



# Environmental Monitoring Report

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Project Number: 34097  
September 2007

## PRC: SHANXI ROAD DEVELOPMENT II PROJECT Quarterly Report No. 12 on Environment Monitoring in Construction Period

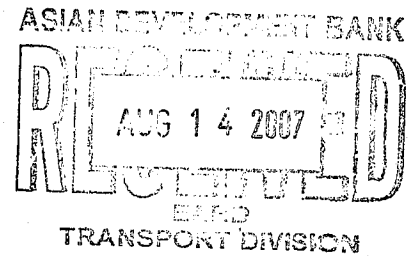
Prepared by Shanxi Environment Monitoring & Testing Center of Communications  
Shanxi, People's Republic of China

For Shanxi Hou-yu Expressway Construction Co. Ltd.

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SHANXI ROAD DEVELOPMENT PROJECT-II  
SHANXI HOUMA - YUMENKOU EXPRESSWAY



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**QUARTERLY REPORT NO. 12**  
**ON ENVIRONMENT MONITORING**  
**IN CONSTRUCTION PERIOD**

Shanxi Environment Monitoring & Testing Center of Communications  
June, 2007

**Project Name:**

**Environment Monitoring in Construction Period**  
For Shanxi Houma-Yumenkou Expressway

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- b) All the data presented in the report are ensured to be scientific, accurate and objective.
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### **Foreword**

Shanxi Houma-Yumenkou Expressway is a part of national trunk road from Erlianhot to Hekou. It's also an integral section of provincial latitude road network in Shanxi. After this project is completed, it will greatly improve the local traffic situation, which is very conducive to the economic development in Shanxi.

This project began in May 2004, and the expected construction period is three years. Entrusted by Shanxi Hou-yu Expressway Construction Co. Ltd, Shanxi Environmental Monitoring & Testing Center (SEMTC) carried out systematic environment monitoring test along the Project alignment from April to June in 2007. In our working process, we strictly followed the regulations issued by the State Environmental Protection Bureau, Shanxi Provincial Environmental Protection Bureau and Shanxi Provincial Communications Department. Based on the monitoring results, we compiled this quarterly report in construction period.

Finally, we would like to acknowledge support and cooperation that Shanxi Hou-yu Expressway Construction Co. Ltd has given us in the monitoring work.

## ENVIRONMENT MONITORING IN CONSTRUCTION PERIOD QUARTERLY REPORT No. 12

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### 1. General Introduction

#### 1.1 Geographic Position & Direction of the Expressway

The proposed Shanxi Houma-Yumenkou Expressway is located at 35°23' to 36°55' N and 110°15' to 112°23'E in southwest of Shanxi province, and its entire length is 66.84km. It is a section of national trunk road from Erlianhot to Hekou. This road is started from Houma traffic hub, passing through Xinjiang county, Jishan county and Hejin city and crossing over Yellow River, and finally ended at a place near Xiyaqian in Shaanxi province.

#### 1.2 Basis for Work

This investigation was based on the contract of Shanxi Houma-Yumenkou Expressway Environmental Monitoring and relevant requirements in the Environment Impact Assessment (EIA).

#### 1.3 Guides & Purpose

This investigation was focused on air quality, noise along the line. We adopted objective working principle and strictly followed relevant environmental monitoring regulations of various levels. Through this assessment on environmental situation along the line, we can provide scientific information for environmental protection of this expressway, which is beneficial to the coordinated development between road construction and environmental protection.

#### 1.4 Monitoring Period and General Situation of Road Construction

We took the samples three times from January 15 to March 9 when the highway <sup>in 2007</sup> had been in normal operation.

#### 1.5 Evaluation Standards of Environment Quality

Construction companies should follow the regulations of environmental protection approved by relevant administrations in the period of project design, construction, acceptance test and its operation. This rule was stated in No.3 document, with its name of Management on Environmental Protection Standards issued by China environmental protection agency in 1999. So we implemented these environmental protection standards in the monitoring work of road construction period. For what was not mentioned in previous regulations, we follow current environmental protection standards according to the practical conditions.

