China：Chongqing New Urbanization Pilot And Demonstration Project

Jiulongpo District Component

ENVIRONMENTAL AND SOCIAL ASSESSMENT

Chongqing Municipal PMO
CCTEG Chongqing Engineering

May 2018

Contents

1 General

1.1 Project background and origin

The State Council and the Central Committee of the Communist Party of China issued the "State New Urbanization Plan (2014-2020)" on 16 March 2014 which has been the blueprint for China future urbanization and economic development. The new urbanization in Chongqing has a new path of "people first, spatial layout improvement, urban-rural interaction, city and industry integration, ecological civilization, and cultural inheritance". It is to finally fulfill such four tasks as improvement of urban layout and morphology, improvement of cities' ability of sustainable development, promotion of the number of former rural residents granted urban residency, and promotion of the integrated development of urban and rural areas.

The Project is located at a main urban district of Chongqing, Jiulongpo District, in the west of the main urban area. Covering a total area of 432 square kilometers, and with jurisdiction over 8 sub-districts and 11 towns, and a total permanent population of 1,186,900.00, such district has Yuzhong District and Nan'an District on the east, Dadukou District on the south, Bishan District and Jiangjin District on the west and Shapingba District on the north.

See Figure 1.1-1 for the geographic location of Jiulongpo District.

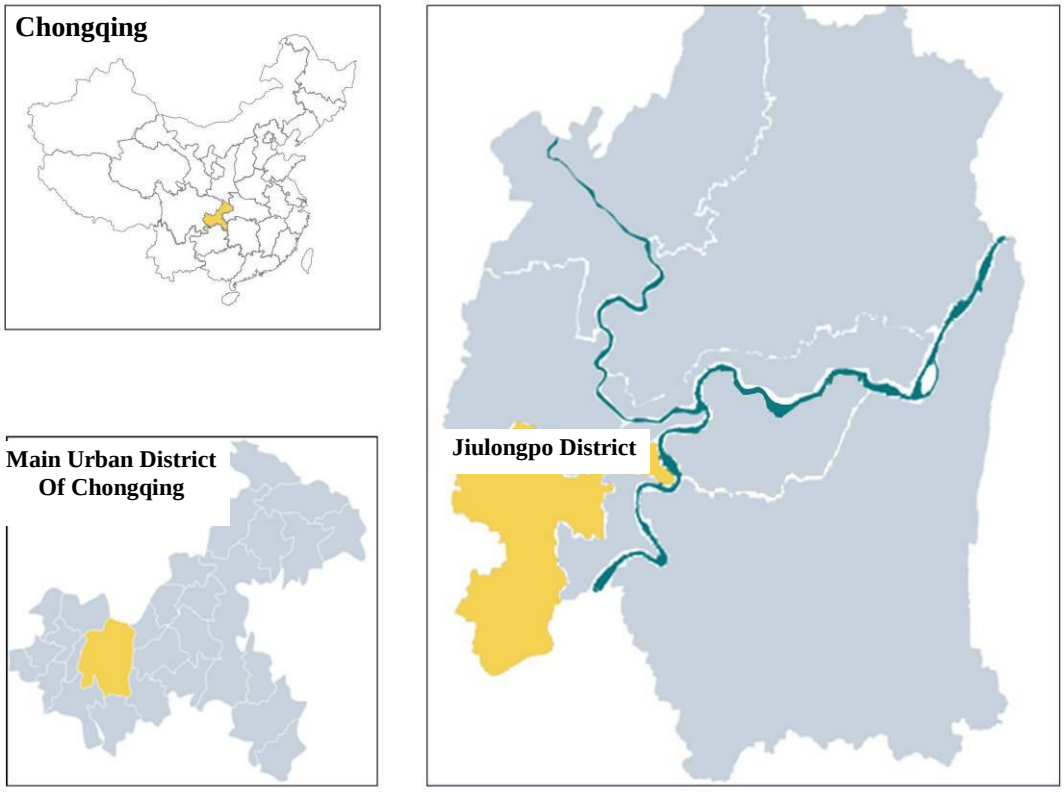


Figure 1.1-1 The geographic location of Jiulongpo District

1.2 Project objective

The **project development objective** is to improve use of public space and increase pedestrian mobility in select districts of Chongqing's *Central City.*

The project interventions under this project development objective consist of **four overall**

activities and components in the proposal should clearly fall in one of the four categories:

(1) urban regeneration technical assistance

(2) neighborhood public space

(3) parks and green public space

(4) pedestrian walkway

(5) institutional strengthening and capacity building

1.3 Project brief

The project will support the urban regeneration activities in Nan'an and Jiulongpo Districts of Chongqing City Center, and provide technical assistance for urban regeneration planning and implementation at district level, as well as institutional development and capacity building. Details of each project component and scope are described below:

Component 1 - Technical Support to Urban Regeneration Planning and Implementation at District Level (IBRD Loan US$ 2.80 million). Provision of technical assistance to (a) Nan'an and Jiulongpo Districts to (i) conduct urban regeneration demand survey and assessment, (ii) prepare Urban Regeneration Plan and Implementation Guidelines, and (iii) assess and enhance the institutional capacity in the Districts for planning and implementing urban regenerations; (b) Nan'an and Jiulongpo Districts to carry out "Nan'an and Jiulongpo Districts' Visioning 2035"; (c) Nan'an and Jiulongpo Districts to conduct "Green Buildings Study" which provides rating and listing of all new and existing buildings and group of buildings based on variety of Green Building Principles; (d) Nan'an District to develop an APP in connection with the district-wide pedestrian walkway network; and (e) Nan'an District to pilot the Community-Led Bottom-Up (CLBU) Approach for Neighbourhood Regenetation.

Component 2 - Urban Regeneration Interventions in Nan'an District (US$ 147.20 million, IBRD Loan US$ 72.25 million). Support of investments in (a) regeneration of 10 neighborhoods (i.e. Dongxinglu, Jinzijie, Yangguang, Xiangshuilu, JInshanlu, Jinyan, Gulouwan, Nanhu, Huangjiaya, and Zhenwushan) of 29 Streets in connection with 16,133 households in 268 buildings of build-up area 1,208,500 m2 on 529 hectares of land in Nanping, Huayuanlu, and Nanshan Street Communities Neighborhoods; (b) improvement of District-Wide Pedestrian Walkway Networks of 29 pedestrian routines of total length and width of 88.32 km and 3m respectively, rehabilitation of Mountain Walkway Networks of 16 pedestrian routines of total length of 42.31 km; and upgrading of 3 road connections (i.e. Huanglonglu of 769 m, Huguilu of 1,403m and Tushanlu of 647 m); and (c) greening improvement of Nanhu Neighborhood, Guohuishan, Houbao, Nanping, Huigonglu and under theDafoqiaoBridge public spaces and parks totaled 32.17 hectares of land area.

Component 3 - Urban Regeneration interventions in Jiulongpo District (US$ 31.61 million, IBRD Loan US$ 27.25 million). Support of investments in (a) construction of 5.3 km pedestrian walkway of average width 3 m to complete a district-wide pedestrian loop; and (b) greening improvements of 9 parks (i.e. new construction of Kanglong, aitao, Wutaishan, Longjingwan, Shimei, Taohuaxi, Jiulong and Tiaodenghe Parks and rehabilitation of Caiyunhu Wetland Parks) totaled 138.37 hectare of land area.

Component 4 - Project Management and Capacity Building (IBRD Loan US$ 3.5 million). Provision of project management, implementation support and capacity building activities for the two project districts of Nan'an and Jiulongpo and the Chongqing PMO of municipal level, including (i) project management, procurement and contract management, accounting and financial management and project reporting; (ii) construction supervision for Nan'an district and Jiulongpo district; (iii) independent monitoring of the implementation of the EMP; (iv) training and workshops for strengthening the capacity of district government for urban regeneration; (v)Performance Evaluation & Results of Promotion; and (vi) external RAP monitoring.

This environmental impact assessment is conducted for the third construction project, Jiulongpo District Urban Regeneration Project.

The construction scope of Jiulongpo District Project covers the eastern urban area of Jiulongpo District. See Figure 1.3-1 for specific scope.

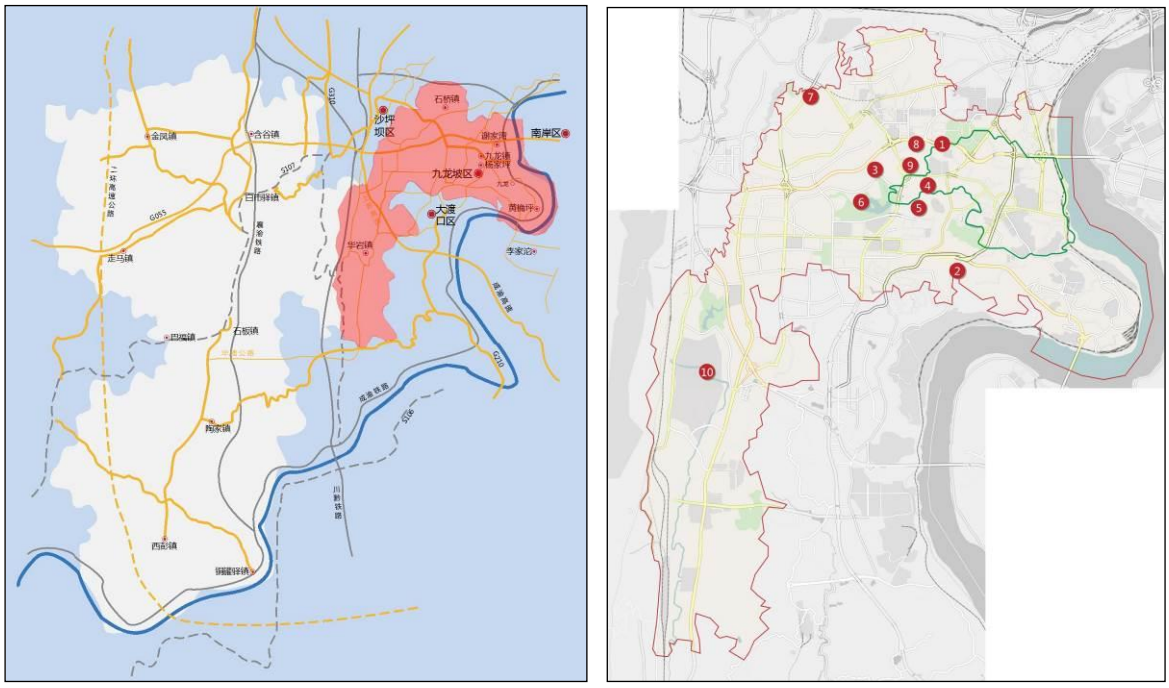


Figure 1.3-1 The construction scope of Jiulongpo District Project

1.4 Assessment scope

The assessment scope of this project is determined based on the project scale and characteristics, and the local environment characteristics. See Table 1.4-1 for the assessment scope.

Table 1.4-1 The assessment scope of individual environmental elements

Assessment content	Assessment scope
Water environment	For Caiyun Lake and the stream segment from the cross section of Caiyun Lake flowing into Taohua Stream to 5km downstream, the assessment will focus on the impact of the project construction on the water environment of Caiyun Lake and its downstream water body.
Ecological environment	For the scope of 200m around the construction area during the construction phase, the assessment will focus on the impact on the Caiyun Lake National Wetland Park.
Ambient air	The scope of 2.5km around the construction area. The assessment will focus on the scope of 200m around the construction area during the construction phase.
Acoustic environment	The scope of 200m around the construction area during the construction phase.

1.5 Assessment phase

The environmental impact assessment phase of this project includes the construction phase and the operational phase.

1.6 Assessment rating

1.6.1 Classification method as per World Bank OP4.01

In accordance with the *Notice on Strengthening Management of the Environmental Impact Assessment for International Financial Organizations Funded Construction Projects* (HJ [1993] No. 324) of ministries and commissions like former General Administration of Environmental Protection, and the World Bank safeguards policies OP4.01 *Environmental Assessment*, this project is classified to be a Category-A project based on the pollution characteristics and the size of the pollution source strength of this project, as well as the environmental conditions of the region where the project is located in.

1.6.2 Assessment rating

(1) Surface water environment

The wastewater from the construction phase of this project is mainly the construction wastewater and the sanitary sewage; that from the operational phase, the sanity sewage from the

public places. The wastewater discharge during the construction phase will be less than 200m3/d, with simple water constituents, and the function of the surface water body is Category III. In accordance with the *Technical Guidelines for Environmental Impact Assessment --- Surface Water Environment* (HJ/T2.3-93), the surface water environmental impact assessment work is graded to be level III.

(2) Atmospheric environment

The assessed scope of this project is the Category-II ambient air quality functional zone. This project mainly includes the transformation and upgrading of the public space, and the construction of the slow-walking footpath. The main pollutants during the construction phase mainly include automobile exhaust, asphalt fume and dust, and those during the operational phase, a small amount of automobile exhaust and rising dust from the parking lots, and the bad smell from the public toilets and biochemical pools. The pollutants from the project are rare and scattered, which will have little impact on the atmospheric environment quality and will not change the regional environmental function. The atmospheric environment impact assessment work is graded to be level III.

(3) Acoustic environment

The acoustic environment functional zone where this project is located at is the Category-2 zone specified by GB3096-2008. The noise during the construction phase is mainly from the construction machines and transport, which will have temporary impact on a few residents in the surrounding area. At the operation phase, with the completion of the park and the increase of visitors, the regional noise of social activities will increase to some extent. The sensitive target noise level increment before and after the project construction will be within 3 dB(A), and the impacted people will not change greatly, without special acoustic environmental protection targets involved. In accordance with the *Technical Guidelines for Environmental Impact Assessment --- Acoustic Environment* (HJ2.4-2009), the acoustic environmental impact assessment work is graded to be level II.

(4) Groundwater environment

In accordance with the *Technical Guidelines for Environmental Impact Assessment --- Groundwater Environment* (HJ610-2016), this project is a Category-IV project which shall not have groundwater environmental impact assessed.

(5) Ecological environment

Since this project involves no special ecological sensitive areas or important ecological

sensitive areas, and covers a total area ＜20km^2, and in accordance with the *Technical Guidelines for Environmental Impact Assessment --- Ecological Impact* (HJ19-2011), the ecological environmental impact assessment work for this project is graded to be level III.

1.7 Environmental protection targets

According to the field investigation, the area surrounding the project is dominated by residences and schools, and the atmospheric and acoustic environmental protection targets are determined primarily in the scope of 200m around the project site.

See Table 1.7-1 to Table 1.7-5 for the environmental protection targets of this project.

Table 1.7-1 Jiulongpo District urban regeneration project Jiulong Community Park environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Caiyun Yinxiang	Southwest side of Jiulong Community Park	Nearest distance 60m 5 33F residences with about 4,300 residents.		Construction, transport and land occupation	Construction phase
		Shiguangli	Southwest side of Jiulong Community Park	Nearest distance 30m 2 33F residences with about 1,402 residents.			
		Yunhu Lvdao	South side of Jiulong Community Park	Nearest distance 150m 4 33F residences with about 3,485 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Vanke Westcity Phase II	South side of Jiulong Community Park	Nearest distance 20m 6 33F residences with about 7,841 residents.			
		Vanke Westcity Phase I	Southeast side of Jiulong Community Park	Nearest distance 20m 5 33F residences with about 6,534 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Poly Aishangli Phase II	East side of Jiulong Community Park	Nearest distance 20m 6 33F residences with about 7,844 residents.			
		Huamei Shidaicheng	East side of Jiulong Community Park	Nearest distance 150m 3 33F residences with about 2,483 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Wangjing Yourenzui	East side of Jiulong Community Park	Nearest distance 185m 2 33F residences with about 1,960 residents.			
	School	Panlong Primary School	Southeast side of Jiulong Community Park	Nearest distance 130m 44 classes with about 2,126 teachers and students.			

Table 1.7-2 Jiulongpo District urban regeneration project Kanglong Park environmental protection targets statistical table

Sensitive targets Target category	Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phas(s)

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phas(s)
Atmospheric environment Acoustic environment	Residence	Better Life (Zhongfang Nali)	South side of Kanglong Park	Nearest distance 70m 4 33F residences with about 4,884 residents.		Construction, transport and land occupation	Construction phase
		Jiujian Community at Yangdu Village Community	Northeast side of Kanglong Park	Nearest distance 100m 9 8F residences with about 1,901 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phas(s)
		Xinhui Garden (Xinhui Minyuan)	North side of Kanglong Park	Nearest distance 160m 2 4F residences with about 300 residents.			
		Longcheng Jindu	West side of Kanglong Park	Nearest distance 100m 5 7F residences with about 700 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phas(s)
		Anxin Jiayuan	Southwest side of Kanglong Park	Nearest distance 170m 1 29F residences with about 500 residents.			

Table 1.7-3 Jiulongpo District urban regeneration project Caiyun Lake National Wetland Park environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Tongtian Lv'an	North side of Caiyun Lake Park	Nearest distance 20m 13 33F residences with about 9,563 residents.		Construction, transport and land occupation	Construction phase

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Tongtian Guanyundi	North side of Caiyun Lake Park	Nearest distance 140m 8 31F residences with about 4910 residents.			
		Tongtian Yiyunjun	Northeast side of Caiyun Lake Park	Nearest distance 20m 31 5F residences with about 2,178 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Sincere Tianjiaocheng	East side of Caiyun Lake Park	Nearest distance 60m 5 33F residences with about 3,267 residents.			
		Jinke Lvyun Kangcheng	Southeast side of Caiyun Lake Park	Nearest distance 120m 4 30F residences with about 2,400 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Caiyun Xiaocheng	Southeast side of Caiyun Lake Park	Nearest distance 40m 5 33F residences with about 2,700 residents.			
		Baguo Jinyuan	Southeast side of Caiyun Lake Park	Nearest distance 40m 2 33F residences with about 1,100 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Yugao Xiangzhou	South side of Caiyun Lake Park	Nearest distance 10m 36 6F residences with about 1,426 residents.			
		Yugao Xincheng Xingzuo	West side of Caiyun Lake Park	Nearest distance 70m 5 32F residences with about 3,168 residents.			

Table 1.7-4 Jiulongpo District urban regeneration project Longjingwan Park environmental protection targets statistical table

Sensitive targets Target category	Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Longxingyuan	Northwest side of Longjingwan Park	Nearest distance 120m 6 8F residences with about 800 residents.		Construction, transport and land occupation	Construction phase
		Jundu Caishe	North side of Longjingwan Park	Nearest distance 70m 2 28F residences with about 1109 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Jinzhou Xingyunyuan	Northwest side of Longjingwan Park	Nearest distance 100m 2 24F residences with about 1,000 residents.			
		Caise Aolin	East side of Longjingwan Park	Nearest distance 50m 2 32F residences with about 1,268 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
	School	Chingqing Yucai School	Northeast side of Longjingwan Park	Nearest distance 120m 43 classes with about 2,165 teachers and students.			

Table 1.7-5 Jiulongpo District urban regeneration project Wutaishan Park environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Zhigao Garden	South side of Wutaishan Park	Nearest distance 30m 4 33F residences with about 2,614 residents.		Impact of construction, transport and land occupation	Construction phase

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Dibo Chuntian	South side of Wutaishan Park	Nearest distance 30m 8 32F residences with about 6,758 residents.			
		Yuqi Community	East side of Wutaishan Park	Nearest distance 30m 6 33F residences with about 5,230 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Junyi New Vision	East side of Wutaishan Park	Nearest distance 120m 7 33F residences with about 6,100 residents.			

Table 1.7-6 Jiulongpo District urban regeneration project Shimei Park environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Rongding Xinyuan	East side of Shimei Park	Nearest distance 60m 3 33F residences with about 2,614 residents.		Construction, transport and land occupation	Construction phase

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Yuanyang Xiangpai	Southeast side of Shimei Park	Nearest distance 20m 3 33F residences with about 2,614 residents.			
		Yijinyuan	Northeast side of Shimei Park	Nearest distance 190m 1 33F residences with about 871 residents.			

Table 1.7-7 Jiulongpo District urban regeneration project Baitao Road Park environmental protection targets statistical table

Sensitive targets Target category	Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Dafei Lvzhou, Chongqing	Northwest side of Baitao Road Park	Nearest distance 10m 3 28F residences with about 2,218 residents.		Construction, transport and land occupation	Construction phase
		Dachuan International	Northwest side of Baitao Road Park	Nearest distance 20m 3 33F residences with about 2,614 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Jiucheng Yihao	North side of Baitao Road Park	Nearest distance 20m 9 33F residences with about 7,841 residents.			
		Huayu Garden	Northwest side of Baitao Road Park	Nearest distance 70m 12 15F residences with about 4,752 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Area D3, Nanfang Garden	West side of Baitao Road Park	Nearest distance 60m 3 33F residences with about 2,614 residents.			
		Qiuyu Jingyuan	West side of Baitao Road Park	Nearest distance 150m 3 33F residences with about 2,614 residents.			

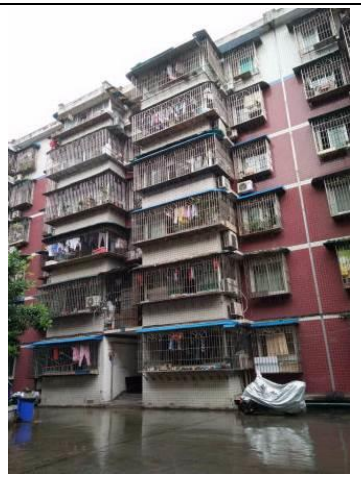
Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main factor(s)	Main impact phase(s)
		Baihe Community Phase II	Southwest side of Baitao Road Park	Nearest distance 180m 4 6F residences with about 500 residents.			

Table 1.7-8 Jiulongpo District urban regeneration project Taohuaxi Sports Park environmental protection targets statistical table

Sensitive targets Target category	Name	Location	Sensitivity factor(s)	Photos of sensitive point(s)	Main factor(s)	Main impact phase(s)

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photos of sensitive point(s)	Main factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Lvzhou Huafu	North side of Taohuaxi Sports Park	Nearest distance 30m 4 30F residences with about 3,168 residents.		Construction, transport and land occupation	Construction phase
		Poly Aishangli Phase I	North side of Taohuaxi Sports Park	Nearest distance 40m 7 33F residences with about 6,098 residents.			

Table 1.7-9 Jiulongpo District urban regeneration project Huayan Riverside Park environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main Factor(s)	Main impact phase(s)
Atmospheric environment Acoustic environment	Residence	Huayu Jiayuan	Northeast side of Huayan Riverside Park	Nearest distance 155m 6 27F residences with about 4,277 residents.		Construction, transport and land occupation	Construction phase
		Banshan First Village Community	North side of Huayan Riverside Park	Nearest distance 30m 17 6F residences with about 3,000 residents.			

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Photo(s) of sensitive points	Main Factor(s)	Main impact phase(s)
		Diecai Xicheng Community	East side of Huayan Riverside Park	Nearest distance 40m 9 33F residences with about 7,841 residents.			
	School	Yuqingsi Primary School	West side of Huayan Riverside Park	Nearest distance 180m 30 classes with about 1,500 teachers and students.			

Table 1.7-10 Jiulongpo District urban regeneration project other environmental protection targets statistical table

Sensitive targets Target category		Name	Location	Sensitivity factor(s)	Main factor(s)	Main impact phase(s)
Ecological environment	Wetland Park	Caiyun Lake National Wetland Park	Within Phase II and Phase III of the park	Park improvement	Construction impact	Construction phase
Water environment	River	Yangtze River	Jiulongpo District section	In accordance with the standard of Category III water area		

2 Environment policies, regulatory and legal framework, and bases for report preparation

2.1 Regulatory and legal framework of environmental protection

2.1.1 Regulatory and legal framework

(1) *Environmental Protection Law of the People's Republic of China* (1 January 2015);

(2) *Law of the People's Republic of China on Environmental Impact Assessment* (September 2016);

(3) *Regulations on the Administration of Construction Project Environmental Protection* (October 2017);

(4) *Law of the People's Republic of China on Prevention and Control of Water Pollution* (June 2008);

(5) *Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution* (January 2016);

(6) *Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise* (March 1997);

(7) *Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste* (Amended in November 2016);

(8) *Law of the People's Republic of China on Water and Soil Conservation* (March 2011);

(9) *Forest Law of the People's Republic of China* (July 1998);

(10) *Regulations on Prevention and Control of Geological Disasters* (Decree of the State Council No. 394 in 2003);

(11) *Land Administration Law of the People's Republic of China* (August 2004);

(12) *Decision of NPC Standing Committee on Amendment to Twelve Laws like "Law of the People's Republic of China on the Protection of Cultural Relics"* (Presidential Decree No. 5, the People's Republic of China, adopted and released on 29 June 2013 at the Third Session of the Twelfth NPC Standing Committee, and coming into effect as of the day of release).

2.1.2 Departmental rules

(1) *Administrative Measures on Prevention and Control of Geological Disasters* (Decree of Ministry of Land and Resources No. 4 in 1999);

(2) *Administrative Measures for Environmental Protection of Traffic Construction Projects* (Ministry of Transport Decree [2003] No.5);

(3) *Catalogue for Guiding Industry Restructuring (2011 Version)* (as amended in 2013) (Decree No. 21 of National Development and Reform Commission, the People's Republic of China);

(4) *National Outline for Ecological and Environmental Protection* (December 2000);

(5) *List of Wild Plants of National Priority Protection (first batch)* (as amended the Ministry of Agriculture and the State Forestry Administration Decree No. 53 in August 2001);

(6) *National Ecological Environment Construction Plan* (issued by the State Council in January 1999);

(7) *The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China* (2016);

(8) *List of Classified Management of Environmental Impact Assessment of Construction Projects* (September 2017);

(9) *Opinions on Strengthening Environmental Protection Management of Construction Projects under the Large-scale Development of China's Western Region Program* (HF [2001] No. 4);

(10) *Notice of the State Council on Protecting Forest Resources and Stopping Disafforestation and Abuse of Forest Land* (GFMD [1998] No. 8);

(11) *Notice of the State Council on Further Implementing the Construction of National Green Channel* (GBF [2003] No. 31);

(12) *Decision of the State Council on Implementing the Scientific Outlook on Development and Strengthening Environmental Protection* (GF [2005] No. 39);

(13) *Opinions on Regulating Ecological Environmental Protection of Resource Development* (HF [2004] No. 24);

(14) *Provisional Methods on Public Participation in Environmental Effect Evaluation* (HF [2006] No. 28);

(15) *Notice on Zoning Key National Areas of Water and Soil Loss Prevention and Control* (the Ministry of Water Resources Notice [2006] No. 2);

2.2 Local laws and regulations

(1) *Regulations of Chongqing on Water Pollution Control for Yangtze River Three Gorges Reservoir Region and Valley* (Chongqing People's Congress Standing Committee Notice [2011] No. 26)

(2) *Regulations of Chongqing on Environmental Protection* (as amended) (Chongqing People's Congress Standing Committee Notice [2010] No. 22);

(3) *The 13th Five-Year Plan for Economic and Social Development of Chongqing* (YFF [2016] No. 6);

(4) *Chongqing Ecological Function Zoning (as edited and revised)* (YF [2008] No. 133);

(5) *The 13th Five-Year Plan for Ecological Civilization Construction of Chongqing* (YFF [2016] No. 34);

(6) *Notice of Chongqing Municipal People's Government on Issuing the List of Aquatic Wild Animals of Chongqing Priority Protection* (YFF [1999] No. 65);

(7) *Notice of Chongqing Municipal People's Government on Issuing the List of Terrestrial Wild Animals of Chongqing Priority Protection* (YFF [1999] No. 94);

2.3 Technical specifications for environmental protection

(1) *Technical Guidelines for Environmental Impact Assessment --- General Principles* (HJ/T2.1-2016);

(2) *Technical Guidelines for Environmental Impact Assessment --- Surface Water Environment* (HJ/T2.3-93);

(3) *Technical Guidelines for Environmental Impact Assessment --- Groundwater Environment* (HJ610-2016);

(4) *Technical Guidelines for Environmental Impact Assessment --- Acoustic Environment* (HJ2.4-2009);

(5) *Technical Guidelines for Environmental Impact Assessment --- Ecological Impact* (HJ19-2011);

(6) *Technical Guidelines for Environmental Impact Assessment --- Atmospheric Environment* (HJ19-2011);

(7) *Technical Guidelines for Environmental Risk Assessment of Construction Projects* (HJ/T169-2004);

(8) Technical Code on Soil and Water Conservation of Development and Construction Projects (GB50433-2008)

2.4 World Bank's safeguards policies and World Bank Group's EHS guideline

2.4.1 World Bank's Safeguards Policies and their compliance analysis

World Bank has ten safeguards policies socially and environmentally. Based on the construction nature of this project, the engineering layout, and the assessment scope determined by this environment impact assessment and the field investigation, the project has been checked to determine whether it involves such ten policies, with the results shown in the following table:

Table 2.4-1 Compliance with World Bank safeguards policies

SN	Safeguard Policies	Whether applicable	Compliance
1	OP/BP4.01 *Environmental Assessment*	Yes	Category A project; Prepared full *Environmental Impact Assessment (EIA)* and *Environmental Management Plans* (EMPs); Prepared Environmental and Social Management Framework for component 1 Technical assistance activity; and Two rounds of public consultation and information disclosure were conducted as per OP4.01.
2	OP/BP4.04 *Natural Habitats*	Yes	The project involves the Caiyun Lake National Wetland Park, which is mainly used for public leisure purposes. The scale of the project is relatively small. Only upgrading existing facilities will not affect the ecological functions or landscape of these sensitive areas. Mitigation measures have been incorporated into the EMP. The project will not lead to major transformation or degradation of natural habitats. However, project activities will not cause degradation or significant changes in natural habitats.
3	OP/BP4.36 *Forests*	No	The project will not have impacts on the health and quality of forests, or affect the rights and welfare of people and their level of dependence upon or interaction with forests. The policy is not triggered.
4	OP/BP4.09 *Pest Management*	No	The project will not involve use or procurement of pesticides directly or indirectly. The policy is not triggered.
5	OP/BP4.11 *Physical Cultural Resources*	No	Based on the cultural relic investigation, the site inspection and the information from the cultural relics management department, there are totally 19 national, manucipal and district-level cultural relics protection sites in Jiulongpo District, but the implementation of the project will not have any impact on the known physical cultural resources. The policy is not triggered.
6	OP/BP4.37 *Safety of Dams*	No	This project does not involve any dams. The policy does not triggered.
7	OP/BP4.10	No	No IPs affected in the project. The population of the affected areas of the project are mostly of Han ethnicity, or the ethnic

SN	Safeguard Policies	Whether applicable	Compliance
	Indigenous Peoples		majority population in China. Thus, the Indigenous Peoples OP/BP 4.10 is not triggered.
8	OP/BP4.12 *Involuntary Resettlement*	No	The project area involves no involuntary resettlement. The policy does not triggered.
9	OP/BP7.50 *Projects on International Waterways*	No	The project area involves no international waterway. The policy does not triggered.
10	OP/BP7.60 *Projects on Disputed Areas*	No	The project area involves no place of disputes. The policy does not triggered.

According to the analysis of the correlation between the project and World Bank safeguards policy documents, the policy documents relating to this project are OP/BP4.01 (Environmental Assessment) and OP/BP4.04 (Natural Habitat).

2.4.2 WBG EHS Guidelines and relevant provision compliance analysis

The World Bank Group *Environmental, Health and Safety Guidelines* (General Guidelines) and other guidelines apply to this project. The mitigation measures included in the *Environmental Management Plans* of the project are completely in conformity with the requirement of foregoing guidelines. Particularly, the content in such guidelines is basically in line with the laws, regulations, guidelines and construction management rules of China.

