THIS CIRCULAR IS IMPORTANT AND REQUIRES YOUR IMMEDIATE ATTENTION

If you are in any doubt as to any aspect of this circular or as to the action to be taken, you should consult your licensed securities dealer, bank manager, solicitor, professional accountant or other professional adviser.

If you have sold or transferred all your shares Zhejiang Expressway Co., Ltd., you should at once hand this circular with the enclosed form of proxy to the purchaser or transferee or to the bank, licensed securities dealer or other agent through whom the sale or transfer was effected for transmission to the purchaser or transferee.

Hong Kong Exchanges and Clearing Limited and The Stock Exchange of Hong Kong Limited take no responsibility for the contents of this circular, make no representation as to its accuracy or completeness and expressly disclaim any liability whatsoever for any loss howsoever arising from or in reliance upon the whole or any part of the contents of this circular.

浙江滬杭甬高速公路股份有限公司
ZHEJIANG EXPRESSWAY CO., LTD.

(A joint stock limited company incorporated in the People's Republic of China with limited liability)

(Stock code: 0576)

(1) DISCLOSEABLE AND CONNECTED TRANSACTION IN RELATION TO THE PROPOSED ACQUISITION OF ENTIRE EQUITY INTEREST IN THE TARGET
(2) PROPOSED MID-TERM NOTES ISSUE
AND
(3) NOTICE OF EXTRAORDINARY GENERAL MEETING

Financial Adviser to the Company on H Share General Mandate

CICC 中金公司

Independent Financial Adviser to the Independent Board Committee and the Independent Shareholders of Zhejiang Expressway Co., Ltd.

八方金融有限公司 OCTAL Capital Limited

A letter from the Board is set out from pages 5 to 22 of this circular.

A letter from the Independent Board Committee is set out on page 23 of this circular.

A letter from Octal Capital Limited, the Independent Financial Adviser, containing its recommendations to the Independent Board Committee and the Independent Shareholders is set out on pages 24 to 48 of this circular.

A notice for convening the extraordinary general meeting (the "**EGM**") of the Company to be held at 10:00 a.m. on Monday, March 4, 2019 at 5/F, No. 2 Mingzhu International Business Center, 199 Wuxing Road, Hangzhou City, Zhejiang Province, the PRC is set out on pages EGM-1 to EGM-4 of this circular.

A form of proxy for the EGM is enclosed with this circular. Whether or not you are able to attend the EGM, you are requested to complete and return the enclosed form of proxy in accordance with the instructions printed thereon. In case of H Shares, the proxy form shall be lodged with the Company's H Shares Registrar, Computershare Hong Kong Investor Services Limited, at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong, not less than 24 hours before the time for holding the EGM (or any adjournment thereof). Completion and delivery of the form of proxy will not preclude you from attending and voting in person at the EGM or any adjournment thereof should you so wish.

January 15, 2019

CONTENT

In this circular, unless the context specifies otherwise, the following expressions shall have the meanings stated below:

"Acquisition"	the proposed acquisition of 100% equity interest in the Target by the Company from Communications Group pursuant to the Equity Purchase Agreement
"associate(s)"	has the meaning ascribed to it under the Listing Rules
"Announcement"	the announcement dated December 13, 2018 made by the Company in relation to the Acquisition and the Mid-term Notes Issue
"Board"	the board of Directors of the Company
"business day"	any day other than a Saturday or Sunday or a public holiday in the PRC, on which banks are generally open for business in the PRC
"Communications Group"	Zhejiang Communications Investment Group Co., Ltd.* (浙江省交通投資集團有限公司), a wholly State-owned enterprise established in the PRC on December 29, 2001 and the controlling shareholder of the Company
"Company"	Zhejiang Expressway Co., Ltd. (浙江滬杭甬高速公路股份有限公司), a joint stock limited company established in the PRC on March 1, 1997, whose shares are listed on the main board of the Stock Exchange
"Completion"	completion of the Acquisition pursuant to the Equity Purchase Agreement
"connected person(s)"	has the meaning ascribed to it under the Listing Rules
"controlling shareholder"	has the meaning ascribed to it under the Listing Rules
"Consideration"	the total consideration of RMB2,943,000,000 (equivalent to approximately HK$3,397,206,510.45) payable by the Company to Communications Group for the Acquisition in accordance with the Equity Purchase Agreement
"Deloitte"	Deloitte Touche Tohmatsu, the auditors of the Company
"Director(s)"	directors of the Company
"Equity Purchase Agreement"	the equity purchase agreement dated December 13, 2018 entered into between the Company and Communications Group in relation to the Acquisition, pursuant to which the Company conditionally agreed to purchase from Communications Group the entire equity interest in the Target

"Financial Adviser"	China International Capital Corporation Hong Kong Securities Limited, the financial adviser of the Company
"Group"	the Company and its subsidiaries
"H Shares"	the overseas listed foreign shares of RMB1.00 each in the share capital of the Company which are primarily listed on the Hong Kong Stock Exchange and traded in Hong Kong dollars since May 15, 1997
"HK$"	Hong Kong dollars, the lawful currency of Hong Kong
"Hong Kong"	Hong Kong Special Administrative Region of the PRC
"Independent Board Committee"	an independent committee of the Board comprising all independent non-executive Directors, namely, Mr. PEI Ker-Wei, Ms. LEE Wai Tsang, Rosa, and Mr. CHEN Bin
"Independent Financial Adviser" or "Octal Capital"	Octal Capital Limited, a corporation licensed to carry out Type 1 (dealing in securities) and Type 6 (advising on corporate finance) under Securities and Futures Ordinance, being the independent financial adviser appointed by the Company to advise the Independent Board Committee and the Independent Shareholders
"Independent Shareholders"	Shareholders who are independent within the meaning of the relevant provisions of the Listing Rules, and, in relation to the approval of the Acquisition at a general meeting to be convened by the Company for such purpose, means the Shareholders other than Communications Group and its associates
"independent third party(ies)"	any party independent and not connected with the Company, any of its subsidiaries or any of their respective directors or substantial shareholders
"Jones Lang LaSalle"	Jones Lang LaSalle Corporate and Appraisal Advisory Limited, an independent valuer appointed by the Company
"Latest Practicable Date"	January 11, 2019, being the latest practicable date prior to the publication of this circular for ascertaining certain information contained herein
"Listing Rules"	the Rules Governing the Listing of Securities on the Stock Exchange, as amended, supplemented or otherwise modified from time to time
"Mid-term Notes"	the mid-term notes of no more than RMB3,000,000,000 (equivalent to approximately HK$3,463,003,578.44) proposed to be issued by the Company
"Mid-term Notes Issue"	the offer and issuance of the Mid-term Notes

"percentage ratio"	has the meaning ascribed to it under Rule 14.04(9) of the Listing Rules
"PRC"	the People's Republic of China which, for the purpose of this circular only, excludes Hong Kong, the Macau Special Administrative Region of the PRC and Taiwan
"PRC Domestic Valuer"	Tianyuan Appraisal Co., Ltd.* (天源資產評估有限公司), a PRC qualified domestic valuer appointed by Communications Group
"PRC Valuation Report"	the valuation report dated November 30, 2018 prepared by the PRC Domestic Valuer and commissioned by Communications Group in respect of the Target
"RMB"	Renminbi, the lawful currency of the PRC
"SFO"	Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong)
"Shareholder(s)"	holder(s) of the Share(s)
"Stock Exchange"	The Stock Exchange of Hong Kong Limited
"subsidiary(ies)"	has the meaning ascribed to it under the Listing Rules
"substantial shareholder(s)"	has the meaning ascribed to it under the Listing Rules
"Target"	Zhejiang Shenjiahuhang Expressway Co., Ltd.* (浙江申嘉湖杭高速公路有限公司), a limited company established in the PRC and a wholly owned subsidiary of Communications Group as at the Latest Practicable Date
"Traffic Study Report"	the traffic and toll revenue forecasts report dated November 22, 2018 prepared by WB Group Consulting (Shenzhen) Limited in respect of the traffic and toll revenue study of Shenjiahuhang Expressway and Zhoushan Bridge
"Valuation Report"	the valuation report dated November 30, 2018 prepared by Jones Lang LaSalle and commissioned by the Company in relation to the Target
"Zhejiang Communications Investment"	Zhejiang Communications Investment Group Industrial Development Co., Ltd.* (浙江省交通投資集團實業發展有限公司), a company established in the PRC and a wholly-owned subsidiary of Communications Group

"Zhejiang HNAL Co"	Zhejiang Hangzhou-Ningbo Alternative Line Phase I Expressway Co., Ltd. *(浙江杭甬複綫寧波一期高速公路有限公司), a limited liability company established in the PRC on September 14, 2017, owned as to 33.87% by the Communications Group and thus an associate of Communications Group
"Zhejiang SASAC"	State-owned Assets Supervision and Administration Commission of the People's Government of Zhejiang Province of the PRC* (中國浙江省人民政府國有資產監督管理委員會)
"Zhoushan Co"	Zhejiang Zhoushan Cross-sea Bridge Co., Ltd.* (浙江舟山跨海大橋有限公司), a limited liability company established in the PRC on November 12, 2004, owned as to 51% by the Target as at the Latest Practicable Date and 49% by other independent third parties
"%"	per cent

* *English names are for reference only*

Note: Unless specified otherwise, the exchange rate of HK$1=RMB0.8663 being the average middle exchange rate of HK$ to RMB as at the Latest Practicable Date as announced by the People's Bank of China, has been used, where applicable, for illustration purposes only and does not constitute a representation that any amount has been, could have been or may be converted at the above rate, at any other rates or at all.

Certain figures set out in this circular have been subject to rounding adjustments. Accordingly, figures shown as the currency conversion or percentage equivalents may not be an arithmetic sum of such figures. Any discrepancy in any table between totals and sums of amounts listed in this circular is due to rounding.

浙江滬杭甬高速公路股份有限公司
ZHEJIANG EXPRESSWAY CO., LTD.

(A joint stock limited company incorporated in the People's Republic of China with limited liability)
(Stock code: 0576)

Executive Directors:
Mr. YU Zhihong *(Chairman)*
Mr. CHENG Tao
Ms. LUO Jianhu

Non-executive Directors:
Mr. DAI Benmeng
Mr. YU Qunli
Mr. YU Ji

Independent Non-executive Directors:
Mr. PEI Ker-Wei
Ms. LEE Wai Tsang, Rosa
Mr. CHEN Bin

Registered Office:
12th Floor, Block A
Dragon Century Plaza
1 Hangda Road
Hangzhou
Zhejiang Province 310007
The People's Republic of China

Principal Place of Business:
5/F., No. 2
Mingzhu International Business Center
199 Wuxing Road
Hangzhou
Zhejiang Province 310020
The People's Republic of China

January 15, 2019

To the Shareholders

Dear Sir or Madam,

(1) DISCLOSEABLE AND CONNECTED TRANSACTION IN RELATION TO THE PROPOSED ACQUISITION OF ENTIRE EQUITY INTEREST IN THE TARGET (2) PROPOSED MID-TERM NOTES ISSUE AND (3) NOTICE OF EXTRAORDINARY GENERAL MEETING

INTRODUCTION

The purpose of this circular is, among other things, to give you notice of the EGM and to provide you with information in relation to certain resolutions to be proposed at the EGM to enable you to make an informed decision on whether to vote for or against those resolutions at the EGM.

DISCLOSEABLE AND CONNECTED TRANSACTION

On December 13, 2018 (after trading hours), the Board announced that the Company and Communications Group entered into the Equity Purchase Agreement, pursuant to which Communications Group conditionally agreed to sell and the Company conditionally agreed to acquire the entire equity interest in the Target at a cash consideration of RMB2,943,000,000 (equivalent to approximately HK$3,397,206,510.45). Upon Completion, the Target will become a wholly owned subsidiary of the Company.

Date

December 13, 2018 (after trading hours)

Parties

Vendor: Communications Group

Purchaser: the Company

Assets to be acquired

100% equity interest of the Target

Consideration and payment terms

The Consideration for the entire equity interest of the Target is RMB2,943,000,000 (equivalent to approximately HK$3,397,206,510.45). 50% of the Consideration will be payable by the Company in cash within 10 business days after the effective date of the Equity Purchase Agreement and the remaining 50% of the Consideration will be payable by the Company in cash within 45 business days from the effective date of the Equity Purchase Agreement, subject to any adjustment as may be necessary.

The Consideration will be funded by the Company's internal resources as well as debt financing. It is expected that not exceeding RMB1,700,000,000 (equivalent to approximately HK$1,962,368,694.45) to be raised under the Mid-term Notes Issue will be applied for the payment of the Consideration. The interest rate of the Mid-term Notes is currently estimated to be 4%. The Company confirms that it has the capacity to pay the Consideration even if the Shareholders vote down the Mid-term Notes Issue. In the event that the Shareholders vote down the Mid-term Notes Issue, the Consideration will be funded by internal resources of the Company and bank borrowings. The Company has a good credit standing, low asset-to-liability ratio and sufficient operating cash flows and bank credit facilities. The costs of funding for the Consideration, in this case, is expected to raise slightly to 4.9%.

The finance expenses expected to be incurred are relatively low compared to the prevailing market rate. The Directors have taken the finance expenses into consideration for the purpose of the Acquisition and believe the financial benefits of the Acquisition outweigh the costs.

Consideration adjustment

The Consideration was determined on the basis that (i) the toll collection rights period of the Huzhou and Lianhang sections of Shenjiahuhang Expressway as finally approved was assumed to be 25 years; and (ii) the 25-year toll collection rights period of the Zhoushan Bridge has already been approved by the governmental authorities. The Valuation Report was based on, among others, the existing toll collection rates of the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge.

In the event that the toll collection rights period of Huzhou and Lianhang sections of the Shenjiahuhang Expressway as finally approved is less than 25 years, or the actual toll collection right period of Huzhou and Lianhang sections of the Shenjiahuhang Expressway and Zhoushan Bridge is less than 25 years, the Company and Communications Group have agreed to enter into a supplemental agreement to adjust downward the Consideration with reference to the PRC Valuation Report. In the event that the toll collection rights period of any expressway section is less than 25 years, the valuation of such expressway section will be its discounted cash flow at the corresponding adjusted toll collection rights period divided by the discounted rate. The Consideration will be adjusted with a deduction of the difference between the valuation of such expressway section at the adjusted toll collection rights period and at 25-year toll collection rights period. The Company and Communications Group have further agreed that the Consideration adjustment shall comply with relevant regulations in relation to the transfer of a PRC state-owned asset as well as the Listing Rules.

In the avoidance of doubts, obtaining the approval of toll collection rights period of the Huzhou and Lianhang sections of Shenjiahuhang Expressway of 25 years does not constitute a condition precedent for the Equity Purchase Agreement to become effective. The Target has obtained all necessary permits from relevant governmental authorities which entitled the Target to exercise the toll collection rights of the Huzhou and Lianhang sections without a specified time limit. According to the existing Regulation on the Administration of Toll Roads (收費公路管理條例) the toll collection rights period of Huzhou and Lianhang sections will not exceed 25 years and according to the customary practice, the toll collection rights of the Huzhou and Lianhang sections in principle would be 25 years. The Company would like to clarify that whether the Target obtains the approval of 25 years' toll collection rights or not would not hinder the Target's entitlement to toll collection rights. The 25-year toll collection rights commenced from the date when the relevant sections of Shenjiahuhang Expressway were completed and opened to traffic, which was 2008 for the Huzhou section and 2010 for the Lianhang section. To eliminate any uncertainty for the purpose of the Acquisition, the Company believes it is necessary to obtain an approval as written confirmation of the Target's entitlement to 25-year toll collection rights which would be in the best interest of the Shareholders as a whole.

As at the Latest Practicable Date, the Target has obtained the approval of the 25-year toll collection rights period of the Huzhou and Lianhang sections of Shenjiahuhang Expressway from Zhejiang Provincial Communication Department (浙江交通運輸廳). Therefore, there will not be any adjustment that may be caused by the approved toll collection rights period of Huzhou and Lianhang sections of the Shenjiahuhang Expressway being less than 25 years.

Conditions precedent

The Equity Purchase Agreement will become effective upon satisfaction of the following conditions:

(i) approval of the Acquisition by the Target's sole shareholder having been obtained;

(ii) approval of the Acquisition by the board of directors of the Communications Group having been obtained; and

(iii) approval of the Acquisition by the Company's Independent Shareholders having been obtained.

As at the Latest Practicable Date, the conditions under paragraphs (i) and (ii) above have been satisfied.

Completion

Within 20 business days from the effective date of the Equity Purchase Agreement, the parties shall cooperate to apply with the relevant governmental authorities to alter the registration for industrial and commercial administration for Completion.

Basis of Consideration

The Consideration under the Equity Purchase Agreement was determined based on arm's length negotiations between the Company and Communications Group. A number of factors were considered by the parties when determining the Consideration, including, among others, the Valuation Report prepared by Jones Lang LaSalle, as well as the PRC Valuation Report prepared by the PRC Domestic Valuer and commissioned by Communications Group pursuant to the requirements of Zhejiang SASAC and relevant PRC laws and regulations.

Summary of the Valuation Report

The appraised value of the entire equity interest of the Target under the Valuation Report was prepared using the income approach, through the use of the discounted cash flow method. As a result, such valuation constitutes a profit forecast under Rule 14.61 of the Listing Rules. Therefore, this announcement is subject to the requirements under Rules 14.60A and 14.62 of the Listing Rules in relation to profit forecast.

As required under Rule 14.62(1) of the Listing Rules, details of the key assumptions used in determining the value of the entire equity interest in the Target upon which the Valuation Report was issued are set out below:

Basic assumptions

- the projected business performances can be achieved with the effort of the managements of the Target;

- there will be no material change in the existing political, legal, technological, fiscal or economic conditions, which might adversely affect the business of the Target;
- the operational and contractual terms stipulated in the relevant contracts and agreements of the Target will be honored;
- copies of the operating licences and Company incorporation documents provided to Jones Lang LaSalle by the Target are reliable and legitimate;
- natural weather can have an impact on toll roads, including flooding and other types of inclement weather and no extended closure will occur to the toll roads managed by the Target;
- shareholder loan will be made to the Target when necessary; and
- there are no hidden or unexpected conditions associated with the assets valued that might adversely affect the reported values. Furthermore, Jones Lang LaSalle assume no responsibility for changes in market conditions after the July 31, 2018.

As at the valuation date of the Valuation Report, there were outstanding loans from the Communications Group and its subsidiaries to the Target. As at the Latest Practicable Date, all of the outstanding loans have been substituted with financing from financial institutions at the same interest rate. As at the Latest Practicable Date, the Company does not expect any further shareholder loan or capital contribution to be provided to the Target. However, in the event of any change of circumstances where the Company shall make advancements to the Target to support its development. The Company will make a comprehensive assessment of the change and comply with all applicable laws and regulations, including the requirements under the Listing Rules in due course on a timely basis.

The Directors consider that all the assumptions contained in the Valuation Report, in particular the assumption that the shareholder loan will be made to the Target when necessary, are fair and reasonable.

