Environmental Monitoring Report

#1 Annual Report
August 2016

People's Republic of China: Jilin Urban Development Project

Prepared by Jilin Project Management Office with assistance from NREM International Inc. for the Jilin Provincial Government and the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 31 August 2016)

Currency unit	–	Chinese Yuan (CNY)
CNY1.00	=	$0.15
$1.00	=	CNY6.68

ABBREVIATIONS

3Rs	–	reduce, reuse, recycle
ADB	–	Asian Development Bank
AP	–	affected person
ASL	–	above sea level
BCDRC	–	Baicheng Development and Reform Commission
BCMG	–	Baicheng Municipal Government
BEDZ	–	Baicheng Economic Development Zone
BEDZMC	–	Baicheng Economic Development Zone Management Committee
BoQ	–	bill of quantities
BSDRC	–	Baishan Development and Reform Commission
BSMG	–	Baishan Municipal Government
CSC	–	construction supervision company
DI	–	design institute
EA	–	executing agency
EIA	–	environmental impact assessment
EMP	–	environmental management plan
EMR	–	environmental monitoring report
EMS	–	environmental monitoring station
EMU	–	environmental management unit
EPB	–	environmental protection bureau
EPD	–	environmental protection department
FB	–	finance bureau
FSR	–	feasibility study report
GRM	–	grievance redress mechanism
HURD	–	housing and urban-rural development
IA	–	implementing agency
IEE	–	initial environmental examination
IMAR	–	Inner Mongolia Autonomous Region
ISWM	–	integrated solid waste management
JPDRC	–	Jilin Provincial Development and Reform Commission
JEPD	–	Jilin (Provincial) Environmental Protection Department
JPFD	–	Jilin Provincial Finance Department
JPG	–	Jilin Provincial Government
JPHURDD	–	Jilin Provincial Housing and Urban-Rural Development Department
JPMO	–	Jilin Project Management Office
LAR	–	land acquisition and resettlement
LARO	–	land acquisition and resettlement office
LARP	–	land acquisition and resettlement plan

LCAB	–	local cultural affairs bureau
LEMS	–	local environmental monitoring station
LEPB	–	local environmental protection bureau
LIEC	–	loan implementation environmental consultant
LPHB	–	local public health bureau
LPMO	–	local project management office
LRB	–	land resources bureau
MSW	–	municipal solid waste
NRW	–	nonrevenue water
OEE	–	onsite environmental engineer
OPF	–	operator of project facilities
PCR	–	project completion report
PIC	–	project implementation consulting services
PIU	–	project implementation unit
PMO	–	project management office
PPCU	–	project public complaints unit
PPTA	–	project preparatory technical assistance
PRC	–	People's Republic of China
RP	–	resettlement plan
SCADA	–	supervisory control and data acquisition
SPS	–	Safeguard Policy Statement
STD	–	sexually-transmitted disease
TA	–	technical assistance
WAB	–	water affairs bureau
WRB	–	water resources bureau

WEIGHTS AND MEASURES

mu	–	0.006 ha
square meter	–	m^2
A-weighted decibel	–	dB(a)

NOTE

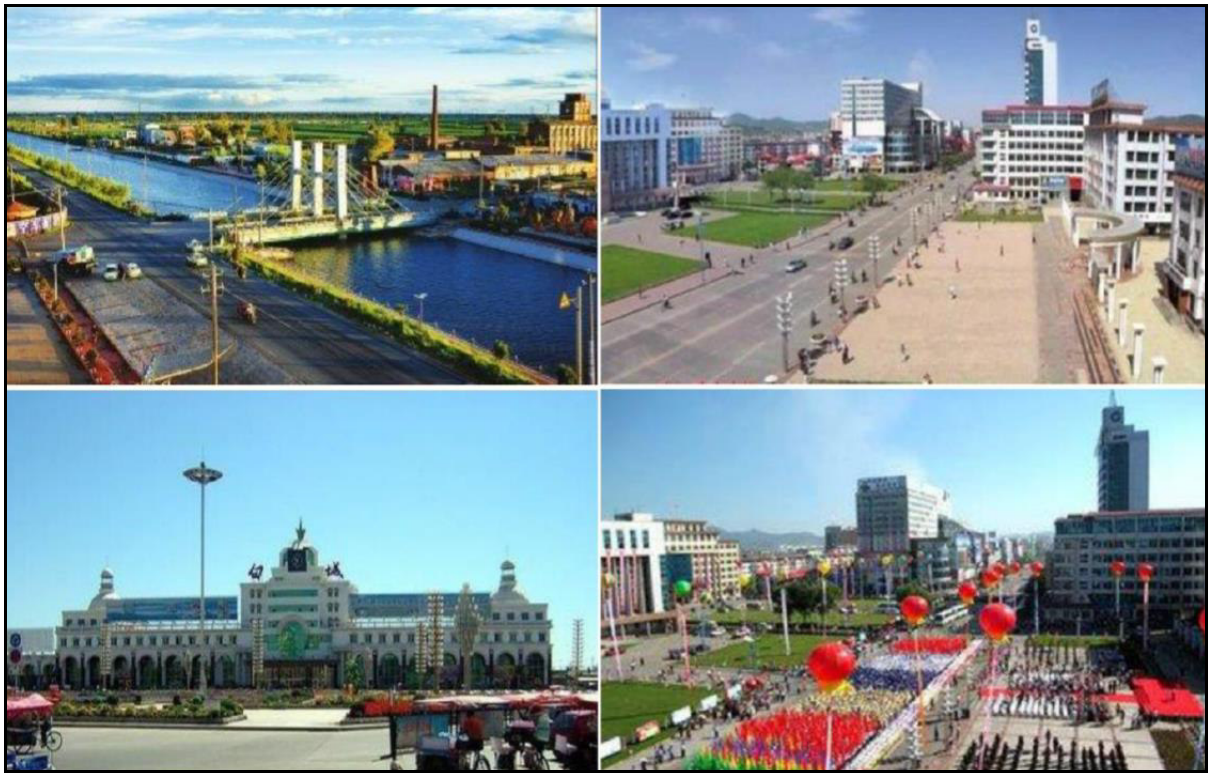
In this report, "$" refers to US dollars.

ADB Loan No.: 3211-PRC

Jilin Urban Development Project

ENVIRONMENTAL MONITORING REPORT

(COVERING 8 MAY 2015 – 30 JUNE 2016)



Submitted to:
Jilin Provincial Government
Asian Development Bank

Prepared by:
Jilin Project Management Office
With assistance from NREM International Inc.

August 2016

Management Office under Leading Group for
ADB-Financed Jilin Urban Development Project

Construction Building
No. 287 Guiyang Street
Changchun City, Jilin Province
People's Republic of China
130051

19 August 2016

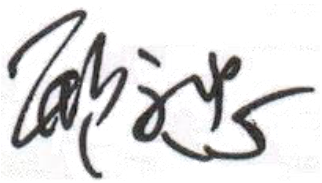
Jilin Provincial Government
Asian Development Bank

Dear Sir / Madam:

SUBJECT: ADB Loan No. 3211-PRC,
Jilin Urban Development Project

On behalf of the Project Management Office of the Leading Group, I am pleased to submit to you the First Environmental Monitoring Report, covering 8 May 2015 through 30 June 2016.

Yours truly,



Xing Wenzhong
Director

TABLE OF CONTENTS

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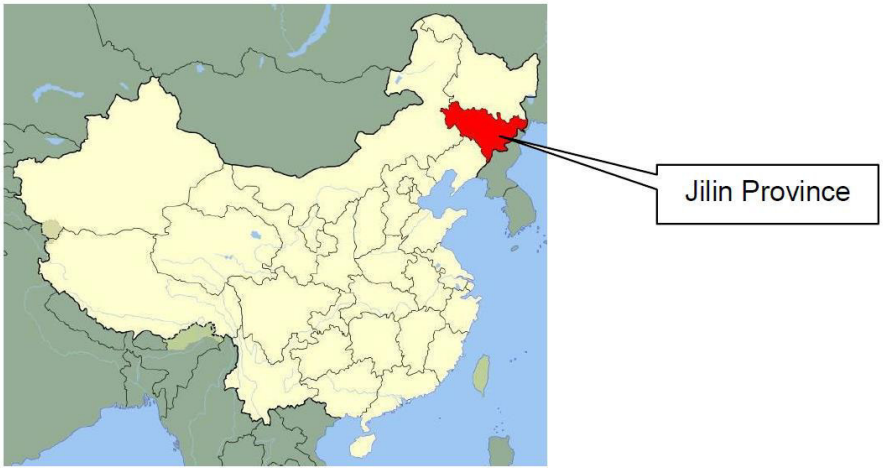
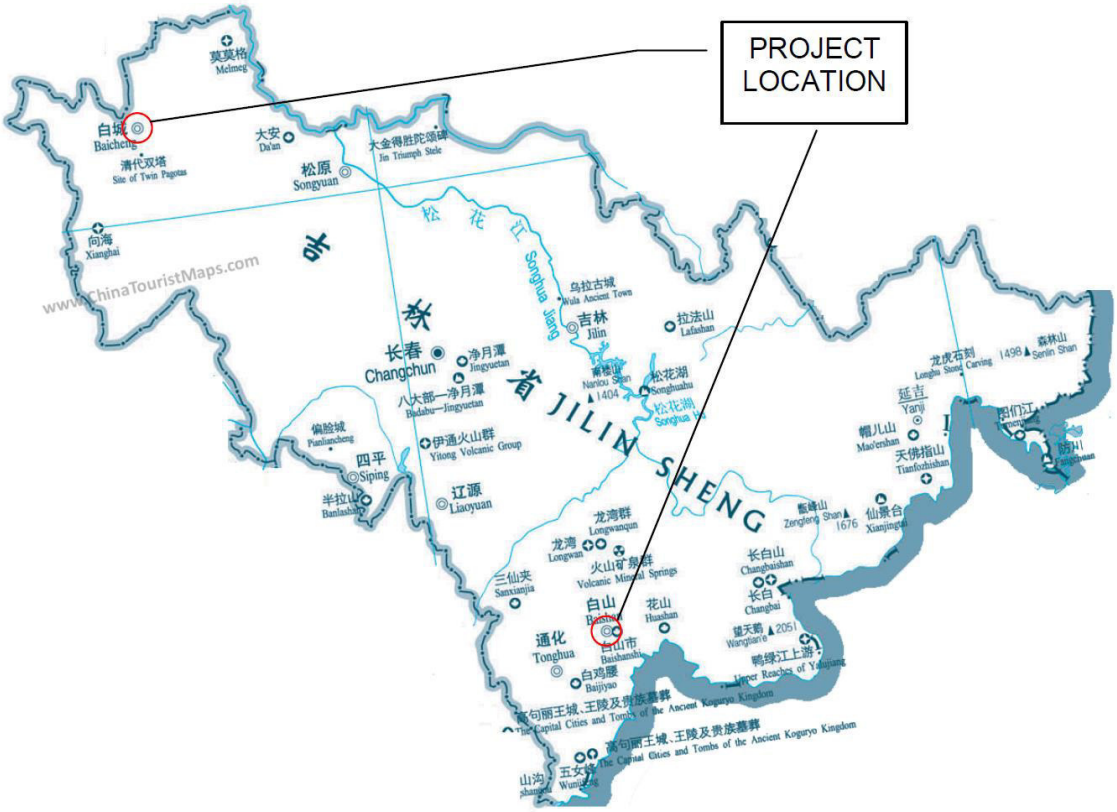
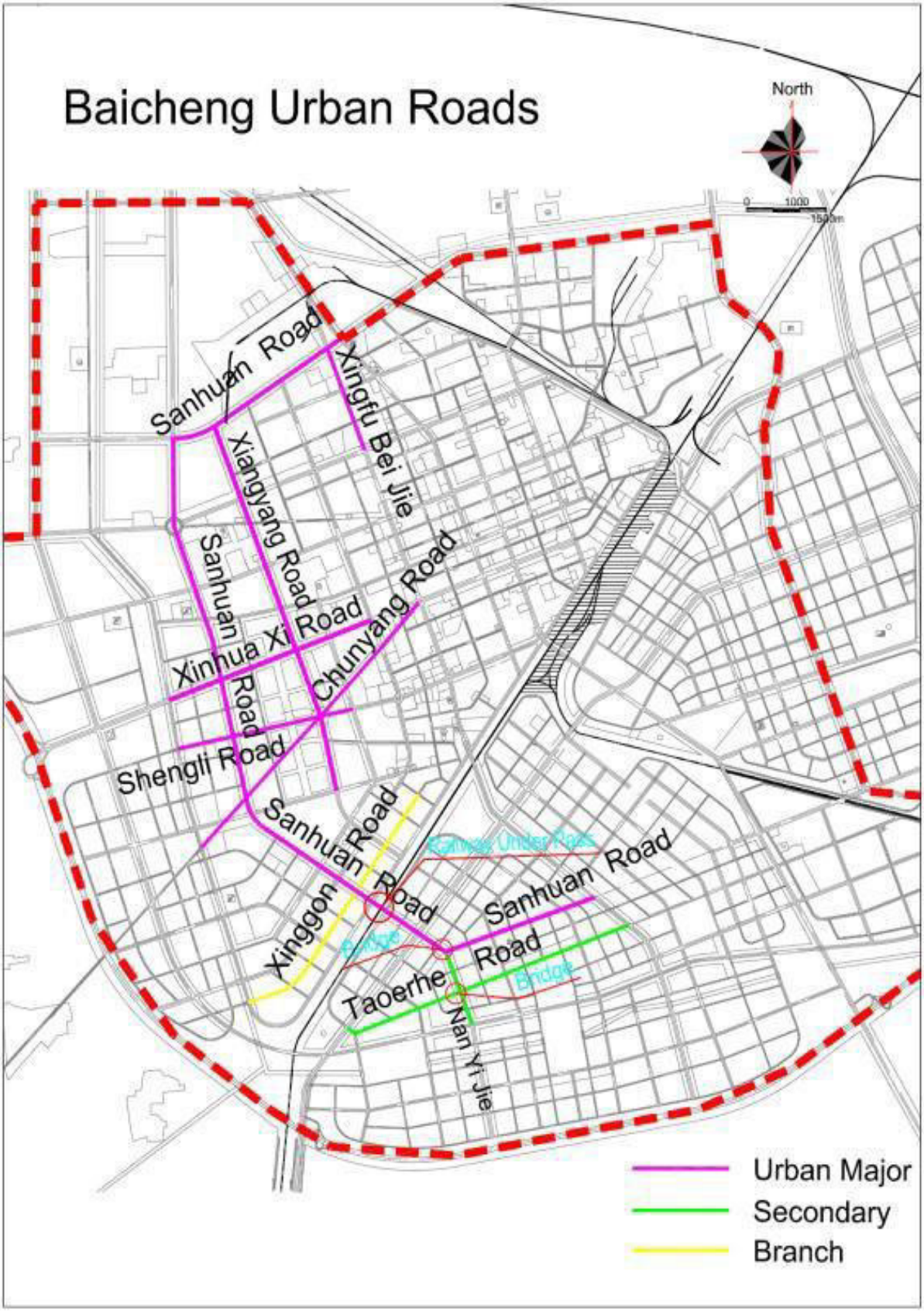
LIST OF TABLES AND FIGURES