Table 2.4-2 Compliance with WBG EHS Guidelines

GeneralEHS Guidelines	**Environmental impact assessment/compliance with Environmental Management Plans (EMPs)**
If any facility or project is near a recognized ecological sensitive area (for example, a national park), the pollution level increase shall be controlled as far as practicable; in addition, appropriate mitigation measures can also include the utilization of clean fuel or technology, and the application of comprehensive pollution control measures.	The project involves the ecological sensitive area, so existing municipal facilities shall be used and local residency shall be rented as far as possible during the construction phase, and the clean fuel should be used during the operational phase to reduce the pollution level.
Dust or particulate matter (PM) is the most common pollutant among irregular emissions. Some operations (for example, transportation and open-air storage of solid materials) and bare soil	The management shall be strengthened, with the wet method operation promoted, barriers erected along the construction site, and the material storage yard fenced and covered;

surface (including unpaved roads) will emit the particulate matter.	throwing materials from a high place is strictly prohibited. The testing and maintenance of motor vehicles shall be strengthened during the operational phase; automobiles of exhaust exceeding standard shall be prohibited from being on roads; road conditions shall be maintained; the vegetation shall be utilized to purify air.
Environmental, Health and Safety Guidelines for Water and Sanitation	**Environmental impact assessment/compliance with Environmental Management Plans (EMPs)**
The industrial wastewater, sanitary wastewater and the wastewater from operations of public works or rain water will be discharged to the public or private wastewater treatment system, and the pretreatment and monitoring requirements of the sewage treatment system such wastewater is discharged to will be met.	During the construction phase, the washing wastewater will be reused after the treatment of the oil separation and grit chamber, without being discharged outside; the sanitary sewage will be collected and pretreated by biochemical pools and regularly sucked to the sewage treatment plant by fecal suction trucks, or directly connected to the municipal sewage pipe network; during the operational phase, the sanitary wastewater from the public space will be all discharged to the sewage treatment plant through the municipal sewage pipe network for treatment.
The rain water shall be separated from the industrial wastewater and the sanitary wastewater to reduce the volume of wastewater which can be discharged after treatment;	The diversion of rain and sewage water will be utilized, with rain water conduits and sewage conduits built separately.
At the most sensitive point, if it is predicted that the noise from the project facilities or the operation activities will exceed relevant noise level, the noise prevention and control measures shall be taken.	The low-noise machines will be used during the construction phase; the construction will be appropriately scheduled, with the night-time construction avoided; construction machines and plant will be appropriately arranged inside the site; and the fence will be erected. At the operational phase, the asphalt pavement will be adopted, and trees and grass will be planted; the speed at the road sections along densely populated residential areas and schools will be limited and the signs of no

	honking will be erected, with acoustic screens built, special funds for noise monitoring and treatment provided and other measures taken to prevent and control the noise.
Environmental, Health and Safety Guidelines for Waste Management Facilities	**Environmental impact assessment/compliance with Environmental Management Plans (EMPs)**
Collection and transportation of wastes	They will be delivered to the local waste treatment plant for unified treatment
Garbage cans or garbage bags are encouraged to be used by every family or waste collecting stations around buildings; wastes shall be collected regularly and frequently to avoid waste accumulation; vehicles to collect and transport wastes shall be covered to avoid wastes blown away by wind when driving;	They shall be delivered to a fixed point, and shall be gathered and transported by the sanitation department to Jiulongpo District municipal solid waste treatment plant for disposal.
Regular waste collection; Developing cleaning plans for garbage collection vehicles and all the garbage collection containers of the enterprises; Advocating the use of garbage bags to avoid polluting the garbage collection equipment.	
The garbage collection routes shall be optimized to shorten the driving distance, and reduce the total fuel consumption and emission; Forwarding stations will be established for small garbage collection vehicles to gather the collected garbage to large vehicles and deliver to the garbage treatment plant;	

2.5 Relevant materials of the construction project

(1) *World Bank Funded Jiulongpo District Urban Regeneration Project Feasibility Study Report* (China Sustainable Transpotation Center in Chaoyang District, Beijing, January 2018);

(2) *General Plan for Caiyun Lake Wetland Park (2008-2015)*(Planning and Design Insitute for Landscape Architecture of Southwest University, August 2008);

(3) Environmental Impact Assessment Work Contract.

2.6 Assessment standards

2.6.1 Environmental quality standard

(1) Surface water environment

In accordance with the *Notice of Chongqing Municipal People's Government Endorsing the Plan of Readjusting the Surface Water Environment Functional Category of Chongqing* (YFF [2012] No. 4) and the *Notice of Chongqing Municipal People's Government Endorsing the Plan of Locally Readjusting the Surface Water Environment Functional Category of Chongqing* (YF [2016] No. 43), the water area function of the Yangtze River section in Jiulongpo District shall be Category-III water area and shall be in accordance with Category-III water quality standard specified in *Environmental Quality Standards for Surface Water* (GB3838-2002).

See Table 2.6-1 for relevant reference values.

Table 2.6-1 Environmental quality standards for surface water (excerpt) (Unit: mg/L)

SN	Item	Category III reference value of environmental quality standards for surface water
1	PH (Dimensionless)	6~9
2	Permanganate index	≤6
3	Ammonia nitrogen	≤1.0
4	COD	≤20
5	BOD_5	≤4
6	Petroleum	≤0.05

(2) Ambient air

In accordance with the *Notice of Chongqing Municipal People's Government on Printing and Issuing Regulations on Chongqing Ambient Air Quality Function Zoning* (YFF [2016] No. 19), the location of the project shall be Category-II areas and shall be in accordance with the level-II standard in *Ambient Air Quality Standards* (GB 3095-2012). See Table 2.6-2 for relevant reference values.

Table 2.6-2 Ambient air quality standards (excerpt) (Unit: mg/m3)

Level / Pollutants	1-Hour average	24-Hour average (Daily mean value)
SO_2	0.50	0.15
NO_2	0.24	0.12
PM_{10}	/	0.15

(3) Acoustic environment

In accordance with *Applicable Area Classification Rules for Chongqing City Proper Environmental Noise Standard* (YFF [1998] No. 90), *Chongqing Environmental Protection Bureau Notice on Printing and Issuing Amendment to Applicable Area Classification Rules for Acoustical Environment Standard* (YHF [2007] No. 39) and *Chongqing Environmental Protection Bureau Notice on Amending Adjustment Plan of Applicable Area Classification Rules for Acoustical Environment Standard* (YHF [2007] No. 78), the project area mainly belongs to the mixed region of residence, business and industry and stays within 30m from either side of the trunk road at present, while its acoustical environment in the mixed area of residence, business

and industry shall be subject to Category 2 norms (60dB in the day and 50dB at night) of the *Acoustical Environment Quality Standard* (GB3096-2008) and the acoustical environment within 30m from either side of the trunk road shall be subject to Category 4a norms (70dB in the day and 55dB at night) of the *Acoustical Environment Quality Standard* (GB3096-2008).

(4) Water and soil conservation

The soil erosion strength is subject to the *Soil Erosion Categorization and Classification Standard* (SL190-2007) and the project area belongs to the earth-rock mountain region. See Table 2.6-3 for standard values.

Table 2.6-3 Soil erosion strength classification standard table

Class	Southwestern earth-rock mountain region	
	Average erosion modulus [t/(km^2·a)]	Average loss thickness (mm/a)
Slight	<500	<0.37
Mild	500-2500	0.37-1.9
Medium	2500-5000	1.9-3.7
Intense	5000-8000	3.7-5.9
Extremely intense	8000-15000	5.9-11.1
Fierce	＞15000	＞11.1

2.6.2 Emission standards

(1) Waste water

Sewage in the park of this project enters the municipal sewage pipe network and Jiulongpo District urban sewage treatment plant for compliance with discharge norms. The pipe acceptance standard shall be in accordance with the standard of level III in the *Integrated Wastewater Discharge Standard* (GB8978-1996), and see Table 2.6-4 for the reference values for discharge.

Table 2.6-4 *Integrated Sewage Discharge Standard* Level III discharge standard (excerpt) (Unit: mg/L (pH dimensionless))

SN	Item	Reference value	SN	Project	Reference value
1	COD	100	4	pH	6~9
2	BOD_5	30	5	Petroleum	10
3	NH_3-N	15	6	SS	70

(2) Exhaust gas

The exhaust gas and rising dust during the construction phase are irregular emissions; and during the operational phase, main atmospheric pollutants are the exhaust gas emission on the road. The construction phase is subject to the *Integrated Discharge Standard of Atmospheric Pollutants* (DB 50/418－2016), and see Table 2.6-5 for the specific schedule.

Table 2.6-5 Integrated discharge standard of atmospheric pollutants (mg/m3)

Pollutant item	Concentration limiting value at irregular emissions monitoring points (mg/m3)

Other particulate matters (main urban districts)	1.0

(3) Noise

The noise during the construction phase shall be in accordance with *Emission Standard of Environment Noise for Boundary of Construction Site* (GB 12523-2011); see Table 2.6-7 for the reference value.

Table 2.6-5 Emission standard of environment noise for boundary of construction site (Unit: dB(A))

Daytime	Nighttime
70	55

2.7 Compliance analysis of relevant regionalpolicies and planning relating to the proposed project

2.7.1 Compliance analysis ofindustrialpolicies

As per *Catalogue for Guiding Industry Restructuring (2011 Version)* (as amended), "XXXVII, Other Service Industries: urban-rural community infrastructure service facilities and comprehensive service network construction" belongs to encouragement type.

2.7.2 Compliance analysis of laws, regulations and planning

(1) Compliance analysis of *Outline for the 13th Five-year Plan of National Economic and Social Development in Chongqing*

The *Outline* states that, leveraging on tourist attractions, blocks for walking, and public greenbelts, a multi-functional walking system integrating tourism, leisure, and fitness shall be created to enrich the travel modes of residents. The construction of barrier-free facilities shall be strengthened to guarantee the disabled with safe and convenient travel. ... Promote urban construction in line with high standards. It is required to coordinate the transformation of the old city and the construction of the new, enhance the transformation of shanty towns, orderly promote the urban dimensional development, optimize the environmental space, improve the urban quality, promote the overall coordination of architectural style, protect the urban skyline and water border line, and highlight the landscape of 'Mountain City' and 'River City'."

This project includes a footpath system and addition and improvement of urban public space and meets the requirements of the *Outline*.

(2) Compliance analysis of*Notice of Chongqing Municipal People's Government Office on Printing and Distributing Ecological Protection Red Line Delineation Scheme of Chongqing* (YFBF [2016] No. 230)

The *Notice* stipulates that: In order to protect and improve ecological functions, such as water source conservation, soil and water conservation, and biodiversity conservation, we shall strictly protect natural ecological space, which is the bottom line to guarantee ecological safety. The *Plan* includes "Key Ecological Function Area", "Ecologically Sensitive Area", "development Forbidden Area", and "Other Areas" in the ecological protection red lines. Among which, the other areas include "the Construction Forbidden Areas of the Four Mountains", "the Three Gorges Reservoir

Drawdown Areas", and "Eco-communal Forest Land", etc.. "The General Goal" is to " ... Protect the four major ecological protection zones, that is, Mount Daba, Mount Huaying, Mount Wuling and Mount Dalou, as well as the three major river systems, including Yangtze River, Jialing River, and Wujiang River, construct the "Four Screens and Three Belts" ecological space system which is multi-layer and grid-based with complete structure and functions ... , protects important ecological function areas, such as nature reserves, scenic areas, forest parks, wetland parks, and drinking water source conservation areas, etc., and reserve permanent ecological space..."

This project only involves the public space or conduct overall improvement in the newly built area and Caiyun Lake National Wetland Park with slight impact on Caiyun Lake National Wetland Park and the area in the ecological protection red lines.

(3) Compliance analysis of*Administrative Measures for National Wetland Park*

According to Article 19 of the *Measures*, unless otherwise provided by the State, the following behaviors are prohibited in national wetland parks:

(1) Opening, enclosing, filling, or draining wetland.

(2) Cutting off the wetland water source.

(3) Dredging and mining.

(4) Pouring toxic and hazardous substances, wastes, and garbage.

(5) Engaging in construction projects and development activities incompliant with the main function positioning, like real estate, resort, golf course, wind power generation, and photovoltaic power generation.

(6) Damaging wildlife habitats and migration conduits like fish migration conduit and capturing of wild animals and plants.

(7) Introducing foreign species.

(8) Grazing, fishing, soil extraction, taking water, sewage discharge, and freeing captive animals without authorization.

(9) Other activities that destroy wetlands and their ecological functions.

According to the upgrading design of the Caiyun Lake National Wetland Park, addition and improvement of sites, roads, buildings, and landscape, addition of water body area, green area, and wetland education facilities within the park do not constitute a violation of the *Measures*.

3. Project description

3.1 Project construction content

This project content covers two categories in total, wherein see Table 3.1-1 for the project content and see Figure 3.1-1 for the layout plan.

Table 3.1-1 Project construction content

Project type	Sub-project name	Project content	Drawing position index
Pedestrian walkway	Walking footpath project	Newly-built footpath from Caiyun Lake Park, through Olympic Sports Center, to Egongyan Park, with the length of 5.3km.	1
Public space improvements	Yangjiaping Street Committee public space improvement	Newly-built Kanglong Public Green Space with a total area of ***2.13*** hectares is divided into two lots, of which Lot A covers the area of 15,113m^2 and Lot B of 6,171m^2. The main construction content includes: i). Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); ii). Protection works; iii). Activity site and square; iv) Water and electricity pipe network and facilities; v) Landscape art (sculpture accessories, landscape wall, entrance landscape); vi) Function building and facilities (toilet and finished product management room); viii). Public furniture; ix) Road pavement and line; x). Signage	2
	Erlang Street Committee public space improvement	Newly-built Baitao Road Public Greenbelt with a total area of ***2.28*** hectares. *The main construction content same as above.*	3
		Newly-built Wutaishan Citizens' Public Greenbelt with a total area of ***4.81*** hectares. *The main construction content same as above.*	4
		Newly-built Longjingwan Public Greenbelt with a total area of ***1.28*** hectares. *The main construction content same as above.*	5
	Jiuilong Town public space improvement	Improvement of existing Caiyun Lake Wetland Park The park has a total area of ***110.26*** hectares. *The main construction content same as above.*	6
	Shiqiaopu Street Committee public space improvement	Newly-built Shimei Citizens' Public Greenbelt with a total area of ***4.55*** hectares. *The main construction content same as above.*	7
	Shipingqiao Street Committee	Newly-built Taohuaxi Sports Public Greenbelt with a total area of ***2.46*** hectares. *The main construction content same as above.*	8

Project type	Sub-project name	Project content	Drawing position index
	public space improvement	Newly-built Jiulong Community Park with a total area of ***19.31*** hectares. *The main construction content same as above.*	9
	Huayan Town public space improvement	Newly-built Tiao Huayan Riverside Park with a total area of ***1.29*** hectares. *The main construction content same as above.*	10

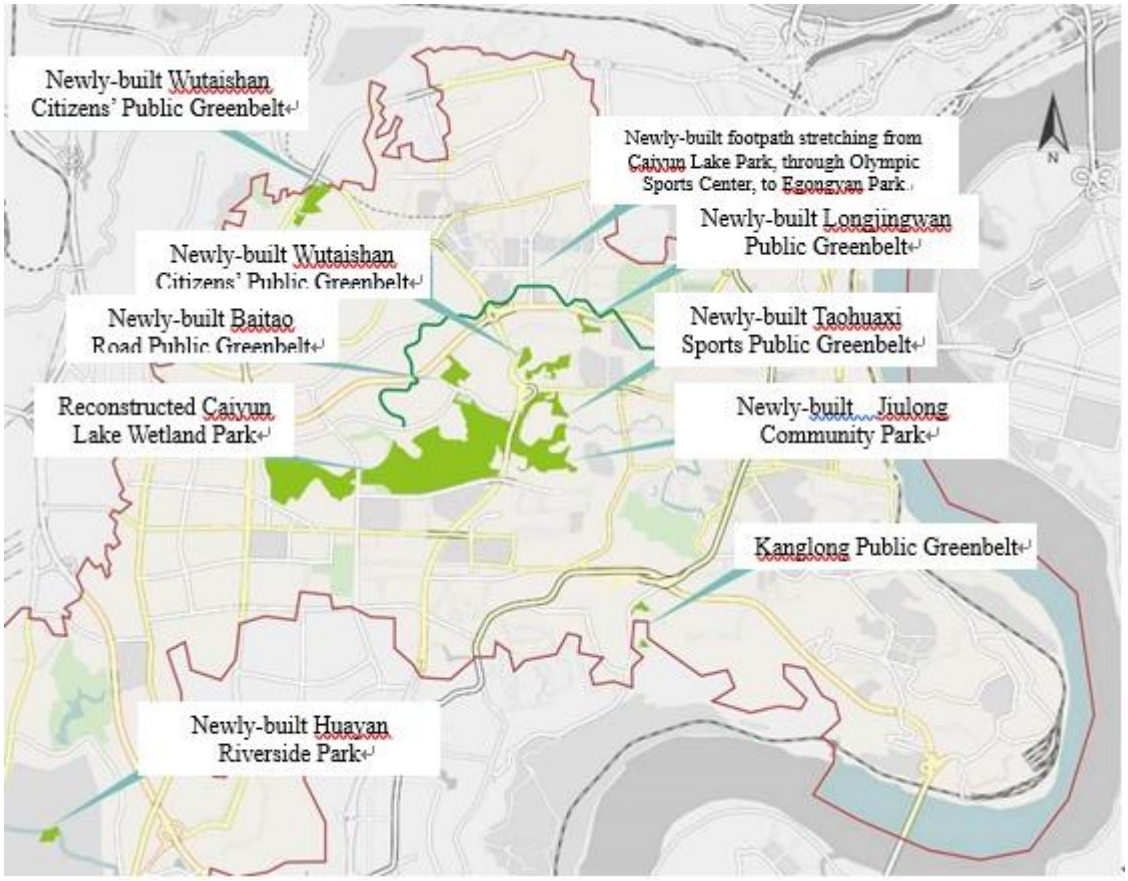


Figure 3.1-1 Jiulongpo District layout plan of each sub-project

3.2 Plan design

3.2.1 Slow-walking footpath

(1) The slow-walking footpath in core area of Jiulongpo District is an important livelihood project. The general planning length is about 21km and it is constructed by three phases. Due to scattered scenic areas and citizen activity nodes of Jiulongpo District, the footpath construction plays the threading effect, connects residents' communities, street greenland and historic sites along the way, provide nodes for citizens to quickly reach city and a safety gallery connecting public transportation. Meanwhile, the path system is an important means for road right division. It's generally divided into four sections, with themes of Old City Impression, Riverside Scenery, Taoyuan Scenery and Historical Relics.

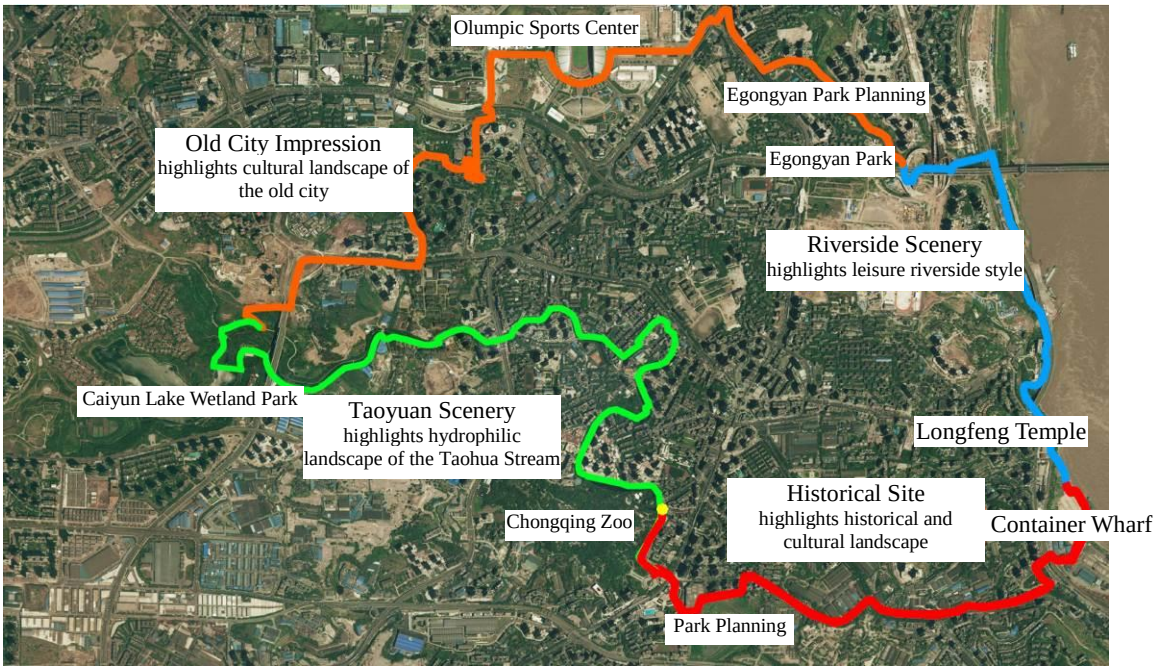


Figure 3.2-1 General planning of original footpath

Ring footpath in core area of Jiulongpo District has been implemented by sections, wherein:

① Taoyuan Scenery (Phase I) has been built with total length of 7.8km. The section is originated from Chongqing Zoo and ends at Caiyun Lake Wetland Park, with building area of about 80,000m^2. Taoyuan Scenery is a featured section reflecting Taohua Stream basin, centrally reflecting appropriate slow stream gallery landscape of Taohua Stream basin and creating healthy fitness ecological greenway for citizens.

② Riverside Scenery and Historical Site theme path (Phase II) has been built with total length of 7.9km. It's originated from Chongqing Zoo and passes by Tiema Park, Yangjiu Road Art Street, Huangfusheng Monument Park, Container Wharf, Longfeng Temple, Jiubin Road to Egongyan Park, with building area of about 78,600m^2.

(2) The slow-walking footpath financed by World Bank is phase III with planning length of 5.3km, with "Old City Impression" as the theme, building "Old City Impression Zone" with atmosphere of humanism. This section connecting greenland Phase II is originated from Egongyan Interchange and finally reaches Caiyun Lake Park of Wutai Mountain Interchange. After completion, the project will connect Egongyan Park and Caiyun Lake National Wetland Park, complete special recreation, fitness and ecological greenway network and form a closed ring with completed slow-walking system and build a complete ring slow-walking system of Jiulongpo District to serve more citizens.

The status of the established footpath is shown in Figure 3.2-2.

Figure 3.2-2 The status of the established footpath

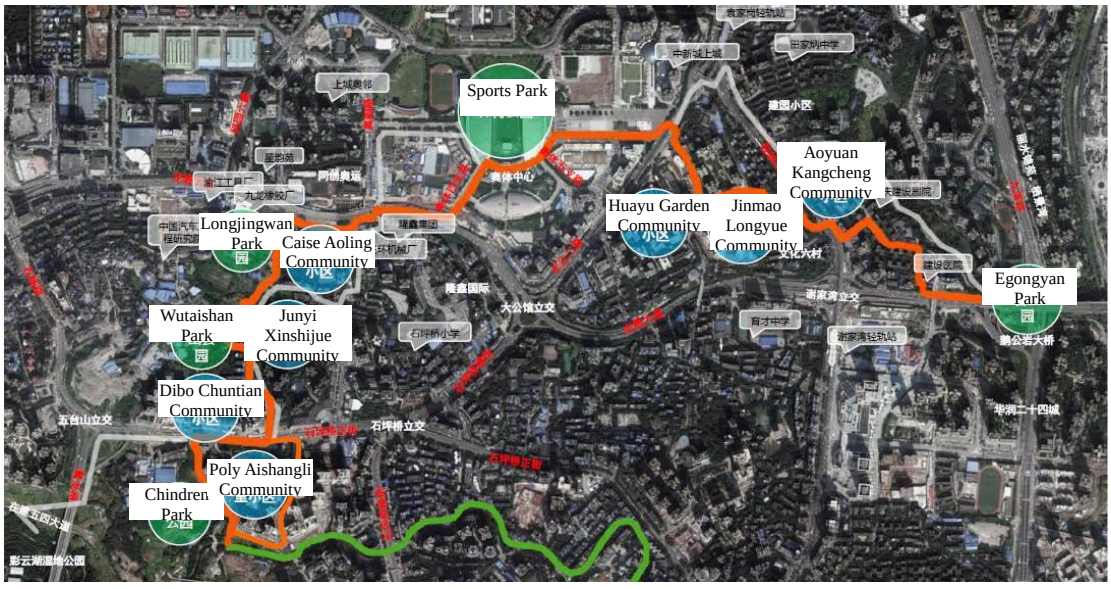


Figure 3.2-3 Original planning of footpath phase III project

As per feasibility study report, the overall route of footpath phase III is finally selected with length of 5.3km. As shown in Figure 3.2-4.

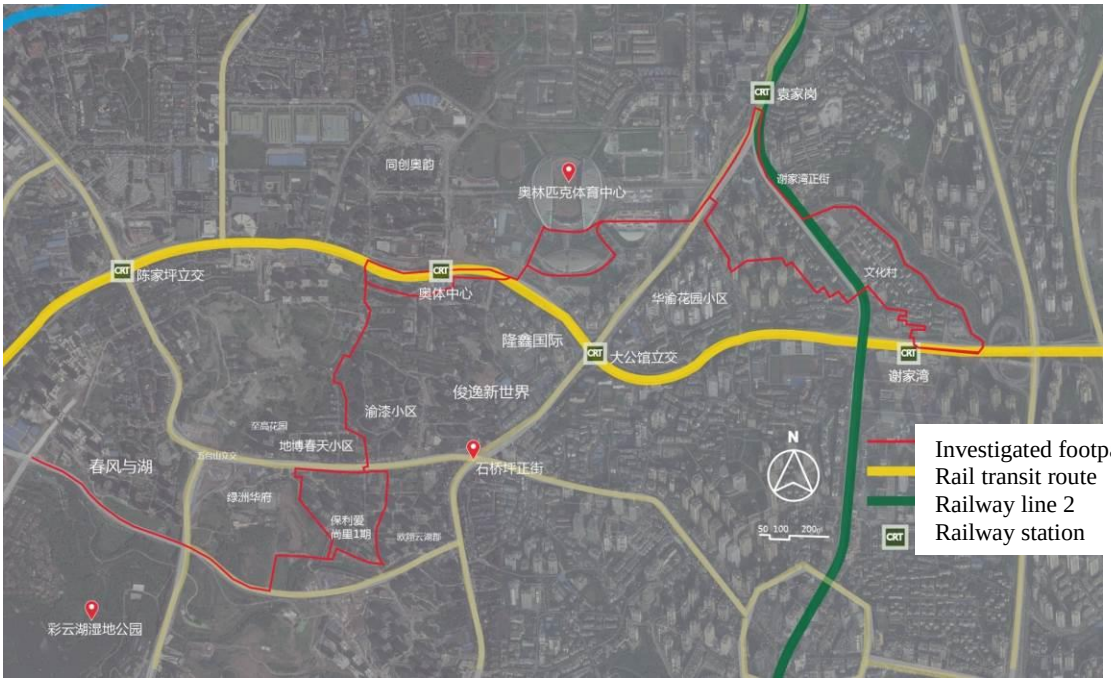


Figure 3.2-4 Phase-III line of footpath system

Figure 3.2-5 The status of the footpath phase III project

3.2.2 Public space quality improvement

(1) Kanglong Park

Kanglong Park occupies 2.13 hectares, where Kanglong Food Factory is located and it's demolished at present. There is high-voltage line tower at site. In the implementation process and using process, high-voltage line tower should be protected to ensure safety. Kanglong Park has two plots. Plot A is located at junction of Yangdu Road and Kanglong Road; Plot B is located at about 200m in the south of plot A and there is no vehicle road system nearby.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

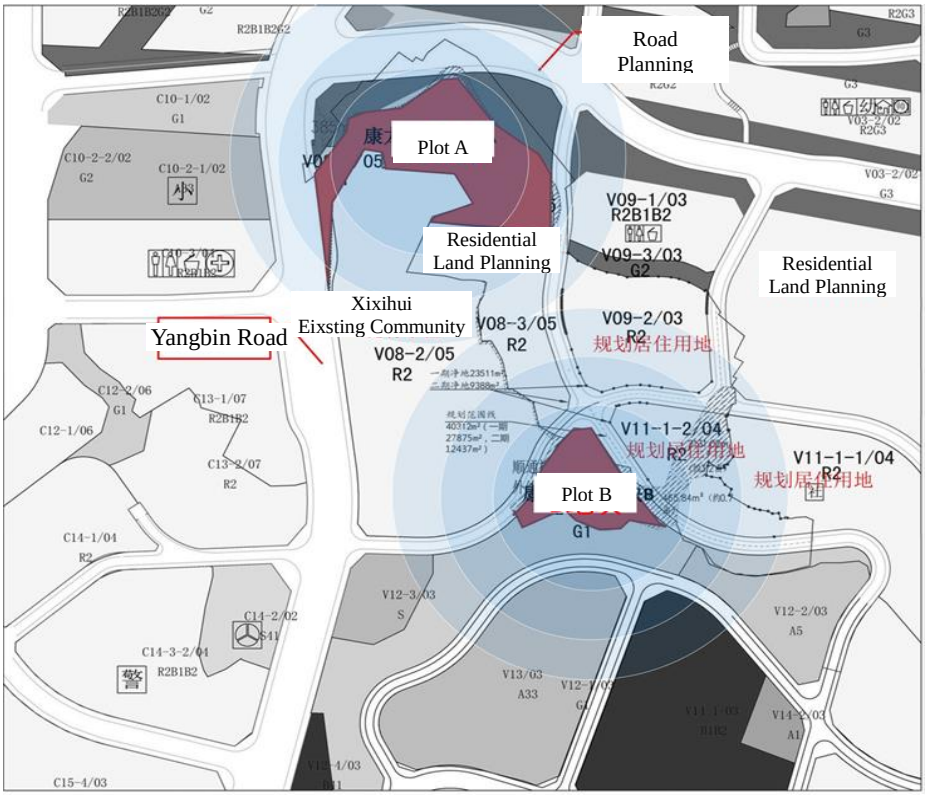


Figure 3.2-6 Current plot composition of Kanglong Park

Figure 3.2-7 Status of Kanglong Park District

Figure 3.2-8 General layout plan of Kanglong Park Plot A

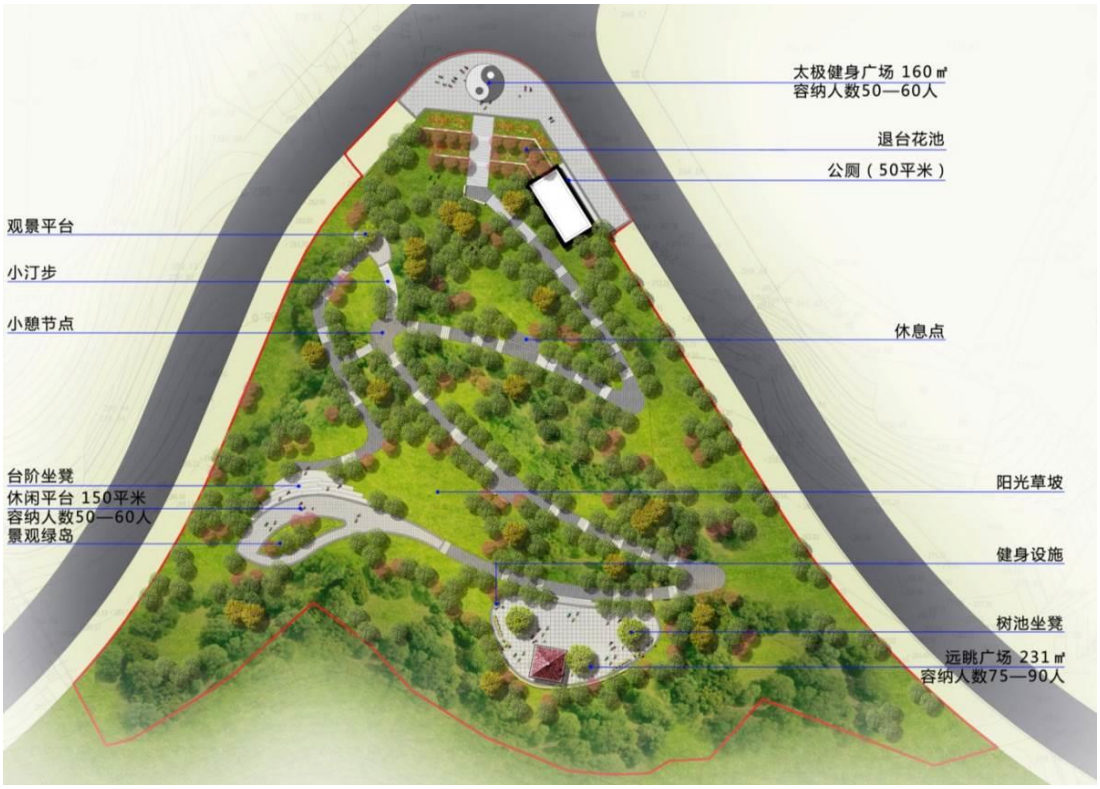


Figure 3.2-9 General layout plan of Kanglong Park Plot B

(2) Baitao Road Park

Baitao Road Park is located at the end of Baitao Road, occupying 2.78 hectares. At present, workshop and warehouse are rent. Due to city construction development, residential community has been built nearby and existing business type is not suitable for this area. Jiulongpo District plans to recover this area into greenland to serve surrounding residents, and has reached an consensus on relocation and removal of temporary building with the lessee.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-10 Status of Baitaolu Park Area

Figure 3.2-11 General layout plan of Baitao Road Park Project

(3) Wutaishan Park

Wutaishan Park occupies 4.8 hectares and it's located at the highest part of Shipingqiao Wutaishan Community and there are Shiyang Road, Xiechen Road, etc. below the site.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-12 Status Quo of Wutaishan Park