##### a) Environmental Air

Total suspended particle ( TSP ) should meet standard of Class II demanded in "Quality Standards of the Environmental Air" ( GB3095-1996 ). The standard value is listed in table 1-1.

Table1-1 Environmental air quality standard (extracted)

Name of pollutant		Limited value ( mg/m <sup>3</sup> )
TSP	Day average	0.30

#### b) Environmental Noise

The tested value of environmental noise along the expressway should meet the standard type No.4, stipulated in the book "Environmental Noise Standards for Urban Area ( GB3096-93 ) ", which is listed as follow.

Table1-2 Environmental Noise Standard for Urban Area (extracted)

Leq: dB (A)

Noise type	Daytime	Night
No.4	70	55

## 1.6 Assurance for Monitoring Quality

Following the related requirements in the document of SEPA(91) HJZ No.043 About Management Regulations of Environmental Monitoring Quality Guarantee ( interim ) , we have worked out a "Quality Control Plan" and strictly carry out it to ensure the correctness of the data. Including:

- All monitoring personnel are qualified and certified.
- All monitoring instruments employed by our center must be checked by authoritative measuring bureau before use in order to guarantee the reliability of test data.
- Strictly follow the test methods stipulated in the related standards of the state.

## 2 Monitoring Results of Environment Quality

### 2.1 Monitoring Results on Air Quality & Analysis

#### 2.1.1 Monitoring Analysis Methods

See Table 2-1 for monitoring analysis methods

Table 2-1 Monitoring analysis method for environmental air

Tested item	Testing method	Method number
TSP	Gravimetric method	GB/T15432-95



## 2.1.2 Monitored Points, Items and Times

See Table 2-2 for monitoring points, items and times

Table 2-2 Monitored points, items and times

Order	Monitored points	chainage	Monitored item	Monitoring frequency
1	BeiPingYuan	K0+500	TSP	Testing for 3 consecutive days with at least 12 hours for sampling every day
2	DongHang	K14+300		
3	FuBo	K44+500		
4	CangTou school	K58+250		

## 2.1.3 Monitoring Results and its Analysis

See Table 2-3 for monitoring results

Table 2-3 Monitoring results of environmental air unit :  $\text{mg}/\text{m}^3$ 

Item	Monitored points	Measured values								
		April			May			June		
		3h	4th	5 th	7 th	8th	9 th	10th	11th	12 th
TSP	BeiPingYuan	0.41	0.31	0.36	0.34	0.31	0.36	0.35	0.32	0.36
	DongHan	0.33	0.33	0.38	0.35	0.30	0.36	0.35	0.35	0.31
	FuBo	0.37	0.30	0.34	0.31	0.38	0.34	0.33	0.36	0.30
	CangTou school	0.40	0.33	0.38	0.39	0.35	0.36	0.35	0.35	0.30

mostly  
exceeded  
limits?

