World Bank Loan Project

World Bank Loan

Jiaozuo Green Transport and Road Safety Improvement Project

Environmental Management Plan

(Assessment Draft)

Zhengzhou University Environmental Technology Consulting and Engineering Company

Leading Group Office of Jiaozuo Green Transport and Road Safety Improvement Project

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1 Overview

1.1 Overall Project Background

In order to meet the needs of Jiaozuo city function transformation, as well as to solve urban traffic problems, urban transport system has become an important starting point to comprehensively enhance urban management and service levels. In order to seek a green, efficient and safe way of development for Jiaozuo City’s urban transport system, Jiaozuo municipal government hope to learn from the World Bank’s advanced transportation development and planning design concepts, and combine it with their own situation, to promote sustainable development of their own urban transport undertakings.

November 2011, under the fully cooperation and initiative operation of Jiaozuo Municipal Finance Bureau, the Municipal Development and Reform Commission and other relevant departments, World Bank Loan of Jiaozuo Green Transportation and Traffic Safety Improvement Project has been submitted for approval.

1.2 The Objectives of Environmental Management Plan

The purpose to develop an EMP is: to develop a technically feasible, financially sustainable, and workable environmental measures to cope with the inevitable environmental impact of the project, to make clear the measures and arrangements for environmental mitigation, environmental management and institution-building implemented by project contractor, supervisor, operators, and environmental management departments during project construction and operation, to eliminate or compensate adverse effects of the project on society and the environment as much as possible, and reduce it to an acceptable level. The specific objectives include:

（1）Make clear the environmental management obligations of contractors and operators

Jiaozuo Municipal Environmental Protection Bureau, the EA consultants and design units
conducted detailed site verification, validation on environmental protection objectives, proposed effective environmental mitigation measures, and incorporated it into the engineering designs, and it will be considered as contractual obligations of project construction contractor and operator.

（2）As an operating guide to environmental management

Environmental monitoring plan for the construction and operation period, proposed by EMP, can ensure the effective implementation of environmental mitigation measures, will be supplied to construction supervision, environmental monitoring units and other relevant units during construction and operation as environmental protection text, to define responsibility and role of relevant functional departments and regulatory bodies, to propose communication channels and methods between various departments.

（3）Ensure funding for environmental management actions

The EMP estimates the mentioned funding for environmental management, environmental supervision and institutional capacity building, and explains the sources of funding, to ensure that the environmental management actions will be implemented, in which management costs include staff salaries, office expenses and travel expenses.

The role of EMP is to avoid and control the environmental impact in the project implementation and operation process, whereby propose the impact mitigation measures, monitoring measures, legal regulatory means that need to be implemented and safeguard measures of the above measures. At the same time it is the key link of environmental impact and the impact mitigation measures and alternative measures evaluated and detailed described in EA. For each of the environmental management measures, EMP specifies its technical content, investment estimates, implementation plan, functions of government organizations, funding sources, and monitoring programs. In order to achieve the reduction goals, environmental impact assessment report and approaches involved in EMP must be implemented.
1.3 EMP Preparation

The EMP of World Bank Loan of Jiaozuo Green Transportation and Traffic Safety Improvement Project is prepared by Zhengzhou University Environmental Technology consulting engineering company. The information source of the EMP is as follows:

(1) Project EA report
(2) Project EA resettlement plan
(3) Project feasibility study report

1.4 EMP Design

To elaborate the content of environmental management, environmental supervision and environmental monitoring etc., the developed EMP is the guidance documents for environmental management during the project implementation, and its action plan includes the following five parts:

(1) Environmental impacts and mitigation measures: Main environmental impacts of the project construction period and operation period, and engineering measures and management measures taken to prevent or mitigate the adverse environmental impacts of the project.

(2) Environmental management and monitoring plan: Environmental monitoring actions taken to ensure the simultaneous implementation of environmental protection measures and project construction.

(3) Environmental monitoring plan: The environmental monitoring action taken to eliminate the environmental pollution of construction and operation period, ensure the safe operation of the project and improvement of the environmental situation in the project area.

(4) Institutional capacity building (i.e. personnel training) program: Knowledge and skills training for management personnel, environmental supervision personnel, full-time or part-time environmental management personnel in the project implementation process, in order to ensure the implementation of the EMP.
（5）Fees and institutional arrangements: To ensure the implementation of EMP, need to ensure certain financial support, implemented by the appropriate agencies.
2 Environmental Policies and Regulations

Through a comprehensive analysis of project types and scale, siting, environmental sensitivity, and the characteristics and size of potential environmental impacts, the main basis and related policies, laws and regulations and standards for the project environmental assessment include:

(1) environmental protection laws and regulations;
(2) Environmental Impact Assessment Technology Guidelines;
(3) World Bank Safeguard Policies;
(4) relevant planning;
(5) related documents;
(6) environmental quality standards;
(7) pollutant emission control standards.

These policies, laws and regulations and standards form the framework of policies, laws and regulations documents that guide and regulate the environmental assessment of this project. As each component differs from type and nature, the applicable policies, laws and regulations standards will be different as well.

I. Environmental laws and regulations

"Environmental Protection law of the People’s Republic of China", 1989.12.26;
"Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution", 2000.9.1;

“Law of the People's Republic of China on Prevention and Control of Water Pollution”, 2008.6.1;

“Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes”, 2005.4.1;
“Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise”, 1997.3.1;


“Highway law of the People's Republic of China”, 2004.8.28;

“Law of the People's Republic of China on Water and Soil Conservation”, 2011.3.1;

“Flood Control of the People's Republic of China”, 1998.1.1;


“Regulations of the People's Republic of China on Wild Plants Protection”, Order of the State Council (No. 204), 1997.1.1;

“Regulations on the Administration of Construction Project Environmental Protection”, Order of the State Council (No. 253), 1998.11.29;

“Regulation on the Safety Management of Hazardous Chemicals”, Order of the State Council (No. 591), 2011.12.1;

“Detailed Rules for the Implementation of the Water Pollution Prevention and Control Law of the People's Republic of China”, Order of the State Council (No. 284);

“Regulations on the Protection of Basic Farmland”, Order of the State Council (No. 257), 1998.12.27;

“Regulations on the Management of Landscape and Famous Scene”, the State Council, 2006.9.19;

“National Key Protected Wild Plants List (List 1)” (No. 4 Order of State Forestry Administration and the Ministry of Agriculture);

“The Temporary Act of Environmental Impact Assessment of Public Participating”,
(Environment and Development [2006] Document No. 28), 2006.3.18;

“Catalogue for the Classified Administration of Environmental Impact Assessments for Construction Projects”, Ministry of Environmental Protection, 2008.10.1;

“Regulations on the Administration of Construction Project Environmental Protection for Henan Province”, 2007.5.1;

“Highway Construction Projects Soil and Water Conservation Work Rules”, (Soil and Water Conservation [2001] Document No. 12);

II. Environmental Impact Assessment Technology Guidelines and Specifications

“Technical guidelines for environmental impact assessment General program”

“Technical guidelines for environmental impact assessment Atmospheric Environment”

“Technical guidelines for environmental impact assessment Surface water environment”

“Technical guidelines for environmental impact assessment Sound environment”

“Technical guidelines for environmental impact assessment Ecological Impact”

“Technical guidelines for environmental impact assessment Groundwater Environment”

“Code for design of urban road public transportation stop, terminals and depot”

“Code for design of urban road engineering”

III. World Bank Safeguard Policies

(1) OP/BP 4.01 Environmental Assessment;

(2) OP/BP 4.04 Natural Habitats;

(3) OP 4.09 Pest Management;

(4) OP 4.36 Forest;

(5) OP 4.37 Safety of Dams;

(6) OP 4.11 Physical Cultural Resources;

(7) OP/BP 4.12 Involuntary Resettlement;
Security policies involved in this assessment are OP/BP 4.01 (Environmental Assessment), OP 4.11 (Physical Cultural Resources) and BP17.50 (Disclosure of Information).

IV. Relevant plannings

"Jiaozuo City Master Plan" (2008-2020);
"Jiaozuo City 2030 Overall Urban Spatial Development Plan";
"Jiaozuo City Water Environmental Function Zoning" (2004);
Jiaozuo City sound environmental function zoning;
"Jiaozuo City Environmental Protection Twelfth Five Year Plan"

V. Project related documents

VI. Environmental quality standards

(1) GB3095-2012 "Ambient Air Quality Standards";
(2) GB3838-2002 "Environmental quality standards for surface water";
(3) GB3096-2008 "Environmental quality standard for noise";
(4) TJ36-79 "Hygienic standards for the design of industrial enterprises" (residential atmosphere harmful substances maximum allowable concentration).

The environmental quality standards and evaluation factor adopted by each component environmental impact assessment are shown in Table 2.1-1.

VII. Pollutant emission control standards

(1) GB16297-1996 "Integrated emission standard of air pollutants";
(2) GB8978-1996 "Integrated wastewater discharge standard" Level 3;
(3) CJ3082-1999 "Sewage discharged into the sewer water quality standards";
(4) GB12523-2011 "Noise limits for construction site";
(5) GB12348-2008 "Emission standard for industrial enterprises noise at boundary";
(6) GB18599-2001 "Standards for pollution control on the storage and disposal site for general industrial solid wastes";
(7) GB18597-2001 "Standard for pollution control on hazardous waste storage"
3 Project Overview

The World Bank Loan Jiaozuo Green Transportation and Traffic Safety Improvement Project is composed of four transportation components, construction includes: Green Tourist Corridor, Safe System Integrated Corridors/Area Development, Public Transport Infrastructure Development & Improvement, Institutional Capacity Building, apply for $100 million World Bank loan, and Jiaozuo City’s supporting funds is $100 million. Specific project construction summaries are shown in Table 3-1.

Table 3-1 Project Construction Summaries

<table>
<thead>
<tr>
<th>Component Name</th>
<th>Construction Content</th>
<th>Project Nature</th>
<th>Static Investment (Ten thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Componen t one: Green tourism corridor</td>
<td>South from Longyuanhu Park, north end located to the south of Minzhubei Road and Yingshi Road intersection, total length of about 16.924km, a bike lane. Roadbed width 5.5m, road width 4.5m, with a 0.5m soil shoulder on each side. K0 +000 to K10 +420 section of this project is located in in Jiaozuo urban areas, the rest is mountainous section. Some sections utilize the bicycle lanes of the existing road. Green Road and other roads have a total of 23 crosses. At south of the Yanhe village, the route will cross Qunying river and set a 4x20m Hollow Slab Bridge. A total of 11 pipe culverts will be set up across the board.</td>
<td>Hardware Construction</td>
<td>9925.7</td>
</tr>
<tr>
<td>Ancillary works</td>
<td>Construction Road Temporary construction roads 9.433km, road width 2.5m, temporary land occupation 2.537hm²</td>
<td>Hardware Construction</td>
<td>9925.7</td>
</tr>
<tr>
<td></td>
<td>Construction Camps Three construction camps, temporary land occupation 0.18 hm²</td>
<td>Hardware Construction</td>
<td>9925.7</td>
</tr>
<tr>
<td></td>
<td>Borrow pits and spoil grounds Two borrow pits and spoil grounds of each, temporary land occupation 6.263 hm²</td>
<td>Hardware Construction</td>
<td>9925.7</td>
</tr>
<tr>
<td>Componen t two: Safe System Integrated Corridors/Area Development</td>
<td>Jiefang Road West from Puji Road, east to Dongyuan Road, 5.3km long, two-way four-lane currently. Conduct comprehensive safety transformation only, not to set the designated bus lanes. Newly constructed storm sewer 10128m, sewers 5736m.</td>
<td>Hardware Construction</td>
<td>70142.1</td>
</tr>
<tr>
<td>Component Three: Public Transport Infrastructure Construction and Improvement</td>
<td>Bus Transfer Hub Construction</td>
<td>Railway Station North Square PT Interchanges</td>
<td>Bus Depots and Garages Construction</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Compartent</td>
<td>Tanan Road</td>
<td>West from Puji Road, east to Zhongyuan Road, 4.7km long, two-way eight-lane currently, with better road conditions, this time to transform the innermost motor vehicle lane to a designated bus lane. Newly constructed storm sewer 8270m, sewers 6200m, as well as other municipal pipelines.</td>
<td>Zhongzhan bus depot transformation</td>
</tr>
<tr>
<td>Zhanqian Road</td>
<td>North from Jiefang Road, south to Fengshou Road, 1.3km long, two-way four and six-lane currently, part of the existing non-motor vehicle lanes are wide, available for compression to provide more designated bus lanes. Newly constructed storm sewer 2820m, sewers 2400m.</td>
<td>Railway Station North Square PT Interchanges</td>
<td>New construction will set the terminals at the southwest corner of the square, will set 5 stations, 10 public transport parking spaces</td>
</tr>
<tr>
<td>Renmin Road</td>
<td>West from Minzhuzhong Road, east to Tanan Road, about 7.1km long, two-way four-lane currently, the inner motor vehicle lane can be transformed to a designated bus lane. Newly constructed sewers 2520m, as well as other municipal pipelines.</td>
<td>Zhongzhan bus depot transformation</td>
<td>Use existing space 1.67ha, 84 parking spaces, a three-storey office building 2250m², maintenance yard 600m², car wash 600m², gas station 300m², one skid-mounted gas filling station 25m³, a buried sewage treatment</td>
</tr>
<tr>
<td>Road traffic safety education and road traffic enforcement building</td>
<td>Road traffic safety education and training base</td>
<td>TSA: utilize existing field of 150 acres, the field has been hardened and greened; utilize an existing four-storey composite building transform the second and third storeys, transformation area of 2035 m².</td>
<td>Hardware Construction</td>
</tr>
<tr>
<td>Freeway traffic safety education and training base</td>
<td>Freeway traffic safety education and training base</td>
<td>PSB: add 15 acres to build a two-storey classroom building, construction area 2492.16 m².</td>
<td>Hardware Construction</td>
</tr>
<tr>
<td>Plant</td>
<td>Labor Capacity</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Macun bus depot</td>
<td>53 people</td>
<td>Use existing space 2ha, 109 parking spaces, a three-storey office building 2250m², maintenance yard 600m², car wash 600m², gas station 300m², one skid-mounted gas filling station 25m³, a buried sewage treatment plant 150m²</td>
<td></td>
</tr>
<tr>
<td>Yimen bus depot</td>
<td>133 parking spaces</td>
<td>New construction land 2.22ha, 133 parking spaces, a three-storey office building 3000m², maintenance yard 600m², car wash 600m², gas station 300m², one skid-mounted gas filling station 25m³, a buried sewage treatment plant 150m²</td>
<td></td>
</tr>
<tr>
<td>Dabeizhang bus depot</td>
<td>176 parking spaces</td>
<td>New construction land 2.67ha, 176 parking spaces, a three-storey office building 3000m², maintenance yard 600m², car wash 600m², gas station 300m², one skid-mounted gas filling station 25m³, a buried sewage treatment plant 150m²</td>
<td></td>
</tr>
<tr>
<td>Dongxuegu bus depot</td>
<td>78 parking spaces</td>
<td>New construction land 2.88ha, 78 parking spaces, a five-storey office building 9255m², main workshop 5280m², split workshop 2830m², maintenance repair capacity 60 / d, car wash 600m², lower level maintenance yard 600m², gas station 300m², one skid-mounted gas filling station 25m³, a buried sewage treatment plant 100m²</td>
<td></td>
</tr>
<tr>
<td>Ancillary works camps</td>
<td></td>
<td>Three Construction camps, temporary land occupation 0.201hm²</td>
<td></td>
</tr>
<tr>
<td>Component Four: Institutional Capacity Building</td>
<td>Advanced bus operation management system building</td>
<td>Improve Jiaozuo City intelligent public transport systems</td>
<td>Software improvement and perfection</td>
</tr>
<tr>
<td>New buses purchase</td>
<td>Purchase natural gas fuel buses a total of 286.</td>
<td>Hardware Construction</td>
<td></td>
</tr>
<tr>
<td>Form a permanent road safety steering committee; training and capacity building; conduct soft subjects studies and research</td>
<td>Consulting service</td>
<td>2261.75</td>
<td></td>
</tr>
</tbody>
</table>
4 Potential environmental impacts and control measures

The project engineering construction’s environmental impact focuses on the construction phase. Effect factors mainly include construction layout, outbound traffic, construction machinery, construction area, construction human activity and waste solid treatment, etc. Engineering construction will generate construction waste, noise, emissions and solid waste, and will have impact on water environment, sound environment, ambient air, soil erosion, human health and ecological environment in the construction area and nearby areas.

Environmental effect factors during the project operation period mainly include domestic sewage and garbage generated by depot staff and training staff, fugitive emission of exhaust and machinery and equipment noise generated by bus maintenance depots, vehicle exhaust and traffic noise generated by safety system comprehensive corridor, domestic sewage and garbage generated by Green Road tourists, etc. Various pollutants all get reasonable disposition, will have less adverse impact on the environment. Details are as follows

4.1 Environmental impact of the construction period

4.1.1 Construction period noise pollution source intensity

The noise in this project construction period comes mainly from construction machinery, such as rollers, loaders, excavators, etc. When these machines run, the noise which is 5m from sound source can be up to 84 ~ 90dB (A).

4.1.2 Construction period ambient air pollution source intensity

The main pollution source for the engineering construction process is fugitive dust pollution. Which, the fugitive dust pollution comes mainly from transportation, loading and unloading, stacking of road construction materials.
4.1.3 **Construction period water pollution source intensity**

During the construction, wastewater mainly comes from production and life activities, including car wash wastewater, construction machinery washing water, domestic sewage, etc.; wastewater pollutants are mainly SS, the majority of wastewater is domestic wastewater.

Construction wastewater: construction machinery and vehicle washing drainage water quality is COD $50 \sim 80 \text{mg} / \text{L}$, SS $150 \sim 200 \text{mg} / \text{L}$. After receiving sedimentation treatment, all construction wastewater will be use back as sprinkler to the dust, without outward emissions.

Domestic sewage: domestic sewage during construction period is about $24 \text{m}^3 / \text{d}$. The main pollutants in construction workers domestic sewage are COD, animal and vegetable oils, SS, etc. Its sewage quality is COD: $200 \sim 300 \text{mg} / \text{L}$, animal and vegetable oils: $50 \text{mg} / \text{L}$, SS: $80 \sim 100 \text{mg} / \text{L}$. Domestic sewage during construction period is planned to be processed by using microbial ecological toilet, and the treated recycled water can be used as wash water.

4.1.4 **Construction period solid wastes**

Construction period solid wastes are mainly earth-rock excavation, construction waste produced by construction and garbage generated by construction workers.

**（1）Earth-rock excavation**

Preliminary estimates based on the engineering design information, green tourism corridor component excavation will be 111,100m³, fill 98,000m³, pile use 27,400m³, borrowed fill 70,600m³, spoil 83,300m³, set 2 borrow pits, 2 spoil sites; Safe System Integrated Corridors/Area Development component will produce spoil 26,700 m³, plan to be transported to Jiaozuo Weitai Green Construction Materials Co., Ltd. as land leveling materials; for public transportation infrastructure construction and improvement component, each depots conduct excavation for fill. The remaining earthworks will be use on the venue
landscape, avoid producing spoil.

(2) **Construction waste**

Preliminary estimates based on the engineering design information: the project will generate construction waste 233,400 m³, plan to be transported to Jiaozuo Weitai Green Construction Materials Co., Ltd.

(3) **Construction workers garbage**

In the peak of construction, site construction staff will be around 300 people, the per capita amount of garbage produced will be 0.1kg / d, daily garbage generated will be about 0.03t.

### 4.2 Operation Period Environmental Impact

#### 4.2.1 Operation period sound environmental pollution

The noise in operation period is mainly traffic noise from Safe System Integrated Corridors/Area Development and vehicle noise from bus depots, as well as equipment noise from bus maintenance depots.

Bus depots vehicle noise is mainly generated during bus entry and exit. Equipment noise is mainly generated by high noise equipments used in bus repair process by Dongxuegu bus maintenance depot. The main noise sources are detailed in Table 4-1.

**Table 4-1**  
**Bus maintenance and repair workshop noise source intensity**

<table>
<thead>
<tr>
<th>Equipment Name</th>
<th>Quantity (units)</th>
<th>Generated source intensity [dB(A)]</th>
<th>Measures to be taken</th>
<th>Emission source intensity [dB (A)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air compressor</td>
<td>2</td>
<td>80</td>
<td>noise elimination, vibration attenuation, sound insulation</td>
<td>70</td>
</tr>
<tr>
<td>Grinder</td>
<td>3</td>
<td>85</td>
<td>vibration attenuation, sound insulation</td>
<td>75</td>
</tr>
<tr>
<td>Boring machine</td>
<td>1</td>
<td>85</td>
<td>vibration attenuation, sound insulation</td>
<td>75</td>
</tr>
<tr>
<td>Drilling machine</td>
<td>2</td>
<td>85</td>
<td>vibration attenuation, sound insulation</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Year</td>
<td>Peak traffic (vehicles / h)</td>
<td>Speed (vehicles / h)</td>
<td>Emission intensity (mg / s • m)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
<td>-----------------------------</td>
<td>----------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Car</td>
<td>Bus</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Car</td>
<td>Bus</td>
<td>NOx</td>
</tr>
<tr>
<td>Milling machine</td>
<td>1</td>
<td>3026</td>
<td>342</td>
<td>28.9</td>
</tr>
<tr>
<td>Shearing machine</td>
<td>2</td>
<td>2195</td>
<td>371</td>
<td>28.8</td>
</tr>
<tr>
<td>Welder</td>
<td>1</td>
<td>3723</td>
<td>524</td>
<td>27.5</td>
</tr>
<tr>
<td>Induced draft fan</td>
<td>1</td>
<td>726</td>
<td>79</td>
<td>46.5</td>
</tr>
</tbody>
</table>

4.2.2 Operation period ambient air pollution

(1) Transportation emissions

Operation period ambient air pollution is mainly vehicle exhaust. Vehicle exhaust pollutants are mainly from crankcase leaks, fuel system volatilization and exhaust funnel emissions. Major pollutants are CO, NOx. Transportation vehicle emissions intensity in Jiefang Road, Tanan Road, Zhanqian Road, and Renmin Road before and after the implementation of this project is shown in Table 4-2.