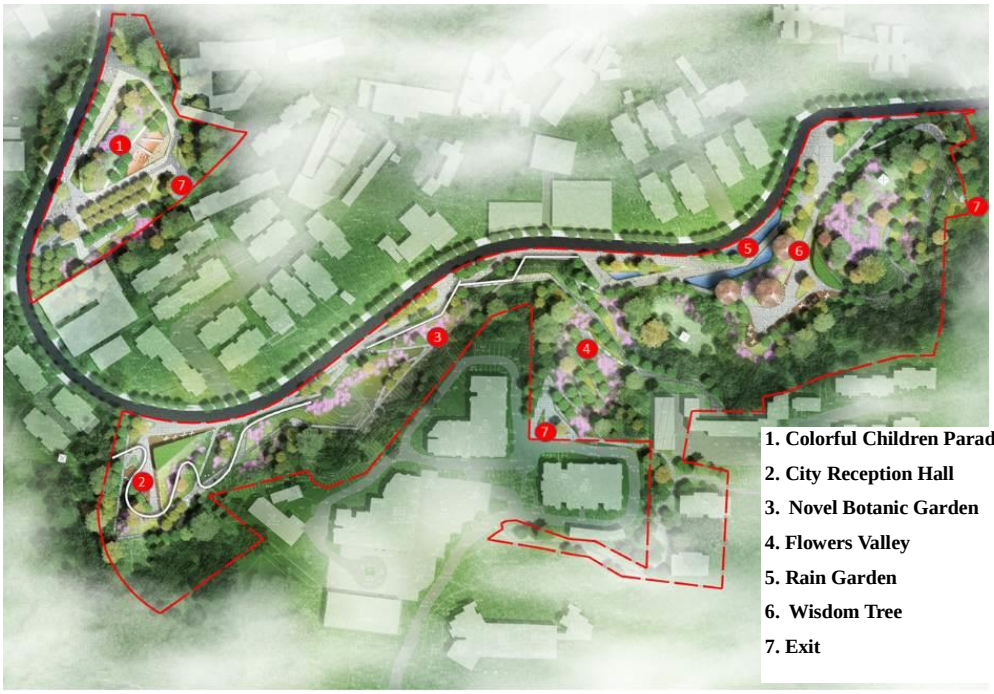


Figure 3.2-13 General layout plan of Wutaishan Park Project

(4) Longjingwan Park

Longjingwan Park occupies 1.28 hectares, is located below Longteng Avenue, and the terrain is slope. At present, it's cultivated by surrounding residents as vegetable land. The plot plays commuting function of two level spaces. One is to connect Shipingqiao Main Street---Wutaishan Community---Longteng Avenue; the other one is to connect Shipingqiao Main Street---Wutaishan Community---Olympic Sports Center. In the future, it's an important route connecting Wutaishan Community and rail transit and an important landscape of Longteng Avenue.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-14 Status of Longjingwan Park Area

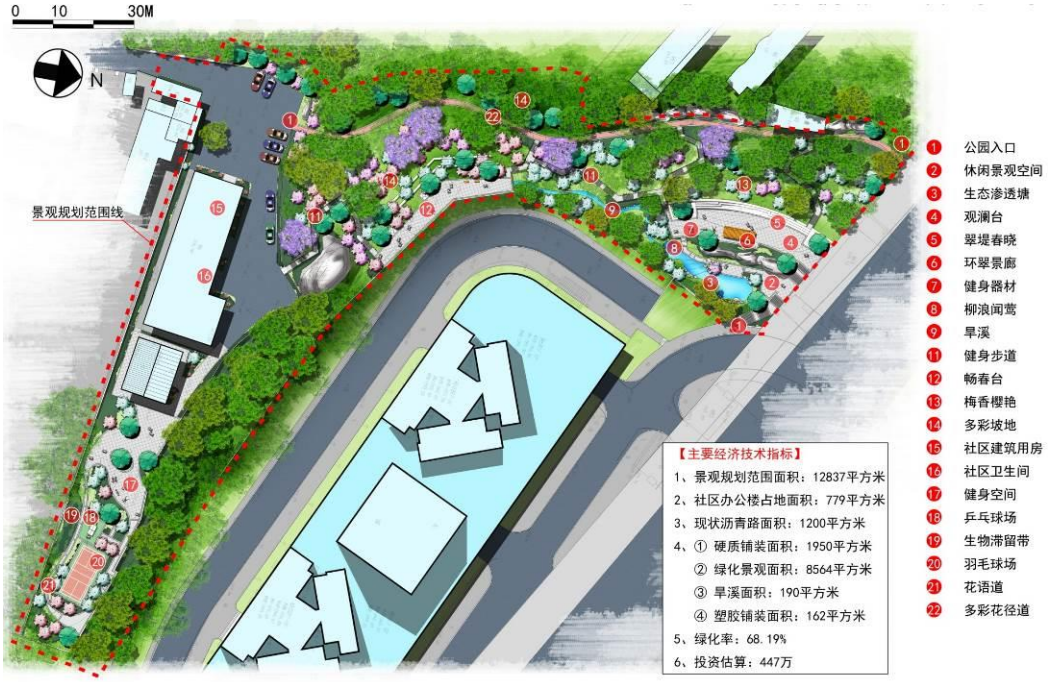


Figure 3.2-15 General layout plan of Caiyun Lake Wetland Park Project

(5) Caiyun Lake Wetland Park

Caiyun Lake is located at the junction of Jiulongpo District and High-tech Zone of Chongqing, Erlang Scientific New Town center, adjacent to Wusi Avenue in the northeast, and adjacent to Panlong Avenue in the south, Yingbin Avenue in the west, and connects Yilong Road, Green Road Phase I of Jiulongpo Core Area, with Chentuo Bridge passing through east of park. With the advance of urbanization, and extensive management of park, the existing functions of Caiyun Lake National Wetland Park cannot meet basic demand of citizens. Caiyun Lake National Wetland Park should be upgraded and developed from medium and low end to medium and high-end.

Caiyun Lake National Wetland Park is upgraded and dividied into third phases, the phase I has been completed at present, the phase II and III will be constrcted with World Bank financed. The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-16 Status of Caiyun Lake Wetland Park

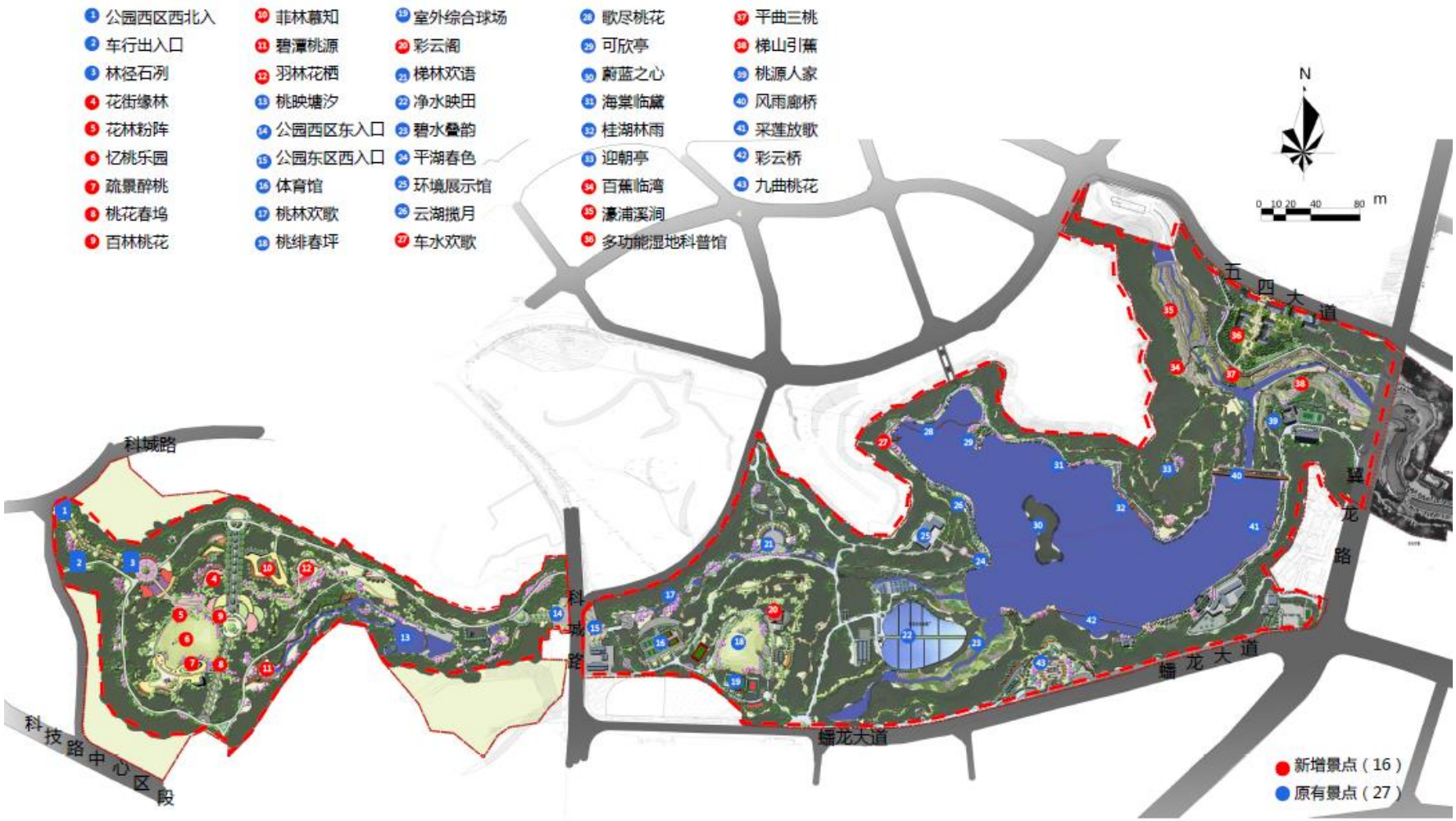


Figure 3.2-17 General layout plan of Caiyun Lake Wetland Park

(6) Shimei Park

Shimei Park occupies 4.55 hectares, it's located beside Jingwei Avenue, adjacent to Gaomiaocun Station of Rail Transit Line 1 and it's highly accessible by surrounding residents by park and public rail transit connection. Shimei Park is at the junction of Jiulongpo District and Shapingba District and the first city landscape exhibition from Shapingba District to Jiulongpo District. At present, it is vegetable land, and there is high-voltage line tower in the plot, i.e. a part of plot is high-voltage line corridor, which should be avoided in the future implementation process.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.




Figure 3.2-18 Current Status of Shimei Park

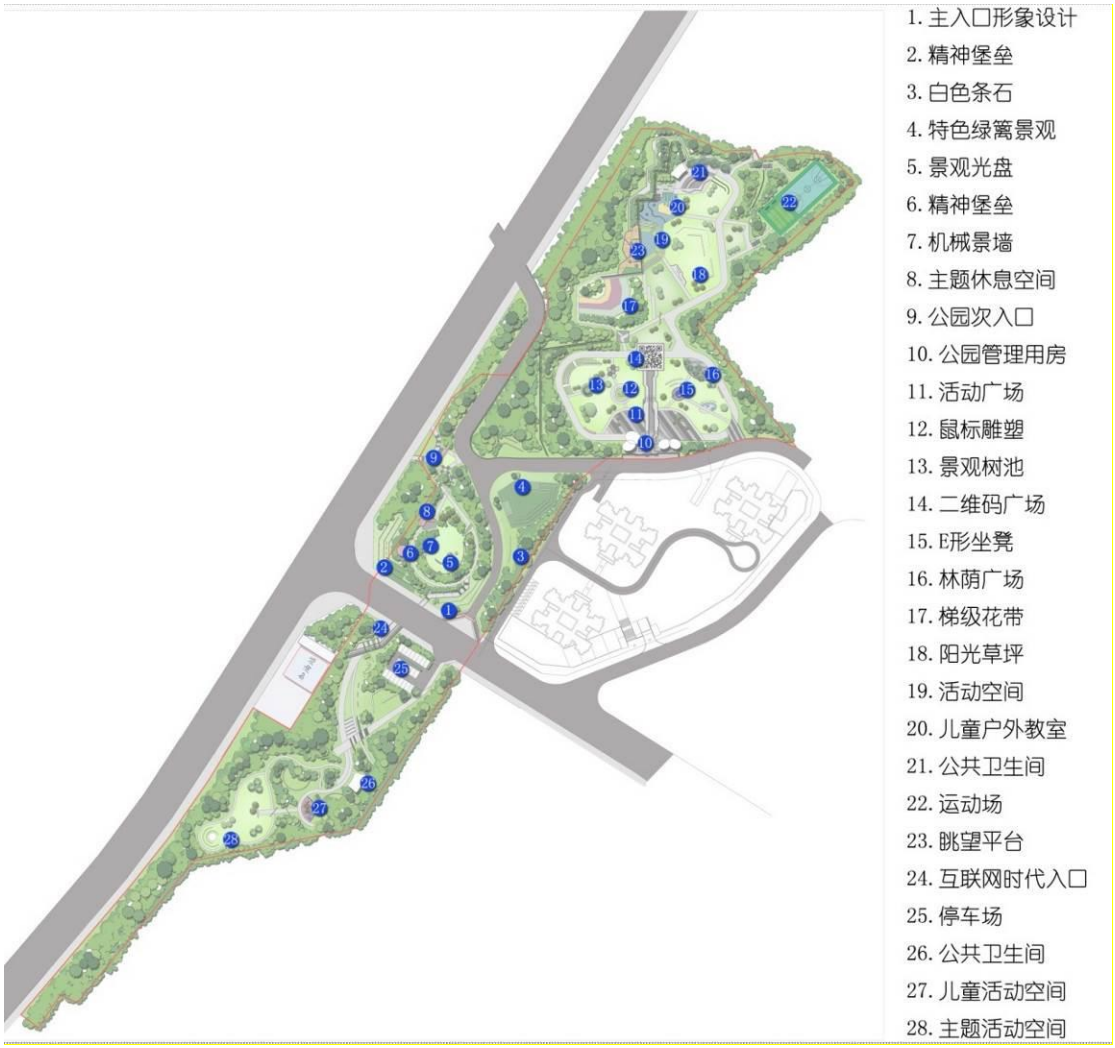


Figure 3.2-19 General layout plan of Shimei Park

(7) Taohua Stream Sport Park

Taohua StreamSport Park occupies 2.46 hectares, it is currently vegetable land and trench valley terrain. The park is in the center of surrounding community, enjoys convenient transportation in the future with two city transportation like Wutaishan Interchange/Shipingqiao

main street. There are Jinhai Xitiecheng/Caiyun Lake Community/Poly Aishangli communities nearby.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-20 Status Quo of Peach Blossom Creek Moving Park Area

Figure 3.2-21 General layout plan of Taohua Stream Sport Park Project

(8) Jiulong Community Park

Jiulong Community Park occupies 15.25 hectares and it is vegetable land at present. There is river passing through and the plot is adjacent to Caiyun Lake Wetland Park and Taohua StreamSport Park.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-22 Status Quo of Kowloon Community Park District

Figure 3.2-23 General layout plan of Jiulong Community Park

(9) Huayan Riverside Park

Riverside park of Tiaodeng River occupies 1.29 hectares. It is located at opposite of Huayan Diecai West City and beside demonstration section of Tiaodeng River. Newly built demonstration section of Tiaodeng River has good effect in landscape. The scope of World Bank Financed project includes ecological landscape construction and restoration after river regulation, providing a good ecological environment for residents at two banks.

The main proposed construction content includes: 1. Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function building and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.

Figure 3.2-24 Status Quo of Huayan Binhe Park

Figure 3.2-25 General layout and sketch map for Huayan Riverside Park

3.3 Construction methods

3.3.1 Construction conditions

(1) Water, power and communication for construction

This project is located in the city proper, which has superior water and power conditions for construction; and the construction water is the municipal network water supply. The power in the construction area is directly supplied by the local power grid, while communication takes the mode of radio communication.

(2) Building materials

The building materials in the vicinity shall suffice for the project with bricks, tiles, rock, gravel, lime, cement etc. all purchased externally and the transportation conditions shall be good.

(3) Labor resource condition

Chongqing belongs to the western region and boasts rich human resource, so as for this project the labor resource required can be easily gotten.

(4) Construction machinery

The main construction machinery in this project contains auto truck, vibrator, hoist, bulldozer, agitator etc. provided by the construction units or leased in the vicinity.

3.3.2 Construction process

In accordance with the foregoing introduction, this sub-project includes 3 aspects in total, wherein the construction content related to civil engineering or possibly producing environmental effects covers infrastructure, plaza, sidewalk and road transformation such as water supply and sewage pipe under “footpath system construction” and “quality improvemet of public space” It mainly includes the construction processes such as rock-earth excavation, connection road (vehicle lane) construction, footpath and site pavement, pipe laying, sub-district facility installation and greening.

(1) Rock-earth excavation process

The project will try to employ the original lanform to reduce the earth-rock excavation with the earth-rock excavation construction process as follows: mark off the excavation line and excavation slope → excavate graded slope → trim the slope surface → temporary protection →construction completion.

(2) Road engineering construction process

The basic procedure of the road engineering construction mainly includes: roadbed excavation → roadbed leveling → road bedding cushion → road base → road deck → construction completion.

(3) Construction process of footpath and site pavement

The construction process of footpath and site pavement is as follows: mark off the excavation line → earth excavation → lay down cushion → lay down pavement material → check pavement → site clearance → construction completion.

(4) Construction process of buildings

The construction process of buildings is as follows: roadbed excavation of buildings → shuttering installation → construction of reinforced concrete →shuttering dismantlement → infill wall →interior trimming→equipment installation→construction completion.

(5) Greening landscape construction process

The construction process of greening landscape is as follows: mark off the greening area → level earth covering →excavate pits → transplant arbors → transplant bush or sow the grass seeds → temporary covering →construction completion.

3.3.3 Construction layout

The project construction process is quite simple, and construction site is respectively set at permanent land of project and area can meet construction site layout requirement. Arrange rebar processing room, material storage yard and equipment storage yard; adopt board room structures for construction office area and management room and material room; use commodity concrete and not set concrete mixing station.

The project is located in the city center. Construction workers can rent houses in the city rather than separately set the living camp. There is no house rental area nearby. Construction workers set up temporary colored steel house around the route.

3.3.4 Project implementation plan

Jiulongpo District People's Government shall set up the World Bank Project Construction Management Group to implement the project. The World Bank Project Construction Management Group is responsible for construction scheme planning, project application, investment fund raising, bidding organization, project management and completion acceptance and so on. The engineering supervision system shall be implemented for subproject infrastructure as per legal documents relating to engineering supervision issued by the Ministry of Construction. Project supervision organization entrusted by bidding must possess qualification certificate of

corresponding qualification level. The project executing organization will assign a representative to properly control the progress, quality and expenses of various infrastructures with the supervision organization. After completion acceptance, the project shall be handed over to the functional department for operation and maintenance.

The project construction cycle is 60 months; including early preparation and survey and design of 6 months, construction period of 54 months. It's implemented from July 2018 and completed in June 2023. Wherein: 2018.7-2018.12 is the early phase of project, complete project preliminary approval, approval and survey design, bidding, etc.; 2019.1-2023.6 is the construction phase; at the end of June 2023, complete project construction and completion acceptance.

See Table 3.3-1 for detailed implementation schedule.

Table 3.3-1 Project implementation schedule

Project categorization	Sub-district name	Project name	Engineering construction	
			Kick-off time	Completion time
Footpath system		Phase-III Construction of the Footpath System	April 15, 2022	April 15, 2023
Quality improvement of public space	Yangjiaping	Newly built Kanglong public greenbelt	December 15, 2018	June 15, 2019
	Shipingqiao	Newly built Baitao Road public greenbelt	December 15, 2019	June 15, 2020
		Newly built Taohuaxi Sports public greenbelt	December 15, 2019	June 15, 2020
		Newly built Caiyun Lake International Community	December 15, 2019	December 15, 2021
		Reconstructed Caiyun Lake Wetland Park	January 15, 2020	October 15, 2020
	Shiqiaopu	Newly built Shimei citizens' public greenbelt	January 15, 2020	July 15, 2021
		Newly built Longjingwan public greenbelt	January 15, 2020	June 15, 2020
		Newly built Wutaishan citizens' public greenbelt	December 15, 2019	December 15, 2020
	Huayan	Newly built Huayan Riverside Park	January 15, 2020	June 15, 2020

3.4 Project land occupied and earthwork

(1) Quantity of project land occupied

The construction land covers a total area of 149.31hm^2 and the occupied land types are mainly paddy field, arid land, other forestry, other meadow, rural cartilage, road land, pond water surface and hydraulic architecture land, involving no new land acquisition .

(2) Earthwork volume

In accordance with the project conditions, the engineering earthwork within the construction scope can be deployed or transferred between the parks and fully used for landfill without discard and it is unnecessary to set the borrow or spoil ground.

3.5 Environmental factors and pollution source intensity analysis

3.5.1 Construction-phase analysis on environmental pollution factors

(1) Water environment

The main sewage during construction mainly contains construction wastewater and domestic sewage of construction staff.

① Construction wastewater

The concrete applied in this project is commercial concrete and no large concrete mixer is set in the construction site, and the construction wastewater mainly includes concrete curing wastewater, wastewater from washing the transportation vehicle tires, and oily wastewater produced from construction machinery repair. The main pollutants are SS and petroleum with the SS concentration of approx. 1,500 to 20,000mg/L and the petroleum concentration of approx. 20 to 50mg/L. Meanwhile, as construction leads to topsoil looseness in the construction area, it is prone to suffer rainfall scouring resulting in SS concentration increase in the surface runoff.

② Construction staff domestic sewage

In accordance with the project construction, about 30 workers carry out construction in the site every day and their domestic sewage discharge is calculated under the formula:

$$Qs=（kq_1v_1）/1000$$

Wherein:

Q_s - living district sewage discharge in t/d;

q_1 - daily domestic sewage quota per person (select and use Table C2, Appendix C, JTJ005-96) in L/(person·d) and this figure takes 100 for this assessment;

v_1 - the number of people in the site, in person;

K - The discharge coefficient in the life and service district, it generally ranges from 0.6 to 0.9 and this figure takes 0.8 for this assessment.

Through calculation, the domestic sewage output is approx. 2.4m^3/d during the project construction. The main pollutants in the domestic sewage are COD, BOD_5, SS and NH_3-N

respectively with their concentrations of approx. 300mg/L, 180mg/L, 250mg/L and 30mg/L, and the corresponding pollutant outputs are 0.72kg/d, 0.43kg/d, 0.60kg/d and 0.07kg/d.

(2) Ambient air

The project during the construction involves road construction in the parks and the main pollutants affecting environmental air are TSP and asphalt fume in the construction process. The main pollution steps involve the work process of asphalt pavement, material transportation and pile-up, earthwork excavation and backfill etc. and each step mentioned above will produce TSP and asphalt fume pollution to the construction sites and the surroundings under the wind force. In addition, the construction machinery will produce off-gas and the transportation vehicle travel will produce the secondary dust pollution on the road and the domestic fuel combustion may generate fume.

①Asphalt fume

The project pavement construction takes modified asphalt concrete and there is no asphalt melting station in the site, but only slight asphalt fume is discharged in the spreading process.

② Dust

The dust during construction mainly comes from earthwork or rockwork excavation, construction activity disturbance, and loading, unloading and vehicle transportation of construction materials in bulk such as cement, sand and gravel. The dust source intensity from construction section and running vehicles is related to construction strength, pavement status and weather conditions. Dust concentration gradually decreases with the distance increase.

③ Construction machinery off-gas

Various fuel construction machines and transportation vehicles emit slight off-gas during the construction and transportation, with the main pollutants of CO and NO_2.

④ Analysis on effects of domestic fuel fume

The domestic fuel will produce slight fume and this project takes liquefied gas as energy, while the liquefied gas belongs to clean energy and the fume produced from combustion has limited effects on environmental air.

(3) Noise

During the construction, the work machinery such as excavator and motorlorry is the main noise source. Such sudden instable noise sources may produce big effects on the surroundings to perturb the residents' normal life. See Table 3.5-1 for the main noise source noise values.

Table 3.5-1 Main construction machinery noise source intensity

SN	Device name	Distance from test point to construction machine	Maximum sound level (dB (A))	Running mode
1	Loader	5	90	Mobile device
2	Bulldozer	5	86	Mobile device

SN	Device name	Distance from test point to construction machine	Maximum sound level (dB (A))	Running mode
3	Excavator	5	84	Mobile device
4	Concrete tank car	5	85	Mobile device
5	Motorlorry	5	85	Mobile device
6	Vibrating roller	5	86	Mobile device
7	Tire roller	5	76	Mobile device
8	Spreading machine	5	82	Mobile device
9	Impact type driller	1	87	Mobile device
10	Air compressor	1	85	Mobile device
11	Diesel generator	1	98	Mobile device

(4) Solid waste

The solid waste during the construction mainly contains earthwork spoil and domestic garbage.

All the earthwork can be transferred within the park and from other parks for landfill without earthwork spoil.

The domestic garbage output of construction staff is 15kg/d providing the domestic garbage produced during construction is calculated to 0.5kg/person •d.

(5) Ecological environment

This construction project highlights effects on the ecological environment. The effects of this project on ecological environment during construction are embodied in the following aspects:

① Construction land requisitioned and occupied may damage the existing plant resource and vegetation around the project line and further change the existing land utilization nature;

② Excavation, landfill and temporary spoil during construction will lead to water loss and soil erosion.

3.5.2 Environmental pollution factor analysis in the operational phase

The public space during the project operational phase may produce slight domestic sewage, solid waste and social life noise and exhaust gas from the minor off-gas and dust of the parkings, and bad smell of the public toilets and biochemical pool.

(1) Waste water

The operational phase wastewater mainly comes from the domestic sewage produced by urban residents in the public space. The public space improvement project includes 9 parks and produces the sewage of 1.8m^3/d in total providing the average sewage output per public space is 200L/d for calculation.

(2) Exhaust gas

The exhaust gas during the project operational phase mainly includes the off-gas and dust

from the parkings, and bad smell from the public toilets and biochemical pool. The exhaust gas is overall dispersed, so it will not be evaluated. The during the operational phase only produces slightly impact on the air environment.

(3) Noise

The noise pollution sources during the operational phase are mainly the social life noise from the public space and the road traffic noise. The social life noise source has its intensity of approx. 60-80dB(A) and generally satisfies the corresponding functional zone requirements of acoustic environment, leading to the slight effects on the circumstances. The road traffic noise will increase with the increase of traffic flow. However, the roads are parks supporting roads with limited traffic and have little impact on the environment.

(4) Solid waste

The solid waste during the operational phase mainly comes from the domestic garbage produced by the urban residents in the public space. The public space quality improvement project includes 9 parks, while it produces the total domestic garbage of 0.36t/d providing the average domestic garbage produced per public space is 40kg/d.

4 Natural, social and economic environment overview

4.1 Natural environment overview

4.1.1 Geographical location

Jiulongpo District is located in the west of main urban area of Chongqing, adjacent to Yuzhong District in the east, borders on Dadukou District in the south, connects with Bishan County and Jiangjin District in the west and adjacent to Shapingba District in the north. It's located in the east longitude 106°14'52"~106°32'55" and in north latitude 29°15'29"~29°33'44". The longest east-west distance is 29.6km and longest south-north distance is 34.1km and total area is 432km^2.

4.1.2 Landform

Jinyunshan is wriggling at western border, Zhongliangshan lie across the center, which divides the district into east and west parts. Jiulongpo District belongs to south extension of Huayingshan ribbon fold. Anticline forms mountains and syncline forms valleys. The anticlinal structure generally forms the middle and low mountains, the two flanks are open and it's mainly round middle and low hills. Low anticline hill covers an area of 105.8km^2, occupying 24.56%; the syncline hill covers an area of 303.2km^2, occupying 70.2%. The general terrain of district is inclining from north to south and the elevation is generally 250-450m. The elevation of the highest point is 692.8m, the elevation of the lowest point is 169.25m and relative height difference is 523.55m.

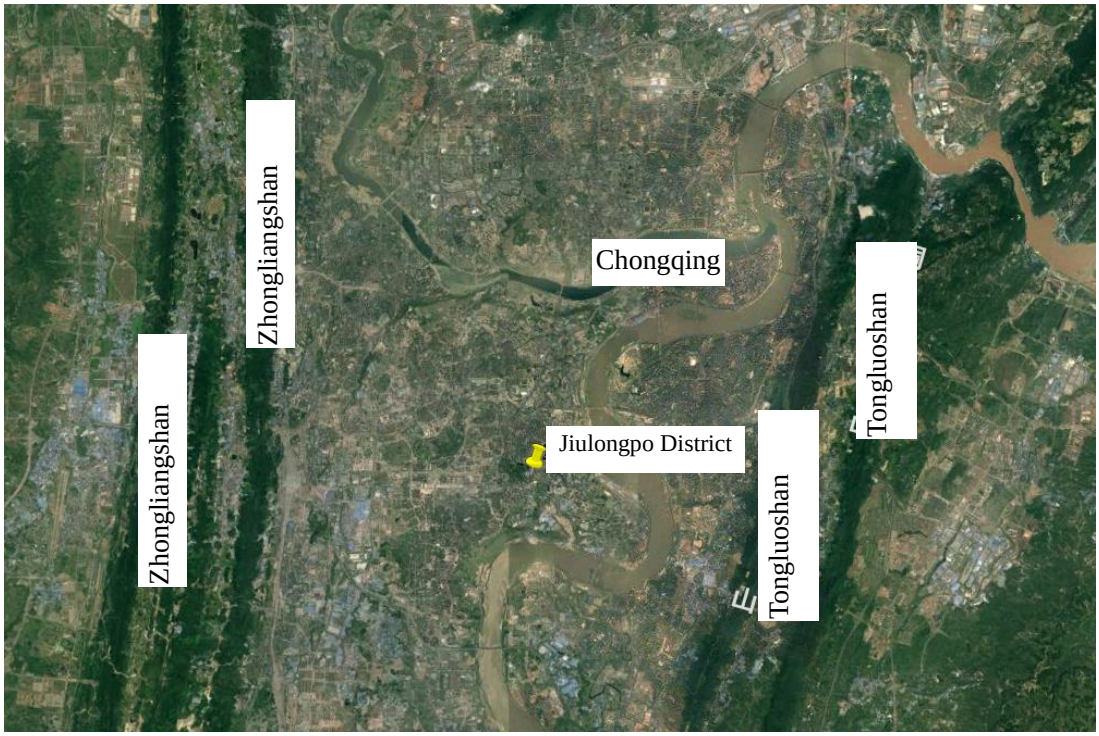


Figure 4.1-1 Jiulongpo District topographic map

4.1.3 Formation lithology

The internal exposure strata of Jiulongpo District is sedimentary rock, mainly including

Triassic system, Jurassic system and Quaternary strata. The total thickness of strata is 3,338-6,014m. Jurassic sand and mudstone are the most widely distributed in syncline hills; Triassic system upper Xujia River sand and shale are mainly distributed at two wings of anticline; Triassic system middle and lower carbonate with clastic rock is mainly distributed at axis of anticline; the Quaternary system is sporadically distributed in surface of main urban area.

4.1.4 Geological structure

The geological structure of Jiulongpo District belongs to East Sichuan virgation Huayingshan brush shape arc structure and it's composed of NNE close anticline and open and loose syncline structure, with block structure characteristics. The anticline has unsymmetrical two wings and the axis is bent in "S"-shape. From west to east, Bishan syncline, Wentang Gorge anticline, Beibei anticline, Guanyin Gorge anticline, Jin'ao Temple syncline, Yuelai syncline, Longwang Cave anticline, Ciqikou syncline, South Hot Spring anticline, Dashengchang syncline and Mingyue Gorge anticline are distributed successively. The fault is mainly distributed in the limestone strata of Guanyin Gorge anticlinal axis and steep wing.

4.1.5 Seism

As per Map A1 in GB18306-2015 Chinese Seismic Peak Acceleration Zoning Map (1/4,000,000) and Map B1 in GB18306-2015 Chinese Seismic Peak Response Spectrum Characteristic Period Zoning Map (1/4,000,000), the seismic peak acceleration of the area is 0.05g, the response spectrum characteristic period is 0.35s and the seismic basic intensity is VI.

4.1.6 Climate and weather

Jiulongpo District is located in the Sichuan Basin. It is a subtropical monsoon humid climate, with abundant water and heat (rain season and hot season), less sunshine and long frost free period. It's cold in early spring, hot in summer, raining frequently in autumn and foggy in winter. The annual average temperature is 16℃～18℃ and the frost-free season of a year is about 340 days.

4.1.7 Hydrology

The Yangtze River flows from the south of jurisdiction area to the east and northeast, gathering tributaries like Taohuaxi, Motan River and Daxi Rvier, it's generally developing in southeast-southwest direction. Liangtan River joins Jialing River out of the district.