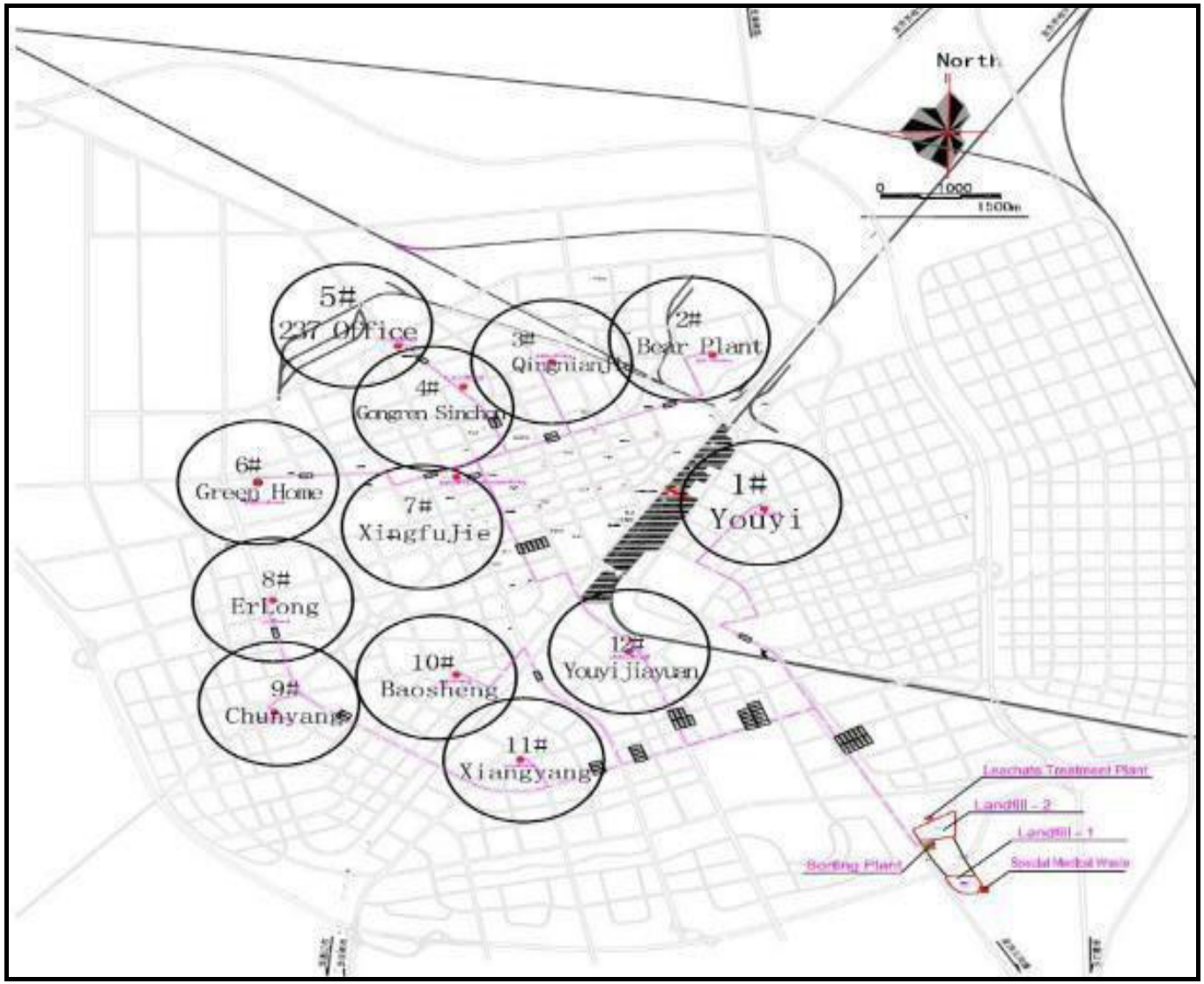




Map A: Location Baicheng and Baishan Cities in Jilin Province

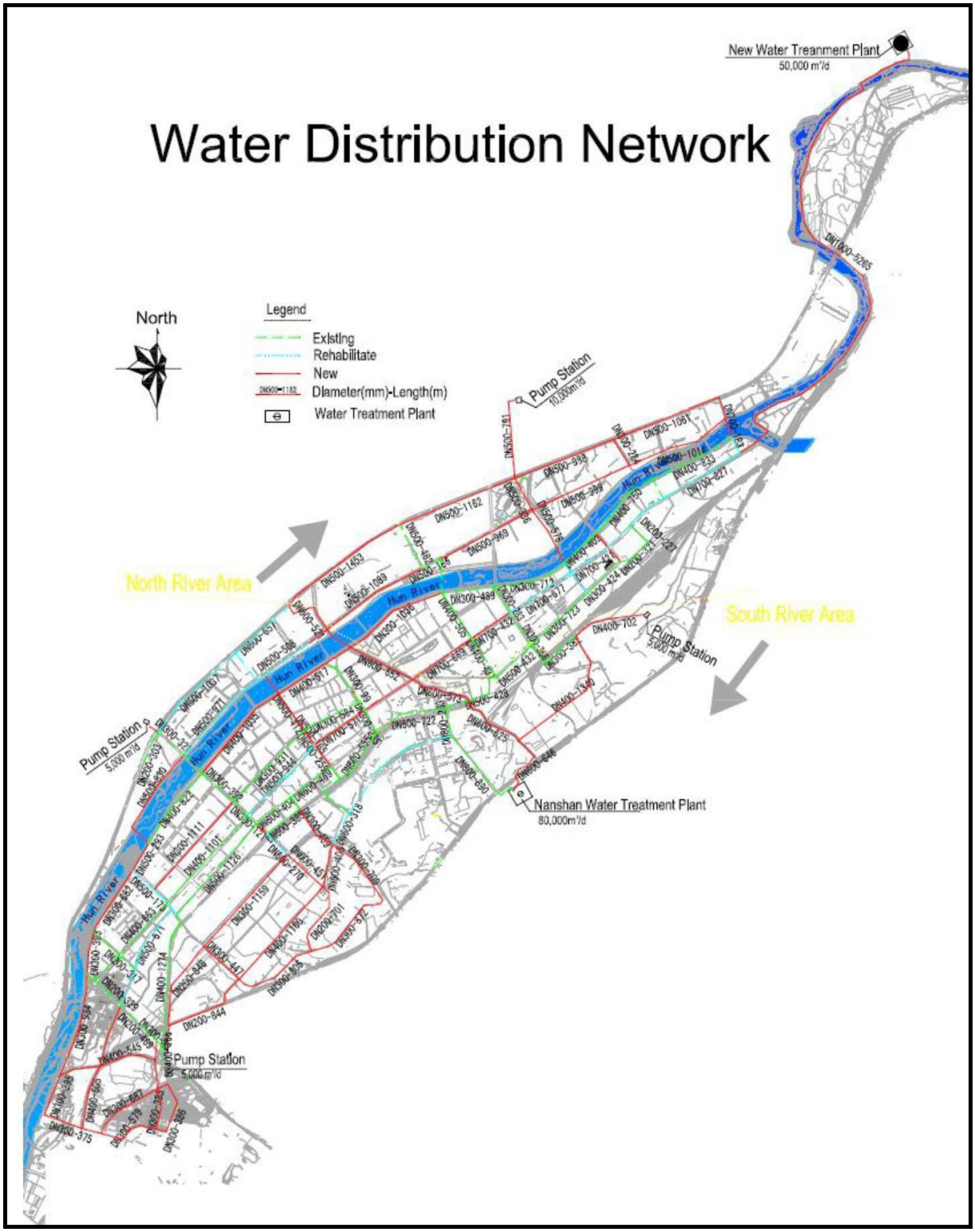


Map B: Location of Roads and Bridges in Baicheng (Component I)



Map C: Solid Waste Management (Transfer Stations and Sorting / Composting Plant) in Baicheng (Component II)

Map D: Location of Improved Water Supply System in Baishan (Component IV)



Map E: Water Distribution Network in Baishan (Component IV)

EXECUTIVE SUMMARY

Background: This document is the first Environmental Monitoring Report for the Jilin Urban Development Project, covering the period from the 8 May 2015, the date of loan effectiveness, to 30 June 2016. It has been prepared by the Project Management Office of the Jilin Provincial Leading Group for the ADB-Financed Jilin Urban Development Project (JPMO), with assistance from NREM International Inc. as the Loan Implementation Consultant, for submission to the Jilin Provincial Government and Asian Development Bank (ADB).

From the environmental management perspective, the project duration can be divided into the following phases: 1) pre-construction phase, from the date of loan effectiveness to the commencement of construction, with the primary task of incorporating environmental management provisions into the detailed design, bidding, contracting, reviews and approvals, institutional strengthening and capacity building, etc.; 2) construction phase, from the start of construction to the date of physical completion, with the primary task of implementing and supervising the implementation of the Environmental Management Plan (EMP) and monitoring the residual environmental impacts; and 3) operational phase, with the primary task of implementing and supervising the implementation of the operational mitigation measures and monitoring the residual environmental impacts. For this reporting period, the project has not commenced its physical construction and therefore it is still in the pre-construction phase.

Status of EMP implementation: The environmental management activities for this reporting period, as defined in the EMP, and their status of implementation are summarized as follows:

Subject	Detailed Requirement	Status of Implementation
1) Include low carbon, climate variability and change resilience considerations	Design low carbon Baishan Water Supply System including variable speed pumps, SCADA 5, accurate water-metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for NRW reduction (ensure reduce the NRW from 65% to 30%).	Based on discussion with the design institute, the detailed design of the Baishan Water Supply System has incorporated variable speed pumps, SCADA 5, accurate water-metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for NRW reduction (ensure reduce the NRW from 65% to 30%).
	Include high-capacity stormwater-drainage pipelines and rainwater detention and reuse facilities in Baicheng Infrastructure Component.	The Baicheng Infrastructure Component has incorporated high-capacity stormwater drainage pipelines and rainwater detention and reuse facilities. Moreover, the pedestrian paths of the roads have adopted permeable pavement under the National Sponge City Pilot Program whereby Baicheng city is selected as a national pilot city.
2) Institutional strengthening for EMP implementation & supervision	Establish an EMU in each LPMO, including at least one environment specialist.	An EMU has been set up in Baicheng and Baishan PMOs, with one environment specialist officer each.
	Appoint environmental coordinators for EMP coordination within JPMO and PIUs.	An environmental coordinator has been appointed in the JPMO and PIUs.
	Engage loan implementation environmental consultant (LIEC) under the project implementation consulting TA.	Loan implementation consultant has been engaged and mobilized in July 2015. The consulting services include an international and national environmental specialist.

	Provide training to all environmental staff for EMP implementation and supervision LIEC or invited environment specialists and/or officials from the JEPD or LEPBs provide training on construction environmental management and implementation and supervision of environmental mitigation measures to contractors and construction supervision companies, in accordance with the training plan in this EMP.	Three comprehensive environmental management trainings have been provided to 103 participants for JPMO, LPMOs, IAs, DIs, tender agency and external environmental monitoring agencies in July and October 2015 and March 2016 by the loan implementation environmental specialists. Tailored training will be undertaken for the contractors and construction supervising agencies once they are mobilized.
3) Update the EMP	Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for review. In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional APs, IAs and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC, JPMOs and LPMOs should consult with ADB.	During this reporting period, no need has arisen to update the EMP. During this reporting period, no major changes in project scope or location and therefore no need has arisen to update the EMP.
4) Environmental monitoring plan	Prior to construction, engage Municipal EMS. Prepare a detailed environmental monitoring plan in accordance with environmental monitoring plan defined in this EMP.	Contracts have been signed with the External Environmental Monitors for all project components. During this period, the project objectives, scope and construction sites and right-of-ways have not changed. In discussion with the External Environmental Monitors, the environmental monitoring plan contains adequate details that can satisfy the requirements and therefore does not need revision.
5) Bidding and contract documents	Ensure the mitigation measures in the EMP are incorporated in all bidding documents, which will be sent to ADB for review. Prepare environmental contract clauses for contractors, namely the special conditions (e.g., reference to EMP and monitoring requirements).	The loan implementation environmental specialists have drafted environmental management provisions for the bidding and contract documents, which are reviewed by ADDB and adopted. Moreover, the EIAs and EMP have been included in the bidding and contract documents as appendices and provided to the bidders and contractors.
6) Establish operational GRM	Establish a Project Public Complaints Unit (PPCU) in each LPMO. Provide training for PPCU members and GRM access points. Disclose the PPCU's phone number, fax, address, and email to the public on City	A Project Complaints Unit has been established in Baicheng and Baishan PMOs. Training has been provided for the PPCU officers. The required information will be posted in the construction information boards.

	EPB's website and on information boards at each construction site.	Meanwhile, the city EPB websites have environmental complaints hotlines.
7) Land acquisition and resettlement	Update LARP after detail design. Establish a resettlement office comprising local government officials to manage the land acquisition and resettlement process. Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS. Ensure that all resettlement activities are reasonably completed before construction starts on any component.	Update is ongoing. Both cities each have a LAR office. Both cities have adequate information dissemination and community consultations mechanisms in place. Construction will not be allowed to commence before resettlement is reasonably completed.
8) Other		The loan implementation consulting services contain capacity building with respect to: roadmaps and / or community awareness and outreach for water supply safety, non-revenue water reduction, stormwater management, integrated solid waste management (3Rs), traffic safety and sustainable urban transport. These activities have been initiated and will be expedited in the second half of the year.

Work plan for the next reporting period (1 July 2016-30 June 2017): The work plan is proposed as follows:

Tasks	Description	Timeframe
1) Design reviews	Loan implementation consultants will continue to work with JPMO, IAs and DIs to ensure the incorporation of climate change considerations and environmental best practices into the detailed designs of remaining project components	Whole duration.
2) Bidding and contract documents	The loan implementation environmental consultants will continue to work with the Tender Agency to ensure the incorporation of environmental management provisions in compliance with EMP into the bidding and contract documents.	Whole duration.
3) Institutional strengthening for EMP implementation & supervision	Loan implementation environmental consultants will organize three training courses on implementation of the EMP: a) One comprehensive environmental training course for JPMO, LPMOs, IAs, DIs, Tender Agency. b) First training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction. c) Second training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction. d) Third training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction.	 IV September 2016. IV September 2016. II April 2017. I July 2017.

4) Implementation and supervision of mitigation measures	Once physical construction is started in September 2016, contractors will be required to implement the proposed mitigation measures as specified in the EMP. The JPMO, local PMOs and IAs, with the assistance of the loan implementation consultants, will supervise the implementation.	September 2016-June 2017.
5) Environmental monitoring plan	The External Environmental Monitors will conduct environmental monitoring in accordance with location, frequency and parameters as specified in the environmental monitoring plan as part of the EMP.	September 2016-June 2017.
6) Public consultations	The EMP requires Public consultation to be undertaken once a year during peak construction period, through questionnaire survey, site visits, and / or informal interviews. Results will be used for adjusting mitigation measures if necessary.	June / July 2017.
7) Update the EMP	Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for review. In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional APs, IAs and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC, JPMOs and LPMOs should consult with ADB.	On an as-needed basis. On an as-needed basis.
8) Land acquisition and resettlement	Update LARP after detail design. Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS. Ensure that all resettlement activities are reasonably completed before construction starts on any component.	On an as-needed basis. As per individual RPs. Whole duration.
9) Other	The loan implementation consulting services contain capacity building with respect to: roadmaps and / or community awareness and outreach for water supply safety, non-revenue water reduction, stormwater management, integrated solid waste management (3Rs), traffic safety and sustainable urban transport. Community awareness and outreach activities will be completed, and draft road maps developed by the end of 2016 and finalized by 30 June 2017.	1 July 2016-30 June 2017.

1. Introduction

1.1 Background

1. This report is the first environmental monitoring report on the Jilin Urban Development Project (the Project) covering the period of 8 May 2015-30 June 2016. It is prepared by the Management Office of the Leading Group for ADB-Financed for Jilin Urban Development Project (or Jilin Provincial Project Management Office, JPMO) with the assistance from NREM International Inc. (NREM) as the loan implementation consultants.

2. The report is prepared in accordance with the environmental management plan (EMP). It is prepared on the basis of the data collected by the loan implementation consultants. Although the external environmental monitoring agencies have been engaged, no monitoring has yet been undertaken as physical construction has not yet commenced. Therefore, the report only covers the work that is required in the EMP for the pre-construction period.

1.2 Project Summary

3. The basic information about the loan project is provided in **Table 1**.

Table 1: Basic Information

ADB Loan No.	3211-PRC
Project Title	Jilin Urban Development Project
Borrower	People's Republic of China
Executing Agency	Jilin Provincial Government
Implementing Agencies	1. Baicheng Economic Development Zone Investment and Development Co., Ltd. 2. Baishan Hengda Drainage Engineering Co., Ltd. 3. Baishan Solid Waste Disposal Co., Ltd.
Total Estimated Cost	$386,840,000
ADB loan	$150,000,000
Counterpart funds	$236,840,000
Loan Negotiations	27 October 2014
ADB Loan Approval Date	5 December 2014
ADB Loan Signed Date	27 February 2015
ADB Loan Effectiveness Date	8 May 2015
Predicted Project Completion Date	31 December 2018
ADB Loan Closing Date	30 June 2019
Total Months	54

1.3 Project Components

4. The project has five major components. As of June 2016, the project scope has no change since loan appraisal. The expected outputs at loan appraisal are as follows:

Component	Expected Outputs at Loan Appraisal
(i) Improved urban infrastructures in Baicheng	(i) construction of nine urban roads with a total length of 32.4 kilometers (km), including dedicated bus (7 km) and non-motorized transport (26 km) lanes; (ii) construction of two bridges (20-meter span) and one railroad underpass; (iii) installation of a 36.9 km water supply piping network; 63.2 km sanitary sewer piping network, including a pump

	station; 59.9 km stormwater piping network with two pump stations; and a 28.2 km heating network; (iv) installation of associated communication, energy, lighting facilities, and landscaping; and (v) installation of traffic control and management system.
(ii) Integrated solid waste management system in Baicheng.	(i) construction of a 30 tons per day (t/d) kitchen waste sorting and composting facility; (ii) procurement of one construction material recycling machine; (iii) construction of 9 new municipal solid waste (MSW) transfer stations and 20 recycle collection points; and (iv) upgrading of MSW handling, city cleaning, and maintenance of vehicles and equipment.
(iii) Integrated solid waste management system in Baishan.	(i) construction of a new MSW sanitary landfill with a daily capacity of 330 t/d; (ii) construction of a 30 t/d kitchen waste sorting and composting facility; (iii) provision for two construction waste recycling machines; (iv) upgrading of 15 MSW transfer stations and 21 recycle collection points; and (v) upgrading municipal solid waste handling equipment, city cleaning vehicles and equipment.
(iv) Improved water supply management in Baishan	(i) construction of a 6.8 km water transmission line to Jiangyuan, supplying water to an existing water treatment plant; (ii) construction of a 21.1 km water transmission line to Hunjiang new water treatment plant; (iii) construction of a new 50,000 t/d water treatment plant with SCADA system; (iv) upgrading of the 11.1 km existing water supply piping network and construction of a 44.2 km new water supply piping network; and (v) construction of four pump stations, and provision of leak detection equipment; iv) manholes, valves, flow meters, and other associated facilities.
(v) Improved capacity and institutional arrangements	(i) support for project implementation and management, institutional strengthening, capacity development, and training; (ii) institutional capacity development support for sewage management, integrated waste management, urban transport system, traffic management and safety and public awareness campaigns; (iii) technical assistance on external resettlement monitoring for the exciting agency (EA) and implementing agencies (IAs).