**Table 4-2 The forecast year (2018) transportation vehicle emission intensity**

<table>
<thead>
<tr>
<th>Road</th>
<th>Year</th>
<th>Peak traffic (vehicles / h)</th>
<th>Speed (vehicles / h)</th>
<th>Emission intensity (mg / s • m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Car</td>
<td>Bus</td>
<td>Car</td>
</tr>
<tr>
<td>Jiefang Road</td>
<td>Before</td>
<td>3026</td>
<td>342</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>2195</td>
<td>371</td>
<td>28.8</td>
</tr>
<tr>
<td>Tanan Road</td>
<td>Before</td>
<td>3723</td>
<td>524</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>2233</td>
<td>552</td>
<td>28.7</td>
</tr>
<tr>
<td>Zhanqian Road</td>
<td>Before</td>
<td>726</td>
<td>79</td>
<td>46.5</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>581</td>
<td>94</td>
<td>38.2</td>
</tr>
<tr>
<td>Renmin Road</td>
<td>Before</td>
<td>1287</td>
<td>68</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>1168</td>
<td>101</td>
<td>35.6</td>
</tr>
</tbody>
</table>

(2) Bus depots emissions
The exhaust gas generated by this project is mainly vehicle exhaust from bus depots, gasoline vapor from gas stations and paint spray emissions from maintenance and repair paint spray booths.

①Vehicle exhaust

According to various depots departure frequency and running routes distance, calculate the emission speed of vehicle exhaust of the depots. The results are shown in Table 4-3.

Table 4-3    Bus depots vehicle exhaust emission speed

<table>
<thead>
<tr>
<th>Depot name</th>
<th>Emission speed (g / s · m²)</th>
<th>Departure frequency (vehicle / min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO₂</td>
<td>CO</td>
</tr>
<tr>
<td>Zhongzhan depot</td>
<td>4.74×10⁻⁶</td>
<td>4.96×10⁻⁶</td>
</tr>
<tr>
<td>Macun depot</td>
<td>3.53×10⁻⁶</td>
<td>3.70×10⁻⁶</td>
</tr>
<tr>
<td>Yimen depot</td>
<td>2.46×10⁻⁶</td>
<td>2.58×10⁻⁶</td>
</tr>
<tr>
<td>Dabeizhang depot</td>
<td>3.09×10⁻⁶</td>
<td>3.23×10⁻⁶</td>
</tr>
</tbody>
</table>

②Gasoline vapor from gas stations

According to diesel usage amount of each depot provided by feasibility study information, combine with gasoline vapor emission factor selected case, each depot’s gas station emission of harmful gases of hydrocarbon is shown in Table 4-4.

Table 4-4    List of each depot gas station annual emissions of NMHC amount

<table>
<thead>
<tr>
<th>Exhaust gas generation source</th>
<th>Diesel consumption (ten thousand L)</th>
<th>NMHC emission (kg / a)</th>
<th>Emission speed (kg / h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus depot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macun</td>
<td>218.82</td>
<td>687.09</td>
<td>0.24</td>
</tr>
<tr>
<td>Zhongzhan</td>
<td>168.63</td>
<td>529.50</td>
<td>0.18</td>
</tr>
<tr>
<td>Yimen</td>
<td>267</td>
<td>838.38</td>
<td>0.29</td>
</tr>
<tr>
<td>Dabeizhang</td>
<td>353.32</td>
<td>1109.42</td>
<td>0.38</td>
</tr>
<tr>
<td>Bus maintenance and repair workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dongxuegu</td>
<td>156.59</td>
<td>491.69</td>
<td>0.17</td>
</tr>
</tbody>
</table>

③Paint spray emissions
The annual NMHC volatilization of bus paint spraying process in Dongxuegu maintenance and repair workshop is 0.275t. Bus painting drying time is about 2h, then NMHC volatilization in spray paint process is 1.125kg / h. Spray paint drying process is arranged in the overhaul workshop, a total of two spray paint drying garages. Set underground ventilation ducts on both sides of each spray paint drying room, connected with the induced draft fan set on the roof. Induced draft fan air volume is 25000m³ / h, while generated NMHC concentration is 45mg/m³. EA recommends this project to configure activated carbon adsorption device to conduct purification treatment to spray drying process exhaust. The removal efficiency of activated carbon adsorption to solvent gas ≥ 80%, NMHC emissions is 0.225kg / h, emission concentration is 9mg/m³. Letting out through a 15m high exhaust funnel can meet the requirements of "Integrated emission standard of air pollutants" (GB16297-1996), Table 2 (exhaust funnel height of 15m, NMHC emission concentration 120mg/m³, NMHC emission speed ≤ 10 kg / h)

4.2.3 Operation period water pollution

Operation period water pollution sources mainly include domestic sewage generated by safety education base staff and floating population, and green road tourists; operation period water pollution sources mainly include oily wastewater, washing wastewater from Dongxuegu bus maintenance depot, domestic sewage generated by its staff, as well as washing wastewater from vehicle maintenance in Yimen, Zhongzhan, Macun and Dabeizhang bus depots, domestic sewage generated by their staff, and pavement runoff water from rain washed road.

（1）Water pollution source intensity

Sewage water quality forecast of this project’s operation period is shown in Table 4-5.

<table>
<thead>
<tr>
<th>Sewage source</th>
<th>Sewage water quality forecast (mg / L)</th>
</tr>
</thead>
</table>

Table 4-5 Operation period generated sewage water quality forecast
<table>
<thead>
<tr>
<th>Sewage generating source</th>
<th>pH</th>
<th>COD</th>
<th>BOD₅</th>
<th>Petroleum</th>
<th>Animal and vegetable oils</th>
<th>SS</th>
<th>Ammonia nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle maintenance sewage</td>
<td>11</td>
<td>1102</td>
<td>/</td>
<td>320</td>
<td>/</td>
<td>450</td>
<td>/</td>
</tr>
<tr>
<td>Car washing wastewater</td>
<td>5.7</td>
<td>516</td>
<td>85</td>
<td>7.4</td>
<td>/</td>
<td>206</td>
<td>/</td>
</tr>
<tr>
<td>Domestic sewage</td>
<td>7.5~8.0</td>
<td>300</td>
<td>180</td>
<td>/</td>
<td>20</td>
<td>220</td>
<td>35</td>
</tr>
</tbody>
</table>

For sewage water amount generated in this project operation period, see Table 4-6.

**Table 4-6 Operation period sewage water amount generated**  
Units: m³ / d

<table>
<thead>
<tr>
<th>Sewage generating source</th>
<th>Bus maintenance depot</th>
<th>Bud depot</th>
<th>Safety education base</th>
<th>Green Road</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dongxuegu</td>
<td>Yimen</td>
<td>Zhongzhan</td>
<td>Macun</td>
</tr>
<tr>
<td>Wastewater amount</td>
<td>38.81</td>
<td>55.13</td>
<td>36.02</td>
<td>45.68</td>
</tr>
</tbody>
</table>

Domestic sewage generated by Green Road tourists during project operation period is planned to be processed by using microbial ecological toilet, and the treated recycled water can be used as wash water. Sewage from Dongxuegu bus maintenance depot, Yimen, Macun, Dabeizhang bus depots, after the process of "grease trap + coagulating sedimentation", the effluent can meet "Integrated wastewater discharge standard" (GB8978-1996) Level 3 criteria and the water quality requirement of Jiaozuo City second sewage treatment plant receiving water. Sewage from Zhongzhan bus depot, after the process of "grease trap + coagulating sedimentation + biological contact oxidation", the effluent can meet “Integrated wastewater discharge standard" (GB8978-1996) Level 3 criteria and the water quality requirement of Jiaozuo City western industrial cluster sewage treatment plant receiving water. Safety education base, by "septic tank" treatment, the effluent can meet " Integrated wastewater discharge standard" (GB8978-1996) Level 3 criteria. All sewage will get into the city sewage treatment plant for further processing.

（2）Road runoff pollution source intensity
According to the relevant domestic units’ experimental data on road runoff pollution, usually in the 40 minutes from the early rains to the formation of runoff, the concentration of suspended solids and oils of rainwater is relatively high, with an average of 160mg / L and 5.8mg / L. Later, with the extension of rainfall, its concentration decreased rapidly. After the rains lasts for 40 minutes, road surface has been basically washed clean, and the road runoff pollutants concentration is relatively stable at a lower level.

4.2.4 Operation period solid waste

Solid waste in this project’s operation period mainly include domestic waste, bus maintenance and repairs generated waste oil, filter element, paint removal wastes, waste rags, waste gas treatment equipments, spent activated carbon and sewage treatment station sludge.

（1）Domestic waste

Domestic waste is mainly from domestic waste generated by workers and transfer passengers. After running this project, the amount of domestic waste generated is 145.74t / a, which will be gathered and collected by collecting points inside depots, and transported to Jiaozuo City life waste disposal plant for processing.

（2）Waste oil

The waste oil amount generated by bus depots after the project put into operation is 307.8t / d. According to "National Inventory of Hazardous Waste", waste oil is classified as hazardous waste. Waste category is HW08 waste mineral oils, and hazardous waste code is 900-249-08. It will be accepted for disposal by Jiaozuo City Shunhe material recycling Co., Ltd.

（3）Sludge

After the project put into operation, sewage treatment plant sludge output amount will be 55.3t / a, water content of 60%, belongs to general solid waste, and will be transported to Jiaozuo City life waste disposal plant for processing.

（4）Waste filter element
Regular filter replacement in the course of bus routine maintenance will produce waste filter element. Waste filter element is mainly from air filters, fuel filters, and lubricating oil filters. Amount which air filters has an annual output of 0.2t / a, fuel filter and lubricating oil filter element annual output is 1.19t / a. Waste air filter is general solid waste, will be collected and sent to landfills. Fuel filter and lubricating oil filter element are hazardous solid waste, will be collected and sent to Henan Tianchen Environmental Science and Technology Co., Ltd. for disposal.

(5) Paint removal wastes

In the repair processes of vehicle body and ancillary facilities, sheath paint removal will produce a small amount of waste paint and rust. This project generates waste paint and rust 0.24t / a. Waste paint and rust are hazardous waste, will be collected and sent to Henan Tianchen Environmental Science and Technology Co., Ltd. for disposal.

(6) Waste rags

Bus routine maintenance and repair process will produce oily waste rags, an annual output of 0.66t. Oily waste rags are hazardous waste, will be collected and sent to Henan Tianchen Environmental Science and Technology Co., Ltd. for disposal.

(7) Spent activated carbon

Paint shops exhaust gas treatment device adopts activated carbon adsorption. After the activated carbon adsorption saturation, the amount in need of replacement is 0.95t / a. Spent activated carbon belongs to general waste, will be collected and sent to Henan Tianchen Environmental Science and Technology Co., Ltd. for disposal.

Common environmental measures see Appendix 1. Environmental protection measures for each component see Appendix 1. The impact of "three wastes" will end with the finish of construction activities. As time goes on, the impact on soil erosion, ecological environment destruction during the construction period will gradually be restored.
5 Environmental Management System

According to the administrative privileges spirit specified in "Environmental Protection law of the People's Republic of China" and "Regulations on the Administration of Construction Project Environmental Protection", the EA report of the project will be approved by Jiaozuo Municipal Environmental Protection Bureau. Jiaozuo City Environmental Protection Bureau is the project's environmental management agency, whose main duty is to base on the content of project environmental impact assessment report, make environmental protection requirements, coordinate environmental protection administration between the various departments, and be responsible for the organization of environmental protection facilities "three simultaneous" acceptance work. Under the overall project administration institutional framework, World Bank Loan Project Management Office manages the project implementation, under the leadership of Jiaozuo city government. The project owner is responsible for the implementation of specific transaction. To ensure the smooth implementation of the project environmental management action, certain full-time or part-time environmental management personnel will be set up in the PMO, project owners, contractors, operators, to specifically implement the environmental management plans.

5.1 Environmental Management Agencies

Due to large difference between the content of the environmental management of construction period and that of the operation period, and the difference of temporality and long-term in working hours of the two, therefore, contractors and operators according to different stages, will respectively set up organizations, and carry out an approach of being in charge at different stages. After the end of the construction period, the corresponding management agencies will be immediately revoked, operation period management agencies begin to operate. According to the specific working circumstances, a certain period of
crossover is allowed. Project environmental management agency setting figure is shown in Figure 5-1, 5-2.

Figure 5-1 Construction period project environmental management organization charts

Figure 5-2 Operation period project environmental management organization charts
5.2 Environmental Management Responsibilities and Content

5.2.1 Responsibilities

The main responsibilities of relevant environmental management agencies are as follows in Table 5-1:

5.2.1.2 Jiaozuo City Environmental Protection Bureau

5.2.1.3 Environmental supervision

Environmental supervision is a new requirement for environmental protection. Assist owners (investment companies) to supervise on the implementation of environmental protection measures in the construction site, meanwhile propose remedial measures to environmental problems occur in the construction. Environmental supervision should run through the whole process of project construction, in order to ensure the smooth implementation of environmental protection work and the effective implementation of environmental protection measures during the construction period.

Develop a detailed management plan in accordance with the project construction plan, and the plan should be checked every month, necessary amendments should be made. The person in charge should report to project leader, report environmental management inspection results monthly, and to propose specific solutions on potential environmental problems found in inspection. To ensure the project environmental protection measures being completed as planned, and ensure the quality of environmental engineering, the owner should commission supervision personnel with environmental engineering supervision qualification. According to the project characteristics of section construction and stage construction, preliminary consider to set two full-time environmental supervision staff, other environmental management personnel can be a part-time job for staff of other departments as needed. The number of staff can be decided later depending on the
work needs.

（1）Environmental supervision working methods

①Environmental supervision is included in project supervision, under unified management of project headquarters supervision management department, participate in monthly meetings of the engineering director, and submit weekly and monthly reports and so on to the director’s office,

②Environmental supervision work conference should be held regularly, combined with the recent environmental supervision, to solve existing problems, propose next stage work plan.

③Each environmental supervision division holds a regular environmental supervision meeting monthly.

④Form a sound on site environmental management system. Establish environment protection leadership team in each participation project department, responsible for leading the environment protection of project department. Organization extends to all construction teams and groups, to divide responsible area and commit responsible person.

（2）Environmental supervision work content

①Environmental supervision of project preparation period: review environment protection terms in construction units’ compilation of "engineering construction plans", check the reasonableness of environmental protection system established by the construction units, participate in approval the submission of "Unit Project Report of Work Commencement", and conduct engineering supervision, implementation supervision to construction of each pollutant treatment works.

②Environmental supervision of the construction period: according to each construction tenders, organize design and preparation of "The focus of environmental protection work", and to carry out environment protection propaganda to construction units, point out environmental pollution sensitive spots for the construction unit, propose specific environmental protection measures according main pollutants of the construction process, review "Project construction environmental protection scheme" submitted by construction units, check whether construction units environmental protection system functioning properly, check implementation of environmental protection measures, etc., and conduct supervision on the construction of water conservation measures. Supervise the
implementation of environmental monitoring plan, and conduct supervision on monitoring results.

③ Environmental supervision in the operational phase of the project: Review the construction units’ compilation of "Project construction environmental protection work summary report", sort environment protection completed documents, projects environmental protection acceptance, write "Environmental supervision work summary report," and so on.

（3）Environmental supervision responsibilities

① Supervision personnel should fulfill strict supervision duties, effectively play the role of supervision and management, and enable the effective implementation of various environmental protection measures that should be taken by each site construction technology, ensure effective implementation of environmental protection work.

② Well implement the publicity of environmental protection laws and regulations, raise environmental awareness of all participating staff, to make them consciously participate in environmental protection work.

③ Develop stage plans for environmental supervision and acceptance, conduct environmental supervision acceptance on unit works completion, to achieve complete environmental protection procedures and information integrity after works completion.

④ Sign environment protection contract terms in the contract to construction projects without bidding, audit the environment protection content in their. Environment protection chapters should be added to the construction organization plan with specific content.

⑤ Record the implementation of the project EMP in detail, prepare weekly and monthly reports, and timely submit to local PMO and the Environmental Protection Agency.

5.2.1.4 Design unit and EA consultant

Develop the implementation plans for environmental management plans and environmental measures; conduct the guidance for carrying out environmental management plan.

5.2.1.5 Investment company

Ensure the implementation of related environmental management measures enacted by environmental management department and the World Bank's
environment department, while assisting the environment management department for routine environmental audits. And set up specialized agencies (environmental protection division) and allied responsible person for environmental management.

5.2.1.6 **Construction contractor**

Specifically carry out various environmental measures and work.

5.2.2 **Content**

Phased environmental management content and staffing of each environmental management agency are shown in Table 5-1.

<table>
<thead>
<tr>
<th>Table 5-1 Phased environmental management content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Design and preparation phase</td>
</tr>
<tr>
<td>Owner</td>
</tr>
<tr>
<td>Design unit</td>
</tr>
<tr>
<td>EA consultant</td>
</tr>
<tr>
<td>Jiaozuo City Cultural relic protection Bureau</td>
</tr>
<tr>
<td>Role</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
| Owner                       | 1. Assign special personnel to be responsible for related environmental management matters during the implementation of the project; responsible for a series of environmental management work in construction period of the project, put environmental protection funds in place;  
                             | 2. Conduct management and supervision to environmental protection work of the construction period, investigate and handle nuisance or pollution problems occurred during construction;  
                             | 3. And is responsible for coordinating with government environmental authorities in the implementation of environmental management issues;  
                             | 4. Tracking the implementation of the environmental management plan, and report regularly to the competent authorities at the same level, the provincial PMO, and the World Bank;  
                             | 5. Receive and deal with public complaints.                                                                                                                                                                                                                                                                                                                                                                                            | 2    |
| Contractor                  | 1. Carry out implementation of environmental protection measures and work in the construction period according to the tender documents, contracts, this environmental management plan etc.;  
                             | 2. Accept the guidance and supervision of the project owner environmental management personnel environmental supervision engineers and relevant government departments;  
                             | 3. Receive technical support from environment protection consulting agencies;  
                             | 4. Take safety protective measures, such as to set up signs on the construction sites, and to enclosure the plant boundary of construction sites, etc., establish communication channels with the public, to ensure construction safety;  
                             | 5. Assign sufficient and experienced environmental protection staff, implement all relevant measures proposed by environmental management plan.                                                                                                                                                                                                                               | 2    |
| Engineering / environmental Supervision | 1. Supervise contractors to perform environmental management plan, implement environmental mitigation measures in the contract;  
                             | 2. Carry out on-site supervision on the implementation of the contractor;  
                             | 3. Assign sufficient, experienced (including cultural relics protection experience) environmental supervisors. Support construction units with environmental management;  
                             | 4. Record the implementation of the environmental management plan; write report, regularly report to the owner.                                                                                                                                                                                                                                                                                                  | 5    |
| Environmental monitoring unit | 1. According to the environmental monitoring plan proposed by project owner’s commission and this evaluation, complete the environmental monitoring of the project construction and operation period;  
                             | 2. If abnormal situation occur in the construction, monitor under the commission of the owners;                                                                                                                                                                                                                                                                                                                                       | Depending on commission |
| Jiaozuo City Environmental Protection Bureau | 1. Supervise and inspect environmental protection measures of the owners and construction units;  
<pre><code>                         | 2. Receive the environmental management plan implementation reports submitted by owners and PMO, and conduct administration according                                                                                                                                                                                                                                                                                               | 1    |
</code></pre>
<table>
<thead>
<tr>
<th>Role/Unit</th>
<th>Responsibilities</th>
<th>Timeframe</th>
</tr>
</thead>
</table>
| Jiaozuo City Cultural relic protection Bureau | 1, before construction, according to "Law of the People's Republic of China on Protection", further investigate and explore cultural relics along the line, to ensure the safety of potential underground heritage.  
2, after cultural relics being found during construction, take responsibility for the protection and save of discovery site or cultural relics. Cultural relic protection experts issue a preliminary assessment report, based on various related cultural heritage assessment criteria; analyze the value and importance of this discovery in terms of aesthetic, historic, scientific, social and economic value respectively. | 2 |
| Technical assistance / Consultant | 1, according to the project owner’s commission and this environmental impact report, as well as environmental design outcome, to provide technical support for environmental protection in the construction period;  
2, provide technical guidance to environmental protection work for the contractors, and do well environmental protection training during construction period. | Unlimited |
| Owners or operating units | 1, responsible for environmental protection management after operation, environmental management plans in implementation period, mitigation measures in operation period and its monitoring;  
2, responsible for liaising and coordinating the implementation of environmental management issues with government authorities;  
3, environmental accidents emergency treatment;  
4, train staff regularly to improve their ability, and actively carry out environmental technology and experience exchange activities to further improve environmental management. | 2 |
| Environment monitoring unit | 1, according to commission of the project owner, and the environmental monitoring plan, complete the environmental monitoring in the project operation period;  
2. project related routine monitoring. | Depending on commission mandate |
| Operation period | 1, environmental conservation project acceptance;  
2, management and supervision for environmental protection compliance in operation period;  
3, supervision and inspection for the operation of completed environmental protection facilities. | 2 |
| Social people or civic organizations | Social supervision | Unlimited |

### 5.3 Environmental Protection Surveillance Plan

According to the characteristics of this project, the environmental protection
implementation of the project will be under the supervision of not only Henan Province Department of Environmental Protection and Jiaozuo City Environmental Protection Bureau, but also relevant departments of the World Bank. During the construction phase of the project, environment supervision personnel should be set to help the constructor on site inspection, while during the operation period, environmental protection division should be set to supervise the project. Project environmental protection surveillance plan is shown in Table 5-2.