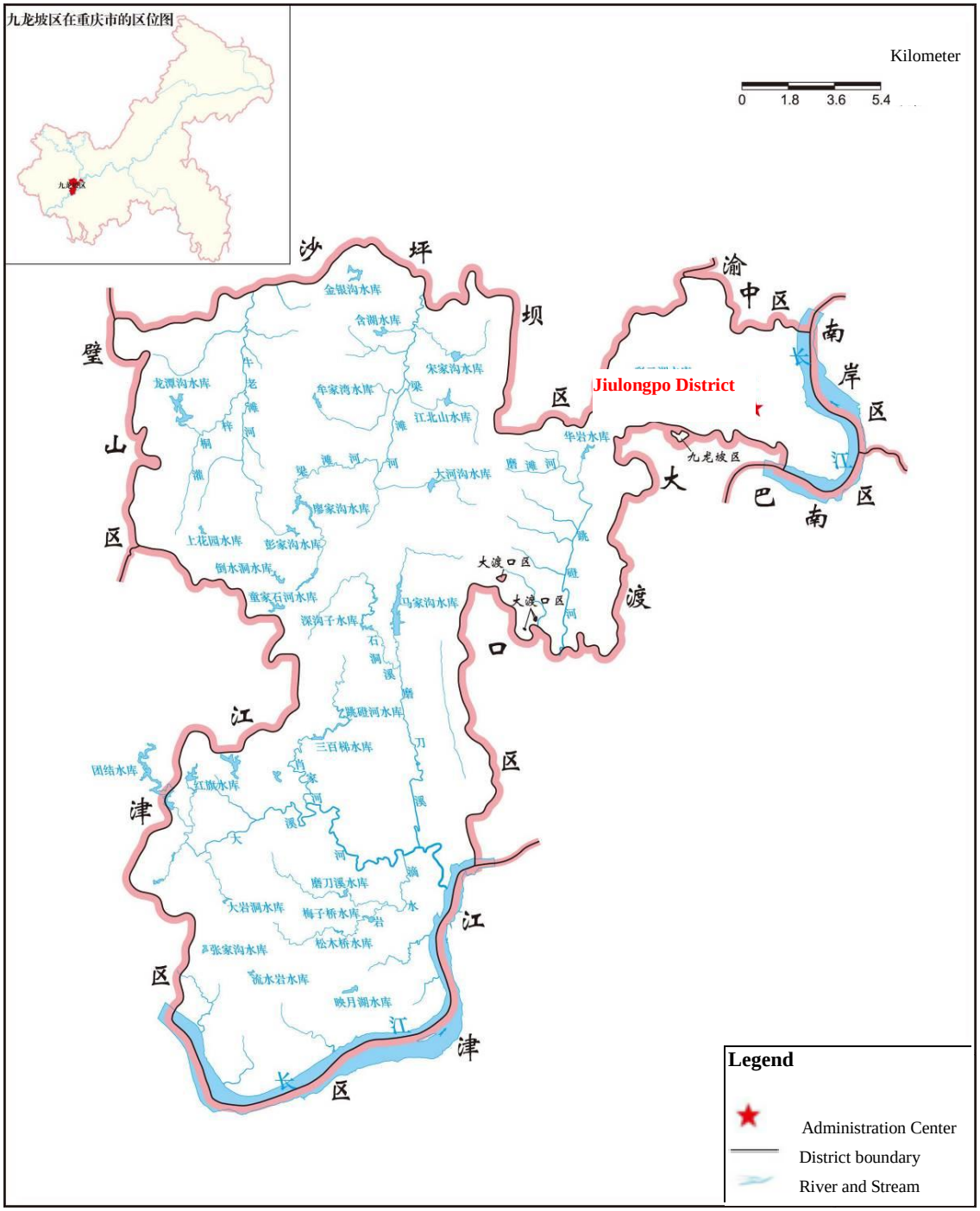


Figure 4.1-2 Jiulongpo District surface water system

4.2 Ecological environment overview

4.2.1 Ecological function zoning

According to the *Chongqing Ecological Function Zoning*, Jiulongpo District is classified as the IV Urban artificial regulation ecological zone - IV_1 City ecological regulation sub-zone in urban area - IV_{1-1} Ecological function zone of core urban ecological restoration. IV_{1-1} Ecological function zone of core urban ecological restoration covers mainly the core urban built-up area whose primary function is ecological restoration.

This ecological function zone consists of Yuzhong District, Dadukou District, Jiangbei

District, Shapingba District, Jiulongpo District and Nan'an District, covering an area of 1,440.68km^2. Its major function is the coexistence of urban artificial ecosystem and agricultural ecosystem. The landscape is dominated by hills and plains. The forest coverage rate is 28.2%. Many rivers such as the Yangtze River and the Jialing River flow through this area, and the quantity of accumulative annual average surface water resource is 742 million m^3. The towns, industrial and mining sites in the area are densely distributed, while the forest coverage rate is relatively low, and the ecosystem is seriously affected by human activities. The focus of ecological protection in this area is the forest and green space resources of "Four Mountains" (Jinyunshan, Zhongliangshan, Tongluoshan and Mingyueshan) area.

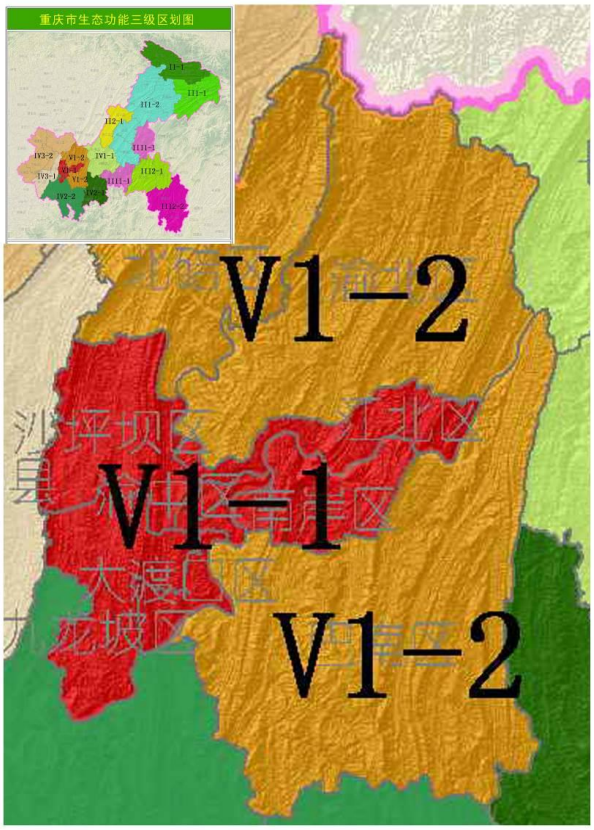


Figure 4.1-3 Three-level zoning of ecological function area

The dominant ecological function is ecological restoration. The auxiliary functions include water and air pollution control, landscaping and urban ecological protection. The leading direction of ecological function protection and construction is ecological restoration, pollution control and prevention, and landscaping.

The key task is to improve the industrial structure and repair the partial pollution damage first, and then exercise a strict control over the discharge of industrial and domestic wastewater. Comprehensive treatment should be implemented on abandoned mining areas to restore the ecological function of these areas. Strict ecological environment protection should be carried out in "Four Mountains" area. Circular economy and ecological industries should be strongly encouraged. The protection of natural resources should be improved. The stringent protection of

forest and green space resources in the “Four Mountains” area should be carried out in combination with the forest city project; the stringent protection of the core areas of nature reserves, scenic spots and forest parks of all levels also is requisite; crucial water areas such as the Yangtze River and the Jialing River in the district must be protected with maximum effort.

4.2.2 The status quo of terrestrial plant resource

The floristic composition of Jiulongpo District belongs to holarctic region. China-Japan forest plant subregion is a core part of China-Japan forest plant flora. In China's vegetation regionalization, it belongs to China subtropical evergreen broad-leaved forest, Sichuan east basin and southwest mountain evergreen broad-leaved forest zone. Mainly vegetation types include evergreen broad-leaf forest, coniferous forest, mixed coniferous broad leaved forest, mixed broad leaved wood, shrubwood, mountain shrubby meadow, river bank meadow and farmland vegetation and so on. The total area of forestry land is 3,977.0 hectares, wherein, the low-yielding forest land is 1,313.4 hectares, accounting for 33.02% of the total area of forest land of the district. Wherein, the low-yielding forest land is 973.11 hectares, the low-yielding shrubland is 337.19 hectares, the low-yielding open forest land is 3.1 hectares, respectively occupying 74.09%, 25.67% and 0.24% of low-yielding forest land. The forest coverage is 24%. Forest vegetation mainly includes masson pine and fir and there are mostly cypress in the limestone distribution area. The evergreen broad-leaf forest is in local fragments of Jinyunshan and Zhongliangshan, including main trees like camphor tree, nanmu, katus, oak, etc.

Most of the native vegetation is destroyed, and it's only rarely distributed in valleys with inconvenient transportation. As for secondary vegetation, the masson pine forest is the most widely distributed, forming subtropical coniferous forest landscape. Secondly, it's mixed forest of pine, fir and cypress with evergreen broad-leaved camphor tree, nanmu, katus, oak, etc. Bamboo mainly includes sinocalamus affinis, fishscale bamboo and few phyllostachys pubescens. Deciduous broad-leaved forest mainly includes oak and maple forest. Bushwood mainly includes rhododendron shrub, wild bush mainly includes five-leaved chaste tree, Coriaria sinica, Rhododendron gardenia, daphne odera, Lycium barbarum, cornel, pyracantha fortuneana, etc.

Plants in the district are divided as per economic usage: mainly 18 commercial tree species, 282 forest plants, 40 medicinal plants and 27 economic tree species. Jiulongpo District is located in the transition zone of north and south climatic type, which is suitable for many kinds of vegetable growth and development. The area is a subtropical evergreen fruit tree and warm temperate fruit tree planting area. There are many fruit tree production variety resources, mainly including peach, plum, pear, orange, grape, chestnut, walnut, date, cherry, etc. Peach, plum, apple, persimmon, etc.

As per site survey, zonal vegetation in the project area is degraded by long-term human activities. Existing vegetation mainly includes manually planted trees, secondary shrubs and natural weed. There are no rare and precious plants, famous and ancient trees. The evergreen broad-leaved forest is mainly distributed in the area around the front and back of the residential

area, and gentle slope around the dry land. Most forest are artificially planted. Tree species mainly include schima superba, Erythrina indica, sinocalamus affinis, ficus virens, ficus microcarpa, camphor (artificially planted), Koelreuteria paniculata, paper mulberry, melia azedarach, cedrela sinensis, etc. Economic fruit wood forest is sporadically distributed. Nurseries mainly include Ficus microcarpa and sweet-scented osmanthus. There is a small area of fruit trees and it's sporadically distributed. It mainly includes orange, pear, loquat, etc. The scrub-grassland is distributed nearby barren land and barren slope and roadside. Advantageous species mainly include yellow wattle, grafts, artemisia, humulus, white grass and kudzu. Agricultural crop vegetation mainly includes vegetable crops, corn, bean and sweet potato.

4.2.3 The status quo of terrestrial animal resource

In Chinese animal geographic zoning, Jiulongpo District belongs to farmland and subtropical forest irrigation fauna in oriental realm, Central China, Western mountain plateau subregion and Sichuan basin. For animal composition in the district, there are many oriental species and few palaearctic species. There are many rodent and insectivorous species, and correspondingly more carnivorous animals, such as mustelidae animals (yellow weasel, ferret badger, hog badger, dog badger and yellow-bellied weasel). There are many small animals and few medium animals.

Abundant aquatic life resources in the basin are obvious advantages. Yangtze River (section of Jiulongpo District) has 36 species of 14 families of 7 items. Main economic fish includes cyprinidae carp, bighead, carp, crucian carp and grass carp.

The project area is mainly located in major city built-up area, there are many surrounding construction activities and human production activities. There is few amphibians, reptiles, animals and other wildlife habitat due to human activities. In the survey period, there is no national level amphibian, reptile, and animal wild key protection animals and no habitat distribution in 200m of project site.

4.3 Overview of social and economic environment

4.3.1 Social and economic conditions of Jiulongpo District

(1) Population

The total household registered population of Chongqing is 33,921,100 in 2016, which increases by 202,700 at a rate of 0.61% compared with that of the last year. Among these people, there are 16,468,700 females, accounting for 48.55%; 19,084,500 urban people at an urbanization rate of 62.6%; 3,819,700 people above 65 years old, accounting for 12.53% of the total population. The population is mainly with Han nationality, the minority population with such as Tujia nationality and Miao nationality is 1,843,200, accounting for 9.5% of the total population. There are 6,578,800 floating population.

The household registered population of Jiulongpo District is 917,200 in 2016. Among these people, there are 462,900 females, accounting for 50.47%; 766,600 urban people, accounting for 83.58%; There are 1,201,800 permanent residents in the district, which increases by 14,900 at a rate of 1.2% compared with that in 2015.

Jiulongpo District governs eight sub-districts and eleven towns in total. This project involves five sub-districts like Yangjiaping, Shipingqiao, Shiqiaopu, Erlang and Zhongliangshan, and two towns including Jiulong Town and Huayan Town. The project area has a household registered population of 417,000 in total, accounting for 41.46% of that of Jiulongpo District; female population of 209,800, accounting for 45.32%; urban population of 413,700, accounting for 53.97%; floating population of 744,800, accounting for 81.2%;

(2) Economic development

① GDP and composition of three industries

In 2016, GDP of Chongqing was 1755.93 billion yuan. Wherein, the added value of primary industry was 130.32 billion yuan, occupying 3.2%, and the driving force for growth of GDP was 0.3%; the added value of secondary industry was 775.57 billion yuan, occupying 47.7% and the driving force for growth of GDP was 5.1%; the added value of tertiary industry was 850.04 billion yuan, occupying 49.1%, and the driving force for growth of GDP was 5.3%.

GDP of Jiulongpo District in 2016 is 108.967 billion yuan, increased by 10.3% compared with previous year. In terms of resident population, the annual per capita GDP was 91,235 yuan, increased by 8.9% compared with the previous year. In terms of industry, the added value of primary industry was 950 million yuan, reduced by 2.3% compared with previous year; the added value of secondary industry was 47.935 billion yuan, increased by 11.7% and the added value of tertiary industry was 60.082 billion yuan, increased by 9.4%. From the contribution of three industries to economic growth, the contribution rate of primary, secondary and tertiary industry to the economy of the district is respectively -0.2%, 50.3% and 49.9%. From the driving of economic growth, the secondary industry drives economic growth of 5.2 percentage points and the tertiary industry drives economic growth of 5.1 percentage points.

② Fiscal revenue

In 2016, the fiscal revenue of Jiulongpo District was 5.965 billion yuan, reduced by 2.6% compared with previous year. Wherein, general public budget revenue was 5.931 billion yuan, reduced by 2.7%. Among general public budget revenue, the tax revenue was 4.326 billion yuan, reduced by 17.9%. The local fiscal expenditure of the year was 20.138 billion yuan, increased by 3.1%. Wherein, general public budget expenditure was 8.548 billion yuan, reduced by 13.2%.

③ Per capita income and expenditure of urban and rural residents

The per capita disposable income of urban residents in Chongqing is 29,610 yuan, and the per capita disposable income of rural residents is 11,549 yuan. The per capita disposable income of urban and rural residents in Jiulongpo District is higher than average level of Chongqing.

In 2016, the per capita disposable income of permanent residents in Jiulongpo District was 32,075 yuan, increased by 9.2% compared with previous year. As per permanent residence, the per capita disposable income of urban permanent residents is 33,431 yuan, increased by 8.8% and the per capita disposable income of rural permanent residents was 16,935 yuan, increased by 9.4%.

The ratio of urban and rural residents' income was decreased from 1.98:1 to 1.97:1. The per capita consumption expenditure of permanent residents in the district was 22,681 yuan, increased by 8.3%. As per permanent residence, the per capita consumption expenditure of urban permanent residents is 23,512 yuan, increased by 7.8%; and the per capital living expenditure of rural permanent residents is 13,407 yuan, increased by 10.9%.

4.3.2 Implementation condition of Chongqing Caiyun Lake National Wetland Park and Wetland Park promotion (Phase I)

The World Bank Financed Project proposes to support Caiyun Lake Wetland Park promotion subproject, involving Chongqing Caiyun Lake National Wetland Park and this section introduces the wetland park.

(1) Background of building park

Chongqing Caiyun Lake Wetland Park is located at the junction of Jiulongpo District and High-tech Zone. The geological position is shown in Figure 4.3-1.

Figure 4.3-1 The location of Chongqing Caiyun Lake Wetland Park

Chongqing Caiyun Lake Wetland Park is one of important auxiliary project of comprehensive regulation project of Taohuaxi in Jiulongpo District and wetland park is an important link. Taohuaxi is one of the largest river in main urban area of Chongqing. It's originated from Zhongliangshan, riverway is 15.79km, basin area is 31.12km^2 and it's famous for peach blossoms blooming on both sides. In nearly 20 years from middle 1980s to the beginning of new millennium, rapid development of city cause serious pollution to water quality. To retain the river full of memory in the city, Chongqing Municipality started to regulate Taohuaxi.

The comprehensive regulating project of Chongqing Taohuaxi basin was initiated by Chongqing Development and Reform Commission in 1999 and approved by the State Council in Nov. 2001. In the same year, the comprehensive regulation of water pollution of Taohuaxi basin

was initiated and primary effects have been obtained at present. However, due to water shortage of Taohuaxi, the municipal government decides to use recycled water and surface catchment water generated from sewage treatment plant to build Chongqing Caiyun Lake Wetland Park with an area of about 20hm^2.

Chongqing Caiyun Lake Wetland Park was planned and designed in 2006, commenced in 207 and completed and free to the public on July 2, 2010. The park aims to create "Taoyuan scenery" as main concept from four aspects like "wetland scenery", "ecological protection", "Taoyuan culture" and "popular science education". Over 10 years, "green mountains and rivers and ideal resting place of citizens" are gradually emerging. In 2009, Chongqing Caiyun Lake Wetland Park applied for national wetland park and was approved as national wetland park at the end of 2009. After the park is built, it's always managed by Taohuaxi Park. On Oct. 1, 2014, Caiyun Lake Park was handed over to Jiulongpo District Municipal Bureau of Parks and Woods for unified management.

(2) Park scope and scale

The total planning area of Chongqing Caiyun Lake Wetland Park is 52.06hm^2; wherein, the wetland area is 26.94hm^2. The maximum length of land is 1,285m, the maximum width is 620m; the highest elevation is 30,933m, the minimum elevation is 255.61m and relative height difference is 53.72m. The park land covers canalization Taohuaxi in the east of Chentuo Bridge, connects Sports Park in the west, connects Panlong Avenue in the south and is adjacent to Phoenix Residential Area and Tonggtian Lv'an Residential Area, Sincere • Caiyun No. 1 in the north and Chentuo Bridge is in the east low-lying land.

(3) Park nature

Chongqing Caiyun Lake Wetland Park is an auxiliary project of water environment regulation of Taohuaxi basin, which aims to build an artificial wetland for providing living water source for Taohuaxi. With Caiyun Lake Ecological Wetland as the core, protecting ecological environment and water quality purification as the base and city Taoyuan culture as a support, exhibiting wetland plant landscape as the feature, it aims to create a wetland park in city center with species resources protection, city ecological pollution research, environment education and tourism and leisure, etc.

(4) Service function location

① Purified water function

Caiyun Lake Wetland receives sewage from Caiyun Lake Sewage Treatment Plant and sewage will be further purified in the artificial wetland.

Caiyun Lake Sewage Treatment Plant adopts the principal technology Constructed Rapid Infiltration System (CRI for short) to treat urban sewage around the upper reaches of Caiyun Lake. The design treatment capacity of Sewage Treatment Plant is daily sewage of 17,000 m^3. It was formally put into operation in Dec. 2008 and upgraded in 2014. After reconstruction, water meets

Level A standard of *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* (GB 18918-2002) and flows to Taohuaxi wetland system for purification again and finally flows to Caiyun Lake.

② Other functions

Except purified water function, Caiyun Lake Wetland Park has urban flood control function, propagandistic and instructive function, ecological function, recreation and leisure functions and scientific research function and so on.

(5) Functional divisions of park

The park is divided into five functional zones: wetland function exhibition area, wetland protection conservation area, sightseeing activity area, management service area and ecological buffer control area.

As per promotion and upgrade planning of Caiyun Lake Wetland Park, the promotion and upgrade project is mainly located in sightseeing activity area and wetland functional exhibition area.

(6) Implementation condition of Wetland Park promotion (Phase I)

The promotion and upgrading of Caiyun Lake National Wetland Park are gradually completed by unified planning and implementation by stages. Upgrading is implemented by three phases. In phase I, mainly build lakeside footpath and waterborne platform; in phase II, mainly optimize main entrance of park, plan sports area in the east zone, improve surrounding environment, park landscape lighting project, Caiyunbian project, adolescent development and senior activities hall, etc.; in phase III, mainly complete promotion and upgrading of the west zone and complete road system and supporting facilities in the west zone. Wherein, phase II and III project will be completed at the World Bank Financed project.

Wetland Park promotion (phase I) project was organized by municipal Bureau of Parks and Woods of the district, with an area of about 35,000m^2. As per characteristics of wetland park, the project aims to complete park functions, improve park quality, give full play to leisure, entertainment, fitness and popular science education of wetland park. Improve the project to mainly break through 2.8km lake path and ensure barrier-free traffic along the lake. On the lakeside sightseeing line, newly add 17 cultural landscape nodes; mainly create 10 lakeside scenes (Fig. 4.3-1) like Spruce Forest, Canoe Mooring, Peach Poem Gallery, Peach Peninsula, etc., increase 3 landscape bridges, 7 recreation facilities like landscape pavilion gallery and add convenient facilities in the way. The project was commenced in May 2016 and completed in September 2016 and the construction period is 4 months.

Before Promotion **After Promotion**


Spruce Forest

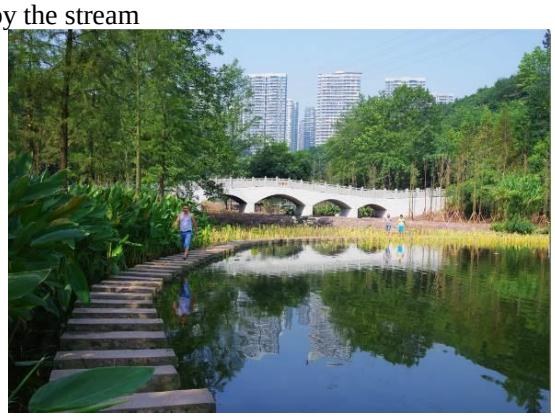

Canoe Mooring


Peach Poem Gallery


Peach Peninsula

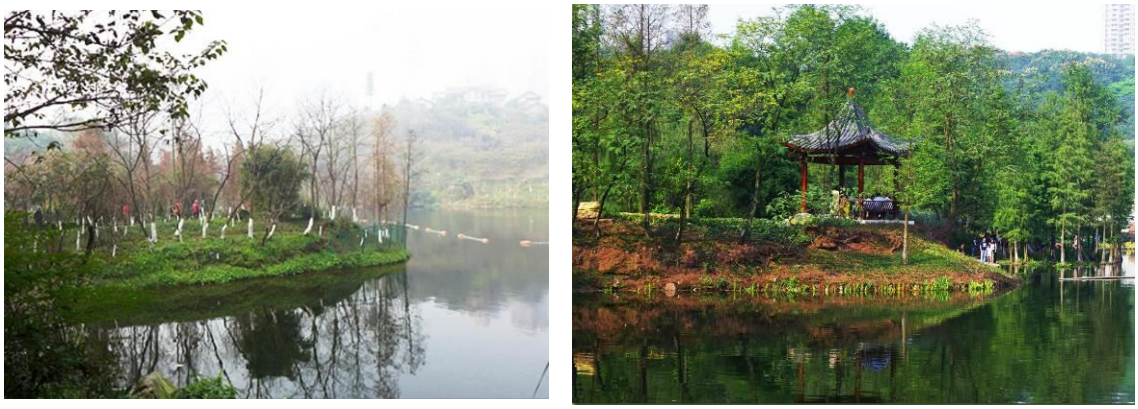

Songs and peach blossoms


Waterwheel by the stream

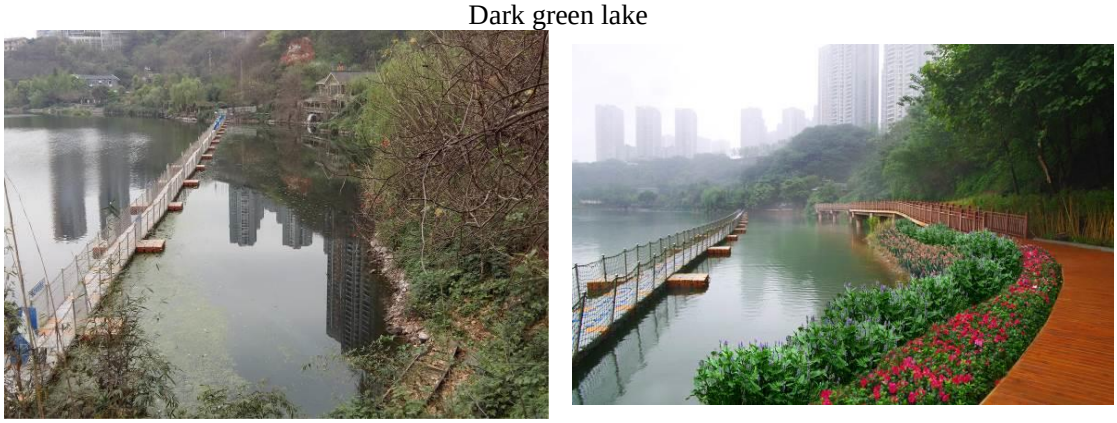



Moon-shadow Bridge


Gallery bridge on the stream



Dark green lake



Double bridges on Yun Lake

Figure 4.3-2 Comparison bettwen before implementation and after implementation of lakeside scenic spots of wetland park promotion (phase I)

4.3.3 Overview of cultural relics

Jiulongpo District has totally 19 cultural relics protection sites (see Table 4.3-1) and the historical background is from the Palaeolithic age to the modern times. Wherein, there are 1 national cultural relics protection site, 6 municipal cultural relics protection sites and 12 district level cultural relics protection sites. By comparison with project location, the project is about 1,050m to cultural relics protection sites of various levels and has no obvious influence on cultural relics protection sites.

Table 4.3-2 Records of national, municipal and district-level cultural relics protection sites in Jiulongpo district

No.	Name	Age	Category	Address	Level of protection	Release time
1	The former site of Chongqing Anti-war Weapon Industry (the former site of No. 1 Arsenal of the Arsenal Administration)	1938-1945	Important historical sites in modern times; Representative architecture	Within Chongqing Jianshe Industry (Group) Co., Ltd., Huangjiamatou Community, Xiejiawan Sub-district, Jiulongpo District	National protection site	May 2013
2	Huayan Temple	The Qing Dynasty	Ancient architecture	Huayan Temple, Kangyuan Community, Zhongliangshan Sub-district, Huayan Town, Jiulongpo District	Municipal protection site	In 1986 and 2000, released as the first group of sites under municipal protection site
3	Mawangchang stone collection site	The Palaeolithic Age	Ancient ruins	About 500 meters from the northwest side of the Dayan Village, Jiulong Township, Jiulongpo District	Municipal protection site	2009
4	The site of the Expansion Meeting of CPC Sichuan Province Temporary Committee and Zhou Gongzhi's Former Residence (including Zhou Gongzhi's Towb)	1928	Important historical sites in modern times; Representative architecture	Zhoujia Dawan, Community 1, Doushita Village, Tongguanyi Town, Jiulongpo District/ Yangjia Shibao, Community 3, Doushita Village, Tongguanyi Town	Municipal protection site	2009
5	Zouma Ancient Building Group (including Sunjia Courtyard, theatrical stage of Guanwu Temple, Saodao Tablet and Ancient Post Road)	The Qing Dynasty	Ancient architecture	Zouma Town, Jiulongpo District	Municipal protection site	2009
6	Liu Bocheng's Former Residence in Liudianzi	1924-1927	Important historical sites in modern times; Representative architecture	Liudianzi Community, Yuzhou Sub-district, Jiulongpo District	Municipal protection site	2009
7	Feng Yuxiang's Former Residence in Chongqing	1939-1945	Important historical sites in modern times; Representative architecture	No. 12, University of Logistics, Jiulongpo District	Municipal protection site	2000
8	Huang Fusheng's Tomb	1948	Important historical sites in modern times; Representative architecture	Huangjueping Sub-district, Jiulongpo District	District-level protection site	1986
9	Relics of Ba Boat-coffin	The Eastern Zhou - Han Dynasty	Ancient ruins	Dongsunba, Community 2, Tongguanyi Town, Jiulongpo District	District-level protection site	1988
10	Ciyun Temple Tombs	The Song - Qing Dynasty	Ancient tombs	Jinyun Mountains, Community 3, Ciyun Village, Zouma Town, Jiulongpo District, about 700 meters from the northwest side of the village committee of Ciyun Village	District-level protection site	1988

No.	Name	Age	Category	Address	Level of protection	Release time
11	Zhou Mill	The Qing Dynasty	Ancient architecture	1 meter from the south side of No. 189-201, branch road of Huaxi Street, Baishiyi Town, Jiulongpo District	District-level protection site	1988
12	Catholic Church	The Republic of China	Important historical sites in modern times; Representative architecture	Doushita Village, Tongguanyi Town, Jiulongpo District	District-level protection site	March 8, 2004
13	Forest fire prevention monument	The Qing Dynasty	Stone cave temple and stone carving	On the stone walls by the Ciyun Temple, Community 3, Ciyun Village, Zouma Town, Jiulongpo District	District-level protection site	2008
14	Yu Yuanbo Mansion	The Republic of China	Important historical sites in modern times; Representative architecture	Inside the Huayan Government, No. 264 Zhongliangshan Main Street, Huayan Town, Jiulongpo District	District-level protection site	August 13, 2011
15	Cliff inscriptions of Wenfeng Mountain	The Qing Dynasty	Stone cave temple and stone carving	Luohanshan, Community 15, Xindian Village, Baishiyi Town, Jiulongpo District	District-level protection site	August 13, 2011
16	Baishiyi Revolutionary Martyrs Monument	Modern times	Important historical sites in modern times; Representative architecture	Community 6, Moujia Village, Baishiyi Town, Jiulongpo District	District-level protection site	August 13, 2011
17	Green-tile Mansion	Modern times	Important historical sites in modern times; Representative architecture	Within the Chongqing Institute of Technology, Xingsheng Road Community, Yangjiaping Sub-district, Jiulongpo District	District-level protection site	August 13, 2011
18	Relics of Walls of Shidingzhai	The Qing Dynasty	Ancient ruins	Shidingzhai, Chenjiashan, Community5, Hailan Village, Jinfeng Town, Jiulongpo District	District-level protection site	August 13, 2011
19	Guanyintan Bridge	The Qing Dynasty	Ancient architecture	Guanyintan, Community 7, Baohua Village, Xipeng Town, Jiulongpo District, and Community 3, Luogudong Village, Taojia Town is on the other end of the bridge	District-level protection site	August 13, 2011

4.4 Environmental quality status and assessment

4.4.1 Surface water environmental quality status

To know about the regional environmental status of surface water, this assessment refers to the water quality monitoring data of the Fengshou Dam of Yangtze River and Cuntan section from the Weekly Report for Water Quality Automatic Inspection issued by Chongqing Manucipal Evironmental Protection Bureau for analysis.

(1) Monitoring factors

Fengshou Dam section: pH, Permanganate Index, NH_3-N.

Cuntan section： pH, BOD_5, COD, NH_3-N, petroleum.

(2) Monitoring time

Fengshou Dam section: April 2017.

Yangtze River Cuntan section: August 2015.

(3) Assessment methods

The water quality shall be assessed through the single factor index method with its formula as follows:

$S_{i,j}=C_{i,j}/C_{si}$

Wherein,

$S_{i,j}$ - the standard index of single water quality parameter i at the point j;

$C_{i,j}$ - the pollution monitoring concentration of Category-i pollutants at the point j (mg/L);

C_{si} - the assessment standards for Category-i pollutants (mg/L);

pH standard index:

$$S_{pH,j}=\frac{pH_j-7.0}{pH_{su}-7.0} \qquad \text{pHj}>7.0$$

Wherein,

S_{pHj} - the standard index of pH at the point j;

pH_j - the monitoring value of pH at the point j;

pH_{su} - the upper limit of pH in the water quality standard.

It is shown in the above formula that, when $S_{i,j}>1$, the DO value exceeds the standard; when $S_{i,j}\leq 1$, the DO value does not exceed.

(4) Assessment standards

The Yangtze River shall be in accordance with Category-III standard specified in *Environmental Quality Standards for Surface Water* (GB3838-2002).

(5) Monitoring and assessment results

See Table 4.4-1 for the data statistics of the Fengshou Dam section.

Table 4.4-1 The Yangtze River monitoring data statistical table [unit: mg/L (excluding pH)]

River	Item	pH	COD	BOD_5	Ammonia nitrogen	Petroleum	Permanganate Index
Yangtze River Fengshou Dam section	Monitoring value	7.82	/	/	0.12	/	2.53
	Exceeding rate	0	/	/	0	/	0
	$S_{i,j}$	0.41	/	/	0.12	/	0.42

River	Item	pH	COD	BOD_5	Ammonia nitrogen	Petroleum	Permanganate Index
Yangtze River Cuntan section	Monitoring value	8.25	11.4	0.74	0.085	0.019	/
	Exceeding rate	0	0	0	0	0	/
	$S_{i,j}$	0.63	0.57	0.19	0.085	0.38	/

It is known from Table 4.4-1, all monitoring factors of the Yangtze River Fengshou Dam section and Cuntan section conform to the Category-III standard specified in *Environmental Quality Standards for Surface Water* (GB3838-2002), and the water quality is overall good.