1.4 Project Investment Plan

5. The project is estimated to cost $386.84 million, including contingencies and financing charges during implementation. **Table 2** provides a summary of the project investment plan.

Table 2: Project Investment Plan

Item	Amount ($ million)[a]	Share of Total (%)
A. Base Cost[b]		
1. Baicheng municipal services	234.05	60.5
a. Baicheng urban infrastructure	202.48	52.3
b. Baicheng integrated solid waste management	31.57	8.2
2. Baishan integrated solid waste management	30.85	8.0
3. Baishan water supply management	63.55	16.4
4. Capacity and institutional arrangement	3.00	0.8
Subtotal (A)	**331.44**	**85.7**
B. Contingencies[c]	**47.80**	**12.4**
C. Financing Charges During Implementation[d]	**7.60**	**2.0**
Total (A+B+C)	**386.84**	**100.0**

Note: Numbers may not add up precisely due to rounding.

a Includes taxes and duties of $16.57 million to be financed from government resources and Asian Development Bank (ADB) loan resources. The amount of taxes and duties to be financed by the project is based on the following principles: (i) the amount of taxes and duties financed by the ADB loan does not represent an excessive share of the project, (ii) the taxes and duties apply only to ADB-financed expenditures, and (iii) the financing of the taxes and duties is relevant to the project success

b In mid-2013 prices

c Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency costs.

d Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at the 5-year United States dollar fixed-swap rate plus a spread of 0.5% and additional 0.2% maturity premium. Commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.

1.5 Financing Plan

6. ADB will provide a loan of $150.0 million from its ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 6 years, an annual interest rate determined in accordance with the London Interbank Offered Rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, and such other terms and conditions set forth in the draft loan and project agreements. The ADB loan will also finance taxes and duties for eligible ADB-financed expenditures, and transportation and insurance costs included in the base cost for ensuring smooth project implementation. The loan will finance 38.76% of the project cost, including civil works, equipment and materials, and institutional strengthening. The government will finance the remaining $236.84 million through counterpart funds from the two project cities

Table 3: Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank	150.00	38.78
Baicheng municipal government	175.50	45.37
Baishan municipal government	61.34	15.86
	386.84	**100.00**

Note: Percentages may not total 100% because of rounding.
Source: Asian Development Bank estimates.

1.6 Flow of Funds and Onlending Arrangements

7. The Government of the People's Republic of China is the borrower of the loan and will make the loan available, through the Jilin Provincial Government to the project city governments on the same terms and conditions as those of the ADB loan. The project city governments will assume the foreign exchange and interest variation risks of the ADB loan. The People's Republic of China, Jilin Provincial Government, and the project city

governments have assured ADB that counterpart funding will be provided in a timely manner, including any additional counterpart funding required for any shortfall of funds or cost overruns.

8. The flow of funds chart and the relending arrangements are shown in **Figure 1**.

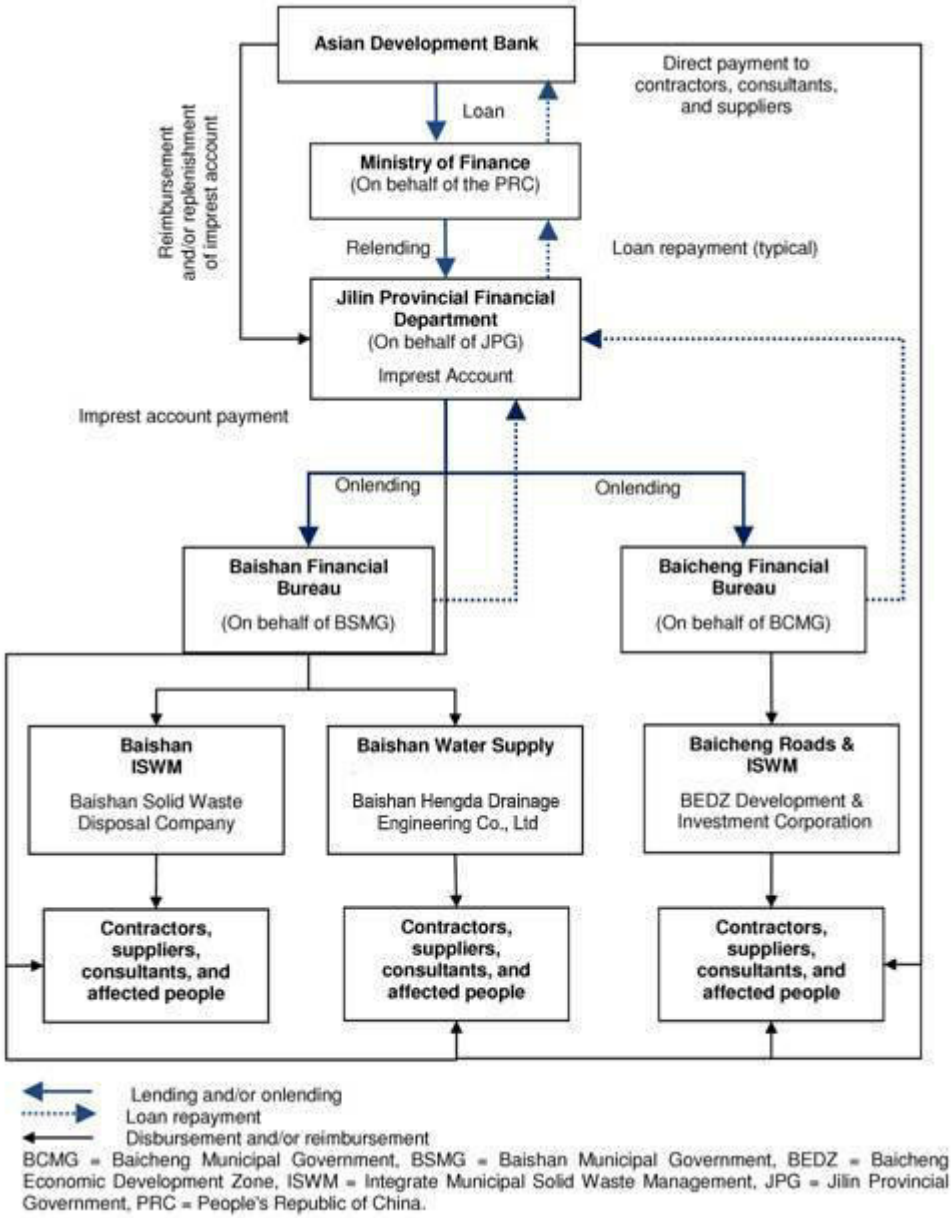
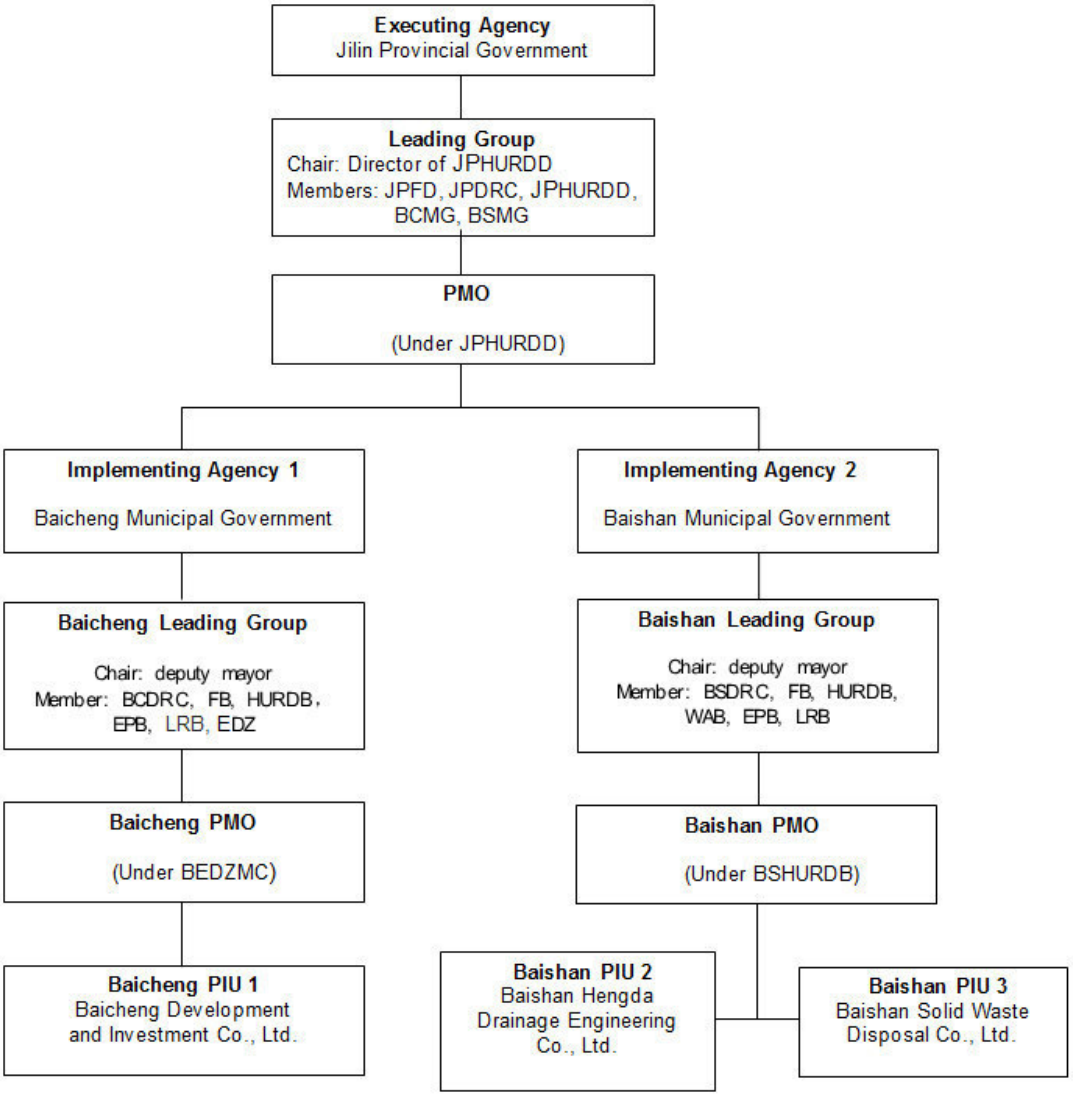


Figure 1: Flow of Funds and Onlending Arrangements

1.7 Implementation Arrangements

9. JPG is the project executing agency (EA). A project management office (PMO) for the project was established in the Jilin Housing and Urban–Rural Development Department. The project implementing agencies are the Baicheng and Baishan municipal governments. For the ISWM subcomponent, the project implementation unit (PIU) is Baishan Solid Waste Disposal Co. Ltd. and for the water supply subcomponent, the PIU is Baishan Hengda Drainage Engineering Co. Ltd. The PIU for implementation of the Baicheng urban infrastructure and ISWM components is BEDZ Investment and Development Co. Ltd. The implementation arrangements are shown in **Figure 2**.



BCMG=Baicheng Municipal, BCDRC=Baicheng Development and Reform Commission, BEDZMC=Baicheng Economic Development Zone Management Commission, BSMG=Baicheng Municipal Government, BSDRC=Baisheng Development and Reform Commission Government, EPD=Environmental Protection Department, JPDRC= Jilin Provincial Development and Reform Commission, JPFD= Jilin Provincial Financial Department, JPHURDD= Jilin Provincial Housing and Urban-Rural Development Department, LRB= Land and Resources Bureau, PIU= Project Implementing Unit, PMO= Project Management Office, WAB= Water Affairs Bureau.

Figure 2: Implementation Arrangements

2. Implementation Progress

2.1 Updated Procurement Plan

10. According to the updated procurement plan, there are 44 contracts to be procured following ADB's procurement guidelines. In total, there are 14 civil works contracts and 10 equipment supply and installation contracts for Baicheng Infrastructures, 6 civil works contracts and 6 equipment supply and installation contracts for Baishan Water Supply, 3 civil works contracts and 3 equipment supply and installation contracts for Baishan Municipal Solid Waste Management, and 2 consulting services contracts. The updated procurement plan is provided in **Appendix 1**.

2.2 Contract Awards

11. As of 30 June 2016, the two consulting services contracts have been awarded. One is for loan implementation and the other for resettlement monitoring.

12. No awards for civil works and goods contracts have taken place.

2.3 Engineering Progress

13. As of 30 June 2016, no physical construction has yet started. Therefore there is no engineering progress.

3. Description of the Environment

3.1 Environmental Setting of Jilin Province

14. Jilin Province is located in the middle of the northeast of the PRC with the longitude from 121°38' to 131°19' E and the latitude from 40°52' to 46°18' N. The province borders Liaoning Province in the south, Heilongjiang Province in the north, Inner Mongolia Autonomous Region (IMAR) in the west, Russian Federation in the east, and North Korea in the southeast across the Yalu River. The province covers an area of 187,400 km^2, accounting for 2% of the nation's total. The total population of the province was 27.53 million at the end of 2015, accounting for approximately 2% of the nation's total, with the urban population being 15.23 million and rural population 12.30 million. The provincial capital is Changchun and there are seven prefecture level cities (Jilin, Siping, Tonghua, Baishan, Liaoyuan, Baicheng, and Songyuan) and one minority autonomous state (Yanbian Korean Autonomous State).

15. Jilin Province is located at the east of Eurasia and has temperate continental monsoon climate with long, cold winters and short, warm summers. The average temperatures in January range from -20℃ to -14℃. The average temperature in July is 20℃. The annual average frost-free season range 100 to 160 days. The annual sunshine duration is about 2,259 to 3,016 hours. The average annual precipitation is 400-800 mm, mostly occurring during July to September.

16. The eastern part of Jilin Province is the mountainous area of the Changbai Mountains, with an elevation of more than 1,000 m, and the Jidong Hills, 500 m above sea level or lower. Other mountain ranges include the Jilinhada, Zhangguangcai, and Longgang mountains. Jilin is drained by the Yalu and Tumen rivers in the extreme southwest (which together form the border between the PRC and the Democratic People's Republic of Korea), by tributaries of the Liaohe River along the southern border, and by the Songhua and Nenjiang rivers, both eventually flowing into the Amur. In the western part of the province are the Songhua–Liao Plains, whose low and flat western section is the grain production base of the province. The catchment area of Songhua River is 128,200 km^2, which accounts for 65.1% of the province's area. The area of Liaohe River is 12,900 km^{2,} Tumen River is 33,200 km^2, Yalu River is 61,900 km^2, and Suifen River is 2,400 km^2.

17. Jilin Province is one of the PRC's six major forested areas. Stretching about 500 km, the Changbaishan Mountains are renowned for their biodiversity and natural beauty. The land used for forestry in the province covers 9.72 million ha, accounting for 51.37% of the province's total and ranking 12th in the country. The province's forest coverage is 42.4%. The highest summit in the province, the White Cloud Peak of the Changbaishan Mountains, is 2,691 m above sea level. The prairies in western Jilin are in the center of the Songhua–Nenjiang Prairies, one of the famous grasslands in the PRC. The prairies are known for their rich forage grasses, most of which are perennial rootstock and bushy grasses. They are also one of the breeding bases of commercial cattle and fine-wool sheep in northern PRC. There are 4.379 million ha of grassland in the province, mainly in its western and eastern parts western part is the easternmost edge of the Euro-Asian grassland, where there are rich water resources and good-quality grass.

18. Jilin province is a nationally important commodity grain and soybean producer. In the agricultural areas, the main farm crops are corn, soybean, paddy rice, wheat, barley, and sorghum. Other important crops are beans, sugar beet, flax, and tobacco.