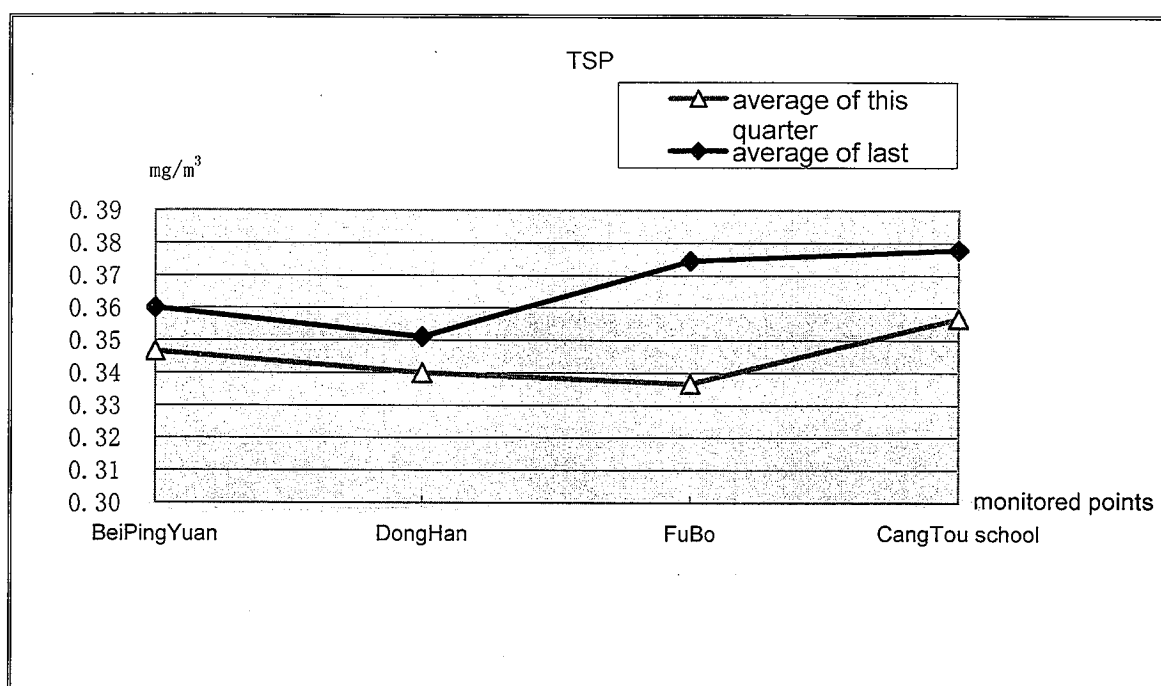
Table 2-4 Statistical table of monitoring results on environmental air

order	Tested points	Range of measured data ( $\text{mg}/\text{m}^3$ )	average ( $\text{mg}/\text{m}^3$ )	Overproof multiple	Maximum overproof multiple
1	BeiPingYuan	0.31-0.41	0.35	0.17	0.37
2	DongHan	0.30-0.38	0.34	0.13	0.27
3	FuBo	0.30-0.38	0.34	0.13	0.27
4	CangTou school	0.30-0.40	0.36	0.20	0.33
Standard value		0.30			

### 2.1.4 Analysis of Air Monitoring Results

Analysis of monitoring results: The range of TSP values in 3 months is from 0.30 mg/m<sup>3</sup> to 0.41mg/m<sup>3</sup>. The average of every tested point in 3 months all exceed standard value. The overproof multiples are between 0.13 and 0.20. The maximum overproof multiple this time is 0.37

### 2.1.5 Analysis of Air Quality Variation



Graph 1: Quarterly variation of air quality

From the graph above, we can learn that the averages of TSP values in 4 sensitive points are dropped compared with that of last quarter.

## 2.2 Monitoring Results on Noise & Analysis

### 2.2.1 Monitoring Method

Measurement was conducted according to GB/T14623-93 "Measurement Method for Environmental Noise in Urban Area". Monitoring instrument: Model HS6288D sound level meter.

### 2.2.2 Monitoring Points, Items and Times

See table 2-5 for Monitoring Points, Items and Times

Table 2-5 Monitoring points for noise and times

Order	Monitored points	About monitoring points	monitored item	Frequency
1	BeiPingYuan	Residential area with roughly 400 inhabitants	Noise : equivalent acoustic level A	Measuring once at daytime and night respectively
2	ShuiXizhuang	Residential area with roughly 500 inhabitants		
3	DongHan	Residential area with roughly 500 inhabitants		
4	FuBo	Residential area with roughly 800 inhabitants		
5	XinFeng	Residential area with roughly 700 inhabitants		
6	LingLi	Residential area with roughly 600 inhabitants		
7	CangTou	Residential area with roughly 1700 inhabitants		
8	CangTou school	300 students		

