China: Sustainable Urban Transport Project in Xi’an-Western Bus Depot Project

Environmental Management Plan

Xi’an Public Transportation Corporation

September 2013
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1 Summary

The Environmental Management Plan (EMP) applies to the western bus depot project in Xi'an. The project is implemented by Xi'an Public Transport Corporation.

According to China's current environmental impact assessment laws and regulations as well as OP/BP4.01 of World Bank operational policies (environmental assessment), the subproject is classified as Category B projects, and is need for a environmental assessment study. Environmental Impact Assessment is prepared by Xi'an University of Architecture and Technology. EIA report includes environmental regulations policy analysis, project overview and engineering analysis, regional environmental and social state of the environment, the survey of existing environmental quality, project impact assessment, public participation, risk assessment and emergency response plans, environmental management and so on.

Environmental Management Plan is consistent with the requirements of national laws, regulations and technical guidelines, as well as World Bank's safeguard policies, including the World Bank Group Environmental, Health and Safety Guidelines. Environmental Management Plan applies the latest available and relatively economic strategy to achieve the project's mitigation objectives.

1.1 Construction Project Summary

Constructing of the western bus depot project will effectively resolve regional population mobility problems and improve the ability to provide different modes of transport to facilitate the mass-intensive, energy-efficient and environmentally friendly bus travel. Changing conditions in the urban transportation from car driving to people-oriented to achieve smooth and sustainable development of urban transport, giving all citizens a better travel options, while comprehensive promoting municipal management capabilities and improving public transport enterprises operation.

The project is on the basis of Xi'an Municipal Development and Reform Document 377 [2010] issued by Development and Reform Commission, and in order for effectively relieving the pressure on public traffic in Xi'an, improving buses
parking, maintenance, operation, scheduling and other issues on west area of the city.
The western bus depot in the west of Shanghang road is decided to build.

The project is located in residential land of the western suburb of Xi’an, north of
Century Avenue and the Longhai Railway, south of the Chaoyue Road. Planning area
covers 30 mu, includes comprehensive building (including intelligent dispatching
room, dining room, staff apartment, staff playroom), repair workshop, boiler room,
water pump room, power distribution room, gate house and with housing, oil and gas
station and stopping pad, with a total construction area of 16,000 square meters.
Figure 1  project orientation diagram
Figure 2  Project and the Surrounding Environment
Figure 3  The Site-plan
1.2 Project Description and the Project Content

The World Bank will provide loans to support the Xi'an West Bus Maintenance plant for civil engineering construction and equipment purchasing. Table 1 gives the project content covered by Environmental Impact Assessment and Environmental Management Plan, which includes construction contents using World Bank loans and domestic capital.

Table 1 Main Contents of the Project

<table>
<thead>
<tr>
<th>Project Category</th>
<th>Construction Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Work</td>
<td>Building (including smart control room, dining room, staff apartment, staff playroom), Repair workshop, boiler room, water pump room, power distribution room, gate house and with housing, oil and gas station and stopping pad etc., with a total construction area of 16,000 square meters.</td>
</tr>
<tr>
<td>Ancillary Works</td>
<td>The project has a power distribution room, parking and ancillary facilities.</td>
</tr>
<tr>
<td>Utilities</td>
<td>Water supply: be provided by municipal water supply network; Drainage: rain and sewage separately drained, the production wastewater generated during repairing is need to be treated by grease first, and then discharged into city sewage pipe network with sewage after being treated with pleiotropic composite septic tanks; Power supply: with a power distribution room; Heating: municipal central heating; Telecommunications: telephone, Internet, cable TV, radio can be laid to the project area.</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>Garbage collection: garbage removal by the local sanitation department; Sewage treatment: Sewage by pleiotropic composite septic tanks into the city sewage pipe network; Green: greening rate of 1.5%; Noise handling: set the necessary damping, noise control measures for noise-making equipments.</td>
</tr>
</tbody>
</table>

1.3 Goals of Environmental Management Plan

Environmental Management Plan implements appropriate mitigation measures identified in the environmental impact and the monitoring of such measures effectiveness within the project life cycle. Environmental Management Plan is compiled based on Environmental Impact Assessment and Plan Environmental Assessment in accordance with Chinese environmental laws and guidelines, the World Bank Safeguard Policies and best similar projects’ practice. The goal of Environmental Management Plan is to ensure the consistency of Environmental
Impact Assessment and Environmental Management Plan in order to achieve the appropriate standards of environmental protection. Environmental Management Plan effectively meets supervision requirements and provides guidance for project owners to manage contractors and subcontractors.

1.4 Environmental Management Plan Structure

A key component of Environmental Management Plan includes procedures related to project during the construction and operational management of the overall environment. Environmental Management Plan includes as follows:

- Environmental Management Roles and Responsibilities;
- Mitigation Measures
- Supervision and Monitoring Plans
- Contractor Environmental Specifications
- Emergency Response Plan
- Publicity and Stakeholder Participation Plan
- Environmental Training and Capacity Building Programs
- Budget for Implementing Environmental Management Plan

Environmental Management Plan provides sufficient information for project owners, contractors, subcontractors to implement the Environmental Management Plan and focus on the following issues:

- Meet environmental requirements established by China, Shannxi Province, and the World Bank;
- Meet the national, provincial and municipal governments all environmental and social economy conditions aim for project approval, permit and related policies;
- During the project implementation, develop, facilitate and promote the common sense of responsibility to the environmental and social economy;
- Improve the regulator and Xi’an Fengwei New Area Administrative Committee (including its contractors) environmental awareness and understanding through training and clear all parties environmental and social management roles and responsibilities;
• Supervise environmental and social performance throughout the project cycle and adopt an adaptive management approach to achieve environmental continuous improvement on demonstration base and minimize the impact;

• Work with local communities and affected stakeholders to ensure that they benefit from the project development;

• At all stages of the project supervision process, notice, invite and allow local stakeholders to participate in;
2 Environmental Laws, Policies and Regulations

Existing regulations and legal requirements drew up by Governments at all levels in China and the World Bank are summarized below. Environmental Impact Assessment Chapters I and II outlines the project-related regulations, policies, guidelines, standards, and planning. Environmental Management Plan meets these legal requirements, the implementation of policies and procedures.

2.1 Compilation Bias of Environmental Impact Assessment and Environmental Management Plan

2.1.1 EIA documents and Feasibility Study Report

(1) The Feasibility Study Report of Xi'an city's comprehensive transportation improvement project (World Bank Loan Mid-term Adjustment) Western Bus Depot, in June 2013, Chang'an University;

(2) The Environmental Impact Statement of Hou Wei Zhai (west) Western Bus Depot Project, August 2013, Xi'an University of Architecture and Technology.

2.1.2 State environmental protection laws and regulations

(1) People's Republic of China Environmental Protection Law, 1989.12

(2) People's Republic of China Environmental Impact Assessment Law, 2002.10.28;

(3) People's Republic of China Air Pollution Prevention Law, 2000.4.29;

(4) People's Republic of China Water Pollution Control Act (Revised), 2008.2.28;

(5) People's Republic of China Environmental Noise Pollution Prevention Law, 1996.10.29

(6) Construction Project Environmental Protection Management Regulations (State Council Decree No. 253), 1998.11;

(7) People's Republic of China Solid Waste Pollution Prevention Law(revised), 2004.12.29

(8) People's Republic of China Cleaner Production Promotion Law, 2002.6.29

2.1.3 The relevant provisions of the The World Bank

(1) The World Bank OP/BP4.01 (Environmental Assessment).

2.1.4 Technical Guidelines for Environmental Impact Assessment

(1) Industrial Standard: Technical Guidelines for Environmental Impact Assessment General Programme (HJ 2.1-2011)
(2) Industrial Standard: Environmental Impact Assessment Technical Guidelines Atmospheric Environment (HJ 2.2-2008)
(3) Industrial Standard: Technical Guidelines for Environmental Impact Assessment — Surface Water Environment (HJ/T2.3-93)
(4) Industrial Standard: Technical Guidelines for Environmental Impact Assessment — Acoustic Environment (HJ 2.4-2009)

2.1.5 Evaluation Criteria

Based on project location and applicable zoning issued by Xi'an Municipal Government on the water environment, ambient air and noise-related laws and regulations, the following evaluation criteria are adopted.

2.1.5.1 Environmental quality standards

(1) Ambient air quality performs Ambient Air Quality Standard (GB3095-2012) secondary standard; Special factor of toluene and xylene reference to Design of Industrial Enterprises Health Standards (TJ36-79) "Residential Area Atmosphere of Harmful Substances Maximum Allowable Concentration "Standard;
(2) The implementation of the acoustic environment Environmental Quality Standard (GB3096-2008) Class 2 District standards;

2.1.5.2 Pollutant emission standards

(1) The implementation of wastewater discharge Integrated Wastewater Discharge Standard(GB8978-1996) level 3 standards and the The Yellow River Valley
(Shaanxi Section) Integrated Wastewater Discharge Standard (DB61/224-2011) level 2 standard;

(2) The implementation of air pollutants emission Gas Station Air pollutants Emission standards (GB20952-2007) and Air Pollutants Integrated Emission Standards (GB16297-1996) level 2 standard; project restaurant lampblack emissions with reference to the implementation of Catering Lampblack Emission Standards (GB18483-2001);

(3) Factory bound noise performs Boundary of Industrial Enterprises of Environmental Noise Emission Standards (GB12348-2008) Class 2 District standards;

(4) The implementation of construction noise Construction Field Boundary Environmental Noise Emission standards (GB12523-2011) relevant regulations;

(5) General industrial solid waste discharging implementation of General Industrial Solid Waste Storage and Disposal Sites Pollution Control Standards (GB18599-2001);


2.2 Regional Environmental Profile

2.2.1 Natural Environment Overview

(1) Topography

The project site flat open terrain, topography unit is Weihe Southbank terrace landscape, the ground elevation of about 391m.

(2) Geology

The project site foundation is clay structure formed by Quaternary Holocene flood impact. The main lithology is clay, loam, clay soil, sand and so on. Clay composition is mainly lithology clay, loam, clay soil, sand and so on. Clay is plastic. Bearing capacity of the foundation is 13-15t/m². Engineering geological zone belong to accumulation of hard soil and ground endurance is greater than 20t/m².

(3) Groundwater
Groundwater is proposed Quaternary pore water type, sand and gravel layer is the main aquifer, groundwater depth 8.2 ~ 13m, groundwater level changes in the extent of 3 ~ 5m in rainy season.

(4) Meteorology

Xi'an is located in the middle of the Guanzhong Plain, between East longitude 33 ° 39 ' ~ 34 ° 45' and North latitude 107 ° 40 ' ~ 109 ° 49'. East-west is 200km long, north-south width of 116km, area is 10100km2, lying South High North low. It belongs to Warm temperate semi-humid continental monsoon climate, the main meteorological disasters as droughts (winter, spring, summer drought) and rain-waterlogging (autumn waterlogging). Xi'an Weather Station is located at East longitude 108 ° 56 ', North latitude 34 ° 18' and observation field altitude is 398.0m. Perennial (1971-2000) average temperature is 13.7 °C, extreme maximum temperature 41.8 °C (Jun, 21 1998), extreme minimum temperature -16.0 °C (Jan, 30 1977). Annual rainfall of 553.3mm, rainfall concentrated in May to Oct, the most in July of 98.6mm. Hours of sunshine is 1646.1h, sunshine percentage of 37%. Average annual wind speed 1.6m / s, maximum wind direction NE (NE), the maximum wind speed 15.2m / s. Annual average first frost date of October 30, last frost date of March 27, frost season 149.3 days.