3.2 Environmental Setting of Baicheng City

A. Geography, Topography and Geology

19. Baicheng Municipality is located in the northwest of Jilin Province with the longitude from 121°38' to 124°22' E and the latitude from 44°13'57'' to 46°18' N. It is bordered with Songyuan City in the south and east, Inner Mongolia in the west, and Heilongjiang Province in the north. The territory of the city is about 230 km in north-south direction and 211 km in the east-west direction with a total area of 25,685km2. It is the connection point of Jilin, Inner Mongolia, and Heilongjiang Province. Under its jurisdiction there are one district of Taobei, where the project will be located in, two counties of Tongyu and Zhenlai, and two county-level cities of Taonan and Da'an. The total area of Baicheng is 26,000 km^2 with the total population of 2.029 million.

20. The topography of Baicheng from north to southeast are orderly low mountains, hill and plain, and the northwest site is higher. The northwestern part is at the extension of the Large Xingan Mountain with the elevation at about 300-663 m ASL, the northeastern and southern parts are in hinterland of Songnen Plain with the elevation at about 130-140 m ASL. Baicheng is located on the quaternary alluvial fan by Tao'er River, and the geology is quaternary sediment layer, under which is clay layer, then the gravel bed. The seismic intensity is Grade VII. The main soil type is black earth.

B. Meteorology and Climate

21. Baicheng has temperate continental monsoon climate with long, cold winters and short, mild summers. The spring is dry and windy, and the autumn is short and cool. The average annual precipitation is 430 mm, mostly occurring during May to September. The characteristic values of local meteorological parameters are shown in the table below.

Table 4: Main Meteorological Parameters of Baicheng City

Weather elements	Unit	Value
Annual average temperature	℃	5.1
Extremely high temperature	℃	40.6
Extremely low temperature	℃	-42
Average air pressure	100Pa	995.8
Annually average precipitation	mm/a	430
Extremely maximum precipitation	mm/a	726.3
Average wind speed	m/s	3.5
Average evaporation amount	mm/a	1,006
Maximum frozen earth depth	mm	2,430
Dominant wind direction in the entire year		w
Average annual sunlight duration	hour/a	2,919
Average annual frost free season	day	144

Source: EIA report

C. Hydrological Condition and Water Resources

22. There are nine (9) rivers in Baicheng Municipality, including Nan River, Tao'er River, Holing River, Jiaoliu River, Najin River, Hu'erda River, Erlongtao River, Emutai River and Wenniugechi River. Within the territory, the Nen River flows from the Shijiazi Village of Dandai Town in Zhenlai County, and out of Baicheng at Sikeshu Village in the Daan, with a total length of 150 km in the territory of Baicheng. The Tao'er River, the first tributary of Nen

River, begins at Taobei District, through the Yueliang Lake and flows into Nen River, whose total length in the territory of Baicheng is 285.83 km. There are more than 700 small lakes and ponds in Baicheng with the total area of 270,033 hectares (ha), which is beneficial for aquaculture and irrigation.

23. Baicheng city is located in a semi-arid area with limited surface water resources but rich in groundwater resources. The annual average water resources in Baicheng are 2.272 billion m^3 in total, of which surface water runoff is 189 million m^3 (8.32% of the total) and groundwater is about 2.083 billion m^3 (91.68% of the total). There are eight (8) reservoirs including Yuelingpao, Xianghai, Qunchang, Chuangye, Tuanjie, Xinglong, Shengli and Wujianfang, which are the major water sources in the municipality with a total storage capacity of 1.717 billion m^3.

24. There is no surface water body within the project area, except an artificial channel to be constructed before 2016 according to the city's master plan. The nearest Tao'er River is 25 km away from the project site.

D. Ecological Resources

25. Baicheng City has 1.17 million ha farmland (45.43% of the city's total area); 405,900 ha of forest land (11.6%); and 377,600 ha of wetland areas. It has two national natural reserves (Xianghai and Momoge) and the Baolawendu provincial natural reserve, which belong to inland wetland and water ecological protection zones. There are 600 vegetation varieties, and 296 breeds of bird, in which the red-crowned crane, white-napped crane, white crane, white-head crane, white stork, white ibis and bustard etc. belong to treasure birds under national protection. The nature reserve areas are the key resting sites for the migration of East Asia migratory birds. There are four nature reserves with a distance to the closest project site ranging from 62 to 114 km. They are outside the project area of influence.

26. The Baicheng project components are located in the urban area, where ecological resources are limited due to high population density and activity. The domestic EIA confirmed that there were no legally protected or endangered species within the project's area of direct influence.

E. Environmental Protection

27. According to 24-hr automated air quality monitoring for 2015, the average annual concentration of PM_{10} is 88 μg/m^3. The number of days whereby the air quality meets the Class II of National Ambient Air Quality Standards accounted for 77.8% of the total monitoring days for the whole year. The average day-time noise levels in urban districts is 52 dB(A), and the day-time road traffic noise level is 67.7 dB(A).

28. The city conducted 15,000 person-times of annual environmental protection inspections. The total number of inspected enterprises amounted to 1,825 times. For the 368 units who exceeded the discharge standards, notifications with deadlines for rectification were issued.

29. There are three natural reserves in the municipality, including 2 national and 1 provincial. The total area of the natural reserve is 312,000 hm^2, account for 12.1% of the city's total area.

30. In 2015, eight environmental programs were started, with a total investment of CNY 4.52 billion. They covered the sponge city pilot, utility tunnels, road improvements,

landscaping, water supply, wastewater management, solid waste management, central heating and low-income housing.

3.3 Environmental Setting of Baishan City

A. Geography, Topography and Geology

31. Baishan City is located in the southeast of Jilin Province, at about 292 km south of Changchun City (the provincial capital), with the longitude from 126°07' to 128°18' E and the latitude from 41°21' to 42°49' N, in the western side of the Changbai Mountain. The city is surrounded by Yanbian Korean Autonomous Prefecture in the east, Tonghua City in the west, Jilin City in the north, and North Korea in the south across the Yalu River. The city is located in the mountainous area of Changbai Mountain, covered with thick forest. The total area of the city is 17,485 km^2.

32. Baishan City is located in the west side of the Changbai Mountain, with the dimension of 180 km from east to west and 163km from north to south. The Changbai lava plateau and Jingyu lava plateau cover the most area of the city. There are two mountain ranges of Longgang and Laoling in Baishan City, the elevation of Longgang Mountain range is 800-1200 m ASL with the relative height of 500-700 m, and the elevation of Laoling Mountain range is 1000-1300 m ASL with the relative height of 500-800 m. The seismic intensity in the project area is Grade VI. The main soil types in the project area are brunisolic soil, albic soil, and black earth.

B. Meteorology and Climate

33. Baishan City has temperate continental monsoon climate with long, cold winters and short, warm summers. The average annual precipitation is 883.4 mm, mostly occurring during May to September. The annual average temperature is 4.6°C. The characteristic values of local meteorological parameters are shown in the table below.

Table 5: Main Meteorological Parameters of Baishan City

Parameter	Unit	Value
Average temperature	°C	4.6
Max. temperature	°C	36.5
Min. temperature	°C	-42.2
Annually average precipitation	mm/a	883.4
Average wind speed	m/s	2.35
Average annual evaporation	mm/a	1,098
Maximum frozen earth depth	mm	1,650
Dominant wind direction		SW
Average annual sunlight	hrs	2,259
Average annual frost free season	days	140

C. Hydrological Condition and Water Resources

34. There are two river systems (Yalu River and Songhua River) in the area, in which the Yalu River is the main river system. The Yalu River originates from the northwest of the Laoyeling Mountain; the Hunjiang River is the biggest tributary of the Yalu River. In the area, the dry season of a year is from December to March, the spring flood season is from April to June while the summer flood season is from July to August. The City is located on the upstream of the Hunjiang River, with an average flow of 20.9m^3/s, and a total average annual runoff volume of 420million m^3. There is one middle-size reservoir (Qujiaying

reservoir) and four small-size reservoirs in the city, with the total storage capacity of 34.79million m^3.

35. The Xibeicha River is a first tributary of Hunjiang River with the total length of 19.25 km, the total catchment area of 157.1 km^2, and the current average flow of 1.62 m^3/s (51.2 million m^3/a). the associated Xibeicha Reservoir is located on the midstream of the Xibeicha River with the total designed capacity of 13.5 million m^3 and dead storage of 0.6073 million m^3. Downstream the reservoir, the Xibeicha River follows 9 km before it merges into the Hunjiang River. The length of Hunjiang River in Baishan Municipality is 67.7 km with the river basin area of 1,734.2 km^2, and the average annual flow of Hunjiang River is 2.11 billion m^3.

36. The groundwater of Baishan City is divided into five types, interstitial water from rock, fissure water from basalt, fissure water from clastic rock, fissure water from carbonate rock and fissure water from bed rock. The chemical component of groundwater is mainly bicarbonate. The groundwater resource amount in Baishan is 252 million m^3 which accounts for 18% of total water resource amount of the city. Groundwater currently supplies for small water treatment plants, including Pearl Gate (Zhenzhumen Gate), Kucanggou, and Jinying, with capacities of 9,000 m^3/d, 5,000 m^3/d, 10,000 m^3/d respectively. Due to groundwater pollution, these WTP are planned to be phased out. There are 130 natural mineral water sources in the city with the total flow rate of 257,100m^3/d.

D. Ecological Resources

37. City has 14,761 km^2 forests with afforest coverage of 83%. 60% of the Changbai Mountain Natural Reserve is in Baishan City. The ample forest resources provide the advantageous survival condition for the wild fauna and flora. There are more than 350 breeds of wild fauna in Baishan, in which there are 37 breeds of national protected animals, such as Manchurian tiger, brown bear, lynx, and musk deer. And there are more than 2,300 vegetation varieties, in which more than 900 medicinal plant varieties (*ginseng*, *ganoderma*, *rhodiola rosea*, *gastrodia elata*), 1,500 economic plant varieties, more than 200 food plant varieties.

38. The Baishan project components will be located on the foot of the Changbai Mountain and close or within the urban area. The domestic EIAs recorded no rare or endangered wildlife species or impact of the proposed works on any protected area or habitat area. Aquatic biodiversity in the Xibeicha River is reported in the FSR and EIA as uniformly low. Species noted were common carp and loach species. There are three nature reserves and the protected parks within 100 km from the project site, but they are outside the project's area of influence.

E. Environmental Protection

39. In 2015, the wastewater treatment plants in Baishan city achieved a reduction of the COD emission by 942.6 t and NH_3-N emission by 103.4 t. The treatment of livestock and poultry manure achieved a reduction of the COD emission by 112.7 t and NH_3-N emission by 9.1 t. The SO_2 emission was reduced by 4,276.2 t and the NO_x emission by 5,531.4 t.

40. The air quality in urban areas meeting the Class II of the *National Ambient Air Quality Standard (GB3095—2012)* amounted to 265 days in 2015 or 72.6%.

41. In 2015, ambient noise and road traffic noise in Baishan city was strictly controlled to meet the *National Ambient Noise Standards for Urban Area (GB3096-93)*. All the indicators of the six water sources met the national standards for drinking water sources.

4. Implementation of the EMP

4.1 Overview

42. The objective of establishing an EMP is not only to propose appropriate mitigation measures, but also to recommend establishment of institutions or mechanisms to monitor and ensure compliance with environmental regulations and implementation of the proposed mitigation measures. Such institutions and mechanisms will seek to ensure continuously improving environmental protection activities during preconstruction, construction, and operation in order to prevent, reduce, or mitigate adverse impacts. The EMP drew on the individual EIA reports and on the PPTA discussions and agreements with the relevant government agencies.

43. The EMP has divided the project duration into the following phases:

1) Pre-construction phase, from the date of loan effectiveness to the commencement of construction, with the primary task of incorporating environmental management provisions into the detailed design, bidding, contracting, reviews and approvals, institutional strengthening and capacity building, etc.

2) Construction phase, from the start of construction to the date of physical completion, with the primary task of implementing and supervising the implementation of the Environmental Management Plan (EMP) and monitoring the residual environmental impacts, etc.

3) Operational phase, with the primary task of implementing and supervising the implementation of the operational mitigation measures and monitoring the residual environmental impacts.

44. For this reporting period, the project has not commenced its physical construction and therefore it is still in the pre-construction phase. The assessment of the status of implementation of the EMP will focus on the pre-construction requirements.

45. A narrative assessment of the status of EMP implementation is presented in the following sections. A summary matrix is provided in **Appendix 2**.

4.2 Climate Change Considerations

46. In the EMP, the first environmental management provision for the pre-construction phase is to include low carbon, climate variability and change resilience considerations. There are two detailed requirements: 1) design low carbon Baishan Water Supply System including variable speed pumps, SCADA 5, accurate water-metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for non-revenue water (NRW) reduction (ensure reduce the NRW from 65% to 30%); and 2) include high-capacity stormwater-drainage pipelines and rainwater detention and reuse facilities in Baicheng Infrastructure Component.

47. Based on discussions with the design institute, the detailed design of the Baishan Water Supply System has incorporated variable speed pumps, SCADA 5, accurate water-metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for NRW reduction with the objective of reducing

the NRW from 65% to 30%. The loan implementation consultants will pay attention to these requirements when the bidding documents are ready for review.

48. With respect to high-capacity stormwater-drainage pipelines and rainwater detention and reuse facilities in Baicheng Infrastructures Component, the stormwater-drainage pipelines have adopted the recommended diameters in the FSR and PPTA design documents. For rainwater detention and reuse facilities, the selection of Baicheng city in May 2015 as a national Sponge City pilot provides a good opportunity for meeting this requirement. In discussions with the IA, eight out of the nine roads will adopt the permeable pedestrian pavements. The loan implementation consultant team includes an international and national stormwater management specialists. They have already fielded one mission and provided advice on international and national best practices on stormwater management. They will be mobilized to provide further review of the detailed designs for the roads and provide further advice on incorporating international and national best practices into the project.

4.3 Institutional Strengthening for EMP Implementation & Supervision

49. Specific requirements under this provision in the EMP are as follows: 1) establish an EMU (Environmental Management Unit) in each LPMO (Local Project Management Office), including at least one environment specialist; 2) appoint environmental coordinators for EMP coordination within JPMO and PIUs; 3) engage loan implementation environmental consultant (LIEC) under the project implementation consulting TA; 4) provide training to all environmental staff for EMP implementation and supervision; and 5) The EMP requires the loan implementation environmental consultants or invited environment specialists and/or officials from the JEPD or LEPBs to provide training on construction environmental management and implementation and supervision of environmental mitigation measures to contractors and construction supervision companies, in accordance with the training plan specified in the EMP.

50. An EMU has been established in the Baicheng PMO and Baishan PMO. The EMU is led by the deputy director of the PMO, and is supported by one environmental officer. An environmental coordinator has also been appointed in the city PMOs for coordination with the JPMO and PIUs. Through international competitive bidding, NREM International Inc. was selected to be the loan implementation consultant and was mobilized in July 2015. There is an international and national environmental safeguard specialist in the loan implementation consultant team.

51. As of today, three comprehensive environmental management trainings have been provided by the loan implementation environmental specialists. The first comprehensive training course was held in 27-28 July 2015 and 14-15 October 2015, with the attendance of 32 participants (24 males and 8 females) and 27 participants (18 males and 9 females), respectively, from the JPMO, local PMOs, PIUs, DIs and the tender agency. The third comprehensive training was organized in 6-7 April 2016, with the attendance of 42 participants (30 males and 12 females) from the JPMO, local PMOs, PIUs, DIs, the tender agency and the environmental monitoring agencies. The topics of the two comprehensive training courses covered ADB safeguard policies, environmental covenants in the loan and project agreements, the environmental management plan, institutional roles and responsibilities, environmental monitoring plan, public consultations, grievance redress mechanism, etc.

52. The detailed implementation status of the institutional strengthening program related to the EMP is shown in **Appendix 3**.

27-28 July 2015 Training Course

14-15 October 2015 Training Course

6-7 April 2016 Training Course

4.4 Updating the EMP

53. The EMP requires regularly updating, on an as-needed basis, the mitigation measures based on final detailed design and submit to ADB for review. The loan implementation environmental consultants reviewed the detailed designs that have been completed to date, and it was determined that the design improvements arising from the detailed designs do not warrant any update of the EMP.

54. The EMP specifies that in case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional APs, IAs and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC,

JPMOs and LPMOs should consult with ADB. As of today, there is no change in location in any of the subprojects. Therefore no need has arisen to update the EMP.

4.5 Environmental Monitoring Plan

55. The EMP requires the engagement of municipal environmental monitoring stations, prior to the start of construction, to implement the external monitoring program. As of today, the environmental monitoring agencies are contracted and awaits mobilization as soon as the construction commences.

