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Ecological Civilization Construction and Intensive Land Use of Metro Project

- Shenzhen Metro Group Co., Ltd.
- PowerChina Railway Construction Co., Ltd.
- PowerChina Southern Construction Investment Co., Ltd.
- China Railway Design Corporation and Shenzhen Municipal Design & Research Institute Co., Ltd.

CHINA

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1

Project overview

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1.Project Overview

The Shenyun Depot of Shenzhen Metro Phase 3 Line 7 is located in Tanglang Mountain Area, the north side of Longzhu Avenue and east side of Nanping Expressway in Nanshan District. The land area is about 31.14hm^2; the amount of excavation is about 3.85 million m^3, and the amount of fill is about 218,000 m^3. The splayed line was used to connect the depot with Antuoshan Station and Shenyun Station and overcomed the height difference of 34.47m respectively. The average longitudinal slope of the access line was 22‰.

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Site selection

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2. Project site selection

Depot selection plan

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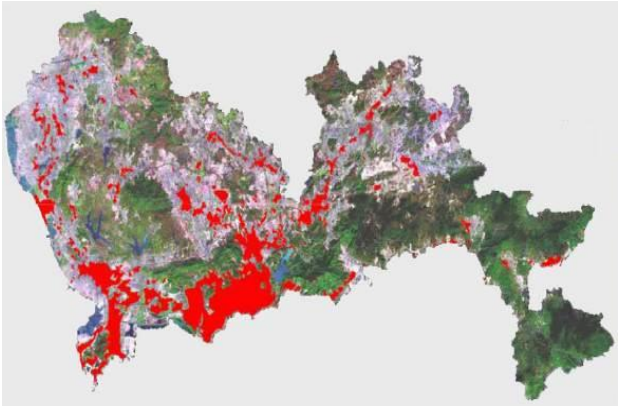
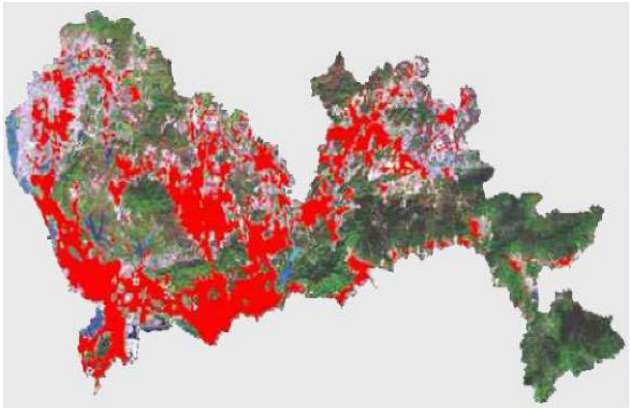
Depot site plan Comparison Table

Scheme		Shenyun village vehicle depot	South Shenyun block	Qiaocheng East depot
Land scale （hm²）		30.39	25.8	22.72
height difference （m）		34.37	21	34
average gradient （‰）		20.22	21	24
Operating conditions		difficulty	easily	easily
Demolition project （m²）		none	21079	36925
Maximum slope height		150	80	10
Quantity of earth and stone （ten thousand m³）	fill	21.8	21	1.08
	dig	385	366	63.8
Engineering risk		Risk of slope collapse and rockfall	Risk of slope collapse and rockfall	/
Ecological impact		Small	large	large
Investment （Hundreds of millions of dollars）		14.74	12.69	11.26