Table 5-2    Project environmental protection surveillance plan

<table>
<thead>
<tr>
<th>Phase</th>
<th>Agency</th>
<th>Supervision content</th>
<th>Supervision purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility study phase</td>
<td>Jiaozuo City Environmental Protection Bureau</td>
<td>1.Audit of the EA Outline 1. Ensure a comprehensive environmental impact assessment, with properly topic setting and strong emphasize</td>
<td>2.Ensure that this project’s possible significant potential problems have been reported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.Audit environmental impact report 1. Ensure there is a feasible implementation plan for the environmental impact mitigation measures</td>
<td>1. Ensure there is a feasible implementation plan for the environmental impact mitigation measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.Audit EMP</td>
<td></td>
</tr>
<tr>
<td>Design and construction phases</td>
<td>Jiaozuo Municipal Government, EPA, Culture and Tourism Bureau</td>
<td>1, audit environmental protection preliminary design and EMP 2, check the construction temporary land occupancy restoration, vegetation restoration, and environmental restoration 3, check the dust and noise pollution control measures, decide the construction time 4, check the air pollutants emissions 5, check domestic sewage and waste oil discharge and treatment on the construction sites 6, restoration and handling of borrow pits and spoil grounds 7, check if there are underground cultural relics</td>
<td>1, strictly enforce the Three Simultaneous 2, ensure that these places meet the requirements of environmental protection 3, reduce the impact of construction on the surrounding environment, execute relevant environmental regulations and standards 4, ensure inland river water not being contaminated 5, ensure landscapes and land resources not being severely damaged, avoid soil erosion 6, protect cultural relics resources not being destroyed</td>
</tr>
<tr>
<td>Operation Phase</td>
<td>Jiaozuo Municipal Environmental Protection Bureau, Public Security Fire Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>check the EMP implementation in operation period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>check the implementation of the monitoring plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>check the sensitive points that need for further environmental protection measures (unexpected environmental issues may occur)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>check whether the environmental quality of environmentally sensitive points meet its appropriate quality standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>strengthen supervision to prevent unexpected incidents, pre-established emergency response plans, to eliminate dangers in time once the accidents occur</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>implement EMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>implement the monitoring plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>effectively protect the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>strengthen environmental management, to effectively protect human health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ensure pollutant emission meet the emission standards</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6   Environment Monitoring Plan

6.1   Monitoring purposes

Environmental monitoring consists of two phases, which are construction period and operation period of the project. Its purpose is to comprehensively and timely grasp the pollution tendencies of the proposed project, learn the changing degree and impact range of the project construction to its area, as well as environmental quality tendencies in operation period, feedback information to the competent authorities on time, to provide a scientific basis for environmental management of the project.

6.2   Environmental monitoring agency

Environmental monitoring during construction and operation period is undertaken by qualified environmental monitoring stations, which are commissioned by project contractor or operator. The undertaking units are all national environmental quality monitoring certification units, with complete equipments and strong technical force, can well accomplish the environmental monitoring task undertaken. According to the environmental impact prediction results, take sensitive concerns points that may have more apparent contamination as monitoring points, track pollution of the monitoring project construction and operation period, select noise, ambient air and surface water environments that have greater impact on the environment as monitoring objects. Monitoring factors are determined according to the engineering contamination characteristics factor. Monitoring and analysis methods employ corresponding project methods in "Technical specification for environmental monitoring" issued by State Environmental Protection Agency.
Evaluation criteria will implement national standards confirmed by each component EA.

6.3 Detailed environmental monitoring requirements

Each classification project detailed environmental monitoring plan and budget see Appendix 3.
7  Environmental Training Plan

7.1  Training Requirements

The main targets of environmental capacity building are environmental managers and environmental supervision. Their training is one of the components of the project Technical support. In order to ensure the smooth and effective implementation of environmental management, relevant staff of all parties, like Project Owner / construction unit, operating units, contractors, project supervision, local PMOs, etc., are required to receive trainings on environmental management plans and other related knowledge, skills. There should also be different trainings for different positions.

7.2  Training content and budget

（1）Environmental management personnel and environmental supervision engineer

The training is organized by the PMO, in the year before the implementation of the project, on PMO environmental management full-time staff and environmental supervision engineer and other related personnel. Specific implementation is conducted by environmental technology experts.

（2） Contractors and construction workers

Before the implementation of the project, staff will be organized by the PMO construction contractor, and the training will be conducted by environmental management experts or trained full-time staff of corporate environmental management at the project location, can be specifically implemented.

（3） Operators

Before the operation of the project, staff will be organized by PMO or the owners, and
the training will be conducted at the project location, can be implemented by environmental management experts or trained full-time staff of corporate environmental management. Training content, personnel, schedule and budget are shown in Table 7-1.
<table>
<thead>
<tr>
<th>Issues</th>
<th>Training content</th>
<th>Implementation time</th>
<th>Duration</th>
<th>Number of trainees</th>
<th>Cost (ten thousand)</th>
</tr>
</thead>
</table>
| Environmental management full-time staff and environmental supervision engineer | Study the World Bank Security Policy  
Intensive study, after construction side developing environmental protection rules, technical consultant preparing environmental protection conditions. Each detail should include monitoring instructions. Study project environmental impact and Environmental project requires monitoring. |                      | 4 days   |                    |                    |
| Operational capability                | Study the World Bank Security Policy  
Intensive study, after construction side developing environmental protection rules, technical consultant preparing environmental protection conditions. Each detail should include monitoring instructions. Study project environmental impact and Environmental project requires monitoring. |                      | 4 days   |                    |                    |
| Compliance identification             | Training projects on-site monitoring process includes organization, communication, roles and responsibilities, decision-making processes, reporting and standards observation procedure. |                      | 1 day    | 2 environmental management full-time staff |                    |
| Emergency response team               | Identification of hazardous materials on site  
Potential leaks and spills  
Environmental impact and physical impact of Leaks and spills  
Emergency response procedures (including priority response)  
Location and use of response facilities  
Communication and reporting facilities |                      | 1/2 day  | 2 project environmental management full-time staff coordinators |                    |
| Emergency relief and medical assistance| Process of seeking medical assistance in the state of emergency and non-emergency, and process of seeking other related medical assistance (such as long-distance telephone, medical advisory). |                      | 1/2 day  | 5 environmental supervision engineers | 6                  |
| Hazardous material and waste management | Proper use and storage process  
Proper use process includes fueling process, usage calculating, and to ensure effective use of the device  
Proper disposal of used storage tanks  
Storage process of hazardous waste |                      | 1/2 day  |                    |                    |
| Health and safety inspection and reporting process | Hazardous waste management  
Emergency response process | 1day |
| --- | --- | --- |
| Road safety | Health and safety issues  
Health and safety requirements  
How to implement health and safety checks  
Reporting and problem-solving process | 1/2 day |
| Water, air and noise monitoring and analysis | Traffic rules  
Safe driving training  
Fueling process  
Vehicle maintenance process  
Emergency response process | 1/2 day |

**Contractors and construction workers**

| General environmental knowledge of construction workers | Introduce environment-related environmental impact factors and environmental protection measures  
Introduction of environmental super sensitive areas and problems within the construction areas, and the introduction of adjacent areas within the construction areas  
Roles and responsibilities of environmental management design engineers, environmental supervision, and construction supervision, and key points of environmental issues report  
Waste management in construction camp and construction sites  
Construction site pollution control measures  
Cultural heritage issues  
Fine of breaking the rules, laws and regulations  
Including the dissemination and protection approaches | Before construction  
Half-day classes held at each venue  
All workers of the contractor |
| General health and safety of construction | Prohibition against alcoholic and drugs  
Process of seeking medical assistance in the state of emergency and non-emergency, and process of seeking other related medical assistance (such as STD testing,  
Half-day classes held at each venue |
<table>
<thead>
<tr>
<th>workers (counseling)</th>
<th>Health and safety knowledge includes certain basic process: road safety, electricity safety, explosion, fire, hazardous waste management, etc.</th>
<th>Use of personal protective equipment</th>
<th>Fine of violation of laws and regulations</th>
</tr>
</thead>
</table>

### Operator

<table>
<thead>
<tr>
<th>Environmental management personnel requirements</th>
<th>Environmental protection policies’ measures and requirements in laws and regulations, operation period environmental protection guidelines World Bank project management process Environmental information archiving, disclosing, exchanging, and reporting mechanism Environmental risk emergency response Health and safety checking and reporting process</th>
<th>Advanced environmental management investigation</th>
<th>1-day class held in Jiaozuo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental staff requirements</td>
<td>Advanced domestic municipal project investigation</td>
<td>Before operation</td>
<td>2 full-time environmental managers; 1 environmental risk emergency response personnel; 2 environmental staff;</td>
</tr>
<tr>
<td></td>
<td>2-day class held in Jiaozuo</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

4
8  Environmental management cost estimates and funding sources

8.1  Budget distribution

The implementation of environmental management plan involves many units, so the channels of funding sources are different. The vast majority of environmental activities is engineering measures, therefore, it should be provided by project construction units and operation units, and included in their engineering costs, these costs will be defined and listed in their tenders for the bid. The costs in environmental management plan is mainly for the environmental management of construction and operation period, mainly including: environmental monitoring costs, environmental supervision costs, staff training costs and the environmental management agency operating costs, as well as risk prevention cost in some projects. Monitoring and surveillance activities are part of the building and supervision costs. Local environmental monitoring stations monitor the sound of water vapor in the course of project operation according to project owner’s commission. The project owner bears the cost of monitoring. If the routine monitoring of local environmental protection department is synchronized with the project, then the routine monitoring data of environmental protection department can be used.

8.2  EMP budget

Component construction period and operation period environmental protection measures and environmental management fees are summarized in Table 8-1.

<table>
<thead>
<tr>
<th>Project</th>
<th>Green transport corridor</th>
<th>Safety integrated corridor project</th>
<th>Public transportation infrastructure development and improvement project</th>
<th>Total</th>
</tr>
</thead>
</table>

40
<table>
<thead>
<tr>
<th>Environmental protection measures costs (ten thousand)</th>
<th>771.72</th>
<th>633.74</th>
<th>392.83</th>
<th>1798.29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental monitoring costs (ten thousand)</td>
<td>19.92</td>
<td>35.6</td>
<td>28.08</td>
<td>83.58</td>
</tr>
<tr>
<td>Soil and water conservation monitoring costs (ten thousand)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>40.05</td>
</tr>
<tr>
<td>Institutional strengthening costs (management, training, etc.) (ten thousand)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>13.5</td>
</tr>
<tr>
<td>Total</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>1935.42</td>
</tr>
</tbody>
</table>
9 Information Management of EMP

9.1 Information exchange

Environmental management requires necessary exchange of information between different departments and positions of organizations, owners, contractors, and operators within PMO, and also the notification of relevant information to the outside (relevant parties, the public, etc.). Internal information exchange can be carried out by meetings, internal presentations and other means, but there must be one formal monthly meeting, and all exchange of information shall be documented and archived. External information exchange carried out every six months or once a year. Information exchanges with cooperative units should be written into the minutes and archived.

9.2 Recording mechanism

For the effective run of the environmental management system, organization must establish a proper recording system, and keep records of the following aspects:

(1) Legal and regulatory requirements;
(2) Administrative license;
(3) Environmental factors and the related environmental impact documents and EMP report;
(4) Training records;
(5) Inspect, check and maintain activities record;
(6) Monitoring data;
(7) The effectiveness of corrective and preventive measures;
(8) Related party information; records of flow and results of complaints and processing.

In addition, necessary controls must also carry out to the above types of records,
including: records’ identification, collecting, cataloging, archiving, storage, management, maintenance, query, shelf life, disposal and other links.

9.3 Reporting mechanism

Contractors, operators, monitoring unit, environmental supervision engineer and PMO should record progress of the project, EMP implementation, results of environmental monitoring in the project implementation process, and report to the authorities in time. Monitoring records of the operation of landfills and sewage treatment facilities involved in relevant works and due diligence should be regularly informed and collected. Relevant requirements included in the monitoring plan. Mainly includes the following six parts:

(1) Project environmental supervision engineers make monthly detailed records on EMP implementation, and submit weekly and monthly report to project owner and municipal PMO in time. Weekly and monthly reports should include the implementation of environmental protection measures, and environmental monitoring development situation as well as the monitoring data.

(2) Contractors and operators make quarterly detailed records on the project's progress and implementation of the EMP, and timely submit the quarterly reports to the PMO, and also send a copy of the quarterly report to the Municipal Environmental Protection Bureau.

(3) After completing monitoring commission, monitoring unit should submit monitoring reports to contractors (operators) and environmental supervision projects in time.

(4) Contractors and operators should promptly submit the project environmental monitoring report to municipal EPB and PMO. The municipal PMO should timely submit the project EMP execution progress, monthly effects, quarterly and annual reports to Municipal Environmental Protection Bureau and relevant units, and if necessary, submit to
the World Bank.

(5) If some particular environmental protection violation occurs, environmental supervision engineers and PMO will notify the local administrative department of environmental protection, and will report the case level by level if necessary.

(6) Project EMP implementation report will be submitted every six months to the World Bank, which may include the following main elements:

a, Implementation of the training program;

b, Project development status;

c, Project environmental protection measures implementation, environmental monitoring development status and the main monitoring results;

d, whether there are public complaint or not. If the complaint occurs, record the main details and solution of the complaints, and public satisfaction degree;
10 Persistent Public Participation Plan and Dispute Complaint Channels

10.1 Persistent Public Participation Plan

(1) In the three years after the construction period and operation, conduct 1 random visits survey quarterly for each environmentally sensitive target. Hold an on-site survey with public participation annually in environmentally sensitive target concentrated areas.

(2) According to the results of quarterly and annual survey to evaluate public satisfaction degree, and to analyze relevant comments, improve environmental mitigation measures when necessary.

10.2 Disputes Complaint Channels

(1) Establishment and composition of the complaints agencies

In order to better protect the legitimate rights of the affected people, a complaint mechanism will be established to provide a convenient, transparent, fair and effective complaints way for affected people. For this reason, a leadership team for the project’s environmental impact complaints acceptance will be established. The leader will be held as a concurrent post by Jiaozuo City Environmental Protection Agency personnel, while members come from the PMO, Jiaozuo City Environmental Monitoring Station, EA consultants and owner units and so on. A complaint acceptance office will be set up under the environmental impact complaints acceptance leadership team, in Jiaozuo City Environmental Protection Bureau. Meanwhile complaint acceptance offices will be set up in owners units, responsible for collecting and sorting daily complaints, and to propose handling opinions after consultation with the
responsible units.

(2) Complaints procedure

Complaints acceptance leadership team and offices will begin accepting outside complaints within a week after the start of the project. At the same time, a complaint hotline and mailbox will be put into use. Detailed complaint procedures are as follows:

When affected people, in any aspect of environmental protection, consider their rights have been violated, can go to complaint acceptance office in the owner units to make written or oral complaints. According to the complaints, owners will resolve through consultation with the complainant within a week, and record and sort the handling of complaints in detail, regularly report to the complainant acceptance leadership team.

When fail to resolve through consultation, the complainant may continue to complain in written or oral form to the complaint acceptance office of Environmental Protection Bureau. Members of the complaint acceptance office make a detailed record, and sort it; after consultation with the relevant responsible units, acceptance office will submit the handling opinions within two weeks.

If not dissatisfied with the opinions from complaint acceptance office, the complainant can complain to Jiaozuo Municipal Environmental Protection Bureau in writing within a month after receiving handling opinions. Environmental Protection Bureau gives handling opinions within three weeks.

If still not satisfied with the handling opinions from Municipal Environmental Protection Bureau, the complainant can prosecute to the local People's Court after receiving the handling opinion, base on “The Procedure Law of the People's Bank of China”. The issue will be solved by a court ruling.
11 Construction Period Liability for Breach of Contract

Construction Contractor shall implement the contractual stipulations, and complete the project construction content on time and with proper quality. If engineering quality does not comply with the contract due to the constructor’s own problems, the owners have the right to request the constructor to repair or rework, rebuild within a reasonable period. The so-called "reasonable period" means, in accordance with specific circumstances of non-conforming engineering quality, and determined duration of construction based on relevant state regulations, and relevant content agreed in the contract documents, the time needed for the constructor’s unpaid repair or rework, rebuild. Whether repair or rework, rebuild, the constructor must not be paid, and the employer shall not be required to pay.

If for the reason of constructor, the construction period has been delayed by repair or rework, rebuild, the project has been handed over beyond the duration of the contract, the constructor shall also be liable for breach of overdue delivery. If the constructor’s performance does not meet the requirements of the EMP, causing environmental pollution accidents and environmental damage events, then the constructor will be prosecuted according to law, and the deposit paid according to construction fee will be deducted for penalty costs.

Supervision personnel shall implement the contractual stipulations, whose on site work days must be over 80% of the construction work days (attendance will be subject to the constructor station staff’s attendance sign-in the and the inspection of PMO inspection team) during the main construction works. If Supervision personnel do not report to duty as required, the deposit paid according to supervision fee will be deducted for penalty costs. If in the project construction process, the supervision did not perform their duties, causing environmental pollution accidents and environmental damage events, then they will be prosecuted according to law.
Appendix 1  Construction Environment Specifications

1.1  Review

I. The Contractor and constructors shall implement all the mitigation measures proposed by this specification to avoid the inconveniences and impacts caused in the process of the project to local people and reduce the impact of the construction and operation periods.

II. The remedies haven’t been effectively implemented in the construction process shall be achieved when completing the project:

1) The vegetation and landscape in all the affected area shall be repaired timely, for example, the grass and trees shall be planted;

2) The rubbles left in the construction and construction waste shall be cleaned to secure the smooth of the flow in the gutter and culvert;

3) All the gravels and waste left in the construction site shall be cleaned and the remaining construction materials shall be reasonably disposed;

4) The borrow pits shall be restored.

1.2  Codes of Conduct for the Constructors and Environmental Standards

Considering national and local regulations, this section will guide the behavior of the constructors. Before construction, the Contractor shall prepare construction plan specific to the project and clarify in the plan detailed implementing rules according to the specifications. The construction of the project will not be advanced unless the plan has been granted consent by the responsible engineer of this project.

1.2.1  Prohibited Acts:

The following acts are prohibited in or around the construction site of the project:

1) Logging for any reason beyond the construction scope allowed by this project;

2) Hunting, fishing, catching wild animals and picking plants;

3) Using toxic materials not approved including lead-based paints, asbestos etc;

4) Affecting other art architectures and buildings of historical value;

5) Causing fire of houses;
6) Drunk constructing.

1.2.2 Traffic

1) The choice of the route leading to the construction site shall be approved by the responsible engineer of the project. The appropriate vehicle shall be chose according to the level of road in the local region and the load shall be limited to avoid its damage to roads and bridges of local traffic.

2) The local unit shall not use vehicles with serious emissions and loud noise.

3) In the entire execution of the contract, the Contractor can adopt necessary traffic control measures after the approval of the responsible engineer of the project.

1.2.3 Constructors and Construction camps

1) The Contractor shall recruit local workers and provide them adequate training as far as possible.

2) The constructors shall comply with local regulations and customs, work in a civilized manner and properly handle the relationship with local residents.

3) The Contractor shall rent private houses along the project and provide adequate sanitary facilities (toilets and washing areas). The sanitary facilities shall provide adequate hot and cold water, soap, and dryer etc.

4) The Contractor shall set latrines and construction wastewater settling tank which will be filled with earth after completing the construction;

5) The Contractor shall recycle the construction waste in the camp as far as possible, regularly transport and pile the waste can’t be recycled at the designated place and shall not litter the waste about.

6) The Contractor shall prohibit the use of wood for cooking or warming at the construction site and shall adopt electricity or other clean energy.

7) The Contractor shall establish a set of systems and methods concerning the storage of materials for the construction site and generation and disposal of solid waste.

8) The Contractor shall make sure the construction site and warehouse are set up at the proper place which shall be away from the settlement for at least 500 meters and whose layout shall be approve by the responsible engineer of the project.

9) The Contractor shall make sure the construction site, warehouse and place for diesel storage are away from the rivers for at least 500 meters and avoid leaking the contaminant into the river especially avoid leaking it through land and surface water in rainy season. It
also shall recycle the lubricant, dig ditches around the site and set settling tank or oil trap at the outfall.