56. The EMP requires the preparation of a detailed environmental monitoring plan in accordance with that defined in the EMP. During this period, the project objectives, scope and construction sites and right-of-ways have not changed. In discussion with the external environmental monitoring agencies, the environmental monitoring plan contains adequate details that can satisfy the requirements and therefore does not need revision.

4.6 Bidding and Contract Documents

57. There are two requirements in the EMP with respect to bidding and contract documents: 1) ensure the mitigation measures in the EMP are incorporated in all bidding documents, which will be sent to ADB for review; and 2) prepare environmental contract clauses for contractors, namely the special conditions (e.g., reference to EMP and monitoring requirements).

58. The loan implementation environmental consultants have drafted the environmental protection and soil erosion requirements for the bidding and contract documents as contained in the Technical Specifications of the Bidding Document. The requirements cover air emission control, wastewater management, solid waste management, noise control, soil erosion control, public and workers health and safety, social impact control, gender equity, resettlement, etc. A sample is shown as follows:

> *The contractor shall strictly observe provisions of relevant national, provincial and municipal departments on environmental protection and relevant content of environmental management plan (EMP) of the ADB Loan Project in Construction Works. The contractor is responsible for taking various effective measures to prevent and eliminate any environmental pollution caused by construction, and shall protect the owner against all claims or fines caused by such pollution. The item for all expenses incurred by environmental protection in project implementation will be paid in the lump sum manner as listed in the BoQ.*
>
> *The environmental management requirements which should be complied in the implementation of the contract are described in the Appendix 1 of the Bidding Document----IEE for Jilin Urban Development Project and Appendix 2 of the Bidding Document----Environmental Management Plan for the Jilin Urban Development Project.*
>
> *(1) Dust control: The contractor shall take all reasonable measures to minimize the dust generated by construction, and shall conform to relevant provisions of local environmental protection departments. At least one person shall be arranged for each construction site to water the construction site regularly thus to reduce dust; the times of watering depends on weather. On principle, water in rush hours (7:30-8:30,*

12:00- 1:00 and 5:30-7:00) once respectively every day, and every 2h on sunny days in summer when wind speed is above level-3.

(2) Noise: The contractor shall control construction noise to the minimum level specified by provincial and municipal environmental protection departments through effective technical means and management measures. The contractor shall not arrange noisy mechanical construction at night near settlements without the approval of project supervisor. Construction at night shall be subject to provisions of relevant local department.

(3) Light pollution: The contractor shall put up baffles in case of using high-brightness light for construction or welding at night to prevent the strong light from disturbing residents and traffic safety of drivers.

(4) Waste: The contractor shall timely deal with the wastes generated in construction and life, and discard them in place designated by project supervisor and relevant local department. The wastes that cannot be timely dealt with or transported shall not be scattered. Mobile toilet easy to manage and clean shall be used on the construction site. It shall be regularly cleaned to keep environment on the construction site clean.

(5) Drainage: The contractor shall deal with sewage or waste water generated in construction and life in a centralized way, and discharge it into underground drainage pipe after inspection shows that it meets environmental protection standard. The contractor shall not discharge water containing pollutant or visible suspended matter into underground drainage pipe or existing drainage system.

(6) Material loss: The contractor must take reliable measures to prevent loss of construction materials during transportation and storage.

(7) Cleaning of construction site: The contractor shall frequently keep the construction site clean to observe provisions of relevant departments on environmental health.

(8) Drainage system: When the route passes through drainage system, the contractor shall take necessary temporary measures to prevent the drainage from being affected or suspended in construction. These temporary measures may include temporary side ditch, water pipe, pump station and other facilities required by project supervisor. The temporary facilities shall not affect peak drainage in construction.

(9) The contractor shall draw up measures to be taken according to practical situation of areas through which the route passes, and execute design scheme with the approval of project supervisor, but the approval does not exempt the contractor from responsibilities.

(10) The contractor shall take full responsibility for the temporary measures taken, and compensate local residents for losses caused by ineffective measures.

(11) The contractor shall be responsible for losses caused by dust, pollution discharge, noise, material loss, etc. to residents in construction.

(12) The contractor shall consider local senior high school entrance examination and college entrance examination, folk customs and statutory holidays, and arrange construction according to specific situation so as not to affect life of local residents.

59. The health and safety provisions in one of the bidding documents are provided as an example below:

(1) General provisions: The contractor shall observe all regulations and codes on safety, health and environmental health, and provide all safety devices, equipment and protective equipment. The work area shall be appropriately closed around to guarantee safety during construction; moreover, when project supervisor deems necessary, the contractor shall take any other measures to protect the life and health of employees and the safety of the public.

(2) Safety officer: The contractor shall assign full-time personnel to the site during construction of the engineering. The personnel shall be qualified for safety work, and familiar with the type of work. His work task includes developing measures for health protection and accident prevention, personal examination, and checking implementation of safety rules and regulations.

(3). Safety sign: (a) The contractor shall provide, erect and maintain all necessary and suitable signboards around the site of engineering for safety and convenience of employees and the public; (b) The signboard shall include (but not limited to the following): warning and danger signs, safety and control signs, and guide sign and standard road sign; (c) The characters on all signs shall be in Chinese. There shall also be internationally-used graphical warning symbols on signs; and (d) The size, color, character and location of all signs shall meet requirements of project supervisor.

(4). Accident report: The contractor shall immediately notify project supervisor, and must immediately suspend the construction of the project and projects related to it apart from taking necessary rescue measures whenever accident that endangers engineering safety, progress and quality happens. An accident report shall be submitted to project supervisor within 7 days after cause is ascertained, including situation of casualties, time loss and detailed data required by project supervisor. The project supervisor can refuse to issue order to resume construction until the cause is ascertained and remedial measures are taken if cause of the accident is not ascertained after a long time or project supervisor believes that the accident potential hasn't been eliminated. The responsibility and expense for the above accident are handled in accordance with contract terms. The contractor shall make contingency plan for human injury during construction. The contractor shall also submit accident report of last month within the first 7 days of every month.

60. The bidding documents also have provisions for social safeguards. The provisions in one of the bidding documents are as follows:

According to Loan Agreement and Project Agreement of ADB, all the contractors conforming to the Bidding Document requirements must abide by relevant measures and requirements prescribed in the gender action plan.

(1). Safeguard measures to be taken by the contractor: The contractors shall (a) implement HIV/AIDS and STDs awareness and prevention training for all employees; (b) provide necessary measures to ensure the safety and health of its employees; (c) together with the local centers of disease control, disseminate information on the risks, hazards, impacts and prevention know-how on HIV / AIDS and STDs among the staff, workers on the construction sites and the local community by means of information disclosure, education and consultation; (d) take due care to ensure that solid and liquid wastes are appropriately disposed of in and around construction sites, or sites where the company might house employees; (e) in conjunction with the

relevant local government and community leaders, hold a public meeting in each Project area prior to commencing construction to discuss issues associated with ensuring the safety of children in the vicinity of the construction site; (f) observe local customs concerning acceptable behavior toward the local population.

(2). The contractor shall abide by the following principles at employment: (a) not discriminate against people seeking work on the basis of age, provided they are capable of doing the work; (b) provide equal pay for equal work, regardless of gender or ethnicity; (c) advertise labor requirements in a timely manner prior to recruitment, in venues and languages that can reasonably be expected to be seen by interested men and women, regardless of age or ethnicity; (d) provide those employed with a written contract; (e) provide the timely payment of wages; (f) use local unskilled labor with priority given to the persons affected by the Project, as applicable; (g) comply with core labor standards and the applicable labor laws and regulations, including stipulations related to employment; (h) not force the labor to work against their will; and (i) not employ child labor. JPG, BCMG and BSMG shall further cause the Works contractors to maintain records of labor employment, including the name, age, gender, domicile, working-time, and the payment of wages and ensure that the records are included in summary form in the Project performance management system.

(3). The works contractors should maintain records of labor employment, including the name, age, gender, domicile, working-time, and the payment of wages and ensure that the records are included in summary form in the Project performance management system.

(4) Resettlement: All land and rights-of-way required for the Project are made available to the Works contractors in a manner and within the time frame compliant with the RPs and all land acquisition and resettlement activities are implemented in compliance with (a) all applicable laws and regulations of the Borrower relating to land acquisition and involuntary resettlement; (b) the Involuntary Resettlement Safeguards; and (c) all measures and requirements set forth in the RPs, and any corrective or preventative actions (i) set forth in a Safeguards Monitoring Report; or (ii) as subsequently agreed between ADB and JPG.

All bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the resettlement plans (to the extent they concern impacts on affected persons during construction), and any corrective or preventative actions set forth in (i) safeguards monitoring reports or (ii) subsequently agreed between ADB and JPG; (b) make available a budget for all such social measures; (c) provide BCMG with a written notice of any unanticipated resettlement risks or impacts that arise during construction, implementation or operation of the project that were not considered in the resettlement plans.

61. The above provisions have also been incorporated into the contract documents. The EIAs, EMPs and resettlement plans are included as appendices to the respective contract documents.

4.7 Grievance Redress Mechanism and Public Consultations

62. In accordance with the EMP, a Project Public Complaints Unit (PPCU) has been established in the Baicheng PMO and Baishan PMO. Officers of PPCU and grievance

redress access points attended the two comprehensive environmental management training courses.

63. Information disclosure is achieved primarily through the bulletin board erected at the construction site. It is required by Chinese law. The bulletin board contains a description about the project, layout map, construction safety, labour standards, environmental and health standards, name of the contractor(s) and names and contact information of the on-site managers and company executives. Public complaints can also be lodged through the 24-hour hotlines of the two municipal EPBs in Baicheng and Baishan ("12369" – common number country-wide). The two municipal EPBs also have online complaints gateways in their webpages. These channels are assessed to be adequate. As of today, no public complaint has been received, as physical construction has not yet started.

Meanwhile, the EMP contains a comprehensive public consultation program for the construction and operation phases, as shown in the table below. The public consultation program includes public participation in: (i) monitoring impacts and mitigation measures during construction and operation, (ii) evaluating environmental benefits and social impacts, and (iii) interviewing the public after the project is completed. The LPMOs and PIUs are responsible for public participation during project implementation. They are supported by the loan implementation environmental consultants.

Table 6: Public Consultation Program for Construction and Operation Phases

Organizer	Approach	Times / Frequency	Subjects	Participants
Construction				
PIUs, LPMOs, LIEC	Public consultation through questionnaire survey, site visits, informal interviews	Once a year during peak construction period	Adjusting mitigation measures if necessary, construction impacts, comments and suggestions	Work staff within construction area; and residents within construction area
	Public workshops	At least once during peak construction period	EMP implementation progress, adjusting mitigation measures if necessary, construction impacts, comments and suggestions	Representatives of residents, APs and social sectors
Operation				
PIUs, OPFs	Public consultation and site visits	At least once	Effects of mitigation measures, impacts of operation, comments and suggestions	Residents, APs adjacent to project facilities
	Public workshop	As needed based on public consultation	Effects of mitigation measures, impacts of operation, comments and suggestions	Representatives of residents, APs and social sectors
	Public satisfaction survey	At least once after one year of operation	Comments and suggestions	Project beneficiaries

AP = Affected people, OPF = Operator of Project Facilities, PIU = Project Implementing Unit, LPMO = Local Project Management Office, LIEC = Loan Implementation Environmental Consultant.

4.8 Land Acquisition and Resettlement

64. In accordance with the EMP, the land acquisition and resettlement plans (LARPs) have been updated if and when there are design changes that affect the scope of land acquisition and resettlement. Baicheng and Baishan cities each have a land acquisition and resettlement office that comprises local government officials for managing the land acquisition and resettlement process.

65. The land acquisition and resettlement processes and procedures in practice entail comprehensive information dissemination, community consultation and community mobilization activities. They are able to meet the regulatory requirement of the PRC Land Administration Law (1999) and the ADB SPS (2009).

66. The EMP requires all resettlement activities are reasonably completed before construction starts on any component. The city PMOs and PIUs understand and will comply with this requirement.

4.9 Status of Compliance with Loan Covenants

67. The status of compliance with the environment-related covenants as prescribed in the Loan and Project is summarized in the table below. All environmental safeguard covenants have been complied with, being complied with or not yet due.

Table 7: Status of Compliance with Loan Covenants

No.	Environmental Covenants	Status of Compliance
	Loan Agreement	
	SCHEDULE 4: Procurement of Goods, Works and Consulting Services	
1	**Conditions for Award of Contract** 7. The Borrower shall cause JPG and the IAs not to award any Works contract which involves environmental impacts until BSMG and BCMG have incorporated the relevant provisions from the EMP into the Works contract.	Not yet due. No contract has been awarded.
	Project Agreement	
	SCHEDULE: Execution of Project; Financial Matters	
2.	**Water Supply Baishan** 3. JPG shall cause BSMG to ensure that (a) the construction of the Xibeicha Reservoir shall be completed and operational within 36 months of the Effective Date; and (b) the Xibeicha Reservoir shall be constructed, operated, maintained, and monitored in strict conformity with all applicable laws and regulations, including national and municipal laws and regulations and standards on environmental protection, health, labor, and occupational safety.	(a) Being complied with. The dam is under construction. (b) Being complied with.
3.	**Solid Waste management** 10. JPG shall cause the BCMG to ensure that Baicheng landfill shall be (a) fully operational prior to December 2016; and (b) operated, maintained, and monitored in strict conformity with all applicable laws and regulations, including national and municipal laws and regulations and standards on environmental protection, health, labor, and occupational safety.	(a) Being complied with. (b) Not yet due.
4.	**Environment** 15. JPG shall cause BCMG and BSMG to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower and Jilin Province relating to environment, health and safety; (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or	(a) Being complied with. (b) Being complied with. (c) Being complied with.

	preventative actions set forth in a Safeguards Monitoring Report.	
5.	16. JPG shall and shall cause BCMG and BSMG to ensure that throughout Project implementation, (a) any changes to the Project design are reviewed that may potentially cause negative environmental impacts; (b) in consultation with ADB, environmental monitoring and mitigation measures are revised as necessary to assure full environmental compliance; and (c) provide ADB within 60 days justification for any proposed changes to the mitigation measures required during design, construction and operation.	No change so far.
6.	17. JPG shall cause BSMG to ensure that (a) any possible pollution from sources or activities in the proximity to Xibeicha Reservoir that might endanger the water quality of the reservoir is adequately controlled; and (b) a comprehensive emergency preparedness and response plan is to be prepared in advance of the initial filling of the reservoir and made available to ADB.	(a) Being complied with. (b) Not yet due.
7.	18. BSMG shall cause the Baishan water authority to ensure that the Xibeicha River downstream of the Xibeicha Reservoir receives a minimum flow of water at all times in accordance with the rule on minimum flow provision as agreed with Jilin Province Environmental Protection Department.	Not yet due.
8.	19. JPG and BCMG and BSMG shall ensure that the contractors shall (a) select and manage borrow and spoil disposal sites in accordance with the EMP and in consultation with relevant environmental protection authorities; (b) take necessary actions to avoid interruptions to water supply, wastewater collection, heating and other utility services during the construction of the project.	(a) To be complied with. (b) To be complied with.
9.	20. JPG shall, and shall cause BCMG and BSMG to ensure that (a) licensed environmental monitoring stations are contracted to conduct periodic environmental impact monitoring in accordance with the approved monitoring plan; and (b) the capacity-building program described in the EMP and the resettlement plans is properly implemented.	(a) Licensed environmental institutes have been contracted for all project components. (b) Being complied with.

ADB = Asian Development Bank, BCMG = Baicheng Municipal Government, BSMG = Baishan Municipal Government, JPG = Jilin Provincial Government, EMP = Environmental Management Plan, IA = Implementing Agency, IEE = Initial Environmenta Evaluation.

4.10 Fulfilment of Institutional Responsibilities for EMP

68. The EMP also defined the institutional responsibilities for EMP implementation. The status of fulfilment of these institutional responsibilities is summarized in the following table.

Table 8: Fulfillment of Institutional Responsibilities for EMP Implementation

Agency	Environmental Management Roles and Responsibilities	Implementation Status
Executing Agency (EA)– Jilin Provincial Government (JPG)	Overall policy and direction control. Responsible for project coordination with two project city governments, liaison with ADB, financial management and administration.	Fulfilled.