(5) vegetation

Area of natural vegetation has been depleted of basic plant in the city of green plant-based, mainly planted willow, poplar, paulownia, locust and other tall trees. Within the project greening rate of 15%.

2.2.2 Social Environment Overview

(1) Administrative Division and Population

The project is located in Xi'an Weiyang Bridge Street office, the region administer Zhang Jiabao, the Daming Palace, Xin temple, Xu Jia Wan, Tan, marsh, Seoul, Weiyang Palace, Bridge, six village 10 Fort Street offices, with a total area of 262 square kilometers, with a total population of 811,400

(2) social and economic structure
In 2011, the region's GDP is completed 47.155 billion yuan; total fixed asset investment was 44.82 billion yuan, total breakthrough one hundred billion scale; above-scale industrial added value reached 15.149 billion yuan; local general budget revenue of 1.87 billion yuan; urban residents per capita disposable income and rural per capita net income of 26,041 yuan, 12,383 yuan, respectively. Shaanxi finalists for five consecutive years, "the city's economic and social development of the top five areas"

(3) science, education, culture

A total of 37 middle and high school in the Weiyang, 88 primary schools, 83 kindergartens. Steady improvement in the quality of teaching

(4) Transportation

Weiyang traffic developed within, the territory has formed seven eleven vertical and horizontal connections, network traffic interchange, there is the Northwest's largest Weiyang interchange, Longhai railway through the West door area, the West copper highway, Weiyang Road, Zhu Road, Taihua Road, Airport Road II from north to south, west treasure Expressway, North Ring Road, crossing the highway, Yossi road across something that is only 18 kilometers away from Xi'an airport.

(5) heritage

No cultural relics protection units within the project scope. When the foundation excavation projects, such as the exploration of underground cultural relics found, should be protected in accordance with the relevant provisions of the laws and regulations relating to protection of cultural relics and heritage departments promptly contact

2.3 Policy Compliance

2.3.1 World Bank Policy

In the ten World Bank safeguard policies which, OP/BP4.01 "environmental assessment", OP / BP 4.12 "Involuntary Resettlement" apply to this project. See table 2-1.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Security policy</th>
<th>Compliance</th>
</tr>
</thead>
</table>

World Bank Group Environment, Health and Safety Guidelines also applies to this project. Mitigation measures Environmental Management Plan items included in full compliance Environment, Health and Safety Guidelines requirements (especially with the construction management-related content), because the "Guide" in the general requirements also exist in China's legal, regulations, guidelines and standards into construction management. Environmental Management Plan in the various measures are fully meet the requirements of Environment, Health and Safety Guide. (See Table 2-2).

Table 2-2 World Bank Group "Environment, Health and Safety Guidelines"

<table>
<thead>
<tr>
<th>Compliance List of project requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>World Bank Environment, Health and Safety Guidelines</strong></td>
</tr>
<tr>
<td>Construction of the use of methods to control dust, such as coverage, spray dust suppression or increase the moisture content of the open pile material, the use of spray suppression method to control the</td>
</tr>
</tbody>
</table>
particulate matter. transport of materials paved roads or paved surfaces.

To a public or private wastewater treatment systems that discharge industrial wastewater, wastewater, public works jobs generated or rain water, pretreatment and monitoring requirements to meet emissions into the sewage system.

After the first project grease trap wastewater treatment and sewage again after pleiotropic composite septic tanks into the city sewage pipe network, to achieve "the Yellow River (Shaanxi section) Integrated Wastewater Discharge Standard" (DB61-224-2011 before entering the sewage treatment plant after) the secondary standard.

And process wastewater and stormwater should be separated from domestic wastewater to reduce the amount of wastewater must be treated before discharge;

Take the rain and sewage diversion project, namely the building of rainwater pipes, sewage pipes.

If the most sensitive receiving point, the project facilities or operating activities generated noise prediction would exceed the noise indicators, noise prevention and control measures should be adopted.

Select the sound power level low equipment; mechanical equipment installation and repair vibration isolation devices; Running time limit specified equipment or operations;

In the likely scenario, facilities and projects should avoid, minimize, and control of atmospheric emissions because of the negative impact to human health, safety and the environment.

Emissions generated by the project are mainly small amount of welding fume paint spray paint estate raw exhaust, paint rooms and welding fuel gas generated in the process. Recommend the use of paint and paint the dry activated carbon environmental protection equipment, mist filter + activated carbon filter layer by filtering harmful substances in the exhaust gas discharged through the exhaust port, exhaust height should not be less than 15m, in order to ensure high-altitude exhaust emissions, reducing impact on the surrounding environment emissions. Intermittent sequence welders, welding gas produces less volume, little impact on the surrounding environment.

The potential for recovery of recyclable materials; identify and reclaim the site back into the manufacturing process or industrial activity products.

Emissions generated by the vehicle parts and tires, the manufacturers of these wastes by recycling centralized collection of all the processing and utilization, will not produce secondary pollution to the environment.

Leakage of hazardous substances should be developed for the prevention and control plans, training of operating personnel to prevent leakage, the implementation of screening programs, on-site emergency plan map marked locations of sites and related work activities dangerous substances, for contingency required personal protective equipment and training requirements provided in writing; writing requirement must be equipped with at least sufficient to

Waste oil production equipment maintenance plant maintenance produced, cotton and other oily waste, as hazardous solid waste, hazardous waste disposal according to relevant requirements specifically set up storage spaces, storage areas should be away from dormitories, offices, canteens and other sensitive points. Regularly by a qualified hazardous waste treatment units. Inter-hazardous solid waste plant chant set temporary, and make collecting waste
meet the demand for preliminary processing spill handling equipment, and lists what external equipment and manpower resources available in order to overcome the lack of internal resources when necessary.

oil, waste solvents and other liquid hazardous wastes. The project should strengthen education for staff to raise awareness of paints, thinners flammable, explosive materials understanding. Establishment of inflammable and explosive materials signs, no smoking in the workplace; handling, transportation must be strictly controlled, attention to light up; surplus paint, thinners should pay attention to the custody, should be loaded into special containers, to avoid harming other people.

Sewage treatment plant design, construction, operation and maintenance of the sewage treatment meet the relevant national requirements or internationally accepted standards, Xi'an sixth sewage treatment plant effluent execution "of the Yellow River basin (Shaanxi section) Integrated Wastewater Discharge Standard" (DB61-224-2011) a standard

**2.3.2 domestic legislation**

Table 2-3 summarizes the key project for China's national laws and regulations compliance.

<table>
<thead>
<tr>
<th>Chinese laws and regulations</th>
<th>Project Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Impact Assessment Law</td>
<td>Full EIA report by a certified environmental impact assessment consultant and project preparation units, and by the Shanxi Environmental Protection Agency for approval.</td>
</tr>
<tr>
<td>Notice on Strengthening loans from international financial organizations manage the construction project EIA</td>
<td>Conducted two rounds of public consultation.</td>
</tr>
<tr>
<td>People's Republic of China Land Management Law</td>
<td>EIA reports and environmental management plans in line with the Bank's security policy.</td>
</tr>
<tr>
<td>Water Pollution Control Act</td>
<td>Nature of the land base belongs to construction land, in line with the overall land use planning in Xi'an (2006-2020)</td>
</tr>
<tr>
<td>Cultural Relics Protection Law</td>
<td>Project construction drainage network, centralized sewage treatment.</td>
</tr>
<tr>
<td>Cultural Relics Protection Law</td>
<td>Sewage treatment plant outfall is not surface water protection zones.</td>
</tr>
<tr>
<td>Cultural Relics Protection Law</td>
<td>Carrying out construction projects, any unit or individual found relics, should protect the site and immediately report to the local cultural relics administrative department</td>
</tr>
</tbody>
</table>
3 Environmental Impact Assessment

3.1 Project Environmental Characteristics

The project is located in the western suburbs of Xi'an, north of Century Boulevard and the Longhai Railway, south beyond the road, living on the land, the project covers an area of 30 acres.

After the project is completed, it will be able to meet the bus terminal and subway hub transport passengers need to address the distribution and regional passenger bus passengers travel problems and achieve seamless integration with the bus terminal and subway hub of an integrated transport system in order to improve passenger transport efficiency.

The main base for the Weihe River alluvial plain terrain, land type is mainly residential land.

3.2 Status land for the project

Status of project planning for the residential land, land integrity intact, smooth surface, good geological conditions.

Item four weeks and the main road was still en route Century Avenue (Planning), connecting Xi'an Xianyang Century Avenue as a major transportation of the main road, bear Xi'an Xianyang's major land transportation. Bus lines around the project have K606, K630, 912 Road and other three, with good traffic conditions.

Currently there are no official other planned road construction, pre-construction project development, the need to accelerate the pace of construction surrounding road network to ensure the normal construction of the project.

Project Xi'an stars surrounding buildings are mainly schools, 180 acres of land for school construction stars, located in the west side of the project. Figure 4 specific site conditions.
3.3 Regional environmental function zoning

1. ambient air

Implementation of air quality of the environment, Ambient Air Quality Standard (GB3095-2012) two criteria;

2. the acoustic environment

Evaluation of the implementation of regional environmental noise sound environmental quality standards (GB3096-2008) Class 2 District standards, road traffic arteries on both sides of the regional implementation of the standard 4a class standards.

3.4 Environmental Quality Status

During the environmental assessment of the project site ambient air monitoring of the status of the sound environment in order to determine the environmental quality of the project area.

1. Ambient Air Quality

The Evaluation of Atmospheric Environmental Quality cited sail Times Square project environmental impact report data.

Monitoring Unit: Xi'an High-tech Zone in Kay Environmental Testing Co., Ltd.
Monitoring Date: August 2, 2011 -2011 August 10
Monitoring Project: SO2, NO2, PM10

Monitoring Methods: analysis methods and based on monitoring the implementation of the project by using the Ambient Air Quality Standard (GB3095-2012) in the relevant regulations.

Monitoring frequency: Continuous monitoring of seven days, including SO2, NO2 daily continuous sampling 18h, PM10 continuous sampling 12h a day.

Monitoring results: atmospheric monitoring sites SO2, NO2 daily average concentration, hour average concentrations are in line with the Ambient Air Quality Standards in the two standards. Daily average PM10 concentrations exceeding the standard rate was 78.6%, exceeding the maximum multiple of 1.5 times, exceeding the main reason for the evaluation is located in loess source areas, arid climate, as well as construction and road-induced secondary dust.

2. acoustic environmental quality.

The status of the acoustic environment quality evaluation cited sail Times Square project environmental impact report data.

Monitoring results: East, West, North factory sector daytime, nighttime ambient noise project site area were built to meet the sound environmental quality standards in the Class 2 standards, the South plant boundary daytime ambient noise to meet the acoustic environmental quality standards 4a of the class standards, environmental noise at night over sound environmental quality standards in the 4a class standards, mainly due to excessive construction noise and traffic noise is caused; West Ham Road, Longhai Railway daytime traffic noise are met sound environmental quality standards in the class 4a standards, traffic noise at night are more than sound environmental quality standards in the class 4a standards, the main reason is because of excessive traffic is heavy and fast vehicle speed. College of Urban Construction Technician daytime and nighttime ambient noise are met sound environmental quality standards in the Class 2 District standards. Pro Road (West Ham Road) building daytime meet the acoustic environmental quality standard Class 2 District standards, over night sound environmental quality standards in the Class 2 District standards, the reasons for the excessive noise caused by traffic.
3.5 The main environmentally sensitive areas

May be affected by the project's environmental and social impact sensitive areas are shown in Table 3.5-1.