Deloitte, acting as the reporting accountants of the Company, has performed an assurance engagement in accordance with Hong Kong Standard on Assurance Engagements 3000 (Revised) ''Assurance Engagement Other Than Audits or Reviews of Historical Financial Information'' issued by the Hong Kong Institute of Certified Public Accountants to obtain reasonable assurance on whether the discounted future estimated cash flows, so far as the calculations are concerned, have been properly compiled in accordance with the bases and assumptions. Deloitte reported that the discounted future estimated cash flows, so far as the calculations are concerned, have been properly compiled, in all material respects, in accordance with the bases and assumptions.

The Financial Adviser confirms that it is satisfied that the valuation of the entire equity interest of the Target in the Valuation Report, which constitutes a profit forecast under Rule 14.61 of the Listing Rules, has been made by the Directors after due and careful enquiry.

A letter from Deloitte in compliance with Rule 14.62(2) of the Listing Rules and a letter from the Financial Adviser in compliance with Rule 14.62(3) of the Listing Rules are included in the Appendices to this circular.

As at the Latest Practicable Date, neither Deloitte nor the Financial Advisers holds any shareholding in the Company or any of its subsidiaries, or any right (whether legally enforceable or not) to subscribe for or to nominate persons to subscribe for securities of the Company or any of its subsidiaries.

To the best of the Directors' knowledge, information and belief, both Deloitte and the Financial Adviser are independent third parties.

Deloitte has consented to the inclusion of its independent assurance report on calculations of discounted future estimated cash flows in this circular, and the references to its name in the form and context in which they are included. The Financial Adviser has consented to the publication of this circular with inclusion of its report and all references to its name in the form and context in which it is included.

Summary of the PRC Valuation Report

According to the PRC Valuation Report, the valuation amount is RMB2,943,000,000 (equivalent to approximately HK$3,397,206,510.45) and the valuation date is July 31, 2018. The valuation of the PRC Valuation Report was conducted on asset-based approach and income approach. The key assumptions of the PRC Valuation Report are set out as follows:

(a) there will be no change to the 25-year operation and toll collection rights;

(b) the toll income forecast is based on the existing toll fees, without taking into account any changes to the toll fee standard as a result of any inflation and policy changes in the future;

(c) the toll income forecast does not include any free-of-charge vehicles;

(d) the forecast has also taken into consideration that there will be no toll fees for vehicles with seven or less passengers during four statutory holidays, including the Spring Festival, Qingming Festival, Labour Day and the National Day, which are expected to be 20 days for each year; and

(e) the alternative line to the Ningbo-Zhoushan Expressway, which is expected to be completed in 2029, will divert the traffic volume of Zhoushan Bridge.

The Board considers that all the assumptions contained in the PRC Valuation Report are fair and reasonable.

Original cost of the 100% equity interest in the Target to Communications Group

The original cost incurred by Communications Group for the 100% equity interest in the Target is approximately RMB1,720,000,000 (equivalent to approximately HK$1,985,455,384.97) (being Communications Group's capital contribution to the Target as at the date of the Equity Purchase Agreement). The original costs simply referred to the book value of the net assets of Shenjiahuhang Expressway and 51% equity interest in Zhoushan Co as at December 31, 2017 and no valuation had been conducted as this acquisition was for the internal reorganisation of the Communications Group. According to the PRC laws and regulations on the management of state-owned assets, as the Target acquired by the Communications Group from its wholly owned subsidiary, the consideration and

mechanism of internal reorganisation shall be determined at Communications Group's sole discretion and no valuation is required. The Company believes that the appraised value of the Target set out in the Valuation Report and the PRC Valuation Report reflects the fair and reasonable value of the Target.

INFORMATION ON THE TARGET

The Target is a limited liability company established in the PRC on July 13, 2018. The Target and its subsidiaries are principally engaged in the toll collection rights of Huzhou and Lianhang sections of Shenjiahuhang Expressway and the operation and management of Zhoushan Bridge. As of the Latest Practicable Date, the Target is a wholly owned subsidiary of Communications Group and upon Completion, the Target will become a wholly owned subsidiary of the Company.

The Shenjiahuhang Expressway is divided into Huzhou section (S12) and Lianhang section (S13). The Huzhou section starts from Lianshi Town at Nanxun District, Huzhou City, and ends at Wuxing District at Huzhou City, for a total length of 41.978 kilometers. The Huzhou section has three ramp toll stations and one pair of service areas, which were completed and opened to traffic on January 28, 2008 with its toll collection right expiring on January 27, 2033. The Lianhang section starts from Lianshi Town at Nanxun District, Huzhou City, and ends at Chongxian Town, Yuhang District for a total length of 50.938 kilometers. The Lianhang section has seven ramp toll stations and one pair of service areas, which were completed and opened to traffic on February 6, 2010 with its toll collection right expiring on February 5, 2035. The Target acquired the toll collection rights of Huzhou section and Lianhang section of the Shenjiahuhang Expressway from the Communications Group on July 31, 2018.

Zhoushan Co is a limited liability company established in the PRC on November 12, 2004, and was owned as to 51% by Communications Group and 49% by other independent third parties since its establishment. On July 31, 2018, the Target acquired 51% equity interest in Zhoushan Co from Communications Group. As at the Latest Practicable Date, Zhoushan Co is owned as to 51% by the Target. Zhoushan Bridge connects Ningbo and Zhoushan, along with the intermediary islands in between. It has total length of 46.3 kilometers and is designed as a two-way four-lane bridge with 100km/h speed limit. It has eight toll booths and was opened to traffic on February 6, 2010 with its toll collection right expiring in 2034.

The Target would undertake additional constructions subsequent to Completion. A total amount of construction fee expected to be incurred by the Target is estimated to be RMB560,700,000 (equivalent to approximately HK$647,235,368.81) which has been taken into consideration in the Valuation Report to determine the Consideration.

As part of the reorganisation of the group of Communications Group, there is no change of control as a result of the acquisitions by the Target from Communications Group in respect of the entire ownership of the Shenjiahuhang Expressway and 51% equity interest in Zhoushan Co. Therefore, the Consideration was determined without reference to the considerations in the above acquisitions.

According to the unaudited combined pro forma financial information of the Target for the year ended December 31, 2016 and 2017 prepared with reference to generally accepted accounting principles in the PRC by the PRC statutory auditor of the Target, the net asset value of the Target as at December 31, 2017 was approximately RMB2,826,220,397.89 (equivalent to approximately HK$3,262,403,772.24). A summary of the unaudited combined pro forma financial information of the Target for the financial years ended December 31, 2016 and 2017 is set out below:

	As at December 31	
	2016	**2017**
	approximate	*approximate*
	RMB	*RMB*
Unaudited net profit/(loss) before taxation and extraordinary items	(250,083,312.92)	(137,181,668.77)
Unaudited net profit/(loss) after taxation and extraordinary items	(250,083,312.92)	(137,181,668.77)

The losses incurred by the Target for the year 2016 and 2017 were largely attributable to (i) high deprecation of its assets; (ii) heavy debt burden; and (iii) an expressway's traffic volume needs certain period of time to reach a stable level since its operation so the toll income was not sufficient to cover its assets' deprecation, financing costs and daily operating cost in that year. The Company plans to lower the heavy debt burden of the Target through debt swap subsequent to Completion.

Pursuant to the Traffic Study Report and the Valuation Report, the Target expects a near breakeven performance by 2018 and a high probability of posting a profit from 2019 onwards. The Directors thus believe the Acquisition will have a positive impact on the financial performance of the Group in the long run and thus benefit the Company and the Shareholders as a whole.

EFFECT OF THE ACQUISITION

Upon Completion, the Company will beneficially own the entire equity interest in the Target. As a result, the Target will become a wholly-owned subsidiary of the Company and the accounts of the Target will be consolidated into the accounts of the Company.

TRANSACTIONS BETWEEN THE TARGET AND CONNECTED PERSONS OF THE COMPANY AFTER COMPLETION

Upon Completion, the Target will become a wholly owned subsidiary of the Company. As a result, should the Target enter into any new transactions or continue any existing transactions with the connected persons of the Company after Completion, such transactions would constitute connected transactions or continuing connected transactions for the Company upon and following Completion.

Partially-exempt Continuing Connected Transaction

As at the Latest Practicable Date, Zhejiang HNAL Co, an associate of the Communications Group, intends to enter into a construction agreement (the "**Construction Agreement**") with Zhoushan Co prior to Completion for the construction of connecting flyovers of Jintang Bridge for the Zhoushan Islands Link Project (舟山連島工程). Upon Completion, Zhoushan Co will become a subsidiary of the Company, therefore the Construction Agreement will constitute a continuing connected transaction of the Company. The transactions contemplated under the Construction Agreement will continue after Completion. Details of the Construction Agreement are set out as below:

Parties: Zhoushan Co

Zhejiang HNAL Co, an associate of the Communications Group

Terms: Four years

The Construction Agreement was part of the Hangzhou-Ningbo Expressway Alternative Line Ningbo Section Phase I Project (the "**Ningbo Section Project**"), Zhejiang HNAL Co won the public tender of which prior to entering into the Construction Agreement. The terms and conditions of the Construction Agreement are legally binding by the tender result of the Ningbo Section Project. The public tender for Ningbo Section Project contains the estimated construction time for the subject matter under the Construction Agreement, which was assessed and determined from a holistic perspective in light of the Ningbo Section Project. Upon Completion, Zhoushan Co will continue to observe and the Company does not see a feasible excuse for Zhoushan Co to deny or modify the terms and conditions contained the public tender for the Ningbo Section Project, including the term of the Construction Agreement of four years.

Provision of services: construction work in relation to the connecting flyovers of Jintang Bridge for the Zhoushan Islands Link Project (舟山連島工程), which was part of the Ningbo Section Project.

Service fees: Not exceeding RMB346,890,000 (equivalent to approximately HK$400,427,103.77) (the "**Service Fees**") payable by Zhoushan Co to Zhejiang HNAL Co as follows:

(i) the amount of RMB34,689,000 (equivalent to approximately HK$40,042,710.38), being 10% of the Service Fees, shall be paid within 30 days from signing of the Construction Agreement;

(ii) the amount of RMB104,067,000 (equivalent to approximately HK$120,128,131.13), being 30% of the Service Fees, shall be paid before 30 June of the second construction year of the Ningbo Section Project;

(iii) the amount of RMB104,067,000 (equivalent to approximately HK$120,128,131.13), being 30% of the Service Fees, shall be paid before 30 June of the third construction year of the Ningbo Section Project; and

(iv) the amount of RMB104,067,000 (equivalent to approximately HK$120,128,131.13), being 30% of the Service Fees, shall be paid before 30 June of the fourth construction year of the Ningbo Section Project.

Basis of the Service Fees:

Zhejiang HNAL Co participated in a public tender in respect of the construction services for the Ningbo Section Project and won the tender on July 17, 2018 which contains, among others, the services fees and the estimated time for the services to be provided under the Construction Agreement, being part of the Ningbo Section Project. Zhejiang HNAL Co won the public tender in an open and fair competition earlier than the date when the valuation of the Target was determined. The terms and conditions of the Construction Agreement are legally binding by the tender result of the Ningbo Section Project.

The amount of the Services Fees was determined based on arm's length negotiations between parties prior to entering the Equity Purchase Agreement and the Services Fees have been taken into account to determine and were reflected in the valuation of the Target. The Valuation Report has included the Construction Agreement as one of the factors for the determination of Consideration. In addition, parties to the Construction Agreement plan to enter into the Construction Agreement prior to the Completion on or prior to January 31, 2019.

For the reasons that (i) the transaction contemplated under the Construction Agreement does not constitute a connected transaction of the Company prior to Completion; and (ii) disclosure requirements under Rule 14A.60(2)(a) have been satisfied, the Company respectfully submits that it would not publish further announcement upon signing of the Construction Agreement. In the event that there is any material change to the terms and conditions of the Construction Agreement, the Company will comply with all applicable laws, and regulations, including the requirements under the Listing Rules in due course on a timely basis.

Reasons for and benefits of the transaction:

The parties intend to enter into the Construction Agreement prior to Completion, which is necessary as part of the Ningbo Section Project.

Information of Zhejiang HNAL Co:

Zhejiang HNAL Co is a company established in the PRC and owned as to 33.87% by the Communications Group. Zhejiang HNAL Co is principally engaged in the investment, construction, operation, maintenance and management of expressway projects.

Listing Rules implications:

Zhejiang HNAL Co is an associate of the Communications Group. Therefore, Zhejiang HNAL Co is a connected person of the Company and entering into the Construction Agreement constitutes a continuing connected transaction for the Company under the Listing Rules.

As the highest of all applicable percentage ratios for the transactions contemplated under the Construction Agreement, are more than 0.1% but less than 5%, the Construction Agreement shall be subject to the reporting, announcement and annual review requirements, but exempt from Independent Shareholders' approval under the Listing Rules.

The parties intend to enter into the Construction Agreement prior to the Completion and the Construction Agreement shall remain valid and effective after Completion. None of the Directors will be involved in approving the signing of the Construction Agreement. On the basis that (i) Zhejiang HNAL Co won the tender for the Ningbo Section Project; and (ii) services provided under the Construction Agreement are necessary as part of the Ningbo Section Project, the Directors (including the independent non-executive Directors) are of the view that the terms of the Construction Agreement are on normal commercial terms and are fair and reasonable and in the interests of the Company and the Shareholders as a whole.

Fully-exempt Continuing Connected Transaction

As at the Latest Practicable Date, the Target intends to enter into the following agreements with Zhejiang Communications Investment. Each of the following agreements will constitute a continuing connected transaction for the Company under Chapter 14A of the Listing Rules. It is expected that the highest applicable percentage ratios under the Listing Rules for each of the following agreements is less than 0.1%, so each of them will be exempted from the reporting, announcement, annual review and independent shareholders' approval requirements under Chapter 14A of the Listing Rules.

1. Service Area Operation Lease Agreements

The Target will enter into a service area operation lease agreement with Zhejiang Communications Investment, pursuant to which the Target will agree to lease to Zhejiang Communications Investment the operation rights in relation to petrol station services, catering services, supermarket services and vehicle repair services in the service area of the Shenjiahuhang Expressway. The term of this agreement will be the same as the remaining toll collection right period of the Target, which is the normal business practice. It is expected that the annual fee payable by Zhejiang Communications Investment to the Target in respect of the lease of the operation rights will be RMB3,300,000 (equivalent to approximately HK$3,809,303.94), determined based on parties' arm's length negotiation with reference to the prices of other service area operation lease agreements entered into between Zhejiang Communications Investment and

other expressway operation companies in the market, consisting of RMB800,000 (equivalent to approximately HK$923,467.62) for property rental and RMB2,500,000 (equivalent to approximately HK$2,885,836.32) for the operation rights which will be reviewed in every five years. The property rental will increase by 5% every five years and the fees payable for the operation rights will increase by RMB100,000 (equivalent to approximately HK$115,433.45) every five years both based on the starting amount upon signing of this agreement up until the end of this agreement.

Zhoushan Co will enter into a service area operation lease agreement with Zhejiang Communications Investment, pursuant to which Zhoushan Co will agree to lease to Zhejiang Communications Investment the operation rights in relation to petrol station services, catering services, supermarket services and vehicle repair services in the service area of the Zhoushan Bridge. The term of this agreement will be the same as the remaining toll collection right period of the Target, which is the normal business practice. It is expected that the annual fee payable by Zhejiang Communications Investment to Zhoushan Co in respect of the lease of the operation rights will be RMB2,300,000 (equivalent to approximately HK$2,654,969.4), determined based on parties' arm's length negotiation with reference to the prices of other service area operation lease agreements entered into between Zhejiang Communications Investment and other expressway operation companies in the market, consisting of RMB400,000 (equivalent to approximately HK$461,733.81) for property rental and RMB1,900,000 (equivalent to approximately HK$2,193,235.60) for the operation rights which will be reviewed in every five years. The property rental will increase by 5% every five years and the fees payable for the operation rights will increase by RMB100,000 (equivalent to approximately HK$115,433.45) every five years both based on the starting amount upon signing of this agreement up until the end of this agreement.

2. *Service Area Utilities Services Agreements*

The Target will enter into a service area utilities services agreement with Zhejiang Communications Investment, pursuant to which the Target will engage Zhejiang Communications Investment to manage utilities facilities and provide utilities services in the service area of Shenjiahuhang Expressway such as washroom, lounge area, safety, cleaning services and utilities system maintenance. The term of this agreement will be the same as the term of the service area operation lease agreement entered into between the parties, which is the normal business practice. It is expected that the annual fee payable by the Target to Zhejiang Communications Investment for the services provided under this agreement will be RMB2,200,000 (equivalent to approximately HK$2,539,535.96), determined based on parties' arm's length negotiation with reference to the prices of other service area utilities services agreements entered into between Zhejiang Communications Investment and other expressway operation companies in the market.

Zhoushan Co will enter into a service area utilities services agreement with Zhejiang Communications Investment, pursuant to which Zhoushan Co will engage Zhejiang Communications Investment to manage utilities facilities and provide utilities services in the service area of Zhoushan Bridge such as washroom, lounge area, safety, cleaning services and utilities system maintenance. The term of this agreement will be the same as the term of the service area operation lease agreements entered into between the parties, which is the normal business practice. It is expected that the annual fee payable by Zhoushan Co to Zhejiang Communications Investment for the services provided under this agreement will be RMB1,000,000 (equivalent to

approximately HK$1,154,334.53), determined based on parties' arm's length negotiation with reference to the prices of other service area utilities services agreements entered into between Zhejiang Communications Investment and other expressway operation companies in the market.

The counterparty of the above transactions, Zhejiang Communications Investment, is a company with expertise in service area operation. It is the normal business practice and it is the practice for most service area operation lease agreements and service area utilities services agreements entered by Zhejiang Communications Investment for the term of such agreements to be the same as the remaining toll collection right period of the expressways. Under this arrangement, the service provider would have the flexibility to conduct a long-term overall planning for the construction or renovation of the service area which is beneficial for its sustainable operation.

Meanwhile, the Target has been negotiating with Zhejiang Communications Investment for the Service Area Operation Lease Agreements and the Service Area Utilities Services Agreements prior to the Acquisition. The terms of the above transaction between the Target and its subsidiaries and the connected persons of the Company were determined based on parties' arm's length negotiation prior to entering the Equity Purchase Agreement. The potential impact of the Service Area Operation Lease Agreements and the Service Area Utilities Services Agreements on cash flows of the Company has been taken into account to determine and was reflected in the valuation of the Target. The Company has not seen any reason to delay the Target's entering into the Service Area Operation Lease Agreements and the Service Area Utilities Services Agreements before Completion.

The Independent Board Committee, taking into account of the recommendation of Octal Capital Limited, is of the view that the terms of the Service Area Operation Lease Agreements and the Service Area Utilities Services Agreements are on normal commercial terms and are fair and reasonable and in the interests of the Company and the Shareholders as a whole. Parties to the above transactions plan to enter into relevant agreements prior to the Completion. Further announcements will be made by the Company (if required) as and when appropriate in accordance with all applicable requirements of the Listing Rules.