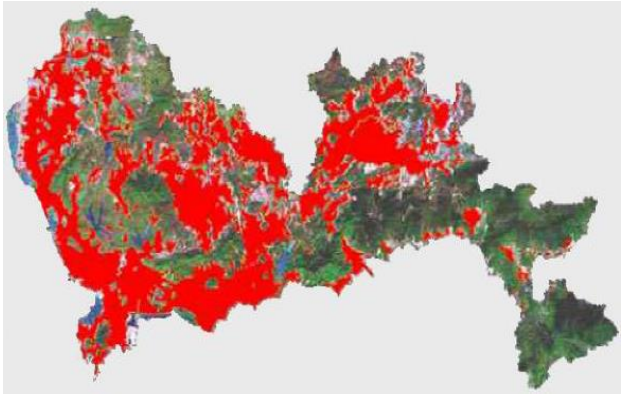
2. Site selection



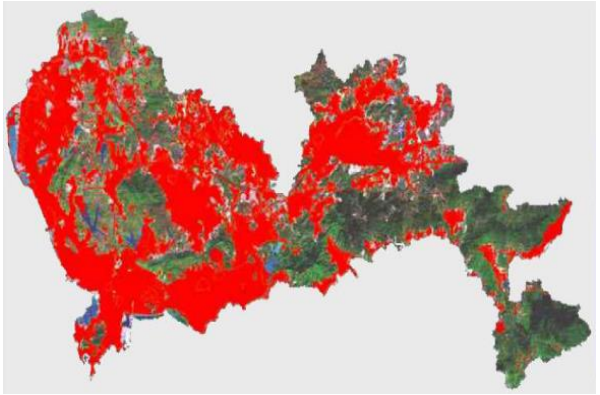
Spatial distribution map of construction land in Shenzhen in 1984



Spatial distribution map of construction land in Shenzhen in 1994



Spatial distribution map of construction land in Shenzhen in 2000



Spatial distribution map of construction land in Shenzhen in 2005

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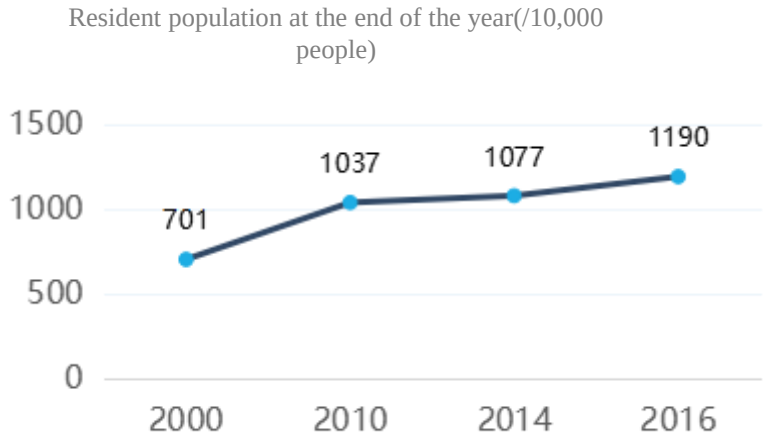
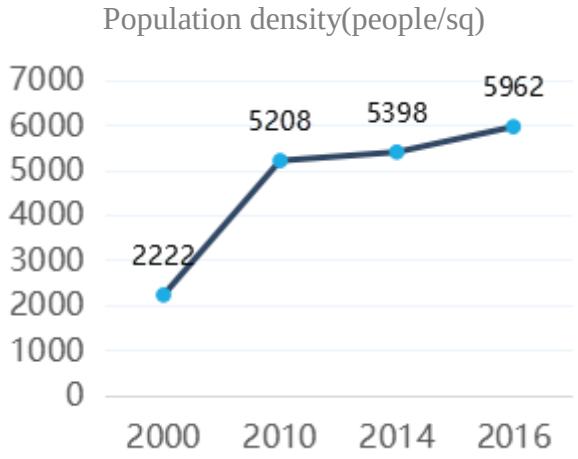
2. Site Selection





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Project concept

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3. Project concept

Currently, representative subway projects in Beijing, Shenzhen, Nanjing, Shanghai and Hong Kong all have launched Depot superstructure development projects and achieved good economic returns and social benefits.