Jilin Provincial Project Leading Group (JPLG)	Responsible for implementation of the entire project Headed by the Vice Governor and consisting of JDRC, JEPD, JHUCD, JFD, and municipal governments of Baicheng and Baishan: • Coordinate and overlook project preparation and implementation; • Provide policy guidance during the project implementation; and • Facilitate inter agency coordination.	Fulfilled.
Jilin Provincial Project Management Office (JPMO)	Supervision and overall management to ensure smooth implementation of the Project: • Responsible for all day-to-day management work during the project preparation and implementation periods; • Assign one environment specialist as EMP officer/coordinator; • Communicate and coordinate with ADB for project management and implementation; report the project implementation progress and compliance monitoring to ADB; • Submit bidding documents, bide valuation reports and other necessary documentations to ADB for necessary approval; • Procurement of project implementation consulting services(PIC), including a loan implementation environmental consultant (LIEC) to assist in supervision, tracking and reporting on EMP implementation of all subprojects; • Consolidate environmental monitoring reports prepared by LPMOs and local environmental monitoring stations (EMS) and submitted to ADB for disclosure. • Commission a Tendering Agency to support the IAs and three project implementation units.	Fulfilled.
Implementing Agencies (IAs)– Municipal Governments of Baishan and Baicheng Cities	Primarily responsible for project implementation for project components in their jurisdiction, including finance and administration, technical and procurement matters, monitoring and evaluation, and safeguard compliance. Day-to-day activities delegated to LPMOs (see below)	Fulfilled.
Local Project Management Offices (LPMOs), Established under IAs[1]	Responsible for all day-to-day management work during the project preparation and implementation periods: • Communicate and coordinate with JPMO for project management and implementation; • Establish environment management unit (EMU); • In conjunction with PIUs, incorporation of EMP into bidding documents; • Establishment of a Grievance Redress Mechanism (GRM) with a dedicated Project Complaints Coordinating Unit (PCCU); • Supervision and monitoring of the EMP implementation and annual reporting to the JPMO (with support of LIEC); and • Participation in capacity building and training programs; • On behalf of the implementation agencies and 3PIUs, submit bidding documents, bide valuation reports and other necessary documentations to JPMO and ADB for necessary approval; • Submit withdrawal applications to Jilin Provincial Finance Department; • Submit required annual audit reports and financial statements of project account of the BCMG, BSMG, and PIUs to ADB; • Engage a design institute to complete preliminary and detailed engineering designs; • Engage a procurement` agency which supports the implementation agencies and 3 PIUs	Fulfilled.

[1] Baishan LPMO was setup under the municipal Housing and Construction Bureau; Baicheng LPMO was established under the Management commission of Baicheng Economic Development Zone.

Project Implementing Units (PIUs)[2]	Ensuring successful implementation of the relevant project components: • Appoint one environment specialist as EMP coordinator; • Tendering contractors and equipment with assistance of the international tendering agency; • Administer and monitor contractors and suppliers; • Construction supervision and quality control • Contracting of local (EMS) to conduct environmental monitoring; • Procurement and management of construction supervision companies (CSCs) required for subproject implementation in accordance with the PRC and ADB procedures and regulations; • Participation in capacity building and training programs; and • Commissioning of the constructed facilities.	Fulfilled.
Facility Operators: (i) Baishan Hengda Drainage Engineering Co., Ltd; (ii) Baishan Solid Waste Disposal Co., Ltd; (iii) Baicheng BEDZ Investment and Development Co., Ltd.	Ensuring successful ongoing operation and maintenance of the relevant project components: • In conjunction with PIUs, commissioning of the constructed facilities; and • O&M of completed facilities, including environmental management, monitoring and reporting responsibilities.	No yet due.

4.11 Other

69. The loan implementation consulting services contain capacity building with respect to: roadmaps and / or community awareness and outreach for water supply safety, non-revenue water reduction, stormwater management, integrated solid waste management (3Rs), traffic safety and sustainable urban transport. These activities have been initiated and will be expedited in the second half of the year.

[2] There are two PIUs in Baishan, the PIU for the water supply component is Baishan Hengda Drainage Engineering Co. Ltd, while the PIU for the MSW Component is Baishan Solid Wastes Disposal Co. Ltd. The PIU for the two Baicheng components is BEDZ Development and Investment Co. Ltd.

5. Environmental Monitoring, Inspection and Reporting

5.1 Introduction

70. The environmental monitoring program focuses on the environment within the project's areas of influence in Baishan and Baicheng. The environmental monitoring program covers the scope of monitoring, monitoring parameters, time and frequency, implementing and supervising agencies, and estimated costs. The environmental monitoring program shall comply with the methodology provided in the relevant national environmental monitoring standards. Other associated standards to be followed are the national environmental quality standards of air, water and noise, and the pollutant discharge standards.

5.2 Internal Monitoring and Supervision and Reporting

71. Internal monitoring, supervision and reporting are undertaken by the construction supervision companies (CSCs). During construction, CSCs conduct internal environmental monitoring in accordance with the monitoring plan. Supervision results will be reported through the CSCs' reports to the PIUs and EMUs.

72. As of today, no contracts have been awarded and therefore no internal monitoring, supervision and reporting has not been conducted.

5.3 Field Sampling and Laboratory Analysis

73. Field sampling and laboratory analysis is undertaken by the external environmental agencies, during construction and operation period, for such quantifiable environmental parameters such water quality, air quality and noise levels, until a project completion report (PCR) is issued. The external environmental monitoring agencies will prepare a sampling and laboratory analysis report according the schedules, frequencies and submitted to JPMO, LPMOs and the PIUs, in accordance with the environmental monitoring plan as included in the EMP.

74. As of today, the external environmental monitoring agencies have been contracted. Baicheng Municipal Environmental Monitoring Station is contracted by the Baicheng Economic Development Zone as the PIU for the Baicheng infrastructures component. Jilin Pony Testing Technology Co. Ltd. is contracted by the Baishan Hengda Drainage Engineering Co. Ltd. for the Baishan water supply component. Jilin Huahang Environmental Testing Co. Ltd. is contracted by the Baishan Solid Waste Management Co. Ltd. for the Baishan solid waste management component. Since no engineering contracts have been awarded and therefore no external monitoring has not been conducted.

75. The external monitoring program, which will be undertaken during the next reporting period (1 July 2016-30 June 2017), is shown in **Appendix 4**.

5.4 Site Inspections and Supervision

76. Once physical construction is commenced, field inspections and supervision will be undertaken, through visual inspections and meetings with relevant stakeholders, by the on-

site environmental engineer (OEE) of the contractor, construction supervision company (CSC), EMU officers, JPMO and the loan implementation consultants on a regular basis. The findings of the site inspections and supervision will be recorded in the internal environmental monitoring report.

77. External environmental inspections and supervision are undertaken, through visual inspections and meetings with relevant stakeholders, by the loan implementation consultants together with the JPMO. The purpose is to verify the accuracy of the information collected by internal and external environmental monitoring agencies, and to identify any additional issues of concern. The information will be combined by the loan implementation environmental consultants to prepare the annual environmental monitoring report (EMR) that is submitted to the JPG and ADB for review, and for ADB to disclose in its website.

78. As of today, no contracts have been awarded and therefore no inspections and supervision of the construction sites have been conducted.

5.5 Reporting

79. According to the EMP, there are six types of environmental monitoring reports, including five for the construction phase, and one for the operational phase. The reporting requirements are summarized in the following table.

Table 9: Environmental Reporting Requirements

Report	From / To	Frequency	Description	Status
A. Construction Phase				
Internal site inspection and supervision report	CSC to PIU and EMU	Monthly	Implementation of waste disposal, soil erosion control, and workers' and public health safety measures; issues of concern. Public complaints received and how they are handled and feedback from the complainants.	Not yet due, because no physical construction has started.
Environmental monitoring report---field sampling and laboratory analysis	External environmental monitoring agency to PIU, LPMO, JPMO	As per the environmental monitoring plan specified in the EMP	Sampling locations, dates, and laboratory analysis results.	Not yet due, because no physical construction has started.
Environmental monitoring report---- semiannual	JPMO to JPG and ADB	Semiannual	Status of EMP implementation; as a chapter in the semiannual progress report.	Complied with.
Environmental monitoring report----annual	JPMO to JPG and ADB	Annual	Status of EMP implementation; stand-alone report.	This report.
Project completion environmental audit report	Licensed institute contracted by the PIU to municipal EPB, IA, PIU, JPMO, ADB	Once within 3 months of component completion	Compliance with design standards for waste discharges.	Not yet due.
A. Operational Phase				

Environmental monitoring report----annual	JPMO to ADB	Annual	Status of implementation of EMP during operation phase.	Not yet due.

6. Work Plan for the Next Reporting Period

6.1 Introduction

80. As of today, the project is in its pre-construction phase. The primary tasks include detailed design, bidding, and capacity building. These tasks will continue to the next reporting period (1 July 2016-30 June 2017). Meanwhile, contract awards are expected to take place and physical construction to commence. The work plan for the next reporting period therefore will entail environmental management for both pre-construction and construction phases.

6.2 Proposed Work Plan

81. The work plan for environmental management for the next reporting period (1 July 2016 and 30 June 2017) is summarized as follows:

Table 10: Proposed Work Plan for 1 July 2016-30 June 2017

Tasks	Description	Timeframe
1) Design reviews	Loan implementation consultants will continue to work with JPMO, IAs and DIs to ensure the incorporation of climate change considerations and environmental best practices into the detailed designs of remaining project components	Whole duration.
2) Bidding and contract documents	The loan implementation environmental consultants will continue to work with the Tender Agency to ensure the incorporation of environmental management provisions in compliance with EMP into the bidding and contract documents.	Whole duration.
3) Institutional strengthening for EMP implementation & supervision	Loan implementation environmental consultants will organize three training courses on implementation of the EMP: a) One comprehensive environmental training course for JPMO, LPMOs, IAs, DIs, Tender Agency. b) First training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction. c) Second training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction. d) Third training courses for the newly mobilized construction contractors on implementation of mitigation measures during construction.	 IV September 2016. IV September 2016. II April 2017. I July 2017.
4) Implementation and supervision of mitigation measures	Once physical construction is started in September 2016, contractors will be required to implement the proposed mitigation measures as specified in the EMP. The JPMO, local PMOs and IAs, with the assistance of the loan implementation consultants, will supervise the implementation.	September 2016-June 2017.
5) Environmental monitoring plan	The External Environmental Monitors will conduct environmental monitoring in accordance with location, frequency and parameters as specified in the environmental monitoring plan as part of the EMP.	September 2016-June 2017.

6) Public consultations	The EMP requires Public consultation to be undertaken once a year during peak construction period, through questionnaire survey, site visits, and / or informal interviews. Results will be used for adjusting mitigation measures if necessary.	June / July 2017.
7) Update the EMP	Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for review. In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional APs, IAs and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC, JPMOs and LPMOs should consult with ADB.	On an as-needed basis. On an as-needed basis.
8) Land acquisition and resettlement	Update LARP after detail design. Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS. Ensure that all resettlement activities are reasonably completed before construction starts on any component.	On an as-needed basis. As per individual RPs. Whole reporting period.
9) Other	The loan implementation consulting services contain capacity building with respect to: roadmaps and / or community awareness and outreach for water supply safety, non-revenue water reduction, stormwater management, integrated solid waste management (3Rs), traffic safety and sustainable urban transport. Community awareness and outreach activities will be completed, and draft road maps developed by the end of 2016 and finalized by 30 June 2017.	1 July 2016-30 June 2017.

Appendix 1: Updated Procurement Plan

No.	Package	General Description	Estimated Cost	Review	Procurement Method	Advertise.	Contract Signing
A. Baicheng Infrastructures							
Civil Works							
1	CBC1	Third Ring Road I (Changqing Bei Street-Mianfang Road)	$18,300,712	Prior	NCB	Q3 2016	Q1 2017
2	CBC2	Third Ring Road II (Mianfang Road-RR underpass)	$17,114,104	Prior	NCB	Q3 2016	Q1 2017
3	CBC3	Third Ring Road III (RR underpass – Xingfu Nan Street)	$8,724,377	Post	NCB	Q3 2016	Q1 2017
4	CBC4	Xiangyang Street I (Third Ring Road-Mianfang Road)	$9,021,975	Post	NCB	Q2 2016	Q3 2016
5	CBC5	Xiangyang Street II (Mianfang Rd-Xinyi Rd)	$9,850,111	Post	NCB	Q2 2016	Q3 2016
6	CBC6	Xinhua Xi Road	$10,279,368	Prior	NCB	Q2 2016	Q2 2016
7	CBC6-1	Xinhua Xi Road landscape engineer	$533,236.00	Post	NCB	Q3 2017	Q4 2017
8	CBC7	Shengli Road	$6,954,216	Post	NCB	Q2 2017	Q2 2017
9	CBC8	Xingfu Bei Street	$4,891,600	Post	NCB	Q2 2016	Q3 2016
10	CBC9	Nanyi Rd & Taoerhe Rd (including the bridge)	$9,598,468	Post	NCB	Q3 2016	Q4 2016
11	CBC10	Chunyang Road	$8,982,864	Post	NCB	Q2 2016	Q3 2016
12	CBC11	Xinggong Road	$5,781,910	Post	NCB	Q2 2017	Q3 2017
13	CBC12	Third Ring Road RR underpass	$6,492,353	Post	NCB	Q1 2017	Q2 2017
14	CBC13	MSW sorting and composting center	$1,551,947	Post	NCB	Q2 2017	Q3 2017
15	CBC14	Transfer Stations	$1,752,283	Post	NCB	Q2 2017	Q3 2017
Equipment Supply and Installation							
16	EBC1	ITS and traffic control	$3,021,667	Post	NCB	Q3 2016	Q4 2016
17	EBC2	Stormwater and sewer pump station	$1,224,180	Post	NCB	Q3 2016	Q4 2016
18	EBC3	Heating pipe network	$11,808,148	Prior	ICB	Q3 2016	Q4 2016
19	EBC4	Equipment for economic development zone 1 (MSW handling equipment, transfer equipment and snow clean vehicles)	$922,000	Prior	NCB	Q2 2016	Q3 2016
20	EBC5	Street lighting	$2,684,917	Post	NCB	Q3 2016	Q4 2016

21	EBC6	Equipment for economic development zone 2 (MSW handling equipment, transfer equipment, trash and recycle bins and snow clean vehicles)	$7,661,500	Post	NCB	Q2 2016	Q3 2016
22	EBC7	Equipment for Taobei District (MSW handling equipment, transfer equipment, trash and recycle bins and snow clean vehicles)	$7,010,833	Post	NCB	Q3 2016	Q4 2016
23	EBC8	Equipment for the industrial park zone (MSW handling equipment, transfer equipment and snow clean vehicles)	$926,250	Post	NCB	Q3 2016	Q4 2016
24	EBC9	Equipment for the new district (MSW handling equipment, transfer equipment and snow clean vehicles)	$951,250	Post	NCB	Q3 2016	Q4 2016
25	EBC10	MSW sorting and composting center equipment	$1,858,417	Prior	ICB	Q3 2016	Q4 2016
B. Baishan Water Supply							
Civil Works							
26	CBSW1	Water transmission line I (reservoir to Jiangyuan)	$4,371,835	Prior	NCB	Q2 2016	Q3 2016
27	CBSW2	Water transmission line I (Jiangyuan to Hunjiang)	$4,120,123	Post	NCB	Q2 2016	Q3 2016
28	CBSW3	Water treatment plant I (site & civil)	$4,807,083	Post	NCB	Q2 2016	Q3 2016
29	CBSW4	Water treatment plant II (processing)	$8,194,083	Post	NCB	Q3 2016	Q3 2016
30	CBSW5	Water distribution network I (main line)	$1,011,883	Post	NCB	Q3 2016	Q4 2016
31	CBSW6	Water distribution network I (branch line)	$6,562,133	Post	NCB	Q4 2016	Q1 2017
Equipment Supply and Installation							
32	EBSW1	Water distribution pump stations	$1,070,900	Post	NCB	Q1 2017	Q1 2017
33	EBSW2	Water transmission pipe	$5,647,723	Post	NCB	Q2 2016	Q3 2016
34	EBSW3	Water treatment plant equipment I	$2,831,258	Post	NCB	Q3 2016	Q3 2016
35	EBSW4	Water distribution pipe I	$7,325,183	Post	NCB	Q3 2016	Q4 2016
36	EBSW5	Water distribution pipe II	$1,051,233	Post	NCB	Q4 2016	Q4 2016
37	EBSW6	Water treatment plant equipment II	$460,082	Post	NCB	Q2 2016	Q3 2016
C. Baishan Municipal Solid Waste Management							
Civil Works							
38	CBSSW1	MSW transfer station civil works	$263,109	Post	NCB	Q1 2016	Q3 2016
39	CBSSW2	MSW sorting and composting center civil works	$2,038,379	Post	NCB	Q1 2016	Q2 2017

40	CBSSW3	Sanitary landfill	$3,389,163	Post	NCB	Q2 2016	Q2 2017
Equipment Supply and Installation							
41	EBSSW1	MSW handling equipment and trash bins	$5,622,000	Prior	ICB	Q2 2016	Q3 2016
42	EBSSW2	MSW transfer station equipment	$4,139,167	Prior	ICB	Q2 2016	Q3 2016
43	EBSSW3	MSW sorting and composting center equipment	$1,446,921	Prior	ICB	Q4 2017	Q1 2018
D. Consulting Services							
44	CS1	Consulting services and capacity development	$2,516,434.13	Prior	QCBS	Q4 2014	Q2 2015
45	CS2	External resettlement monitoring	$126,438.50	Prior	CQS	Q1 2015	Q2 2015

Note:
*: Cost Estimate: If bidding is completed, the successful bid price is adopted as cost estimate. If contract is awarded, the contract price is adopted as cost estimate. For contracts whose bidding is not completed, the cost estimate is based on PIU's estimate.