4.4.2 Ambient air quality status

To know about the ambient air quality status of the area, this assessment refers to the ambient air monitoring data of Yangjiaping Regular Ambient Air Monitoring Point, Xinshancun Regular Monitoring Point and Xietaizi Regular Monitoring Point for analysis. The ambient air monitoring data the assessment refered to can indicate the ambient air quality in the project area and its effectiveness conform to the related regulation of the *Technical Guidelines for Environmental Impact Assessment --- Atmospheric Environment* (HJ2.2-2008), so it is applicable to the assessment on the environment status of the area.

(1) Monitoring factors

Yangjiaping Regular Ambient Air Monitoring Point: PM_{10}, SO_2, NO_2

Xinshancun Regular Monitoring Point and Xietaizi Regular Monitoring Point: $PM_{2.5}$

(2) Monitoring time

Yangjiaping Regular Ambient Air Monitoring Point monitors 24-hour average concentration from May 30, 2015 to June 5, 2015;

Xinshancun Regular Monitoring Point monitors 24-hour average concentration of $PM_{2.5}$ from August 2, 2016 to August 8, 2016.

(3) Assessment methods

Based on the ambient air quality status, this assessment adopts the assessment method specified in *Technical Guidelines for Environmental Impact Assessment --- Atmospheric Environment* (HJ2.2-2008), calculates the percentage of the max concentration at each monitoring point in each time divided by corresponding standard quality concentration limits, and evaluates the compliance result. The assessment methods are as follows:

$$I_{ij}=C_{ij}/C_{0j}*100\%$$

Wherein:

I_{ij} - the percentage of the max measured value of the pollution factor j at the status monitoring point i divided by the standard limit - standard occupying rate, when the value is between 0～100%, it conforms to the standard; when it is greater than 100%, it exceeds the standard;

C_{ij} - the measured value of the pollution factor j at the status monitoring point i (mg/m_3);

C_{0j} - the environmental quality standard of the pollution factor j (mg/m_3).

(4) Assessment standards

Each monitoring points shall be in accordance with the Class-II concentration limit specified in *Ambient Air Quality Standards* (GB 3095-2012).

(5) Assessment results

See Table 4.4-2 for ambient air status monitoring statistics and assessment results.

Table 4.4-2 Ambient air status monitoring statistics and assessment results (unit: μg/m3)

Monitoring point	Monitoring indicator	24-Hour concentration range	Class-II 24-Hour average standard	Percenrage of max concentration accounting for standard concentration (%)	Exceeding rate (%)
Yangjiaping Monitoring Point	SO_2	18~37	150	24.7	0
	NO_2	53~73	80	91.3	0
	PM_{10}	62~84	150	56.0	0
Xietaizi Monitoring Point	$PM_{2.5}$	13~58 (hourly)	225	25.8	0
Xinshancun Monitoring Point	$PM_{2.5}$	19~49 (hourly)	225	21.8	0

Note: as PM_{10} has no hourly standard concentration, the 1-hour average concentration assessment standard in this assessment is the triple of its 24-hour average concentration.

It is known in Table 4.4-2, all monitoring factors of the monitoring points conform to the standard specified in *Ambient Air Quality Standards* (GB3095-2012), and the regional ambient air quality is good.

4.4.3 Acoustic environmental quality status

(1) Monitoring points distribution

Based on the project layout, this assessment refers to the acoustic environmental monitoring data of Xiejiawan on the Second Ring of Yangjiaping Business District and Shiyang Road area for analysis. The monitoring data the assessment refered to can indicate the acoustic environmental quality in the project area and its effectiveness conform to the related regulation of the *Technical Guidelines for Environmental Impact Assessment --- Acoustic Environment* (HJ2.4-2009), so it is applicable to the assessment on the environment status of the area.

Monitoring Point 1# is located in Baoli Huabanli Community; Monitoring Point 2# and 3# are located in Laodong Third Village; Monitoring Point 1# is located in the starting point of Dacheng Road.

(2) Monitoring item

Equivalent continuous sound level A.

(3) Monitoring time and monitoring method

Monitoring the noise value in the day and at night for two days. Adopting the monitoring method specified in *Acoustical Environment Quality Standard* (GB3096-2008).

Monitoring frequency: two times a day, one in the day and the other at night.

(4) Assessment of acoustic environment status

Table 4.5-3 Acoustic environment status monitoring statistics and assessment results [unit: dB(A)]

Monitoring point	Monitoring time	Monitoring value	Standard	Result
1#	Daytime	68.3~68.7	70	Meet the standard
	Nighttime	55.3~55.6	55	Exceed the standard
2#	Daytime	56.8~57.1	60	Meet the standard
	Nighttime	47.2~47.7	50	Meet the standard

3#	Daytime	66.1~66.3	70	Meet the standard
	Nighttime	54.8~54.9	55	Meet the standard
4#	Daytime	54.2~54.6	70	Meet the standard
	Nighttime	44.9~45.3	55	Meet the standard

It is shown in the monitoring results, the noise value of monitoring point 1# in the day conforms to Category 4a standard in the *Acoustical Environment Quality Standard* (GB3096-2008), the noise value at night exceeding the Category 4a standard, which is mainly caused by traffic nosie from passing vehicles; the noise value other monitoring points conforms to the standard and the status of acoustic environment quality is good.

4.4.4 Soil Quality

During the preparation of the project, on-site investigations were conducted on newly built parks and public spaces. Six small plots in nine locations were left unused due to difficult terrain or locations. Currently, they are used as vegetable plots by local residents. Huayan Binhe Park and Wutaishan Park are relocated residential areas and original green spaces. Bai Tao Road Park is At present, there are building material warehouses and small mechanical processing plants in the region, which present a certain degree of soil contamination risk. Before the construction commences, further site investigations should be conducted to determine if repairs are required.

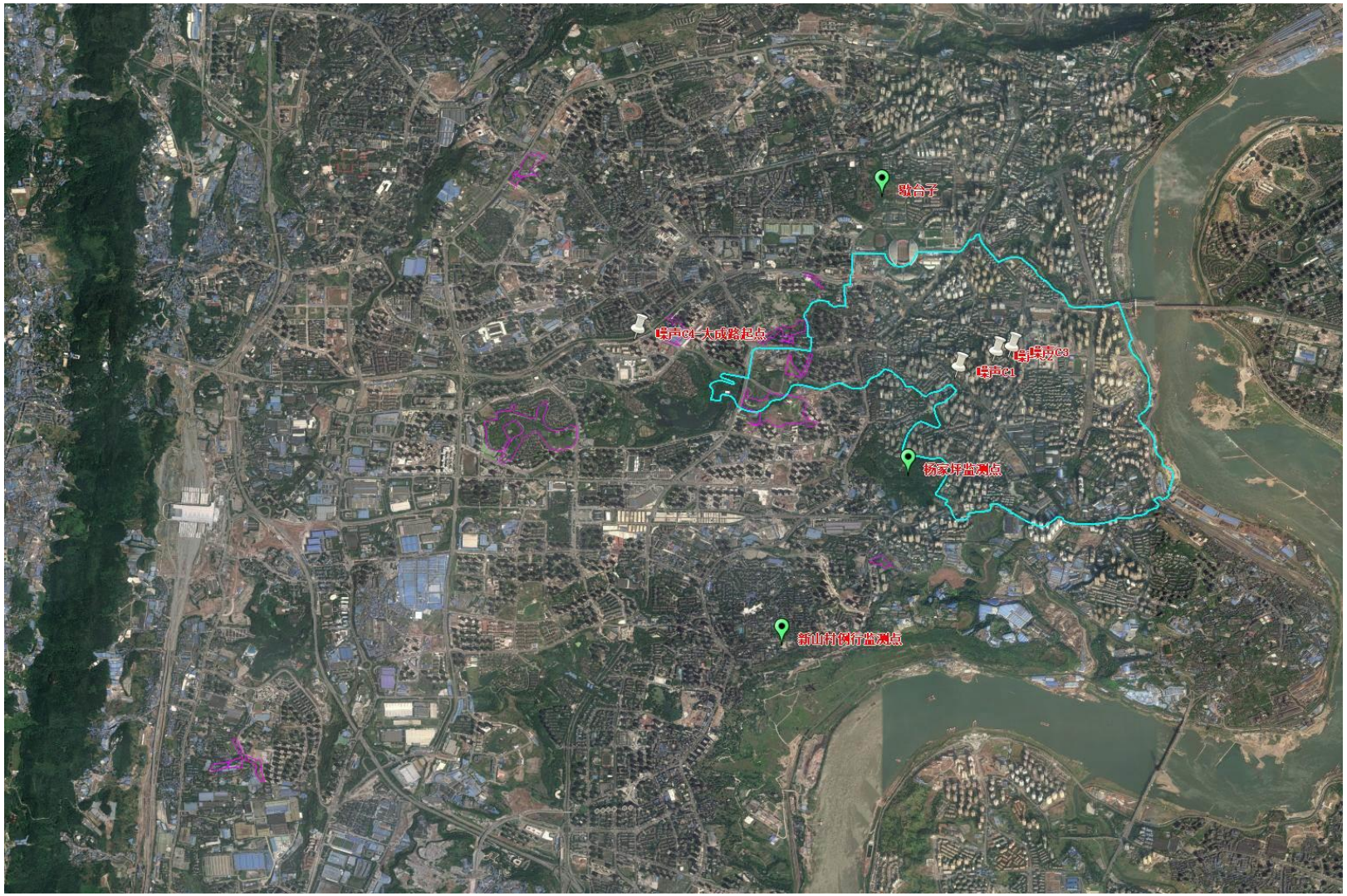


Table 4.4-1 Monitoring points distribution figure

5 Analysis of alternatives

5.1 With/without project

The analysis of the impact with/without project, namely the analysis of the environment development trend, refers to the analysis of the dominating development trend of the regional environmental conditions and the industry involved environment problems, without this project.

At present, there are 9 large parks in Jiulongpo District:

There are 9 large parks in Jiulongpo District: Baguocheng Park, Baiyangwan Park, Huayan Scenic Area, Bayu Style Garden, Central Park in District C, Caiyun Lake National Wetland Park, Jiandaoshan Forest Park, Banshan Park and Chongqing Zoo. Urban greenbelt covers a total area of 3425.75 hectares of which the greenbelt in parks covers 401.39 hectares, protective greenbelt covers 208.25 hectares, squares covers 16.19 hectares, attached greenbelt covers 2498.15 hectares, regional greenbelt covers 301.41 hectares, per capita park greenbelt covers 4.62 square meters, per capita green area covers 32.09 square meters, ratio of green space is 33.68% and green coverage ratio is 35.73%.

The investigation and survey uncover the following problems of the area covered by the project at present.

① The current size of urban green buffer is too small and is not functioning well. Its length and width cannot meet the requirements of urban protection construction.

② The network system of the protection forest of the whole city is not perfect. Some roads andbanks are not protected effectively. The coastal area is rather messy and broken.

③ In the rapid development of urban construction, many protective greenbelts have been eroded. The protection greenbelt under high tension corridors, near rivers and railways have been occupied and thus become broken, resulting in the loss of function of protection.

④ The construction of urban parks and community parks in areas such as Yangjiaping and Jiulongpo District has lagged behind and the quality of these parks is inferior.

⑤ To keep pace with the rapid development of economic society in the urban area as well as the living standard of urban residents, the completed large city parks need to be further expanded and regenerated.

⑥ The landscape of greenbelts needs to be improved. Landscape design is restricted by many factors. There is a lack of overall planning for urban greening which features arbitrariness. The greening varieties are restricted to a few breeds, which cannot contribute to the diversity of city greening and highlighting the beauty seen in the greening of the city.

If the project is constructed, it will improve the walking experience, promote the walking travel rate, reduce the use of motor vehicles, and enhance the accessibility of traffic and the integration of regional public space. Besides, it will strengthen the connectivity of community and

public transport while promoting the land value of the surrounding areas of the project, increase the urban landscaping rate as well as improve the ecological micro-system and microclimate, alleviate the urban heat island effect while upholding urban ecological civilization. As a result, with the quality of living environment in Jiulongpo District being improved and the vitality of the neighborhood activated, the residents will have higher sense of happiness and gaining.

Conversely, if the project is not carried out, the above situations will not be significantly improved, and the disadvantages caused therefrom will gradually be highlighted. Thus, the impact of "without project" on the external environment is clear and obvious.

On the contrary, if the project is not implemented, the above situations of the old communities will not be significantly improved, the drawbacks will be gradually highlighted, and the impact of the alternative without the project on the external environment is obvious.

Compared with the alternative without the project, this project is a project that benefits the people's livelihood, with its positive environment benefit larger than its negative benefit. The project has a far-reaching impact on improving the living environment and quality of life of the residents, shaping the image of Jiulongpo District, and promoting the urban construction and the sustainable development of economy, society and environment of Jiulongpo District.

5.2 Comparison of alternatives

The footpath system route is selected based on the following principles, as shown in figure 5.2-1:

(1) Put residents' needs first. The route should be able to link as many residential areas and communities as possible as well as provide service to as many residents as possible.

(2) The route should give full play to uniqueness, such as displaying the unique features of the city including the mountainous regions, streets and walkways, as well as cultural characteristics so as to enable the memory of the city to be better retained.

(3) The route should be connected to public transportation (the principle of TOD). The footpath is an important link between communities and public transportation. So it should be linked with public transportation stations and public service providers.

(4) The route must be connected with public resources. In addition to providing convenience for residents' work and life, the footpath should also provide convenience for residents' leisure trip and enrich citizens' life. Therefore, it is necessary to take this principle into account.

(5) The route must be able to be expanded in the future. The artery route should be selected according to the number of residents it can serve. At the same time, it should be constructed in a way that it can be expanded in the future. With the increasingly upgraded patterns of road distribution in the process of urban regeneration, more and more high-quality route resources will be incorporated into the footpath system.

(6) Put safety first. The route should ensure that passers-by can cross the street safely and

make the best use of overpass, underground passage, zebra crossing and other facilities.

(7) The footpath system should be systematic. The construction of the footpath should be able to extend dead end road and serve as a complement to the regional pedestrian traffic system.

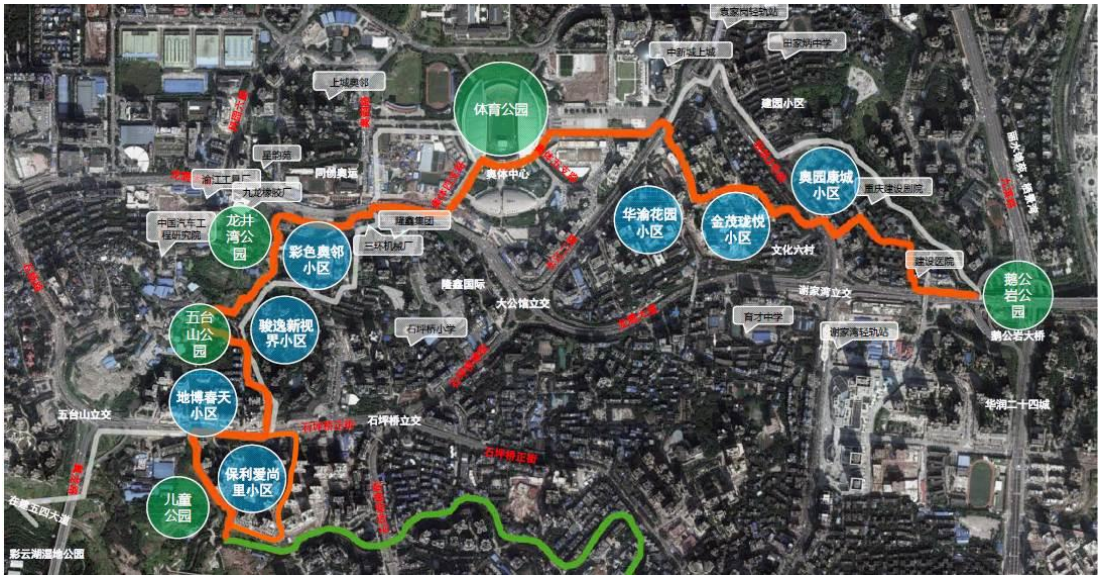


Figure 5.2-1 Original route of the footpath planning

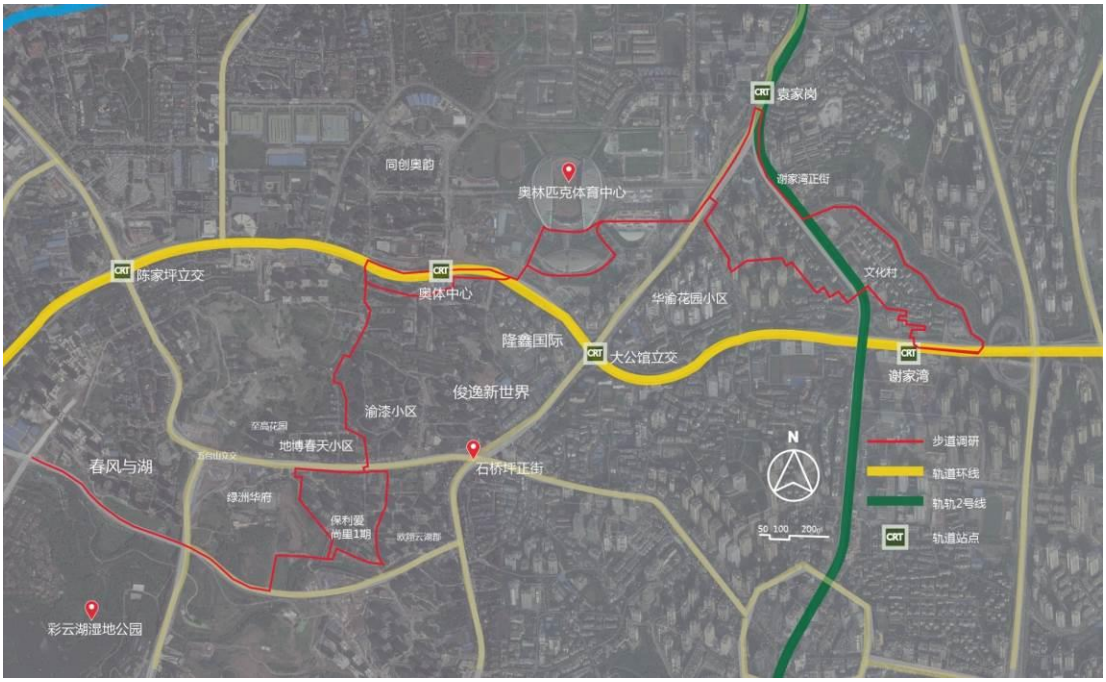


Figure 5.2-2 Selected route of the footpath

The public space quality improvement project is selected based on the following principles, as shown in Figure 5.2-3:

(1) The compliance principle. The public greenbelt should conform to the land control planning and its usage characteristics should be clear so as to minimize the potential controversy and uncertainty in future construction from the very beginning.

(2) Construction plan. The government should build the greenbelt where it is adjacent to

other regional construction projects in the early and medium period so as to improve its feasibility.

(3) The principle of using non-controversial land. Make sure that there is no conflicts and controversies as to the ownership of land so as to prevent any obstacles to project construction.

(4) The principle of the property of surrounding land. The usage characteristics of surrounding land are closely related to the number of residents it can serve. It is also an important indicator of the prioritization in the process of construction.

(5) The principle of putting citizens' demands first. The prioritization in the process of construction should be determined according to the number of residents it can serve.

(6) The principle of considering the project's ability to serve in the future. The prioritization in the process of construction should be determined according to the use plan of the surrounding land, the number of residents it can serve in the future as well as the calculated data.

(7) The prioritization in the process of construction should be determined according to the consideration of its comprehensive value, which means we should prioritize the construction the greenbelt which can bear more other functions such as commuting, connecting communities and breaking space barrier, etc.) if other conditions of the greenbelt are the same.

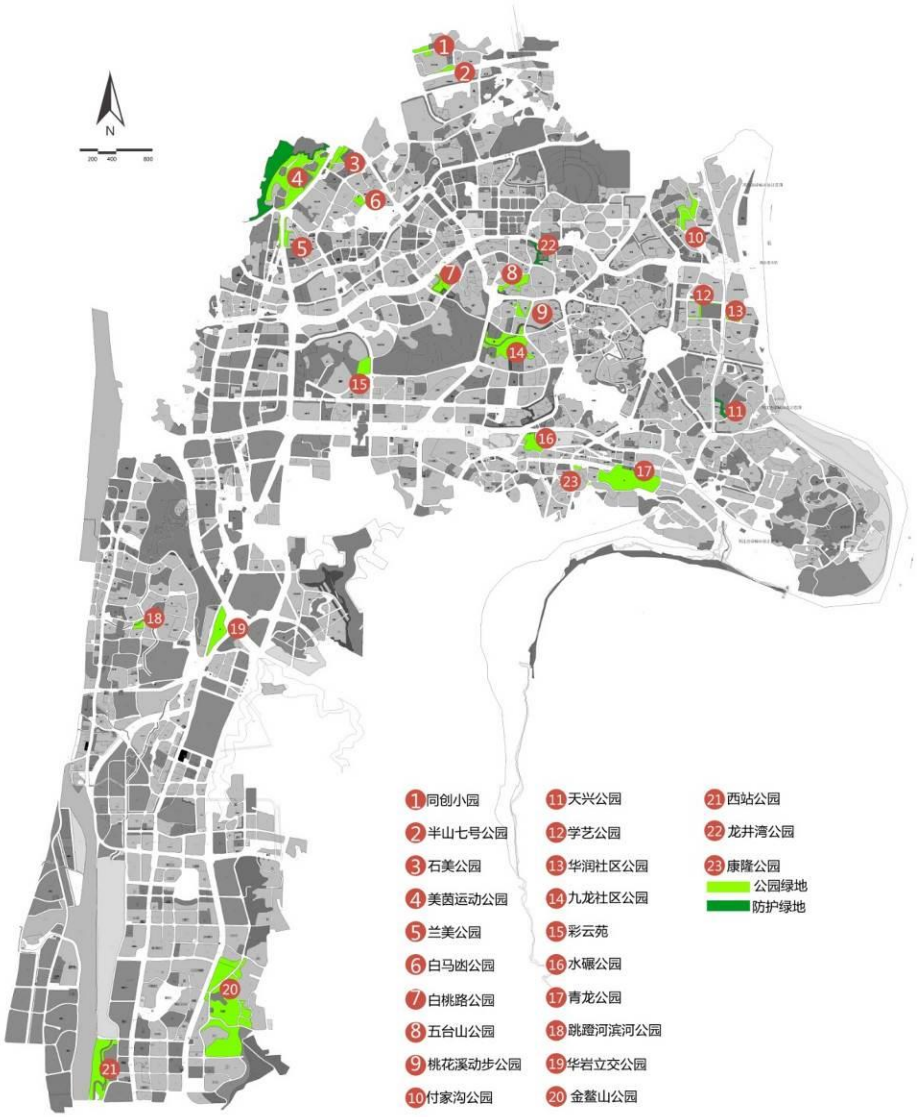


Figure 5.2-3 Layout plan of planning newly built greenbelt in Jiulongpo District

Based on the above principles, after thorough investigation and analysis, all the subprojects executed in Jiulongpo District as well as their distribution areas and ranges are determined, as shown in Figure 5.2-4.

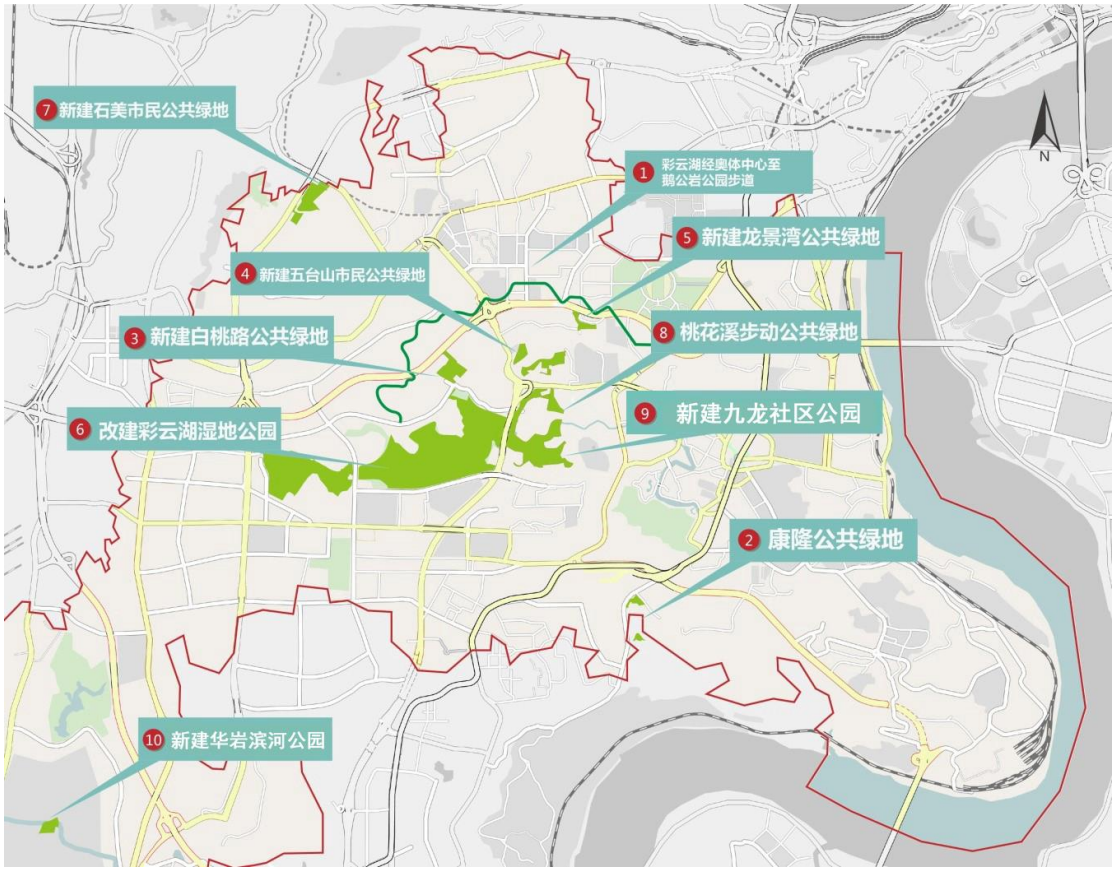


Figure 5.2-4 Jiulongpo District layout plan of each sub-project

6 Prediction and assessment of environmental impacts

Based on the previous analysis of the project and the environment, this Assessment considers that the major environmental and social impacts of the project are as follows:

(1) The project includes 2 categories of sub-project--footpath system and quality improvemnt of public space. All the sub-projects involve no new land acquisition.

(2) The footpath system only involves one slow-walking footpath, that is the newly-built footpath stretching from Caiyun Lake Park, through Olympic Sports Center, to Egongyan Park with the length of 5.3km. This footpath belongs to existing footpath and the sub-project only conduct improvement and transformation on it, so the impacts during the operational phase on the surrounding communities' residents (especially on the aged and children) are mainly social impacts arising from inconvenience on life, trips and safty.

(3) The quality improvemnt of public space includes 8 newly built parks (Kanglong Public Greenbelt, Baitao Road Public Greenbelt, Wutaishan Citizens' Public Greenbelt, Longjingwan Public Greenbelt, Shimei Citizens' Public Greenbelt, Taohuaxi Sports Public Greenbelt, Jiulong Community Park and Huayan Riverside Park) and 1 wetland park transformation (Caiyun Lake Wetland Park). The environmental impacts during the construction phase focus on the atmospheric environment, acoustic environment, water environment and possible water and soil loss, and the impacts on the surrounding communities' residents (especially on the aged and children) are mainly social impacts arising from inconvenience on life, trips and safty, while the impacts during the operational phase are slightly.

6.1 Prediction and assessment of environmental impacts during construction phase

6.1.1 Impacts on water environment

The water pollution sources of this project during the construction phase mainly include the construction wastewater and the sanitary sewage of construction personnel.

(1) Construction wastewater

The concrete is required for the road pavement and park construction of this project (1. Landscape buildings: landscape gallery frame, landscape leisure pavilion (area); 2. Protection works; 3. Activity site and plaza construction; 4. Water and electricity pipe network and facilities; 5. Landscape art (sculpture accessories, landscape wall, entrance landscape); 6. Function buildings and facilities (toilet and finished product management room); 8. Public furniture; 9. Road pavement and lineation; 10. Signage, etc.). The concrete used in this project is commercial concrete. Large concrete mixing facilities will not be erected in the construction site. The wastewater produced by the project is mainly the concrete curing wastewater in the park construction, the wastewater from washing the transportation vehicle tires, the oily wastewater produced by the maintenance of the construction machines, etc. Compared with similar projects, the construction wastewater to be produced during the park construction phase may be 15m^3/d.

The main pollutants are SS and petroleum pollutants. The construction wastewater will be reused or used for reducing dust in the construction site and roads after the treatment of the oil separation and grit chamber erected in the construction site, without being discharged outside.

(2) Sanitary sewage from constructors

The construction of the park construction requires more labors. It is estimated that 30 people/d will be employed during peak construction period. The sanitary sewage will be discharged 2.4m^3/d. The main pollutants are COD, BOD_5, SS and ammonia nitrogen. Sanitary sewage is strictly forbidden to be discharged directly into the natural water body. The river beach should be avoided at construction site selection (for example, the bank of Caiyun Lake, the beach of Taohua Stream or the beach of Tiaodeng River). If it is impossible to connect with the existing municipal sewage pipe network, the sewage should be regularly sucked by the fecal suction truck to the sewage treatment plant for treatment after being collected and pretreated by the biochemical pool; if the municipal sewage pipe network can be connected, the sewage shall be discharged to the municipal sewage pipe network after being collected and pretreated by the biochemical pool.

(3) Impacts of non-point loss caused by rainfall on water environment

During the construction, the exposed excavation and filling side slope will generate a large amount of soil and water loss in the local conditions of heavy rainfall, which will flow into the surrounding water, and have impact on the water environment. Therefore, attention should be paid to the protection of these exposed slopes during construction. During the construction of the project, the plastic film or non-woven fabrics should be applied to cover the excavation and filling slopes without protective measures, topsoil stockpiling location, stockpiling yard and the like, and measures like woven soil bags as fence and intercepting ditches should be taken around the topsoil stockpiling location and the stockpiling yard. These measures will greatly reduce the topsoil's exposure and the erosion of the rainwater, reduce the loss of the surface source, and will have little impact on the surrounding water environment.

6.1.2 Impacts on ambient air

During the project construction phase, its impact on the air is mainly due to the transportation of project materials and the construction of all parks. The main pollutants generated in the process of material transportation and the excavations and filling of earth and stonework are TSP and the exhaust discharged by the transporting vehicles and other machinery. The main pollutants to the air generated by the pavement of trails in each park are TSP and asphalt fume. Much of the pollution is generated in the process of asphalt paving, transportation and stacking of construction materials, the excavations and filling of earth and stonework, etc. TSP and asphalt fume will further impact the environment of the construction site and its neighboring areas if there is strong wind. In addition, the construction machinery will dischargeexhaust, the transporting vehicle will produce secondary dust pollution and living fuels will discharge smoke during combustion.

(1) Impacts of asphalt fume

Roads will be newly constructed during the construction phase of this project, the road surface will have asphalt pavement, and the asphalt for the project will be externally purchased. On the construction site, there are no processes of asphalt boiling, stirring, etc., and thus there will be no environmental problem of asphalt fume (which contains Benzo[a]pyrene) in the process of asphalt boiling and stirring. The externally purchased asphalt will be used directly on the construction site to pave the road, the road pavement period is short, and the measure of water cooling will be taken. Therefore, the asphalt fume generating during the road pavement will have little impact on the ambient air.

(2) Impacts of rising dust

During the construction phase, the dust mainly comes from the excavation of earthwork, the disturbance of construction activities, loading and unloading of bulk construction materials like cement, sand and gravels, vehicle transportation, etc. According to the data of similar construction, the dust produced by the excavation of earthwork on the construction site, construction activities, loading and unloading of bulk materials will mainly impact the scope of 50m around the construction site, and 80 to 150m in the direction down the wind of the construction site. The dust produced by vehicle transportation will affect the ambient air along both sides of the road. When the dust accumulated on the road is 0.1kg/m^2, the impact range of the road dust is between 10 to 20m. During the construction, the tires of all transportation vehicles into and out of the construction site should be cleaned to avoid the soil being brought onto the urban roads. At the same time, spraying water in the construction area accumulating a great amount of dust and on the transportation road 200m outside the construction site (2 to 3 times at ordinary times, and 4 to 5 times from July to September). These will decrease the rising dust in the air by over 70% and effectively reduce the impact of the rising dust on the near ambient air.

The impact of the rising dust on ambient air during the construction phase is temporary and will disappear with the completion of the construction.

(3) Analysis of impacts of the exhaust of machines and tools

The exhaust gas pollutants from transport vehicles and construction machines during the construction phase are mainly CO and hydrocarbons. According to the pollutant emissions from the exhaust gas of construction machines used in similar projects, it can be predicted that the emission of CO and hydrocarbon pollutants in the exhaust gas of construction machines is little. It is estimated that during the project construction, the exhaust gas of the construction machines will have little impact on the ambient air quality around the project area.