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Initial property development plan for Shenyun Depot

If the development of properties based on residential, commercial, office, hotel, and supporting functions is carried out according to the initial open plan, it can bring economic benefits of more than 35 billion yuan and reduce the investment risk of the subway.

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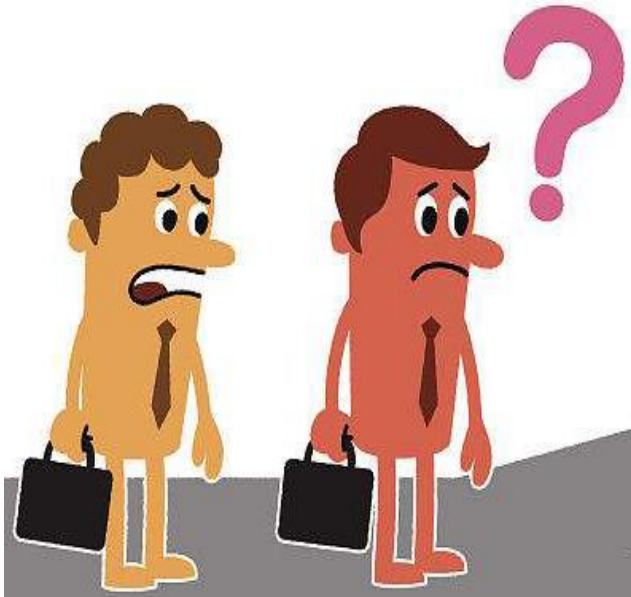
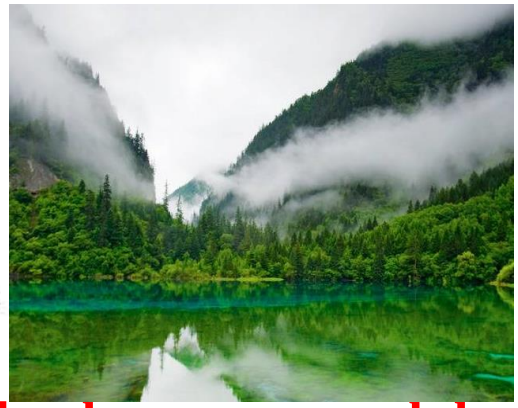


Economic

Ecology



The contradiction between the expected value of urban land resources and the demand of infrastructure land

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Idea reconstruction

4.Idea reconstruction

1. Tripartite wins for ecological restoration, social demand and subway function

In order to prevent the future operation of the depot from causing a disconnect between the public and the Tanglang Mountain Country Park, the idea of functional adjustment within the Shenzhen Metro is proposed - the function of commercial development of the Shenyun depot and the training of the Tanglang Depot The base function is replaced, and the upper cover of the Shenyun depot is built into an open and harmonious recreation park with the theme of subway culture.

Schematic diagram of planning land use adjustment

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2. Concept formation---Construction of subway depots with ecological design concept

After combing the functional composition of the surrounding urban space in the location of the depot, a large number of built living spaces with relatively complete education and medical facilities was found around the base. However, the green space and recreation facilities in the area were relatively scarce therefore could not meet the need of surrounding area. The need of living and leisure has become an important factor restricting the improvement of the public service level in the district.