REASONS FOR AND BENEFITS OF THE ACQUISITION

Upon Completion, the total length of expressways operated by the Company will increase from approximately 663 km to approximately 803 km. The main businesses of the Company will be enhanced through the Acquisition which help to increase the market share and competitive strength of the Company in Zhejiang Province. The Directors believe that the Acquisition will facilitate the Company to better utilise its experience and advantages in toll operation and to complement the Company's existing network of expressways, and are in line with the Company's development strategy.

The Directors expect the Acquisition will further integrates local advantages for the regional development in the Yangtze River Delta. Shanghai, the largest city in the PRC and one of the four municipalities, is one of the largest economy, technology, industry, finance, trade, exhibition and shipping centers in the PRC. Hangzhou City, located in the northern part of Zhejiang Province, the northern bank of the lower reaches of the Qiantang River, the southern end of the Beijing-Hangzhou Grand Canal and the provincial capital of Zhejiang Province, is a pivotal city for national software and an integrated circuit design industrialization base. The high-tech industry, led by information on new

medicine, environmental protection and new green materials, has generated a good momentum of development and has become a major advantage of Hangzhou City. Ningbo City, located in the middle section of the PRC's coastline and the southern wing of the Yangtze River Delta, is the economic center of Zhejiang Province and the chemical industrial base of the south sector of the Yangtze River Delta. The Zhoushan Islands in the east are natural barriers, with Hangzhou Bay in the north, which also connect with Sanmen and Tiantai in Taizhou. Ningbo's economy has continued to develop rapidly, showing great vitality and potential, and has become one of the most active regions in the national economy. Zhoushan City is located in the north-eastern part of Zhejiang Province, east to the East China Sea and west to Hangzhou Bay. It is the maritime gateway of the Yangtze River Delta and the core city of the Dawan District of Hangzhou Bay.

The Shenjiahuhang Expressway is one of the five major thoroughfares from Zhejiang Province to Shanghai within the Yangtze River Delta economic zone. It further strengthens the relationship between the northern part of Zhejiang Province and Shanghai, accelerates the integration of the region into the Yangtze River Delta concept, improves the highway networks in the region, reduces the traffic pressure on the Shanghai-Hangzhou Expressway and achieves the three-hour travel circle of the Yangtze River Delta. The Shenjiahuhang Expressway and the future highway planning projects will enhance and sustain the economic development and urbanization of the region. Meanwhile, the Zhouhan Bay Bridge is an important economic connection between the Zhoushan Islands and the continent which has greatly improved the transportation efficiency and population mobility of Zhoushan city. With the Zhoushan Bridge the driving distance between Zhoushan City, Ningbo City and Hangzhou City will be greatly shortened, and the travel time from Zhoushan City via the south bank of Hangzhou Bay to Shanghai will be three hours only, which realized the integration of Zhoushan City in the Yangtze River Delta Economic Zone. The Acquisition not only presents a positive contribution to the financial position of the Group upon Completion, but also comes with strategic significances and influences in the regional development.

The expressways operated by the Target were developed under the build-operate-transfer basis, where the project financing provided by loans and cash represents the capital expenditure to be invested in the project. When these expressways were opened to traffic, the depreciation and amortisation would be recorded in accordance with the established accounting treatment of depreciation. As provided in the Traffic Study Report, the historic and forecasting traffic volumes illustrate a linear growth trend. The loss of the Target Group significantly narrowed in 2017 compared to the figures in 2016. Pursuant to the Traffic Study Report and the Valuation report and the Company plans to lower the heavy debt burden of the Target through debt swap, the Target expects a near breakeven performance by 2018 and a high probability of posting a profit from 2019 onwards. Therefore, the Directors believe the Acquisition will have a positive impact on the financial performance of the Group in the long run and will be in the benefit of the Company and its Shareholders as a whole.

The terms of the Equity Purchase Agreement were arrived at after arm's length negotiations between the Company and Communications Group, and are on normal commercial terms or better, taking into account various factors and with reference to the Valuation Report and the PRC Valuation Report.

The Board is fully aware of its fiduciary duties in assessing the merits of the terms of the Equity Purchase Agreement and due procedures have been and will be followed. Mr. YU Zhihong, being the Chairman and an executive Director, and Mr. DAI Benmeng, Mr. YU Qunli and Mr. YU Ji, being non-executive Directors, who are also the director or executive members of the Communications Group, had abstained from voting on the Board resolution passed to approve the Acquisition. The Directors (excluding the members of the Independent Board Committee, whose opinion will be set out in this circular after taking into account the Independent Financial Adviser's advice to be set out in this circular) consider that the terms of the Acquisition are fair and reasonable and in the interests of the Company and the Shareholders as a whole.

INFORMATION ON THE COMPANY AND COMMUNICATIONS GROUP

The Company is a joint stock company established in the PRC on March 1, 1997, the H Shares of which are listed on the Main Board of the Stock Exchange. It is principally engaged in investing in, developing and operating high-grade roads in the PRC. The Group is also engaged in the expressway related development and operation, as well as securities business.

Communications Group is a wholly state-owned enterprise established in the PRC on December 29, 2001 and is principally engaged in a diverse range of businesses, including investment, operations, maintenance, toll collection and ancillary services of expressways, construction and building of transportation project, ocean and coastal transport, as well as real estate.

LISTING RULES IMPLICATIONS

As one or more of the applicable percentage ratios in respect of the Acquisition are over 5% but less than 25%, the Acquisition constitutes a discloseable transaction for the Company and is subject to the reporting and announcement requirements under Chapter 14 of the Listing Rules.

In addition, as at the Latest Practicable Date, Communications Group holds approximately 67% of the issued share capital of the Company. By virtue of this shareholding interest, Communications Group is a controlling shareholder of the Company. Therefore, Communications Group is a connected person of the Company and as a result, the Acquisition constitutes a connected transaction for the Company and is subject to the reporting, announcement and Independent Shareholders' approval requirements under Chapter 14A of the Listing Rules.

Given Mr. YU Zhihong, being the Chairman and an executive Director, and Mr. DAI Benmeng, Mr. YU Qunli and Mr. YU Ji, being non-executive Directors, hold positions as a director or executive member in Communications Group, they have an abstained from voting on the board resolutions with respect to the approval of the Equity Purchase Agreement. Save for Mr. YU Zhihong, Mr. DAI Benmeng, Mr. YU Qunli and Mr. YU Ji, none of the Directors has any material interest in the transactions contemplated under the Equity Purchase Agreement or is required to abstain from voting on the relevant board resolution approving the Equity Purchase Agreement and the transactions contemplated thereunder.

In view of the interest of Communications Group in the Equity Purchase Agreement, Communications Group and its associates will abstain from voting at the general meeting to be convened by the Company to, among others, consider and approve the resolution in relation to the Equity Purchase Agreement and the Acquisition.

PROPOSED MID-TERM NOTES ISSUE

Pursuant to the relevant laws and regulations of the PRC and the Articles of Association of the Company, the offer and issuance of the Mid-term Notes is subject to the approval of the Shareholders at general meeting and approval by the National Association of Financial Market Institutional Investors (中國銀行間市場交易商協會). The principal terms of the proposed Mid-term Notes Issue are set out below:

Issue size:	not more than RMB3,000,000,000 (equivalent to approximately HK$3,463,003,578.44)
Term:	according to the prevailing market circumstances as normally not more than five years from the date of issue
Manner of issue:	one-time registration with the relevant authorities. The Mid-term Notes will be issued in one tranche or tranches
Interest rate:	prevailing market rate of mid-term notes of similar maturity
Use of Proceeds:	equity acquisition, project investment and repayment of borrowings of the Group and replenish working capital of the Group

It is proposed that the general manager of the Company will be authorized from the date when this special resolution is approved by the Shareholders, to determine in her absolute discretion and deal with matters in relation to the Mid-term Notes Issue, including but not limited to the following:

(a) to determine, to the extent permitted by laws and regulations and according to the Company's specific circumstances and the prevailing market conditions, the specific terms and arrangements of the Mid-term Note Issue and make any changes and adjustments to such types and terms of the Mid-term Notes Issue, including but not limited to, the types of issue, time of issue, manner of issue, size of issue, issue price, term of maturity, interest rates, tranches and any other matters in relation to the Mid-term Notes Issue;

(b) to appoint the relevant intermediaries in connection with the Mid-term Notes Issue and to deal with filing and submission matters;

(c) to enter into agreements, contracts and other legal documents relating to the Mid-term Notes Issue, and to disclose relevant information in accordance with the applicable laws and regulations; and

(d) to deal with any other the matters in relation to the Mid-term Notes Issue.

REASONS FOR AND BENEFITS OF THE MID-TERM NOTES ISSUE

The Directors are of the view that the proposed Mid-term Notes Issue will enable the Company to fully utilize the financing channels available on the capital market, help improve the Company's financing structure, reduce its cost of capital and lower its finance costs. On these bases, the Directors are of the view that the proposed the Mid-term Notes Issue is in the interests of the Company and the Shareholders as a whole.

THE EGM

You will find on pages EGM-1 to EGM-4 of this circular a notice of the EGM to be held at 10:00 a.m. on Monday, March 4, 2019 at 5/F, No. 2 Mingzhu International Business Center, 199 Wuxing Road, Hangzhou City, Zhejiang Province, the PRC. A form of proxy for use at the EGM is enclosed. Whether or not you are able to attend the meeting in person, you are requested to complete and return the accompanying form of proxy in accordance with the instructions printed thereon. In case of H Shares, the proxy form shall be lodged with the Company's H Shares Registrar, Computershare Hong Kong Investor Services Limited, at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong no later than 10 a.m. on March 1, 2019 or note less than 24 hours before the time for holding any adjournment of the EGM. Completion and delivery of the form of proxy will not preclude you from attending and voting in person at the EGM or any adjournment thereof should you so wish.

RECOMMENDATION

The Independent Board Committee comprising all the independent non-executive Directors, namely, Mr. PEI Ker-Wei, Ms. LEE Wai Tsang, Rosa, and Mr. CHEN Bin, has been formed to consider the Acquisition, and Octal Capital Limited has been appointed as the Company's independent financial adviser to advise the Independent Board Committee and the Independent Shareholders as to whether the terms of the Acquisition are fair and reasonable, whether the Acquisition is on normal commercial terms or better and in the ordinary and usual course of business of the Group, whether the Acquisition is in the interests of the Company and the Shareholders as a whole and whether the Independent Shareholder should vote in favour of the Acquisition.

The Directors (excluding the members of the Independent Board Committee, whose views are set out in the letter from the Independent Board Committee on page 23 of this circular) consider that the terms of the Equity Purchase Agreement are on normal commercial terms and are fair and reasonable and in the interests of the Company and the Shareholders as a whole.

The text of the letter from Independent Board Committee is set out on page 23 of this circular and the text of the letter from the Independent Financial Adviser containing its advice is set out on pages 24 to 48 of this circular.

FURTHER INFORMATION

The Valuation Report on the valuation of the entire equity interest in the Target has been prepared by Jones Lang LaSalle and is set out in Appendix I of this circular.

The Traffic Study Report prepared by WB Group Consulting (Shenzhen) Limited in respect of the traffic and toll revenue study of Shenjiahuhang Expressway and Zhoushan Bridge is set out in Appendix II of this circular.

As the appraised value of the entire equity interest of the Target under the Valuation Report was prepared through the income approach based on the discounted cash flow method, such valuation constitutes a profit forecast under Rule 14.61 of the Listing Rules. A letter from Deloitte in compliance with Rule 14.62(2) of the Listing Rules are included in Appendix III of this circular. A letter from the Financial Adviser confirming that they are satisfied that the forecast has been made by the Directors after due and careful enquiry in compliance with Rule 14.62(3) of the Listing Rules are included in Appendix IV of this circular.

Your attention is drawn to the letter from the Independent Board Committee, the letter from the Independent Financial Adviser and the additional information set out in the appendices to this circular and the notice of the EGM.

By order of the Board
Zhejiang Expressway Co., Ltd.
YU Zhihong
Chairman

浙江滬杭甬高速公路股份有限公司
ZHEJIANG EXPRESSWAY CO., LTD.

(A joint stock limited company incorporated in the People's Republic of China with limited liability)
(Stock code: 0576)

January 15, 2019

To the Independent Shareholders

Dear Sirs,

DISCLOSEABLE AND CONNECTED TRANSACTION IN RELATION TO PROPOSED ACQUISITION OF THE ENTIRE EQUITY INTERESTS IN ZHEJAING SHENJIAHUHANG EXPRESSWAY CO., LTD.

We refer to the circular of the Company dated January 15, 2019 to the Shareholders (the "**Circular**"), of which this letter forms part. Terms defined in the Circular shall have the same meanings when used in this letter, unless the context otherwise requires.

We have been appointed by the Board as members of the Independent Board Committee to advise you as to the fairness and reasonableness of the terms of the Equity Purchase Agreement and whether the Acquisition is in the interests of the Company and the Shareholders as a whole. Octal Capital Limited has been appointed as the independent financial adviser to advise you and us in this regard. Details of the recommendations from Octal Capital Limited are set out in its letter of advice on pages 24 to 48 of the Circular.

Your attention is also drawn to the letter from the Board set out on pages 5 to 22 of the Circular and the additional information set out in the appendices to the Circular.

Having considered the terms of the Equity Purchase Agreement, and taken into account the advice from Octal Capital Limited and in particular the principal factors and reasons considered by Octal Capital Limited as set out in its letter of advice, we are of the view that (i) the terms of the Equity Purchase Agreement are on normal commercial terms and are fair and reasonable so far as the Independent Shareholders are concerned; and (ii) the Acquisition is in the ordinary and usual course of business of the Company and in the interests of the Company and the Shareholders as a whole. Accordingly, we recommend the Independent Shareholders to vote in favour of the relevant resolution to approve the Equity Purchase Agreement and the transactions contemplated thereunder at the EGM.

Yours faithfully,
Independent Board Committee

Mr. PEI Ker-Wei	**Ms. LEE Wai Tsang, Rosa**	**Mr. CHEN Bin**
Independent non-executive Director	*Independent non-executive Director*	*Independent non-executive Director*

The following is the letter of advice from Octal Capital Limited to the Independent Board Committee and Independent Shareholders prepared for the purpose of inclusion in this circular.

金融有限公司
OCTAL Capital Limited

801-805, 8/F, Nan Fung Tower,
88 Connaught Road Central,
Hong Kong

January 15, 2019

To the Independent Board Committee and the Independent Shareholders

Dear Sirs,

DISCLOSEABLE AND CONNECTED TRANSACTION IN RELATION TO THE PROPOSED ACQUISITION OF ENTIRE EQUITY INTEREST IN THE TARGET

INTRODUCTION

We refer to our engagement as the Independent Financial Adviser to advise the Independent Board Committee and the Independent Shareholders in respect of the terms of the Equity Purchase Agreement, particulars of which are set out in the letter from the Board (the "**Letter from the Board**") of the circular to the Shareholders dated January 15, 2019 (the "**Circular**"), of which this letter forms a part. Unless the context requires otherwise, capitalised terms used in this letter shall have the same meanings as given to them under the definitions section of the Circular.

On December 13, 2018 (after trading hours), the Company (as purchaser), Communications Group (as vendor) entered into the Equity Purchase Agreement, pursuant to which Communications Group conditionally agreed to sell and the Company conditionally agreed to acquire the entire equity interest in the Target at a cash consideration of RMB2,943,000,000 (equivalent to approximately HK$3,397,206,510.45).

As at the Latest Practicable Date, the Company was owned as to approximately 67% by Communications Group. Accordingly, Communications Group is the controlling shareholder (as defined under the Listing Rules) of the Company. As at the date of the Equity Purchase Agreement, Communications Group was the sole shareholder of the Target. Accordingly, Communications Group and the Target are connected persons of the Company pursuant to Chapter 14A of the Listing Rules, and the transaction contemplated under the Equity Purchase Agreement constitutes a connected transaction of the Company.

As the applicable percentage ratios of the transaction under the Equity Purchase Agreement are more than 5% but lower than 25%, the transaction contemplated under the Equity Purchase Agreement is subject to the reporting and announcement requirements under Chapter 14 of the Listing Rules, and are subject to the reporting, announcement and independent shareholders' approval requirements under Chapter 14A of the Listing Rules.

An Independent Board Committee comprising all independent non-executive Directors, namely Mr. Pei Ker-Wei, Ms. Lee Wai Tsang, Rosa, and Mr. Chen Bin, has been established to advise the Independent Shareholders in relation to the Equity Purchase Agreement and the transaction contemplated thereunder. Our role as the Independent Financial Adviser is to provide independent opinion and recommendation to the Independent Board Committee and the Independent Shareholders on whether the terms of the Equity Purchase Agreement are fair and reasonable so far as the Independent Shareholders are concerned and are on normal commercial terms, and whether the entering into the Equity Purchase Agreement is in the interests of the Company and the Shareholders as a whole and in the ordinary and usual course of business of the Group.

As at the Latest Practicable Date, we were not connected with the Company or any of their respective substantial shareholders, directors or chief executives, or any of their respective associates and accordingly, are considered suitable to give independent advice to the Independent Board Committee and the Independent Shareholders in respect of the Acquisition. In the last two years, we did not have any engagement with the Company, the Directors, the chief executive of the Company, the substantial shareholders of the Company or the Communications Group. Apart from normal professional fees paid or payable to us in connection with the appointment as the Independent Financial Adviser, no arrangements exist whereby we had received or will receive any fees or benefits from the Company, the Communications Group, its subsidiaries or their respective controlling shareholders that could reasonably be regarded as relevant to our independence. Accordingly, we consider that we are independent to act as the Independent Financial Adviser in respect of the Acquisition pursuant to Rule 13.84 of the Listing Rules.

In formulating our opinion, we have relied on the accuracy of the information and representations contained in the Circular and have assumed that all information and representations made or referred to in the Circular as provided by the management of the Company were true at the time they were made and continue to be true as at the date of the Circular. We have also relied on our discussion with the management of the Company regarding the Equity Purchase Agreement including the information and representations contained in the Circular. We have also assumed that all statements of belief, opinion and intention made by the management of the Company respectively in the Circular were reasonably made after due enquiry. We consider that we have reviewed sufficient information to reach an informed view, to justify our reliance on the accuracy of the information contained in the Circular and to provide a reasonable basis for our advice. We have no reason to suspect that any material facts have been omitted or withheld from the information contained or opinions expressed in the Circular nor to doubt the truth, accuracy and completeness of the information and representations provided to us by the management of the Company. We have not, however, conducted an independent in-depth investigation into the business and affairs of the Group, Communications Group and the Target Company, and any of their respective subsidiaries and their respective associates, nor have we carried out any independent verification of the information supplied to us.

PRINCIPAL FACTORS AND REASONS CONSIDERED

In arriving at our opinions and recommendations in respect of the Acquisition, we have taken into consideration the following principal factors and reasons:

I. Background of and reasons for entering into the Equity Purchase Agreement

1. Information of the Company, Communications Group and the Target

a) The Company

The Company is a joint stock company established in the PRC on March 1, 1997, the H Shares of which are listed on the Main Board of the Stock Exchange. It is principally engaged in investment, development, and operation of high-grade roads in the PRC. The Company and its subsidiaries (the "**Group**") are engaged in the expressway related development and operation, as well as securities business.