Table 3.5-1 environmental and social sensitive areas

<table>
<thead>
<tr>
<th>No.</th>
<th>Environmentally sensitive areas around the project</th>
<th>the relative position of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Three Town placement cell</td>
<td>S, 175m</td>
</tr>
<tr>
<td>2</td>
<td>New Army Village</td>
<td>N, 25m</td>
</tr>
<tr>
<td>3</td>
<td>Double-walled primary</td>
<td>NW, 450m</td>
</tr>
</tbody>
</table>

3.6 Analysis of pollution sources

(1) The main environmental impacts of behavior in the construction period

According to site survey and investigation, the behavior of the main environmental impacts of the construction period are shown in Table 3.6-1.

Table 3.6-1 major environmental influence the behavior of the construction period

<table>
<thead>
<tr>
<th>No.</th>
<th>The main environmental influence behavior</th>
<th>Environmental impact factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water and sewage sludge generated in the construction</td>
<td>Water Pollution</td>
</tr>
<tr>
<td>2</td>
<td>Construction dust, machinery and equipment exhaust</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>3</td>
<td>Noise generated by construction equipmentoperation</td>
<td>Sound pollution</td>
</tr>
<tr>
<td>4</td>
<td>And decorative garbage waste generated by construction workers</td>
<td>Solid Waste</td>
</tr>
<tr>
<td>5</td>
<td>Demolition and reconstruction of the existing processing plant construction waste</td>
<td>Solid Waste</td>
</tr>
<tr>
<td>6</td>
<td>Temporary occupation of land during construction and road</td>
<td>Social Environment</td>
</tr>
<tr>
<td>7</td>
<td>The project occupies the original building compost site, yard temporarily shift</td>
<td>Water Pollution, Air Pollution</td>
</tr>
<tr>
<td>8</td>
<td>Green transplant</td>
<td>Environment</td>
</tr>
</tbody>
</table>

Environmental impact of the construction of the main air pollutants are dust and construction machinery, vehicle exhaust emissions, ground excavation, loading and
unloading of construction materials, spoil, construction waste, vehicle access to the site, etc., will produce dust; noise pollution mainly the noise generated by the construction and running of the vehicle.

(2) The main environmental impacts behavior at runtime

The main environmental impacts of run-time behavior is shown in Table 3.6-2

<table>
<thead>
<tr>
<th>No.</th>
<th>The main environmental influence behavior</th>
<th>Environmental impact factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Paint shop maintenance of major pollutants emissions generated by sanding: paint mist, toluene, xylene, dust)</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>2</td>
<td>Welding smoke emissions (the main pollutants: soot)</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>3</td>
<td>Parking automobile exhaust (main pollutants: soot, NOx, HC compounds, etc.)</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>4</td>
<td>Fuel, exhaust gas stations generated (major pollutants: total non-methane hydrocarbons, natural gas)</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>5</td>
<td>Canteen exhaust fumes (main pollutants: NOx, SO2, soot, etc.)</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>6</td>
<td>Car repair, car wash water, wastewater and domestic wastewater office, canteen cooking water</td>
<td>Water Pollution</td>
</tr>
<tr>
<td>7</td>
<td>Among automotive maintenance equipment (air compressor, drum machines, compressors, etc.) noise, car noise and run debug smoke exhaust fan painting room, pump room noise</td>
<td>Sound pollution</td>
</tr>
<tr>
<td>8</td>
<td>Abandoned auto parts, garbage, cafeteria food waste and waste oil, cotton oil paint residue and other solid waste</td>
<td>Solid Waste Pollution</td>
</tr>
</tbody>
</table>

(3) analysis of pollution sources

A. Analysis of wastewater pollution

According to the project construction content, including car washing wastewater water unit, vehicle maintenance wastewater and domestic water, canteen cooking water, green water spray and the like. According to the "Shaanxi Provincial People's Government of Shaanxi Province on the issuance of the notice fixed water industry" (Shaan Zheng Fa [2004] No. 18), approved the project of water approximately 4.3643 Wan m3 / a. Wastewater discharge coefficient of 0.8 in accordance with the accounting, engineering, wastewater is about 3.4872 Wan m3 / a. Specific water balance in Table 3.6-3.
### Table 3.6-3 balance supply and drainage engineering analysis table

<table>
<thead>
<tr>
<th>Water unit</th>
<th>Water (ten thousand m3 / a)</th>
<th>Loss amount (ten thousand m3 / a)</th>
<th>Emissions (ten thousand m3 / a)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic water</td>
<td>2.56</td>
<td>0.51</td>
<td>2.05</td>
<td>The main sewage for employees</td>
</tr>
<tr>
<td>Dining water</td>
<td>1.28</td>
<td>0.26</td>
<td>1.02</td>
<td>1170 people eat every day, every meal 30L per meter</td>
</tr>
<tr>
<td>Auto repair shop cleaning</td>
<td>0.048</td>
<td>0.0096</td>
<td>0.0384</td>
<td>Auto repair shop cleaning according 2L/m2. Times, 100 times in wash</td>
</tr>
<tr>
<td>Maintenance and repair of wastewater</td>
<td>0.011</td>
<td>0.0022</td>
<td>0.0088</td>
<td>Maintenance and repair of wastewater by 0.06m3 / vehicles, 12-year maintenance and repair / vehicle</td>
</tr>
<tr>
<td>Wash with water</td>
<td>0.062</td>
<td>0.012</td>
<td>0.015</td>
<td>Buses fixed water 80L / vehicles, flushing frequency 21 / day, of which 70% of circulating drainage reuse.</td>
</tr>
<tr>
<td>Green watering</td>
<td>0.0033</td>
<td>0.0033</td>
<td>0</td>
<td>Green area 317m2, water quota for the 2.0L / m2. Times weekly.</td>
</tr>
<tr>
<td>Unforeseen amount</td>
<td>0.40</td>
<td>0.08</td>
<td>0.32</td>
<td>10% calculated above water</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4.3643</strong></td>
<td><strong>0.8771</strong></td>
<td><strong>3.4522</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: washing water standard reference water quota Gansu Industry (Amendment) (Gan Zheng Fa [2011] No. 64); maintenance and repair of wastewater refer to auto maintenance and repair of water pollution discharge standards (GB26877-2011)

**B. Analysis of exhaust pollution**

Project operation and maintenance of major air pollutants, including painting workshop produced polished exhaust (main pollutants: spray mist, toluene, xylene, dust), and welding smoke emissions (the main pollutants: soot); parking automobile exhaust (major pollution matter: soot, NOx, HC compounds, etc.); refueling, gas filling stations generated (major pollutants: total non-methane hydrocarbons, natural gas); canteen exhaust fumes (main pollutants: NOx, SO2, soot, etc.). These are intermittent emission of pollutants, the specific production row in Table 3.6-4.
### Table 3.6-4 air pollutant emission inventory sheet items

<table>
<thead>
<tr>
<th>Content Type</th>
<th>Emission sources (No.)</th>
<th>Name of pollutant</th>
<th>And generate a concentration (unit) pre-treatment</th>
<th>Emission concentration and Emissions (units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric pollutants</td>
<td>Spray painting Paint Organic solvents</td>
<td>1.39t/a</td>
<td>1.39t/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Benzene</td>
<td>0.53t/a</td>
<td>0.53t/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thinner Organic solvents</td>
<td>3.65t/a</td>
<td>3.65t/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Benzene</td>
<td>1.86t/a</td>
<td>1.86t/a</td>
<td></td>
</tr>
<tr>
<td>Canteen</td>
<td>Lampblack</td>
<td>0.30t/a</td>
<td>0.045t/a</td>
<td></td>
</tr>
<tr>
<td>Cooking emissions gas NOx</td>
<td>502kg/a</td>
<td>502kg/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SO₂</td>
<td>2.0kg/a</td>
<td>2.0kg/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soot</td>
<td>0.05kg/a</td>
<td>0.05kg/a</td>
<td></td>
</tr>
<tr>
<td>Refueling stations</td>
<td>NMHC</td>
<td>1.69t/a</td>
<td>0.169t/a</td>
<td></td>
</tr>
</tbody>
</table>

C. Analysis of solid waste pollution

Waste generated auto parts, garbage, cafeteria food waste and waste oil, cotton oil paint residue and other solid waste during construction operations, specifically in Table 3.6-5.

### Table 3.6-5 List of solid waste production row

<table>
<thead>
<tr>
<th>Producing pollution Area</th>
<th>Pollutants</th>
<th>Generation t / a</th>
<th>Solid Waste nature</th>
<th>Storage and disposal measures</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty Workshop</td>
<td>Abandoned Auto Parts</td>
<td>9.0</td>
<td>General Solid Waste</td>
<td>Stockpiling auto repair shop in the corner of a dedicated venue, as scrap steel and other raw materials to conduct foreign sales</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Scrap tires</td>
<td>80 条/月</td>
<td>General Solid Waste</td>
<td>Recycling</td>
<td>0</td>
</tr>
<tr>
<td>Office life</td>
<td>Garbage</td>
<td>213.5</td>
<td>General Solid Waste</td>
<td>Recycling of waste packaging materials, the rest transported to a landfill in Xi'an</td>
<td>0</td>
</tr>
<tr>
<td>Canteen</td>
<td>Food waste</td>
<td>128.1</td>
<td>General Solid Waste</td>
<td>Catering kitchen lid barrels collect temporary storage, delivery of local qualified recycling units</td>
<td>0</td>
</tr>
</tbody>
</table>
D. Analysis of noise pollution

The main noise generated by the project include inter automotive maintenance equipment (air compressor, drum machines, compressors, etc.) between the noise, noise, and painting the car running debugging smoke exhaust fan, water pump room noise. The main sources of noise intensity is shown in Table 3.6-6.

Table 3.6-6 operational analysis of the main sources of noise equipment

<table>
<thead>
<tr>
<th>Producing pollution Area</th>
<th>Location</th>
<th>Producing noise device</th>
<th>Noise level</th>
<th>Measures required</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance room</td>
<td>Equipment</td>
<td>Welder</td>
<td>80~85</td>
<td>Workshop insulation</td>
<td>Mechanical noise, intermittent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hammer percussion</td>
<td>90</td>
<td>Workshop insulation</td>
<td>Percussion, instantaneous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compressor</td>
<td>82</td>
<td>Muffler, Workshop insulation</td>
<td>Aerodynamics, continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Send exhaust fan</td>
<td>85~90</td>
<td>Silencer, vibration, Workshop insulation</td>
<td>Aerodynamics, intermittent</td>
</tr>
<tr>
<td>Pumping Station</td>
<td>Pump Rooms</td>
<td>Pump</td>
<td>80</td>
<td>vibration, Silencer</td>
<td>Mechanical noise, continuous</td>
</tr>
<tr>
<td>Between devices</td>
<td>Between devices</td>
<td>Diesel generators</td>
<td>95</td>
<td>Silencer, vibration</td>
<td>Mechanical noise, continuous</td>
</tr>
<tr>
<td>Canteen</td>
<td>Dining</td>
<td>Fans fume purification device</td>
<td>75~85</td>
<td>Silencer, Workshop insulation</td>
<td>Aerodynamics, intermittent</td>
</tr>
<tr>
<td>Station area</td>
<td>Cars</td>
<td>Motor vehicle noise</td>
<td>60~70</td>
<td>Speed, Jinming, management</td>
<td>Traffic noise, intermittent</td>
</tr>
</tbody>
</table>
3.7 Environmental Risk

Environmental risks mainly in the proposed filling, refueling area, the main risk types including tank leaks, explosions of paint, resulting in pollution would harm the environment, it must be a sound security measures to prevent accidents.