Schematic diagram of land use around the Shenyun depot

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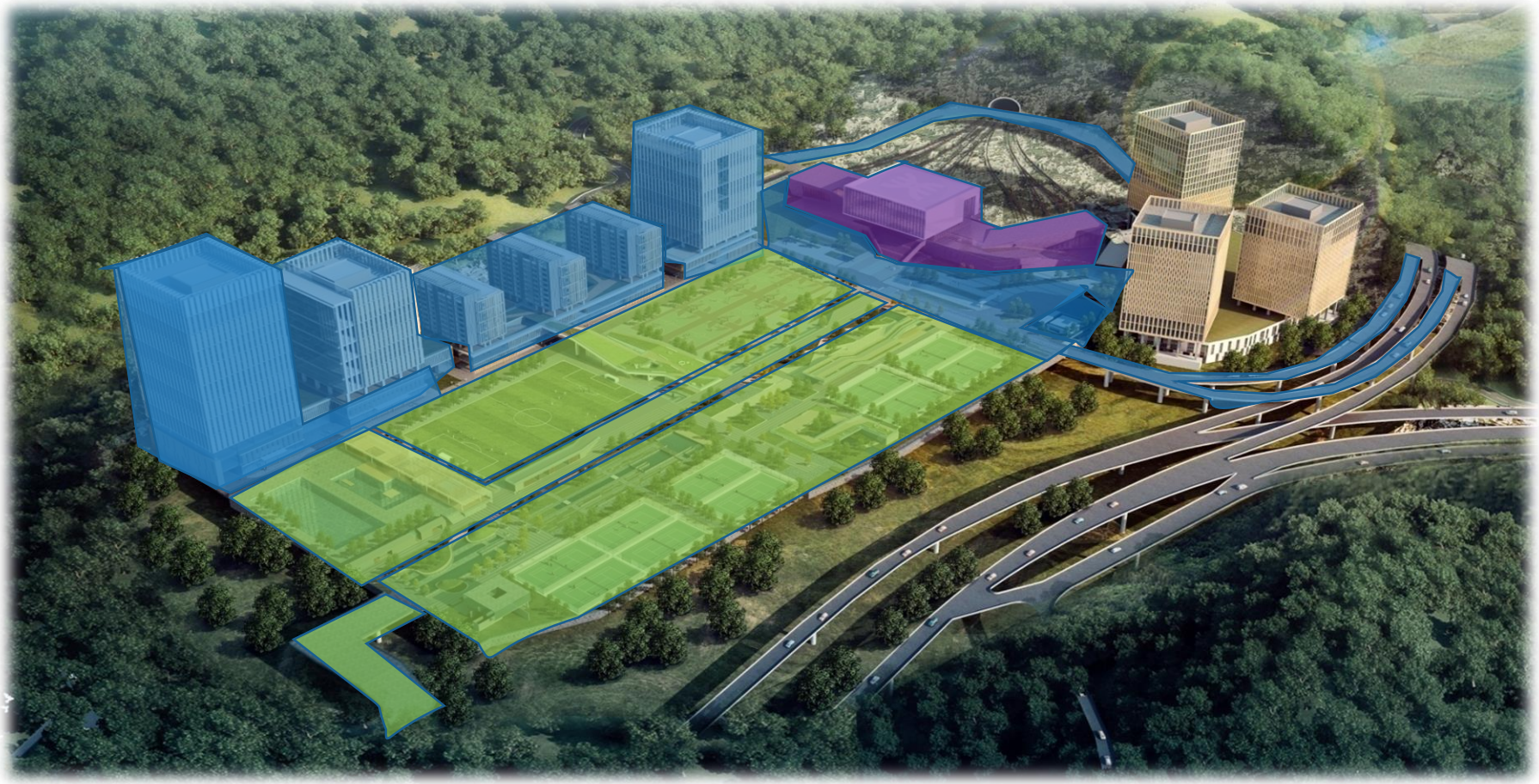
INNOVATIVE UNDERGROUND SPACE CONCEPT - OF THE YEAR -