The table below summarizes the financial information of the Group for the two years ended December 31, 2016 and 2017 ("**FY2016**" and "**FY2017**", respectively) and the six months ended June 30, 2018 ("**1H2018**") as extracted from the annual report of the Company for the year ended December 31, 2017 (the "**2017 Annual Report**") and the interim report of the Company for the six-month ended June 30, 2018 (the "**2018 Interim Report**"):

	For the year ended December 31,		**For the six-month ended June 30,**
	2016	**2017**	**2018**
	RMB million (audited)	*RMB million* (audited)	*RMB million* (unaudited)
Business Segments			
Toll operation	5,279.3	5,986.2	3,065.8
Securities operation[1]	4,175.2	3,491.3	1,513.7
Others[2]	280.8	148.8	52.8
Total Revenue	**9,735.3**	**9,626.3**	**4,632.3**
Gross profit	5,139.3	4,970.2	2,574.3
Gross Profit Margin (%)	52.8%	51.6%	55.6%
Profit before taxation	4,888.6	5,183.3	2,666.1
Profit after taxation	3,727.0	3,991.0	2,078.2
Profit attributable to the Shareholders of the Company	3,037.4	3,202.1	1,812.2

Notes:

1. Includes "commission and fee income from securities operation" and "interest income from securities operation".

2. Includes "revenue from sales of properties" and "hotel and catering revenue".

As set out in the above table, the revenue of the Group was mainly contributed by its toll road operation and securities operation, which in aggregate accounted for over 97% of the total revenue for the two years ended December 31, 2016 and December 31, 2017, as well as the six-month ended June 30, 2018. The revenue from toll highway operation increased by RMB706.9 million or 13.4% between FY2016 and FY2017. The growth on its toll road operation revenue demonstrates the success of the Group's strategy in becoming the leading toll-road operator in China. The profit margin increased from 51.6% for FY2017 to 55.6% for 1H2018. This significant efficiency gain was due to the Group's initiative to adopt smart technologies into its core toll road business, including the deployment of smart toll station on a trial basis, the expansion of ETC lanes, and the utilization of a mobile payment processing system, all of which reduced the operating costs and improved operation efficiency. According to the 2017 Annual Report, the Group is proactively looking for further technological advancements to enhance the competitiveness of its core expressway business.

According to the 2017 Annual Report, toll operation benefits from the favorable economic development momentum in Zhejiang Province, which experienced 7.8% GDP growth on a yearly basis exceeding the national GDP growth of 6.9%. The toll operation revenue derives from five expressways, namely the Shanghai-Hangzhou-Ningbo Expressway, the Shangsan Expressway, the Jinhua Section of the Ningbo-Jinhua Expressway, the Hanghui Expressway, and Huihang Expressway. Table below summarizes their revenues and operations in the year of 2016 and 2017.

	Toll Revenue			**Traffic Volume**		
Toll Operation Roads	**2016** *RMB million*	**2017** *RMB million*	**% change from 2016**	**2016 No. of Vehicles***	**2017 No. of Vehicles***	**% change from 2016**
Shanghai-Hangzhou-Ningbo Expressway	3,342.6	3,772.9	12.9%	50,611	57,275	13.2%
Shangsan Expressway	1,112.3	1,244.3	11.9%	27,094	30,223	11.6%
Jinhua section, Ningbo-Jinhua Expressway	335.1	362.3	8.1%	17,932	19,708	9.9%
Hanghui Expressway	446.4	477.7	7.0%	16,177	17,500	8.2%
Huihang Expressway**	43.0	129.1	200.3%	7,413	7,240	(2.3%)
Total	**5,279.4**	**5,986.3**	**13.4%**	**119,227**	**131,946**	**10.7%**

* Indicates number of daily average vehicles in the year of 2016 and 2017.

** Huihang Expressway was acquired by the Company in September 2016, therefore the revenue from Huihang Expressway in 2016 does not represent a full year result.

As set out in the above table, four out of five expressways of the Group experienced toll revenue growth rate in excess of the GDP growth rate of Zhejiang Province due to a number of positive factors. According to the 2017 Annual Report, the strong growth was the result of 1) the "post-G20 effect", the summit of which was held in Hangzhou, Zhejiang in September 2016, brought positive impact to the region, including rapid development of economy and tourism in Zhejiang Province; and 2) the release of "Regulations on Overloaded Trucks on Roadways" by the PRC Ministry of Communication and Transport in September 2016 which increased the truck traffic volume on the expressways operated by the Company, resulted truck traffic volume growth rate of 5% above the growth rate of passenger vehicles. Given the positive outlook of the toll road business, the Directors are of the view that given the Group's competitiveness and leading position in the toll road business, the business will continue to benefit the Group and it will remain as the Group's main source of revenue.

The Group also engages in the securities business (i.e. commission and fee income, and interest income) and others (i.e. hotel operations and sales of ancillary apartments, namely the Qiyu Apartments). According to the 2017 Annual Report, the lackluster financial market remained volatile and resulted in a decrease of 11.7% in trading volume on the Shanghai and Shenzhen stock markets on a yearly basis. As a result, the revenue from the securities business reduced from RMB4,175.2 million for FY2016 to RMB3,491.3 million for FY2017. Despite the downturn of the financial market, Zheshang Securities, a subsidiary of the Company, was successfully listed on the Shanghai Stock Exchange, and its securities investment gain amounted to RMB778.80 million for FY2017 while it was RMB205.28 million for FY2016, representing an increase of 279.4%. The revenue derived from others is mainly contributed by the Company's subsidiary, Zhejiang Yuhang Expressway Co. Ltd., for which the Company holds 51% equity interest.

b) Communications Group

As stated in the Letter from the Board, Communications Group is a wholly State-owned enterprise established in the PRC on December 29, 2001. It principally engages in a diverse range of businesses, including investment, operations, maintenance, toll collection and ancillary services of expressways, construction and building of transportation project, ocean and coastal transport, as well as real estate. Communications Group is the controlling shareholder of the Company.

c) The Target

As stated in the Letter from the Board, the Target is a limited liability company established in the PRC on July 13, 2018 with a registered capital of RMB1,720,000,000. The Target and its subsidiaries are principally engaged in the toll collections of Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the operation and management of the Zhoushan Bridge. As of the Latest Practicable Date, the Target is a wholly owned subsidiary of Communications Group, and the Target will become a wholly owned subsidiary of the Company upon Completion.

The Shenjiahuhang Expressway is divided into Huzhou section (S12) and Lianhang section (S13). The Huzhou section starts from Lianshi Town at Nanxun District, Huzhou City, and ends at Wuxing District at Huzhou City, for a total length of 42.0 kilometers. The Huzhou section has three ramp toll stations and one pair of service areas, which were completed and opened to traffic on January 28, 2008. The Lianhang section starts from Lianshi Town at Nanxun District, Huzhou City, and ends at Chongxian Town, Yuhang District for a total length of 50.9 kilometers. The Lianhang section has seven ramp toll stations and one pair of service areas, which were completed and opened to traffic on February 6, 2010. The Target acquired the toll collection rights of Huzhou section and Lianhang section of the Shenjiahuhang Expressway from Communications Group on July 31, 2018.

Zhoushan Co is a limited liability company established in the PRC on November 12, 2004 with a registered capital of RMB3,606,690,000, and was owned as to 51% by Communications Group and 49% by other independent third parties since its establishment. On July 31, 2018, the Target acquired 51% equity interest in Zhoushan Co from Communications Group. As of the Latest Practicable Date, Zhoushan Co is owned as to 51% by the Target. The Zhoushan Bridge connects Ningbo and Zhoushan, along with the intermediary islands in between. It has total length of 46.3 kilometers and is designed as a two-way four-lane bridge with 100km/h speed limit. It has eight toll booths and was opened to traffic on February 6, 2010 with its toll collection right expiring in 2034. As the Target was established in 2018, the table below sets out the consolidated financial information of the Target for the two years ended December 31, 2016 and December 31, 2017 prepared in accordance with the generally accepted accounting principles in the PRC by the PRC statutory auditor of the Target assuming it had been established prior to the year 2016:

	As at December 31, 2016 *RMB million* (unaudited)	**As at December 31, 2017** *RMB million* (unaudited)
Total Assets	17,038.9	16,334.7
Total Liabilities	14,075.5	13,508.5
Net Assets	**2,963.4**	**2,826.2**

The Target's total assets mainly account for the value of the Shenjiahuhang Expressway and the Zhoushan Bridge. The total assets amounted to approximately RMB16,334.7 million as at December 31, 2017, which represented a decrease of 4.1% from approximately RMB17,038.9 million as at December 31, 2016. The decrease was mainly attributable to the depreciation of fixed asset.

The Target's total liabilities mainly account for the construction loan payable as the initial construction cost of the aforementioned expressway and bridge. The total liabilities amounted to approximately RMB13,508.5 million as at December 31, 2017, which represented a decrease of 4.0% from approximately RMB14,075.5 million as at December 31, 2016. The decrease was mainly attributable to the repayment of debt.

	For the year end December 31,	
	2016	**2017**
	RMB million (unaudited)	*RMB million* (unaudited)
Operating revenue	1,214.6	1,402.5
Operating cost	(856.9)	(1,016.2)
Gross profit	**357.8**	**386.3**
Other expense	(17.2)	(6.3)
Administrative expense	(6.5)	(6.8)
Finance cost	(604.9)	(515.7)
Other income and gains and losses	20.7	5.3
Profit before taxation	**(250.1)**	**(137.2)**
Profit after taxation	(250.1)	(137.2)
Profit attributable to the Shareholders of the Target	(172.3)	(55.6)

As set out in the above table, the operating income and operating cost increased by RMB187.9 million and RMB159.4 million between FY2016 and FY2017 respectively, and they amounted to RMB1,402.5 million and RMB1,016.2 million respectively for FY2017. As the increase in revenue exceeded the increase in cost, gross profit increased by RMB28.5 million and amounted to RMB386.3 million for FY2017.

Taking into account of the non-operating income and expenses, the profit before taxation improved by RMB112.9 million from a loss of RMB250.1 million for FY2016 to a loss of RMB137.2 million for FY2017. The improvement was primarily due to a decrease of RMB89.2 million in finance cost between FY2016 and FY2017. The loss in profit before taxation was mainly due to the large amount of finance cost that represents the interest payments on the outstanding debt, which amounted to RMB515.7 million for FY2017. The loss attributable to owners of the Target improved by RMB116.7 million from a loss of RMB172.3 million for FY2016 to a loss of RMB55.6 million for FY2017.

Despite the Target recorded net losses of RMB250.1 million in FY2016 and RMB137.2 million in FY2017, the management account of the Target for the eleven months ended November 30, 2018 indicates that the Target has turned from a loss making to a profit making position. Further, we are advised by the Directors and

pursuant to the Valuation Report, the Target expects a high probability of posting a profit from 2019 onwards. The Directors believe that i) it is a common practice in the toll road business to record losses in early years due to the initial large construction loan and only begin to record profits as the operation and business development mature, and the Target is showing sign that it is entering its mature stage at which it starts to record profits; ii) the Target's business experienced significant improvement on its operation efficiency; and (iii) the successful business strategies and good performance of the Group's management will further enhance the financial performance of the Target upon completion of the Acquisition.

2. Economic and industry development of Zhejiang Province

According to the statistics compiled by the National Bureau of Statistics of China, the real gross domestic product ("**Real GDP**") in the PRC has been increasing at a compound annual growth rate of 7.6% between 2011 to 2017, while the Zhejiang Provincial Bureau of Statistics disclosed that the Real GDP in Zhejiang Province has been increasing at a compound annual growth rate of 8.0%, exceeding the national growth rate, in the same period. The strong growth in the Zhejiang Province signifies the effectiveness of the comprehensive provincial strategy, 《浙江省國民經濟和社會發展第十二個五年規劃綱要》, announced by the People's Government of Zhejiang Province ("**Zhejiang Government**") in 2011. This provincial strategy outlined the Zhejiang Government's action plans for economy growth in 2011 to 2015 in many aspects, including but not limited to, urbanization, research and development, environmental enhancement, living standards, and political stability.

The table below sets out the annual growth rate of the Real GDP and urbanization rate of the PRC and Zhejiang Province from 2011 to 2017:

	2011	2012	2013	2014	2015	2016	2017
Real GDP Growth Rate							
– the PRC	9.5%	7.9%	7.8%	7.3%	6.9%	6.7%	6.9%
– Zhejiang Province	9.0%	8.0%	8.2%	7.6%	8.0%	7.6%	7.8%
Urbanization Rate *(Note)*							
– the PRC	51.3%	52.6%	53.7%	54.8%	56.1%	57.4%	58.5%
– Zhejiang Province	62.3%	63.2%	64.0%	64.9%	65.8%	67.0%	68.0%

Source: National Bureau of Statistics of China and Zhejiang Provincial Bureau of Statistics

Note: Urbanisation rate represents the percentage of urban population to total population

As set out in the table above, Zhejiang Province experienced surpassing growth rates in GDP as well as urbanization rate as compared to the national levels since 2012. In 2015, the Zhejiang Government published the successive provincial strategy, 《浙江省國民經濟和社會發展第十三個五年規劃綱要》, which outlined the provincial development action plans for the period 2016 to 2020. As evidenced by the strong growth in 2016 and 2017, this new provincial strategy has demonstrated to be another successful strategy in stimulating the economic development in the Zhejiang Province so far. As of the end of 2017, Zhejiang

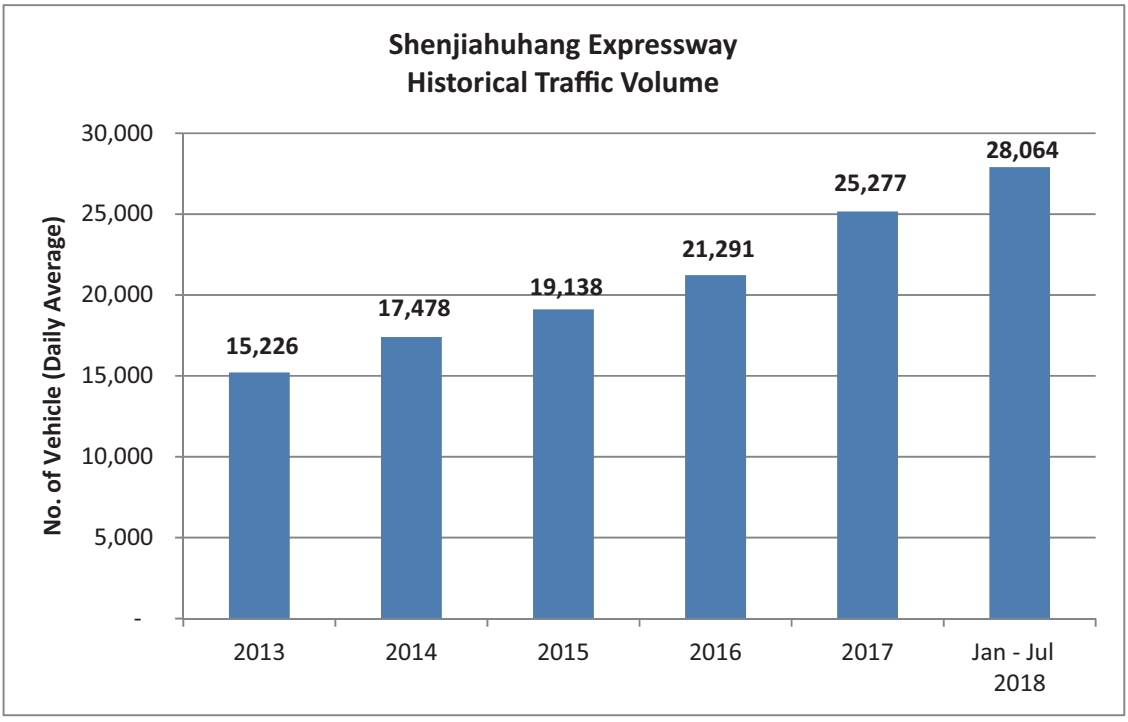
Province's GDP reached RMB5.176 trillion. In light of the rapid economic growth, the Zhejiang Government also released an opinion, "Implementation Opinions of the Zhejiang Provincial People's Government on Promoting the Development of Modern Integrated Transportation in the Province"(《浙江省人民政府關於推進全省現代綜合交通發展的實施意見》), which responded and implemented measures to the surging demand on transportation as a result of the rapid economic growth in order to maintain the development momentum.

Taking into account of Zhejiang Province's strong economic development in the past years, and that the Zhejiang Government has strong initiatives in promoting economic growth and has been implementing the corresponding measures to facilitate the momentum, we are of the view that the rural and urban integration development in Zhejiang Province will benefit the industry of infrastructure construction, traffic consolidation and logistics. We concur with the Directors that the prospect remains positive for the Group as the economic development and urbanization drive greater demand on expressways that connect the major cities across the province.

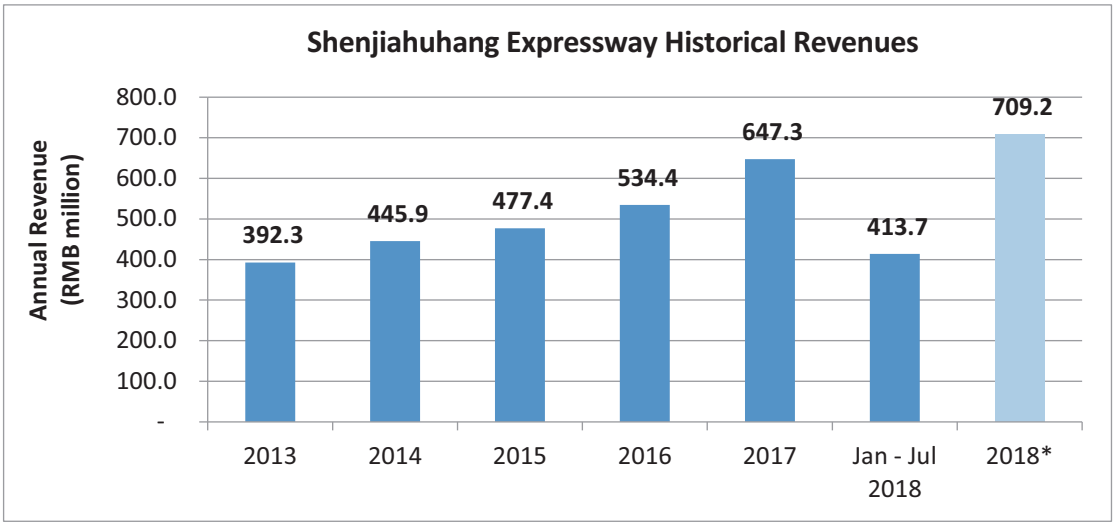
3. Traffic volume and toll revenue of the Shenjiahuhang Expressway

The Shenjiahuhang Expressway is comprised of two sections – Huzhou section (S12) and Lianhang section (S13) within the State expressway network. The Huzhou section begins at Nanxun District (南潯區練市鎮) and ends at Wuxing District (吳興區) with total length of 42.0 km, it was opened to traffic on January 28, 2008. The Lianhang section begins at Nanxun District (南潯區練市鎮) and ends at Yuhang District (余杭區崇賢鎮) with total length of 50.9 km, it was opened to traffic on February 6, 2010.