3.8 Public Participation

According to the World Bank Environmental Impact Assessment Policy (OP4.01), and the need for public participation in the preparation of the corresponding chapter, therefore, conducted a public participation, public participation involving the main target of the project area, directly or indirectly affect the masses.

The full text of Environmental impact statement had already to the public in September 2012 at the following locations:

(1) Xi'an University of Architecture and Technology (Address: Xi'an Beilin Yanta Road 13)

(2) Xi'an Public Transport Corporation (Address: Xi'an, Shaanxi Province Zhu Road 79)

In addition, the project distributed 50 copies of public participation questionnaires, 100 valid questionnaires were recovered, the recovery was 100%. The survey covered the project construction land surrounding their employees and local residents. The public comment statistical results showed that public understanding of the project, 62%; held in favor of the project and representing 80% favor, 20% of people do not care; 96% believe that almost no post-production on the surrounding environment affect or influence the project in general. Masses of the construction of the project is to support and believe that the completion of the project will help to improve the local environment and residents’ living standards. Meanwhile, the construction unit should strengthen the construction of environmental management, reduce construction noise, transportation noise, construction dust impact on the surrounding environment.
The full text of the Environmental management plan has already been made public in April 25 2014 at the website of Xi'an Public Transport Corporation. Figure 5 showed the conditions.

Figure 5  site of the public
4 Environmental management roles and responsibilities

4.1 participation in environmental management agencies

Implementation of the Environmental Management Plan requires the participation of multiple agencies and departments; each institution plays a different but important roles to ensure effective environmental management of the project.

Basically, the environmental processes involved in the management of two bodies: Responsible organization or implementation of the Environmental Management Plan organization, as well as relevant standards, laws and regulations, supervision and Environmental Management Plan in the project during the construction and operational execution and implementation of the project as well as the overall environmental performance of the organization. Environmental Management Plan during construction of the project organizational structure see Figure 6.

![Figure 6  Management structure during construction](image-url)
Table 4.1 lists the major environmental management responsibilities of each agency.

Table 4.1 environmental management responsibilities

<table>
<thead>
<tr>
<th>NO.</th>
<th>Organization / unit</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Xi'an Urban Infrastructure Construction Investment Group Co., Ltd.</td>
<td>Xi'an Urban Infrastructure Construction Investment Group Co., Ltd. will be responsible for implementation of the project management and coordination. Its World Bank Office (PMO) will be the implementation of the daily management and coordination, supervision and implementation of the project and responsible for the project to meet the requirements of the World Bank.</td>
</tr>
<tr>
<td>2</td>
<td>Shaanxi Provincial Environmental Protection Office</td>
<td>Shaanxi Provincial Environmental Protection Office is responsible for reviewing and approving the project EIA, will be responsible for the implementation of laws, regulations, technical guidelines and environmental quality standards during the project construction and operation.</td>
</tr>
<tr>
<td>3</td>
<td>Weiyang District Xi'an Environmental Protection Agency and the Environmental Protection Branch</td>
<td>Representatives during the construction and operation of monitoring the implementation of the Provincial Environmental Protection Office of Environmental Protection, and supervision. Disturbing the investigation and handling of complaints during construction. Ensure three while ensuring the normal operation of environmental protection facilities.</td>
</tr>
<tr>
<td>4</td>
<td>Xi'an Public Transport Corporation</td>
<td>Xi'an Public Transport Corporation will implement more infrastructure projects, including procurement, construction management, security and compliance policy implementation, and monitoring and reporting.</td>
</tr>
<tr>
<td>5</td>
<td>Environmental Supervision Engineer</td>
<td>Environmental supervision engineer responsible for inspecting, monitoring and audit all contractors to carry out construction work and other activities, and ensure compliance with environmental requirements and contractual requirements. Refers to the environmental engineering supervision functions of supervision</td>
</tr>
<tr>
<td>6</td>
<td>Contractor</td>
<td>Project owners hire construction contractors will be responsible for project activities.</td>
</tr>
<tr>
<td>7</td>
<td>Environmental quality monitoring consultant</td>
<td>Environmental quality monitoring consultant will conduct a professional monitoring agency said environmental quality monitoring in accordance with the environmental monitoring plan contained in the environmental impact assessment report of. The project owner will hire consultants to monitor environmental quality monitoring program implementation. Refers Environmental Monitoring Station</td>
</tr>
</tbody>
</table>

4.2 Environmental management responsibilities during construction
Xi'an Urban Infrastructure Construction Investment Group Co., Ltd. and Xi'an Public Transport Corporation

Xi'an Urban Infrastructure Construction Investment Group Co., Ltd. is the owner of the project will be fully responsible for the management and coordination of project implementation. Its World Bank Office (PMO) will be the implementation of the daily management and coordination, supervision and implementation of the project and responsible for the project to meet the requirements of the World Bank. Xi'an Public Transport Corporation for a specific project implementing agency, Shaanxi Provincial Environmental Protection Office and the World Bank is responsible for overseeing implementation of the project. Therefore, it is responsible for ensuring compliance with the environmental management project "Environmental Management Plan" and related regulations.

Environmental management responsibilities Xi'an Public Transport Corporation include, but are not limited to the following:

1. in overseeing the implementation of the project during the construction of the mitigation measures and environmental measures, including the training of these measures into tender documents and contracts, the contractor's organization, the implementation of other environmental management plan, and carry out regular inspections of the construction site.

2. Hire and supervise environmental monitoring consultant (environmental quality monitoring consultants) to conduct environmental monitoring in accordance with the project environmental monitoring programs.

Xi'an Public Transport Corporation 1-2 will be assigned a dedicated environment staff responsible for the overall coordination of the work of Environmental Management Plan implementation. The dedicated environment staff must be familiar with environmental management and environmental regulations, able to understand and implement, Environmental Management Plan. Its responsibilities include the following:
1. Ensure compliance with environmental management, Environmental Management Plan and the related regulatory requirements of the project. If you find non-compliance, should take appropriate measures.

2. Keep Xuancheng Economic and Technical Development Zone, supervising engineers and contractors open and smooth communication on environmental issues.

3. To review and approve the contractor's preparation, may cause significant environmental impacts of key project activities' environmental implementation plan.

4. In accordance with the Environmental Management Plan requirements, regular on-site inspections of all construction areas.

5. Review and archive all types of contractors and environmental supervision engineers report on environmental management.


- **Contractors**

  At any time, the Contractor and its employees should first try to avoid any negative impact of the construction activities of the project, followed should follow the Environmental Management Plan and the mitigation measures specified in the contract, which will damage and its impact on the environment and local communities drop to a minimum.

  Remedy not effectively implemented during the construction phase should be completed after the project is completed and implemented before acceptance.

  The Contractor shall establish a robust environmental management system to meet the mechanisms, all on-site measures, monitoring, training and reporting requirements.

  Chapter 7 contains a detailed environmental norms contractors.

- **Environmental Supervision Engineer (ESE)**

  Environmental supervision engineer supervising engineer is an integral part of the functions. Each company will be supervising engineer each contract / working groups assigned at least one environmental supervision engineer. Environmental
Supervision Engineer Responsibilities include:

1. Review and ensure that the contractor's construction organization plan in terms of compliance with environmental protection and mitigation Environmental Management Plan and the project construction requirements.

2. For the potential environmental impact (if any) of the key project activities, before final approval of the project owner to review each contractor construction site Environmental Implementation Plan and environmental construction plans.

3. To carry out routine site inspections and ensure that the contractor's activities are consistent with environmental management plan and other relevant provisions; When discovered irregularities or inconsistencies, in the period to instruct the Contractor to take corrective prescribed environmental supervision engineer measures.

4. During the implementation of environmental monitoring and supervision, if necessary, to help Sun City Economic and Technological Development Zone.

5. Regular monitoring of the implementation of the environmental management system contractors, including environmental staff, procedures, and reporting; check to make sure environmental supervision procedures, parameters, monitoring, equipment and results. If you find any inconsistencies, the environmental supervision engineers will guide the contractor to take corrective measures, including the replacement of staff capacity building and environmental contractors.

6. Prepare periodic reports and submit to the Environmental Commissioner of Economic and Technological Development Zone, Xuancheng City, review, and archiving.

7. As a supervising engineer, according to Environmental Management Plan approved the implementation of various types of invoices or payments.

- **Environmental Quality Monitoring Consultant (EQMC)**

To closely monitor the quality of the environment in the project area and to minimize the environmental impact of the construction and operational phases, Xi'an Public Transport Corporation will hire professional consultants to implement environmental monitoring in the environmental assessment phase of the development.
of the environmental monitoring program. Environmental quality monitoring consultant's responsibilities include:

1. Familiarize with the project and the Environmental Management Plan, especially environmental monitoring programs.
2. In accordance with the environmental monitoring plan, and sometimes apply a professional approach to environmental monitoring.
3. Verify and confirm the results of monitoring guidelines, monitoring equipment, monitoring locations, monitoring procedures and sensitive areas.
4. Timely submission of monitoring results and recommendations to the Sun City Economic and Technological Development Zone.

### 4.3 Contractor Management

Project contractor is environmental management, pollution control and the impact of the process is a key component of remission. During construction, the Contractor shall maintain a construction site, is mainly responsible for effective control and reduce the impact on the environment. Most environmental measures should be implemented by the Contractor. In order to ensure the implementation of relevant environmental measures and contractors' environmental management plan should take the following measures:

1. In the pre-qualification process, when reviewing the qualifications of the contractor, identified provisions should be included in environmental management. Under the same conditions, priority should be selected through the ISO9000 and ISO14000 certified bidders.

2. In the course of preparation of tender documents, the project owner shall ensure that the Environmental Management Plan is written in the relevant provisions of the mitigation measures and require potential bidders to tender should fully cover the implementation of the Environmental Management Plan budget. Therefore, the implementation of environmental protection measures will be the successful bidder's obligations and responsibilities.
3 Each Contractor shall appoint at least one full-time environmental staff in every segment of the construction project; competency to make this work, the environmental protection commissioner will need to receive environmental training.

4 Before construction, there is a potential for environmental impact (if any) of the key project activities, contractors need to be submitted to the construction site of the Environmental Protection Implementation Plan and environmental construction plans. The plan should be consistent with national environmental regulations as well as environmental management plan requirement contained in the mitigation measures. The plan should provide the following details, such as: Contractor's project management team's commitment to environmental protection; implementation of the project Environmental Management Plan approach; pollution prevention facilities, detailed design and installation (such as drainage, sedimentation tanks, temporary noise screen, etc.); environmental control mechanisms; detailed management plans and site earthworks construction plan (detailed instructions to reduce the maximum limit, mitigate and control the various impacts during the construction methods); environmental monitoring programs in different stages of construction.

5 Before the start, the Contractor shall receive adequate training, Environmental Management Plan and related regulations. Each section/sub-contractors and contractors should at least be assigned a project manager and an environmental engineer training. In addition, environmental supervision engineers should also participate in the training.
5 environmental impacts and mitigation measures

The key based on the Environmental Impact Assessment found in the following sections summarizes some of the more prominent environmental impacts and mitigation measures. Table 5-1, the main activities and stages Table 5-2 and Table 5-3 lists the project's potential environmental impacts have been identified and typical mitigation measures, as well as implementation and monitoring responsibilities. Table 5-4 lists the mitigation measures in sensitive areas.