3. Implementation of the plan---the overall layout of the ecological and metro functions



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Sports recreation

- Recreation park
  - sport
  - Recreation

Education& training

- Training basement
  - logistics service
  - Teaching experiment

Display& communication

- Display
  - Conference Center
  - Metro museum

Subway control

- Facility
  - Track facility
  - NOCC
  - Innovation

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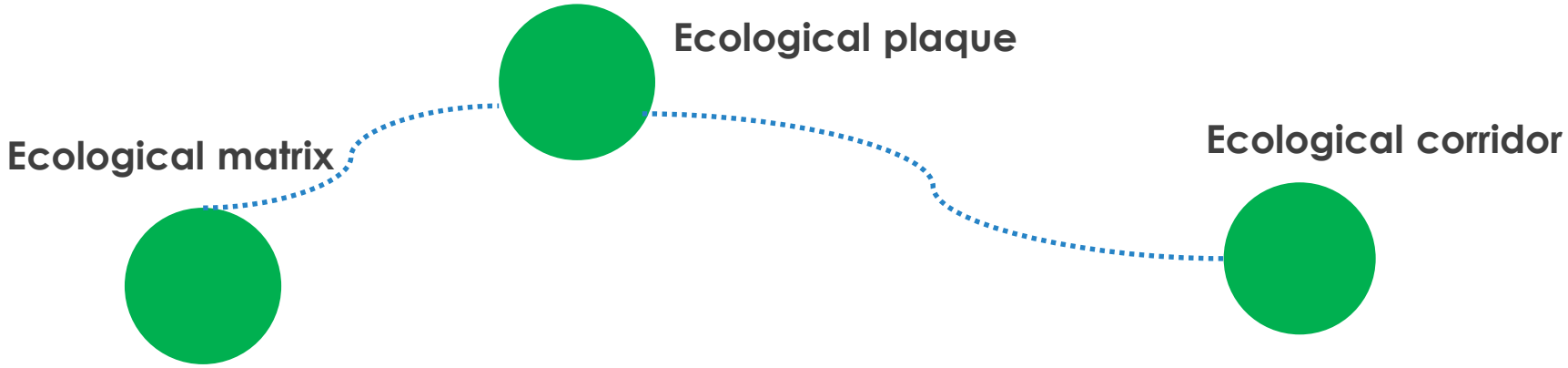
Idea improvement

5.Idea Improvement---Concept of Ecological Plan

Ecological planning

The project uses the basic principles of ecological landscape science to construct the basic ecological landscape unit of ecological matrix, ecological patch and ecological corridor, and proposes the design concept of "reconnecting with the mountain" to maximize the ecological restoration of the damaged base. And give it a variety of composite features to maximize the value of land use.