According to the Traffic Study Report, the two charts below summarize the average daily traffic volume by month and annual toll revenue of the Shenjiahuhang Expressway from the year 2013 to the seven-month ended July 31, 2018.



The above chart shows that the average daily traffic volume from 2013 up to the seven-month ended July 31, 2018 maintained a steady growth every year. The growth was particularly strong in 2017 and 2018 – both years experienced a double-digit growth rate of 19.1% and 12.5% respectively. For FY2017 and the seven-month ended July 31, 2018, the average daily traffic flow of the Shenjiahuhang Expressway was approximately 25,277 vehicles and 28,064 vehicles respectively.



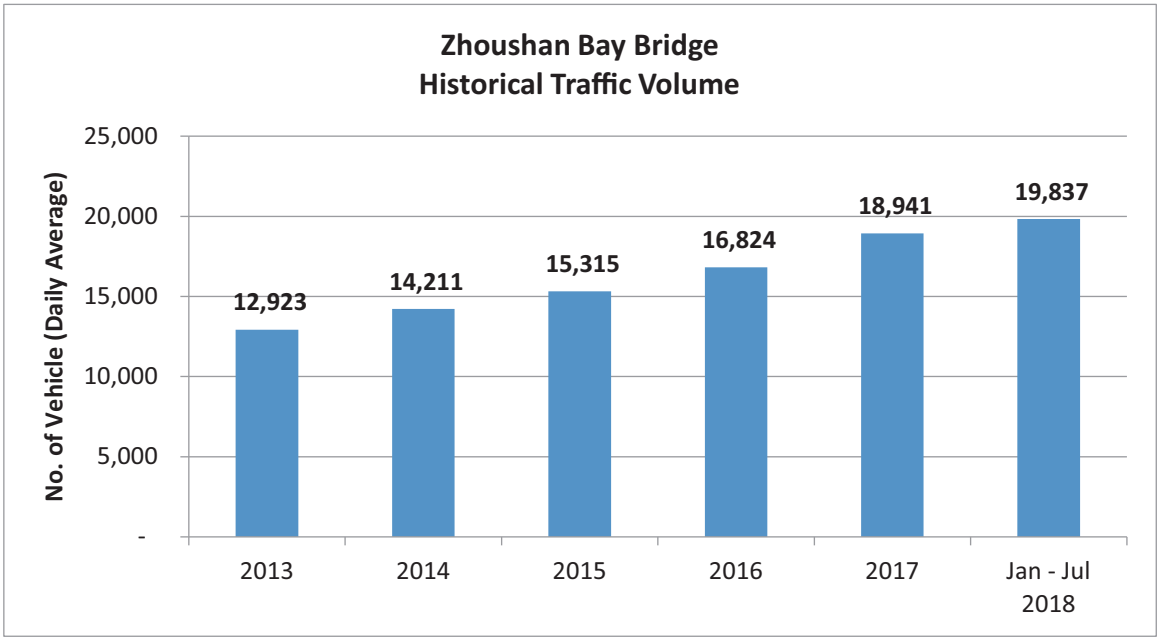
* 2018 annual revenue is annualized based on the earned revenue for the first seven months from January to July 2018.

The above chart shows that the annual toll revenue increased at a compound double-digit annual growth rate of 13.3% between 2013 and 2017, while the revenue for the seven-month ended July 31, 2018 has increased by 13.9% as compared to the seven-month ended July 31, 2017. Based on the earned revenue in the first seven months of 2018, the revenue for the entire year of 2018 annualizes to be RMB709.2 million. According to the traffic study report set out in Appendix II to the Circular, the annual toll revenue of the Shenjiahuhang Expressway is expected to reach its maximum of approximately RMB1,245.0 million in 2032.

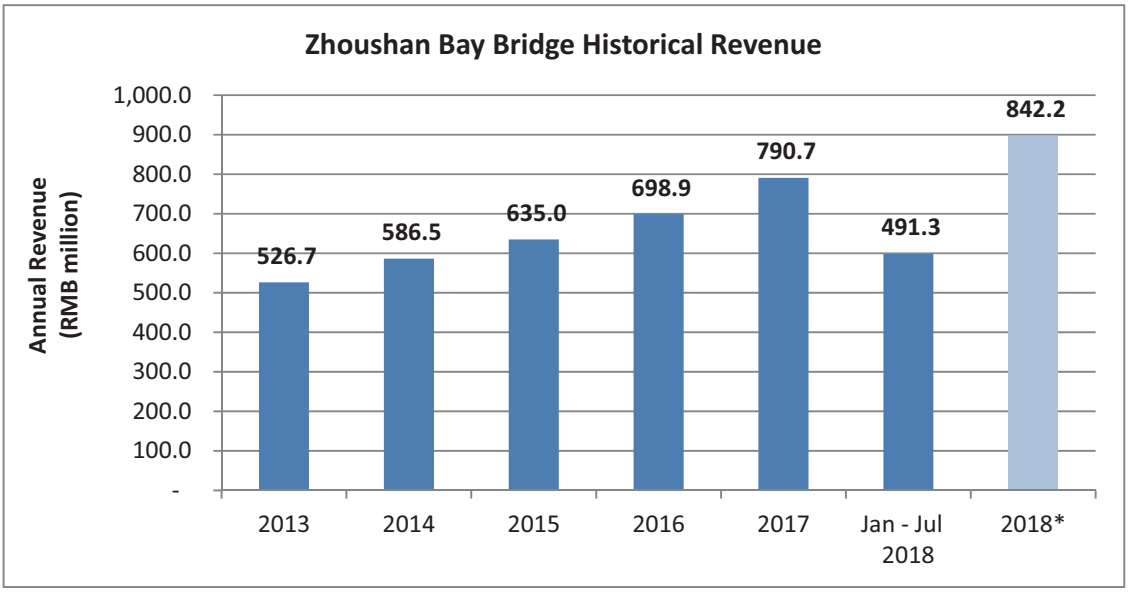
4. Traffic volume and toll revenue of the Zhoushan Bridge

The Zhoushan Bridge connects Ningbo and Zhoushan, along with the intermediary islands in between. It has total length of 46.3km and is designed as a two-way four-lane bridge with 100km/h speed limit. It has eight toll booths and was opened to traffic on February 6, 2010 with its toll collection right expiring in 2034.

According to the Traffic Study Report, the two charts below summarize the average daily traffic volume by month and annual toll revenue of the Zhoushan Bridge from the year 2013 to the seven months ended July 31, 2018:



The above chart shows that the average daily traffic volume from 2013 up to the seven-month ended July 31, 2018 maintained a steady growth every year. The growth was strong in the past two years (2016 and 2017) – while all years experienced approximately 10.0% growth rate. For FY2017 and the seven-month ended July 31, 2018, the average daily traffic flow of the Zhoushan Bridge was approximately 18,941 vehicles and 19,837 vehicles respectively.



* 2018 annual revenue is annualized based on the earned revenue for the first seven months from January to July 2018.

The above chart shows that the annual toll revenue increased at a compound double-digit annual growth rate of 10.7% between 2013 and 2017. The revenue as at July 31, 2018 has increased by 13.0% as compared to the seven-month ended July 31, 2017. Based on the earned revenue in the first seven months of 2018, the revenue for the entire year of 2018 annualizes to be RMB842.2 million. According to the Traffic Study Report set out in Appendix II to the Circular, the annual toll revenue of the Zhoushan Bridge is expected to reach its maximum of approximately RMB1,891.6 million in 2029.

As shown by the Traffic Study Report, both the Shenjiahuhang Expressway and the Zhoushan Bridge maintained consistence double-digit growth on revenues since 2013. The Directors believe there are no apparent factors that would negatively affect such growth trend and are confident that the growth will maintain into the future. As such, we concur with the Directors that the Acquisition will contribute to the business growth of the Group.

5. Reasons for and benefits of entering into the Equity Purchase Agreement

Positive market outlook with Government initiatives

In 2017, the Zhejiang Provincial Development and Reform Commission announced the Zhejiang Government's future long-term strategy to develop a "Zhejiang Province Bay Area" (浙江省大灣區) involving RMB750 billion of investment in the next five years that aims to integrate and link the productive cities around the area - Shanghai, Hangzhou, and Ningbo - covering around 30 million of population, and doubling the economic output to RMB6.0 trillion by 2022. One of the focuses of the strategy is to facilitate the development of transportation, including ports, airports, railroads, and roads. The strategy has planned 70 transportation projects with the investment estimated to be RMB1,500 billion while the projects to be completed in the next five years

accounted for RMB750 billion. Among these projects, 44 of them are being carried out in 2018. The Directors believe that such large-scale development will add more truck traffic volumes to the Shenjiahuhang Expressway and the Zhoushan Bridge.

Given the provincial plan and the continuous urbanization development, the Directors are optimistic of the prospect of the toll road infrastructure and the urbanization in Zhejiang province will increase demand on roads, which will bring about favorable earnings to the Group through toll revenues.

Enhancement of competitiveness and potential synergy effect

As set out in the Letter from the Board, the total length of expressways operated by the Company will increase from approximately 663 km to approximately 803 km upon completion of the Acquisition. The core business of the Company will be enhanced through the Acquisition which will help to increase the market share and competitive strength of the Company in Zhejiang Province. Table below sets out the cities with their respective GDP's in 2017 that are currently covered and will be covered by the roads that the Company operates after the Acquisition.

Zhejiang Province Cities	**2017 GDP** *(RMB billion)*	**% of Total**	**Growth Rate**
Hangzhou[1]	1,255.62	24.3%	8.0%
Ningbo[1]	984.69	19.0%	7.8%
Shaoxing[1]	510.80	9.9%	7.1%
Jiaxing[1]	435.52	8.4%	7.8%
Jinhua[1]	387.02	7.5%	6.5%
Huzhou[2]	247.61	4.8%	8.5%
Zhoushan[2]	121.90	2.4%	8.8%
Others	1,233.67	23.8%	n/a
Total	**5,176.83**	**100.0%**	**7.8%**

Source: Zhejiang Provincial Bureau of Statistics

Notes:

1. Covered by the toll road currently under operation by the Company.

2. Will be covered by the toll road upon completion of the Acquisition.

According to the table above, the Company's toll roads city coverage will increase from RMB3,573.65 billion or 69.0% of the total Zhejiang Province's GDP to RMB3,943.16 billion or 76.2% of the total Zhejiang Province's GDP.

Furthermore, the Directors believe that the Company will be able to generate additional toll revenues from the Acquisition with its expertise in the toll road business and pricing scheme without incurring substantial expenses by utilizing its existing management team, equipment and machinery for maintenance. The Directors believe that the Acquisition will facilitate the Company to better utilize its experiences, advantages, and resources on toll operations and to complement the Company's existing network of expressways, both of which are in line with the Company's development strategy and are in the best interests of the Company and the Shareholders.

Geological significance and strategic development in the region

As set out in the Letter from the Board, the Directors expect the Acquisition will further integrate local advantages for the regional development in the Yangtze River Delta economic zone. The zone is a metropolitan region covering parts of the provinces of Zhejiang, Jiangsu, and Anhui, and the Shanghai municipality. In 2016, the Yangtze River Delta generated a GDP of RMB17.72 trillion, representing 20% of the national GDP.

As set out in the Letter from the Board, the Shenjiahuhang Expressway is one of the major expressways that connects Zhejiang Province with Shanghai within the Yangtze River Delta economic zone. It further strengthens the economic relationship between Zhejiang Province and Shanghai by i) enhancing the integration of the two regions into the Yangtze River Delta economic zone; ii) providing an alternative route in the highway network in the region; and iii) reducing the traffic pressure on the Shanghai-Hangzhou Expressway in order to achieve the goal of establishing a three-hour travel circle within the Yangtze River Delta economic zone.

Meanwhile, as Zhoushan is consisted of islands at the southern mouth of Hangzhou Bay off the coast from Ningbo, the Zhoushan Bridge serves as the only bridge that connects the Zhoushan islands and Ningbo. The Zhoushan Bridge greatly shortened the driving distance between Zhoushan and Ningbo and Hangzhou. In particular, the travel time from Zhoushan to Shanghai via the south bank of Hangzhou Bay will fall within three hours, achieving the goal of the three-hour travel circle within the Yangtze River Delta economic zone as mentioned above. As a result, the Directors believe that the Acquisition not only presents a positive contribution to the financial position of the Group upon Completion, but also contributes strategic significances and influences in the development of the Yangtze River Delta economic zone.

Having taken into account (i) the government large-scale development plan of Zhejiang Province in boosting its economy and promoting urbanization rate; (ii) the Acquisition is in line with the development strategy of the Company in strengthening the core business of the Company; (iii) the Acquisition presents significant cost synergy effect with the Company's existing expertise and resources, and (iv) the Acquisition presents positive financial contribution to the Group and promotes development of the Yangtze River Delta economic zone, we concur with the Directors that the entering of the Equity Purchase Agreement is in the interests of the Company and the Shareholders as a whole.

II. Major terms of the Equity Purchase Agreement

1. Consideration and payment terms

The Consideration for the entire equity interest of the Target is RMB2,943 million. 50% of the Consideration will be payable by the Company in cash within 10 business days after the effective date of the Equity Purchase Agreement and the remaining 50% of the Consideration will be payable by the Company in cash within 45 business days from the effective date of the Equity Purchase Agreement, subject to any adjustment.

The Consideration will be funded by the Company's internal resources as well as debt financing. It is intended that not exceeding RMB1,700,000,000 to be raised under the Mid-term Notes Issue will be applied for the payment of the Consideration. The interest rate of the Mid-term Notes is currently estimated to be 4.0%. The Company confirms that it has the capacity to pay the Consideration if the Mid-term Notes Issue were unsuccessful. The Company has a good credit standing, low asset-to-liability ratio and sufficient operating cash flows and bank credit facilities. In the event that the Mid-term Notes Issue were unsuccessful, the Company intends to fund part of the Consideration by bank borrowings. It is expected that the cost of such bank borrowing would be around 4.9%.

2. Consideration adjustment

The Consideration was determined based on (i) the assumption that the toll collection rights period of the Huzhou and Lianhang sections of the Shenjiahuhang Expressway as finally approved was assumed to be 25 years; and (ii) the 25-year toll collection rights period of the Zhoushan Bridge as already approved by the government authorities. The Valuation Report was based on, among others, the existing toll collection rates of the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge.

We noted that the Target has obtained all necessary permits from relevant government authorities which entitled the Target to exercise the toll collection rights of the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge. In the event that the toll collection rights period of the Huzhou and Lianhang sections of the Shenjiahuhang Expressway as finally approved is less than 25 years or the actual toll collection right period of Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge is less than 25 years, the Company and Communications Group have agreed to enter into a supplemental agreement to adjust downward the Consideration with reference to the PRC Valuation Report.

As at the Latest Practicable Date, the Target has obtained the 25-year toll collection rights written approvals for the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge from Zhejiang Provincial Communication Department (浙江交通運輸廳). Therefore, there will not be any adjustment on the Consideration as a result of the toll collection rights not being approved for 25 years for the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge.

3. Conditions precedent

The Equity Purchase Agreement will become effective upon satisfaction of the following conditions:

(i) approval of the Acquisition by the Target's sole shareholder having been obtained;

(ii) approval of the Acquisition by the board of directors of the Communications Group having been obtained; and

(iii) approval of the Acquisition by the Company's Independent Shareholders having been obtained.

As at the Latest Practicable Date, the conditions under paragraphs (i) and (ii) above have been satisfied.

4. Completion

Within 20 business days from the effective date of the Equity Purchase Agreement, the parties shall cooperate to apply with the relevant governmental authorities to alter the registration for industrial and commercial administration for Completion.

We have reviewed the terms of the Equity Purchase Agreement and having considered that i) the Consideration was agreed after arms' length negotiations between the Company and Communications Group, and with reference to the Valuation Report (please refer to section "**III. Analysis of Consideration**" for detailed analysis on the Consideration); and ii) as at the Latest Practicable Date, the Target has obtained both written approvals from the government authorities granting the toll collection rights for the Huzhou and Lianhang sections of the Shenjiahuhang Expressway and the Zhoushan Bridge for 25 years since their respective first day of operation, we consider the terms on the Equity Purchase Agreement are on normal commercial terms, and they are fair and reasonable so far as the Independent Shareholders are concerned and in the interest of the Company and Shareholders as a whole.

III. Analysis of Consideration

1. Basis of Consideration

As set out in the Letter from the Board, the consideration was determined after arm's length negotiations between the Company and Communications Group. The principal business of the Target is the operation and management of the Shenjiahuhang Expressway and the Zhoushan Bridge. With over 20 years of toll road operating experiences, the Company comprehensively considered factors including the traffic volume, operation, policy environment and the maturity of the project for assessing the estimated value of the Target, and took into account the Valuation Report prepared by Jones Lang LaSalle (the "**Independent Valuer**") as the major factors in negotiating the consideration of the Acquisition. The income approach was adopted in the valuation of the market value of the Target as at July 31, 2018 by the Independent Valuer. According to the Valuation Report set out in Appendix I to the Circular, the fair value of the Target (the "**Valuation**") as at July 31,

2018 was RMB2,969,552,000. We noted that both Valuation Report and Traffic Study Report assume the toll collection rights of the Shenjiahuhang Expressway and the Zhoushan Bridge will be 25 years commenced on their first day of operation. We also noted that the Target has already obtained the toll collection rights from the government authority for both the Shenjiahuhang Expressway and the Zhoushan Bridge. The Consideration of RMB2,943,000,000 represented a discount of approximately RMB26,552,000 or 0.1% of the Valuation prepared by the Independent Valuer, which we understand to certain extent, was determined with reference to the Traffic Study Report of the Shenjiahuhang Expressway and the Zhoushan Bridge prepared by WBG. The summary of the Traffic Study Report is set out in Appendix II to the Circular. In order to determine whether the Valuation could provide a valid benchmark to assess the fairness and reasonableness of the Consideration, we have reviewed the Valuation Report and the Traffic Study Report.

2. Competence of the Independent Valuer

As part of our due diligence, we have reviewed the qualification and experience of the Independent Valuer. In addition, we have also reviewed the terms of the Independent Valuer's engagement, we are satisfied and consider the terms of engagement and the scope of work of the Independent Valuer to be appropriate. Furthermore, we have enquired with the Independent Valuer as to its current and prior independence with the Group, and understood that the Independent Valuer is an independent third party from the Company, the Target, and the connected persons of the Group and Communications Group.

3. The Valuation Report

a. Methodologies

We understand that the Independent Valuer has considered three generally accepted valuation approaches, namely the market approach, asset-based approach and income approach, as the valuation methodology in valuing the market value of the Target as at July 31, 2018.