10) The project will not set special concrete mixing station and asphalt mixing plant. All the needed concrete and asphalt will be purchased from outside.

11) The constructors are forbidden to heat the fuel with wood when forming and preparing the construction materials. The camps for construction and residence shall be set separately according to the bidding section. The camp of each bidding section shall be set at a place at a higher sequence in this bidding region according to actual situation. The construction camp include facilities for residence and working welfare, construction plant, construction warehouse, simple maintenance station and other construction ancillary facilities.

12) All the surface soil stripped when building the construction camp shall be piled in the temporary stack yard in the camp, blocked temporarily by piled bagged soil, surrounded by temporary drainage ditch and grit removal facility and covered by dust screen. After finishing construction, withdraw the construction machinery and equipment, clean the construction waste and debris on the site and level and earth up the land to create conditions for later restoration of vegetation. The area needing restoration because of the temporary utilization of construction camp is 0.381hm² large.

1.2.4 Construction Equipment

1) Store the construction equipment in the designated area of the construction. Don’t locate them outside the construction site casually which may increase the temporary occupation of land and damage the vegetation and land.

2) Use construction equipment with low noise as far as possible.

3) Install acoustical damper at the equipment noise source, namely proper position of various exhaust and vent systems and other air intake and outlet to damp the sound; meanwhile, adopt basic damping measures or set damping bearings.

4) Use the fuel construction machineries and vehicle only if they are in normal state to guarantee up-to-standard emissions.

5) Use the equipment reasonably, enhance the maintenance and repair, prevent the equipment to leak which will influence the water environment and soil environment of the earth’s surface in the project area.

1.2.5 Construction Access Roads
1) Use the current roads at the county, township and village levels as the construction access roads and transform the roads at the township and village levels.

2) If new construction access roads are needed, avoid deep-digging and high-filling while conserve water and soil well to reduce soil erosion and ecological damage; when building new construction access roads, harden them. Reusable load-bearing bricks (components) can be used when building roads for heavy vehicles; reusable permeable bricks can be paved when building ordinary roads.

3) Before building new construction access roads, the surface soil shall be stripped and piled temporarily at a relatively level region at the site, blocked temporarily by piled bagged soil, surrounded by temporary drainage ditch and grit removal facility and covered by dust screen for the ecological restoration of the access roads after finishing construction.

4) The construction access roads and construction camp access roads shall be overlapped to reduce the number of access roads.

5) The construction access roads shall be maintained and cleaned regularly every day and dusty sections shall be sprinkled to control the dust.

6) Control vehicle speed, ban honking and ban transportation between 12:00-14:00 at daytime and 22:00-6:00 at night to ease the impact of noise on the environment and residents.

7) Before finishing the construction, the newly-built construction access roads shall be restored ecologically, at least to the state before construction.

8) The local roads occupied or damaged shall be removed and protected as well as restored and greened after finishing construction. The local government shall be paid with certain amount of compensation expense to safeguard the legitimate interests of the local government and residents. The site requirements for construction access roads are illustrated in Schedule 1.

<table>
<thead>
<tr>
<th>Shall not Choose</th>
<th>Shall choose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic farmlands or other farmlands, paddy fields and fields for cash crops</td>
<td>Roads at county, township and village levels</td>
</tr>
<tr>
<td>Lands in sensitive areas such as water source protection area, scenic spot or forest park</td>
<td>Wastelands</td>
</tr>
<tr>
<td>Homesteads</td>
<td>Abandoned lands</td>
</tr>
<tr>
<td>Forests</td>
<td>Other low-quality lands</td>
</tr>
<tr>
<td>Lands within a radius of two hundred meters of land area of rivers</td>
<td></td>
</tr>
<tr>
<td>Depressions or paddy fields</td>
<td></td>
</tr>
<tr>
<td>Lands with good vegetation cover</td>
<td></td>
</tr>
<tr>
<td>Areas vulnerable to collapse and landslide</td>
<td></td>
</tr>
<tr>
<td>Debris flow-prone areas</td>
<td></td>
</tr>
<tr>
<td>Land for special purposes</td>
<td></td>
</tr>
</tbody>
</table>

9) After finishing construction, withdraw the construction machinery and equipment, clean the construction waste and debris on the site, level and earth up the land and restore
vegetation. The area needing restoration because of the temporary utilization of construction access roads is 2.537 hm².

1.2.6 Waste Management

Through implementing the following measures, the solid waste, sanitary facilities and toxic waste can be effectively controlled.

1) Reduce the generation of waste needing disposing and cleaning;

2) Identify and classify generated waste. If any dangerous waste is generated, it must be stored, collected, transported and disposed according to proper procedure.

3) Identify and divide disposing areas and clearly indicate the materials and matters allowed to be stored.

4) The construction waste shall be stored and disposed after transported to designated site (>300 m from rivers, streams, lakes, or wetlands). Set recycle, separation and classification systems for solid waste at the designated disposing sites to treat garbage, scrap metal, waste oil and excess construction materials.

5) If there may be hazardous waste or suspected hazardous waste (such as matters containing asbestos in debris of demolished buildings) generated in the construction site, the contractor need to develop a hazardous waste management plan. This plan shall be approved by the project engineer and applied by all the workers participating in the operation and transportation. The removal and disposal of the hazardous waste at the construction site shall be conducted by specially trained personnel according to national and provincial regulations or internationally recognized procedure.

6) Transport the abandoned earth and rubbles to designated yard for comprehensive utilization or spoil ground for landfill.

1.2.7 Transportation of Construction Materials and Waste

The management methods to be adopted when transporting the construction materials and waste in this project are as follows:

1) Use low-noise vehicles strictly according to daytime transportation shifts. Enhance the control and reduce the nighttime transportation times in non-normal construction conditions.

2) Limit the speed of transportation vehicles when passing environmentally protected spots (such as hospitals, residential areas and schools).

3) Set signs indicating vehicles accessing. The drivers shall drive in a civilized manner and guarantee safe transportation.
4) Powdery materials such as cement and lime shall be canned or bagged and must not be transported unpacked; The vehicles transporting sand and gravel, abandoned earth and rock and construction materials shall be installed with anti-scattering equipment, and shall not be filled too full to avoid the matters to be blew up by strong wind. The vehicles must be covered by felt to prevent dust proliferation in transportation; the transportation path and time shall be well planned to minimize the impact to environmentally sensitive spots (areas).

5) The stacking spot for powdery materials and waste shall be designated at a place downwind from and more than 300m away from the environmentally sensitive spots. Reduce the storage amount and use them timely.

6) Ensure regular inspection of construction vehicles. Timely repair the broken body to prevent vehicles from scattering construction materials and construction waste while in motion along the way.

7) Harden or spay water on the construction access roads (if there are) to control the impact of motor vehicle crushing and minimize dust pollution.

8) Strengthen management of transportation and utilization of powdery and granular materials and spray water on and clean the working place prone to dust proliferation for another time.

1.2.8 Earthworks, Cut and Fill Slopes

1) All earthworks shall be reasonably controlled, especially during the rainy season. The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works. The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.

2) In order to protect any cut or fill slopes from erosion, in accordance with drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains shall be provided above high cuts to minimize water runoff and slope erosion.

3) Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the responsible engineer of the project.

4) Disposal sites shall not be located where they can cause future slides, interfere with agricultural land or any other properties, or cause runoff from the landfill towards any
surface waters. Drains may need to be dug within and around the landfills, as directed by the responsible engineer of the project.

1.2.9 Borrow Pits and Soil Grounds
During construction in borrow pits, use excavators to cut and dumpers to transport with covers on the vehicle body to so the materials would not be scattered and blown away by wind on the way. Prior to construction, according to the terrain, soil reserve and borrow amount, define the boundary of the borrow pit through calculation. Install drainage system outside the boundary to prevent the water flow from in-site and off-site to erode the pit and wash away soil. Build construction access roads and corresponding temporary drainage facilities. During construction, borrow the earth from the upper layer to the lower layer and build drainage facilities at each layer. The height of each layer is around 3m, and the slope ratio is 1:0.75. During construction, in case of heavy rain, stop working and temporarily cover the slopes in the borrow pit. When completing borrowing, level and earth up the bottom and then plant vegetation or crops.

The stockpile is centralized in soil spoil grounds. During construction at waste spoil ground, generally use dumpers to transport and machineries to crush. Prior to construction, according to the terrain of surrounding areas and spoil amount, define the boundary of spoil ground through calculation. Install drainage facilities 2m outside the boundary to prevent the water flow from in-site and off-site to wash the soil. Build construction access roads and temporary in-site roads. Build walls to block the waste with M7.5 mortared rubbles at relatively narrow section of the ditch. Spoil the waste from lower layer to upper layer from the nearest place in the ground. Each layer is 3m high. Pile up one layer after compacting. When spoiling, pile the waste with larger diameter at the layer near the bottom. The slope ratio is 1:2.

1.2.10 Water and Soil Erosion
1) Utilize and damage as little ground area as possible, stabilize these areas as soon as possible, control drainage through the area, and trap sediment onsite. Install erosion control barriers around perimeter of cuts, disposal pits, and roadways.

2) Conserve topsoil with its leaf litter and organic matter, and reapply this material to local disturbed areas to promote the growth of local native vegetation.

3) Apply local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces.
4) Apply erosion control measures before the rainy season begins for smoother following construction. Install erosion control measures as each construction site work is completed.

5) In all construction sites, install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is re-established. Sediment control structures include windrows of slash, rock berms, sediment catchment basins, straw bales, brush fences, and silt fences.

6) Control water flow through construction sites or disturbed areas with ditches, berms, check structures, live grass barriers, and rock.

7) Erosion control measures shall be maintained until vegetation is successfully reestablished.

8) **Water shall be sprayed as needed on dirt roads, cuts, fill material and soil stockpile place to reduce wind-induced erosion.**

### 1.2.11 Dust Control

The constructor shall take the following measures to control dust:

1) The newly-built roads in Green Tourism Corridor shall be closed for construction, and Jiefang Road, Tanan Road (including Station Road) and Renmin Road shall be semi-closed for construction. At both sides of the construction roads and camps, 3m high PVC blocks shall be set up to reduce the proliferation of dust.

2) In the process of digging and drilling, spray water to maintain certain humidity on the working place; spray water often to prevent dust proliferation on loose and dry topsoil in the construction site; when filling the soil back, spray water if the topsoil is dry to prevent dust proliferation.

3) Strengthen the management of soil stockpiles for refilling with developing methods such as compact the topsoil and spray water and cover surface regularly; the undesired earth and construction waste shall be removed quickly and are not suitable for long-time storage.

4) Trucks transporting soil and vehicles transporting construction materials shall be covered with tarpaulin, covers or other overflow protection materials and the load shall not be over-loaded to avoid loosing while in motion; the transportation roads shall be cleaned and sprinkled regularly to avoid dust blowing for the second time and sprinkler shall be at service.

5) The stockpile, construction waste stockpile and temporary soil stockpile for the road construction shall be distant from sensitive spots along the roads and be located at relatively open space. Considering the survey on surrounding environmentally sensitive spots of the
project, the stockpile, construction waste stockpile and temporary soil stockpile of the project shall be located more than 200m away from and downwind of the various environmentally sensitive spots.

6) Speed of all the construction vehicle shall not exceed 25km/h off-site and shall not exceed 15km/h in-site.

7) During construction, the construction comp canteen shall use liquefied petroleum gas or electric cook and must not use abandoned construction materials as fuel. When completing the construction, timely restore the land occupied for construction.

8) Time removal of vegetation to prevent large areas from becoming exposed to wind.

9) Spray water as needed on dirt roads, cut areas, borrow pits and spoil grounds.

### 1.2.12 Noise and Vibration Control

1) Use low-noise machineries as far as possible. Test the noise of construction machineries and equipment for the project under normal working state prior to the usage. The operation of machineries with higher noise than national standard shall be prohibited on the site. During construction, frequent maintenance and repair of the equipment shall be conducted to avoid intensified noise because of its poor performance.

2) Reasonably arrange construction working time and construction site. The construction time is 6:00-22:00 with pauses during 22:00-6:00 and 12:00-14:00. During the construction period of Green Tourism Corridor Component, high-noise operating machineries shall be banned to work at night at Longwo Village, Longsi Village, Niangniang Temple, Longsi Tomb, People’s park, Feng Mountain Park, Longyuan Lake Park and the urban newly-built roads of the project.

3) Considering the construction road sections of the Safe Integrated Corridor Project are located at urban main roads, along which are many residential districts, hospitals and schools. Considering survey on surrounding environmentally sensitive spots of the project, 3m high PVC blocks as temporary noise barriers shall be installed at one side of residential districts, hospitals and schools shall be installed.

4) As to construction sites needing successive working, the Contractor shall contact with environmental protection administration considering actual situation, apply for and receive Nighttime Construction Certificate and inform the surrounding people through various channels.

5) According to the requirements of Emission Standard of Environment Noise for Boundary of Construction Site, the boundary of construction site shall be defined reasonably.
The route for construction transportation vehicles to enter and leave the site shall be arranged at the farther side from sensitive spots such as residential districts and schools.

6) Well manage the construction of sensitive road sections, work in a civilized manner as well as carefully supervise the noise during construction. Attention shall be paid to the reasonable arrangement of construction material transportation. When the vehicles are passing villages, towns and school, they shall slow down and mustn’t honk.

7) Construction units should instruct the constructor to post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.

8) In the Green Tourism Corridor Component, large machineries shall not be used in road construction around Qunying Aqueduct, Wang Languang Tomb, Niangniang Temple, Longsi Tomb. Try to adopt manual methods in works such as digging to prevent vibration from damaging tangible cultural relics.

1.2.13 Construction Waste Water

1) Domestic sewage from Green Tourism Corridor Component and Yimen depot, Dabeizhang depot and Dongxuegu maintenance depot in Public Transport Infrastructure Development & Improvement Component is planned to be collected and treated by self-built septic tank and cleaned regularly by fecal suction truck send by Jiaozuo municipal administrative department appointed by the Contractor.

2) Domestic sewage from Zhongzhan, Macun depots in Public Transport Infrastructure Development & Improvement Component and Safe Integrated Corridors/Area Development Component is planned to be collected and treated by self-built septic tank and be discharged into urban sewage pipe network.

3) As to construction waste water, this assessment suggests the construction camps install sedimentation ponds according to actual situation. After sedimentation, the waste water will be used to be sprayed to prevent dust and will not be discharged.

1.2.14 Temporary Soil Stockpiles

1) Build barriers with sacked soil at the boundary of temporary soil stockpile field and build temporary drainage ditch outside the barrier and pile the soil from layer to layer. Its ratio of slope shall be 1:1.5, and its height shall be controlled below 5.0m. The catchment of the temporary soil stockpile would be collected from surrounding drainage.
2) Cover the slope of temporary soil stockpile prone to erosion to avoid water and soil erosion of bare and loss stockpile caused by rainwater stream wash.

1.2.15 Construction Waste

1) The constructor shall develop and act according to Daily Construction Site Waste Disposal Procedure and purchase adequate treatment facilities of construction waste.

2) Debris generated by demolition of existing houses can be re-used as construction materials for other projects (such as for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the responsible engineer of the project. The constructor shall ensure that these sites (a) are not located within designated forest areas; (b) do not impact natural drainage courses; and (c) do not impact endangered/rare flora. Under no circumstances shall the Contractor dispose of any material in environmentally sensitive areas.

3) In the construction any debris or silt from the sites is deposited on adjacent land. The constructor shall immediately remove such debris or silt and restore the affected area to its original state to the approval of the project engineer.

4) All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered incidental to the work and shall be planned and implemented by the contractor as approved and directed by the project engineer.

1.2.16 Traffic and Transportation

The following methods are proposed to avoid traffic accident or reduce the loss of traffic accident at the crossing of Green Tourism Road Construction and other roads:

1) Road safety reminding signs and facilities shall be installed at the crossings to inform the driver of road construction ahead. Two traffic management personnel shall be arranged to direct the traffic and remind the drivers to focus and lower the speed; and

2) When construction vehicles are passing the crossings, they would honk and shall run no faster than 25km/h.

1.2.17 Safety during Construction

The constructor’s responsibilities include the protection of every person and nearby property from construction accidents. The constructor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following 10 items:
1) Carefully and clearly mark pedestrian-safe signs on construction transportation roads and entry to the site;

2) Before and after school time, include road safety personnel to direct traffic during school hours;

3) Maintain adequate supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction;

4) Conduct safety training for construction workers prior to beginning work;

5) Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed boots, etc.,) for construction workers and enforce their use;

6) Provide post Material Safety Data Sheets for each chemical storage warehouse on the worksite;

7) Require that all workers know all Material Safety Data Sheets. Clearly explain the risks to them and their family, especially when a family is expecting a child or plan to get pregnant. Encourage workers to share the relevant information with each other;

8) Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers;

9) During heavy rains or emergencies of any kind, suspend all work;

10) Brace electrical and mechanical equipment to withstand seismic events during the construction.

1.2.18 Demolition of Existing Buildings

The Contractor shall implement adequate measures during demolition of existing infrastructure to protect workers and public from falling debris and flying objects. These measures include:

1) Set aside a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels;

2) Conduct sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable;

3) Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap on the road and pollute the air;

4) Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged;

5) Evacuate all affected areas during blasting operations, and use blast mats or other means of deflection to minimize the impact fly rock or ejection of demolition debris;
6) Provide all workers with safety glasses with side shields, face shields, hard hats, and safety boots or shoes.

1.2.19 Social Impact
When constructing at populous places (such as downtown areas), the constructor shall do as follows to mitigate the impact caused by construction to social lives:

1) Inform the population about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate.

2) Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.

3) At least five days in advance of any service interruption (including water, electricity, telephone, and bus routes) the community must be advised through postings at the project site, at bus stops, and in affected places.

4) As to frontage commercial buildings along the construction road section of the project, work within the red lines on the road. Install fences, simple temporary pedestrian path, and work from section to section which would not block the way for business and the business activities shall continue.

5) When constructing at places around hospitals, schools or kindergartens, set corresponding temporary bridges and roads for passing pedestrians.

6) Maintain traffic control measures around or on the construction site. Timely restore the impact brought by construction to guarantee the safety of passing residents and business of merchants.

1.2.20 Healthcare Service
1) The constructor shall provide workers basic emergency medical service and emergency medical facilities including personal medical equipment and treatment and needed handling of wounded worker prior to transportation to the hospital.

2) The constructor is responsible to develop a prevention program to prevent sexually transmitted infections

3) The constructor shall add Health Plan Program in the construction plan to provide suggestions for the health of workers during construction which shall be approved by the project engineer prior to the initiation of the construction.
3  Environmental Supervision during Construction

During construction, the project engineer will supervise the conduction of the specifications. If several norms are not carried out, the project engineer will require the constructor to stop construction or take other punitive measures until the violations are settled. Meanwhile, the project engineer will require the constructor to work according to national or local rules and regulations concerning environmental protection, public health and safety.
Appendix 2 Bridge Construction
Environmental Specifications

2.1 Management Measures

① Establish Environmental Protection Bodies: The construction units should actively cooperate with the Environmental Protection Administration Departments to establish the Environmental Protection and Management Office, which is responsible for inspecting and supervising the environmental protection measures taken by the construction units and its implementation during the construction period.

② Conduct environmental protection monitoring during the construction period. Environmental Protection Administration Departments conduct real-time monitoring of deforestation and occupation of land, water and soil erosion, noise pollution, air pollution, water pollution, landscape destruction, etc. during the construction period, and timely inform the construction units to rectify if there is any behavior that exceeds standards or unfavorable to the environmental protection.

③ Play the supervising engineer’s role in monitoring. The supervising engineer should inspect whether the environmental protection engineering design is implemented and whether the quality meets the required standards; check whether the environmental protection engineering funds is put into practice and do well in the testing and monitoring in cooperation with environmental protection departments.

2.2 Water and Soil Erosion Reduction Measures

① According to the actual properties of excavation and filling, reasonably set the gradient of the slope and temporary drainage system on the construction site of earthwork cutting and filling; timely divert rainwater to reduce its erosion on the cutting and filling slope surface; timely compact and green the filling slope; reasonably determine the Borrow pits and Spoil Grounds; exploit the sand and gravel quarry reasonably; note the separate disposal of dressed stone, spoil and dregs.

② When selecting the stacking place of earthwork, the extra earthwork is used to sort out the slope on the spot; When the earthwork has to be transported outside, it should be transported the designated spoil ground.
③ Use block slurry masonry retaining wall to block at the pier foundation toe; Employ the precast concrete blocks to protect at the bridge slope.

④ Reasonably facilitate the pier foundation cofferdam, which is built by textile bags plus mold or geomembrane materials in order to avoid water and soil erosion.

### 2.3 Air pollution prevention and control measures

① The waste on the construction spot must be removed timely. Besides, adequate watering is needed to reduce dust and random shedding is prohibited.

② Water the construction site regularly to shorten the dust pollution period and narrow down the pollution scale, and minimize the amount of dust.

③ Construction workers suffer most from the ambient air pollution during the construction period. Therefore, construction units should attach great importance to the protection and labor protection measures for the construction workers, such as shortening working time and distributing dust masks.

### 2.4 Water pollution prevention and control measures

① Try to construct the bridge pile foundation engineering in the dry season and try to avoid culvert pile foundation construction in the flood season.