### 2.2.3 Analysis on Monitoring Results

Monitoring results for noise is listed in table 2-6

Table 2-6 Monitoring results for noise

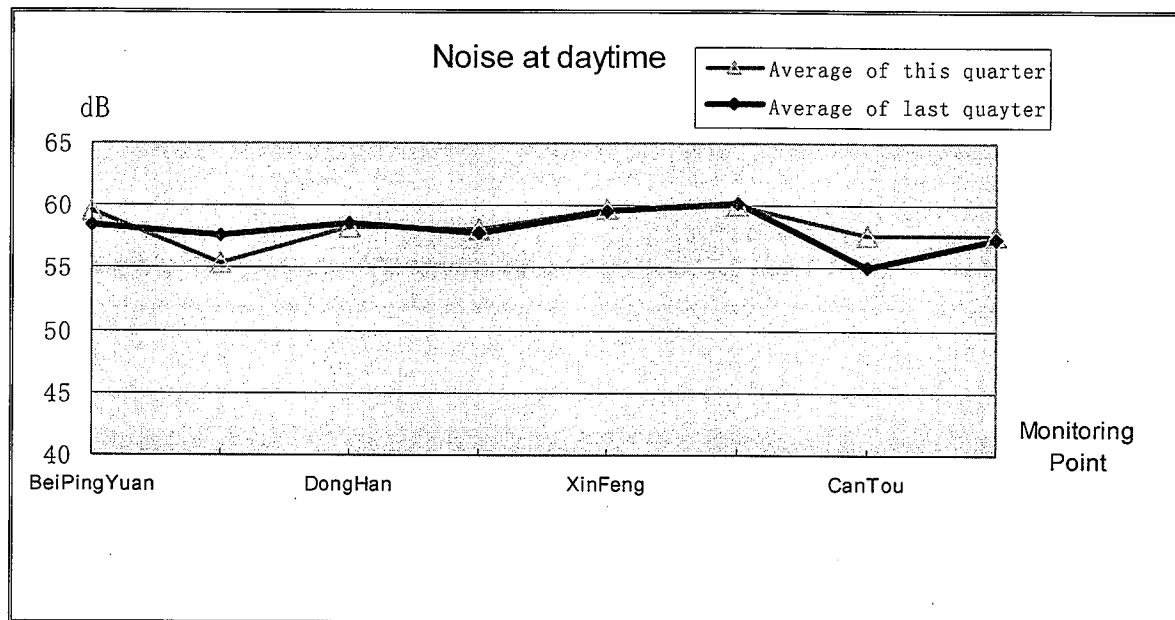
No.	Monitored points (villages)	Leq dB(A)					
		April		May		June	
		day	night	day	night	day	night
1	BeiPingYuan	57.2	51.2	61.3	52.1	60.1	51.4
2	ShuiXiZhuang	53.8	49.5	55.4	48.6	56.8	49.0
3	DongHan	57.8	52.7	59.6	51.4	57.6	51.0
4	FuBo	57.3	50.2	57.3	50.5	59.8	48.6
5	XinFeng	58.5	52.5	60.7	51.8	60.0	49.8
6	LingLi	59.5	52.0	59.6	50.6	61.2	51.6
7	CangTou	57.6	51.6	58.6	52.6	56.8	50.8
8	CangTou school	56.8	48.6	58.1	50.8	57.9	48.4