These mitigation measures comply with national laws, regulations, guidelines, guidelines, the World Bank policies and Environmental, Health and Safety General Guidelines, in order to solve the influence of various types of design, construction and operation stages.

Chapter 7 to Chapter 9 in detail about the contractor specifications, contingency planning, tracking cumulative environmental impact plan, training and capacity building, detailed management plans.
### Table 5-1 construction phase environmental impacts and mitigation measures List

<table>
<thead>
<tr>
<th>Aspects and elements</th>
<th>The potential impact / issues</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| Social Impact        | Inappropriate siting affect the surrounding sensitive points | ① to be taken into account when designing the project, according to the surrounding environment should be designed to further refine the plan covering permanent, rational use of land.  
② design construction of population health should pay great attention to the living conditions of the temporary living quarters should not be too shabby and crowded, but should choose a better area surrounding residential areas as construction workers, to prevent the introduction of infectious diseases to spread.  
③ through public participation in the public and the affected community to understand the |

<table>
<thead>
<tr>
<th>Mitigation measures references to environmental management plan / Resettlement Action Plan</th>
<th>Embodiment</th>
<th>Supervision party</th>
<th>Monitoring indicators</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Management Plan in Chapter 7</td>
<td>Xi'an Weiyang, World Bank</td>
<td>Environmentl impact assessment by the World Bank and the Shaanxi Provincial Department of Environmental Protection approved</td>
<td>before assessment</td>
<td></td>
</tr>
</tbody>
</table>
### Sound environment

**Impact on construction workers**

As the building works and road construction process, noisy construction, engineering design should need to take reasonable measures based on acoustic noise, construction noise mitigation on-site construction personnel.

**Environmental Management Plan in Chapter 7**

| Xi'an Weiyang  |
| Environmental Assessment Consultant |

**Xi'an Weiyang District, Shaanxi Province Environmental Protection Bureau**

**Environmental impact assessment by the Shannxi Provincial Department of Environmental Protection approved**

**before assessment**

### Traffic noise sensitive points along the route

- **Traffic noise sensitive points along the route**
- **Affect the lives of residents**

1. green belt on both sides of the road for special design;
2. according to traffic conditions and road noise monitoring results for the

| Environmental Management Plan in Chapter 7 |
| Environmental Assessment Consultant |

| Xi'an Weiyang  |
| Environmental Assessment Consultant |

**Xi'an Weiyang, World Bank**

**Environmental impact assessment by the World Bank and the Shannxi Provincial Department of Environmental Protection approved**

**before assessment**

**Traffic noise sensitive points along the route**

**Affect the lives of residents**
<table>
<thead>
<tr>
<th>Air environment</th>
<th>Impact on sensitive points</th>
<th>Design of ventilation noise sensitive points on both sides of the window;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend planning department within the prescribed range on both sides of the road should not be building more sensitive points;</td>
<td>Environmental Management Plan in Chapter 7</td>
<td>Environmental Assessment Consultant</td>
</tr>
<tr>
<td>Environmental impact assessment by the World Bank and the Shaanxi Provincial Department of Environmental Protection approved</td>
<td>Xi'an Weiyang, World Bank</td>
<td>Environment impact assessment before assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 5-2 Construction List of environmental impact and mitigation measures

<table>
<thead>
<tr>
<th>Aspects and elements</th>
<th>The potential impact / issues</th>
<th>Mitigation Measures</th>
<th>Environmental management plan / RAP references</th>
<th>Implementation responsibilities</th>
<th>Monitoring duties</th>
<th>Monitoring indicators</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Environment</td>
<td>Traffic travel Question</td>
<td>① develop road counseling, and temporary diversion channel program, and the establishment of a sufficient number of traffic control signs. And should advance the use of radio, television, newspapers and the advance notice; ② should strengthen the management of the construction of the bridge, especially construction management structures, construction should coordinate with relevant departments to arrange a good travel time and vehicle construction time, and piers and other structures located at a significant warning lights to alert passing vehicles attention to safety; ③ road construction warning lights to be set to guide the passage of vehicles;</td>
<td>Environmental Management Plan in Chapter 7</td>
<td>Contractor</td>
<td>Environmental Supervision Engineer</td>
<td>Environmental supervision engineer for field supervision; Norms are followed;</td>
<td>Before assessment</td>
</tr>
<tr>
<td>Heritage conservation</td>
<td>According to field investigation, project construction and operation of the process does not tie up any surface artifacts and</td>
<td>Environmental Management Plan in</td>
<td>Contractor</td>
<td>Environmental Supervision Engineer</td>
<td>Has provided information and training;</td>
<td>Every day</td>
<td></td>
</tr>
<tr>
<td>Sound Environment</td>
<td>Noise impacts during construction</td>
<td>① prohibited high noise, high vibration equipment to rest at noon or night time operations, construction units should be used with low-noise machinery and equipment or sound insulation, noise reduction equipment; ② reasonable arrangements for the construction time, under normal circumstances, the daytime noise has little effect on the daily lives of residents, nighttime noise will affect people's rest. It should be noted arrange construction time, to avoid a break in the residents at night time construction; ③ reasonable arrangements for construction sites, work area should be away from high noise sound sensitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Management Plan in Chapter 6 and 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor</td>
<td>Environmental Supervision Engineer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has provided information and training; Environmental monitoring programs have been prepared</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every day</td>
<td>Heritage stumbled record</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
points, more serious impact on the individual construction site, you need to take temporary noise envelope, may also consider building temporary housing in the side near the sensitive points in lieu of walls and the role of earthworks should arrange multiple devices operating simultaneously, shortening affect the time. The vibration source is fixed relative concentration of the construction site, in order to reduce the range of the vibration disturbance. Before construction of the surrounding schools, neighborhoods and other sound sensitive points, such as sound barriers should be taken to temporary noise reduction measures;
④ Construction vehicles entering and leaving the venue arrange transport away from residential areas, schools and other sensitive points on one side;
⑤ People's Republic of China in accordance with the provisions of the Environmental Noise Pollution Prevention Act, if, after taking noise reduction measures are still not up to the
| Surface Water Environment | Impact of the project on surface water environment | specified limit, the construction unit should be affected by an organization or individual to apologize and pay compensation | ① construction wastewater may not be directly discharged into water bodies, construction waste can be discharged after precipitation municipal sewer or surface runoff efflux, after living through the sedimentation tank or septic tank effluent discharged into the pretreatment of city water supply network or with surface runoff emissions, the construction of sewage treatment is prohibited without directly into nearby water bodies. ② construction units of the project but also on the muddy water filtration sedimentation simple treatment, prohibition of direct emissions, the construction unit to strengthen management, civilized construction. ③ For new construction, the resulting sewage and waste water rinse should focus on the collection, unpaved until the completion of the drainage network, through settling ponds and septic tanks Environmental Management Plan in Chapter 7 | Environmental Supervision Engineer | Environmental supervision engineer for field supervision; Norms are followed; Every day |
after pretreatment with surface runoff into nearby water bodies; laying of underground drainage network completed later, centralized wastewater collected by sedimentation tank pretreatment into the new drainage network, and then into the municipal drainage pipe network for processing.

④ For household waste, construction waste, maintenance waste, due to the experience of entering the water pollution caused so require tissue recovery, separation, storage and handling of materials which can be used, and should focus on the use of, or submission to the acquisition, as the majority of paper, wood, metallic and glassy waste collection stations available for re-use, that can not be utilized, should be referred to the sanitation department to properly sound processing, incineration, landfilling, stockpiling and so on.

⑤ Construction period of residual and waste oils were collected in different containers, recycling and disposal; gravel roadbed construction materials
flushing water, concrete mixing equipment wash water should be treated after precipitation, its wastewater reuse for the site as much as possible. Sprinklers reduce dust:

<table>
<thead>
<tr>
<th>Air Environment</th>
<th>Project impact on the air environment</th>
<th>Environmental Management Plan in Chapter 7</th>
<th>Contractor</th>
<th>Environmental Supervision Engineer</th>
<th>Environmental supervision engineer for field supervision; Norms are followed; having been prepared the environmental monitoring programs</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>① floor construction site must be hardened, conditional take concrete floor; ② excavation, drilling and demolition, so watering operations maintain a certain humidity; construction site on the loose, dry topsoil, dust prevention should also be frequent watering; backfill earth, the soil surface should be dried in the appropriate watering to prevent dust flying; prohibit construction windy weather and reasonably determine the construction site; ③ earthwork dumps backfill strengthen management, to develop earth surface compaction, regularly spray, cover and other measures; unwanted dirt, construction materials spoil shall promptly transported, not the accumulation of time; Should be taken fully enclosed dust</td>
<td>Environmental Management Plan in Chapter 7</td>
<td>Contractor</td>
<td>Environmental Supervision Engineer</td>
<td>Environmental supervision engineer for field supervision; Norms are followed; having been prepared the environmental monitoring programs</td>
<td>Every day</td>
</tr>
</tbody>
</table>
pollution prevention during construction methods

4. construction. Earthmoving trucks and supplies truck should be required to be covered with tarpaulin, canopy or other measures to prevent spills, loading should not be too full, to ensure that the transport process is not scattered; and planned transport vehicles running routes and time, try to avoid downtown area, traffic concentrated residential areas and other sensitive areas and traveling; sections of the environmental requirements should be selected transport at night to reduce the impact of dust on the environment in accordance with the actual situation. Spilled during transport on the road should be promptly cleaned soil to reduce dust during operation;

<table>
<thead>
<tr>
<th>Solid Waste</th>
<th>Solid waste impacts of the project</th>
<th>Environmental Management Plan in Chapter 7</th>
<th>Contractor</th>
<th>Environmental Supervision Engineer</th>
<th>Environmental supervision engineer for field supervision; Norms are followed;</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>① planned and orderly way spoil pile to avoid disorderly area and soil erosion. ② manual garbage collection to garbage transfer stations, and finally into the landfill.</td>
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</tbody>
</table>
### Table 5-3 and mitigation of environmental impacts of operational measures List