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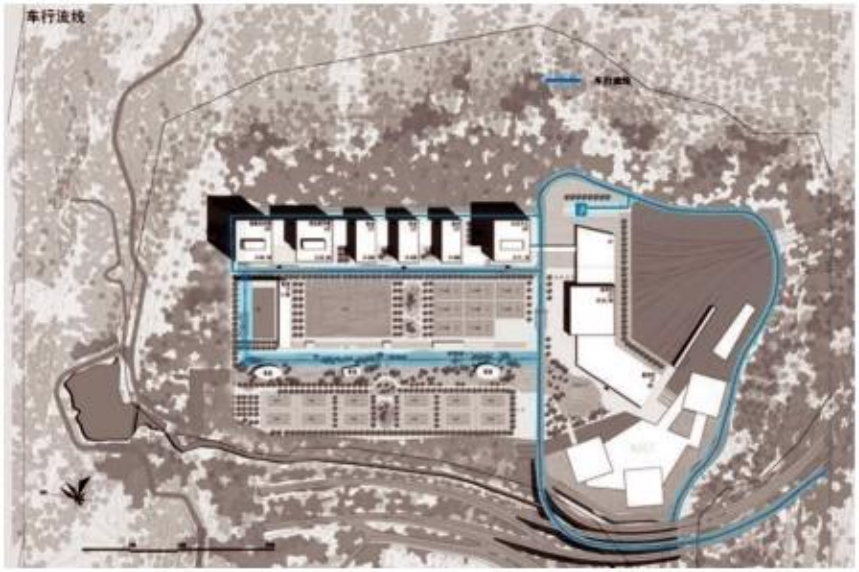
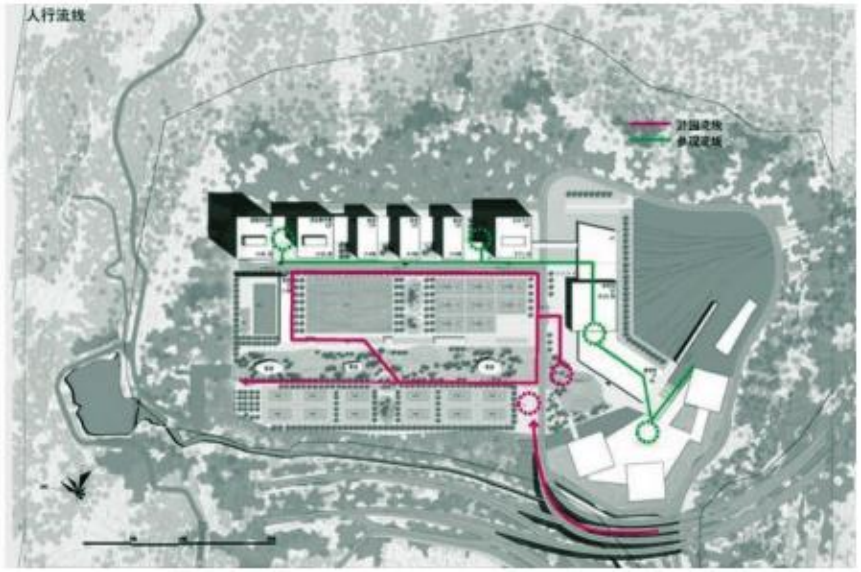
As one of the future recreation center of the district, the total passenger capacity of the park is estimated to be 3,699 person/day through the passenger flow. The total number of trains per day in the subway training base is 3,194, and the overall traffic is large. In the design of the traffic stream line, the design of the traffic stream line is completely separated from the field under the cover. At the same time, in order to avoid the conflict of different people in the recreation park, the traffic flow is “pipelined” design with the separation of people and vehicles in the flow of people. While ensuring the convenient and smooth arrival of the personnel, the effective combination of various natures of traffic is realized.





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Application and result

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6.Application and result

Contribution 1: The use of "waste land" and the restoration of "naked slope" to achieve the unification of land use and ecological restoration

Slope before construction of depot

Slope after construction of depot

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Contribution 2: "Abandoned land" utilization, "naked slope" recovery, realizing the unification of land use and ecological restoration

Comparison of influences on mountains before and after NOCC adjustment plan

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INNOVATIVE UNDERGROUND SPACE CONCEPT - OF THE YEAR -

Contribution 3: Forming a Metro Recreation Park to enhance the ecological capacity of the area