② When clearing the silt topsoil in the bridge foundation engineering, recycle them to the road, dispose, or transport them to a designated place, then discard and pile; The abandoned stone and spoil should be transported to reasonable places instead of randomly stacked and blocking river; a thorough cleaning is needed after the cofferdam construction in order not to block the river.

③ The setting of stock ground, camps, and temporary accumulation of materials, etc. are prohibited on the beach; non-operating machinery is banned to stay on the beach; all kinds of construction machinery during the riverbed construction must be ensured free from trouble; prohibit oil leakage, oil bleeding, oil dripping and oil spill; once any construction machinery malfunctions, it should immediately be driven back to the shore to be repaired; adopt containers to collect oil if there is any oil dripping and oil spill, and transport them back to the shore to be properly handled. During the downtime, various mobile construction machineries should be driven back to the shore and park there.

④ When constructing bridge, if there is any mortar mixing operation in any place, sedimentation tanks must be set up there. The wastewater which has been precipitated twice
after discharging into the sedimentation can be recycled to sprinkler dust. Untreated muddy water is prohibited to discharge directly into rivers.

⑤ Set up sediment buckets near the bored pile to precipitate the drilled sludge; Establish mud pits near the shore and use geomembrane to conduct sour prevention and impermeable treatments on them. Stock and pile the precipitation sludge at the designated place; prohibit randomly discarding or abandoning the drilling residue in the river-way. The rinsing in the mud pit can be recycled to sprinkler dust instead of discharging directly into rivers.

⑥ There should be some flood prevention measures during the riverbed construction. Avoid accidentally rushing temporary construction materials, appliances, etc. into the river, resulting in the river pollution and block.

2.5 Noise Pollution Prevention Measures

① Construction units must use the construction equipment and transportation vehicles complying with the relevant national standards, and try to employ those low-noise construction machineries and technologies. Fixed mechanical equipment with larger vibration should be installed with damping base; fixed strong noise source should be considered to install enclosures, such as power generation cars etc. Meanwhile, maintenance and repair service should be strengthened to all kinds of construction equipments to keep its good functioning on the purpose of radically reducing the strong noise source.

② Construction machinery with strong noise should stop operating at night (22:00-06:00). As for those work sites that have to continuously constructing, the construction unit should timely get in touch with the local environmental protection department according to the specific situation, apply for the night construction permits in accordance with relevant regulations. Meanwhile, announce the public and strive for their maximized support. Transport of construction materials should be prohibited at night on the side-work if there are patches of residents near the construction sites within 50m.

③ The processing of finished products, semi-finished products and production operations generating strong noise should be completed in factories, workshops to reduce the noise produced by processing and manufacturing on the construction site.

④ Strengthen the management of the construction site, and eliminate the noises caused by human beating, yelling, etc. in particular in order to minimize the noise nuisance to the residents.
⑤To protect the health of construction workers, construction units should make reasonable arrangements for staff, making them operate the construction machinery with high-radiation and strong noise in turn, in the hope of reducing their time of exposure to strong noise. For those who are near to the high-radiation and strong noise source, the working time should be shortened apart from the wearing earplugs, helmet or other protective measures.

⑥Construction units should instruct the constructor to post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.
Appendix 3   Soil and Water Conservation Measures

3.1   Depots Project

Before conducting depots project, strip the topsoil and centralized stacking. Take temporary protective measures, such as blocking, drainage and covering; set gutters surrounding the construction site; renovate land and reply topsoil after construction; plant trees and grass to green those places, such as, within the parking lot, in front of the offices and around the fence.

3.2   Road Engineering

①When conducting road engineering, according to the engineering design, stack the stripped topsoil in centralization, and take some temporary protective measures, such as blocking, drainage, setting basin and covering.

②Use the stripped topsoil to conduct land reclamation and cover soil greening on the embankment slope in the late period.

③Plant grass to green the embankment slope arch skeleton.

④Set drainage ditches and intercepting ditches during the roadbed construction and establish platform intercepting ditches and planting trough on side slopes.

⑤When constructing retaining walls and slope protecting engineering, minimize temporary land occupation; When finishing the project, timely remove the spoil as well as abandoned stones to reduce land occupation, and recover vegetation to reduce water and soil erosion.

3.3   Construction Access Road

①After construction, green the area by sowing the seeds, namely, Bermuda grass, with an area of 2.537hm².

②Considering that the construction period may span the flood season, repeat rolling compaction and hardening on the temporary access roads by construction vehicles are needed until the surface gathered water cannot easily infiltrate. In order to prevent surface gathered water from influencing the normal use of access roads, a vertical drain whose inside
needs artificial compaction, leading to the natural channel nearby on both sides of the pavement sub-grade according to the actual site topography is needed. At the same time, a settling basin is needed at the exit of the drain.

### 3.4 Construction camp

① During the construction period of the Green Tourism Corridor component, three construction camps are needed. So is the Public Transport Infrastructure Development & Improvement component. After construction, green the area by sowing the seeds, namely, Bermuda grass, with an area of 0.381hm².

② The surroundings of temporary bulldozers field of construction camps should be blocked with bags loaded by soil. When in inclement days, thatch and cover the temporary bulldozer surface with dust screen.

③ After repeat walking, rolling compaction and surface hardening on the temporary camps by construction workers and vehicles, the surface gathered water cannot easily infiltrate. In order to prevent surface gathered water from impacting the normal use of sidewalks, a vertical drain leading to the natural channel nearby according to the actual site topography is needed in the construction camp. The inside of the drain needs artificial compaction.

### 3.5 Borrow pit and Spoil Ground

(1) In total, this green corridor project sets 2 borrowing areas. The water and soil conservation in the two borrowing areas are as follows:

① Borrow earth from top to bottom layer by layer, and establish drainage facilities layer by layer, with a layer of about 1.5m and earth slope of 1:0.75.

② Before borrowing earth, strip the topsoil and centralized stacking. After borrowing, recover the vegetation of the borrowing area.

③ After borrowing, green the area by sowing the seeds, namely, Bermuda grass and dog tail grass, and planting oriental arborvitae.

(2) In total, this green corridor project sets 2 spoil grounds. The water and soil conservation in the two spoil grounds are as follows:

① Before construction, set cutting and flood control ditches outside the second spoil ground to prevent the convergence of inside and outside from eroding the soil.
② In Spoil ground 2, wall retaining walls with a height of 100m along the outside of quarry with M7.5 stone masonry.

③ If the current terrain of Spoil ground 1 is a deep pit, flood discharging ditches are needed on both sides of this spoil ground.

④ After borrowing, green the area by sowing the seeds, namely, Bermuda grass and dog tail grass, and planting oriental arborvitaes.
Annex 4  Risk prevention measures

4.1  Risk prevention measures

4.1.1  Refueling process and facility risk prevention measures

4.1.1.1  Tank risk prevention measures

(1) Tank inlet pipe should be down into the tank, 0.2m above the bottom;

(2) When self-priming tanker is applied, bottom valve should be designed at the bottom of the outlet pipe inside the tank. Preferably there should be a 0.15 to 0.2m distance between oil inlet of the bottom valve and the bottom of the tank;

(3) Tank dip hatch of the tank should be designed with lockable oil cap and joint pipe at the lower part of the oil cap should extend downwards until at about 0.2m to the bottom of the tank;

(4) The tank should be equipped with a tank gauge with high liquid level alarm function;

(5) The setup of tank vent pipes should conform to the following requirements: diesel fuel tank vent pipe should be set apart; pipe orifice should be at least 4m above the ground; when using unloading oil and gas collection system, the distance between pipe orifice and enclosure can be lessened properly, but not less than 2m; the nominal diameter should not be less than 50mm; vent pipe should be installed with flame arrester.

4.1.1.2  Process systems

(1) Gas station should adopt a supporting refueling process of oil tanks equipped with oil-immersed pump with one pump for multi-machine (gun);

(2) Grease gun should preferably be self-sealing, with its flux no more than 60L/min;

(3) Static conductive and oil-resistant hoses should be employed as hoses of oil discharge and gas recovery when discharging oil and the nominal diameter of the connecting hoses should not be less than 50mm;

(4) The tank inlet pipe, snorkel horizontal pipe, and oil and gas recovery pipe connected with tanks should have slope, which should not be less than 2‰.

(5) Gas station should be equipped with supporting oil and gas recovery facilities;

(6) The employment of electrogas welding when maintaining and repairing the system should strictly implement management system of safety hotwork.

(7) Before refueling, motor vehicles must turn off engines when entering into gas station;
vehicle repairing in gas station and start-up when refueling are forbidden.

4.1.2 Fire-fighting and drainage facilities

4.1.2.1 The fire-fighting facilities

Fire extinguishers configuration at gas station should meet the following requirements:

(1) There should be at least a 4kg portable dry powder fire extinguisher and a foam fire extinguisher for every two tanker, calculated as 2 when tankers are less than 2;

(2) 5 fire blankets and 2m³ sand should be equipped;

(3) The configuration of fire-fighting equipment in other buildings should accord with current national standard code of "Design for Building Fire Extinguisher" and GB140's specifications.

4.1.2.2 Drainage System

Ground rainwater inside the station can disperse out the station. When there is an open trench formed, water seal equipment should be set up before rainwater rushes out the fence.

4.1.3 Lightning and static electricity protection

4.1.3.1 Lightning Protection

(1) Tanks must be grounding for lightening and grounding spot should not be less than two;

(2) Grounding for lighting and static electricity at the station, working and protecting grounding of electrical equipment and grounding of information system should share grounding devices, whose ground resistance should not exceed 4Ω;

4.1.3.2 Anti-static measures

(1) At the beginning, end, and joint of oil pipelines on the ground or trench laying, anti-static and anti direct lightning joint grounding device should be set up, whose grounding resistance should not exceed 30Ω;

(2) Tanker unloading space at the station should be equipped with anti-static grounding device when the tanker unloads. Static grounding instrument which could detect jumpers wire and monitor the status of grounding device should be set up as well;

(3) Metal jumper should be used on the ends of the flanged hose or other joints of the oil pipelines in explosion hazardous areas. When the flange bolts are more than 5, jumper is not needed in a non-corrosive environment;

(4) Ground Resistance of anti-static grounding device should not exceed 100Ω.

4.1.4 Risk Management

(1) Providers of blocking explosion-proof skid-mounted gas station equipments
purchased by project should have pipe installation qualification of petrochemical engineering equipments.

(2) Requirements made in Specifications for Design and Construction of Automobile Refueling Stations (GB50156—2002) should be complied with to examine the materials and equipments and make the construction of pipeline project, electric instrument and anticorrosion engineering run smoothly.

(3) Requirements made in "Three Simultaneous" of construction project for check and acceptance of gas station should be complied with strictly, which can come into use only when confirmed to be qualified.

(4) Striking safety signs, prohibition, warning and signboards should be set up at the gas station. Open flame sources are prohibited.

(5) Necessary safety training towards management and manipulation staffs of gas station working units should be undertaken, according to the requirements made in Hazardous Chemical Safety Management Regulations, to make them grasp laws, regulations, specifications and knowledge on security, professional skills, occupational protections and emergency rescues related to hazardous chemicals. They shall not take up their jobs unless passed the examination.

(6) Establish and improve various safety regulations and safety manipulation specifications to eliminate and avoid illegal manipulations. Gas stations with potential safety hazard those who are not in conformity with the requirements of fire safety are required to rectify or shut down.

(7) Test lightning protection and anti-static facilities at the gas station regularly.

4.2 Risk contingency plan

4.2.1 Emergency treatment of oil escaping, spill, drip and leakage in working sites and tank areas

4.2.1.1 Treatment measures

(1) Accident discoverers should immediately throttle down tank brake valves and tank valves, cut off the power switch in the station and inform duty manager.

(2) If the oil escaping, spill, and leakage is in a small quantity, the duty manager should organize operation group in the station to cover the oil on the spot with sand. After the oil has been fully absorbed, sand with stains of oil should be put to the designated place for professional treatment.
(3) If oil escaping, spill, and leakage is in large quantities, rang the alarm bell and stop the operation depending on the circumstances. The accident site should be monitored, the whole station should be on alert and all harmful actions on the spot should be prohibited. The duty manager should organize operation group to surround the oil completely with sand to prevent its further spills. Logistical support post should fetch fire-fighting equipments and put them on the spill site and make the safety and evacuation work proceed smoothly. Other posts should work differently according to different responsibilities. Remove all vehicles at the refueling site.

(4) The duty manager should arrange operation group to recycle the oil which can be recycled with containers producing no static electricity.

(5) After recycling, cover the surface of the oil which can not be recycled with sand and clean up the sand after the oil has been fully absorbed then put sand with stains of oil to the designated place for professional treatment.

(6) If oil spills out of the gauge hatch, staffs on duty should first surround the operating well areas with sand, fetch fire-fighting equipments and put them around the well. And recycle the oil in the operating well with containers that produce no static electricity. After 2 to 10 hours of precipitation, put the upper net oil back to the tank, and oil with impurities to professional places for professional treatment.

(7) Check whether there is oil remaining in manhole or around and whether there are other hidden potential dangers.

(8) After confirmation, measures must be taken immediately to find out the root cause for the accident of oil escaping, spill and drip and the treatment of it must be handled with discretion. If it is caused by measurement errors and oil in the tank has reached its maximum safety capacity, the ongoing oil unloading work must be put to an end. At the same time, report this to safety department in charge and contact oil depot total scheduling, under whose arrangement the remaining oil in the tank will be transported to other gas stations; if it is caused by the lack of airtightness between pipelines and oil discharge gate valve, pipelines must be reconnected to ensure its being airtight. Then start oil discharge gate valve to continue working. If the pipelines are broken, wedge, cotton yarn and cotton cloth mop can be used to block the breakage.

4.2.1.2 Isolation and evacuation

If the accident of oil escaping, spill and drip is serious, immediately turn off the power
switch to stop the refueling operations and report it to the public security department and fire department in order to block nearby traffic road in time. The gas station manager must organize some staff to tighten security on the spot by evacuating people and vehicles out of the station, checking and removing all fire and power sources around and forbidding other persons and vehicles to enter into the station. Besides, inform nearby units and residents to watch out for danger and not to use fire

4.2.1.3 On-site first aid

When someone is soaked and filled with oil during accident handling, flame proofing measures must be taken immediately. If it happens in summer, wash through the whole body by clean water, and then change clothes to avoid the open fire burning caused by the oil vapor from large quantity oil volatilization of the clothes attached to the body; in winter, take off the soaked coat and socks and act slowly to avoid producing static electricity and skin toxicity and change clothes in time..

4.2.1.4 Precautions

While dealing with incidents, firstly, such behaviors as producing open fire and static electricity must be ensured to be forbidden. Secondly, the sand which fully absorbs oil should be placed and dealt with in strict accordance with the regulations to avoid environmental pollution and additional accidents. After the accident, a careful analysis and investigation of the accident must be made, those responsible for the accident must be investigated and the masses must be educated according to the "four left off" principles.

4.2.2 Emergency treatment of fires at refueling and unloading site
4.2.2.1 Measures

(1) The accident discoverer shall immediately close oil tank brake valve and tanker valve and inform the duty manager. Oil station alarm liaison man shall ring the alarm bell promptly, and then firefighting group staff rush to the scene in the first time and try to put out the fire at initial stage.

(2) The duty manager shall command fire extinction according to the fire behavior. At initial stage of small fire, the staff and drivers nearby can quickly use 35kg hand-push fire extinguishers, fire blankets and fire sand. In the case of fire spreading, the logistical group staff shall timely fetch 4kg portable fire extinguishers and 35kg hand-push fire extinguishers to participate fire fighting.

(3) The duty manager shall assign duty guard members to keep the refueling vehicle and personnel in the station in order (evacuating when necessary). Accounting staff shall report a fire according to the situation of fire fighting, put cash, account books and important
vouchers in the safe and then fight the fire.

(4) If the fire continues to expand and cannot be extinguished by the fire extinguishers, the duty manager should organize firefighting group staff to evacuate to a fire hydrant, connect fire hose, control fire remotely with firefighting lance so as not to cause burn of the staff.

(5) If the fire is completely uncontrollable, the manager on duty should immediately organize evacuation of all staff. Any vehicles or persons are not allowed to enter the station. Immediately evacuate the crowd, command vehicles to evacuate from the scene, and wait in the safe area out of the refueling areas for the fire vehicles and firefighters coming into the site.

(6) In the course of fire extinguishing, ensure one’s own personal safety first. In the course of fire extinguishing, ensure one’s own personal safety first. After the fire brigade arrives, concerning staff should help extinguish the fire alongside. The fire brigade should extinguish the fire according to the predetermined plan.

(7) When the fire is extinguished, promptly report the related situation to the safety management.

4.2.2.2 Emergency treatment measures, isolation and evacuation

When a fire occurs, keep calm and tackle it depending on the severity of the fire: if the fire is small, the director on the scene should immediately organize personnel to control the fire and extinguish it as soon as possible. If the fire is too large to control, all the people on site should quickly evacuate to a safe area and guarantee their own safety, and the on-scene commander shall count the number of people present.

4.2.2.3 On-site first aid

If suffocations or burns are found in site, the wounded should be rescued and moved immediately to safe zones with fresh air; artificial respiration should be immediately carried out if respiratory arrests happen. Burned people should be protected of the wound and avoid secondary injury. People who bleed for traumas should be bandaged immediately. Further treatment will be implemented after the staff from the first aid center arrives.

4.2.2.4 Precautions

When oil leakage occurs, the vehicle is not allowed to be immediately started; arrange firefighting equipment from the windward side; check and eliminate fire sources nearby; prohibit the use of the iron which is easy to produce the spark for recovery operation; alert
evacuation group staff to be responsible for notifying nearby units and residents to pay attention to the danger. After the accident, carefully analyze and research the accident, prosecute the person responsible for the accident, and educate the masses in accordance with the “Four Left Off” principle.

4.2.3  Emergency Treatment of Vehicle Fire

4.2.3.1  Treatment Measures

(1) Stop fueling or unloading operations immediately when vehicle fire occurs.

(2) The accident discoverer shall promptly fetch other portable fire extinguishers in gasoline filling island and aim at and jet the vehicle’s part on fire. The duty vestibular supervisor shall immediately inform the duty manager to come to the scene for command and decision-making. At the same time, accounting staff shall immediately report the fire.

(3) If fire expands, other people should fetch the portable fire extinguisher on the gasoline-filling island and hand-push fire extinguisher weighing 35kg to participate in the fire fighting at once.

(4) If the fire continues to expand and cannot be reduced or extinguished by fire extinguishers, the duty manager should organize firefighting group staff to fetch lance and hose, connect pipes and control fire remotely with firefighting lance so as to put out the fire timely and not to cause casualties. If the fire is uncontrollable, the people on site should immediately evacuate to safety zone.

(5) In the course of fire extinguishing, ensure one’s own personal safety fire.

(6) After the fire is extinguished, promptly report the circumstances to the safety management departments. Push the damaged vehicle to safe areas relatively far away from gasoline station or oil tanks in order to avoid the fire of oil in the station.

(7) As for an accident with a clear cause, the petrol station manager should investigate and understand the accident causes under the principle of fairness and justice, and give treatment opinions after clarifying responsibilities. If it is the driver himself that caused the accident, the driver must compensate for the damaged equipments, goods as well as fire-fighting equipment that are consumed at the petrol station; if it is the staff of the petrol station that caused the accident because of mis-operation and illegal operation, the very person must take the responsibility and compensate for the loss of both the driver and the petrol station.

(8) If the cause of an accident is unclear, it should be reported to the superior Security Authorities and wait for the treatment suggestions. If the technical evaluation and analysis
are needed, actively cooperate with the staff of relevant departments to investigate.

(9) In the course of fire extinguishing, ensure one’s own personal safety first. When the fire brigade arrives on the scene, the people should cooperate with the fire brigade to put out the fire. The fire brigade should quench the fire according to the scheduled plan for extinguishing fire.

4.2.3.2 Emergency Treatment Measures and Isolated Evacuation

Keep calm when a fire happens. Observe the size of fire: when it is small, the on-site commanding officer should immediately organize the fire fighting group to control the fire, and quench the fire as soon as possible; when the fire is too big to put out, all the people on site should quickly evacuate to a safe area to ensure their own safety.

4.2.3.3 On-site First Aid

If suffocations or burns are found in site, the wounded should be rescued and moved immediately to safe zones with fresh air; artificial respiration should be immediately carried out if respiratory arrests happen. Burned people should be protected of the wound and avoid secondary injury. People who bleed for traumas should be bandaged immediately. Further treatment will be implemented after the staff from the first aid center arrives.

4.2.4 Emergency treatment of fires for electric equipment

4.2.4.1 Treatment Measures

(1) When electrical fire accident happens, the discoverer should immediately fetch the nearest portable fire extinguisher weighing 4kg to put out the fire, and shout and inform the manager on duty at the same time.

(2) The manager on duty assigns a person to rush to switch board room to cut off the power, then to fetch the portable carbon dioxide fire extinguisher or dry powder fire extinguisher placed in the switch board room, and to quickly return to the fire spot and organize staff on duty to come to extinguish the fire. If the manager on duty considers it as a secondary power distribution, the main power station gate should be promptly switched off. If the first power distribution point causes the fire, contact with the local administration of power supply and timely stop the power supply.

(3) The vestibular director and accounting personnel on duty should move away important items around the fire source and combustible and easy-inflammable items which may lead to greater fires to safe areas. The manager of oil station should direct other personnel on duty to effectively fight the fire until it is completely controlled. If the fire has
not been extinguished, accounting personnel should immediately notify the fire brigade to come to the rescue.