Appendix 2: Status of EMP Implementation

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
A. Design & Preconstruction Phases								
Detail Design Stage	Include low carbon, climate variability and change resilience considerations	1) Design low carbon Baishan Water Supply System including variable speed pumps, SCADA[3], accurate water metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for NRW reduction (ensure reduce the NRW from 65% to 30%). 2) Include high-capacity stormwater-drainage pipelines and rainwater detention and reuse facilities in Baicheng Infrastructure Component.	DIs[4]	JPMO, LEPBs,[5] LPMOs,[6] PIUs[7]	2) Being complied with.	-	1) Complied with.	-
	Institutional strengthening for EMP Implementation & supervision	3) Establish an EMU in each LPMO, including at least one environment specialist. 4) Appoint environmental coordinators for EMP coordination within JPMO and PIUs. 5) Engage loan implementation environmental consultant (LIEC) under the project implementation consulting TA. 6) Provide training to all environmental staff for EMP implementation and supervision	LPMOs, JPMO, PIUs	EA, ADB	3) Established. 4) Appointed. 5) Engaged. 6) Three training courses provided.			
	Updating EMP	7) Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for review. 8) In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional APs[8], IAs and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC, JPMO and LPMOs should consult with ADB.	JPMO, LPMOs, LIEC	JEPD,[9] LEPBs, ADB	7) Complied with. 8) Not applicable.			

[3] Supervisory Control and Data Acquisition System.
[4] Design Institutes.
[5] Baishan and Baicheng Municipal Environment Protection Bureaus.
[6] Baicheng and Baishan Project Management Offices.
[7] Project Implementation Units.
[8] Affected people.
[9] Jilin Provincial Environment Protection Department.

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
Construction Preparation	Environmental monitoring plan	9) Prior to construction, engage Municipal EMS[10]. 10) Prepare a detailed environmental monitoring plan in accordance with environmental monitoring plan defined in this EMP.	PIUs, EMSs	LPMOs, JPMO, ADB	9) Contracted; 10) Complied with.			
	Bidding and contract documents	11) Ensure the mitigation measures in the EMP are incorporated in all bidding documents, which will be sent to ADB for review. 12) Prepare environmental contract clauses for contractors, namely the special conditions (e.g., reference to EMP and monitoring requirements).	DIs, JPMO, LPMOs, PIUs	LIEC, JEPD, LEPBs, ADB	11) Complied with. 12) Complied with.			
	EMP training	13) LIEC, or invited environment specialists and/or officials from the JEPD or LEPBs provide training on construction environmental management and implementation and supervision of environmental mitigation measures to contractors and CSCs, in accordance with the training plan in this EMP.	LIEC, JPMO	JEPD, ADB	13) Three comprehensive environmental management training courses have been conducted by LIEC.			
	Establish operational GRM	14) Establish a Project Public Complaints Unit (PPCU) in each LPMO; provide training for PPCU members and GRM access points; and 15) Disclose the PPCU's phone number, fax, address, and email to the public on City EPB's website and on information boards at each construction site.	LPMOs	JPMO, LIEC, ADB	14) Complied with. Established and trained. 15) To be disclosed when construction is commenced.			
	Land acquisition and resettlement	16) Update LARP[11] after detail design 17) Establish a resettlement office comprising local government officials to manage the land acquisition and resettlement process; 18) Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS; and 19) Ensure that all resettlement activities are reasonably completed before construction starts on any component.	PIUs, LAROs[12],	BCA[13]; BLM[14], LBs[15], BCAs	16) Complied with. See resettlement monitoring report for details. 17) Complied with. 18) Complied with. 19) Not yet due.			

[10] The Municipal Environmental Monitoring Station of Baishan and Baicheng (the licensed environmental monitoring units).
[11] Land acquisition and resettlement plan.
[12] Land Acquisition and Resettlement Offices in Baishan and Baicheng.
[13] Baishan and Baicheng Municipal Bureaus of Civil Affairs.
[14] Baishan and Baicheng Municipal Bureaus of Land Management.
[15] Labor Bureaus of Baishan and Baicheng.

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
B. Construction Phase								
Topography and Soils	Earthwork, soil erosion, soil contamination	1) Define spoil disposal sites and borrow pit locations in the construction tender documents; 2) Construct intercepting ditches and drains to prevent runoff entering construction sites, and divert runoff from sites to existing drainage; 3) Limit construction and material handling during periods of rains and high winds; 4) Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on; 5) Properly store petroleum products, hazardous materials and wastes on impermeable surfaces in secured and covered areas; 6) Remove construction wastes from the site to the approved disposal sites; 7) Establish emergency preparedness and response plan (Spill Management Plan) including spill cleanup equipment at each construction site and training in emergency spill response procedures; 8) Stabilize all earthwork disturbance areas within 30 days after earthworks have ceased at the sites;	Contractor, CSCs	PIUs, EPBs, WRBs, LIEC				
Ambient Air	Dust generated by construction activities, gaseous air pollution (SO_2, CO, NOx) from construction machinery and asphalt pavement	9) Equip material stockpiles and concrete mixing equipment with dust shrouds, maintain shrouds regularly; 10) Spray water on construction sites and earth/material handling routes where fugitive dust is being generated; 11) Cover materials during truck transport, in particular, the fine material, to avoid spillage or dust generation; 12) Purchase pre-mixed asphalt for road surface paving; if asphalt is heated and mixed onsite, asphalt mixers must be located at least 200m away from residential areas and other sensitive receptors; 13) Store petroleum or other harmful materials in appropriate places and covering to minimize fugitive dust and emission; 14) Ensure emissions from vehicle and construction machineries are in compliance with the PRC	Contractor, CSCs	LPMOs, PIUs, LIEC				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		standards of GB18352-2005, GB17691-2005, GB11340-2005, GB2847-2005, and GB18285-2005; 15) Provide high-horsepower equipment with tail gas purifiers; 16) Carry out atmospheric monitoring during the construction period;						
Noise	Noise generated from construction activities	17) Ensure that noise levels from construction equipment and machinery conform to the PRC standard of GB12523-90, and properly maintain vehicles and machineries to minimize noise; 18) Apply noise reduction devices or methods where piling equipment is operating, such as construction of bridges and WSP & MSW structures, within 300 m of sensitive sites; 19) Locate sites for rock crushing, concrete-mixing, and similar activities at least 1000 m away from sensitive areas; 20) To reduce noise at night, restrict the operation of machinery generating high levels of noise, such as piling, and movement of heavy vehicles along urban and village roads between 20:00 and 06:00 the next day in accordance with the PRC regulations; 21) Place temporary hoardings or noise barriers around noise sources during construction, if necessary; and 22) Monitor noise at sensitive areas and consult potentially affected people at regular intervals (refer to the monitoring plan in the EMP). If noise standards are exceeded, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation;	Contractor, CSCs	LPMOs, PIUs, LIEC				
Water Resources	Impact of bridge construction on river hydrology	23) Conduct bridge pier construction during the dry season; 24) Protect banks by matting and sediment traps, and on the completion of construction by the planting of grass and stabilizing vegetation to prevent soil and water loss; 25) Pump slurry from pile drilling in the channel bed to shore and properly dispose to reduce the disturbance of sediments and the impact on water	Contractor, CSCs, EMS	PIUs, LIEC, EPBs, WRB				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		quality; 26) Plan pier construction so as to ensure adequate opening for water flow;						
	Surface and GW contamination	27) Develop contingency plans for control of oil and other dangerous substances (Spill Management Plan) as part of the CS-EMP; 28) Collect wastewater from construction activities in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil; 29) Equip all areas where construction equipment is being washed with water collection basins and sediment traps; 30) Place storage facilities for fuels, oil, and other hazardous materials within secured areas on impermeable surfaces, and provide bunds and cleanup installations; 31) Contractors' fuel suppliers must be properly licensed and follow proper protocol for transferring fuel and the PRC standard of JT3145-88 (Transportation, Loading and Unloading of Dangerous or Harmful Goods); 32) Ensure that water quality (for pollutants such as SS, CODcr, and oil) in surface water is monitored in accordance with the EMP monitoring program;						
Solid Waste	Solid waste generated by construction activities and from workers' camps	33) Provide appropriate waste collection and storage containers at locations away from surface water or sensitive receivers; 34) Reach agreement with municipal waste collection services for regular collection of waste prior to construction; 35) Properly remove and dispose of any significant residual materials, wastes and contaminated soils that remain on the ground timely during and after construction to the spoil sites. Any planned paving or vegetating of the area shall be done as soon as the materials are removed to stabilize the soil; 36) Burning of waste is strictly prohibited; and 37) Provide sufficient garbage bins at strategic locations and ensure that they are protected from birds and vermin, and emptied regularly (using the municipal	Contractor, CSCs	PIUs, LIEC				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		solid waste collection systems).						
Biological Resources	Protection of flora and fauna around construction sites	38) Protect existing trees and grassland during road and pipeline construction. Where trees are to be removed or an area of grassland disturbed, replant trees and re-vegetate the area immediately after construction; 39) Remove trees or shrubs only as a last resort if they impinge directly on permanent works or approved necessary temporary works; 40) In compliance with the PRC Forestry Law, undertake compensatory planting of an equivalent or larger area of affected trees and vegetation; 41) Only native plant species of local provenance shall be used for re-vegetation; and 42) Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live such as vegetated roadside areas, trees, inner areas of bridges and river beaches, etc.;	Contractor, CSCs	PIUs, LIEC				
Socioeconomic Resources	Impact on physical cultural resources	43) Establish chance-find procedures for physical cultural resources; 44) If a new site is unearthed, work shall be stopped immediately and local BCR and the LPMO promptly notified;	Contractor, CSCs	LPMO, LIEC, City BCR				
	Community health and safety	45) Prepare a traffic control plan, to be approved by Local Traffic Management Bureau before construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings, selecting transport routes to reduce disturbance to regular traffic, reinstating roads, and opening them to traffic as soon as the construction is completed; 46) Plan construction activities so as to minimize disturbances to utility services. Three-dimensional detection of underground facilities shall be conducted before construction; 47) Inform residents and businesses in advance through media of the construction activities, given the dates and duration of expected disruption; 48) Place clear signs at construction sites in view of the						

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		public, warning people against potential dangers such as moving vehicles, hazardous materials, excavations etc., and raising awareness on safety issues. Heavy machinery shall not be used at night (noise and vibration control); 49) Secure all sites, disabling access by the public through appropriate fencing whenever appropriate;						
	Occupational health and safety	50) Prepare environmental, health and safety management plan for the construction works. The plan will include the following provisions: 51) Provide clean water for all construction sites and workers' camps; 52) Provide an adequate number of latrines and other sanitary arrangements at construction sites and work camps, and ensure that they are cleaned and maintained in a hygienic state; 53) Garbage bins at construction sites and camps will be set up, which will be periodically cleared to prevent outbreak of diseases; 54) Provide personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection; 55) Prepare an emergency response plan to take actions on accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events; 56) Establish emergency phone link with hospitals; 57) Organize a fully equipped first-aid base in each construction camp; 58) Ensure that occupational health and safety matters are given a high degree of publicity to all persons regularly or occasionally on each construction site. Display posters prominently in relevant areas of the site; 59) Train all construction workers in basic sanitation, general health and safety matters, and on the specific hazards of their work. Implement site HIV/AIDS and other communicable diseases awareness and prevention program to target the	Contractors	CSCs, LPMOs, LBs, EPBs, LIEC				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		local community and construction workers; 60) Civil works contracts shall stipulate priorities to (i) employ local people for works, (ii) ensure equal opportunities for women and men, majorities and minorities, (iii) pay equal wages for work of equal value, and pay women's wages directly to them; and (iv) not employ child or forced labor. Specific targets for employment have been included in the gender action plan (GAP);						
Cumulative Impacts	Cumulative impacts during construction	61) Contractors shall coordinate with other project contracts and other projects in the area of influence in terms of construction schedule, possible access roads and disposal sites sharing; 62) Contractors shall develop material transport plans in consultation with local traffic management authorities, other contractors, and local community.	Contractors	CSCs, LPMOs, LBs, EPBs, LIEC				
C. Operation								
Baicheng Urban Infrastructures Component								
Ambient Air	Excessive vehicle emissions affecting ambient air quality	1) Conduct periodic examination of emission of vehicle exhaust pollutants for each vehicle in accordance with PRC regulation (such as GB18352.3-2005); 2) Refuse registration to vehicles with excessive emissions; 3) Implement policies and measures for vehicle emission control formulated by the state and provincial authorities.	OPF, TMB	LEPB, JPMO, LPMO				
		4) Conduct periodic air quality monitoring (through the EMS) in accordance with the monitoring program in this EMP;	EMS	LEPB				
Acoustic Environment	Traffic noise along project roads	5) Plant trees and shrubs along the proposed roadsides after construction; and 6) Install 70 double-glazed windows along the Third Ring Road in Erlong village (CBC1) and Hujia village (CBC3) in accordance with the domestic EIA.	Contractors	PIU, LIEC				
		7) Conduct ambient noise monitoring and inspection, determine whether mitigation measures will be required for sites where noise levels are expected to exceed by more than 3 dB(A);	EMS	LEPB				
Water Resources	Pollution from	8) Install special stormwater collection, storage and infiltration system under the roadside landscaping	OPF, MDC, EMS	LEPB, WRB				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
	storm water runoff and solid waste	strip along two project roads (included in detailed design); 9) Routinely collect and properly dispose litter and debris from sidewalks, driveways, and parking lots, especially near channels; 10) Clean the roadside catch basins before rainy season to avoid surface water pollution by storm water runoff flushing debris and silt; 11) Place garbage bins and containers along the road networks; and 12) Prohibit the construction of car washing near drainage networks and channels.						
	Sewers, wastewater collection and treatment	13) Regularly inspect and maintain project sewer network; 14) Review performance of linked WWTP(treatment performance, compliance with effluent standards)	OPF, WWTP EMS, MDC	LEPB				
Socioeconomic Resources	Road Safety	15) Conduct traffic audit and separate traffic safety awareness campaigns both in schools and residential communities; 16) All roads shall be designed with pedestrian sidewalks. All major roads shall have separate lanes for non-motorized traffic. Pedestrian-priority traffic lights, safety islands, crosswalks (zebra lines), and boarding bays/islands shall be established at all intersections; 17) Road maintenance vehicles shall be equipped with warning lights, and staff will wear safety hats and reflective garments and undergo safety training; 18) Proper operation of ITS, include traffic monitoring system, red light and speeding violation monitoring system, real time traffic condition displays	JPMO, PIC, OPF, Traffic Police, ITS contractor	LEPB, TMB, PSB				
	Spills of dangerous goods	19) Ensure that all trucks carrying hazardous materials are marked according to PRC norms; 20) Enforce traffic controls, and set speed limits for trucks carrying hazardous material; and	OPF, Local Traffic Police					
Biological Resource	Vegetation	21) Routinely inspect and properly maintain all roadside trees, slope stabilization sites, and landscaping vegetation.	OPF	LPMO, LEPB, PSB				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
Water Source	Water source protection, contamination	1) Properly delineate and maintain water source protection zones around the water source (Xibeicha Reservoir) in accordance with Drinking Water Source Protection Plan for the Xibeicha Reservoir (approval document No. Jilin Gov-2010-112); 2) Install and properly operate automatic water source monitoring and emergency warning system in Xibeicha Reservoir (at the water intake point); 3) In case of pollution, shut down water transmission from Xibeicha Reservoir, and temporary switch to existing Nanshan WTP through the pipeline network; and take effective measures to identify and remove pollution source.	PIU (OPF), LEPB	**Water Supply Component in Baishan**				
Water Supply Safety (Quality)	Drinking water quality monitoring	4) Equip WTP with laboratory able to examine 42 parameters of the National Standard for Drinking Water (GB5749-2006); 5) Twice a year, send water samples taken from the clean water tank of the WTP to Changchun WSC for examination of 106 parameters according to the PRC regulation; 6) Ensure that WSPs' staff/workers are well trained on all steps of the treatment process, including emergency warning and response actions.	PIU, LIEC	JEPB, WRB, LPHB				
Handling and Disposal of Chlorine Dioxide at the WTP	Risk caused by hydrogen chloride and chlorine dioxide leakage	7) Chemicals will be transported and managed in compliance with PRC regulations on hazardous chemical substance management (The PRC State Council Order No.2002-244); 8) Transport vehicles and personnel will be trained and qualified with hazardous chemical substance handling and transportation; 9) Storage of hazardous chemicals will be arranged with certificates procured from the police department and fire authorities; 10) Chlorination rooms and chemical storage rooms in the WSP will be equipped with automatic censors and alarms, which will be triggered by ClO_2 leakage; 11) The WSP will be equipped with gas masks, oxygen breathing apparatus and other rescue materials, to protect staff in the event of leakage of hydrogen	PIU,	LEPB, IA, WRB				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		chloride and ClO_2; and 12) An emergency response plan will be prepared and implemented in the WSP. The plan will inform staff about the characteristics of ClO_2 and hydrochloric acid, potential hazards, and define accident prevention measures and evacuation plan.						
Noise	Operational noise in the WTP	13) All noise-emitting machinery and equipment including pumps, fans, and sludge dewatering machines (spin-driers) shall be installed in sound-proof housing within rooms in the WTP, and be kept in good operation condition. 14) Conduct periodic noise monitoring to confirm compliance with GB12348-2008	PIU	EPB, WRB				
Sludge in WTP	Sludge in sedimentation tanks	15) Develop and implement a sludge handling plan, including collection and storage of sludge, transport, environmentally sound reuse and/or disposal. Sludge shall be reused for manufacturing bricks and other construction materials, if possible.	PIU	LEPB				
Solid Wastes and Wastewater	WTP staff will generate wastewater and solid waste	16) Ensure environmentally sound collection, transportation, and disposal of domestic solid waste (13.7 t/a) to the existing Baishan Sanitation Landfill; and 17) Treat 1,300 m^3/a of domestic wastewater generated at WTP onsite (septic tank).	PIU	LEPB				
Ecological Impact to Downstream	Water extraction from Xibeicha Reservoir, reduction of downstream flow, water quality of return waters from use of supplied water reentering the river basin	18) Ensure minimum ecological flow release of 0.14m3/s to downstream of the Xibeicha River and Hunjiang River in accordance with approved EIA for the Xibeicha Reservoir; verify and manage downstream riparian releases; 19) Automatically measure the water flow at the downstream of Xibeicha River, and feedback the measurement result to influence the water extraction operation; 20) Extend capacity of existing Baishan WWTP from 50,000m3/d to 100,000m3/d by 2016 (before WTP completion) to cope with increased wastewater amounts induced by increased water supply capacities; ensure that effluent from the WWTP will	PIU, WRB	LEPB, LPHB				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		meet the PRC Standard of GB18918-2002.						
Integrated MSW Components in Baishan and Baicheng								
Municipal Landfill (Baishan)	Leachate treatment, groundwater pollution	1) Construct and maintain interception drains to divert runoff water from entering the landfill site; 2) Install impermeable lining for the landfill base and sides; 3) Operated and maintain leachate collection cell that were constructed for Phase 1 and Phase 2 of the landfill to contain and treat leachate; 4) Conduct periodic monitoring of the leachate treatment facility and groundwater quality to confirm adequacy of protection measures.	PIU, OPF[16]	LEPB, JPMO				
	Dust, windborne waste	5) Install and maintain an adequate buffer zone around the landfill facility; 6) Ensure that waste transport vehicles are covered; 7) Install and maintain fences around the landfill site to control wind-borne waste; 8) Enforce strict site management prescriptions such as covering the opening of a single active tip face at any one time, daily soil catch wind-borne litter, and watering of dust-prone areas.	PIU, OPF	PIU, OPF				
	Odorous (NH_3, H_2S) and GHGs emissions	9) Collect and flare methane produced in the landfill; 10) Regularly (monthly) monitor methane, H_2S and NH_3 levels in and around the landfill; 11) Conduct regular inspections of the methane gas outlet pipes to check for blockages or damage, and fire control and lightning protection facilities; 12) Regularly consult nearby residents, and define corrective actions as needed; 13) Prohibit construction of new residential houses or community buildings within 600m.	OPF	LEPB, JPMO				
	Pest and disease vector control	14) Timely soil cover to minimize breeding areas for flies and mosquitoes; arrange staff timely soil cover the hollow area within the landfill site 15) Monitor mosquito, fly and rat activities during landfill operation; and	OPF	LEPB, JPMO				