<table>
<thead>
<tr>
<th>Aspects and elements</th>
<th>The potential impact / issues</th>
<th>Mitigation Measures</th>
<th>Environmental management plan / RAP references</th>
<th>Implementati on responsibilities</th>
<th>Monitoring duties</th>
<th>Monitoring indicators</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>sound Environment</td>
<td>Vehicle noise</td>
<td>① enhance access control and out of parked vehicles, try to shorten the residence time of idling vehicles, plant area speed limit vehicular whistle, try to shorten the duration of vehicular access to reduce their impact on the surrounding environment and vehicle noise and car exhaust on. ② greening work around the plant boundary green belt around the project and internal reasonable green design. Planting tall trees, green multiplexing layer, forming a tree, shrub, grass green barrier cladding can play better noise reduction. Both can play the role of natural sound barrier, but also can play a role in landscaping.</td>
<td>Environmental Management Plan in Chapter 6</td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>Norms are followed; Environmental monitoring plan has been prepared</td>
<td>Every mouth</td>
</tr>
<tr>
<td>Equipment Noise</td>
<td>equipment</td>
<td>① optional low-noise equipment; equipped with sound insulation, damping measures to minimize noise production ② rational arrangement of noise</td>
<td>Environmental Management Plan in Chapter 6</td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>Norms are followed; Environmental monitoring plan</td>
<td>Every mouth</td>
</tr>
<tr>
<td>Environment</td>
<td>Type</td>
<td>Description</td>
<td>Environmental Management Plan in Chapter 6</td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>Norms are followed; Environmental monitoring plan has been prepared</td>
<td>Every mouth</td>
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<tr>
<td>Surface Water Environment</td>
<td>Wastewater</td>
<td>After the first project grease trap wastewater treatment and sewage again after pleiotropic composite septic tanks into the city sewage pipe network, to achieve &quot;the Yellow River (Shaanxi section) Integrated Wastewater Discharge Standard&quot; (DB61-224-2011 before entering the sewage treatment plant after) the secondary standard.</td>
<td></td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>has been prepared</td>
<td>Every mouth</td>
</tr>
<tr>
<td>Air Environment</td>
<td>Various fuel handling machinery and exhaust from vehicles produced work, the vehicle forward, while outbound vehicle emissions generated</td>
<td>① strictly enforce vehicle emission standards formulated by the state, strengthening law enforcement Vehicle Administration to prohibit excessive emissions of exhaust pollutants in motor vehicle traffic in order to reduce exhaust emissions. ② enhance greening, the use of plants to absorb pollutants and reduce pollution. ③ unorganized form in automobile exhaust emissions, in order to ensure good production workers in the working environment, to ensure good ventilation plant should be forced to install exhaust fans or other ventilation devices, reduce</td>
<td>Environmental Management Plan in Chapter 6</td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>Norms are followed; Environmental monitoring plan has been prepared</td>
<td>Every mouth</td>
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<td></td>
<td>Set fouling ability, strong ability to absorb harmful gases consisting of tall trees in the buffer zone around the plant boundary, in order to play cover barrier and absorption.</td>
<td>Spray a small amount of welding fume exhaust paint raw estate, paint rooms gas emissions, generated in welding process</td>
<td>use of dry activated carbon environmental means mist + activated carbon by filtration, the filter layer is discharged through the exhaust gas filter the harmful substances in the exhaust port, exhaust height of not less than 15m, to ensure that the exhaust emission altitude, the exhaust gas to reduce the impact on the surrounding environment.</td>
<td>Environmental Management Plan in Chapter 6  Owner Environmental Protection Branch Weiyang  Nons are followed; Environmental monitoring plan has been prepared  Every month</td>
<td></td>
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</tr>
<tr>
<td>Solid Waste</td>
<td>Production process used parts and scrap tires</td>
<td>By the manufacturers focus on recycling will be fully recovered after reprocessing use, does not produce secondary pollution to the environment.</td>
<td></td>
<td>Environmental Management Plan in Chapter 7  Owner Environmental Protection Branch Weiyang  Visual inspection; Garbage disposal records; norms are followed;  Every month</td>
<td></td>
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<tr>
<td></td>
<td>Oil and cotton oil</td>
<td>Set up a dedicated hazardous waste storage sites and storage containers meet the requirements. Mixed with other solid waste storage is strictly prohibited.</td>
<td></td>
<td>Environmental Management Plan in Chapter 7  Owner Environmental Protection Branch Weiyang  Visual inspection; Garbage disposal  Every month</td>
<td></td>
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</tr>
<tr>
<td>Garbage</td>
<td>Artificial regular collection, transfer station into the landfill through Environmental Management Plan in Chapter 7</td>
<td>Owner</td>
<td>Environmental Protection Branch Weiyang</td>
<td>Visual inspection; Garbage disposal records; norms are followed; Every year</td>
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<tr>
<td>Risk</td>
<td>Gas fire and explosion ① The route selection should be considered from the planning, Environmental Management</td>
<td>Owner</td>
<td>Environmental Protection</td>
<td>Norms are followed; Every year</td>
<td></td>
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<tr>
<td>Risks</td>
<td>Pipeline should strictly implement the provisions relating to the safety norms, while environmentally sensitive points along the pipeline are protected with distance. No large-scale production and storage of toxic chemicals businesses should be allowed along the pipeline to prevent leakage of gas, causing fire, explosion, poison, venom, and secondary pollution. Recommended safety precautions and plumbing works around environmentally sensitive points should maintain a distance greater than 20m.</td>
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<tr>
<td>①</td>
<td>Stop using gas pigging, valve closed automatically, and other advanced technology and equipment</td>
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<td>②</td>
<td>Choice when laying the pipeline route, try to avoid landslides, soft soil, landslides, and adverse project areas, across the road, rail, appropriate protective measures are taken when the river, pipeline rupture will minimize the chances of accidents</td>
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<tr>
<td>③</td>
<td>Engineering from the management, operational aspects to prevent accidents,</td>
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</tr>
<tr>
<td>Plan in Chapter 9</td>
<td>Branch Weiyang</td>
<td>Accident records</td>
<td></td>
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<tr>
<td>Social Environment</td>
<td>Social Benefit</td>
<td>Owner</td>
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<tr>
<td>Environmental Plan in Chapter 11</td>
<td>Owner</td>
<td>Environmental</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Cumulative Environmental Influence</td>
<td>participation in environmental monitoring</td>
<td>environmental monitoring group to monitor the operation of the project in environmental conditions</td>
<td>Management Plan in Chapter 11</td>
<td>Protection Branch Weiyang</td>
<td></td>
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</tr>
<tr>
<td>Project development on surface water environment, air environment, sound environment and ecological environmental impact; Cumulative impacts have been identified at the base planning solutions environmental assessment report; Xi'an Public Transport Corporation using best management practices (BMP); Environmental Management Plan in Chapter 10</td>
<td>Owner</td>
<td>Shaanxi Provincial Environmental Protection Office</td>
<td>Standards</td>
<td>Every year</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6 Supervision and monitoring plans

6.1 Environmental Supervision

Supervising engineer is responsible for inspection, monitoring and review of all construction activities to ensure that the Environmental Management Plan in the various mitigation measures are properly implemented, and the negative impact of the project on the environment is reduced to a minimum. Supervising engineer companies need to specify an environmental supervision engineer, contractor to be responsible for the implementation of the environmental mitigation measures daily site supervision.

The key responsibilities of environmental supervision engineers include:

6.1.1 Phase I: Prepare

The first phase aims to lay the foundation for the successful implementation of the project. At this stage, environmental supervision engineers

• Review of Environmental Impact Assessment Report, Environmental Management Plan, project design and technical specifications, and verify mitigation measures in the absence of any significant omissions;

• Prepare the relevant guidelines for the implementation of the Environmental Management Plan contractor;

• Develop and implement one pair for all parties involved in construction activities for training programs.

The main tasks of the first stage:

• Review project file: environmental supervision engineers will examine environmental impact assessment, Environmental Management Plan, project design and technical specifications, and confirmed in writing mitigation measures that do not exist any significant omissions. If you find any problem, environmental supervision engineer should advise the Project Management Office (PMO) on
Environmental Management Plan, design and technical specifications to be updated to address these issues. Once approved by the PMO, environmental supervision engineers will update.

- Environmental Management Engineer will review and approve the Environmental Management Plan implementation plan submitted by the Contractor.

- Environmental Supervision Checklist: environmental supervision engineers will produce a comprehensive checklist for contractors during the construction project supervision. The checklist will cover the main aspects of the project, the necessary mitigation / control measures and their implementation arrangements.

- Logbook: environmental supervision engineers will prepare a work log records that may affect the environmental impact assessment or may not lead to conform with changes in environmental supervision engineers to rectify non-compliance of the recommendations of the various status or condition.

- Environmental Training: environmental supervision engineers should design and implement a comprehensive training program to train project involved parties, including the supervising engineer, project office staff, safety and environmental authorities contractor, the contractor's workers, and so on. The training includes environmental requirements of the project and how they are monitored and reviewed, in particular the following aspects:

- Environmental Supervision should cover Environmental Management Plan requirements, agreed environmental monitoring checklist, environmental monitoring table, Environmental Management Plan treatment non-compliance, as well as all other key issues. Contractors should pay particular attention to the technical specifications of each specific provisions on how to follow the Environmental Management Plan.

- Health and safety: health and safety requirements should be clearly projects and communicate with contractors and PMO.
• At the end of training, the contractor will also sign a declaration confirming their understanding of the relevant environmental regulations, "Environmental Management Plan" compliance framework and health and safety obligations. Environmental supervision should sign a similar declaration confirming their understanding of their oversight responsibilities. These statements should be submitted to the PMO and the World Bank.

6.1.2 Second stage: construction supervision activities

• An independent, objective and professional manner to review and check the "Environmental Management Plan" to implement various aspects.

• For safety record compiled by environmental authorities and contractors random inspection and review.

• regularly carry out on-site inspections.

• Review of the implementation of environmental protection measures in accordance with the state, "Environmental Management Plan" and the contract documents. Significant violations will result in downtime contractors and other punishment until the irregularities make environmental supervision engineers get a satisfactory solution.

• Check whether the contractor regulations and other environmental, public health and safety are met.

• Review the effectiveness of environmental mitigation measures and project environmental performance.

• Review construction method (temporary and permanent works), relevant design plans and submissions in environmental acceptability; when necessary, environmental supervision engineer with designers, contractors and project office consultations to find and recommend to the environment minimal impact alternatives.

• Verify that the environmental quality of any non-compliance findings, as well as the effectiveness of corrective measures.
• According to "Environmental Management Plan" in the non-compliance procedures, periodically review the results back to the PMO and CST.

• At least once every six months to provide training, every time a new workers or new contractor should also provide training for admission. The training should include "Environmental Management Plan" requirements, prohibited items, regulatory compliance, and environmental awareness.

• Regular monitoring of contractor performance and environmental engineers monitoring methods and results are verified. When considered safety and environmental authorities or any member of the team's failure to perform duties or comply with the contract requirements, environmental supervision engineer should require the contractor to replace the safety and environmental authorities and his team members.

• When the violation or complaint, in accordance with the contract requirements and related procedures, require the contractor to take corrective action within a specified time, and when needed to carry out the additional supervision.

• When irregularities / inconsistent findings require the contractor to take measures to mitigate the impact and follow the provisions of the "Environmental Management Plan" program.

• When the adverse effects of certain activities and / or when the Contractor fails to implement "environmental management plan" requirements / remedial measures to require the contractor to stop these activities.

• Environmental supervising engineer should ensure compliance with the contract documents in terms of health and safety requirements.

• Environmental supervising engineer should visit and visual inspection to detect the presence of potential environmental problem areas, and take to implement a regular on-site inspections to strict supervision of the construction activities through daily live. Check the area should cover the construction area and the surrounding
environment, directly or indirectly contractor activities in the affected area.

• Environmental supervising engineer should bring their own handheld or portable monitoring equipment, such as cameras, vehicles and other resources. When the need for additional oversight activities to resolve contentious issues or punishment, environmental supervision engineers can work with third-party contracted to carry out the monitoring location being examined.

• When violations of technical specifications or contract terms, or do not follow the "Environmental Management Plan", environmental safety and environmental supervision engineer notify the contractor in charge immediately. Environmental supervision engineers of all irregularities should be reported to the PMO, as part of its monthly reporting responsibilities.

• Environmental supervising engineer in charge of environmental and safety should be a contractor regularly organized (such as weekly) combined with on-site environmental inspection. Environmental supervision engineers should use this opportunity to further training of staff contractors.

• Environmental Supervision Engineer shall maintain on-site work logs, ready for inspection by all persons involved in the project management.