(4) If the fire continues to expand and fire extinguishers cannot reduce or extinguish the fire, gauge hatches of tankers and oil storage tanks should be airtight, then refueling vehicles and personnel at the station should be evacuated, and any vehicles or persons are not allowed to enter the station from then on.

(5) If the fire is completely uncontrollable, the manager on duty should immediately organize evacuation of all staff, and wait for the fire vehicles and firefighters coming into the site.

(6) After the fire is extinguished, the information about the accident should be quickly reported to the concerning offices of security.

(7) The concerning offices of security should immediately send professional repairpersons to mend the electric systems of the gas station and restore the production and life to normal.

4.2.4.2 Precautions

In the course of fire extinguishing, ensure one’s own personal safety first. When the fire brigade arrives on the scene, put out fire according to the scheduled plan for extinguishing fire in cooperation with people present.

4.2.4.3 Emergency Treatment Measures and Isolated Evacuation

Keep calm when a fire happens. Observe the size of fire: when it is small, the on-site commanding officer should immediately organize the fire fighting group to control the fire, and quench the fire as soon as possible; when the fire is too big to be put out, all the people on site should quickly evacuate to a safe area to ensure their own safety.

4.2.4.4 On-site First Aid

If suffocations or burns are found in the site of fire, the wounded should be rescued and moved immediately to safe zones with fresh air; artificial respiration should be immediately carried out if respiratory arrests happen. Burned people should be protected of the wound and avoid secondary injury. People who bleed for traumas should be bandaged immediately. Further treatment will be implemented after the staff from the first aid center arrives.

4.2.5 Emergency Treatment of Casualties

4.2.5.1 Emergency treatment measures, isolation and evacuation

When casualties occur, all staff should remain calm and start first aid depending on the
types of injuries. In severe cases, on-site director should immediately notify the first-aid center and organize to stabilize the wounded to ease the injury as much as possible. Irrelevant persons are prohibited to trespass the site; onlookers are prohibited to clog the roads, entrance and exits.

4.2.5.2 On-site First Aid
If suffocations or burns are found in site, the wounded should be rescued and moved immediately to safe zones with fresh air; artificial respiration should be immediately carried out if respiratory arrests happen. Burned people should be protected of the wound and avoid secondary injury. People who bleed for traumas should be bandaged immediately. Further treatment will be implemented after the staff from the first aid center arrives.

4.2.6 Emergency Plan for Personal Poisoning
4.2.6.1 Treatment Measures
When discovering someone poisoning, promptly organize staff to rescue. First, call the emergency call 120 to the hospital nearby. Before doctors arrive, treat the person according to the normal emergency treatment principles in order to sustain life and avoid the poison continuing to work. Then try to clarify the toxicants that the person touched, such as the toxicant type and the amount, and tell the doctors exactly so that they can carry out the rescue in time.

4.2.6.2 Emergency Treatment Measures and Isolated Evacuation
Keep calm when discovering someone poisoning. Conduct first-aid depending on different types of traumatic conditions. If severe, the on-site commander should immediately inform the emergency center, send staff to comfort and stabilize the wounded first, and ease the poisoning conditions as soon as possible. Prohibit the irrelevant personnel to destroy the spot and prevent those onlookers from blocking roads, and the entrance and exit.

4.2.7 Emergency Monitoring
When environmental emergencies occur, the petrol station should immediately entrust Jiaozuo Environmental Monitoring Station to organize staff to rush to the accident spot. According to the actual situation, quickly determine the monitoring program (including monitoring sites, frequency, projects and methods, etc.) and timely conduct emergency monitoring work. Then judge the types of pollutants, their concentration, pollution scope and the possible hazard with small and portable instruments within a shortest time so as to timely and properly dispose the accident.
4.2.8 Emergency Training and Drills

4.2.8.1 Training of the Emergency Rescue Team

Professional training of emergency rescue for the emergency rescue team members of the petrol station is needed. The training contents are as follows:

- Learn and master the contents of accident emergency rescue plan;
- Be familiar with the use of all kinds of protective equipments;
- Know how to conduct rescue, help and accident disposal on site;
- Measures to conduct self-protection and guardianship.

4.2.8.2 Training of petrol station operators

With regard to the basic requirements of emergency rescue, the operators of the petrol station should be trained systematically. For instance, when accidents of dangerous chemical at all levels happen, operators should know the basic requirements of alarming, emergency treatment, escape, individual protection, first aid, evacuation and other emergency procedures. The training contents are as follows:

1. Rules and regulations of safety production and safety operation;
2. Basic knowledge of fireproofing, anti-explosion and antitoxin;
3. Excluding and processing methods of abnormal situations at the petrol station;
4. How to conduct self-rescue and mutual rescue after the accident;
5. Methods of withdrawing and evacuating after the accident.

4.2.8.3 Public Education

Conduct public education and training, and releasing the petrol station’s basic information concerning safety production in the areas near the petrol station. Strengthen exchanges with the surrounding public so that they can be better evacuated and protected from pollution if there is any accident.

Promote evacuation and individual protection to the masses nearby so that the masses of the possible affected areas can have a comprehensive understanding of the basic procedures of emergency rescue of dangerous chemical accidents as well as measures that need taking.

4.2.9 Drills

1. Organizing and commanding drills: According to the requirements of the emergency rescue plan, leaders of the commanding group and persons in charge of different professional groups organize and conduct drills of emergency rescue missions in the form of organization and command;
(2) Individual drills: Individual subject drills in the emergency rescue missions are conducted by each professional group;

(3) Comprehensive drills: The emergency rescue headquarters should conduct comprehensive drills according to the requirements of the emergency rescue plan.

Annex 5  Material Cultural Heritage Management Plan

1 Impact of the project on material cultural heritage

The material cultural heritages involved in the project are mainly distributed along the Green Tourist Corridor, which are illustrated in Table 1-5. See attached map 2 for the specific distribution.

① The Green Tourist Corridor is situated outside heritage protection area for Ci Kiln in Dangyang Valley and the constructive control zone. During the route selection and design of the Corridor, the route avoids and diverts from the Ci Kiln in Dangyang Valley on the basis of field investigation. Construction will not be conducted within the heritage protection area and the constructive control zone and the route will not go through the historical and cultural site. The shortest distance from the construction site (spoil ground) to heritage protection area is 110m. Therefore, the selected route of the Green Tourist Corridor meets the requirement that certain activities may not be conducted within the heritage protection area or constructive control zone in Law of the Peoples Republic of China on Protection of Cultural Relics (2013 Amendment).

② Qunying Aqueduct, 30m to the east of the center line of the Green Tourist Corridor, is a municipal historical and cultural site; Tomb of Wang Guanglan, 12m to the east of the center line of the Green Tourist Corridor, is a municipal historical and cultural site; Temple of Goddess, 30m to the west of the center line of the Green Tourist Corridor, is a county-level historical and cultural site; Cemetery Longsi, 8m to the south of the center line of the Green Tourist Corridor, is an illegal cemetery without going through relevant procedures. None of the protection area of these four tangible cultural heritages is delimited. The selected route of the Green Tourist Corridor will not go through the four cultural heritages and exert no direct influence to the tangible cultural heritages. However, the vibration caused by excavation and fill of the roadbed and the operation of construction machinery etc. may have certain effect on the heritages during construction.
③ The construction will not exert influence on the Temple Yuanrong which is some distance from the centerline of the Green Tourist Corridor.

2 Protection measures for heritage and relics

1）Pay attention to the protection of cultural relics units along the way included in the table 1-5. Strictly adhere to the requirements of Cultural Relics Protection Law of the People's Republic of China.

2）According to Cultural Relics Protection Law of the People's Republic of China, before construction, research and explore the cultural relics along the line to ensure the safety of the potential underground cultural relics.

3）The green corridor design and construction sketch should be submitted to the cultural relics department for comment/approval.

4）The construction activities must be outside the material cultural heritage protection range, the shortest distance from the construction site (spoil ground) to heritage protection area is 110m; Use manual method instead of large machinery to complete the excavation work near the cultural relics.

5）Personnel with cultural relic protection expertise are needed in the construction and supervision units.

6）If the constructor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the constructor shall:

① Stop the construction activities in the area of the finding;

② Delineate the discovered site or area;

③ Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Administration of Cultural Relics take over;

④ Notify the supervising engineer who in turn will notify the responsible local authorities and National Culture Administration within 24 hours;

⑤ Responsible local authorities and the National Administration of Cultural Relics would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of the National Culture Administration. The significance and
importance of the findings shall be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;

⑥ Decisions on how to handle the finding shall be taken by the responsible authorities and by National Administration of Cultural Relics. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and utilization;

⑦ Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and

⑧ Construction works could resume only after permission is granted from the responsible local authorities or the National Administration of Cultural Relics concerning safeguard of the cultural relics and sites.

7）Large machineries shall not be used in road construction around Qunying Aqueduct, Wang Languang Tomb, Niangniang Temple, Longsi Tomb. Try to adopt manual methods in works such as digging to prevent vibration from damaging material cultural relics.

8）It is prohibited to set temporary soil stockpile field within 50m around cultural relics protection group including Qunying Aqueduct, Wang Languang Tomb, Niangniang Temple and Longsi Tomb. Warning signs shall be placed at obvious spots.
Appendix 1 The environmental protection measures and specific environmental project investment

<table>
<thead>
<tr>
<th>Title</th>
<th>Main measures</th>
<th>Operator</th>
<th>Supervision</th>
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<tbody>
<tr>
<td><strong>Green Tourist Corridor</strong></td>
<td>(1) Road engineering: the green corridor projects will be in accordance with the design with the roadbed at width of 5.5 m, the driveway at width of 4.5 m; (2) Ancillary works: improve all traffic signs, lines, and service facilities (rest, parking, ... Design phase: 1. Avoid the basic farmland protection areas, farmland, forests and waters, keep the connectivity of the lands and waters when it comes the route and construction point selection. Avoid important and sensitive buildings such as schools, cultural relics. 2. Avoid concentrated residential areas, schools and critical infrastructure. With regard to important infrastructures, the route direction should be taken into account, in order to coordinate with cross roads, water conservancy, electric power facilities to minimize the interference and influence of the normal operation of those mentioned above. 3. Do a job with the design of height of roadbed, road longitudinal slope and road conditions should during the period of design. Make full use of earth-rock to reduce the damage to the surrounding environment caused by rock stockpiling. 4. Design road surface drainage system to ensure safety and durability of road. 5. Design road safety facilities: design a safe dimensional / flat intersection plan for the green channel and other roads; 6. Design traffic signs and lines along the roads; 7. Adopt the split design for cycling and walking;</td>
<td>Design PMO</td>
<td>PMO</td>
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<tr>
<td>Public Health Facilities</td>
<td>8. Green way service facilities (rest, bicycle parking facilities and so on).</td>
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<td></td>
<td>9. Set up 30 garbage bins with the distance of 500 meters between one another outside of the underground drinking water source reservation zone.</td>
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<td></td>
<td>10. Protection measures for material cultural resources</td>
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<tr>
<td></td>
<td>a) Pay attention to the protection of cultural relics units along the way included in the table 1-5. Strictly adhere to the requirements of Cultural Relics Protection Law of the People's Republic of China.</td>
<td></td>
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<td></td>
<td>b) According to Cultural Relics Protection Law of the People's Republic of China, before construction, invite experienced experts on cultural relics protection to research and explore to ensure the safety of the potential of underground cultural relics along the road.</td>
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<td></td>
<td>c) The green way design and construction sketch should be submitted to the cultural relics department for comment/approval.</td>
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<td></td>
<td>d) The construction activities must be outside the material cultural heritage protection range. Use manual method instead of large machinery to complete the excavation work near the cultural relics.</td>
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<tr>
<td></td>
<td>e) The construction unit and supervision unit needs to have experienced employee in the protection of cultural relics.</td>
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<td></td>
<td>f) When cultural relics are found, it is necessary to perform cultural relics discovery procedures.</td>
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</table>

### Construction phase:

1. The sub project green tourism corridor excavates 111100 m\(^3\), fills 98000 m\(^3\), uses 27400 m\(^3\) at spot, borrows 70600 m\(^3\), discard 83300 m\(^3\). This project set up two spoil banks, all abandoned soil is sent to soil field for disposal.  
2. Green tourism corridor engineering construction generates construction waste 3918.4 m\(^3\), which are supposed to be carried to the proposed Jiaozuo Weitai environmental protection building materials co., LTD for processing.  
3. At the peak of construction, the constructors produce about 0.01 t of life rubbish daily. After collection, it is shipped to the proposed Jiaozuo municipal waste disposal station;  
4. Billboards should be set up at the entrance, showing engineering contractors and construction

| Constructor | Supervisor |
supervision units as well as the local environmental protection bureau hotline number and the name of the contact person, so that when the residents have a complaint, they can contact with the relevant department.
5. The construction activities must be outside the material cultural heritage protection range. Use manual method instead of large machinery to complete the excavation work near the cultural relics.
6. The construction unit and supervision unit needs to have experienced employee in the protection of cultural relics.
7. When cultural relics is found, it is necessary to perform cultural relics discovery procedures.

Operation phase
1. One person should be responsible for the management of each ecological toilet. The bins along the road should be managed by 3 persons, each one his own area.
2. Set up 5 microbial ecological toilets every 3 km outside of the underground drinking water source reservation zones.
3. Strengthen the management of tourist attractions around the green transport corridor, and avoid excessive of visitor as a result of the green transport corridor and the damage to the scenic environment. Specific measures include:
   (1) Adjust price of the entrance tickets and cooperate with travel agents to regulate the tourists flow according to the tourist season;
   (2) Limit the number of tourists every day according to the actual situation of environmental bearing capacity of scenic spots;
   (3) Optimize area planning layout of the scenic, set up tour guide boards, road signs and increase the number of public toilets, garbage bin in scenic spots;
   (4) Set up convenient pass way for the tourists that don’t have too much visiting demand to cross fast according to the actual situation.

Integrated Safe System Corridor Construction

<table>
<thead>
<tr>
<th>Design phase:</th>
<th>Desi</th>
<th>Proje</th>
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<tbody>
<tr>
<td>1. The design should give full consideration to network of rain, sewage pipe network and city</td>
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</tbody>
</table>
1. Existing road reconstruction:
2. Jiefang Road (5.5 km) only include the bus stops
3. Systematic integrated traffic corridor construction and improvement (including cross-street facilities and drainage pipes) at Tanan Road (4.0 km), Renmin Road (7.1 km), Tananzhanqian Road (1.3 km)

Construction phase
1. For Jiefang Road, Tanan Road (including Zhanqian Road), Renmin Road reconstruction, segments construction should be considered. Before closing the road, alternate routes and temporary channels should be set in advance. In the crossing of the Jiefang Road, Renmin Road, Tanan Road, Zhanqian Road, there should be signs to guide the vehicles to slow down or take the other route.
2. Jiefang Road, Tanan Road and Zhanqian Road should organize the traffic according to the half-enclosed construction and temporary half-passage. Renmin Road reconstruction only affects the inside lane and can isolate the construction and adopt two-way traffic.
3. To ensure the horizontal road traffic, temporary detour can be set in the crossings. During construction, keep all kinds of safety measures and facilities in place, in order to ensure road safety in the construction period.
4. The Safe System Integrated Corridors/Area Development project construction site is mainly located in the city center of Jiaozuo city overall plan. The publicity investigation work should be done in advance and the understanding and support from related functional departments of local government and local residents should be asked for. The main environmental sensitive points are shown in table 1-5;
5. At the entrance of construction site, billboards should be set up at the entrance, showing engineering contractors and construction supervision units as well as the local environmental protection bureau hotline number and the name of the contact person, so that when the residents have a complaint, they can contact with the relevant department.
6. The domestic sewage, after the collection and processing in self-built septic tanks in piping network to ensure the sewage along the road and wastewater of the two training bases can be disposed of properly.
2. Consider cover the designated bus lanes with low noise materials, to reduce the impact of traffic noise to environment.
3. Retain existing road green belts as much as possible to avoid additional ecological destruction and redundant construction.
construction camp, should cleaned daily by Jiaozuo Municipal Department;
7. For construction waste water, the evaluation suggests that the construction camps set up settling basins according to the actual situation. The waste water, after precipitation treatment, is recycled for spraying dust and will not be drained outside.
8. The component of Safe System Integrated Corridor Construction discards 26700 m³, which are intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD., as the field leveling materials.
9. The component of Safe System Integrated Corridor Construction produces 227000 m³ of construction waste, which is proposed to be carried to Jiaozuo Weitai environmental protection building materials co., LTD. for processing instead of being carried outside. According to the construction plan, discarded construction waste should be cleared as soon as it is produced. No need to set up temporary storage area.
10. During the peak of construction, the life rubbish generated every day is about 0.01 t. After collection, it should be shipped to the proposed Jiaozuo municipal waste disposal station;
11. At present the greening of Jiefang Road, Tanan Road and Renmin road is growing well. This project in the design phase reserves the existing green trees and the separation zone, only move the greening belt needed to be dismantled because of the platform and road renovation;
12. After the construction, the destroyed green land and vegetation should be restored and compensated. The reconstruction of vegetation area cannot be lower than the original area. In addition to considering the suitable choice for local fast-growing tee species, the layout of various tree species should also be considered to increase the diversity and disease-resistant ability. After a detailed investigation on the regional terrain, soil and climate conditions, it is decided that the grass seeds and tree seeds should be local species and new fine species of grass seed can also be introduced, to ensure the survival rate of green plantings.
13. For the street commercial housing inside of the construction area, construction should be enclosed within the road red line, and adopt simple fencing, temporary walkway, section construction and so on. Avoid disturbance to the residents and business. If there is any influence, notification and negotiation should be done as early as possible. After the construction, the walkway for the residents and merchants’ business should be restored as soon as possible.
Operation phase
1. Management units should strictly carry out policies and measures of the country and the departments at different levels on motor vehicle emission control and strengthen the in-use vehicle inspection and maintenance. Vehicles with excessive pollutants emissions should be banned on road;
2. Strengthening management and optimizing the traffic signal indicator system can guarantee the road traffic flow and reduce the low-speed motor vehicles’ emissions;
3. Strengthen the maintenance of the existing green on both sides of the road;
4. A noise barrier set along the overpass on the second floor of the Wanfang overpass, the crossing of the main road Tanan Road and Jianshe Road, near the 4th floor of the residence area of aluminum plant, can reduce the noise by 15 dB (A);
5. Set signs of slow down and no honking in Wanfang overpass;
6. Strengthen the road maintenance to ensure the smoothness of the road surface and reduce traffic noise caused by the turbulence because of poor road conditions.
7. Set speed limit signs and red lights at the intersections or residential areas; make sure the vehicle moving at a constant speed without honking;
8. Guarantee the road motor vehicle in good conditions; strengthen the management and maintenance of motor vehicles. Unqualified vehicles should be prohibited on the road.

Construction phase
1. At the entrance of construction site, billboards should be set up at the entrance, showing engineering contractors and construction supervision units as well as the local environmental protection bureau hotline number and the name of the contact person, so that when the residents could contact with the authorities when there is any complaint;
2. A PVC wall with a height of 3 m should be built surrounding the road safety publicity base of Public Security Bureau, safety and training base of transportation administration bureau. Jiefang Road, Tanan Road(including Zhanqian Road), Renmin Road should undertake semi-closed construction. A PVC wall with a height of 3 m on both sides of the road should be built to reduce dust floating.
3. The domestic sewage of Safe System Integrated Corridor should enter the city piping network.
the 2nd and 3rd floors, the construction space is 6000m².
2.2 The training base of Public Security Bureau covers an area of 15 mu. With a new 2-floor building, the construction space goes to 2000m².

The construction wastewater of safety education training base should be collected and processed in self-built septic tanks and then cleaned daily by Jiaozuo Municipal Department; After the construction, septic tank should be cleaned and sanitized with lime and filled.
4. For construction wastewater, the evaluation suggests that the construction camps set up settling basins according to the actual situation. The waste water, after precipitation treatment, is recycled for spraying dust and will not be drained outside;
5. During the peak of construction, the life rubbish generated every day is about 0.01 t. After collection, it should be shipped to the proposed Jiaozuo municipal waste disposal station.