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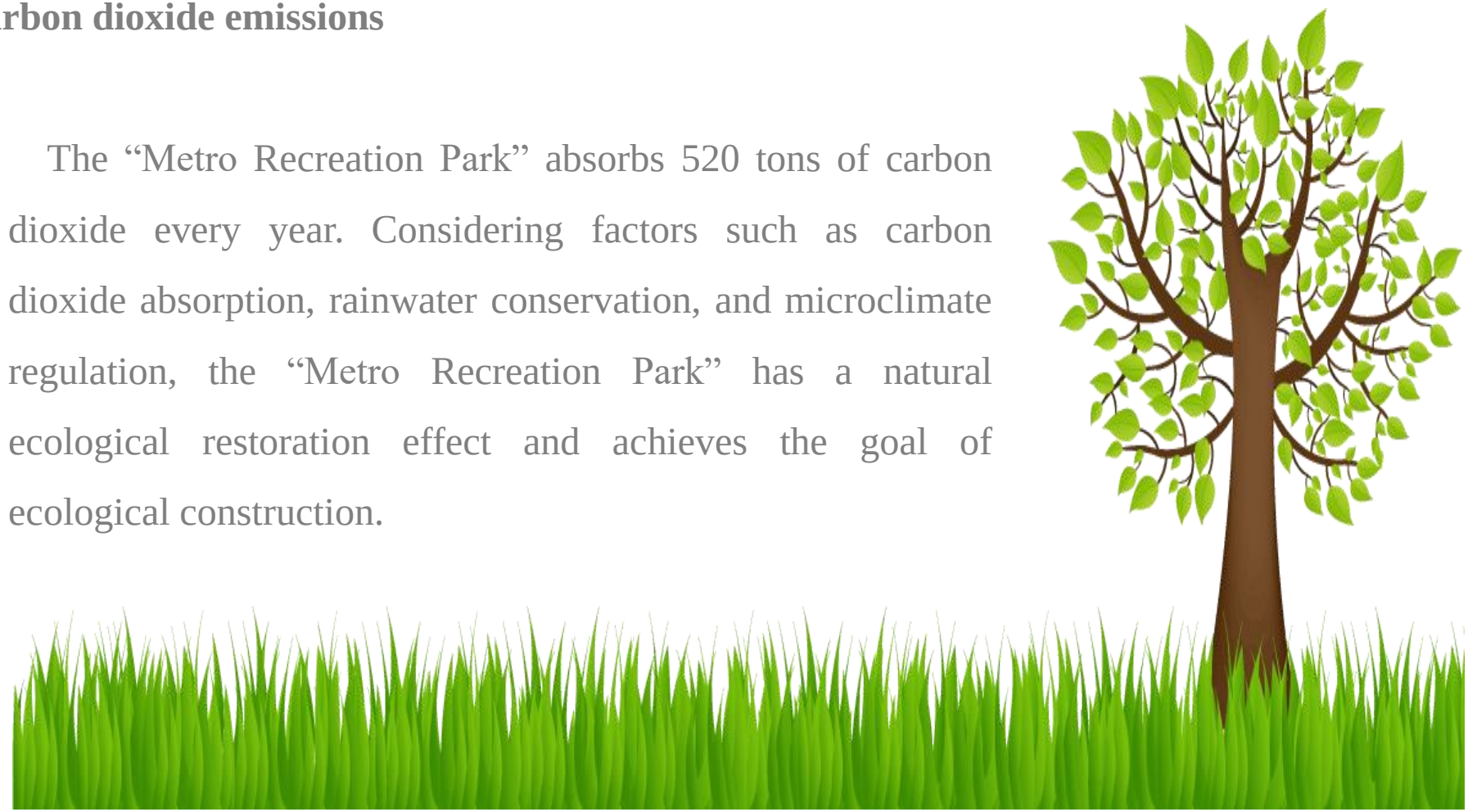
Contribution 4: Improve small-area environment and reduce carbon dioxide emissions

The “Metro Recreation Park” absorbs 520 tons of carbon dioxide every year. Considering factors such as carbon dioxide absorption, rainwater conservation, and microclimate regulation, the “Metro Recreation Park” has a natural ecological restoration effect and achieves the goal of ecological construction.



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Project promotion application

Liangmao Mountain Depot. Shenzhen Urban Rail Transit Line 10

The decapitation of the Liangmao Mountain depot uses the abandoned Zhukeng Reservoir as the site for the site selection of the depot, which solves the problem of large-scale occupation of land, insufficient land use and ecological destruction of the metro depot.

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Project promotion application

Yitian Paking lot.Shenzhen Urban Rail Transit Line 10

Yitian Parking Lot uses the street green park to set up an underground parking lot, and the upper part restores greening, which solves the problem of environmental damage caused by engineering construction.