• Environmental supervising engineer should also periodically review the contractor's records to ensure that it kept up to date, in line with the actual situation and to meet the "Environmental Management Plan" reporting requirements (such as environmental complaints register).

• Contractor's site office will receive all kinds of complaints. Environmental Supervision Engineer shall provide a copy of such complaints, and environmental supervision engineer should be recognized during the on-site inspection in accordance with the Contractor has been found to be the same solution to the problem properly addressed.

• When the discovery of the "Environmental Management Plan" or
"environmental impact assessment" in the event of unforeseen environmental supervision engineers should work closely with the contractor and the project office and confirmed the event to get a satisfactory solution. Environmental supervision engineers to deal with "environmental management plan" to update and implement guidelines and training of staff accordingly contractors.

• For environmental supervision engineers recommend to clients related to environmental protection, environmental supervision engineer should confirm their monthly payments.

• Environmental supervision engineer at least a written report should be prepared by the following:

  • Weekly issues related violations;

  • Key issues covered in the review and supervision of monthly summary found;

  • Monthly consolidated report of the contractor.

  • Environmental supervision engineers should also collect and report information required by the PMO.

• At the end of the project, environmental supervision engineer should prepare a summary of all of its work found that the number of violations, the final report to resolve the situation, etc., and provides information on how to carry out such work in the future should the recommendations and guidelines.

• During the project implementation, environmental supervision engineer should provide the PMO, the environmental protection department and requested the World Bank, the project progress, events and other presentations, and environmental issues related to the management and supervision. These presentations should be submitted at least once every six months.

6.2 Environmental Quality Monitoring Plan

Environmental monitoring project implementation phase shall be commissioned
by the owners of the environmental quality monitoring consultants (usually Environmental Monitoring Station) to execute. Environmental monitoring consultants will periodically collect environmental samples at selected locations (including air, noise, etc.). The results of such monitoring, reviewing and sampling results shall be submitted to the proponent, and constitutes all kinds of indicators to determine whether the project meets environmental regulations.

Environmental Management Plan in the monitoring plan should focus on the following key points:

• The project owner is committed to implementing all kinds of monitoring programs and related projects.

• Might be expected to give the environmental and social impacts of the project area resources will be subject to monitoring, including air quality, noise, water quality, soil quality, and socioeconomic resources.

• Regular monitoring of the owners of various types of data to carry out trend analysis monitoring program to assess the success of the monitoring program, but also through the analysis clear whether the monitoring programs need to be changed or adjusted.

• When necessary, in cooperation with environmental authorities designed the latest monitoring programs.

Based on the evaluation of environmental impact, it was confirmed under normal circumstances, will affect the period of the specific items in the environment surrounding the embodiment. Generally, these effects can be mitigated through various environmental measures. The comprehensive monitoring programs and assessment programs are listed in the Environmental Management Plan.

In order to test the effectiveness of mitigation measures, monitoring is needed to confirm the effectiveness of mitigation measures within a reasonable timeframe. During the monitoring period must be determined that the target environment
parameters and baseline data, and Environmental Impact Assessment Section 1.4, the law or standards set forth for comparison.

**6.2.1 Introduction monitoring procedures**

In the design of monitoring programs and monitoring frequency should quantify the overall environmental performance of the Project and any short-term impact of the intensive construction activities caused. Specifically, as a key component of "Environmental Management Plan", the environmental monitoring plan shall contain the following objectives:

• Predicted environmental impact assessment during the confirmation process, Environmental Management Plan to develop and monitor the effects.

• Determine the types and extent of the actual extent of the impact.

• Assess the effectiveness of mitigation measures.

• Against accidental impacts during project implementation, identify and adjust any additional mitigation measures.

• Under any new regulatory standards, track and update the environmental quality monitoring methods and objectives of the project.

During peak construction or at the request of the environmental monitoring consultant will conduct additional monitoring to monitor the short-term impact. If you find that the performance of non-compliance with environmental quality standards, it shall conduct additional monitoring.

**6.2.2 Monitoring Parameters**

**Table 6.2-1 Construction of the project environmental monitoring programs**

<table>
<thead>
<tr>
<th>Monitoring Elements</th>
<th>Monitoring points (section)</th>
<th>Index</th>
<th>Monitoring frequency</th>
<th>Implementation responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>Construction camps,</td>
<td>SS and oil</td>
<td>Once every quarter</td>
<td>Environmental quality testing</td>
</tr>
<tr>
<td></td>
<td>construction sites, yard</td>
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</tr>
</tbody>
</table>


There are a lot of job sites operating equipment, sensitive areas or near sensitive environmental non-paved roads or open space. PM\textsubscript{10} is used for random sampling in the peak construction period. Environmental quality testing consultant.

- **Air Quality**: There are a lot of job sites operating equipment, sensitive areas or near sensitive environmental non-paved roads or open space. Equivalence continuous sound level (LA\textsubscript{eq}) is used for random sampling in the peak construction period. Environmental quality testing consultant.

### Table 6.2 -before the start of project operations environmental monitoring programs

<table>
<thead>
<tr>
<th>Monitoring Elements</th>
<th>Monitoring points (section)</th>
<th>Index</th>
<th>Monitoring frequency</th>
<th>Implementation responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage</td>
<td>Downstream of the sewage outfall</td>
<td>COD, BOD\textsubscript{5}, SS, Ammonia</td>
<td>Once a year</td>
<td>Routine monitoring of environmental protection department</td>
</tr>
<tr>
<td>Gas</td>
<td>Each exhaust port</td>
<td>THC, CO, Mist, NO\textsubscript{x}</td>
<td>Once a year</td>
<td>Routine monitoring of environmental protection department</td>
</tr>
<tr>
<td>Production of noise</td>
<td>From the high noise source at 1m</td>
<td>Equivalent continuous sound level (LA\textsubscript{eq})</td>
<td>Once per quarter</td>
<td>Routine monitoring of environmental protection department</td>
</tr>
<tr>
<td>Social environmenta l noise</td>
<td>Office within the region and around the border</td>
<td>Equivalent continuous sound level (LA\textsubscript{eq})</td>
<td>Once per quarter</td>
<td>Routine monitoring of environmental protection department</td>
</tr>
</tbody>
</table>
7 contractor environmental specifications

Insurers environmental norms offers a range of guidelines, processes and procedures to ensure the ecological environment is not affected by the project contractor during the implementation of the activities. The Contractor shall follow the guidelines identified in the document. Environmental issues in general and contractor activities include:

• On-site management

• Fuel and materials storage and handling

• Dust and Noise Hazard Control

• Wastewater Management

• Waste Management

Environmental issues and specific project-related activities (such as soil and water conservation plans, contingency plans, etc.) described in detail later chapters.

7.1 contractor Environmental Protection Plan

Contractor are required to hold Environmental Management Plan copies, and the words Environmental Management Plan incorporated into the tender documents. Before construction began, the Contractor shall submit a construction site for its job environmental program for environmental supervision engineers, management consultants and owners of the external environment review. The environmental protection plan should cover generic environmental impact mitigation measures (as well as specific mitigation measures for emergency response, etc.), including (but not limited to) the following:

• Construction of the total plan, indicating the work area, fuel storage and refueling areas, parking, equipment maintenance areas, material storage areas and camp area;
• Waste Management Plan;
• Dust Control Plan;
• Noise Control Plan;

7.2 on-site facilities

Ensure that construction camps and peripheral industries at a distance. Environmental supervision engineer responsible for the production and approval of construction activity plan.

7.2.1 labor hire

• If appropriate, priority should be to hire local labor.

• The Contractor shall publish its towns and villages in the base of each job position.

• Construction and legal staff should have employment contracts .

• The Contractor shall provide the education and training of construction workers, environmental protection and occupational health and safety.

7.2.2 requires construction camp

• The Contractor shall provide a safe construction workers suitable accommodation .

• Construction camp were men and women workers should be independent and well equipped bathing facilities ( toilets and the bathroom ) . Toilet water should be sufficient , and with soap and toilet paper . All of these facilities require clean, ready for use. Toilets should be marked "male" , " female ."

• Construction camp kitchen should have clean water and good health .

• Camp sewage may not be discharged directly into any waters , should at least be treated by septic tanks .
• Construction camp should provide emergency medical facilities. Camp shall provide first aid equipment and sent people management. First aid personnel should receive a complete first-aid training and obtain the appropriate qualifications, the injured or the patient can go to a local hospital timely and appropriate manner. More health facilities once used should be promptly added.

7.3 Code of conduct

Construction workers should be established Code of Conduct, emphasizing appropriate behavior, drug and alcohol abuse is strictly prohibited and follow the relevant laws and regulations, thus reducing the impact on the community. Code of Conduct propaganda notification should be implemented to every worker. Construction worker code of conduct should be notified to the local community. Failure to comply with Code of Conduct, shall be subject to disciplinary action. Code of Conduct includes but is not limited to the following measures:

• All staff shall comply with national laws and regulations;
• dangerous goods and hazardous site is prohibited weapons;
• the site is prohibited pornographic materials and gambling activities;
• Do fights;
• Do not obstruct the immediate vicinity and the local people’s life and production;
• respect local traditional culture, customs and traditional activities;
• designated areas only smoking;
• proper dress and personal hygiene standards;
• suitable accommodation sanitation;
• When you visit the neighborhood and the local people, should comply with the relevant code of conduct.
Prohibited acts

Prohibit the construction site and the surrounding occurrence of the following acts:

• harm wildlife and livestock villagers adjacent areas;
• Capture the protection of animals or picking protected plants;
• Buy food protection of animals;
• affect or destroy objects of historic or architectural value;
• Outdoor lights the fire;
• Working hours drinking;
• mechanical maintenance (oil and lubricant supply) outside the designated area;
• outside the area designated dumping;
• Local roads dangerous driving;
• The construction of the dress is not secure (such as: safety boots and helmets);
• impact on nearby residents;
• leakage of pollutants, such as: Oil;
• Incineration.

Any contractor, office staff or other staff, if found in violation of the above rules, depending on its severity should be released verbal criticism to disciplinary labor contracts.

7.4 Health and Safety

• The Contractor shall ensure that the project complies with all national and local safety regulations and other measures to avoid damage ;
• Before construction, the Contractor shall worker safety training ;
• There should be sufficient daylight and nighttime lighting ;
• construction fence around the site should be anti- interference, and the construction of its inspection and maintenance ;
• Contractor management personnel without the approval of unauthorized
persons can not enter the construction camp;

- Construction camps shall be equipped with fire extinguishers and other fire fighting equipment;

- The Contractor shall provide adequate protection for the personal safety of construction workers (for example: goggles, protective gloves, protective masks, dust cover, helmet, ear protectors, helmets, etc.), and ensure that it is used to the construction site;

- safety procedures, emergency plans and emergency contact information, etc. should express at the construction site bulletin board;

- All dangerous place that may occur should be warned express;

- safety distance shall be determined in accordance with the relevant provisions;

- The Contractor shall take all reasonable measures to prevent risks and ensure that all construction sites and camps have been providing fire protection equipment;

- no need of fire engineering, the environment can only be approved by the supervising engineer to by its oversight be required. Meanwhile, the corresponding fire-fighting equipment should be arranged in place;

- The Contractor shall provide an annual physical examination as construction workers;

- The Contractor shall also provide training in basic personal hygiene and epidemic prevention, including respiratory and infectious diseases;

- The Contractor shall carry out the prevention and treatment of diseases related to educational activities (especially protective AIDS and sexually transmitted diseases), including the construction site and adjacent areas in the form of notices and training courses for publicity;

- The Contractor shall provide basic first aid services and emergency measures
for the construction workers;

- The Contractor shall road near the construction of local communities (if any) to establish the necessary warnings and road deceleration device, to ensure the traffic safety of nearby residents.