From our discussion with the Independent Valuer, we understand that due to the lack of information on comparable transactions with comparable business structure, asset size, scale of operations, profitability and other factors, it is not suitable to use market approach in the evaluation. We also understand from the Independent Valuer that the asset-based approach, which involves the assessment of assets and liabilities to appraise the value of the Target, is not ideal for this evaluation as (i) it only takes into account of the Target worth as at the valuation date and forgoes the positive growth prospect of the Target; and (ii) the earning potential of the Target is in its ability to generate sustainable and predictable revenue in the future through its well-established toll road and bridge. Given that the main source of revenue for the Target is toll income, which is recurring

and relatively stable in the future, the Independent Valuer advised us that the income approach is the most commonly used valuation method that appropriately values predictable toll revenue streams with consistent growth based on assessment on the Target's historical business performance. The income approach refers to the evaluation method of capitalising or discounting the expected future benefits and determining the value of the appraised object. On this basis, nothing has come to our attention that will cause us to doubt the reasonableness of using the income approach.

b. Valuation assumptions

We have reviewed and discussed with the Independent Valuer in respect of the valuation assumptions applied in the Valuation. We discussed with the Independent Valuer regarding the discounted future cashflow (DCF) calculation method of the income approach adopted in the Valuation. We understand from the Independent Valuer that the Valuation is mainly derived from the discounted future cashflow of the future revenues that will be generated by the Target, while the discount rate is determined through the Capital Asset Pricing Model (CAPM), which adjusts the Target's beta by taking into account of the country risk premium and liquidity premium from comparable companies' betas that are also listed on the Stock Exchange. Such comparable companies are listed companies on the Stock Exchange which also engage in the similar business to that of the Target, namely, operation of toll roads in the PRC. Given the comparable companies are in the same industry as the Target, we are of the view that it is fair and reasonable to derive the beta from such comparable companies. We have further reviewed that such comparable companies, as disclosed at the end of the Valuation Report as set out in Appendix I, are a fair and representative sample.

For the key assumptions used in the valuation model, the Independent Valuer advised that a discount rate of 11.0% is within the discount range used by the Independent Valuer when evaluating similar acquisitions of toll road assets by listed companies. Moreover, we note that in determining the Valuation, the Independent Valuer had taken into consideration and relied on the revenue projections based on the Traffic Study Report and information provided by the Company and the Target.

We noted that they are common assumptions adopted in business valuation, including but not limited to (i) no material change in the existing political, legal, technological, fiscal or economic conditions, which might adversely affect the economy in general and the business of the Target; and (ii) the accuracy of the financial and operational information provided to the Independent Valuer by the Company and the Target are relied upon to a considerable extent in arriving at the Independent Valuer's conclusion of value. We are not aware of any material facts which may lead us to doubt the principal bases and assumptions adopted for the Valuation.

We have further discussed with Deloitte, acting as the reporting accountant of the Company, (the "**Reporting Accountant**") regarding their work performed on the discounted future cashflow method. We understand that the Reporting Accountants checked the arithmetical calculations and the complications of the discounted future cash flows and concluded that the discounted future cash flows have been properly compiled

in all material respects in accordance with the bases and assumptions adopted by the directors of the Target, who are solely responsible and the profit forecast has been prepared by them based on the audited financial results of the Target as set out in the Valuation.

In addition, we have discussed with the Financial Adviser regarding their views on the basis and assumptions adopted in the profit forecast. We understand that the Financial Adviser has taken into account of the business plans, toll market environment and historical business performance of the Target before forming their views on the bases and assumptions, including but not limited to the growth rates and discount rates used in the profit forecast.

Taking into account (i) the Independent Valuer is independent from the Company and is competent to perform the Valuation; (ii) scope of work of the Independent Valuer is appropriate for the relevant engagement; (iii) the discounted future cash flows have been reviewed by the Reporting Accountant, as set out in Appendix III of the Circular; and (iv) the Financial Adviser is satisfied with the profit forecast included in the Valuation Report which is solely responsible by the Directors, as stated in the Appendix IV of the Circular, we consider that the Valuation is an appropriate reference to assess the fairness and reasonableness of the consideration for the Acquisition.

4. The Traffic Study Report

We have reviewed and discussed with WB Group International Limited ("**WBG**") about the Traffic Study Report on the bases, assumptions and methodologies underlie the estimate of the traffic volume and toll revenue of the Shenjiahuhang Expressway and the Zhoushan Bridge. We note that WBG has (i) collected economic and historical traffic data for the Shenjiahuhang Expressway and the Zhoushan Bridge; (ii) analyzed the data in (i) above; and (iii) built a traffic model to estimate the traffic volume and toll revenue of the Shenjiahuhang Expressway and the Zhoushan Bridge.

In the traffic model in estimating the traffic volume and toll revenue of the Shenjiahuhang Expressway and the Zhoushan Bridge, we note that WBG has considered (i) the existing travel patterns; (ii) the historical traffic data; (iii) an assumption that there will be no change in the existing toll rate during the forecast period; and (iv) the growth rate of traffic volume is based on the GDP growth of the relevant area (e.g. Zhejiang Province and the area along the Shenjiahuhang Expressway and the Zhoushan Bridge). In addition, we understand from WBG that they have also considered the potential competition factors and government toll policies during the forecast period in the traffic projection of the Shenjiahuhang Expressway and the Zhoushan Bridge. As stated in the Traffic Study Report, WBG adopted the generalized cost approach in determining users' route choice behaviors, which are affected by trip length, travel time and costs. In addition, the potential road network change is also considered in this model.

On this basis, nothing has come to our attention that will cause us to doubt the reasonableness of the Traffic Study Report regarding the Shenjiahuhang Expressway and the Zhoushan Bridge prepared by WBG. With regard to the toll rate, we note that WBG has assumed a fixed toll rate over the forecast period. To evaluate the fairness and reasonableness of the assumption, we have (i) discussed with WBG the determining factors to use fixed toll rate over the forecast period, such as historical toll rate policy in Zhejiang; (ii) reviewed the historical toll rate changes of the Shenjiahuhang Expressway and the Zhoushan Bridge and other expressways in Zhejiang; and (iii) reviewed the policy on other expressways in Zhejiang. We note there had not been any change in toll rates since the operation of the Shenjiahuhang Expressway and the Zhoushan Bridge. In light of (i) the uncertainty on toll rate policy changes and the trend of toll rates cannot be predicted; and (ii) the toll rates have been fixed since operation, we concur with WBG that the abovementioned assumption is reasonable. Nonetheless, it is noteworthy that the JLL Valuation could be affected by the possibility of toll rate increases or decreases of the Shenjiahuhang Expressway and the Zhoushan Bridge in the future. WBG has advised that the underlying assumptions adopted in the Traffic Study Report are commonly used in the industry, and are fair and reasonable. WBG also advised us that the forecast procedures performed in the Traffic Study Report are commonly used in the industry.

Based on our interview with WBG, we have not identified any major issues that would cause us to doubt the fairness and reasonableness of the bases, assumptions, and methodologies applied in the Traffic Study Report. As such, we are of the opinion that the Traffic Study Report provides a fair and reasonable basis for the Valuation Report.

5. Other factors considered

We note that the Target's net assets amounted to approximately RMB2,826.2 million as at December 31, 2017, which represents a discount of approximately RMB116.8 million or 4.1% of the Consideration of RMB2,943.0 million. We also noted that the original cost incurred by Communications Group for the Target was RMB1,720 million. The Directors are of the view that the net asset value represents the carrying value of the Target and the original cost is a sunk cost which both did not reflect the market value and future earnings potential of the Target. Meanwhile, we note that the Target incurred losses for the years ended December 31, 2016 and 2017 but based on management account of the Target Group for the 11 months ended November 30, 2018, the Target has turnaround from a loss making position to profit making. Based on the historical trend and the projections in the Traffic Study Report, it is expected that the traffic volume will continue to increase which will result in a positive impact to the revenue and earnings of the Target in the future.

On the other hand, although part of the Consideration will be funded by external financing such as the Mid-term Notes (or bank borrowing if the Mid-term Notes cannot be issued) which will incur certain finance expenses, given the Company generates positive net profits of approximately RMB3,727.0 million and RMB3,991.0 million in the year of 2016 and 2017 respectively and the Target will generate positive cash inflow in the near future, the annual finance expenses of approximately RMB60.0 million to be incurred does not have material impact to the Company.

Furthermore, as advised by the Company, the continuing connected transactions (please refer to section "**IV. Transactions between the Target and Connected Persons of the Company after Completion**" for detailed description and analysis) are essential to the operation of the Target. Also, the Company has taken the costs related to the abovementioned continuing connected transactions into consideration for the purpose of preparing the Valuation of the Target. As such, the Consideration has included the impact of these costs.

Having considered the above, in particular that i) the Valuation of the Target by the Independent Valuer is higher than the Consideration; ii) the Valuation adopted the DCF of income approach which appropriately values the future earnings potential of the Target; iii) the competence and independence of the Independent Valuer in preparing the Valuation Report; and iv) the competence and independence of WBG in preparing the Traffic Study Report, we concur with the Directors' view that the basis of determining the Consideration is fair and reasonable.

IV. Transactions between the Target and Connected Persons of the Company after Completion

1. Partially-exempt Continuing Connected Transaction

As set out in the Letter from the Board, as at the Latest Practicable Date, Zhejiang HNAL Co, an associate of the Communications Group, intends to enter into a construction agreement (the "**Construction Agreement**") with Zhoushan Co prior to Completion for the construction of connecting flyovers of Jintang Bridge for the Zhoushan Islands Link Project. Upon Completion, Zhoushan Co will become a subsidiary of the Company, therefore the Construction Agreement will constitute a continuing connected transaction of the Company. The transactions contemplated under the Construction Agreement will continue after Completion. The details of the Construction Agreement are set out in the Letter from the Board. As the highest of all applicable percentage ratios for the transaction contemplated under the Construction Agreement, are more than 0.1% but less than 5%, the Construction Agreement shall be subject to the reporting, announcement and annual review requirements, but exempt from Independent Shareholders' approval under Chapter 14A of the Listing Rules.

We have reviewed the proposed Construction Agreement intended to be entered by Zhejiang HNAL Co and Zhoushan Co. We noted that the Construction Agreement was part of the overall Ningbo Section Project, in which Zhoushan Co was obligated for the construction of the Zhoushan bridge corridor that connects the Zhoushan Bridge and Hangzhou-Ningbo alternative expressway ("杭甬複綫寧波高速公路"). In 2017, the Transportation Ministry of the city of Ningbo initiated the construction of this connector, and subsequently, Zhejiang HNAL Co won the public tender on July 17, 2018 in respect of the construction services of which Zhoushan Co is responsible for the relevant construction cost. As such, the Company will comply and fulfill the construction obligation from the Target upon Completion and the respective cost has been taken into account in the Valuation of the Target. The duration of the Construction Agreement is in the term of four years from 2018 to 2022, which is greater than three years. In accordance to Rule 14A.52 of the Listing Rules, the period for the agreement governing continuing connected transaction must not exceed three years except in special circumstances where the nature of the transaction requires the contract to be of duration

longer than three years. In this regard, we have discussed with the management of the Company regarding the principal reasons for the four years term of the Construction Agreement. We have discussed with the Company regarding the construction periods of all the other expressways that the Company operates and been advised by the Company that it is a normal business practice in the road construction industry to take three to five years to complete a construction project. As such, we are of the view that it is a normal business practice for this type of project to have a construction period longer than three years.

On the above basis that i) it is a normal business practice for construction project of this type to have a period of more than three years; ii) the Construction Agreement was part of the overall Ningbo Section Project and the entering into the Construction Agreement was to fulfill the obligation of the Target; and iii) the construction cost has been taken into account and reflected in the Valuation, we are of the view that the Construction Agreement, which requires a period longer than three years, is normal business practice for agreement of this type to be of such duration and the terms are in the interest of the Company and Shareholders as a whole.

2. Fully-exempt Continuing Connected Transaction

As set out in the Letter from the Board, as at the Latest Practicable Date, the Target intends to enter into the agreements, namely the Service Area Operation Lease Agreements and the Service Area Utilities Services Agreements (collectively the "**Proposed Agreements**"), with Zhejiang Communications Investment (the " **Service Provider**"). As the Service Provider is a wholly-owned subsidiary of Communications Group, each of the agreements will constitute a continuing connected transaction for the Company under Chapter 14A of the Listing Rules. It is expected that the highest applicable percentage ratios under the Listing Rules for each of the agreements is less than 0.1%, so each of them will be exempted from the reporting announcement, annual review and independent shareholders' approval requirements under Chapter 14A of the Listing Rules.

The duration of each of the Proposed Agreements will be the same as the remaining toll collection right period granted to the Target, which will be in excess of three years. The Proposed Agreements cover facilities and services to be provided such as gas stations, restaurants, supermarkets, vehicle repair shops, carparks, public toilet and rest area. According to Rule 14A.52 of the Listing Rules, any continuing connected transactions must not exceed three years, except in special circumstances where the nature of the transaction requires a longer period. The duration terms were negotiated based on the parties' arm's length negotiation with reference to the market practice and common commercial terms. In particular, we are advised by the Company that this long-term arrangement provides the Service Provider flexibility and incentive to conduct a long-term planning and investment for the construction and renovation of service areas which will be beneficial for the business operation in the long-term. The respective costs and revenues that arise throughout the duration of the Proposed Agreements have all been reflected in the Valuation.

In order to assess the duration of the Proposed Agreements, we have obtained and reviewed the similar leasing and operating agreements for another expressway that the Company operates, namely the Huihang Expressway, which the Company outsourced to an independent third party. In this agreement with the independent third party, we noted that i)

the agreement expires at the end of the toll collection right; and ii) the service agreement covers similar services to be provided in the Proposed Agreements, such as the provision of gas station, restaurants, public toilets, carpark, car wash facility and supermarket.

In arriving at our opinion, we have considered the following factors:

i) the duration set out in the agreement with the independent third party expires when the toll collection right ends;

ii) the facilities and services covered in the agreement with the independent third party are similar to the services to be provided under the Proposed Agreements;

iii) the Directors have advised that Zhejiang Communications Investment is a leading expressway servicer in the industry and currently manages a number of expressways for the Group;

iv) given Company does not provide expressway utility services, the Directors believe that entering into a long-term agreement will streamline its administrative process in managing its operating lease and utility service for its expressways;

v) a long-term agreement provides the Service Provider flexibility and incentive to conduct long-term investment for the construction and renovation of service areas; and

vi) the Valuation has included all the costs and revenues that will be generated throughout the duration of the Proposed Agreements.

With reference to the above, we are of the view that the Proposed Agreements requiring a period longer than three years are normal business practice for agreements of this type to be of such duration, and the terms are in the interest of the Company and Shareholders as a whole.

V. Financial effects of the Acquisition on the Group

As a result of the Acquisition, the Target would become a wholly-owned subsidiary of the Company, and its financial statements will be consolidated to the financial statements of the Company.

1. Earnings

For the year ended December 31, 2017, the consolidated net profit of the Group was approximately RMB3,991.0 million. Upon completion of the Acquisition, the results of the Target will be consolidated into the financial statements of the Group. Except for the finance cost to be incurred for the debt financing to fund the Consideration and the professional expenses in relation to the transaction under the Equity Purchase Agreement, there would be no material impact on the earnings of the Group. Pursuant to the Traffic Study Report and the Valuation Report, the Directors are of the view that the Acquisition would likely to have a positive impact on the future earnings of the Group in the long run.

2. Working capital

As set out in the Letter from the Board, the Consideration of RMB2,943 million will be settled by cash from its internal cash resources as well as debt financing, namely the Mid-Term Notes Issue. According to the 2018 Interim Report, the Group had bank balances and cash of approximately RMB7,734.8 million as at June 30, 2018. It is expected that the Group's cash and cash equivalent would be reduced as a result of the Acquisition. As advised by the Company, based on the existing available cash and the cash to be generated through debt financing which has already been announced and in the process, the Directors are confident that the Company will have adequate cash to settle the payments of the Consideration when the Equity Purchase Agreement becomes effective. It is expected the Group's bank balances and cash would be reduced by the part of the Consideration that will be settled by internal cash resources.

3. Net asset value

As at June 30, 2018, the unaudited consolidated net assets value of the Group was approximately RMB29,769.4 million. Upon completion of the Acquisition, the Target will become a subsidiary of the Company and its assets and liabilities will be consolidated into the financial statements of the Group. As at December 31, 2017, the consolidated net asset value of the Target is approximately RMB2,826.2 million, which represents a discount of approximately RMB116.8 million or 4.1% of the Consideration of RMB2,943.0 million. The impact on the net assets value of the Group would be adjusted and recognized in accordance with the Group's accounting policies.

It should be noted that the aforementioned analyses are for illustrative purposes only and do not purport to represent how the financial position of the Group will be upon completion of the Acquisition.

VI. Recommendation

Having considered the principal factors and reasons as discussed above, and in particular the following:

(i) the Shenjiahuhang Expressway and the Zhoushan Bridge both maintained consistence double-digit growth on revenues since 2013;

(ii) a profitable performance in 2018 as indicated in the management account of the Target Group for the eleven months ended November 30, 2018 and a high probability of posting profits from 2019 and onwards according to the Valuation Report;

(iii) the positive outlook of the economy in the Zhejiang province and the provincial government's strong initiative in promoting transportation;

(iv) upon Completion, the Group would be able to further enhance its competitiveness in the toll-road industry and benefit from potential synergy effects; and

(v) consistence growth strategy as evidenced by similar acquisition previously.

We are of the opinion that (i) the terms of the Equity Purchase Agreement are fair and reasonable so far as the Independent Shareholders are concerned; (ii) the transactions contemplated under the Equity Purchase Agreement are on normal commercial terms in the ordinary and usual course of business of the Group; and (iii) the entering into the Equity Purchase Agreement is in the interests of the Company and the Shareholders as a whole. Therefore, we advise the Independent Board Committee to recommend to the Independent Shareholders that they vote in favour of the relevant resolution to approve the Equity Purchase Agreement and the transactions contemplated thereunder at the EGM and we recommend the Independent Shareholders to vote in favour of the resolution in this regard.

Yours faithfully,
For and on behalf of
Octal Capital Limited

Alan Fung	**Louis Chan**
Managing Director	*Director*

Note: Mr. Alan Fung has been a responsible officer of Type 1 (dealing in securities) and Type 6 (advising on corporate finance) regulated activities since 2003. Mr. Fung has more than 24 years of experience in corporate finance and investment banking and has participated in and completed various advisory transactions in respect of connected transactions of listed companies in Hong Kong. Mr. Louis Chan has been a responsible officer of Type 1 (dealing in securities) and Type 6 (advising on corporate finance) regulated activities since 2008. Mr. Chan has more than 16 years of experience in corporate finance and investment banking and has participated in and completed various advisory transactions in respect of connected transactions of listed companies in Hong Kong.

Jones Lang LaSalle Corporate Appraisal and Advisory Limited
6/F Three Pacific Place, 1 Queen's Road East Hong Kong
tel +852 2846 5000 fax +852 2169 6001
Company Licence No.: C-030171

仲量聯行企業評估及咨詢有限公司
香港皇后大道東 1 號太古廣場三期 6 樓
電話 +852 2846 5000 傳真 +852 2169 6001
公司牌照號碼：C-030171

VALUATION REPORT

CONSIDERING

THE FAIR VALUE

OF

100 PERCENT EQUITY INTEREST

IN

ZHEJIANG SHENJIAHUHANG EXPRESSWAY CO., LTD.