### 2.2.4 Noise Monitoring Results & its Analysis

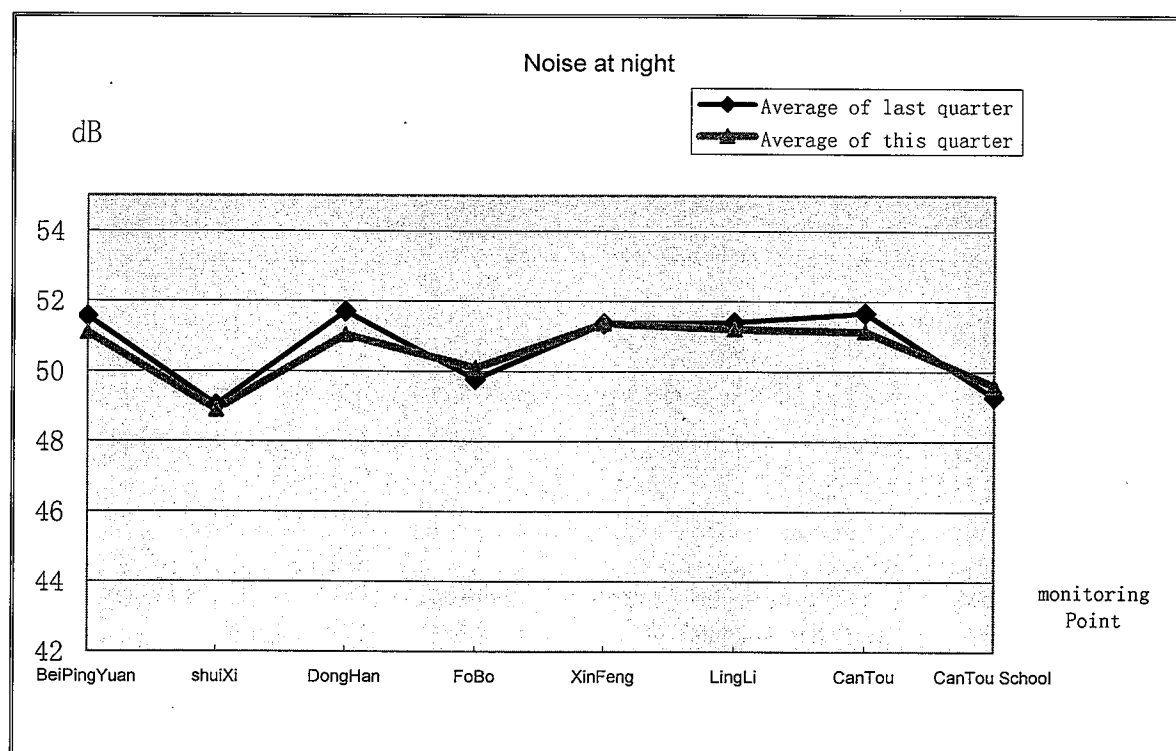
(1) The recorded results are between 53.8dB and 61.3dB on 8 monitored points at day time, which all meet the limited value, 70dB.

(2) The results between 48.4 dB and 52.7 dB are recorded on 8 monitored points at night. All meet the requirement of limited value, 55 dB.

### 2.2.5 Analysis on Environmental Noise Quality Variation



Graph2: Quarterly variation of noise at daytime



Graph3: Quarterly variation of noise at night

From the chart above, we can see that environmental noise quality basically keeps stable compared with last quarter.

### 3 Environmental Quality Assessment

The expressway has gone into normal operation this quarter. TSP values exceed limited standard, but monitored values are close to that of last quarter. Monitored noise values at all sensitive points meet current standard. For noise limit 70dB in the daytime, there is relatively big environmental capacity this quarter, but at night, due to higher tested noise values, environmental capacity is smaller in respect of noise limit 55dB.

**Appendix:**

Measured meteorological data along the HouYu expressway

Time Point		April 3th				April 4th				April 5th			
		Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction
Bei Ping Yuan	7:00	10	97.2	windless	-	10	97.2	windless	-	9	97.2	windless	-
	11:00	19	97.2	windless	-	19	97.2	windless	-	17	97.2	windless	-
	15:00	21	97.1	windless	-	21	97.1	windless	-	21	97.1	windless	-
	19:00	17	97.1	windless	-	17	97.1	windless	-	17	97.1	windless	-
Dong Han	7:00	10	96.5	windless	-	10	96.5	windless	-	9	96.6	windless	-
	11:00	19	96.5	windless	-	19	96.5	windless	-	17	96.6	windless	-
	15:00	21	96.6	windless	-	21	96.6	windless	-	21	96.4	windless	-
	19:00	17	96.6	windless	-	17	96.6	windless	-	17	96.4	windless	-
FuBo	7:00	10	97.1	windless	-	10	97.1	windless	-	9	97.3	windless	-
	11:00	19	97.7	windless	-	19	97.7	windless	-	17	97.4	windless	-
	15:00	21	97.3	windless	-	21	97.3	windless	-	21	97.3	windless	-
	19:00	16	96.9	windless	-	16	96.9	windless	-	17	97.3	windless	-
Cang Tou school	7:00	10	96.9	windless	-	10	96.9	windless	-	9	97.0	windless	-
	11:00	18	96.9	windless	-	18	96.9	windless	-	17	97.0	windless	-
	15:00	21	97.8	windless	-	21	97.8	windless	-	21	97.2	windless	-
	19:00	17	97.8	windless	-	17	97.8	windless	-	17	97.2	windless	-

**Note:** related units in this table: "°C" for air temperature, "kpa" for atmospheric pressure, "m/s" for wind velocity, degree"°" for wind direction.