(4) Analysis of impacts of living fuel exhaust gas

This project uses the liquefied gas (LPG) as the living fuel. LPG is a clean energy, and the exhaust gas produced by the burning of LPG has little effect on the ambient air.

6.1.3 Impacts on acoustic environment

(1) Construction site noise impact prediction

This project uses fewer high-noise equipment for the construction of the footpath, the site pavement and the afforestation, but the machines and transportation facilities for the excavation of earthwork, pipeline laying and road engineering will produce high noise during use, which will easily have impact on the nearby acoustic environment; therefore, this Assessment will predict and analysis the impact of the construction noise on the acoustic environment.

Based on the common construction machines used in China currently, the noise values of construction machines are listed in Table 3.5-1.

There are many kinds of construction machinery. The common characteristic of construction machinery is the high noise value, which impacts the construction site. At the same time, it is difficult to take the sound absorption, sound insulation and other measures to control their impact on the environment.

The prediction mode is as follows:

① A construction noise source can be approximated as a point acoustic source, and the noise value of different distance of each construction machine can be calculated according to the noise attenuation mode of such point acoustic sources. The attenuation mode of point acoustic source is as follows:

$$L_P = L_{P_o} - 20L_g\left(r/r_o\right)$$

Wherein:

L_P— the sound pressure level (SPL) r (m) away from the sound source, dB (A);

L_{PO}— the sound pressure level (SPL) r_o (m) away from the sound source, dB (A);

② Computational formula of predicted equivalent sound level (L_{eq}) at the predicted point;

$$L_{eq} = 10\lg\left(10^{0.1L_{eqg}} + 10^{0.1L_{eqd}}\right)$$

Wherein:

L_{eqg}- Contribution value to the equivalent sound level at the predicted point of the sound source of the construction project, dB (A);

L_{eqb}- Background value at the predicted point, dB (A).

Predict the pollution scope (the distance from the operation point to the place where the noise value reaches the standard) of the construction machine noise in Table 3.5-1 with the formula. See Table 6.1-1 for the noise impact of construction machines at difference distances.

Table 6.1-1 Predicted results of the construction machine noise impact scope (Unit: dB (A))

Distance (m) / Noise source	10	20	50	70	100	150	200
Loader	84.0	74.4	70.0	67.1	64.0	60.5	58.0
Bulldozer	80.0	70.4	66.0	63.1	60.0	56.5	54.0
Excavator	78.0	68.4	64.0	61.1	58.0	54.5	52.0
Concrete tank truck	79.0	69.4	65.0	62.1	59.0	55.5	53.0

Distance (m) / Noise source	10	20	50	70	100	150	200
Truck	79.0	69.4	65.0	62.1	59.0	55.5	53.0
Vibrating roller	80.0	70.4	66.0	63.1	60.0	56.5	54.0
Pneumatic tyre roller	70.0	60.4	56.0	53.1	50.0	46.5	44.0
Paver	81.0	71.4	67.0	64.1	61.0	57.5	55.0
Impact drilling machine	67.0	57.5	53.0	50.1	47.0	43.5	41.0
Air compressor	65.0	55.5	51.0	48.1	45.0	41.5	39.0
Diesel generator	78.0	68.5	64.0	61.1	58.0	54.5	52.0

According to the foregoing table, the contribution value of the construction machine to the acoustic environment is 51.0 to 70.0dB (A) at 50m away from such construction machine, 45.0 to 64.0dB (A) at 100m, and 39.0 to 58.0dB (A) at 200m.

When the distance between the construction machine and the site boundary is less than 50m in the daytime and less than 200m at night, the noise of the construction machine can easily exceed the requirements of the *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011) at the construction site boundary. In addition, the daytime noise of the area 150m and the night noise of the area 200m away from the main construction machines will easily exceed the requirements of the Category 2 standard in *Acoustical Environment Quality Standard* (GB3096-2008).

According to the site survey, there are many residences within 200m away from the area of the proposed project (See Section 1.7 for details), so the construction during daytime will has certain impact. The daytime construction will cause certain disturbance. The night construction will greatly impact the residents, so the operation time should be strictly controlled and the night construction should be reported to the local environmental protection department.

The Environmental Impact Assessment has the following requirements to the construction process: ① High-noise construction sites should be located in areas far away from the environmental sensitive points; ② Large machines should be kept far away from sensitive objects, and when the construction is conducted near residences, schools and other facilities, fences should be erected, and the construction should be accelerated to reduce the time of the impact on the sensitive objects; ③ Choose low noise equipment, strengthen the repair and maintenance for construction machines, and ensure that they are in the best working condition; ④ The construction time shall be reasonably arranged and the night construction shall be prohibited, but when the construction must be conducted at night due to the requirement of the construction technology, the night construction procedures shall be handled and the surrounding people shall be informed; and ⑤ Strengthen communication with nearby residents before construction to gain their understanding and support.

The impact of the construction noise on the surrounding environment may be furthest reduced by taking foregoing nose control measures.

6.1.4 Impacts of solid wastes on environment

(1) Analysis of impacts of disused earth and stone on environment

All the earthwork can be transferred within the park and from other parks for landfill without earthwork spoil. Construction waste from old buildings removal, and dust traffic noise from transpotation may cause some impacts on the alongside environment. Therefore, transport vehicles are prohibited from over-speed and overload, at the same time, fences and covering measures will be taken to prevent the waste slags from falling on the road to intensify the impact of the rising dust. After those management measures for vehicle transportation are taken, earthwork transportation will has slight impact on the environment.

(2) Analysis of impacts of municipal solid wastes on environment

The maximum output of municipal solid wastes in the project construction phase is about 30kg/d. If municipal solid wastes are stacked disorderly, the construction site image and sanitation will be affected; at the same time, breeding bacteria, flies, mosquitoes and others may be harmful to the health of constructors.

The project plans to take measures of collection at fixed points and regular clearing and transportation for the municipal solid wastes. Special people will be employed to regularly clear up the waste which will be delivered to the nearby refuse treatment station for treatment, and shall be prevented from scattering on the way to the station. At the same time, special attention should be paid to the maintenance and management of the temporary dump sites, and prevention of the wastes from scattering everywhere caused by stacking wastes randomly, and at the same time, spray germicides and pesticides to the stacking point to reduce the breeding of mosquitoes and germs.

6.1.5 Impacts on ecological environment

All the constructions of the project involves no newly acquired land and sensitive areas. According to the field survey, the project land is mainly dry land, shrubs, grassland, homestead and vacant land.

(1) Analysis of impacts on plant resources and vegetation

This project is located in the central area of the city, so the native vegetation and plant resources have disappeared. The existing plants in the project area are mainly artificial cultivated plants and secondary developing plants, which is a typical urban ecosystem. Part native vegetation will be removed due to the excavation of the land surface and the land construction, which will cause damage to the vegetation in the project construction area.The project land occupation will cause direct damage to the vegetation like shrubs and grasslands, and the crops scattering in the construction area, and the plant biomass and crop yields will lose.

Landscape buildings, plazas, landscape elements, functional architectures, facilities and roads within parks will occupy the land permanently and the vegetation in parks will disappear forever. But the project covers arelatively small area and the engineering work occupies relatively small areas of woodland and grassland. As a result, it just exerts a relatively small impact on the biomass

and crop yield in the project region. According to field investigation, there is no rare and endangered wild species.The plants in the region are common breeds. The construction will endanger the species to a little extent and will not result in the decrease of the number of species and will not have huge impact on bio-diversity in the region. After the completion of the construction, the vegetation will be restored and there will be artificial planting, which will compensate for the loss of bio-diversity in the region. But it should be noted that local species should be planted to prevent the invasion of harmful species.

(2) The impact on animals

The project is carried out within the city and is greatly subject to human disturbance. The existing terrestrial animals are few and far between with birds and rodents which have been adapted to cultivated land and thickets as the main breeds. The project will not hurt rare animals protected by the nation and the city and it will have little impact on the terrestrial animals.

6.1.6 Social impacts

(1) Construction camps

It is not considered at present to separately set up construction camps. If they cannot be rented, construction camps will be set up according to the actual situation at the project construction phase in accordance with relevant requirements in the *Environmental Management Plan*.

(2) Slow-walking footpath project

① The impact of the construction on residents' travel efficiency and safety

The construction of the project will have certain impact on the neighboring residents, students and vehicles in terms of their travel efficiency. Some slow-walking footpaths are rather narrow with intersecting flows of pedestrians and vehicles. Once the construction starts, the construction road will be closed and transporting vehicles will pass through, which will pose threats to the safety of local residents, especially the aged, children and women. The noise and dust generated by the construction may have an impact on nearby residents and vehicles, resulting in congestion, lower traffic efficiency and inconvenience to crossing the streets.

② The disturbance of the construction on residents' lives

During the construction, a large number of construction machinery and transporting vehicles will be used, which will increase the traffic flow in the areas along the route and cause interference to the regional traffic.

③ The impact of the construction on the environment

The slow-walking system involves many roads and entails a large amount of construction. The polluted wastewater, dust and exhaust generated by the construction may have adverse effects on water and ecological environment. The solid waste generated by the construction may also adversely affect the environment.

(3) Public space project

① The impact of the project on environment and traffic

During the construction phase of public space and slow-walking footpath, it will cause adverse impact on the local water environment, atmospheric environment, acoustic environment and ecological environment according to environmental impact assessment. Construction dust is caused by the extraction and filling of earth and stonework, the construction itself, the bulk materials such as cement, the loading and unloading of sand stone, and transporting vehicles, as well as the exhaust generated in the process of transporting, all of which will pollute the air in the construction site, endanger the health of the construction workers and impede the advancement of the construction project. Acoustic pollution mainly stems from the noise caused by the transportation in the construction site and the operating machinery there. Due to the fact that the construction machinery and all sorts of transporting vehicles will create severely unpleasant noise and that there are a lot of residential buildings within the range of 200 meters of the construction site, the construction will certainly produce interference during the night shift, which will have a great impact on residents'sleep. The earth and stonework and household garbage will affect the good outlook and sanitation of the construction site, which will not only pollute the environment but also impact the health of the construction workers, the aged, children and pregnant women.

During the construction of the project, certain public space and the roads near the slow-walking trail may be closed, which will have adverse impact on nearby residents, students and vehicles. Because of the passing of construction vehicles and the close of some roads, the traffic flow along the routewill be increased and there will be traffic congestion during rush hour. After the completion of the project, due to the increase of visitors flowrate in public space, there will be an increase in the vehicles in nearby areas and traffic congestion and traffic accidents are more likely to happen. Visitor from other areas will gather here, which may bring pressure to the public facilities and drain the local residents of their resources.

② The impact on the shops near the public space

Baitaolu Park, Caiyun Lake Park and other public space have witnessed the building of commercial residential communities near them. Due to the noise generated by the construction, customers' shopping activity will be interfered to a certain extent, thus influencing normal trading activities. The closed road due to the construction will cause inconvenience to customers. The delivery vehicle of the storeswill not be able to go through the roads without hindrance, which will have adverse impact on the transportation and sales of products. With the decrease of business turnover, the staff working in those stores will earn less. But all these effects are short-term.

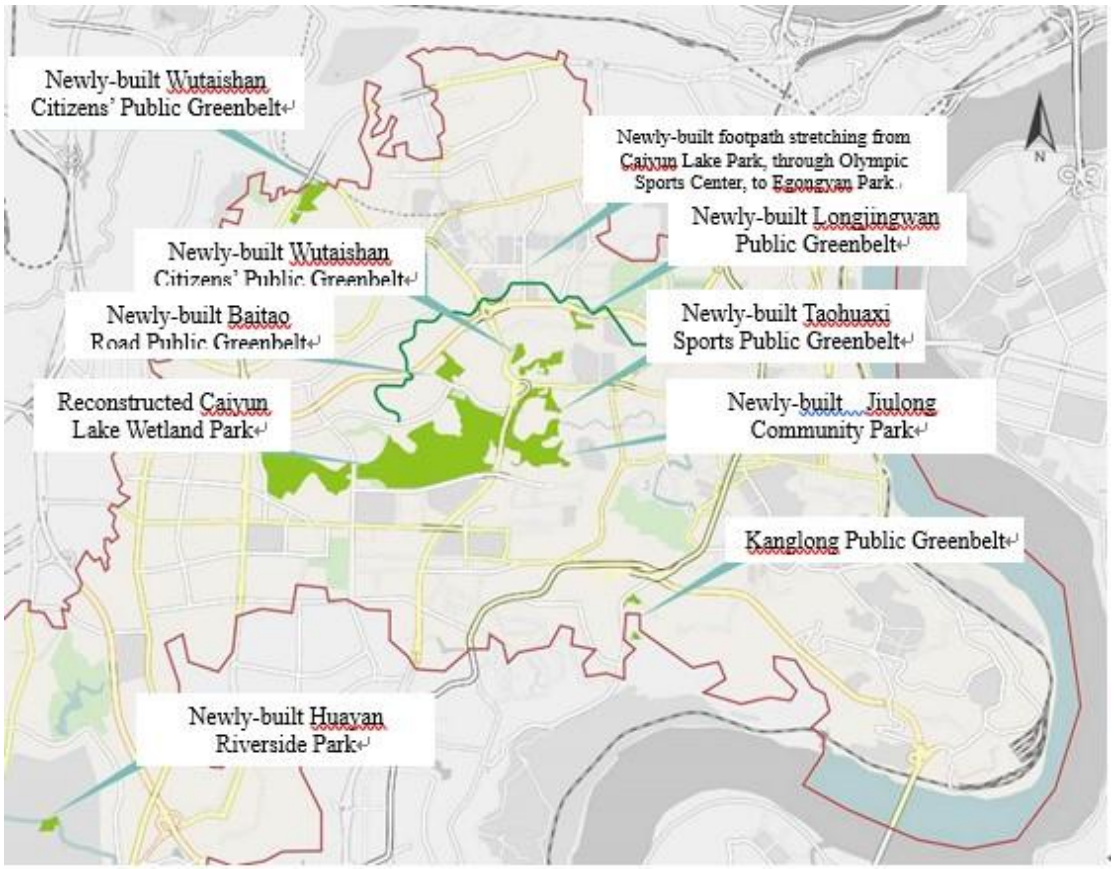
③ The impact on the rent of neighboring houses and commodity price

The improvement of the environment in public space may result in an increase of the apartment and store rent as well as the living cost of external population. It may even force the external population to emigrate. The commodity price and residents' living cost may also be

increased. However, according to the survey, residents believe that the construction of the park will only contribute to an increase of 1.9% of the commodity price in the neighboring areas. In a word, the impact of the construction of the park on the increase of commodity price is trivial.

6.1.7 Cumulative effects

The physical works to be built in Jiulongpo district includes a 5.3 km pedestrian walkway and 9 parks/green belts. The scale of the pedestrian walkway is rather small that the potential impacts are localized and limited. Cumualtive impacts analysis hence examined the 9 parks (see below map). It is noted that 7 prposed parks have an area of 1-5 ha. These parks are located in highly developed urban area of Jiulongpo District. Due to the hilly topography of the city, these pocket of lands, being sloping or situated in between/under built-up structure or infrastructure, are left underutilized.



According to the existing data and on-site surveys, no other projects around the park sites are being implemented or planned to be implemented. Therefore, no other projects around the project are simultaneously constructed on time and space. Hence overlapping of construction impacts are not anticipated.

According to the construction plan, the construction time of the Baitao Road public greenbelt, Taohuaxi Sports Public Greenbelt, Jiulong Community Park, Wutaishan Citizens' Public Greenbelt and Caiyun Lake Wetland Park project are close to each other, and there may be mutual influence during construction, such as traffic volume that produce noise, illumination at nighttime.

Therefore, the construction management department should coordinate the construction arrangement of the project in a timely manner, make preventive measures in advance, and reasonably arrange the construction time and construction period of each different construction point to avoid or mitigate the potential cumulative impact.

6.2 Environmental impact prediction and assessment during operational phase

During the operational phase of this project, the public space may produce a small amount of sanitary sewage, solid wastes, social life noises. The exhaust gas mainly includes minor off-gas and dust from the parkings, and the bad smell from the public toilets and biochemical pool.

6.2.1 Impacts on water environment

The new wastewater during the operational phase is mainly the sanitary sewage produced by urban residents at the public space. The sanitary sewage will be collected by the pipe network, then flow into the main sewage pipe under the action of gravity flow, and finally flow into the sewage treatment plant. After the implementation of this project, the pollution to the water body in this area will be largely mitigated. The public space quality improvement includes 9 parks, and 1.8m^3/d of sewage will be generated, according to the average amount of sewage generated in each public space of 200L/d. The sewage flowing into the sewage treatment plant for discharge after reaching standards through municipal pipe network will not impact the water environment.

6.2.2 Impacts on ambient air

The exhaust gas during the operational phase of this project mainly includes minor off-gas and dust from the parkings, and the bad smell from the public toilets and biochemical pool. The exhaust gas is overall dispersed, so it will not be evaluated. The project during the operational phase only produces slightly impact on the air environment.

6.2.3 Impacts on acoustic environment

(1) Strong noise source

The noise sources in the operational phase are mainly the noise in the public space. The strength the former is about 70 to 80dB (A), which can generally meet the requirements of the corresponding acoustic environment function area, and has little outside impact.

6.2.4 Impacts of solid wastes on environment

Solid wastes during the operational phase are mainly the municipal solid wastes produced by urban residents at the public space. The public space quality improvement project totally includes 9 parks, and the municipal solid wastes of 0.36t/d will be produced according to 40kg/d per public space component averagely. The municipal solid wastes will be collected at fixed places, cleared and transported by the environmental sanitation department regularly, and will not have impact on the environment after being properly treated.

6.2.5 Impacts on ecological environment

(1) Analysis of impacts on animals and plants

During the construction of parks, according to different themes of spring, summer, autumn and winter, plants of all seasons were introduced, including crape myrtle, prunus lannesiana, yulan magnolia, malus spectabilis, camellia, azalea, lignum cinnamomi camphorae, elaeocarpus decipiens, cinnamomum japonicum, hibiscus syriacus, machilus, excoecaria sebifera, koelreuteria paniculata, autumn blaze, ginkgo trees, oriental plane, cotinus coggygria, cypresses, podocarpus macrophyllus, five-leaved pine, plum blossom, phyllostachys edulis, etc. This area was mainly able land and shrubs. After the construction of parks, the trees planted and the habitat created in the project area can increase the diversity of species in the region and attract more animals to this area.

(2) Impacts on ecological system

The ecosystem in urban parks is a man-made environmental system. The main factors that affect the ecological environment of the parks include vegetation, soil, topography, water bodies and human activities. The construction of the parks enhances the natural undulating topography and the smooth and changing water profile, providing a variety of ecological environment for the landscape plants. The various landscape plant communities in the parks are collocated by designers according to the ecological habits of various landscape plants and people's aesthetic needs. The landscape plants have the functions of adjusting urban local balance of ecological environment like landscaping, air purifying, and wind prevention and sand fixation. After the parks are completed, the regional biodiversity of the city can be recovered and the quality of the ecological environment can be improved, which will benefit the stability of the local ecosystem.

6.2.6 Social impacts

(1) Walking path project

① Optimize walking environment and meet requirements of surrounding disadvantaged residents

As per requirements of surrounding communities, the walking path will supplement and optimize furniture of walking space, increase furniture of walking space, increase seats, beautify piping shaft, adjust lighting facilities, etc.; adjust business type at two sides, set business service function as per surrounding living requirements; cultivate convenient node space, increase intelligence + of walking space, build walking space blending intelligent street facilities, make it more suitable for participation of community residents at two sides, especially meet requirements of the aged, children, disabled, and poor people with higher requirement on walking path; and make the walking path provide better service to surrounding vulnerable groups.

② Build complete ring walking system and increase accessibility

The walking path financed by World Bank includes three phases with temporary planning length of 4.7-5.3km, with "Old City Impression" as the theme, building "Old City Impression Zone" with atmosphere of humanism. This section connects path Phase II which is originated from Egongyan Interchange and finally reaches Caiyun Lake Park of Wutaishan Interchange. After

completion, the project will connect Egongyan Park and Caiyun Lake National Wetland Park, complete special recreation, fitness and ecological greenway network and form a closed ring with completed walking system and build a complete ring walking system of Jiulongpo District to facilitate more residents' transportation, improve the transportation efficiency and improve the transportation smoothness of city.

③ Improving the pedestrian environment and the comfort level of citizens' walking experience

The walking environment along both sides of the existing urban main road of Jiulongpo District is poor. Part of the sidewalk has no separation of pedestrians and automobiles or the walking space is too narrow, and part of the road is occupied by vehicles. The shading effect along the two sides is not good, and the landscape is shabby, without good landscape experience. Most of the secondary roads and branch roads lack crossing facilities, including traffic lights, blind roads, etc., and it is dangerous for pedestrians to cross the roads; the walking path is too narrow and the isolation effect is inadequate, and there are shops and marketing booths on the roads.

The walking space width of the walking system is controlled at 4-6m. If condition permits, landscape space of 4m should be reserved to expand existing walkway space. Adjust the ground pavement, increase street-crossing facilities, increase supporting facilities of walking space, the green belt is used for separating pedestrian and vehicle if condition permits. When the land is insufficient, ensure continuous rail type separation belt. Increase supporting design and blind road facilities for the disabled, ensure continuity and safety of blind road facilities, create some landscape nodes and landscape balcony, optimize walking space landscape, adjust green plants of streets, optimize the walking environment, improve the walking experience comfort of residents, especially special population like the aged and the disabled.

(2) Public space project

① Serve surrounding population and provide better leisure experience to residents

The project area is in old city like Yangjiaping, Shipingqiao, Shiqiaopu, etc. with large population density, many old communities and a large number of poverty stricken population. Zhongliangshan, Erlang, Jiulong Town and Huayan Town are located at the rural-urban continuum, so more buildings are built, the proportion of poor people is larger, the living conditions is poor and it's lacking of fitness and public leisure space. Implement public space project, re-plan the activity space of park, add seats, fitness, entertainment and other leisure facilities of public space, enhance leisure and entertainment functions of public space; increase infrastructures like garbage can, public toilet, road lamp, guardrail, etc., improve the using convenience and safety for residents; re-set the vehicle and pedestrian system of square and pedestrian street, form orderly traffic flow and pedestrian and improve the using convenience; and provide better public space leisure experience to population that frequently use public space leisure like women, the aged, poor people, etc.

② Create the city culture image exhibition window and increase the space vitality

Existing park and square are lacking of cultural connotation. At present, Caiyun Lake Wetland Park is the largest comprehensive park in Jiulongpo District and the "green lung" of city. At present, the Phase I promotion and upgrading has been completed, lakeside path has been built, which can be directly included in the walking path system. However, Phase II and III landscape are ordinary, various facilities are in shortage, and it's lacking of attractiveness, which forms a sharp contrast with Phase I. It can increase the cultural connotation of public space, increase cultural rendering and activity setting facilities, become the window of city cultural image of Jiulongpo District and increase the space vitality.

③ Improve surrounding environment and promote ecological development and employment

The project construction will facilitate residents to obtain better public space environment, increase visitors flow to park and square, increase consumers, drive the development of surrounding business and service industry in public space, promote economic growth, increase employment, promote the employment of residents in the project area, especially vulnerable groups like women, poor people, external population, etc. in the project area and improve income of residents.

④ Improve the accessibility and security of public space

The accessibility and security of public space are important factors hindering residents to public space to enjoy leisure life. The park will change existing abandoned green space environment, provides good public leisure space and set safety protection facilities and leisure facilities of park and walking path to improve the accessibility and security of public space and increase the attractiveness of public space to residents.

The project will improve the quality of public space and build walking road to build public space and fitness footpath for rest and fitness of surrounding residents, reasonably configure leisure facilities for park and walking path, set safety protection facilities, change the abandonment and waste of park greenland, improve the accessibility and safety of public space and increase the attractiveness of public space to residents.

6.3 Environmental impact assessment of Caiyun Lake National Wetland Park

6.3.1 Position relation between the project and Caiyun Lake National Wetland Park

The project includes subproject "improvement to Caiyun Lake Wetland Park". The subproject is located in Caiyun Lake National Wetland Park. Other sub-projects don't involve the wetland park.

6.3.2 Analysis of impacts of the project on Caiyun Lake National Wetland Park

(1) Project construction content

The promotion and upgrading of Caiyun Lake National Wetland Park are gradually

completed by unified planning and implementation by stages. Upgrading is implemented by three phases. In phase I, mainly build lakeside footpath and waterborne platform; in phase II, mainly optimize main entrance of park, plan sports area in the east zone, improve surrounding environment, park landscape lighting project, Caiyun edge project, adolescent development and senior activities hall, etc.; in phase III, mainly complete promotion and upgrading of the west zone and complete road system and supporting facilities in the west zone. Wherein, phase II and III project will be completed at the World Bank Financed project.

At present, Phase I project has been completed. As per the construction scheme for Phase II and III of Caiyun Lake Wetland Park, the promotion design takes water system as a carrier, fully explores the connotation of "Taoyuan", uses relevant design factors of "Taoyuan culture" in traditional culture, and respectively creates unique "wetland Taoyuan leisure culture" with themes like "Taohua Garden", "Taohua Stream", "Taohua Lake (Caiyun Lake)" and "Taohua Valley". Wherein, Taohua Garden and Taohua Valley will be mainly created.

Taohua Garden---dominated by leisure, combine Taoyuan culture and create city leisure culture greenland from service facilities, signage system and plant landscape and so on.

Taohua Gully---dominated by sports, mainly create stream landscape, plant peach blossom to form Taohua Stream, and combine sports function to create cultural sports fitness area integrating sports and culture.

Taohua Lake (Caiyun Lake)---dominated by sightseeing, plant peach blossom along the lake, partially form featured landscape avenue, make full use of lake bay, peninsula and island to form unique Taohua Lake (Caiyun Lake) landscape; recover and add scenic spots along the lake and cultivate relaxed and natural and ecological sightseeing culture area.

Taohua Valley---dominated by popularization of science, recover entrance square connected with Wusi Avenue. Wetland is the main landscape object. It needs to be transformed from the conservation function to the popular science exhibition and experience function. Plant peach blossom in wetland, combine the relation of peach blossom, Stream, wetland, plank road and platform to improve the participation of tourists and give full play to the function of science popularization education.

Proposed activities include landscape building (landscape corridor and landscape pavilion); protection works; activity site, square construction; water and electricity pipe network and facilities; landscape art (sculpture accessories, landscape wall, entrance landscape); function building and facilities (toilet and finished product management room); public furniture; road pavement and lineation; signage, etc. The park is for public recreational purpose. Similarly facilities have been built around the core area of the park. The project will expand such facilities in the park. Intentional landscape accessories are shown in Figure 6.3-1.

Figure 6.3-1 Landscape accessories

(2) Impact on natural environment

For garbage and waste in the construction process, A variety of effective measures such as excavation and filling, waste utilization and timely clearance are taken to prevent environmental pollution. In short term, noise and dust in the project construction process may have certain impact on the environment, however, it can be eliminated after completion. During the construction of the project, there are many human activities, and the trampling and destruction of vegetation will cause a small amount of water and soil loss. During the construction, plants in some sections may be slightly damaged. However, in the project construction process, various plants mainly including peach trees will be planted. After completion, vegetation will be recovered in succession. Due to the recovery of wetland ecological system, the biodiversity will be enriched, especially the increase of migratory birds will increase the risk of bird flu. The wetland ecological system will be more complete, the ecological environment will be better, the local government may develop tourism, more and more tourists will come here to enjoy leisure time, go sightseeing and tourism, which may cause certain pollution to the living environment.

(3) Impact on cultural environment

Wetland park construction project is built on the basis of local culture. To create Taoyuan culture, promote and disseminate wetland culture and scientific culture knowledge is to protect, inherit and develop cultural resources. Therefore, the project construction may not cause impact on cultural environment, in contrary, the wetland park will be good for spreading wetland culture,

developing popular science education, improving environmental protection awareness, promoting domestic and international scientific research and cooperation and cultural exchange, and playing an active role in modernization of the region, spiritual civilization construction, social sustainable development and the construction of a harmonious society.

Therefore, the wetland park construction project may not cause obvious negative impact on local natural environment and cultural environment, in contrary, the project implementation will greatly optimize the regional environment, create the excellent project and improve the comprehensive image and competitiveness of Jiulongpo District.

(4) Impact on biological diversity

The promotion and upgrading project of Caiyun Lake Wetland Park include peach trees like Zhaoshou peach tree, Sajinbi peach tree, red leaves prunus persica, supported by arborous plants like white magnolia, osmanthus, camellia, waxberry, maple, yew, ginkgo and so on, create multilayered plant structure on land. Wetland area selects plants like sequoias, cannas, refleas, scallions, yellow calamus, water lilies, etc, and creates diversified plant landscape. The plants planting have positive function for recovery and protection of wetland.

By scientific recovery and protection of wetland, on one hand, it can gradually improve the ecological function of wetland, complete wetland ecological system, provide good reproduction and habitat for animals and plants, especially waterfowl birds; so as to improve biodiversity; on the other hand, it actively attracts and reasonably introduces species to increase category and number of animals and plants and improve the biodiversity.

The potential negative impact of a large number of introduced plants is the ecological problems of invasion of harmful species. Therefore, the assessment requires to strictly select plants from local native species to prevent invasion of harmful species.

(5) Impact on biological safety

With the completion of wetland ecological system functions and stability of food source, the number of migratory birds will increase significantly, which may increase the risk of the spread of bird flu. However, it's hard to predict these risks by current technology at present. It's required to establish close monitoring measures and emergency measures to effectively lower the risk and improve the safety of people and other species.

6.3.3 Conclusion on the impact of the project on the environment of Caiyun Lake National Wetland Park

The park reconstruction will have no impact on the park’s nature and objective, its functional and service functions and landscape; the construction period has an short-term impact on the environment, which will disappear once building completed. Plantation of peach trees and other kinds of plants, the project highlights the "Taoyuan (Peach Flower Origin) culture", enhances the landscape ornamental value of the wetland park, and improves the biodiversity of the park through various plant combinations, which has an obvious

positive effect on the natural environment and the humanistic environment of the wetland park. Native species will be planted to avoid potential threats from invasive alien species.

6.4 Environmental impact assessment of the newly built Huayan Riverside Park

Riverside park of Tiaodeng River occupies 1.29 hectares, located at opposite of Huayan Diecai West City. After the implementation of the black and odorous water body regulation phase I project for Tiaodeng River, the environment is improved significantly (Chapter 4.3.3). The phase II and III regulation project for Tiaodeng River will continue. The newly-built Tiandeng River Riverside Park financed by World Bank financed on ecological landscape construction and restoration after river riverway regulation, which provides a sound ecological environment and involves no water body regulation. According to the design data, the construction contents of Huayan Riverside Park consist of footpaths in the parks, including Yinghuayuan Road, Qujing Road, Sanxing Road, Denghui Binhe Road, Luwei Dangjiang Road and Linqu Road, etc., landscape accessories, children's facilities and public facilities, etc.

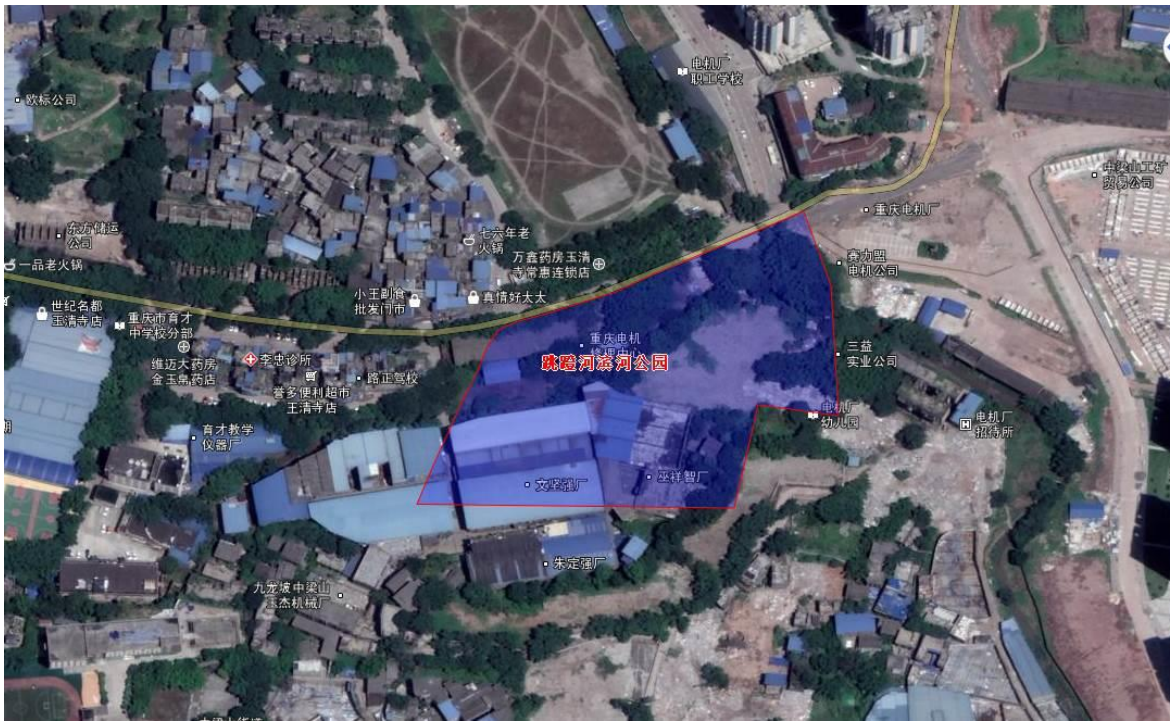


Figure 6.4-1 The geographic location of Huayan Riverside Park

The impact of the construction on the park mainly concentrates in the construction phase. Besides the detailed analysis in Chapter 6.1 in this report, a brief analysis on the Huayan Riverside Park is carried out herein.

