilometers** away from Huzhou High Speed Railway Station, **7 kilometers** away from CEPC, and the site area is about **3.92 square kilometers**.



International Science City

With the ecological lake as the core of the landscape, urban development corridor and ecological landscape corridor are built along the main roads and water systems，According to the functional requirements, the Scientific research core area, Public communication area and living area are formed.



International Science City

International Science City

Some regional buildings

business street

ancient culture Characteristic of Jiangnan of China

The conference center

which has the modern lifestyle

Research Area

CONTENTS

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2 Civil Engineering

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4 Summary

Summary（Zhe Jiang Hu Zhou site ）

In 2019, the work that has been done is as follows

- CEPC report on site selection (Zhejiang Huzhou)

Answer the questions-Why did CEPC choose huzhou

- CEPC report on socio-economic assessment

Answer the questions-Why did huzhou choose CEPC

- CEPC Technology Design Report on Civil engineering of the first stage
- CEPC report on science city concept plan

Find a comfortable home for scientists

In 2020 each work needs to be deepened, and the emphasis is on site selection,

Further review of CEPC civil works and installation schedule.

And looking forward to your visit to Zhen Jiang Hu Zhou site In this year.

Welcome to Zhe Jiang Hu Zhou

the site suitable for both CEPC and Scientists