<table>
<thead>
<tr>
<th>Operation Phase</th>
<th>Traffic Administration Bureau of Jiaozuo</th>
<th>Environment Protection Bureau of Jiaozuo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The training base of Public Security Bureau processes wastewater by septic tank, which is 25 m³; after the wastewater meets the standards, it is sent to Bo’ai county sewage treatment plant.</td>
<td>Traff</td>
<td>Envir</td>
</tr>
<tr>
<td>2. The training base of Traffic Administration Bureau processes wastewater by septic tank, which is 25 m³; after the wastewater meets the standards, it is sent to Jiaozuo No. 2 sewage treatment plant.</td>
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<tr>
<td>3. The training base of Traffic Administration Bureau produces 0.0515 t/d of life garbage while the safety education base of Public Security Bureau, 0.06 t/d. After the collection, the waste will be sent to Jiaozuo landfill sanitary field for disposal.</td>
<td>nistra</td>
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<tr>
<td>4. One person will be responsible for the sewage treatment station in the training base of Traffic Administration Bureau and the safety education base of Public Security Bureau.</td>
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<tr>
<td>5. 2 persons will be full-time responsible for the garbage collection and pickup in the training base of Traffic Administration Bureau and the safety education base of Public Security Bureau.</td>
<td>Burea</td>
<td>ction</td>
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<td>u</td>
<td>Bureau of Jiaozuo</td>
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Public Transport Infrastructure Development & Improvement
<table>
<thead>
<tr>
<th>3.1 Reconstruction at the Railway Station north square PT interchanges</th>
<th>Construction phase</th>
<th>Operator</th>
<th>Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. At the entrance of construction site, billboards should be set up at the entrance, showing engineering contractors and construction supervision units as well as the local environmental protection bureau hotline number and the name of the contact person, so that when the residents could contact with the authorities when there is any complaint; 2. Construction units shall instruct the constructor to post notices and complaint phone number at the construction site; the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner. 3. Tall walls should be set up around the construction area in advance to reduce the dust floating, 4. The construction waste is intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD. 5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.</td>
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<table>
<thead>
<tr>
<th>Operation phase</th>
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<tr>
<th>3.2 Newly built Dongxuegu bus maintenance depot which covers an area of 2.88ha</th>
<th>Design phase</th>
<th>Bus company</th>
<th>Planning Bureau of Jiaozuo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhere strictly to the overall development plan of Jiaozuo city</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
### Construction phase
1. At the entrance of construction site, billboards should be set up at the entrance, showing engineering contractors and construction supervision units as well as the local environmental protection bureau hotline number and the name of the contact person, so that when the residents could contact with the authorities when there is any complaint.
2. Construction units should instruct the constructor to post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.
3. Tall walls should be set up around the construction area in advance to reduce the dust floating.
4. The construction waste is intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD.
5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.

### Operation phase
1. By “separation tank + coagulation sedimentation process”, after the 50m³/d of waste meeting the standards, the waste will be sent by the pipe line to the municipal pipe network.
2. Install one set of oil and gas recovery unit;
3. One set of activated carbon adsorption device and a set of 15 m vent pipe;
4. 1 sludge storage room of 10m² and 1 centrifugal machine;
5. The waste oil, waste cloth, filter, paint waste, activated carbon waste, after storage in the 20m² waste storage room, the waste oil will be collected by Jiaozuo Shunhe recycling co., LTD., while the waste rags, waste filter elements, waste paint removal, activated carbon waste will be sent to Henan Tianchen environmental protection technology co., LTD.;
6. Life garbage, after collected, should be shipped to the proposed Jiaozuo municipal waste disposal station.
7. Dongxuegu Bus maintenance depot should set one maintenance room, where noisy equipment such as air compressor machines, grinding machines, boring machines, drilling machines, induced draft fan contour should be stored; Install shock pad, and the air compressor and induced draft fan should also install the silencer to further reduce the generation of noise;
8. Around Dongxuegu bus maintenance depot should be greened with trees and at the same time avoid operating high noise equipment at night;
9. 1 full-time employee in charge of the sewage treatment station;
10. 1 full-time employee in charge of garbage collection and pickup.

<table>
<thead>
<tr>
<th>3.3 Zhongzhan bus depot (including the gas station) reconstruction, covering an area of 1.67 ha</th>
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<tbody>
<tr>
<td>Construction phase</td>
</tr>
<tr>
<td>1. At the entrance of construction site, a billboard with hotline number and the name of the contact person of the engineering contractor, construction supervision unit as well as the local environmental protection bureau on it should set up so that when the residents could contact with the authorities when there is any complaint;</td>
</tr>
<tr>
<td>2. The construction unit shall post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.</td>
</tr>
<tr>
<td>Tall walls should be set up around the construction area in advance to reduce the dust floating,</td>
</tr>
<tr>
<td>4. The construction waste is intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD.</td>
</tr>
<tr>
<td>5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. By “separation tank + coagulation sedimentation process + biological contact oxidation”, after the 50m³/d of waste meeting the standards, the waste will be sent to western industry group sewage treatment plant.</td>
</tr>
<tr>
<td>2. One set of installation of oil and gas recovery unit;</td>
</tr>
<tr>
<td>3. The waste oil, waste cloth and filter, after storage in the 10m² waste storage room, the waste oil will be collected by Jiaozuo Shunhe recycling co., LTD., while the waste cloth and filter will be sent to Henan Tianchen environmental protection technology co., LTD.;</td>
</tr>
<tr>
<td>4. 1 sludge storage room of 10m² and 1 centrifugal machine;</td>
</tr>
<tr>
<td>5. Life garbage, after collected, should be shipped to the proposed Jiaozuo municipal waste disposal station</td>
</tr>
<tr>
<td>6. 1 full-time employee in charge of the sewage treatment station;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operator</th>
<th>Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bus company</th>
<th>Environmental Protection Bureau of Jiaozuo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>3.4 Macun bus stop and maintenance (not including the gas station) reconstruction, covering an area of 2 ha</strong></td>
<td>7. 1 full-time employee in charge of garbage collection and pickup.</td>
</tr>
<tr>
<td><strong>Construction phase</strong></td>
<td><strong>Running phase</strong></td>
</tr>
<tr>
<td>1. At the entrance of construction site, a billboard with hotline number and the name of the contact person of the engineering contractor, construction supervision unit as well as the local environmental protection bureau on it should set up so that when the residents could contact with the authorities when there is any complaint; 2. The construction unit shall post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner. 3. Tall walls should be set up around the construction area in advance to reduce the dust floating, 4. The construction waste is intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD. 5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.</td>
<td>1. By “separation tank + coagulation sedimentation process”, after the 70m³/d of waste meeting the standards, the waste will be sent to Jiaozuo No. 2 sewage treatment plant. 2. The waste oil, waste cloth and filter, after storage in the 10m² waste storage room, the waste oil will be collected by Jiaozuo Shunhe recycling co., LTD., while the waste cloth and filter will be sent to Henan Tianchen environmental protection technology co., LTD.; 3. 1 sludge storage room of 10m² and 1 centrifugal machine; 4. Life garbage, after collected, should be shipped to the proposed Jiaozuo municipal waste disposal station 5. 1 full-time employee in charge of the sewage treatment station; 6. 1 full-time employee in charge of garbage collection and pickup.</td>
</tr>
<tr>
<td><strong>3.5 Newly built Yimen bus depot which covers an area</strong></td>
<td><strong>Design phase</strong></td>
</tr>
<tr>
<td>Adhere strictly to the overall development plan of Jiaozuo city</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Operator</strong></th>
<th><strong>Supervisor</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Envir onme nt Prote ction Bure au of Jiaoz uo</td>
<td>Bus comp any</td>
</tr>
<tr>
<td>Plann ing Bure</td>
<td>Bus comp any</td>
</tr>
</tbody>
</table>
Construction phase
1. At the entrance of construction site, a billboard with hotline number and the name of the contact person of the engineering contractor, construction supervision unit as well as the local environmental protection bureau on it should be set up so that when the residents could contact with the authorities when there is any complaint;
2. The construction unit shall post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.
3. Tall walls should be set up around the construction area in advance to reduce the dust floating,
4. The construction waste is intended to be carried to Jiaozuo Weitai environmental protection building materials co., LTD.
5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.

Running phase
1. By “separation tank + coagulation sedimentation process”, after the 70m³/d of waste meeting the standards, the waste will be sent to Jiaozuo No. 2 sewage treatment plant.
2. One set of installation of oil and gas recovery unit;
3. The waste oil, waste cloth and filter, after storage in the 10m² waste storage room, the waste oil will be collected by Jiaozuo Shunhe recycling co., LTD., while the waste cloth and filter will be sent to Henan Tianchen environmental protection technology co., LTD.;
4. 1 sludge storage room of 10m² and 1 centrifugal machine;
5. Life garbage, after collected, should be shipped to the proposed Jiaozuo municipal waste disposal station
6. 1 full-time employee in charge of the sewage treatment station;
7. 1 full-time employee in charge of garbage collection and pickup.
### Design phase

Adhere strictly to the overall development plan of Jiaozuo city

### Construction phase

1. At the entrance of construction site, a billboard with hotline number and the name of the contact person of the engineering contractor, construction supervision unit as well as the local environmental protection bureau on it should set up so that when the residents could contact with the authorities when there is any complaint;
2. The construction unit shall post notices and complaint phone number at the construction site, the construction unit should promptly get in touch with the local environmental protection department when receiving a complaint, in order to handle various environmental disputes in a timely manner.
3. Tall walls should be set up around the construction area in advance to reduce the dust floating,
4. The construction waste is proposed to send to Jiaozuo Weitai environmental protection building materials co., LTD.
5. Life garbage should be shipped to the proposed Jiaozuo municipal waste disposal station.

### Running phase

1. By “separation tank + coagulation sedimentation process”, after the 100m³/d of waste meeting the standards, the waste will be sent to Jiaozuo No. 2 sewage treatment plant.
2. One set of installation of oil and gas recovery unit;
3. The waste oil, waste cloth and filter, after storage in the 10m² waste storage room, the waste oil will be collected by Jiaozuo Shunhe recycling co., LTD., while the waste cloth and filter will be sent to Henan Tianchen environmental protection technology co., LTD.;
4. 1 sludge storage room of 10m² and 1 centrifugal machine;
5. Life garbage, after collected, should be shipped to the proposed Jiaozuo municipal waste disposal station
6. 1 full-time employee in charge of the sewage treatment station;
7. 1 full-time employee in charge of garbage collection and pickup.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Items</th>
<th>mitigation measures</th>
<th>mitigation effects</th>
<th>No.</th>
<th>Investment Estimation (10,000RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>domestic wastewater</td>
<td>Construction camp set up septic tanks. After the treatment, it should be cleaned by the fecal suction truck sent by municipal departments of the Jiaozuo city at a daily base.</td>
<td>It is forbidden to be discharged to the surface waters. It should not harm the water environment</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>construction wastewater</td>
<td>Recycled after the treatment of sedimentation basin</td>
<td>It is forbidden to discharged to Jianggou and Qunying river</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Waste</td>
<td>dust</td>
<td>Equip with small sprinkler. Spray the road and construction surface</td>
<td>Reduce the dust impact</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid</td>
<td>Life garbage</td>
<td>Set up garbage bins in the construction camp. The garbage should be carried away by municipal departments</td>
<td>Clean and collect timely to ensure the sanitation of the area</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>earthwork</td>
<td>Carry to the spoil bank</td>
<td>Recycle properly as much as</td>
<td>83312</td>
<td>19.65</td>
</tr>
</tbody>
</table>

Attached table 1-2

Green transport Corridor Environmental Protection Measures Investment Estimation

<table>
<thead>
<tr>
<th>Phase</th>
<th>Items</th>
<th>mitigation measures</th>
<th>mitigation effects</th>
<th>No.</th>
<th>Investment Estimation (10,000RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>domestic wastewater</td>
<td>Construction camp set up septic tanks. After the treatment, it should be cleaned by the fecal suction truck sent by municipal departments of the Jiaozuo city at a daily base.</td>
<td>It is forbidden to be discharged to the surface waters. It should not harm the water environment</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>construction wastewater</td>
<td>Recycled after the treatment of sedimentation basin</td>
<td>It is forbidden to discharged to Jianggou and Qunying river</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Waste</td>
<td>dust</td>
<td>Equip with small sprinkler. Spray the road and construction surface</td>
<td>Reduce the dust impact</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid</td>
<td>Life garbage</td>
<td>Set up garbage bins in the construction camp. The garbage should be carried away by municipal departments</td>
<td>Clean and collect timely to ensure the sanitation of the area</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Waste</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>earthwork</td>
<td>Carry to the spoil bank</td>
<td>Recycle properly as much as</td>
<td>83312</td>
<td>19.65</td>
</tr>
<tr>
<td>Operation phase</td>
<td>Category</td>
<td>Activity</td>
<td>Description</td>
<td>Units</td>
<td>Quantity</td>
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<tr>
<td>-----------------</td>
<td>----------</td>
<td>----------</td>
<td>-------------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>Construction waste</td>
<td>Send to the proposed Jiaozuo Weitai Environmental Friendly Building Materials Co., Ltd.</td>
<td>Recycle properly as much as possible. It is forbidden to stack and do not impact the regional environment.</td>
<td></td>
<td>m³</td>
<td>3918.4 5.88</td>
</tr>
<tr>
<td>Ecological protection</td>
<td>conservation of water and soil</td>
<td>Protect the slope on both sides of the road in construction and restore the vegetation afterward</td>
<td>Prevention and control of soil and water erosion</td>
<td>/</td>
<td>612.99</td>
</tr>
<tr>
<td>society</td>
<td>crowds</td>
<td>Set up billboards in construction site</td>
<td>/</td>
<td>6 6</td>
<td></td>
</tr>
<tr>
<td>Green Tourism Corridor toilet wastewater</td>
<td>Set up microbial ecological toilet</td>
<td>Recycled through microbial decomposition, the wastewater will not be discharged outside</td>
<td></td>
<td>5 100</td>
<td></td>
</tr>
<tr>
<td>Solid waste</td>
<td>life garbage</td>
<td>Set up classification dustbin along the Green Tourism Corridor. The garbage should be cleaned every day and sent to the Garbage Disposal Station of Jiaozuo city</td>
<td>Keep the sanitation of the area.</td>
<td></td>
<td>30 0.6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>/</td>
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</tr>
<tr>
<td>Phase</td>
<td>Items</td>
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<td>mitigation effects</td>
<td>No.</td>
<td>Investment Estimation (10,000RMB)</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>construction phase</td>
<td>wastewater</td>
<td>Set up septic tanks in the training base of Traffic Police Force and TSA. After the treatment, it should be cleaned by the fecal suction truck sent by municipal departments of the Jiaozuo city at a daily base.</td>
<td>It is forbidden to be discharged to the surface waters. It should not harm the water environment</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>construction phase</td>
<td>construction wastewater</td>
<td>Set up sedimentation basin at Jiefang Road, Tanan Road, Renmin Road, construction site of training base of traffic police force and TSA. The water will be used for water spray after treatment.</td>
<td>It is forbidden to discharge to Jianggou and Qunying river</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Waste gas</td>
<td>dust</td>
<td>Equip with small sprinkler at Jiefang Road, Tanan Road, Renmin Road, construction site of training base of traffic police force and TSA, spray water on the road and site surface.</td>
<td>Reduce the dust impact</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>noise</td>
<td>Noise</td>
<td>Set up 3m high PVC wall near the sensitive spots, such as residential area, hospital and school at Jiefang Road, Tanan Road, Renmin Road, construction site of training base of traffic police force and TSA. Altogether</td>
<td>Reduce the dust and noise impact</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>----------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Solid waste</strong></td>
<td><strong>Life garbage</strong></td>
<td>Set up garbage collection station in the base of the TSA and the Traffic Police Force. Clean the garbage daily. The sludge of the septic tank should be cleaned by the environmental department.</td>
<td>Ensure the sanitation of the area</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>earthwork</strong></td>
<td>Send to Jiaozuo Weitai Environmental Friendly Building Materials Co., Ltd and used as field leveling materials.</td>
<td>Recycle properly as much as possible. It is forbidden to stack. Do not impact the regional environment.</td>
<td>2.67 万 m³ 26,700 m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Construction waste</strong></td>
<td>Send to the proposed Jiaozuo Weitai Environmental Friendly Building Materials Co., Ltd.</td>
<td>Recycle properly as much as possible. It is forbidden to stack. Do not impact the regional environment.</td>
<td>22.7 万 m³ 227,000 m³</td>
<td></td>
</tr>
<tr>
<td><strong>Ecological protection</strong></td>
<td><strong>conservation of water and soil</strong></td>
<td>Conduct slope construction on both sides of the road in construction and restore the vegetation afterward</td>
<td>Prevention and control of soil and water erosion</td>
<td>/ 175.14</td>
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</tr>
<tr>
<td></td>
<td><strong>society crowds</strong></td>
<td>Set up billboards at Jiefang Road, Tanan Road, Renmin Road, construction site of training base of traffic police force and TSA</td>
<td>/</td>
<td>5 5</td>
<td></td>
</tr>
</tbody>
</table>
| **Operation phase** | **Domestic wastewater of Public Security** | After the treatment by the septic tank, the wastewater should be sent to Bo’ai Sewage Treatment Plant. The capacity of the tank is 25 m³ | Meet the 3-grade standard of "Integrated Wastewater Discharge Standard" (GB8979-1996). | 1 5 交通警察局和焦作环境
<table>
<thead>
<tr>
<th>Bureau training base</th>
<th>After the treatment by the septic tank, the wastewater should be sent to Bo’ai Sewage Treatment Plant. The capacity of the tank is 25 m³</th>
<th>Meet the 3-grade standard of &quot;Integrated Wastewater Discharge Standard&quot; (GB8979-1996).</th>
<th>1</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste gas vehicle exhaust</td>
<td>Limit the vehicles that don’t meet the exhaust emission standards to the road. Reduce the pollution to the atmospheric environment</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Noise protection of sensitive spot</td>
<td>Set 30-meter long, 3-meter high transparent noise barriers outside along the edge on the second floor of Wanfang overpass, which is on the intersection of Tanan Road and Jianshe Road, two main city roads of Jiaozuo, and is closer to the fourth floor of Aluminum Manufacture staff residence.</td>
<td>Meet the standards of GB3096-2008</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Solid waste</td>
<td>Set up garbage collection station in the base of the TSA and the Public Safety Bureau and clean the garbage daily. The sludge of the septic tank should be cleaned by the environmental department.</td>
<td>Ensure the sanitation of the area</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>633.74</td>
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</tbody>
</table>
### Measures Investment Estimation

<table>
<thead>
<tr>
<th>Phase</th>
<th>Items</th>
<th>mitigation measures</th>
<th>mitigation effects</th>
<th>No.</th>
<th>Investment Estimation (10,000RM B)</th>
<th>Operator</th>
<th>Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>construction phase</td>
<td>domestic wastewater</td>
<td>Set up temporary septic tanks sedimentation basin at bus transit hub at the Railway Station north square PT interchanges, reconstruction of Zhongzhan bus depot and Macun bus depot, Dongxuegu bus maintenance depot, Yimen bus depot, Dabeizhang bus depot. After the treatment, it should be cleaned by the fecal suction truck sent by municipal departments of the Jiaozuo city regularly.</td>
<td>It is forbidden to be discharged to the surface waters. It should not harm the water environment</td>
<td>3</td>
<td>3</td>
<td>Constuctor</td>
<td>Supervisor</td>
</tr>
<tr>
<td>construction phase</td>
<td>construction wastewater</td>
<td>Set up sedimentation basin at bus transit hub at the Railway Station north square PT interchanges, reconstruction of Zhongzhan bus depot and Macun bus depot, Dongxuegu bus maintenance depot, Yimen bus depot, Dabeizhang bus depot. The water will be used for water spray after oil separation treatment.</td>
<td>It is forbidden to be discharged to the surface waters. It should not harm the water environment</td>
<td>6</td>
<td>6</td>
<td>Constuctor</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Waste gas</td>
<td>dust</td>
<td>Equip with small sprinkler at bus transit hub at the Railway Station north square PT interchanges, reconstruction of Zhongzhan</td>
<td>Reduce the dust impact</td>
<td>6</td>
<td>30</td>
<td></td>
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<tr>
<td>Waste Type</td>
<td>Details</td>
<td>Quantity</td>
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<td></td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Set up garbage bins in the construction camp of Dongxuegu bus maintenance depot, Yimen bus depot, Dabeizhang bus depot. The life garbage should be collected and carried away by municipal departments at daily base.</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clean daily and to ensure the sanitation of the area</td>
<td>1.5</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Recycle properly as much as possible. It is forbidden to stack. Do not impact the regional environment</td>
<td>250 m³</td>
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<td></td>
<td>Prevention and control of soil and water erosion</td>
<td>87.57</td>
<td></td>
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</tr>
<tr>
<td>Life Garbage</td>
<td>Set up billboards at the Railway Station north square PT interchanges, reconstruction of Zhongzhan bus depot and Macun bus depot, Dongxuegu bus maintenance depot, Yimen bus depot, Dabeizhang bus depot. The water will be used for water spray after treatment.</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Construction Waste</td>
<td>Clean timely and send to Jiaozuo Weitai Environmental Friendly Building Materials Co., Ltd.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conduct slope protection on both sides of the road in construction and restore the vegetation after the construction is completed.</td>
<td></td>
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<td>Meet the integrated wastewater discharge standard</td>
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<td>No.</td>
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<td>-----------------</td>
<td>------------------------</td>
<td>-------------------</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15</td>
<td>Yimen bus depot sewage</td>
<td>After the treatment of “separation tank + coagulation sedimentation”, at a 70 m³/d scale, the wastewater will be sent to Jiaozuo No.2 Sewage Treatment Plant by pipe network.</td>
<td>Meet the integrated wastewater discharge standard (GB8978-1996) Level 3 standard</td>
<td>1 15</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15</td>
<td>Dayimen bus depot sewage</td>
<td>After the treatment of “separation tank + coagulation sedimentation”, at a 100 m³/d scale, the wastewater will be sent to Jiaozuo No.2 Sewage Treatment Plant by pipe network.</td>
<td>Meet the integrated wastewater discharge standard (GB8978-1996) Level 3 standard</td>
<td>1 20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Zhongzha bus depot sewage</td>
<td>After the treatment of “separation tank + coagulation sedimentation + biological contact oxidation” at a 50 m³/d scale, the wastewater will be sent to Western Industrial cluster Sewage Treatment Plant</td>
<td>Meet the integrated wastewater discharge standard (GB8978-1996) Level 3 standard</td>
<td>1 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Dongxueg u bus maintenance depot sewage</td>
<td>After the treatment of “separation tank + coagulation sedimentation”, at a 50 m³/d scale, the wastewater will be sent to Jiaozuo No.2 Sewage Treatment Plant by pipe network.</td>
<td>Meet the integrated wastewater discharge standard (GB8978-1996) Level 3 standard</td>
<td>1 15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Wast e gas Oil gas in gas station</td>
<td>Install one set of oil and gas recovery unit</td>
<td>Reduce the unorganized waste gas emission</td>
<td>4 40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- GB8978-1996: China's standard for integrated wastewater discharge.
- Level 3 standard: Refers to the third level of discharge standards.
<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Description</th>
<th>Action</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint spray waste gas</td>
<td>One set of activated carbon adsorption device and a set of 15 m vent pipe</td>
<td>Meet the integrated air pollutants discharge standard (GB16297-1996) level 2 standard</td>
<td>1 15</td>
</tr>
<tr>
<td>Noise</td>
<td>Dongxuegu Bus maintenance depot should set one maintenance room, where noisy equipment should be installed with shock pad and silencer.</td>
<td>/</td>
<td>1 10</td>
</tr>
<tr>
<td>Domestic garbage</td>
<td>Set up rubbish pool in each depot and clean the domestic garbage every day.</td>
<td>Ensure the sanitation of the area</td>
<td>5 5</td>
</tr>
<tr>
<td>Sludge</td>
<td>Set up a sludge dewatering plate and frame filter press in each depot</td>
<td>After adding the lime, and through plate pressure filtration dewatering to 60% and a short storage in the 10 m² sludge room, the sludge should be sent to Jiaozuo City Garbage Disposal Station.</td>
<td>5 10</td>
</tr>
<tr>
<td>Solid waste</td>
<td>Set up a 10 m² sludge storage room,</td>
<td>Set up a 10 m² sludge storage room,</td>
<td>5 10</td>
</tr>
<tr>
<td>Waste oil</td>
<td>Set up a 20 m² hazardous waste storage room in Dongxuegu maintenance depot. Set up a 10 m² hazardous waste storage room in the bus depot at Zhongzhan, Macun, Yimen and Dabeizhang. After short storage, the waste oil is collected by Jiaozuo Shunhe Materials Recycling co., LTD for safe disposal.</td>
<td>Get effective treatment without pollution to the environment</td>
<td>5 50</td>
</tr>
</tbody>
</table>
Waste filter element, waste paint removal, waste activated carbon, waste rag

After stored within the hazardous waste storage room, it should be sent to Henan Tianchen Environmental Protection Technology co., LTD.