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Wining Reason

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荣誉证书

中国水利水电第十一工程局有限公司：

你公司承建的 深圳地铁7号线-7307-1标段（深云车辆段） 工程，荣获二〇一三年度上半年深圳市安全生产文明施工优良工地奖。

特发此证

深圳建筑业协会
二〇一三年五月


中国水利水电第十一工程局有限公司
承建的“深圳地铁7号线BT项目7307-1标段（深云车辆段）”工程，荣获2013年广东省房屋市政工程

安全生产文明施工示范工地

广东省建筑安全协会
二〇一四年二月

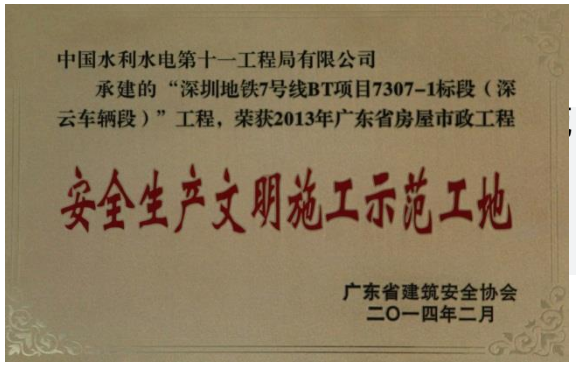

中国水利水电第十一工程局有限公司：

你公司承建的深圳地铁7号线BT项目7307-1标（深云车辆段综合基地工程）项目，经评价，授予：

2015年广东省优质结构工程

广东省建筑业协会
二〇一六年三月

2013 2014 2015 2016


中国水利水电第十一工程局有限公司
承建的“深圳地铁7号线BT项目7307-1标段（深云车辆段）”工程，荣获2013年广东省房屋市政工程

安全生产文明施工示范工地

广东省建筑安全协会
二〇一四年二月


CCIA

第四批全国建筑业绿色施工示范工程

工程名称：深圳地铁7号线
承建单位：中水电南方建设投资有限公司

中国建筑业协会
二〇一四年十二月


中国电建集团铁路建设有限公司：

你单位施工总承包的深圳市城市轨道交通7号线BT项目 荣获2016-2017年度国家优质工程金质奖。

特发此证。

中国施工企业管理协会
二〇一七年十二月

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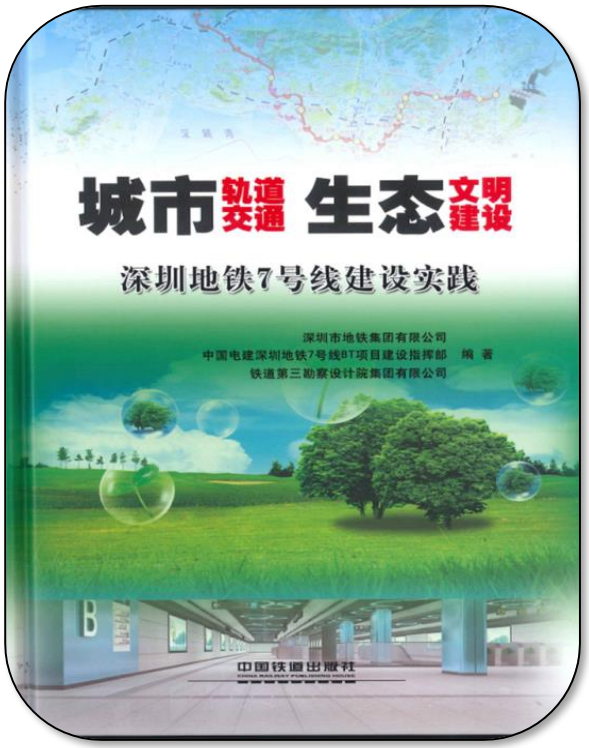

The project has achieved good results in sustainable development and ecological civilization construction. In the game of economic benefits and social benefits, more considerations have been made for social benefits, fully demonstrating the social responsibility of the participating units of this project, the success of this project. It has taken an important step for the sustainable development of the subway and the practice of ecological civilization construction, providing new ideas for the sustainable development of the future construction of the project, and promoting social and economic benefits.

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THANK YOU