(1) Water Environment

The water pollution sources during the construction phase mainly include the construction wastewater and the domestic sewage of construction personnel. The construction wastewater will be reused or used for reducing dust in the construction site and roads after the treatment of the oil

separation and grit chamber erected in the construction site, without being discharged outside. If it is impossible to connect with the existing municipal sewage pipe network, the sewage should be regularly sucked by the fecal suction truck to the sewage treatment plant for treatment after being collected and pretreated by the biochemical pool; if the municipal sewage pipe network can be connected, the sewage shall be discharged to the municipal sewage pipe network after being collected and pretreated by the biochemical pool. During the construction, the plastic film or non-woven fabrics should be applied to cover the excavation and filling slopes without protective measures, topsoil stockpiling location, stockpiling yard and the like, and measures like woven soil bags as fence and intercepting ditches should be taken around the topsoil stockpiling location and the stockpiling yard.

After those measures are taken, the impacts on the water environment of Tiaodeng River by the park construction will be slightly.

(2) Atmospheric environment

The ambient air pollution sources during the construction phase mainly include the exhaust gas with NOx and CO from such activities as all kinds of fuel powered machinery, road dust, material handling and transportation, etc.. Carry out wet method operation during the construction phase; the tires of all transportation vehicles into and out of the construction site should be cleaned to avoid the soil being brought onto the urban roads; set baffle, materials storage yard fence and cover it along the construction site; adopt machinery and vehicle meeting the environmetal requirements.

After those measures are taken, the impacts on the atmospheric environment of Tiaodeng River by the park construction will be slightly.

(3) Acoustic environment

The noise sources during the construction phase mainly include the construction machinery and transportation vehicles, which will cause temporary impact on the life of the surrounding reisedents. The environmental assessment requirements in the construction process: reasonably arrange construction time, prohibit night construction, and be sure to handle the relevant formalities for night construction and inform the surrounding residents for construction process necessary at night; large machinary shall be arranged away from sensitive targets, fences shall be set up around the residentail bulidings and schools and the construction schedule shall be speeded up to shorten the impacted period for the sensitive targets; select low-noise equipment and enhance maintenance of equipment to ensure its best working condition; enhance communication with the surrounding residents to earn their understanding and support.

After those measures are taken, the impacts on the surrounding acoustic environment of Tiaodeng River by the park construction will be slightly.

(4) Solid waste

The solid waste sources during the construction phase mainly include the earthwork spoil and domestic garbage of construction personnel, etc.. The riverside park involves 7 parks and earthwork can be transferred among each park without earthwork spoil; domestic garbage produced during the construction phase shall be collected at fixed points and transported regularly.

After those measures are taken, the impacts on the surrounding environment of Tiaodeng River by the park construction will be slightly.

(5) Ecological environment

During the construction phase, small amount of earthwork excavation, filling, and temporary storage of construction materials, appliances, etc. will damage the original topography, and the vegetation alongside, causing surface exposure. Therefore, the local ecological structure in the area alongside will be changed to a certain extent. The exposed earth surface may cause soil erosion due to rainwater and earth surface runoff, leading to the reduction of soil fertility and the stability of the terrestrial ecosystems. In the construction process of the park, the environmental assessment requires that all the construction materials and appliances should be stacked in the permanent occupation area of the Park; during the construction phase, strengthen the exposed land coverage and reduce soil erosion; speed up the park construction and restore vegetation to reduce water and soil loss as soon as possible after construction.

After those measures are taken, the impacts on the surrounding ecological environment of Tiaodeng River by the park construction will be slightly.

At the completion of the project, the Huayan Riverside Park will form an ecological corridor along both sides of the Tiaodeng River, which will enhance the functions and the structure of the riparian ecosystem and play a significant role in the water environment protection of Tiaodeng River and the ecological environment along the river.

7 Mitigation measures for environmental impacts

7.1 Environment protection measures during construction phase

7.1.1 Prevention and control measures for sewage and wastewater pollution

The pollution control measures to be taken during the construction phase are as follows:

(1) Domestic sewage from constructors

The domestic sewage produced by the constructors is strictly forbidden to be discharged directly into the natural water body. The river beach should be avoided at construction site selection (for example, the bank of Caiyun Lake, the beach of Taohua Stream or the beach of Tiaodeng River). If it is impossible to connect with the existing municipal sewage pipe network, the sewage should be regularly sucked by the fecal suction truck to the sewage treatment plant for treatment after being collected and pretreated by the biochemical pool; if the municipal sewage pipe network can be connected, the sewage shall be discharged to the municipal sewage pipe network after being collected and pretreated by the biochemical pool.

It is suggested that the construction unit should try to rent the local residences during the construction phase. If it is indeed necessary to construct temporary construction residences, the construction camp should be arranged within the permanently acquired land.

(2) Construction wastewater

The wastewater produced by the project is mainly the concrete curing wastewater in the park construction, the wastewater from washing the transportation vehicle tires, the oily wastewater produced by the maintenance of the construction machines, etc. The construction wastewater will be reused or used for reducing dust in the construction site and roads after the treatment of the oil separation and grit chamber erected in the construction site, without being discharged outside.

(3) Management measures

The environmental protection education as to the construction site and the construction camp should be carried out for the construction personnel to make them understand the importance of water resources protection. Reasonable construction procedures should be developed for efficient organization of construction operations and the construction management and engineering supervision should be strengthened. Construction machines must be strictly inspected to prevent oil leakage polluting water body. Construction materials such as oil and chemicals should not be piled near the surface water body, and the canvas should be prepared as temporary shelter. During the construction, the plastic film or non-woven fabrics should be applied to cover the excavation and filling slopes without protective measures, topsoil stockpiling location, stockpiling yard and the like, and measures like woven soil bags as fence and intercepting ditches should be taken around the topsoil stockpiling location and the stockpiling yard. Scientific, reasonable, efficient and strict construction management will help to reduce the impact of construction phase on the surrounding surface water environment.

(4) Others

①The principles of "water for multiple usages, recycling and water saving" shall be implemented in the process of construction, and efforts should be made to reduce the discharge of wastewater.

②The management of construction machines should be strengthened to prevent moving, false use, dripping and leaking of the machines.

The Environmental Impact Assessment thinks that after foregoing water pollution prevention and control measures are taken, the sewage and wastewater produced during the construction phase will have little impact on the environment.

7.1.2 Ambient air pollution prevention and control measures

The ambient air pollution mitigation measures during the construction phase shall be in strict accordance with the *Prevention and Control Measures for Dust Pollution of Chongqing Main Urban Districts* (Chongqing Municipal People's Government Decree No. 272), the *Notice of* Chongqing *Municipal People's Government on Enclosed Transport of Materials Easy to Scatter and Leak in Main Urban Districts* (YF Decree No. 164) and other relevant regulations, and relevant measures mainly include:

(1) The construction unit shall, in accordance with the technical specifications for the prevention and control of dust pollution, formulate the prevention and control plan for dust pollution in combination with the actual situation of a specific project, and report to the municipal administrative department and the administrative department responsible for supervision and management of the dust pollution of this project respectively for recording three working days before the commencement of the project;

(2) Promoting the wet operation during the construction, erecting the watering for dust prevention supporting devices on the construction site, and strengthening the watering for dust prevention. The entrance and exit for transport vehicles should be properly arranged on the construction site, the tires of the vehicles out of the construction site must be washed for soil at the exit, and the wastewater from such washing should be treated by establishing sedimentation tanks.

(3) Building hard enclosed fences before the construction of the road section involving sensitive points, which shall be not lower than 1.8m.

(4) The enclosures of not lower than the height of the stacked materials shall be erected for such materials easy to rise or scatter as cement, mortar and plaster stacked in the open air or the construction wastes which cannot be cleared and transported within 48h, which shall also be covered; it is forbidden to throw construction wastes or materials easy to rise or scatter from a places higher than 3m; bulk materials (cement, river sand, etc.) shall be enclosed (covered or sheltered) for transportation.

(5) The sites that may be idle for more than 3 months should be covered, simply paved or

afforested; after the completion of the project, the construction waste shall be removed within 10 days from the date of application for acceptance of the project completion;

(6) The construction site should be equipped with the watering cart for watering in dry weather on the construction site, and focus on the communities and sub-districts affected by the project construction;

(7) Use commercial concrete, and the construction site shall not be equipped with large concrete mixing stations which are not necessary for the process. Modified asphalt concrete shall be used for road surface, and the construction progress shall be accelerated at paving. The construction machines and plant shall be regularly maintained to keep them in good condition, and reduce the exhaust gas and pollutant emission from construction equipment.

(8) Construction personnel use the liquefied gas (LPG) as their living fuel.

After aforesaid air pollutant prevention measures are taken, the adverse effects of the dust produced during the construction on the environment can be effectively suppressed, and its overall impact on the surrounding sensitive points can be limited.

7.1.3 Noise pollution prevention and control measures

(1) High-noise construction sites shall be located in areas far away from the environmental sensitive points;

(2) The organization of the construction can be well designed by appropriate layout of construction machines and proper arrangement of the construction intensity. Try to place construction machines far away from surrounding sensitive points, appropriately position high-noise machines on the construction site, and erect fences around the construction site; temporary machine rooms should be arranged for strong-noise machines on the site like air compressors and diesel engines.

(3) Choose low-noise equipment that meets national standards, strengthen the maintenance of such equipment, and avoid the high noise pollution caused by the abnormal working of such equipment;

(4) In accordance with the stipulations of the *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523－2011), the construction time shall be appropriately arranged and the construction machines with strong noise are forbidden to work near residential areas at night (22:00 to 6:00); where under special circumstances it is necessary to conduct continual construction, the prior approval of relevant departments must be obtained and the prior communication with residents shall be conducted;

(5) Night construction operations which may emit noise pollution other than urgent repair and emergent rescue shall be prohibited at the area with dense noise sensitive buildings within 15 days before and during the college entrance examination and the senior high school entrance examination, and the construction operations which may produce environmental noise pollution

shall be prohibited within the area of 100m around the examination rooms during the college entrance examination and the senior high school entrance examination;

(6) The passing time of the construction vehicles should be coordinated during the construction phase. With busy existing traffic, the construction unit, the construction party and the traffic administration shall strengthen their communication and coordination to avoid traffic jams. During the transportation at night, measures of slowing down and no honking will be taken. Strengthen the maintenance of construction machines;

(7) Some existing roads within the project area will be used to transport construction materials and earth-rocks during project construction, and attention should be paid to the appropriate arrangement of the construction material transportation time. When vehicles pass the road sections of residential areas and schools, measures of slowing down and no honking should be taken.

(8) Minimize the construction environmental noise hazard by optimizing the construction plan and appropriately arranging the construction period; at the construction bidding, the measures to reduce the environmental noise pollution shall be listed in the construction organization design and defined in the contract.

(9) Construction workers and field construction workers shall perform self-protection in the working time as per labour hygiene standard; such as wearing earplug and helmet;

(10) The supervision organization shall properly perform noise supervision during the construction phase, configure certain number of simple noise measuring instruments to monitor nearby residential areas of construction site so as to protect it from influence of noise exceeding standard.

After foregoing noise prevention and control measures are taken, the impact of the construction noise on the regional environment can be minimized.

7.1.4 Solid waste pollution presentation and control measures

The solid wastes durinh the construction phase are manly construction wastes and the domestic wastes from constructors.

Solid wastes during the construction phase shall be treated under the principles of “gathering together, separate treatment and recycling”. Earth-rocks in the park and each park can be temporarily transferred without spoil; construction wastes from old buildings removal will be directly transported to surrounding legal slag disposal fields. Transport vehicles for waste earth and stone are prohibited from over-speed and overload; at the same time, fences and covering measures will be taken to prevent the waste slags from falling on the road to intensify the impact of the rising dust.

The project plans to take measures of collection at fixed points and regular clearing and transportation for the domestic wastes during the construction phase. Special people will be

employed to regularly clear up the waste which will be delivered to the nearby refuse treatment station for treatment, and shall be prevented from scattering on the way to the station. At the same time, special attention should be paid to the maintenance and management of the temporary dump sites, and prevention of the wastes from scattering everywhere caused by stacking wastes randomly, and at the same time, spray germicides and pesticides to the stacking point to reduce the breeding of mosquitoes and germs.

7.1.5 Ecological environment protection measures

(1) Yielding measures

The Project mainly considers city greenland construction like park and reduces occupation of ground facilities by project construction. Construction shall avoid the dense vegetation.

(2) Mitigation measures

① Before the construction, the mellow soil of the topsoil layer in the area of the acquired land should be stripped, piled up at fixed points and covered with waterproof membrane. After the completion of the construction, the mellow soil may be used as the surface covering soil to recover the construction slash.

② The disturbance to the surrounding ecological environment can be minimized by appropriately arranging the construction site, trying to confine the construction activities to the area of the acquired and occupied land for construction, and transplanting tall arbors within the area of the occupied land before construction.

③ The inevitable water and soil loss caused by the construction can be minimized by appropriate design of the construction during the construction phase and excavation and filling by phases and areas.

④ Combined with the construction plan in an organized way, to build facilities of grit chambers, drainage ditches, retaining walls, etc. in advance. In order to ensure the stability of the temporary stacking and prevent the water and soil loss during construction, the necessary fences and covers shall be made for the temporary stacking, and at the same time, drainage ditches will be built in the direction where the water comes. During the construction in the rainy season, woven bags and plastic cloth may be used to cover the slope side of the excavated exposed soil and so on to reduce the earth surface erosion caused by the rainwater.

⑤ It is strictly forbidden to dump waste soil and slags into or clean construction equipment by the natural water bodies.

⑥ Raise the awareness of protection of the construction personnel. The construction method and time should be planned well to reduce the disturbance of the construction noise to the wild animals. Management should be strengthened to avoid direct discharge of sanitary sewage and construction wastewater, so as to reduce water pollution and maximize the protection of animal habitats.

(3) Recovery measures

① After the completion of the construction, the temporarily occupied land should be recovered in time, and the appropriate collocation of arbors, shrubs, flowers and grass should be strengthened.

②The tall arbors transplanted during the construction phase can be used for afforestation upon the conclusion of the construction.

③ Upon the conclusion of the construction, the bare areas along both sides of the road should be afforested, grass sowing by spraying for soil slopes, and spraying organic matrix for stone slopes.

④ Adopt the native species to prevent the impact of harmful species.

(4) Water and soil conservation measures

In accordance with the stipulations of the *Law of the People's Republic of China on Water and Soil Conservation*, the *Regulations for the Implementation of the Law of the People's Republic of China on Water and Soil Conservation*, etc., the possible water and soil loss caused by the construction of this project must be protected. The principles and objectives of the water and soil loss control shall meet the general requirements of the state on soil and water conservation and environmental protection. The design of soil and water conservation should be synchronized with engineering design, construction and acceptance. The project construction unit shall bear the cost of controlling the water and soil loss caused by the construction.

7.2 Environment protection measures during operational phase

7.2.1 Prevention and control measures for sewage and wastewater pollution

The wastewater during the operational phase is mainly the demestic sewage produced by urban residents at the public space, which will be discharged into the municipal sewage pipe network.

7.2.2 Ambient air pollution prevention and control measures

The exhaust gas during the operational phase is mainly the minor off-gas and dust from the parkings, and the bad smell from the public toilets and biochemical pool.

(1) Afforestation: the construction of green belts of the project should be improved. The points, lines and planes should be integrated and trees, shrubs, flowers and grasses should be appropriately matched. The function of absorption of the vegetation should be used to mitigate the impact of the exhaust gas on the two sides of the project.

(2) Reducing road damage: the specifications and load of vehicles on the road shall comply with relevant regulations. The dust prevention measures should be taken for damaged road surface in time which should be repaired within a month.

(3) The vehicle exhaust emission inspection system will be implemented and the vehicles

with their emitted exhaust gas exceeding standard will be controlled for being on road.

(4) The public toilet management should be strengthened. Public toilets should be timely cleaned and kept sanitary and ventilated. Afforestation should be made around public toilets to reduce the escape of the bad smell.

(5) Biochemical pools should be equipped with exhaust funnels to lead the bad smell above the ground for emission, with the emission height of 1m, in the form of shutter type, and surrounded by enclosed green space.

7.2.3 Noise pollution prevention and control measures

(1) Set No Honking Area;

(2) Plant tall arbors around the parking to reduce noise;

(3) Noiese produced by assembly, party, recreation, bodybuilding, raising animals and other activities in the area cannot disturb the residents.

7.3 Environmental protection measures of the Caiyun Lake National Wetland Park

During the construction and operational phase of the Wetland Park, some domestic sewage and solid waste will be produced, which may impact the local environment. Therefore, ecological engineering and management measures should be taken to minimize the pollution to the surrounding environment.

(1) Conscientiously implement the relevant environmental quality standards, pollutants discharge standards and basic environmental standards, etc., and list the environmental protection as one of the important contents of the management of wetland protection targets.

(2) Degrade and eliminate the production and domestic sewage generated during the operational phase of the project through the wetland ecosystem measures formed.

(3) The solid waste generated during the operational phase of the project can be disposed by filling, reclamation, recycling, and other treatments. After repeated purification and qualification, the domestic sewage will be introduced into the natural forest to avoid secondary pollution.

(4) Strengthen environmental protection education, and build up and enhance their awareness of environmental protection, to control and reduce environmental pollution.

(5) During the construction phase, loading and covering should be carried out to minimize the earthwork excavation, avoid damaging the surrounding vegetation, and reduce the water and soil loss caused by the project construction. After the completion of the civil engineering, harden and beautify the excavation site and the central site.

(6) Protect the soil and vegetation resources, establish a reasonable and healthy wetland ecosystem and natural open space to enhance the wetland landscape effect and biodiversity.

(7) Cultivate and plant wetland plants with unique characteristics, increase the area of green space, optimize the distribution pattern of green plants to promote the natural ecological

restoration of the wetland, regulate the microclimate, reduce noise and dust, and beautify the wetland environment.

(8) Select native species to prevent harmful species invasion.

(9) Establish an emergency plan for avian influenza.

8 Analysis of land acquisition and resettlement impacts

Based on the existing urban footpath, the slow-walking footpath stretching from Caiyun Lake Park, through Olympic Sports Center, to Egongyan Park is to reconstructed and extended without land acquisition and resettlement. All the 9 proposed public spaces involve no land acquisition or resettlement.

9 Public consultation and information disclosure

9.1 Purpose of public consultation and information disclosure

Public consultation and information disclosure are important parts of the project environmental impact assessment. Information disclosure is to inform the stakeholders in the project of the project information without delay, put forward concern on the project impact, or make comments and suggestions on the project. Public consultation is to get public opinions from the area directly impacted by the project, so that the decision making department may timely discover potential problems and promptly modify and improve the design plan to fundamentally address the problems put forward by the public, further perfect and rationalize the process design, environment protection measures and environment monitoring and management of the project, and strive to achieve the optimized unification of the project construction in terms of environmental benefits, social benefits and economic benefits.

The public consultation and information disclosure are designed for organizations and individuals within the scope of the project environment impact, and attach special importance to the needs and appeals of the groups of schools, hospitals, non-governmental organizations, etc.

9.2 Public consultation methods

This Assessment conducts the public consultation activities by the way of symposiums, visits, questionnaire surveys, etc., in accordance with the *Provisional Methods on Public Participation in Environmental Impact Assessment* (HF 2006 No. [28]), the World Bank OP/BP4.01 *Environmental Assessment* and BP17.50 *Information Disclosure*.

9.3 Summary, opinions and feedback of public consultation

The public subscribe to and support the implementation of the project according to the interviews in the project area.

9.4 Information disclosure

This project has been disclosed twice.

9.4.1 First disclosure

From November 18, 2017 to January 2, 2018, our company was disclosing the basic information of the project on the website of CCTEG Chongqing Engineering Co., Ltd. (http://www.cqmsy.com/) for the first time.

The screen shot of such disclosure is as follows:

Figure 9.4-1 Screen shot of the first disclosure of environmental impact assessment information

9.4.2 Second disclosure

From January 11, 2018 to January 24, 2018, our company was disclosing the basic information of the project on the website of CCTEG Chongqing Engineering Co., Ltd. (http://www.cqmsy.com/) for the second time.

The screen shot of such disclosure is as follows:

Figure 9.4-2 Screen shot of the second disclosure of environmental impact assessment information

9.5 Information disclosure methods

The full text of the Environmental Impact Assessment Report of this project disclosed its complete first draft at the offices of all Jiulongpo District communities involved in the project for the first time on December 25, 2017; and disclosed at the offices of all communities for the second time after the project symposium and the pubic engagement inquiry.


Figure 9.5-1 Photos of full text disclosure site

9.6 Public engagement methods, content and inquiry scope

9.6.1 Public engagement methods and scope

In January 2018, our company inquired the public opinion by the way of symposiums and questionnaire surveys and directly got written opinions and suggestions on this project from the public.

The pubic inquiry this time mainly covered relevant departments of Jiulongpo District and the residents of the place where the project is located.

Figure 9.6-1 Project symposium

9.6.2 Public engagement inquiry content

The inquire content mainly includes individuals' attitudes towards the project construction, how the project construction will impact the environment, public suggestions and demands, etc.

9.7 Findings statistics and suggestion feedback

9.7.1 People compositions of public engagement

Our company issued 79 questionnaire forms and actually took 79 forms back, with a retrieve rate of 100%. See Table 9.7-1 for the people composition of public engagement, and see attachments to the Report for their personal information list.

Table 9.7-1 Analysis of people compositions of public engagement

Item	Category	Number	Percentage (%)
Gender	Male	42	53.2
	Female	37	46.8
Age	50 years old and above	16	20.3
	30 to 49 years old	46	58.2
	Under 30 years of age	14	17.7
Educational level	Junior middle school and primary school	6	7.6
	Senior high school and technical secondary school	12	15.2
	Colleges, junior colleges and above	42	53.2
Profession	Cadre	6	8.3
	Office clerk	24	30.4
	Teacher	3	3.8
	Worker	13	16.5
	Farmer	1	1.3
	Deputy to the People's Congress	0	0
	Others	25	31.6

Note: there are 3 people with age unfiiled, 19 people with educational level unfiiled and 7 people with profession unfiiled, so 79 people are taken into account when percentage calculation.

It can be seen from the foregoing table that among the people of public engagement, the number of males is 42, accounting for 53.2%, and females 37, 46.8%; people under 30 years old accounts for 17.7%, 30 to 49, 58.2% and 50 and the above, 20.3%; most people have the educational level of college, junior college and the above, accounting for 53.2%, then the educational level of senior high school and technical secondary school, 15.2%, and the least, junior high school and primary school, 7.6%; most people are engaged in professions other than those listed in the table, accounting for 31.6%, then office clerk 30.4%, worker 16.5%, cadre 8.3%, techer 3.8% and famer 1.3%; the people of public engagement have certain representativeness

according to the local actual social and environmental conditions.

9.7.2 Statistics of public opinions

See Table 9.7-2 for the findings and statistics of public opinions.

Table 9.7-2 Public engagement findings and statistics

1. Do you know Jiulongpo District Urban Regeneration Project?		
[27, 34.2%] Yes	[46, 58.2%] Basically	[6, 7.6%] No
2. Are you satisfied with the environmental conditions of the place where you currently live or work?		
[18, 22.8%] Yes	[47, 59.5%] Relatively satisfied	[14, 17.7%] No
3. Do you think the construction of the project will facilitate the economic and social development of the project area?		
[75, 94.9%] Yes	[0, 0] No	[4, 5.1%] Not clear
4. What do you think is the environment concern that will impact you most or you care about most at the construction phase?		
[24, 30.4%] Wastewater	[25, 31.6%] Exhaust gas	[28, 35.4%] Waste residues
[61, 77.2%] Noise	[20, 25.3%] Ecological damage	
5. What do you think is the environment concern that will impact you most or you care about most at the operational phase?		
[24, 30.4%] Wastewater	[26, 32.9%] Exhaust gas	[39, 49.4%] Waste residues
[30, 38.0%] Noise	[20, 25.3%] Ecological damage	
6. What is your attitude towards the impact of this project during the construction and operational phases?		
[33, 41.8%] Understand	[46, 58.2%] Understand, but there must be mitigation measures	
[0, 0] I don’t care		
7. What do you think is the function of the construction of this project for the project area?		
[68, 86.1%] To improve regional environment	[42, 53.2 %] To promote economic development	
[31, 39.2%] To improve the standard of living	[0, 0] A minor role	
8. Provided that environment protection and ecological protection are guaranteed, do you agree the construction of the project?		
[79, 100%] Agree	[0, 0] Disagree	[0, 0] I don’t care

Note: Question 4, 5 and 7 may have multiple answers.

The statistics in the table shows that:

① 34.2% of the questioned know about the Jiulongpo District Urban Renwal Project, 58.2%

have basic knowledge and 7.6% don't know it.

② Among the public questioned, 22.8% are satisfied with the environmental conditions of the place where they currently live, 59.8% relatively satisfied and 46.7% unsatisfied.

③ 94.9% of those questioned believe the construction of the project will facilitate the economic development of the project area, and 5.1% say they are not clear.

④ As for the environmental concerns brought about by the construction of the project during the construction phase, 77.2% of the questioned show their concern about noise impact, followed by waste residues, exhaust gas, wastewater and the ecological environment, respectively accounting for 35.4%, 31.6%, 30.4% and 25.3% of the investigation samples.

⑤ As for the environmental concerns brought about by the completation of the project during the operational phase, 49.4% of the public questioned think the impact of waste residues is most serious, 38.0% think the impact of noise is most serious, 32.9% think the impact of exhaust gas is most serious, 30.4% think the impact of wasterwater is most serious, and 25.3% think the impact of ecological damage is most serious.

⑥ As for the impacts caused by the construction and operational phases of the project, 41.8%% of the questioned think they can understand, 58.2% say they can understand but there must be mitigation measures.

⑦ As for the function of the construction of the project for the project area, 86.1% of those questioned think it may improve the regional environment, 53.2% believe it may promote the economic development, 39.2% say it may improve the standard of living.

⑧ 100% of those questioned agree and support the construction of the project, and nobody **objects.**

9.7.3 Public concerns and solutions

According to the analysis of the statistics of the questionnaire forms of public engagement issued this time, the major public concern is environment polluting problems.

The noise pollution concerns the public most, followed by waste residues, exhaust gas, wastewater and the ecological environment during the construction phase, which the proposed project has taken corresponding actions to address. The waste residues concerns the public most, followed by noise, exhaust gas, wastewater and the ecological environment during the operational phase, which the proposed project has taken corresponding actions to address. The construction unit shall strictly take the prevention and control measures proposed in this Environmental Impact Assessment for treatment and mitigate the environment pollution brought about by the construction of the project as far as practicable.

During the disclosure of this project to the public, neither the assessment unit nor our company received any information feedback given in other forms.

9.8 Public engagement research conclusion

It can be seen from the public engagement inquiry process that most of the local people have certain knowledge of the project, and such public engagement will also facilitate the public to know details of the project, raise their awareness of environment protection and right to speak, and protect their own interest. The public questioned agree the construction of the project, and the Environmental Impact Assessment requires the construction unit to strictly take the prevention and control measures proposed in this Environmental Impact Assessment for pollution treatment and mitigate the environment pollution brought about by the production of the project as far as practicable. This Environmental Impact Assessment think as long as appropriate pollution prevention and control measures are taken practically, the local public concerns may be properly addressed and the adverse environmental impacts of the project construction are acceptable to the public.

10 Environmental Management Plan (EMP)

10.1 Purpose

The *Environmental Management Plan* is to implement relevant mitigation measures to the identified environment impacts, and supervise the effectiveness of such measures during the project life cycle. The *Environmental Management Plan* based *Environmental Impact Assessment* is developed in accordance with Chinese laws, regulations and guidelines pertaining to environment, the World Bank safeguards policies and the best practices of similar projects. The *Environmental Management Plan* is designed to guarantee its consistency with the *Environmental Impact Assessment* to reach the standards with regard to environment protection. The *Environmental Management Plan* effectively meets the supervising requirement, and guides the Project Owner to manage the Contractor and subcontractors.

10.1.1 Environment management organizations

The implementation of this *Environmental Management Plan* requires the engagement of multiple organizations and departments; each organization plays a different but important role to guarantee the effective environment management for the project.

Such two groups of organizations will be involved in the environment management process: as one group of organizations to be responsible for organizing or implementing the *Environmental Management Plan*, and the other group to enforce standards, laws and regulations pertaining to the project, and supervise the implementation of the *Environmental Management Plan* and the overall environmental performance. See Figure 10.1-1 for the project environment management and supervisory organization frame diagram.

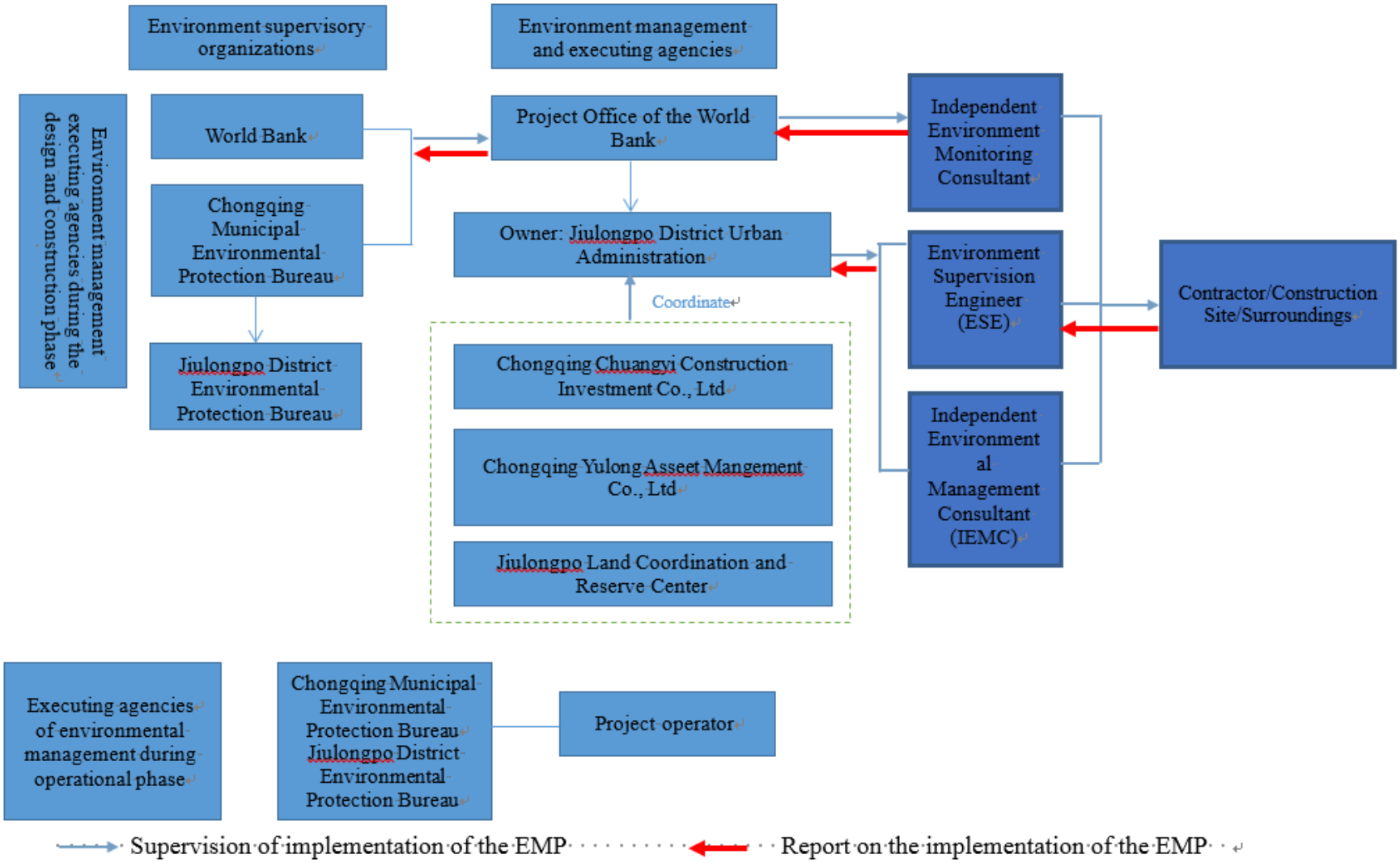


Figure 10.1-1 Environmental management and supervisory organization

10.1.2 Environment management responsibilities

See Table 10.1-1 for key environment management responsibilities of each environment management organization.