[16] Operator of project facility.

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		16) Periodic spraying with approved pesticide as needed.						
Waste Transfer Stations	Leachate, wastewater from MSW transfer stations	17) Install and regularly clean septic tanks in each transfer station; transport accumulated sediments by covered vehicles to local landfills for disposal; 18) Design and construct the floor of the MSW stations and the septic tanks to prevent any potential seepage and pollution of groundwater; 19) Conduct periodic monitoring of the pollutant concentrations in the pre-treated wastewater to confirm compliance with Class III of the Integrated Wastewater Discharge Standard of GB8978-1996;	PIU, OPF	LEPB, JPMO				
	Odors, noise emissions, pest control	20) Install a 5 m wide buffer zone and a greening belt no less than 2 m around the MSW transfer stations, as specified in Technical Specifications for Domestic Solid Waste Transfer Stations (CJJ47-2006); 21) Design MSW transfer stations as closed structure and with a maximum capacity of 10t/d; 22) Pack and store MSW in enclosed MSW containers; the collected MSW shall be removed daily; 23) Conduct pest control (sprinkle with disinfectant) at least once a day in summer; 24) Monitor ambient noise and odor (H2S, NH3) to determine whether further mitigation measure is required or not; 25) Consult nearby residents regularly on odor nuisance, and define and implement corrective actions as necessary;	PIU, OPF	LEPB, JPMO				
Composing Facilities	Leachate	26) Control leachate generation by monitoring and correcting the moisture levels in the composting pile; 27) Collect leachate in collection basin, back-spray on compost piles; place windrows or piles under a roof to prevent excessive moisture levels due to precipitation.	OPF	LEPB, JPMO				
Occupational Health and Safety (All MSW Facilities)	Bio-aerosols endotoxins	28) Implement dust control measures described above (to effectively control bio-aerosols and endotoxins dissemination); 29) Keep compost and feedstock moist; moisten compost during the final pile teardown and before being loaded onto vehicles, taking care not to over-wet the material, which can produce leachate or	OPF	LEPB, JPMO				

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status			
			Who Implement	Who Supervise	Baicheng		Baishan	
					Infra.	MSW	WSP	MSW
		runoff; and isolate workers from spore-dispersing components of the composting process such as mechanical turning (for example, using tractors or front-end loaders with enclosed air-conditioned or heated cabs).						
	Personal protective equipment training	30) Provide training to MSW workers, covering rights and responsibilities of workers under the PRC's labor law; identification of chemical, physical, and biological risks at the site; safe practices and operating procedures; the role of engineering controls and personal protective equipment in preventing injuries and illnesses; procedures for reporting injuries and illnesses; and procedures for responding to emergencies. 31) Provide personal protective equipment (PPE) to employees, as well as shower facilities, and first medical aid kits.	OPF	LEPB, JPMO				

Appendix 3: Implementation Status of Environmental Management Training Program

Training Program	Scope of Training	Trainer	Trainee	Implementation Status
Procurement and contract management	1. ADB's procurement Guideline and process; 2. Bidding document preparation, including EMP clauses; 3. Risk of improper procurement and mitigation measures; 4. Handling variation orders and contract management.	PIC	JPMO, PIUs, IAs, LPMOs, LFBs[17]	Fulfilled. IAs appointed and recruited personnel prior to start of project implementation.
Implementation of EMP and other health and safety requirements including GRM	5. EMP implementation, including implementation responsibilities, environmental monitoring, inspection and reporting, public consultation and participation, mechanism of EMP review, feedback and adjustment; 6. The GRM, including GRM structure, responsibilities and timeframe, types of grievances, eligibility assessment; 7. Environment, Health and Safety (EHS) considerations during project construction and operation, including community and occupational health and safety; 8. Monitoring and inspection methods, data collection and processing, interpretation of data, reporting system; 9. Communication with the public by different means (Innovative community-based advocacy campaigns); 10. Prevention and control of Transmissible diseases and HIV/AIDS.	PIC, LIEC	JPMO, IAs, PIUs, LPMOs, LEPBs, LCAB[18], GRM access points, other related local Units	The IAs have recruited the external environmental monitoring agencies. The grievance redress mechanism has been established. External environmental monitoring and public consultants will be conducted after the start of construction. First training was conducted between 27 and 28 July 2015. More are planned.
Drinking water source protection and WTP operation including NRW reduction	11. The PRC and Jilin provincial regulations for drinking water source protection and protection zoning; 12. Point and non-point pollution control, and principles of surface water management; 13. Energy saving and GHG emission reduction in water supply sector including NRW reduction strategy and methods; 14. Sustainable water management and water saving practices.	Experts invited from ADB or IWA[19] (Beijing Office)	PIU,OPF of the WTP, LWRB	First training was conducted between 27 and 28 July 2015. More are planned. Second round of training was undertaken 15-28 May 2016 during the capacity building mission fielded by the international and national water safety plan and NRW specialists.
Municipal solid waste management	15. International and national good practices for MSW management (3R concept and practice); 16. MSW disposal and management technologies and options including sorting and composting.	Experts from JPEPD, and LIEC	LPMOs, PIUs, LPHB, LEPBs	First training was conducted between 27 and 28 July 2015. More are planned.
Sustainable transport planning,	17. International and national good practice for urban traffic safety; 18. Road safety audit tools and approaches;	PIC	Baicheng IA,PIU, and other related	First training was conducted between 27 and 28 July 2015.

[17] Municipal Finance Bureau
[18] Local Civil Affair Bureau
[19] International Water Association

traffic safety	19. Public awareness program and education for traffic safety; 20. Use of performance indicators and short-, medium- and long-term planning; 21. GHGs emission reduction and climate change adaptation in transport sector.		units (e.g. traffic management bureau)	More are planned.
Emergency preparedness and response planning	22. Environmental accidents, mitigation measures for the sectors of water supply, 23. Urban infrastructures and MSW; 24. Emergency response team, procedure and actions; 25. Urban drainage and flood emergency response.	PIC	IAs, PIUs, OPFS, other related local bureaus.	Will be undertaken in advance of facility operations.

ADB =Asian Development Bank, EA =executing agency, EHS = environment health and safety, EMP = environment management plan, EPB =environment protection bureau, GRM= grievance redress mechanism, IA=implementing agency, JPMO= Jilin provincial project management office, LPMO= project city project management office, OPF=operator of project facilities, PIC = project Implementation consulting service, PIU = project implementing unit.

Appendix 4: Environmental Monitoring Program

Subject	Parameter	Location	Frequency	Implementing Agency	Supervising Agency
1. Construction					
1.1 Quality of sewer from work camp	pH, SS, NH_3-N, COD_{Cr}, oil	Domestic wastewater discharge at selected work-camps (50% of total camps in each city)	Compliance monitoring: four times per year during construction activities	LEMS	LEPB, LPMO
1.2 Construction wastewater	SS, oil, pH	At the bridge (50m upstream and 100m downstream of the drainage channel in Baicheng); At wastewater discharge points of all construction sites in each city	Compliance monitoring: four times per year during construction activities	LEMS	LPMO, LEPB
1.3 Water quality downstream of the reservoir	pH, SS, DO, NH_3-N, BOD_5, COD_{Cr}, Total coliform, oil	Downstream of Xibeicha River (at the section 2000 m downstream of the reservoir)	Compliance monitoring: twice per year during construction activities	LEMS	LPMO, LEPB
1.4 Ambient air	Dust mitigation measures (water spraying, cover vehicles, etc.); and	Visual inspection at all construction sites	Internal monitoring: once a week	CSC	PIU, LIEC
	TSP, PM_{10}, NO_x	At all construction sites (at least one point upwind, one points downwind) and sensitive receivers nearby (see Chapter IV - sensitive receptors within project area of influence)	Compliance monitoring: four times per year during construction activities	LEMS	LPMO, EPB
1.5 Noise	LAeq	At boundaries of all construction sites and sensitive receivers nearby (see Chapter IV-sensitive receivers within project area of influence)	Compliance monitoring: twice per year (twice a day, once in day time and once at night time, for 2 consecutive days)	LEMS	LPMO, EPB
1.6 Solid Waste	Garbage from work-camps and construction waste at construction sites	Visual inspection at all construction sites and work-camps	Internal monitoring once a week	CSC	PIU, LPHB
			Compliance monitoring	LIEC	ADB
1.7 Soil erosion and re-vegetation	Soil erosion intensity	Visual inspection at spoil sites and all construction sites, in particular the water transmission pipeline route and the Baishan landfill site	Internal monitoring: Random check after rain (rainfall>50 mm)	CSC	PIU, LPHB
			Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	EPB, EA, ADB
	Re-vegetation of spoil disposal sites and	Visual inspection at all disposal sites, and temporary occupied lands	Internal Monitoring: At least four times per year	CSC	PIU

	construction sites		Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	JPMO, ADB
1.8 Occupational health and safety	Work camp hygiene and safety, availability of clean water and emergency response plans	Inspection at all construction sites and work-camps	Internal Monitoring: once a month	CSC	PIUs
			Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	LPHB
2. Operation Phase					
2.1 Water quality of Xibeicha reservoir	pH, SS, DO, NH_3-N, oil, CODcr, Cr^{6+}, BOD_5, TN, TP, chloride, NO_3-N, total coliforms, dipterex, dimethoate, dichlorphos,	Two points: (i) center of the Xibeicha Reservoir; and (ii) the water intake point of the water transmission pipeline.	Four times a year (in addition to online monitoring system of WTP operator)	LEMS	PIU, LEPB
2.2 Water quality of treated water at WTP	42 regular parameters in the standard of GB5749-2006.[20]	Internal monitoring: clear water tank in the WSP	Once a week	Lab in the PIU	LEPB, LPHB
	106 parameters of GB5749-2006	Compliance monitoring: Clear water tank in the WSP	Twice a year	Changchun Water Supply Co.	LEPB, LPHB
2.3 Water quality and quantity downstream of Xibeicha River	m^3/s, pH, SS,NH^3-N, Oil, CODcr, Cr^{6+}, BOD_5, TN, TP, DO, total coliforms,	One sampling at confluence section of the downstream Xibeicha River and the Hunjiang River	Once a month	LEMS	LEPB
2.4 Landfill leachate	SS, CODcr, NH_3-N, Total bacteria, heavy metals	Landfill leachate	Four times per year	LEMS	LEPB
2.5 Groundwater quality	pH, NH_3-N, COD_{Mn}, Cr(+6), As, Pb, Cd, Hg, volatile phenol, cyanide, fecal coliform, total hardness, chloride	Baishan Landfill site: One sampling at the background well, two at a 50m distance of both sides of landfill site; one at a distance of 50m downstream of the direction of ground water under the landfill site, separately.	Twice per year	LEMS	LEPB, JPEPD
2.6 Noise	LAeq	(i) At the boundary of the WTP; (ii) The boundary of the MSW transfer stations; (iii) landfill site boundaries.	Twice per year (twice a day, once in day-time and once at night-time for 2 consecutive days)	LEMS	LEPB
		All sensitive receivers along the roads and nearby bridges;			

[20] The 42 regular water quality in the standard of GB5749-2006 includes: Total coliform, Thermo-tolerant coliform, Escherichia coliform, Total plate count, As, Cd, Cr^{+6}, Pb, Hg, Se, Cyanide, NO_3-N, Chloroform, Tetrachloromethane (CCl_4), Fluoride, Bromate, Formaldehyde, NH_3-N, Chlorite, Chlorate, Chromaticity, Turbidity, odor & taste, Lookable (appearance), pH, Al, Fe, Mn, Cu, Zn, Chloride, Sulfate, TDS, Total hardness, COD_{mn}, Volatile phenol, LAS, Total α-radioactivity, Total β-radioactivity, ClO_2, Residual Cl2.

2.7 Ambient Air	TSP,SO_2,NOx, PM_{10}	All sensitive receivers along the roads and nearby bridges	Twice a day for 3 consecutive days, twice per year	LEMS	LEPB
	CH_4,TSP, NH_3, H_2S	(i) Upwind and downwind of the MSW sorting/ composting plants and the landfill boundaries; (ii) 20% of MSW transfer stations (random selected)	Twice a year	LEMS	LEPB
2.8 Soil and Vegetation	Vegetation survival and coverage rate	All re-vegetated sites.	Spot check, twice a year	PIU	LEPB, LFEO
2.9 Traffic flow and safety	Traffic flow and road use (against predictions), and accident incidents	Project roads	Once a year, in particular in the representative years of 2019, 2025 and 2033	PIU	LTMB, JPMO
2.10 Pest and disease vectors	Rats, mosquitos, fly density (No./m^2)	Four boundaries of MSW facilities and the landfill.	Twice a year (once in summer)	PIU	LPHB