**Appendix:**

Measured meteorological data along the houyu expressway

Time Point		May 7th				May 8th				May 9th			
		Air temperature	Air pressure	wind velocity	Wind direction	Air temperature	Air pressure	Wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction
Bei Ping Yuan	7:00	19	97.7	windless	-	20	97.7	windless	-	24	97.8	windless	-
	11:00	25	97.3	windless	-	25	97.3	windless	-	28	97.3	windless	-
	15:00	29	97.1	windless	-	28	97.1	windless	-	30	97.1	windless	-
	19:00	26	97.1	windless	-	25	97.1	windless	-	27	97.1	windless	-
Dong Han	7:00	19	96.6	windless	-	20	96.6	windless	-	24	96.8	windless	-
	11:00	25	96.5	windless	-	25	96.6	windless	-	28	96.8	windless	-
	15:00	29	96.5	windless	-	28	96.6	windless	-	30	96.8	windless	-
	19:00	26	96.5	windless	-	25	96.6	windless	-	27	97.1	windless	-
FuBo	7:00	19	96.8	windless	-	20	96.5	windless	-	24	96.5	windless	-
	11:00	25	96.8	windless	-	25	96.6	windless	-	28	96.5	windless	-
	15:00	28	96.7	windless	-	28	96.6	windless	-	30	96.6	windless	-
	19:00	24	96.7	windless	-	25	96.5	windless	-	27	96.6	windless	-
Cang Tou school	7:00	19	96.8	windless	-	20	97.2	windless	-	24	97.2	windless	-
	11:00	25	96.8	windless	-	25	97.1	windless	-	28	97.1	windless	-
	15:00	29	97.6	windless	-	28	97.2	windless	-	30	96.6	windless	-
	19:00	26	97.6	windless	-	25	97.2	windless	-	27	96.6	windless	-

**Note:** related units in this table: “°C” for air temperature, “kpa” for atmospheric pressure, “m/s” for wind velocity, degree“°” for wind direction.