7.5 fuel storage, oil and hazardous toxic substances

- All fuel storage construction site should be fenced; storage area should be 110% of the fuel storage container. Fuel storage area should not be near any water source (ie: from the water within 100 meters);

- Hazardous materials should be stored in the storage device explicitly specified. Such as fuel, oil, and paint and other dangerous items should also develop temporary storage requirements.

- The storage area is limited to the persons concerned before entering;

- The point should also be stored in the vehicle from damage, and regularly check for leaks, damage and contamination;

- Machinery and equipment maintenance is limited to be within the scope of the contractor camp. Operating surface (ie, within the fenced area of the concrete floor) must be designed properly to ensure that oil and other fuel can concentrate to a suitable container. In the event of oil/fuel leaks, remove contaminated soil is required to properly licensed locations for processing;

- To prevent grease, oils, fuels, solvents and chemicals for water and soil erosion caused by pollution or must always adopt appropriate preventive measures;

7.6 Waste Management

- During construction, the contractor will be required to adopt an appropriate manner at all times to clear the waste site to a licensed waste disposal facilities. Construction waste should minimize the accumulation of circumstances.

- Contractor camp activities all garbage must be placed in the trash (210L steel
or plastic drums) or garbage dump car. Contractor shall ensure that once a week or emptied the trash container when needed.

- All trash should be immediately placed in the trash or garbage dump car. Work area or contractors shall not littering the camp.

- Construction waste shall be kept at the camp contractors, the Contractor is responsible for handling. Construction of contaminated waste must be dealt with separately.

- Construction site prohibit the incineration of waste.

**7.7 wastewater and storm water management**

- the construction site and camp wastewater directly discharged into surface water bodies shall be;

  Before being discharged after: • subject to proper sewage treatment (eg septic tanks).

  • the need to implement storm water discharged into the river before the determination of energy dissipation;

  • the construction site (temporary drainage facilities) discharge of storm water runoff should be evenly distributed as possible; and

  Using gabion, ripples bed with low-lying land by reducing the flow rate of water in the buffer.

**7.8 Noise Control**

- Limit construction time during the day;

- Construction weekend approaching local communities, they should ensure that no noise activities;

- site staff, visitors and construction workers, personnel must be equipped with proper hearing protection measures to avoid the effects of noise on hearing harm;
• environmental supervision engineer must carry out regular site inspections to ensure compliance with "occupational health and safety."

7.9 Construction Phase communication with the public information

Community (public) participation and complaint registration (CR)

• During construction, the Contractor shall remain with the local government and people in the community about the open communication;

• Before construction, the contractor shall be in the form of community meetings to affected parties (such as: local government, businesses and residents) published project information;

• Each construction site shall be prominently labeled information about the project, including, but not limited to:
  a) Project Overview;
  b) construction plans;
  c) The main construction activities;
  d) The main environmental issues and mitigation measures;
  e) project managers, engineers and environmental officers supervising the name, telephone, etc.;

• Contractors and environmental supervision engineers should regularly communicate with the main sensitive receptors to minimize its adverse impact;

• All contractor should be provided to workers on the surrounding relationship maintenance, communication, training of local customs and codes of conduct;

• channels for complaints related information shall be published on the site at the entrance;

• Main construction site shall be provided to the office to register a complaint. All complaints, problems and related issues should be included in the feedback report,
by environmental supervision engineers and city Economic Development Zone declared technical review;

- The need to correct the handling of complaints must be communicated to the parties concerned to ensure that the complainant satisfied.

7.10 Physical Cultural Resources

- aims to educate workers about the historical relics and historical artifacts found in the training and protection program.

- if found resources;

  a) The Contractor shall immediately stop the construction, protection of the site;

  b) reporting environment supervising engineer with the owners and the local authorities and cultural resources;

During c) local authorities in their investigation, the Contractor shall take appropriate measures to protect the historical heritage site, and the implementation of preventive measures weather;

  d) only after the consent of the relevant authorities, contractors before resuming construction.
8. Emergency plan

8.1 Contingency Plan

After the project put into various pipelines, in the case of normal operation, no adverse effects on the environment, but in the following cases: natural gas drilling gas pipeline due to criminals stealing gas, above the illegal construction of the pipeline, the pipeline of internal and external corrosion, pipeline quality defects, construction defects and floods, landslides, earthquakes and other natural disasters caused the pipeline rupture, causing a natural gas leak, fire source might be a fire, explosion.

For this project, the owners need to develop emergency response procedures related, including: emergency command structure and related responsibilities and tasks cooperative unit, select technology and handling emergency procedures, equipment, equipment configuration and layout, human and material resources to ensure and deployment, dynamic monitoring system of the accident, after the accident reporting system.

8.2 City gas accident prevention measures

① strict control of natural temperament, a regular pigging, excluding water and dirt inside the tube in order to reduce corrosion of the pipeline;

② pipe wall thickness measurements every three years, severe thinning of the pipe wall, timely maintenance and replacement, burst pipes to avoid accidents;

③ pipeline safety inspection every six months protection systems (such as shut-off valve, safety valve, venting systems, etc.), so that the pipe can be overpressure in the safe handling, so that the scope of damage is reduced to a minimum.

④ in rail, road, river crossing point mark not only clear, unambiguous, and its setting should be from different directions and different angles can see;

⑤ increasing frequency transmission line, improve the effectiveness of the transmission line; checked daily with pipeline construction, check surface conditions,
and are concerned about the activities of this zone personnel found to influence the behavior of pipeline safety, it is timely to stop, take appropriate measures report to superiors;

⑥ for crossing rivers and other sensitive areas of the pipe should be inspected once every three years;

⑦ in the flood period, special attention should be safe section of the pipeline crossing the river;

⑧ distribution stations venting accident, should pay attention to the fire.

8.3 Strategies sudden accident and emergency programs

Plant maintenance during operation, once sudden accident occurs, the program must be prepared in advance, and for emergency treatment. Content emergency plan are as follows:

(1) General insurance source
Syria risks detailed source type, source of small and powerful position.

(2) emergency response organizations
Emergency group is responsible for the overall command of the scene, professional repair team is responsible for the accident or fault repair or excluded.

(3) emergency facilities, equipment and materials
With related spare equipment, tools and materials.

(4) emergency communications, notifications and traffic
Contact communication requirements under the state of emergency, notify all interested parties, control the scene of the accident to determine the repair teams arrive.

(5) Emergency protective measures
Control accidents, and prevent the expansion of the chain reaction; closure of the gate, enable accident pools, harm reduction.
(6) the termination of the emergency situation and recovery measures

State of emergency provisions to terminate the program, dealing with the aftermath scene of the accident, quickly returned to normal operation.

(7) emergency environmental monitoring and assessment after the accident

For larger scene of the accident near the water environment monitoring, the nature of the accident, the parameters and consequences assessed to provide a basis for decision-making authorities.

(8) personnel training and exercises

After formulating contingency plans, usually arrangements for staff training and exercises.

(9) Records and reports

Set accidents specially recorded files and accident reporting system established to set up a full-time or part-time staff responsible for the management.
9 Environmental Training and capacity planning

9.1 Construction Training

Before any activity related to the conduct of Xi'an west bus maintenance plant project, all employees have been adequately trained. Trained personnel Zone objects include environmental management, environmental supervision engineers and contractors

9.1.1 Training of recruits and environmental supervision engineer.

Training purposes environmental supervision engineers and recruits to strengthen the construction and operational phases of environmental management to ensure the effectiveness of environmental management, thereby improving the overall quality of the project. Through training, supervision engineers and environmental managers to identify the major environmental issues and management deficiencies, and prompted the contractor to take the necessary precautionary measures as soon as possible. During construction, the zone will be invited to have a similar experience in environmental consultancy (Environment experts or environmental agencies) to carry out the training venue for potential problems and corresponding solutions.

9.1.2 Training contractors

Before the start of the winning bidder environmental personnel and staff should receive training in environmental supervision system environment Knowledge Zone Management team provides engineers and to avoid environmental damage caused by misuse. Contractor personnel training environment is to determine responsibility for environmental management of construction units, the training of staff dealing with the problem properly operate during construction methods to reduce or avoid unnecessary losses. Through training, the Contractor shall know the results of its commitment to environmental responsibility and environmental damage that may result from the staff to clearly understand the training methods and the degree of protection, the staff should be environmentally sensitive point for a week, depending on the actual situation.
Training programs and estimates are shown in Table 9.1-1

**Table 9.1-1   Environmental Training Programme**

<table>
<thead>
<tr>
<th>NO.</th>
<th>Trainees</th>
<th>Content</th>
<th>Organizer</th>
<th>Participants</th>
<th>Deadline</th>
<th>Location</th>
<th>Budget (in RMB million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Recruits, environmental supervision engineer</td>
<td>Learning environment protection and management knowledge of environmental management measures</td>
<td>Weiyang</td>
<td>3</td>
<td>5 天</td>
<td>Xi'an</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Weiyang's environmental staff</td>
<td>Study visit focused on infrastructure projects for environmental protection</td>
<td>Weiyang</td>
<td>3</td>
<td>5 天</td>
<td>Pending</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Environmental Supervision Engineer</td>
<td>Relevant provisions Environmental Management Plan requirement contingency plans</td>
<td>Weiyang</td>
<td>10</td>
<td>10 天</td>
<td>Xi'an</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Main contractor responsible for the construction and the person in charge</td>
<td>Relevant provisions Environmental Management Plan requirement contingency plans</td>
<td>Weiyang</td>
<td>30</td>
<td>10 天</td>
<td>Xi'an</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Total construction teams and team operations</td>
<td>Relevant provisions &quot;Environmental Management Plan&quot; requirement contingency plans</td>
<td>Weiyang</td>
<td>20</td>
<td>3 天</td>
<td>Xi'an</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>
10. Environmental Investment

Implemented during construction and operation, "Environmental Management Plan" have been budget, as shown in Table 10-1. The total budget of the investment environment, including environmental mitigation measures, environmental protection, monitoring and project management and major projects, as well as to mitigate or eliminate the negative impact of the investment environment right. Note that many of the mitigation measures is the nature of management practices, which are included in the overall budget of the contract may not be specifically noted.

Table 10-1 List of environmental investment projects

<table>
<thead>
<tr>
<th>The main sources of pollution</th>
<th>Treatment measures and facilities</th>
<th>Quantity</th>
<th>Investment (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wastewater</td>
<td>Sewage</td>
<td>Pleiotropic composite Septic</td>
<td>1</td>
</tr>
<tr>
<td>Noise</td>
<td>Fans, pumps, etc.</td>
<td>Damping based on noise reduction measures</td>
<td>Several</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Life, producing garbage</td>
<td>Separate collection, accumulation point</td>
<td>Several</td>
</tr>
<tr>
<td></td>
<td>Waste oil, waste cotton yarn</td>
<td>Temporary storage sites</td>
<td>1</td>
</tr>
<tr>
<td>Green environment</td>
<td>Green area 317m²</td>
<td>/</td>
<td>5.0</td>
</tr>
<tr>
<td>total</td>
<td></td>
<td></td>
<td>50.5</td>
</tr>
</tbody>
</table>