Client : **Zhejiang Expressway Co., Ltd.**
Ref. No. : **CON000435942BV-1**
Report Date : **30 November 2018**

Jones Lang LaSalle Corporate Appraisal and Advisory Limited
6/F Three Pacific Place, 1 Queen's Road East Hong Kong
tel +852 2846 5000 fax +852 2169 6001
Company Licence No.: C-030171

仲量聯行企業評估及咨詢有限公司
香港皇后大道東 1 號太古廣場三期 6 樓
電話 +852 2846 5000 傳真 +852 2169 6001
公司牌照號碼：C-030171

30 November 2018

The Board of Directors
Zhejiang Expressway Co., Ltd.
12th Floor, Block A, Dragon Century Plaza 1 Hangda Road
Hangzhou, China 310007

Dear Sirs,

INTRODUCTION

In accordance with your instructions, we have undertaken an investigation and analysis to express an independent opinion of the fair value of 100 percent equity interest in Zhejiang Shenjiahuhang Expressway Co., Ltd. ("Shenjiahuhang" or "the Company") as at 31 July 2018 (the "Valuation Date"). The report which follows is dated 30 November 2018 (the "Report Date").

The purpose of this valuation is a circular reference for the Company.

Our valuation was carried out on a fair value basis. Fair value is defined as "*the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date*."

In arriving at our assessed value for the equity interest, we have considered three generally accepted approaches, namely, market approach, cost approach and income approach. In our opinion, the market approach and cost approach are inappropriate for valuing the subject asset. Firstly, the market approach requires market transactions of comparable assets as an indication of value. However, we have not identified any current market transactions which are comparable. Secondly, the cost approach does not directly incorporate information about the economic benefits contributed by the subject asset. We have therefore relied solely on the income approach, through the use of the discounted cash flow method, in determining our opinion of value.

As part of our analysis, we have been furnished with information prepared by the Company regarding the subject business. We have relied to a considerable extent on such information in arriving at our opinion of value.

The conclusion of value is based on accepted valuation procedures and practices that rely substantially on our use of numerous assumptions and our consideration of various factors that are relevant to the operation of the Company. We have also considered various risks and uncertainties that have potential impact on the businesses. Further, while the assumptions and consideration of such matters are considered by us to be reasonable, they are inherently subject to significant business, economic and competitive uncertainties and contingencies, many of which are beyond the control of the Company and Jones Lang LaSalle Corporate Appraisal and Advisory Limited.

We do not intend to express any opinion on matters which require legal or other specialized expertise or knowledge, beyond what is customarily employed by valuers. Our conclusions assume continuation of prudent management of the Company over whatever period of time that is reasonable and necessary to maintain the character and integrity of the assets valued.

Based on the results of our investigation and analysis outlined in the report which follows, we are of the opinion that the fair value of 100 percent equity interest in the Company as at the Valuation Date is reasonably stated as below:

Valuation Date	31 July 2018
Fair Value of 100% Shenjiahuhang Expressway (excluding Zhoushan Bridge)	RMB 1,788,376,000
Fair Value of 51% Zhoushan Bridge	RMB 1,181,177,000
Fair Value of Total 100% Equity Value of Shenjiahuhang Expressway	**RMB 2,969,552,000**

The following pages outline the factors considered, methodologies and assumptions employed in formulating our opinions and conclusions. All opinions are subject to the assumptions and limiting conditions contained therein.

Yours faithfully,

For and on behalf of

Jones Lang LaSalle Corporate Appraisal and Advisory Limited

Simon M.K. Chan

Regional Director

TABLE OF CONTENTS

INTRODUCTION

This report has been prepared in accordance with instructions from Zhejiang Expressway Co., Ltd. ("Zhejiang Expressway") to express an independent opinion of the fair value of 100 percent equity interest in Zhejiang Shenjiahuhang Expressway Co., Ltd. ("Shenjiahuhang" or "the Company") as at 31 July 2018 (the "Valuation Date"). The report day which follows is dated 30 November 2018 (the "Report Date").

PURPOSE OF VALUATION

The purpose of this valuation is a circular reference for Company.

BASIS OF VALUE

Our valuation was carried out on a fair value basis. Fair value is defined as "*the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.*"

We have conducted our valuation in accordance with International Valuation Standards issued by the International Valuation Standards Council. We planned and performed our valuation so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to express our opinion on the subject asset. We believe that the valuation procedures we employed provide a reasonable basis for our opinion.

BACKGROUND

Zhejiang Shenjiahuhang Expressway Co., Ltd. is a limited liability company established in the PRC on 13 July 13, 2018. The Company and its subsidiaries are principally engaged in the operation and management toll collection rights of Huzhou (S12) and Lianhang (S13) sections of Shenjiahuhang Expressway and the operation and management of Zhoushan Bridge.

Shenjiahuhang Expressway is comprised of two sections: Huzhou (S12) and Lianhang (S13) sections of Shenjiahuhang Expressway. The Huzhou section (S12) starts from Lianshi Town, Nanxun District, Huzhou and ends at Wuxing District, Huzhou, with a total length of 41.978 kilometers. The Lianhang Section (S13) starts from Lianshi Town, Nanxun District, Huzhou and ends in Chongxian, Yuhang District. The total length is 50.938 kilometers.

Zhejiang Zhoushan Bridge Co., Ltd. is a limited liability company established in the PRC on 12 November 2004, and was owned as to 51% by Communications Group and 49% by other independent third parties since its establishment. In 2018, Shenjiahuhang Expressway acquired 51% equity interest in Zhejiang Zhoushan Bridge Co., Ltd. from Communications Group. As at the dated of this valuation report, Zhejiang Zhoushan Bridge Co., Ltd. is owned as to 51% by Shenjiahuhang Expressway. The Zhoushan Bridge is an important part of the National Expressway Network (G9211) with a total length of 46.293 kilometers.

仲量聯行

QUALIFICATION AND EXPERIENCE

The subject valuation exercise is led and signed by Mr. Simon M. K. Chan. Mr. Chan is the Regional Director of Jones Lang LaSalle ("JLL"). He is a fellow member (FCPA) of Hong Kong Institute of Certified Public Accountants (HKICPA) and Certified Public Accountants of Australia (CPA (Australia)), a Chartered Surveyor of the Royal Institution of Chartered Surveyors (RICS), a Certified Valuation Analyst (CVA), a member of The International Association of Consultants, Valuers and Analysts (IACVA), a member of Canadian Institute of Mining, Metallurgy and Petroleum (CIM), and a member of The Australasian Institute of Mining and Metallurgy (AusIMM).

Mr. Chan oversees the business valuation services of JLL and has over 15 years of accounting, auditing, corporate advisory and valuation experiences. JLL valuation team has provided a wide range of valuation services to numerous listed and listing companies of different industries in China, Hong Kong, Singapore and the United States. During the past years, JLL valuation team has participated in many valuation practices of toll road and toll bridge for listing or circular purpose. Examples of cases are listed in Exhibit E.

We began to provide valuation service to the Company since 2015, for various of valuation purposes, including accounting reference and circular purpose. Prior to current service, we provided service for circular purpose for Zhejiang Hanghui Expressway Company Limited.

INFORMATION AND DOCUMENTS

In conducting our valuation of Shenjiahuhang, we have reviewed information from several sources, including but not limited to:

- Documents of background and operation of Company;
- Business licenses of Company;
- The standards and documents of road toll rates;
- Financial information and forecasting of Shenjiahuhang;
- Details and Articles relating to the toll road; and
- Traffic Study Report prepared by WB Group International Limited (WBG).

We conducted discussions with Zhejiang Expressway and Company's senior management. We have relied to a considerable extent on information provided by the management in arriving at our opinion of value. We have also analyzed the financial information and documents provided and conducted research using various sources.

TRAFFIC AND REVENUE FORECASTING

We have considered and relied to a considerable extent on the traffic flow and revenue study (the "Traffic Study Report") for Shenjiahuhang Expressway & Zhoushan Bridge prepared by WBG.

We have had the discussions about the key assumptions in Traffic Study Report together with the management of Shenjiahuhang, Zhejiang Expressway and WBG. We understand WBG is a professional expert with extensive experience in expressway industry and the underlying assumptions used in the Traffic Study Report are in line with industry practice. We are of the opinion that the assumptions adopted in the study are acceptable.

WBG prepared a projection for the traffic flow and revenue with respect to the subject toll road covering the respective concession period. The projection is mainly based on the expected annual GDP growth rate, vehicle types, existing road network and future transportation plan in the target area.

We believe that the traffic growth rate and the toll charge growth rate projected by WBG are reasonable and accurate. Therefore, we have adopted their findings in developing the forecast for Shenjiahuhang. The Shenjiahuhang Expressway of is composed of two parts: Huzhou section (S12) and Lianhang section (S13). The Huzhou section (S12) intersects with the Lianhang section in the training hub, and intersects with the Hangning Expressway (G25) at the Lushan hub. There are 3 ramp toll stations and a pair of service areas, which were completed and opened on January 28, 2008. The Lianhang section (S13) and the Hangzhou Ring Expressway intersect at the Chongxian Hub. There are 7 ramp toll stations and a pair of service areas. It was completed and opened on February 6, 2010. The Huzhou section charges until January 27, 2033, and the Lianhang section charges until February 5, 2035. There are 8 toll stations on the Zhoushan Bridge.

METHODOLOGY

In arriving at our assessed value, we have considered three generally accepted approaches, namely, market approach, cost approach and income approach.

Market Approach considers prices recently paid for similar assets, with adjustments made to market prices to reflect condition and utility of the appraised assets relative to the market comparative. Assets for which there is an established secondary market may be valued by this approach.

Benefits of using this approach include its simplicity, clarity, speed and the need for few or no assumptions. It also introduces objectivity in application as publicly available inputs are used. However, one has to be wary of the hidden assumptions in those inputs as there are inherent assumptions on the value of those comparable assets. It is also difficult to find comparable assets. Furthermore, this approach relies exclusively on the efficient market hypothesis.

Cost Approach considers the cost to reproduce or replace in new condition the assets appraised in accordance with current market prices for similar assets, with allowance for accrued depreciation or obsolescence present, whether arising from physical, functional or economic causes. The cost approach generally furnishes the most reliable indication of value for assets without a known secondary market.

Despite the simplicity and transparency of this approach, it does not directly incorporate information about the economic benefits contributed by the subject asset.

Income Approach is the conversion of expected periodic benefits of ownership into an indication of value. It is based on the principle that an informed buyer would pay no more for the project than an amount equal to the present worth of anticipated future benefits (income) from the same or a substantially similar project with a similar risk profile.

This approach allows for the prospective valuation of future profits and there are numerous empirical and theoretical justifications for the present value of expected future cash flows. However, this approach relies on numerous assumptions over a long time horizon and the result may be very sensitive to certain inputs. It also presents a single scenario only.

Selection of Valuation Approach and Methodology

In our opinion, the market approach and cost approach are inappropriate for valuing the underlying asset. Firstly, the market approach requires market transactions of comparable assets as an indication of value. However, we have not identified any current market transactions which are comparable. Secondly, the cost approach does not directly incorporate information about the economic benefits contributed by the underlying asset. We have therefore relied solely on the income approach in determining our opinion of value.

In this study, the value of the total equity was developed through the application of an income approach technique known as discounted

cash flow method to devolve the future value of the business into a present fair value. This method eliminates the discrepancy in time value of money by using a discount rate to reflect all business risks including intrinsic and extrinsic uncertainties in relation to the business.

Under this method, value depends on the present worth of future economic benefit to be derived from the projected income. Indications of value have been developed by discounting projected future net cash flows available for payment of shareholders' interest to their present worth at discount rate which in our opinion is appropriate for the risks of the business. In considering the appropriate discount rate to be applied, we have taken into account a number of factors including the current cost of finance and the considered risk inherent in the business.

MAJOR ASSUMPTIONS

Assumptions considered to have significant sensitivity effects in this valuation have been evaluated in order to provide a more accurate and reasonable basis for arriving at our assessed value.

The following key assumptions in determining the fair value of the equity interest have been made:

- The projected business performances can be achieved with the effort of the managements of the Company;
- There will be no material change in the existing political, legal, technological, fiscal or economic conditions, which might adversely affect the business of the Company;
- The operational and contractual terms stipulated in the relevant contracts and agreements will be honored;
- We have been provided with copies of the operating licenses and company incorporation documents. We have assumed such information to be reliable and legitimate. We have relied to a

considerable extent on such information provided in arriving at our opinion of value;

- Natural weather can have an impact on toll roads, including flooding and other types of inclement weather. We have assumed that no extended closure will occur;
- We have assumed shareholder loan when necessary in the valuation;
- We have assumed that there are no hidden or unexpected conditions associated with the assets valued that might adversely affect the reported values. Furthermore, we assume no responsibility for changes in market conditions after the Valuation Date.

Our valuation is mainly based on the projections provided by the Company. We have conducted industry analysis by comparing with the information of other peer expressway groups in the industry, which information include, but is not limited to: revenue growth rate, margin analysis, cost growth rate, interest expense and the depreciation & amortization policy etc. We did time series analysis as well, with historical actual performance as the starting point. The analysis results could justify the fairness and reasonableness of the assumptions adopted.

The valuation result as at the Valuation Date is mainly based on the following assumptions:

Revenue

The forecast revenue includes the toll revenue as well the service area revenue.

In determining the traffic the toll revenue of Shenjia Huhang, we have made reference to the Traffic Study Report provided by WBG. To justify the reasonableness and fairness of the revenue projection, we have had discussion about the key assumptions in Traffic Study Report together with the management of Shenjia Huhang, Zhejiang Expressway and WBG. We understand WBG is a professional expert with extensive experience in expressway industry and the underlying assumptions used in the Traffic Study Report are in line with industry practice.

The service area revenue is determined per the ancillary agreement signed between Hanghui and the subsidiaries of Zhejiang Communications Investment Group Co., Ltd.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Toll revenue ('0000 CNY) (including taxes)	31,784	79,279	78,303	80,310	85,065	92,287	95,613	100,337	101,001
Growth rate		*4%*	*-1%*	*3%*	*6%*	*8%*	*4%*	*5%*	*1%*
Toll revenue ('0000 CNY) (excluding taxes)	30,858	76,970	76,022	77,971	82,587	89,599	92,828	97,415	98,059
Total revenue (000'CNY)	308,583	769,699	760,223	779,709	825,874	895,990	928,282	974,146	980,592

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Toll revenue ('0000 CNY) (including taxes)	105,485	109,728	113,223	117,012	120,566	124,495	77,623	75,211	11,679
Growth rate	*4%*	*4%*	*3%*	*3%*	*3%*	*3%*	*-38%*	*-3%*	*-84%*
Toll revenue ('0000 CNY) (excluding taxes)	102,413	106,532	109,925	113,604	117,054	120,869	75,362	73,020	11,339
Total revenue (000'CNY)	1,024,126	1,065,320	1,099,252	1,136,039	1,170,544	1,208,689	753,621	730,204	113,388

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Toll revenue ('0000 CNY) (including taxes)	39,596	97,212	100,553	110,671	125,063	135,178	146,104	156,629	166,927
Growth rate	*11.80%*	*145%*	*3.43%*	*10.08%*	*12.99%*	*7.70%*	*7.70%*	*-36.30%*	*5.96%*
Toll revenue ('0000 CNY) (excluding taxes)	38,442	94,381	97,624	107,448	121,420	131,241	141,849	152,067	162,065
Total revenue (000'CNY)	384,423	943,806	976,243	1,074,476	1,214,204	1,312,408	1,418,485	1,520,670	1,620,650

	2027	2028	2029	2030	2031	2032	2033	2034
Toll revenue ('0000 CNY) (including taxes)	168,328	179,120	189,161	130,095	136,892	144,166	150,723	155,139
Growth rate	*5.60%*	*5.70%*	*4.90%*	*5.00%*	*4.30%*	*4.40%*	*3.70%*	*2.10%*
Toll revenue ('0000 CNY) (excluding taxes)	163,425	173,903	183,651	126,306	132,905	139,967	146,333	150,620
Total revenue (000'CNY)	1,634,252	1,739,029	1,836,515	1,263,058	1,329,049	1,399,670	1,463,330	1,506,204

Business Tax and Surplus

The business tax includes (local) education supplementary tax, construction tax and fee etc.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Business Tax (000'CNY)	1,986	4,296	4,264	4,329	4,485	4,724	4,833	4,989	5,011
% of Revenue	*0.64%*	*0.56%*	*0.56%*	*0.56%*	*0.54%*	*0.53%*	*0.52%*	*0.51%*	*0.51%*

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Business Tax (000'CNY)	5,158	5,299	5,414	5,539	5,656	5,785	3,209	3,070	434
% of Revenue	*0.50%*	*0.50%*	*0.49%*	*0.49%*	*0.48%*	*0.48%*	*0.43%*	*0.42%*	*0.38%*

Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Business Tax (000'CNY)	1,529	3,696	3,813	4,166	4,669	5,024	5,405	5,773	6,133
% of Revenue	*0.40%*	*0.39%*	*0.39%*	*0.39%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*

	2027	2028	2029	2030	2031	2032	2033	2034
Business Tax (000'CNY)	6,182	6,560	6,911	4,847	5,084	5,339	5,568	5,716
% of Revenue	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*

Cost of Goods Sold

Cost of goods sold is forecasted based on the historical average cost of the principal business related to the maintenance of road, including maintenance cost, labor cost, depreciation and other costs.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Labor cost	11,158	27,715	28,650	29,585	30,520	31,455	32,390	33,326	34,261
Admin expense	4,231	8,265	8,411	8,562	8,717	8,877	9,041	9,211	9,386
Operation expense	2,561	4,942	4,932	4,952	5,001	5,074	5,108	5,156	5,163
Depreciation	124,294	311,445	324,584	337,723	350,862	364,001	389,478	402,617	415,756
Depreciation (increasing land)	-	-	-	-	2,857	2,857	2,857	2,857	2,857
Total depreciation	124,294	311,445	324,584	337,723	353,719	366,858	392,335	405,474	418,614
System maitenance cost	2,294	3,455	3,455	3,455	3,455	3,455	3,455	3,455	3,455
Road maitenance cost	49,300	84,945	59,821	78,464	80,931	77,353	79,738	68,098	70,058
Total COGS	193,838	440,765	429,852	462,741	482,343	493,072	522,068	524,720	540,936
GP Margin	*37%*	*43%*	*43%*	*41%*	*42%*	*45%*	*44%*	*46%*	*45%*

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Labor cost	35,196	36,131	37,117	38,103	39,088	40,330	28,801	28,672	2,917
Admin expense	9,566	9,751	9,942	10,138	10,341	10,550	7,896	7,841	791
Operation expense	5,209	5,252	5,288	5,327	5,363	5,403	3,205	3,045	352
Depreciation	428,896	442,035	455,174	468,313	481,452	494,661	414,173	317,429	178,538
Depreciation (increasing land)	2,857	2,857	2,857	2,857	2,857	2,857	2,857	2,857	2,857
Total depreciation	431,753	444,892	458,031	471,170	484,309	497,518	417,030	320,286	181,395
System maitenance cost	3,455	3,455	3,455	3,455	3,455	3,455	2,010	1,894	187
Road maitenance cost	96,537	78,417	72,611	74,743	77,009	79,409	60,526	48,494	49,691
Total COGS	581,715	577,898	586,644	602,936	619,565	636,664	519,466	410,232	235,333
GP Margin	*43%*	*44%*	*47%*	*47%*	*47%*	*47%*	*31%*	*44%*	*-10%*