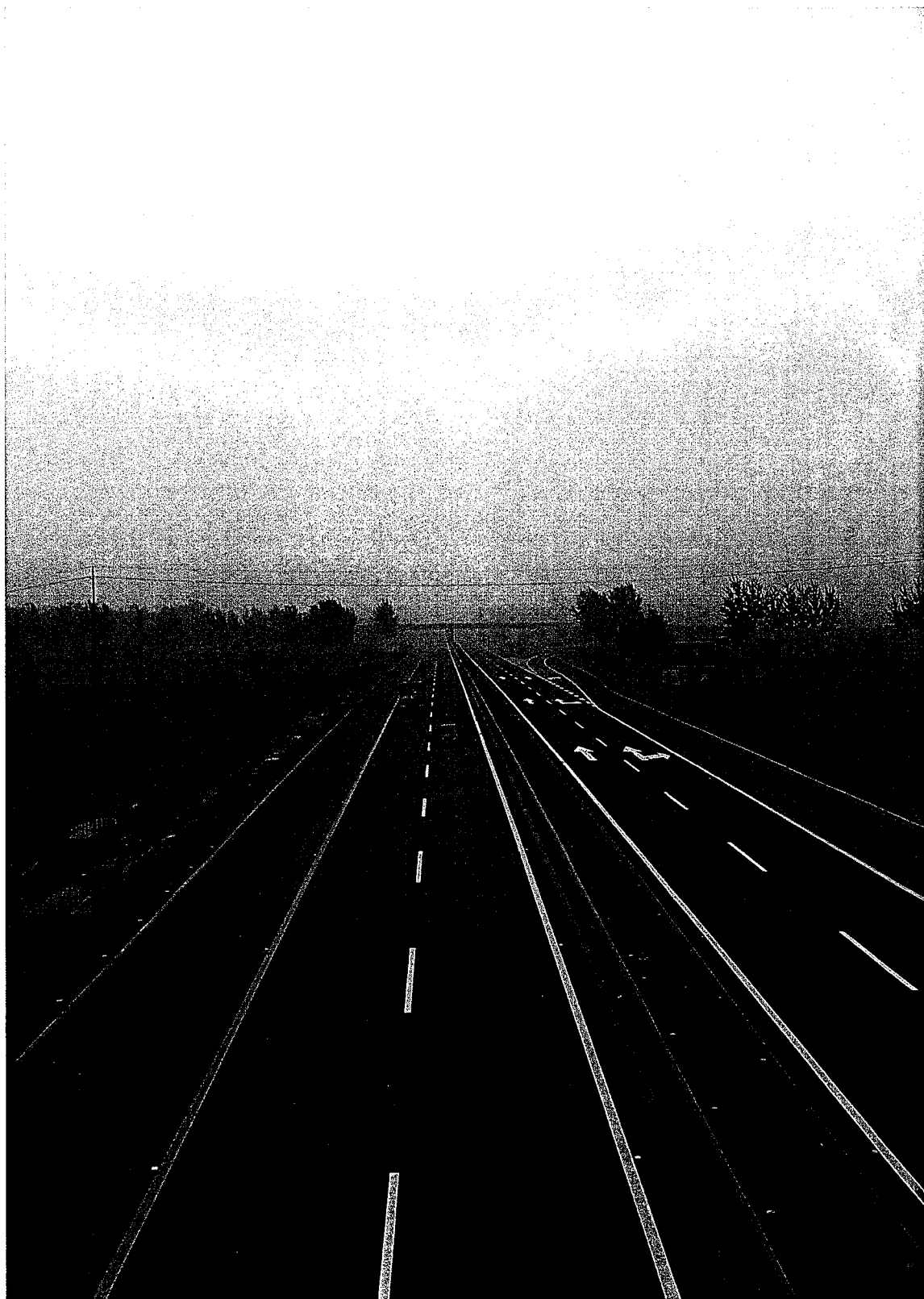
**Appendix:**

Measured meteorological data along the HouYu expressway

Time Point		June 10th				June 11th				June 12th			
		Air temperature	Air pressure	wind velocity	Wind direction	Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	Wind direction
Bei Ping Yuan	7:00	19	95.1	windless	-	21	95.1	windless	-	20	95.1	windless	-
	11:00	26	95.1	windless	-	26	95.1	windless	-	26	95.1	windless	-
	15:00	31	95.0	windless	-	33	95.0	windless	-	34	95.0	windless	-
	19:00	23	95.0	windless	-	25	95.0	windless	-	26	95.0	windless	-
Dong Han	7:00	20	95.0	windless	-	22	95.0	windless	-	20	95.0	windless	-
	11:00	26	95.0	windless	-	27	95.0	windless	-	26	95.0	windless	-
	15:00	30	94.9	windless	-	34	94.9	windless	-	31	94.9	windless	-
	19:00	23	94.9	windless	-	25	94.9	windless	-	25	94.9	windless	-
FuBo	7:00	19	94.7	windless	-	21	94.7	windless	-	20	94.7	windless	-
	11:00	25	94.7	windless	-	25	94.7	windless	-	25	94.7	windless	-
	15:00	31	94.6	windless	-	33	94.6	windless	-	33	94.6	windless	-
	19:00	24	94.6	windless	-	25	94.6	windless	-	27	94.6	windless	-
Cang Touschool	7:00	20	95.6	windless	-	20	95.6	windless	-	20	95.6	windless	-
	11:00	26	95.5	windless	-	28	95.5	windless	-	26	95.5	windless	-
	15:00	32	95.5	windless	-	34	95.5	windless	-	34	95.5	windless	-
	19:00	24	95.6	windless	-	26	95.6	windless	-	26	95.6	windless	-

**Note:** related units in this table: “°C” for air temperature, “kpa” for atmospheric pressure, “m/s” for wind velocity, degree“°” for wind direction.





Hou-yu Expressway