Table 10.1-1 Environmental supervision and management responsibility list

SN	Organization/unit	Responsibilities
1	Project Office of the World Bank	Responsible for all the environment management work of the project, including effective implementation of mitigation measures, supervision and monitoring, budget security and report to the World Bank and the local environment bureau; Ensure that measures in the Environmental Management Plan have been included in the bidding documents and the construction contract; Supervise the construction unit to implement the pollution control measures, and timely report any violations to the construction unit; Guarantee that the supervised content of the environmental protection agency is included in the bidding documents and the contract concluded with the Supervision Engineer, supervise and participate in the supervision of the project; Entrust the environment monitoring organization with environment monitoring during the construction phase, and cooperate in the environment monitoring during the construction phase. Organize environmental trainings for the Contractor and the Environment Supervision Engineer.
2	Jiulongpo District Environmental Protection Bureau	Jiulongpo District Environmental Protection Bureau is responsible for the environmental management and supervision within the development area. Implementation of the monitoring and supervision over environment protection on behalf of Chongqing Municipal Environmental Protection Bureau during the construction and operational phases. Investigate and address the resident disturbance complaints during the construction and operational phases. Guarantee the "three simultaneous". Guarantee the normal operation of environment protection facilities.
3	Jiulongpo District Urban Administration	The Project Owner is going to implement the World Bank funded infrastructure construction, including procurement, construction management, implementation of safeguards policies and compliance, monitoring and reporting, etc.
4	Project operator	Operation of environment protection facilities, environment management and other activities during the operational phase of the project.
5	Environment Supervision Engineer (ESE)	Review and assess whether the construction design meets the requirement of the environmental impact assessment and the Environmental Management Plan, and in particular review and assess the site environmental management and the required measures used to mitigate impacts; Supervise the site environmental management of the Contractor and

SN	Organization/unit	Responsibilities
		provide accurate guidance; Review the Contractor's implementation of the Environmental Management Plan, and verify and confirm the environment supervisory process, parameters, monitoring locations, equipment and results; Report the implementation of the Environmental Management Plan; Examine and approve invoices or expenditures according to the implementation of the Environmental Management Plan.
6	Contractor	Develop detailed Contractor Environment Protection Plan which shall be a component of the construction contract. Report new environmental issues or any cultural relics discovered during the construction phase to the Supervision Engineer. Conduct ongoing public consultation during the construction.
7	Independent Environmental Management Consultant (IEMC)	Project Office of the World Bank (PMO)will employ the IEMC independent from the Environment Supervision Engineer and the Contractor. The IEMC's task is to assess the implementation of the Environmental Management Plan during the project construction phase, advise the Project Owner on management and finally guarantee that the project conforms with the requirements of the Environmental Management Plan.
8	Environment Quality Monitoring Consultant (EQMC)	The Environment Quality Monitoring Consultant refers to the professional monitoring organization to implement environment quality monitoring in accordance with the Environment Monitoring Plan contained in the Environmental Impact Assessment Report. The Project Owner will employ the Environment Quality Monitoring Consultant to implement the monitoring plan.

10.2 Environmental mitigation measures

Based on the analysis in *Environmental Impact Assessment*, following chapters summarize some outstanding environmental impact and mitigation measures. Table 10.2-1, 10.2-2 and 10.2-3 list main activities and phases, confirmed potential environmental impact and typical mitigation measures, as well as implementation and monitoring responsibilities.

These mitigation measures are in conformity with waste collection and transportation requirements in relevant national laws, regulations, guidelines, rules, World Bank's policies, the *General Guideline for* Environment, *Health and Safety*, the *Guideline for Water and Sanitary Environment, Health and Safety*, the *Guideline for Environment, Health and Safety of Waste Management Facilities*; so as to solve various impacts during the design, construction and operational phase.

10.2.1 Environmental protection measures and suggestions during the design phase

Table 10.2-1 List of environmental impacts and mitigation measures during the design phase

Links and factors	Potential impacts/issues	Mitigation measures	Implementor	Supervisor	Monitoring indicators	Monitoring frequency
Acoustic environment	Impacts on construction workers	During the construction, reasonable noise isolation and reduction measures shall be taken during the project design to mitigate the impact of construction noise on the field construction workers.	Environmental assessment consultant	World Bank PMO, Jiulongpo District Environmental Protection Bureau	Environmental impact assessment approved by World Bank and Jiulongpo District Environmental Protection Bureau	Before assessment
Atmospheric environment	Impacts of dust from transportation on surrounding residents	Raw materials shall be purchased locally.	Environmental assessment consultant	World Bank PMO, Jiulongpo District Environmental Protection Bureau	Environmental impact assessment approved by World Bank and Jiulongpo District Environmental Protection Bureau	Before assessment
Ecological environment	Impacts of water and soil loss	Each park and footpath system design shall be further optimized, try to balance excavation and filling, reduce work quantity of excavation and filling, reduce surface vegetation damage and reduce new water and soil loss.	Environmental assessment consultant	World Bank PMO, Jiulongpo District Environmental Protection Bureau	Environmental impact assessment approved by World Bank and Jiulongpo District Environmental Protection Bureau	Before assessment
	Impacts of land occupation	The project design shall comprehensively consider the surrounding environment and shall further refine the permanent land occupation design to use land reasonably.				
	Impacts of landscape	The parks shall maintain the natural landscape and harmonize with the surrounding environment as much as possible. To reduce the damage to existing ecological environment, implement greening ecological construction project synchronously during the project design.				

10.2.2 Environmental protection measures and suggestions during the construction phase

Table 10.2-2 List of environmental impacts and mitigation measures during the construction phase

Links and factors	Potential impacts/issues	Mitigation measures	Implementation responsibilities	Monitoring responsibilities	Monitoring indicators	Monitoring frequency
Social environment	Cultural relics protection	In the protection scope of cultural relics protection unit, no construction or blasting, drilling, excavation, etc. shall be carried out. If the project scheme involves protection scope of cultural relics protection unit or construction control zone, environmental assessment should firstly consider avoidance measures to avoid impacts on cultural relics protection unit. If it's unable to avoid it, it shall ensure the safety of cultural relics protection unit, verify and publicize the approval from people's government where the cultural relics protection unit is located and obtain consent from cultural relics administration department of superior people's government. Construction or blasting, drilling, excavation, etc. in the protection scope of national key cultural relics protection unit can only be carried out after obtaining approval from people's government of province, autonomous region and municipality with the consent of cultural relics administration department of the State Council. In the construction process, as per relevant cultural relics regulations, if underground cultural relics sites are discovered, the construction organization shall properly protect the site, notify cultural relics management department for rescue and treatment and ensure safe and smooth construction of cultural relics sites.	Contractor	Environmental supervision engineer, independent environmental management consultant	Publicity and training are provided; Record of randomly discovered cultural relics	Daily
Ecological environment	All projects	Before implementation of this project, adopt avoidance measures to avoid lush vegetation; during construction, take ecological mitigation measures to reduce the impact on ecological environment; after construction, recover the temporarily occupied land in time. ④Adopt the native species to prevent the impact of harmful species.	Contractor	Environmental supervision engineer, independent environmental management consultant	Filed supervision by the environmental supervision engineer; specifications are followed;	Daily

Links and factors	Potential impacts/issues	Mitigation measures	Implementation responsibilities	Monitoring responsibilities	Monitoring indicators	Monitoring frequency
Acoustic environment	Impacts of noise during the construction phase	Reasonably arrange the construction site, reasonably arrange construction machinery, reasonably arrange construction strength and time, set fences around construction site, and select low-noise equipment meeting national standards; prohibit night construction emitting noise pollution in noise sensitive building areas 15 days before and during college entrance examination and entrance examination for secondary school; prohibit construction generating environmental noise pollution within the area 100m away from the examination room during college entrance examination and entrance examination for secondary school; and properly coordinate passage time of construction vehicle. Construction workers shall pay attention to self-protection, and the supervision organization shall properly control noise during the construction phase.	Contractor	Environmental supervision engineer, independent environmental management consultant	Filed supervision by the environmental supervision engineer; specifications are followed;	Monthly
Atmospheric environment	All projects	Construction organization shall formulate dust pollution prevention plan; promote wet method operation in the construction process; repair hard closed enclosure before road construction in sensitive areas; cover easily splashing materials; transport bulk materials in closed manner (covering or shielding); use commercial concrete and modified asphalt concrete for pavement; and adopt liquefied gas as fuel for construction workers.	Contractor	Environmental supervision engineer, independent environmental management consultant	Filed supervision by the environmental supervision engineer; specifications are followed;	Randomly sampling during the peak construction period
Surface water environment	All projects	It's prohibited to directly discharge domestic sewage of construction workers to natural receiving water; construction site shall not be located on the beach; domestic sewage shall be directly discharged to municipal sewage pipeline or regularly extracted to sewage treatment plant by a fecal suction truck. Construction sewage can be recycled after oil separation settlement or be used for water splashing and dust suppression in the construction site and road, without being discharged outside. Carry out environmental protection education in the construction sites and enhance construction management and project supervision.	Contractor	Environmental supervision engineer, independent environmental management consultant	Filed supervision by the environmental supervision engineer; specifications are followed;	/

Links and factors	Potential impacts/issues	Mitigation measures	Implementation responsibilities	Monitoring responsibilities	Monitoring indicators	Monitoring frequency
Solid waste	All projects	Solid waste produced during the construction phase shall be directly transported to surrounding legal spoil area. Domestic garbage produced during the construction phase shall be collected at fixed points and transported regularly.	Contractor	Environmental supervision engineer, independent environmental management consultant	Filed supervision by the environmental supervision engineer; specifications are followed;	Daily

10.2.3 Environmental protection measures and suggestions during the operational phase

Table 10.2-3 List of environmental impacts and mitigation measures during the operational phase

Links and factors	Potential impacts/issues	Mitigation measures	Implementation responsibilities	Monitoring responsibilities	Monitoring indicators	Monitoring frequency
Surface water environment	All projects	Domestic sewage generated in public spaces will be discharged to municipal pipe network.	the Owner of World Bank PMO	Jiulongpo District Environmental Protection Bureau	Specifications are followed	/
Atmospheric environment	All projects	Complete greenbelt construction of the Project; reduce road damage; implement automobile exhaust emission testing system and prevent passage of vehicle with exhaust emission beyond standard.	the Owner of World Bank PMO	Jiulongpo District Environmental Protection Bureau	Specifications are followed; environmental monitoring plan prepared	Quarterly
Acoustic environment	Public space	Set No Honking Area; Plant tall arbors around the parking to reduce noise; Noiese produced by assembly, party, recreation, bodybuilding, raising animals and other activities in the area cannot disturb the residents.	the Owner of World Bank PMO	Jiulongpo District Environmental Protection Bureau	Specifications are followed; environmental monitoring plan prepared	Quarterly

10.3 Environmental monitoring plan

10.3.1 Purpose and principle of formulation

The purpose of formulating environmental monitoring plan is to supervise implementation of various measures; properly adjust environmental protection action plan as per the monitoring results and provide a basis for implementation time and scheme of environmental protection measures. The principle of formulating the plan is the estimated main environmental impacts possibly generated in each phases (construction phase or operational phase).

10.3.2 Monitoring organization

The environment monitoring during the construction phase and operational phase shall be conducted by national environment quality supervision and certification organization that has complete equipment, strong technical strength and properly completes environment monitoring task undertaken.

10.3.3 Environment monitoring plan

As per characteristics of the Project and all construction and operational phases, Table 10.3-1 lists monitoring plan during the project construction and operational phases.

Table 10.3-1 Implementation of environment monitoring plan during the construction and operational phases

Category	Item	Monitoring plans by phases	
		Construction phase	Operational phase
Acoustic environment	Monitoring location	Around the operation site with a large amount of operating equipment, school, residential building and other sensitive points	Lighting UP, Better Life, Caise Aolin, Zhigao Garden, Yuanyang Xiangpai, Chongqing Dafei LVzhou, Huayu Jiayuan
	Monitoring factors	Equivalent continuous sound level (L_{Aeq})	Equivalent continuous sound level (L_{Aeq})
	Monitoring frequency	Once/Month	Once/Quarter
Air quality	Monitoring location	The operation site with a large amount of operating equipment	Xietaizi Regular Monitoring Point Yangjiaping Regular Monitoring Point
	Monitoring factors	PM_{10}	NO_2, CO, PM_{10}
	Monitoring frequency	To perform random sampling during the peak construction period	1 day per quarter
Surface water environmental	Monitoring location	500m downstream of the Jiulong Community Park of Taohua River	/
	Monitoring factors	SS , petroleum, pH, BOD5, COD	/
	Monitoring frequency	Once/Month	/

10.3.4 Environment monitoring report

(1) Environment monitoring report during the construction phase

The construction phase of project is about 5 years. According to the different phases of the project content, as per Chinese environment management regulations and business policy requirements of World Bank, the Owner shall prepare Environment Monitoring Report and submit it to World Bank and Jiulongpo District Environmental Protection Bureau. The purpose of the report is to make environmental protection department confirm that all environmental protection measures are implemented as per relevant requirements of approved environment monitoring plan so as to control adverse environmental impact in the project plan.

Environmental monitoring report shall include:

① Brief description of project schedule;

② Setting and responsibilities of environment management organizations;

③ Main construction content and methods, environmental impacts and mitigation measures and implementation condition of measures;

④ Environment monitoring report;

⑤ Public complaints and solutions.

According to construction management provisions, the Contractor and ESE shall submit the periodic environmental report to the Owner during the construction phase.

(2) Environment monitoring report during the operational phase

After the proposed project is put into operation, as per the monitoring plan, World Bank Loan Project Office shall entrust environment monitoring station with qualification to perform environment monitoring. Meanwhile, the annual environmental monitoring report is prepared, and its contents include: The establishment of the environmental management organization, operation status of the project, the implementation of environmental prevention measures as required by the Environmental Protection Bureau, environmental monitoring (date, frequency, locations, methods, applicable standards, etc.), statistical analysis results of monitoring data and necessary follow-ups. The prepared environment monitoring report shall be submitted to Jiulongpo District Environmental Protection Bureau and World Bank.

10.4 Training and ability construction

10.4.1 Environmental protection technology and skill training

(1) In-service training for environmental management personnel

The purpose of in-service training for environmental management personnel is to enhance environment management during the construction phase and operational phase, ensure quality of environmental monitoring and practical and effective environmental management, so as to improve the whole project quality. After participating in position training, environmental management personnel can tell apart main environmental issues during the construction phase, and have a better understanding of existing problems and deficiencies on environmental management, and report to the engineering environmental protection office (department) in time in

order to take necessary prevention and control measures as soon as possible. During the construction phase, the project management organization shall invite environmental protection experts or environmental management personnel with similar management experience to explain possible environmental issues and solutions.

(2) Training for construction responsible personnel and construction workers

Before the construction, for the bid winner, the systematic environmental professional knowledge training shall be organized for the responsible personnel and construction workers responsible for construction in order to avoid environmental damages due to misoperation during construction. For contract responsible personnel, the purpose of training is to define the environmental protection responsibilities of the Contractor; for construction workers, the purpose is to ensure the proper construction operation during the construction phase in order to avoid some construction behaviors having unnecessary adverse impacts on the environment. The training is helpful for the project responsible personnel to understand their obligations in environmental protection needed to be assumed and possible consequences of the environmental damage. The construction workers will have a better understanding of the protection level and methods for environmental sensitive areas. Based on the actual situation of the Project, the training for construction workers shall last one week.

(3) During the operational phase of Project, the project management organization shall regularly hold environmental protection knowledge training to facilitate the staff to identify possible environment issues of respective posts and take necessary measures. Each person shall hold the idea of environmental protection.

10.4.2 Training modes and training expenses

Table 10.4-1 Environmental protection training program

SN	Training objects	Training content	Organizer	Number of trainees	Training and study time	Venue	Budget (RMB 10 thousand)
1	Staff of project office and project environmental protection office (department)	Knowledge in environmental protection management	Construction unit	2 persons	15 days	Chongqing	0.6
2	Staff of project office and project environmental protection office (department)	Visit similar domestic project sites so as to learn the mature environmental management experience.	Construction unit	2 persons	5 days	/	0.2
3	Staff of project office and project environmental protection office	Acquire comprehensive knowledge in environmental protection and	Construction unit	2 persons	15 days	Chongqing	0.3

SN	Training objects	Training content	Organizer	Number of trainees	Training and study time	Venue	Budget (RMB 10 thousand)
	(department)	management and understand the contents of environmental impact report of the Project.					
4	Site responsible personnel from the supervision organization and environmental supervisor of the project	Knowledge of environmental supervision, content of environmental impact report of the Project and corresponding environmental protection design documents of the Project.	Construction unit and supervision organization	1 person	15 days	Chongqing	0.3
6	Main technical leaders and construction responsible personnel of the Contractor	Knowledge in environmental protection and environment management	Construction unit and Contractor	3 persons	15 days	Chongqing	0.9
7	Construction workers	Knowledge in environmental protection of the Project	Construction unit and Contractor	150 persons	5 days	Chongqing	7.5
Total				/	/	/	9.8

10.5 Environmental protection investment

Budget has been made for implementing *Environmental Management Plan* during the construction and operational phases, as shown in Table 10.5-1. Total budget of environmental investment covers environmental mitigation measures, environmental protection monitoring and project management and main works, as well as mitigation and elimination of negative impacts on environment. Notes that many mitigation measures are management practices, and the budget is included in the whole contract and may not be indicated specifically.

The environmental protection investment estimate of the Project is totally RMB 3.7 million and the total investment of the Project is RMB 252,700,000, so the environmental protection investment occupies 1.46% of total investment. See the table below for the environmental protection project and investment estimate of the Project:

Table 10.5-1 List of environmental protection investment

SN	Phase	Environmental factors	Pollution sources	Environmental protection measures	Environmental protection investment (RMB 10 thousand)
1	Construction	Sewage and	Flushing	Set the oil separation and sand	50

SN	Phase	Environmental factors	Pollution sources	Environmental protection measures	Environmental protection investment (RMB 10 thousand)
	phase	wastewater	wastewater	settlement pond, and recycle wastewater after treatment rather than discharging out.	
2			Domestic sewage	Set a biochemical pool for collection pretreatment. For the construction camp with conditions, sewage can be directly connected with municipal sewage pipe network; and for the construction camp without conditions, sewage shall be regularly extracted to the sewage treatment plant for treatment by a fecal truck.	30
3		Atmospheric pollutants	Dust	Enhance management, promote wet method operation, set baffle, materials storage yard fence and cover it along the construction site; prohibit throwing materials from high places.	60
4		Noise	Noise	Select low-noise equipment; reasonably arrange construction schedule, avoid night construction; reasonably arrange construction machinery and equipment on the site; and set a fence.	30
5		Solid waste	Spoil Domestic garbage	Transport spoil to specified slag disposal pit; collect domestic garbages at fixed points and regularly clean and transport it.	40
6		Ecological environment	Ecological environment	Arrange construction activities within the construction land scope; before construction, strip surface in the land scope and use it as greening soil after construction.	40
7			Water and soil conservation	Excavated materials shall be transported for backfilling; set retaining wall, drainage ditch, ecological protection slope, intercepting drain and sand settlement pond and plant trees and grass.	Included in investment for main project
8	Operational phase	Air pollutant	Dust, off-gas	Enhance detection and repairing of motor vehicle, prohibit passage of vehicle with off-gas exceeding standard, maintain road conditions and use plants to purify air.	20
9		Noise	Noise	Build asphalt pavement, plant	20

SN	Phase	Environmental factors	Pollution sources	Environmental protection measures	Environmental protection investment (RMB 10 thousand)
				trees and grass and set honking prohibition signs.	
10		Risk prevention measure	/	Speed limit and formulation of emergency plan	/
11	Environmental management	/	Environmental monitoring during the construction phase, environmental management maintenance during the operational phase, etc.		80
12	Total				370

Note: the investment is only the environmental assessment estimate, and the actual investment depends on project estimation.

11 Environmental assessment conclusions

11.1 Project overview

The **project development objective** is to improve use of public space and increase pedestrian mobility in select districts of Chongqing's *Central City.*

Urban Regeneration interventions in Jiulongpo District (US$ 31.61 million, IBRD Loan US$ 27.25 million). Support of investments in (a) construction of 5.3 km pedestrian walkway of average width 3 m to complete a district-wide pedestrian loop; and (b) greening improvements of 9 parks (i.e. new construction of Kanglong, aitao, Wutaishan, Longjingwan, Shimei, Taohuaxi, Jiulong and Tiaodenghe Parks and rehabilitation of Caiyunhu Wetland Parks) totaled 138.37 hectare of land area.

11.2 Compliance analysis of relevant policies and planning relating to the project

As per *Catalogue for Guiding Industry Restructuring (2011 Version)* (as amended), "XXXVII, Other Service Industries: urban-rural community infrastructure service facilities and comprehensive service network construction" belongs to encouragement type.

The Project meets requirements of *Outline for the 13th Five-year Plan of National Economic and Social Development in Chongqing*, *Notice of Chongqing Municipal People's Government Office on Printing and Distributing Ecological Protection Red Line Delineation Scheme of Chongqing* (YFBF [2016] No. 230), *Administrative Measures for Forest Park, Administrative Measures for National Wetland Park.*

11.3 Current status of environmental functional areas and environment quality of the project

11.3.1 Division of environmental functions

Surface water: Yangtze River section water function in Jiulongpo District is Category-III water area and implements Category-III water quality standard.

Ambient air: the towns and rural areas under Jiulongpo District shall be Category-II areas and shall be in accordance with the Class -II standard in the *Ambient Air Quality Standards* (GB 3095-2012).

Acoustic environment: the acoustic environment of project area is Category 2 and 4a (noise level of Category 2 in daytime is 60dB; 50dB at night; noise level of Category 4a in daytime is 70dB and 55dB at night).

11.3.2 Present condition of environment quality

(1) Surface water

The monitoring factors of the two sections of Yangtze River conform to the Category-III standard specified in the *Environmental Quality Standards for Surface Water* (GB3838-2002), and the water quality is overall good.

(2) Ambient air

All the monitoring factors of the two monitoring points conform to the relevant requirements specified in the *Ambient Air Quality Standards* (GB3095-2012), and the ambient air quality of the area is overall good.

(3) Acoustic environment

It is known from the monitoring result that the monitoring data at night of several areas exceed relevant standard, which is caused by the traffic noise of the passing vehicle; the monitoring data of other areas conform to the relevant standard, and the acoustic environmental quality of the area is overall good.

11.4 Summary of natural environment and investigation of environment sensitive target

Jiulongpo District is located in the west of main urban area of Chongqing, adjacent to Yuzhong District in the east, borders on Dadukou District in the south, connects with Bishan County and Jiangjin District in the west and adjacent to Shapingba District in the north. It's located in the east longitude 106°14 '52 "~106°32' 55" and in north latitude 29°15 '29 "~29°33" 44". The longest east-west distance is 29.6km and longest south-north distance is 34.1km and total area is 432km^2. The seismic peak acceleration of the area is 0.05g, the response spectrum characteristic period is 0.35s and the seismic basic intensity is VI. Jiulongpo District is located in the Sichuan Basin. It is a subtropical monsoon humid climate, with abundant water and heat (rain season and hot season), less sunshine and long frost free period. It's cold in early spring, hot in summer, raining frequently in autumn and foggy in winter. The annual average temperature is 16℃～18℃ and the frost-free season of a year is about 340 days. The Yangtze River flows from the south of jurisdiction area to the east and northeast, gathering tributaries like Taohua Stream, Motan River and Daxi Rvier, it's generally developing in Southeast-southwest direction. Liangtan River joins Jialing River out of the district.

The assessment scope involves Caiyun Lake National Wetland Park. As per field investigation, residential buildings, schools and other buildings are distributed near the Project. Atmospheric and acoustic environmental protection target in 200m of project shall be confirmed.

11.5 Environmental impact and pollution prevention measures

11.5.1 Water environment impact and pollution prevention measures

(1) Construction phase

The domestic sewage is strictly forbidden to be discharged directly into the water body. The river beach should be avoided at construction site selection (for example, the bank of Caiyun Lake, the beach of Taohua Stream or the beach of Tiaodeng River). If it is impossible to connect with the existing municipal sewage pipe network, the sewage should be regularly sucked by the fecal suction truck to the sewage treatment plant for treatment after being collected and pretreated by the biochemical pool; if the municipal sewage pipe network can be connected, the sewage shall be

discharged to the municipal sewage pipe network after being collected and pretreated by the biochemical pool.

An oil separation and settlement pond shall be set at construction site for collecting construction sewage. Construction sewage can be recycled after oil separation settlement or used for waster splashing and dust suppression in the construction site and road.

The environmental protection education as to the construction site and the construction camp should be carried out for the construction personnel to make them understand the importance of water resources protection. Reasonable construction procedures should be developed for efficient organization of construction operations, and the construction management and engineering supervision should be strengthened. Construction machines must be strictly inspected to prevent oil leakage polluting water body. Construction materials such as oil and chemicals should not be piled near the surface water body, and the canvas should be prepared as temporary shelter. During the construction, the plastic film or non-woven fabrics should be applied to cover the excavation and filling slopes without protective measures, topsoil stockpiling location, stockpiling yard and the like, and measures like woven soil bags as fence and intercepting ditches should be taken around the topsoil stockpiling location and the stockpiling yard.

(2) Operational phase

The wastewater during the operational phase is mainly the domestic sewage produced by urban residents at the public space, which will be discharged into the municipal sewage pipe network.

11.5.2 Ambient air impact and pollution prevention measures

(1) Construction phase

During the construction phase of the project, the impact on ambient air is mainly reflected in the earthwork excavation, backfilling, materials transportation and mixing, asphalt pavement, etc. Regularly spray water at construction site, cover tarpaulin on vehicle with road materials; keep the stockyard away from residential areas, set a fence; use commodity concrete and use liquidized gas as fuel to alleviate impact degree.

(2) Operational phase

The exhaust gas during the operational phase is mainly the minor off-gas and dust from the parkings, and the bad smell from the public toilets and biochemical pool, whose impacts on the environment can be reduced by enhancing afforestation project, leading the bad smell of the biochemical pools above the ground for emission, strengthening to cleaning the public toilet and taking other measures.

11.5.3 Noise impact and pollution prevention measures

(1) Construction phase

Noise during the construction phase is mainly from construction machinery and

transportation vehicle. The environmental assessment requirements in the construction process: ① High-noise construction places shall be arranged away from environment sensitive points; construction machinery shall be reasonably arranged; construction strength shall be reasonably arranged; construction organization design shall be properly made; high-noise construction machinery shall be away from surrounding sensitive areas and temporary machine rooms shall be set up and fences shall be set up around the construction site. ② Select low-noise equipment meeting national standards and enhance maintenance of equipment; ③ Reasonably arrange construction time; prohibit night construction of high-noise construction machinery; for continuous construction in special conditions, be sure to obtain approval from relevant departments in advance and communicate with residents in advance; ④ Except repairing and emergency rescue operation; prohibit night construction emitting noise pollution in noise sensitive building areas 15 days before and during college entrance examination and entrance examination for secondary school; and prohibit construction generating environmental noise pollution in 100m of examination room during college entrance examination and entrance examination for secondary school; ⑤ During the construction phase, properly coordinate passage time of construction vehicle; the construction unit, the construction party and the traffic administration shall enhance communication and coordination to avoid traffic jam. Take slow-down measures and prohibit honking for transportation at night. Enhance maintenance of construction machinery; ⑥ Reasonably arrange transportation time of construction materials. Slow down and prohibit honking when passing by nearby residential areas and schools; ⑦ Construction workers and field construction workers shall perform self-protection in the working time as per labour hygiene standard; such as wearing earplug and helmet; ⑧ The supervision organization shall properly perform noise supervision during the construction phase, configure certain number of simple noise measuring instruments to monitor nearby residential areas of construction site so as to protect it from influence of noise exceeding standard.

(2) Operational phase

Noise pollution source during the operational phase is mainly from social activity of the public space, which can be prevented by: ① setting No Honking Area in the park; ② planting tall arbors around the parking to reduce noise; ③ controlling the noiese produced by assembly, party, recreation, bodybuilding, raising animals and other activities in the area to avoid disturbing the residents.

11.5.4 Solid waste impact and pollution prevention measures

The solid wastes during the construction phase are mainly construction wastes and the domestic wastes from constructors. Earth-rocks in the park and each park can be temporarily transferred without spoil; construction wastes from old buildings removal will be directly transported to surrounding legal slag disposal fields. The domestic wastes will be delivered to the nearby refuse treatment station for treatment after collection at fixed points

11.5.5 Ecological environment impact and protection measures

(1) Yielding measures

The Project mainly considers city greenland construction like park and reduces occupation of ground facilities by project construction. Construction shall avoid the dense vegetation.

(2) Mitigation measures

① Before the construction, the mellow soil of the topsoil layer in the area of the acquired land should be stripped, piled up at fixed points and covered with waterproof membrane. After the completion of the construction, the mellow soil may be used as the surface covering soil to recover the construction slash.

② The disturbance to the surrounding ecological environment can be minimized by appropriately arranging the construction site, trying to confine the construction activities to the area of the acquired and occupied land for construction, and transplanting tall arbors within the area of the occupied land before construction.

③ The inevitable water and soil loss caused by the construction can be minimized by appropriate design of the construction during the construction phase and excavation and filling by phases and areas.

④ Combined with the construction plan in an organized way, to build facilities of grit chambers, drainage ditches, retaining walls, etc. in advance. In order to ensure the stability of the temporary stacking and prevent the water and soil loss during construction, the necessary fences and covers shall be made for the temporary stacking, and at the same time, drainage ditches will be built in the direction where the water comes. During the construction in the rainy season, woven bags and plastic cloth may be used to cover the slope side of the excavated exposed soil and so on to reduce the earth surface erosion caused by the rainwater.

⑤ It is strictly forbidden to dump waste soil and slags into or clean construction equipment by the natural water bodies.

⑥ Raise the awareness of protection of the construction personnel. The construction method and time should be planned well to reduce the disturbance of the construction noise to the wild animals. Management should be strengthened to avoid direct discharge of domestic sewage and construction wastewater, so as to reduce water pollution and maximize the protection of animal habitats.

(3) Recovery measures

① After the completion of the construction, the temporarily occupied land should be recovered in time, and the appropriate collocation of arbors, shrubs, flowers and grass should be strengthened.

② The tall arbors transplanted during the construction phase can be used for afforestation upon the conclusion of the construction.

③ Upon the conclusion of the construction, the bare areas along both sides of the road should be afforested, grass sowing by spraying for soil slopes, and spraying organic matrix for stone slopes.

④ Adopt the native species to prevent the impact of harmful species.

(4) Water and soil conservation

In accordance with the stipulations of the *Law of the People's Republic of China on Water and Soil Conservation*, the *Regulations for the Implementation of the Law of the People's Republic of China on Water and* Soil *Conservation*, etc., the possible water and soil loss caused by the construction of this project must be protected. The principles and objectives of the water and soil loss control shall meet the general requirements of the state on soil and water conservation and environmental protection. The design of soil and water conservation should be synchronized with engineering design, construction and acceptance. The project construction unit shall bear the cost of controlling the water and soil loss caused by the construction.

11.6 Public participation

The public participation and publicity of the Project adopts online publicity and field publicity. Carry out seminar on the publicity basis, visit and investigate individuals who are directly affected by the Project and care the project construction and the respondents support the project construction.

11.7 Comprehensive conclusion

China: Chongqing New Urbanization Pilot and Demonstration Project Jiulongpo District Urban Regeneration Project meets the national industrial policy, environmental protection policies and relevant planning. The construction phase and operational phase of the Project may cause certain impact on environment. After taking strict ecological environment protection measures and pollution prevention measures, the adverse impact on environment is effectively controlled and alleviated; pollutant emitted can meet standard, the environmental impact is limited; therefore, from environmental protection aspect, the assessment regards that the construction is feasible.

11.8 Suggestions

(1) Enhance implementation of environmental protection measures and strictly implement "three synchronizations" system.

(2) Improve environment awareness and enhance environmental management.

(3) Enhance management of greenbelt in the project area and ensure survival rate of trees.

(4) Part of the parks in the Project are located under high-tension line. According to the *Protection of Power Facilities* (as amended on January 8, 2011), any unit or individual is not allowed to grow plants that would endanger the safety of power facilities in the overhead power line protection zones; no unit or individual is allowed to fly kite(s) in areas 300 meters from power lines on both sides. Marking signs shall be accordingly set for guidance in the park.

(5) Ensure allocation of environmental protection fund and ensure construction of environmental protection facilities.

Attachment:

Statistical table for the public participating in the investigation

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Yuan Yuan	Female	32	Undergraduate	Jiulongpo Gardening and Greening Adminitration Office	13508368720
Xie Wei	Male	47	Undergraduate	Jiulongpo District Urban Administration	13883391010
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Wu Tianrong	Female	53	Junior college	Retiree	13509439128
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Chang Chun	Male	38	University	Caise Aolin	
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