Get effective treatment without pollution to the environment

Reason prevention

Emergency equipment coping with accident risks

Emergency processing coping with accident risks

4 4

<table>
<thead>
<tr>
<th>Road</th>
<th>No.</th>
<th>Environmental sensitive sites</th>
<th>Nearest distance (m)</th>
<th>The positional relation with the road</th>
<th>General situation of the sensitive site</th>
<th>environmental influence</th>
</tr>
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<tbody>
<tr>
<td>Jiefang Road</td>
<td>1</td>
<td>Jiaozuo Traditional Chinese Medicine</td>
<td>43</td>
<td>south side</td>
<td>Hospital</td>
<td>Noise, atmosphere</td>
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</table>

Total 392.83
<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Building Name</th>
<th>Distance</th>
<th>Direction</th>
<th>Type</th>
<th>Noise/Ambience</th>
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<tbody>
<tr>
<td>2</td>
<td>Henan Polytechnic University staff residence</td>
<td>28 north side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Experiment Middle School</td>
<td>55 south side</td>
<td>School</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>First People’s Hospital of Jiaozuo</td>
<td>97 north side</td>
<td>School</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Aluminum Manufacture staff residents</td>
<td>54 east side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Wanfang School</td>
<td>36 west side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>Xinxin Home</td>
<td>26 east side</td>
<td>3 layers, brick structure</td>
<td>Noise, atmosphere</td>
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<tr>
<td>8</td>
<td>Xiaozhuang New Village residents</td>
<td>60 west side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>Ring Road First Primary School</td>
<td>24 north side</td>
<td>School</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Jiaozuo 22nd Middle School</td>
<td>36 north side</td>
<td>School</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>City Garden</td>
<td>44 south side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
<td></td>
<td></td>
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<tr>
<td>No.</td>
<td>Location</td>
<td>Distance (m)</td>
<td>Side</td>
<td>Type</td>
<td>Protection Status</td>
<td>Noise, Vibration</td>
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<tr>
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<tr>
<td>12</td>
<td>People’s Government of Shanyang District</td>
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<td>Administrative Office</td>
<td>Noise, atmosphere</td>
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<td>13</td>
<td>Yidaitianjiao Kindergarten</td>
<td>43</td>
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<td>School</td>
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<td>14</td>
<td>Yulanguan Tomb</td>
<td>12</td>
<td>east side</td>
<td>City-level culture relic protection site</td>
<td>Atmosphere, vibration</td>
<td></td>
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<tr>
<td>15</td>
<td>Qunying flume</td>
<td>30</td>
<td>east side</td>
<td>City-level culture relic protection site</td>
<td>Atmosphere, vibration</td>
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<tr>
<td>16</td>
<td>Tangyan valley song dynasty kilns</td>
<td>415</td>
<td>north side</td>
<td>National key culture relic protection site</td>
<td>Atmosphere</td>
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<tr>
<td>17</td>
<td>Niangniang Temple</td>
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<td>west side</td>
<td>County-level culture relic protection site</td>
<td>Atmosphere, vibration</td>
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<tr>
<td>18</td>
<td>Yuanrong Village</td>
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<td>north side</td>
<td>National 4A tourist attraction</td>
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<tr>
<td>19</td>
<td>Longsi cemetery</td>
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<td>south side</td>
<td>Material cultural relics, no relevant procedures</td>
<td>Atmosphere, vibration</td>
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<td>20</td>
<td>Longsi village</td>
<td>5</td>
<td>south side</td>
<td>1 layer, brick structure</td>
<td>Noise, atmosphere</td>
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<tr>
<td>21</td>
<td>Yanhe village</td>
<td>10</td>
<td>cross</td>
<td>1 layers, brick structure</td>
<td>Noise, atmosphere</td>
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<td>22</td>
<td>Longyuannhu park</td>
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<td>starting point</td>
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<td>city park</td>
<td>Noise, atmosphere</td>
</tr>
<tr>
<td>23</td>
<td>Renmin park</td>
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<td>cross</td>
<td>0</td>
<td>city park</td>
<td>Noise</td>
</tr>
<tr>
<td>No.</td>
<td>Location</td>
<td>Population</td>
<td>Distance</td>
<td>Side</td>
<td>Structure</td>
<td>Noise, Atmosphere</td>
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<td>24</td>
<td>Fengshan park</td>
<td>120</td>
<td>10</td>
<td>north side</td>
<td>city park</td>
<td>Noise</td>
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<td>25</td>
<td>Zhuguozhuang village</td>
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<td>2 layers, steel structure</td>
<td>Noise, atmosphere</td>
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<td>Litun village</td>
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<td>0</td>
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<td>Dongxuegu village</td>
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<td>2 layers, brick structure</td>
<td>Noise, atmosphere</td>
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<td>Dongdazhai village</td>
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<td>Noise, atmosphere</td>
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<td>29</td>
<td>Xiaobeizhang village</td>
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<td>6 layers, brick structure</td>
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<td>31</td>
<td>Xiwangfeng village</td>
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<td>north side</td>
<td>2 layers, brick structure</td>
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</tr>
<tr>
<td>32</td>
<td>residential settlement</td>
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<td>0</td>
<td>east side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
</tr>
<tr>
<td>33</td>
<td>residential settlement</td>
<td>20</td>
<td>0</td>
<td>south side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
</tr>
<tr>
<td>34</td>
<td>residential settlement</td>
<td>60</td>
<td>0</td>
<td>west side</td>
<td>Multilayer, steel structure</td>
<td>Noise, atmosphere</td>
</tr>
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<td>35</td>
<td>Yaoguoquzhuang village</td>
<td>50</td>
<td>0</td>
<td>east side</td>
<td>2 layers, brick structure</td>
<td>Noise, atmosphere</td>
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<tr>
<td></td>
<td>Public Security Bureau</td>
<td>36</td>
<td>Shuiyun village</td>
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</tbody>
</table>
Appendix 2   Category items environmental monitoring plan and budget detail

Attached table 2-1   Green transport Corridor Project monitoring plan and budget detail

<table>
<thead>
<tr>
<th>Monitoring Period</th>
<th>environment element</th>
<th>layout of the monitoring spots</th>
<th>monitoring project</th>
<th>monitoring frequency</th>
<th>price(RMB / phase)</th>
<th>annual cost(RMB /year)</th>
<th>Phase cost(RMB )</th>
<th>Total(RMB)</th>
<th>executable unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction phase (one year)</td>
<td>air</td>
<td>Set up 11 monitoring spots. Longwo village, Longsi village, Qunying river ditch, Wanglanguang tomb, Yuanrong Temple, Niangniang Temple, Dangyang song dynasty kiln, Renmin park, Fengshan park and Longyuanhu park</td>
<td>TSP</td>
<td>1 phase/month, 2 days/phase, one time/day</td>
<td>10800</td>
<td>129600</td>
<td>129600</td>
<td>180000</td>
<td>Qualified monitoring unit</td>
</tr>
<tr>
<td></td>
<td>water quality</td>
<td>Select randomly 2 construction camps in every phase and set up 3 monitoring sits in each camp: water outlet of construction site and machine maintenance area, sewage outlet of work shed and water outlet of concrete mixing</td>
<td>pH, COD, BOD₅, ammonia nitrogen, suspended solid, petroleum</td>
<td>1 phase/month, 2 days/phase, one time/day</td>
<td>1800</td>
<td>21600</td>
<td>21600</td>
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<tr>
<td>Year</td>
<td>Monitoring Locations</td>
<td>Measured Parameter</td>
<td>Frequency</td>
<td>LeqdB(A) 1 Phase/Year</td>
<td>LeqdB(A) 2 Days/Phase</td>
<td>LeqdB(A) One Time Night and Day</td>
<td>Invest Company of this Project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
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<td>-------------------------------</td>
<td>--------------------------------</td>
<td></td>
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</tr>
<tr>
<td>2023</td>
<td>Set up 11 monitoring spots. Longwo village, Longsi village, Qunying river ditch, Wanglanguang tomb, Yuanrong Temple, Niangniang Temple, Dangyang song dynasty klin, Renmin park, Fengshan park, Longyuanhu park</td>
<td>LeqdB(A)</td>
<td>1 phase/month, 2 days/phase, one time every night and day</td>
<td>2400</td>
<td>28800</td>
<td>28800</td>
<td>/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>Set up 11 monitoring spots. Longwo village, Longsi village, Qunying river ditch, Wanglanguang tomb, Yuanrong Temple, Niangniang Temple, Dangyang song dynasty klin, Renmin park, Fengshan park, Longyuanhu park</td>
<td>LeqdB(A)</td>
<td>phase/year, 2 days/phase, one time every night and day</td>
<td>2400</td>
<td>9600</td>
<td>19200</td>
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<td>Total (RMB)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>199200</td>
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</table>

Appendix 2-2  Safety System Integrated Corridor Project monitoring plan and budget detail
<table>
<thead>
<tr>
<th>Monitoring Period</th>
<th>Environment element</th>
<th>layout of the monitoring spots</th>
<th>monitoring project</th>
<th>monitoring frequency</th>
<th>price(RMB /period)</th>
<th>annual cost(RMB /year)</th>
<th>Phase cost(RMB)</th>
<th>Total(RMB)</th>
<th>executab le unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction phase (2 year)</td>
<td>Air</td>
<td>Set up 15 monitoring spots: Jiefang Road: He'nan Polytechnic University staff residence, Experiment Middle School, Jiazu Traditional Chinese Medicine Hospital outpatient department, First People's Hospital of Jiaozuo Ta'nan Road: Xiaozhuang New Village residents, Xinxin Home, Wanfang School, Aluminum Manufacture staff residents Renmin Road: City Garden, People's Government of Shanyang District, Yidaitianjiao Kindergarten, Ring Road First Primary School, Jiaozuo 22nd Middle School, Shuiyun Village, Yaoguozahung Village</td>
<td>TSP</td>
<td>1 phase/month, 2 days/phase, one time/day</td>
<td>9900</td>
<td>118800</td>
<td>237600</td>
<td>33360 0</td>
<td>Qualified monitoring unit</td>
</tr>
<tr>
<td>Water quality</td>
<td>In the construction camp of the training bases of TSA and Public Security Bureau, set up 3 monitoring sits in each camp:</td>
<td>pH, COD, BOD₅, ammonia nitrogen,</td>
<td>1 phase/month, 2 days/phase,</td>
<td>1800</td>
<td>21600</td>
<td>43200</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Noise Source</td>
<td>Monitoring Locations</td>
<td>Leq dB(A)</td>
<td>Phase/year</td>
<td>2 days/phase</td>
<td>One time/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction site water outlet, machine maintenance area, sewage outlet of work shed and water outlet of concrete mixing</td>
<td>Set up 15 monitoring spots: Jiefang Road: He'nan Polytechnic University staff residence, Experiment Middle School, Jiaozuo Traditional Chinese Medicine Hospital outpatient department, First People's Hospital of Jiaozuo Ta'nan Road: Xiaozhuang New Village residents, Xinxin Home, Wanfang School, Aluminum Manufacture staff residents Renmin Road: City Garden, People's Government of Shanyang District, Yidaitianjiao Kindergarten, Ring Road First Primary School, Jiaozuo 22nd Middle School, Shuiyun Village, Yaoguozahung Village</td>
<td>2200</td>
<td>26400</td>
<td>52800</td>
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<tr>
<td>Set up 15 monitoring spots: Jiefang Road: He'nan Polytechnic University staff residence, Experiment Middle School</td>
<td>LeqdB(A)</td>
<td>1 phase/month, 2 days/phase, One time every night and day</td>
<td>2200</td>
<td>8800</td>
<td>17600</td>
<td>22400</td>
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</tr>
<tr>
<td>Set up 15 monitoring spots: Jiefang Road: He'nan Polytechnic University staff residence, Experiment Middle School</td>
<td>LeqdB(A)</td>
<td>phase/year, 2 days/phase, One time</td>
<td>2200</td>
<td>8800</td>
<td>17600</td>
<td>22400</td>
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<td></td>
</tr>
<tr>
<td>Water quality</td>
<td>Set up 2 monitoring spots, located respectively in the water outlet of the training bases of TSA and Public Security Bureau</td>
<td>pH, COD, BOD&lt;sub&gt;5&lt;/sub&gt;, ammonia nitrogen, suspended solid, petroleum</td>
<td>4 phases/year, 2 days/phase, one time/day</td>
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<td>2400</td>
<td>4800</td>
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<tr>
<td>Construction and operation phase</td>
<td>Collect and submit the running state of the landfill field and the monitoring data regularly in due diligence</td>
<td>Invest company of this project</td>
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</table>
### Public Transport Infrastructure Development & Improvement Component monitoring plan and budget detail

<table>
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<th>Monitoring Period</th>
<th>Environment Element</th>
<th>Layout of the Monitoring Spots</th>
<th>Monitoring Frequency</th>
<th>Project</th>
<th>Monitoring Frequency</th>
<th>Price (RMB/period)</th>
<th>Annual Cost (RMB/year)</th>
<th>Phase Cost (RMB)</th>
<th>Total (RMB)</th>
<th>Executable Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction phase (2 years)</td>
<td>Air</td>
<td>Set up 6 monitoring spots, located in the Railway Station north square, residential buildings near Zhongzhan bus depot, residential buildings near Macun bus depot, Dongxuegu village, Yimengong village, Xiaobeizhang village</td>
<td>1 phase/month, 2 days/phase, one time/day</td>
<td>TSP</td>
<td>5400</td>
<td>64800</td>
<td>129600</td>
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<tr>
<td></td>
<td>Water</td>
<td>Monitor the 6 construction camps in the Railway Station north square PT interchanges, Zhongzhan bus depot, Machun bus depot, newly built Dongxuegu bus maintenance depot, Yimen bus depot and Dbeizhang bus depot respectively. Set up 3 monitoring sits in each camp: water outlet of construction site and pH, COD, BOD₅, ammonia nitrogen, suspended solid, petroleum</td>
<td>1 phase/month, 2 days/phase, one time/day</td>
<td>5400</td>
<td>64800</td>
<td>129600</td>
<td>259200</td>
<td>Qualified monitoring unit</td>
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<td>Component</td>
<td>Details</td>
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<td>14400</td>
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<td>Noise</td>
<td>Set up 6 monitoring spots, located in the Railway Station north square, residential buildings near Zhongzhan bus depot, residential buildings near Macun bus depot, Dongxuegu village, Yimengong village, Xiaobeizhang village</td>
<td>1200</td>
<td>2 days/phase, One time every night and day</td>
<td>1200</td>
<td>4800</td>
<td>9600</td>
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<td>(2 年) Operation phase(2 years)</td>
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<tr>
<td>Noise</td>
<td>Set up 6 monitoring spots, located in the Railway Station north square, residential buildings near Zhongzhan bus depot, residential buildings near Macun bus depot, Dongxuegu village, Yimengong village, Xiaobeizhang village</td>
<td>1500</td>
<td>2 days/phase, One time every night and day</td>
<td>1500</td>
<td>6000</td>
<td>12000</td>
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<td>Water quality</td>
<td>Set up 5 monitoring spots, located in the Zhongzhan bus depot, Macun bus depot, newly built Dongxuegu bus depot, Yimeng bus depot and Dabeizhang bus depot water outlet</td>
<td>pH, COD, BOD, ammonia,悬浮物,石油类</td>
<td>4 phases/year, 2 days/phase, one time /day</td>
<td>1500</td>
<td>6000</td>
<td>12000</td>
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<td>Construction and operation phase</td>
<td>Collect and submit the running state of the landfill field and the monitoring data regularly in due diligence</td>
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<td>Invest company of this project</td>
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<tr>
<td>Monitoring phase</td>
<td>Monitoring area</td>
<td>Monitoring content</td>
<td>Monitoring method</td>
<td>Monitoring spots</td>
<td>Monitoring frequency</td>
<td>Monitoring cost (1000 RMB)</td>
<td>Executive unit</td>
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<tr>
<td>Before the construction preparation phase</td>
<td>Project construction area</td>
<td>The status of the vegetation, soil, water and soil erosion, soil and water conservation</td>
<td>Field investigation, simple slope measurement</td>
<td>Monitor the background values of the construction area before the construction preparation phase</td>
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<tr>
<td>From the construction preparation phase to design level year (Jan. 2015 to Dec. 2018)</td>
<td>Safe System Integrated Corridor Construction Project</td>
<td>① Topography and landform changes; Dig fill quantity; land occupation, disturbed land space and destroyed vegetation space</td>
<td>On-site inspection, survey and measurement; positioning observation, simple water and soil loss observation spot</td>
<td>Set up 2 spots</td>
<td>① One time before and after the construction</td>
<td>① One time before, during and after the construction</td>
<td>Qualified monitoring unit</td>
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<td></td>
<td>Road construction</td>
<td>② temporary pile soil, discharged soil quantity, stacking height, slope and area; planting area, plant survival rates, and coverage rate; implementation quantity, quality, area of prevention and control measures</td>
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<td>3. Soil and water loss in the project</td>
<td>One time before, during and after the flood season and one more time after heavy rain</td>
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<td>5. Water erosion rate before and after the water conservation measures</td>
<td>One time before June and after September; one time in June, July, August and September; one more time after heavy rain</td>
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<td><strong>Base construction</strong></td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 2 spots</td>
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<td>Same as the road construction area</td>
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<td><strong>Production and life area of construction</strong></td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 1 spot</td>
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<td>Same as the road construction area</td>
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<td><strong>Green Tourist Corridor Construction Project</strong></td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 2 spots</td>
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<td>Roadbed construction</td>
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<td>Same as the road construction area</td>
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<tr>
<td>Activity</td>
<td>Area Description</td>
<td>Methodology</td>
<td>Setup</td>
<td>Overview</td>
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<td>Crossing construction</td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement</td>
<td>Set up 1 spot</td>
<td>Same as the road construction area①③④⑤</td>
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<td>Bridge construction</td>
<td>Same as the road construction area①③④⑤</td>
<td>On-site inspection, survey and measurement</td>
<td>Set up 1 spot</td>
<td>Same as the road construction area①③④⑤</td>
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<td>Construction road</td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 1 spot</td>
<td>Same as the road construction area</td>
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<tr>
<td>Production and life area of construction</td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 1 spot</td>
<td>Same as the road construction area</td>
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Public Transport Infrastructure Development & Improvement
<table>
<thead>
<tr>
<th></th>
<th>Depot construction</th>
<th>Same as the road construction area</th>
<th>On-site inspection, survey and measurement; positioning observation</th>
<th>Set up 3 spots</th>
<th>Same as the road construction area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and life area of construction</td>
<td>Same as the road construction area</td>
<td>Same as the road construction area</td>
<td>On-site inspection, survey and measurement; positioning observation</td>
<td>Set up 1 spot</td>
<td>Same as the road construction area</td>
</tr>
</tbody>
</table>
Attached map 1 Environment protection targets map