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
COGS	229,311	622,251	637,349	642,930	664,578	678,526	703,441	796,764	815,708
D&A (Marina interchange)					26,684	26,684	26,684	26,684	26,684
D&A (Asphalt mixing station)			2,454	2,454	2,454	2,454	2,454	2,454	2,454
Total COGS	229,311	622,251	639,803	645,384	693,716	707,663	732,579	825,901	844,846
GP Margin	*40.35%*	*34.07%*	*34.71%*	*40.16%*	*45.27%*	*48.30%*	*50.41%*	*47.60%*	*49.67%*

COGS	840,380	902,555	880,885	835,039	856,614	876,206	902,892	925,799	
D&A (Marina interchange)	26,684	26,684	26,684	26,684	26,684	26,684	26,684	26,684	
D&A (Asphalt mixing station)	2,454	2,454	2,454	2,454	2,454	2,454	2,454	2,454	
Total COGS	869,518	931,693	910,023	864,177	885,752	905,344	932,030	954,937	
GP Margin	*48.58%*	*48.10%*	*52.03%*	*33.89%*	*35.53%*	*37.40%*	*39.30%*	*38.53%*	

Administrative Expenses

The main administrative expenses include commission expense and organization management expense. Based on the historical information that related to Company's operating expenses, the selling expense is assumed to be minimal and insignificant.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Commision Expense	489	200	200	200	200	200	200	200	200
Organization management expense	1,674	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Total Administrative Expense	2,163	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Commision Expense	200	200	200	200	200	200	200	200	20
Organization management expense	1,800	1,800	1,800	1,800	1,800	1,800	1,047	987	97
Total Administrative Expense	2,000	2,000	2,000	2,000	2,000	2,000	1,247	1,187	117

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Total Administrative Expense	2,700	6,752	6,878	7,065	7,261	7,468	7,684	7,912	8,151
% of Revenue	*0.72%*	*0.72%*	*0.70%*	*0.66%*	*0.60%*	*0.57%*	*0.54%*	*0.52%*	*0.50%*

	2027	2028	2029	2030	2031	2032	2033	2034
Total Administrative Expense	8,401	8,665	8,941	9,232	9,536	9,856	10,192	10,343
% of Revenue	*0.51%*	*0.50%*	*0.49%*	*0.73%*	*0.72%*	*0.70%*	*0.70%*	*0.69%*

Finance Cost

The financial expense is referred to the interest expense based on the forecasted net borrowing balance and forecasted interest rate.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Interest Expense	102,311	215,083	167,948	144,939	89,065	29,792	19,387	5,355	-
Interest Expense (new borrowing)	1,088	34,800	71,993	86,130	133,980	179,916	187,137	183,222	168,867
Total Interest Expense	103,399	249,883	239,941	231,069	223,045	209,708	206,524	188,577	168,867

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Interest Expense	-	-	-	-	-	-	-	-	-
Interest Expense (new borrowing)	151,467	131,457	109,272	83,172	56,637	30,885	15,225	-	-
Total Interest Expense	151,467	131,457	109,272	83,172	56,637	30,885	15,225	-	-

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Interest Expense	138,434	309,644	314,214	256,310	224,037	225,050	174,738	144,846	105,972
Net Interest Expense	138,434	309,644	314,214	256,310	224,037	225,050	174,738	144,846	105,972

	2027	2028	2029	2030	2031	2032	2033	2034
Interest Expense	76,646	41,763	13,892	-	-	-	-	-
Net Interest Expense	76,646	41,763	13,892	-	-	-	-	-

Other Operating Income

Other operating income mainly includes internal leasing income and external leasing income.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Other opearing Income	1,492	3,352	3,352	3,281	3,202	3,324	3,324	3,324	3,324
Other operating Expense	3,270	6,038	6,101	6,364	6,426	6,489	6,752	6,815	6,878
Net other operating income	(1,778)	(2,685)	(2,748)	(3,083)	(3,224)	(3,166)	(3,428)	(3,492)	(3,554)

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Other opearing Income	3,324	3,459	3,459	3,459	3,459	3,459	1,822	1,804	-
Other operating Expense	7,141	7,204	7,267	7,530	7,593	7,656	4,426	4,269	318
Net other operating income	(3,817)	(3,745)	(3,808)	(4,071)	(4,134)	(4,197)	(2,604)	(2,465)	(318)

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Other opearing Income	1,174	2,257	2,257	2,257	2,257	2,372	2,372	2,372	2,372
Other operating Expense	440	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190
Net other operating income	734	1,067	1,067	1,067	1,067	1,182	1,182	1,182	1,182

	2027	2028	2029	2030	2031	2032	2033	2034
Other opearing Income	2,372	2,489	2,489	2,489	2,489	2,489	2,515	2,447
Other operating Expense	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,167
Net other operating income	1,182	1,299	1,299	1,299	1,299	1,299	1,325	1,280

Non-operating Income

Non-operating income is mainly local government subsidy and compensation income.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Non-Operating Income	1,136	2,833	2,799	2,870	3,040	3,298	3,417	3,586	3,610
Non-Operating Expense	911	2,273	2,245	2,303	2,439	2,646	2,742	2,877	2,896
Net Non-Operating Income	225	560	553	567	601	652	675	709	714

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Non-Operating Income	3,770	3,922	4,047	4,182	4,309	4,449	2,774	2,688	417
Non-Operating Expense	3,025	3,146	3,247	3,355	3,457	3,570	2,226	2,157	335
Net Non-Operating Income	745	775	800	827	852	879	548	531	83

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Non-Operating Income	231	567	586	645	729	788	852	913	973
Non-Operating Expense	109	268	277	305	345	373	403	432	460
Net Non-Operating Income	122	299	309	340	385	416	449	482	513

	2027	2028	2029	2030	2031	2032	2033	2034
Non-Operating Income	981	1,044	1,103	758	798	840	879	887
Non-Operating Expense	464	494	521	359	377	397	415	419
Net Non-Operating Income	517	551	581	400	421	443	463	468

Income Tax

The effective income tax rate is assumed to be 25%.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Income Tax	1,411	17,657	20,493	19,264	27,844	45,993	47,526	62,769	65,234

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Income Tax	70,178	86,424	98,279	109,787	120,851	132,510	53,105	78,445	-

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Income Tax(25%)	-	-	-	-	71,493	92,200	124,928	134,475	164,311

	2027	2028	2029	2030	2031	2032	2033	2034
Income Tax(25%)	168,801	188,049	224,657	96,625	107,599	120,218	129,332	134,239

Capital Expenditure, Depreciation and Amortization

Capex is forecasted the by the management of the Company. Due to the particularity of expressway industry, massive investment has been invested in road, structures and buildings at the very beginning, therefore the Capex in forecast period is mainly for maintenance and renovation from time to time.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Capex	59,541	69	7,399	4,246	3,736	161,164	49,605	21,282	56,921
Capex(increasing land)			36,000	4,000					
Total Capex	**59,541**	**69**	**43,399**	**8,246**	**3,736**	**161,164**	**49,605**	**21,282**	**56,921**
Depreciation	124,510	311,964	325,103	338,242	351,381	364,520	389,997	403,136	416,275
Depreciation(increasing land)					2,857	2,857	2,857	2,857	2,857
Total Depreciation	**124,510**	**311,964**	**325,103**	**338,242**	**354,238**	**367,377**	**392,854**	**405,993**	**419,132**

	2027	2028	2029	2030	2031	2032	2033	2034	2035
Capex	1,355	7,170	1,455	12,187	10,131	51,970	5,384	30,745	-
Capex(increasing land)									
Total Capex	**1,355**	**7,170**	**1,455**	**12,187**	**10,131**	**51,970**	**5,384**	**30,745**	**-**
Depreciation	429,414	442,554	455,693	468,832	481,971	495,180	414,474	317,713	178,566
Depreciation(increasing land)	2,857	2,857	2,857	2,857	2,857	2,857	2,857	2,857	2,857
Total Depreciation	**432,272**	**445,411**	**458,550**	**471,689**	**484,828**	**498,037**	**417,331**	**320,570**	**181,423**

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Capex	29,620	9,042	10,437	3,471	121,477	3,451	16,558	6,065	44,989
Capex(Marina interchange)	34,689	104,067	104,067	104,067					
Capex(Asphalt mixing station)		36,810							
Total Capex	**64,309**	**149,919**	**114,504**	**107,538**	**121,477**	**3,451**	**16,558**	**6,065**	**44,989**
Depreciation	181,967	456,570	476,420	496,271	516,121	535,971	555,822	575,672	595,522
Depreciation(Marina interchange)					26,683.85	26,684	26,684	26,684	26,684
Depreciation(Asphalt mixing station)			2,454	2,454	2,454	2,454	2,454	2,454	2,454
Total Depreciation	**181,967**	**456,570**	**478,874**	**498,725**	**545,259**	**565,109**	**584,960**	**604,810**	**624,660**
Amortization	807	1,911	1,858	1,858	1,239	-	-	-	-

	2027	2028	2029	2030	2031	2032	2033	2034
Capex	65	2,240	97,837	1,526	50	-	2,073	25,949
Capex(Marina interchange)								
Capex(Asphalt mixing station)								
Total Capex	**65**	**2,240**	**97,837**	**1,526**	**50**	**-**	**2,073**	**25,949**
Depreciation	615,373	635,223	655,073	674,924	694,774	714,624	734,475	753,563
Depreciation(Marina interchange)	26,684	26,684	26,684	26,684	26,684	26,684	26,684	26,684
Depreciation(Asphalt mixing station)	2,454	2,454	2,454	2,454	2,454	2,454	2,454	2,454
Total Depreciation	**644,510**	**664,361**	**684,211**	**704,061**	**723,912**	**743,762**	**763,612**	**782,701**
Amortization	-	-	-	-	-	-	-	-

Net Borrowing

The borrowing and repayment schedule was prepared by the management of Hanghui. According to capital structure, the loan for Hanghui is RMB5,673,400,000 including bank loan and loan to the financial center of Zhejiang Communications Investment Group Co., Ltd.

- Shenjiahuhang Expressway

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Beginning Balance	5,673,400	5,643,800	5,453,700	5,280,100	5,061,100	4,800,000	4,695,000	4,489,000	4,212,000
Repayment	149,600	1,550,100	523,600	519,000	2,161,100	317,000	326,000	127,000	-
New Borrowing	120,000	1,360,000	350,000	300,000	1,900,000	212,000	120,000	(150,000)	(330,000)
Ending Balance	5,643,800	5,453,700	5,280,100	5,061,100	4,800,000	4,695,000	4,489,000	4,212,000	3,882,000
Net Borrowing	**(29,600)**	**(190,100)**	**(173,600)**	**(219,000)**	**(261,100)**	**(105,000)**	**(206,000)**	**(277,000)**	**(330,000)**

	2027	2028	2029	2030	2031	2032	2033	2034
Beginning Balance	3,882,000	3,482,000	3,022,000	2,512,000	1,912,000	1,302,000	710,000	350,000
Repayment	-	-	-	-	-	-	-	-
New Borrowing	(400,000)	(460,000)	(510,000)	(600,000)	(610,000)	(592,000)	(360,000)	(350,000)
Ending Balance	3,482,000	3,022,000	2,512,000	1,912,000	1,302,000	710,000	350,000	-
Net Borrowing	**(400,000)**	**(460,000)**	**(510,000)**	**(600,000)**	**(610,000)**	**(592,000)**	**(360,000)**	**(350,000)**

- Zhoushan Bridge

	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026
Beginning Balance	6,741,750	6,542,000	6,365,000	6,070,000	5,620,000	5,080,000	4,458,000	3,793,000	3,163,000
Repayment	249,750	617,000	2,060,000	540,000	1,570,000	1,110,000	415,000	180,000	-
New Borrowing	50,000	440,000	1,765,000	90,000	1,030,000	488,000	(250,000)	(450,000)	(760,000)
Ending Balance	6,542,000	6,365,000	6,070,000	5,620,000	5,080,000	4,458,000	3,793,000	3,163,000	2,403,000
Net Borrowing	**(199,750)**	**(177,000)**	**(295,000)**	**(450,000)**	**(540,000)**	**(622,000)**	**(665,000)**	**(630,000)**	**(760,000)**

	2027	2028	2029	2030	2031	2032	2033	2034
Beginning Balance	2,403,000	1,738,000	947,000	315,000	-	-	-	-
Repayment	-	-	-	-	-	-	-	-
New Borrowing	(665,000)	(791,000)	(632,000)	(315,000)	-	-	-	-
Ending Balance	1,738,000	947,000	315,000	-	-	-	-	-
Net Borrowing	**(665,000)**	**(791,000)**	**(632,000)**	**(315,000)**	-	-	-	-

DISCOUNT RATE

In applying the discounted cash flow method, it is necessary to determine an appropriate discount rate for the assets under review. The discount rate represents an estimate of the rate of return required by a third party investor for an investment of this type. The rate of return expected from an investment by an investor relates to perceived risk. Risk factors relevant in our selection of an appropriate discount rate include:

1. Interest rate risk, which measures variability of returns caused by changes in the general level of interest rates.
2. Purchasing power risk, which measures loss of purchasing power over time due to inflation.
3. Liquidity risk, which measures the ease with which an instrument can be sold at the prevailing market price.
4. Market risk, which measures the effects of the general market on the price behavior of securities.
5. Business risk, which measures the uncertainty inherent in projections of operating income.

Consideration of risk, burden of management, degree of liquidity, and other factors affect the rate of return acceptable to a given investor in a specific investment. An adjustment for risk is an increment added to a base or safe rate to compensate for the extent of risk believed involved in the investment.

Required Return on Equity Capital

We have used Capital Assets Pricing Model (the "CAPM") to estimate the required return on equity capital. The CAPM is a fundamental tenet of modern portfolio theory which has been generally accepted basis for marketplace valuations of equity capital. The CAPM technique is widely accepted in the investment and financial analysis communities for the purpose of estimating a company's required return on equity capital.

The equation of CAPM is shown as follow:

Expected Required Return on Equity = *Risk Free + Nominal Beta (β) x Risk Premium + ε*

The return on equity required of a company represents the total rate of return investors expect to earn, through a combination of dividends and capital appreciation, as a reward for risk taking. The Capital Asset Pricing Model ("CAPM") is used to calculate the required rate of return on equity investment by using publicly-traded companies.

Parameters for CAPM

In determining the equity discount rate for the Company, the following parameters have been used as at the Valuation Date:

Valuation Date	2018-7-31
Listed Market	HK Market
Risk Free Rate	2.72% (Long-term (20-year) U.S. Treasury Coupon Bond Yield; Source: Duff & Phelps 2017 SBBI Valuation Handbook)
Market Risk Premium	6.94% (Long-horizon expected equity risk premium (historical): large company stock total returns minus long-term government bond income returns; Source: Duff & Phelps 2017 SBBI Valuation Handbook)
Estimated Beta	0.83 (indicated by the average beta of listed companies in similar industry as at Valuation Date, Source: Bloomberg)
CAPM	8.49% (2.72% + 0.83 x 6.94%)

In determining the beta, we have considered the information of certain listed comparable companies in Hong Kong which are engaged in the business of operating expressways in China, including Jiangsu Expressway Co., Ltd. (177.HK), Sichuan Expressway Co., Ltd. (107.HK), Anhui Expressway Co., Ltd. (995.HK), Shenzhen Expressway Co., Ltd. (548.HK) and Zhejiang Expressway Co., Ltd. (576.HK). Considering the similarity of the business nature for Shenjiahuhang, we are of the opinion that the above-mentioned comparable companies are the fair and reasonable samples as the comparable companies of Shenjiahuhang.

The selection of comparable beta is based on the selected comparable companies, which are the expressway companies listed in Hong Kong, while operating in mainland China, and with enough listing period as of the Valuation Date.

For details of the description for the comparable companies and beta calculation, please refer to Exhibit D.

In determining the discount rate, ε is considered as some premiums other than the risk free rate and market return, including Country Risk Premium, Liquidity Premium and Specific Premium. Each premium is explained in the following report.

Discount Rate

Valuation Date	2018-7-31
Listed Market	HK Market
CAPM	8.49%
Country Risk Premium	0.57% (with reference to Dr. Aswath Damodaran's Research, NYU, 2016)
Liquidity Premium	2.0% (with reference to "Marketability and Value: Measuring the Illiquidity Discount" of Stern School of Business, NYU, June 2005, by Aswath Damodaran)
Cost of Equity (Rounded)	**11.00%**

To calculate the cost of equity of the Company, we have considered country risk premium and liquidity premium besides CAPM result to justify the unique risk attached with the Company compared with

risk of comparable companies. These risks are referred to various research paper and we have made assessment on the assumption adopted in the research and adjustment of the risks to make sure the risks applied are reasonable and justified.

Considering the parameters in determining the CAPM, the risk free rate and market return are based on the parameter of US market, which is different from Shenjiahuhang. Hence a country risk premium is considered to adjust CAPM to reflect the cost of equity of the Company. Per the latest research on country risk premium performed by Dr. Aswath Damodaran (http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html), the country risk premium to adjust from US market to Hong Kong market is 0.57%. We thus apply 0.57% as country risk premium in this valuation exercise.

As suggested by "Marketability and Value: Measuring the Illiquidity Discount", a 4% of general liquidity premium is normally applied for general industrial companies. Since the liquidity premium in this study is estimated using the returns of venture capital investor over the return on traded stocks, while venture capital investors usually focus on emerging and fast growing industry. Having considered the characteristics of the expressway industry, which is a defensive industry, the cash flow of an expressway company is believed more stable than other industry. We believe the liquidity premium for expressway industry could be substantially lower than the rate adopted in the research. We thus, applied 2% as illiquidity premium in the valuation exercise of the Company.

VALUATION COMMENTS

As part of our analysis, we have reviewed financial and business information from public sources together with such financial information, project documentation and other pertinent data concerning the project as has been made available to us. Such information has been provided by the Company. We have assumed the accuracy of, and have relied on such information. We have relied to a considerable extent on such information provided in arriving at our opinion of value.

We confirm that we have carried out inspections of the assets of the business and have made relevant searches and enquire and obtained such further information as is considered necessary for the purposes of this study.

In arriving at our assessed value, we have only considered the core business of the Company. We have not made provision for other non-operating cash flow items such as exchange rate gain/loss, etc. in the valuation model.

The conclusion of value is based on accepted valuation procedures and practices that rely substantially on the use of numerous assumptions and the consideration of many uncertainties, not all of which can be easily quantified or ascertained. Further, while the assumptions and consideration of such matters are considered by us to be reasonable, they are inherently subject to significant business, economic and competitive uncertainties and contingencies, many of which are beyond the control of the Company and Jones Lang LaSalle Corporate Appraisal and Advisory Limited.

RISK FACTORS

- **Traffic Volume**

  Traffic volume is affected by a number of factors including alternative means of transport, toll rates, fuel prices, and general economic conditions in the region. Any significant change in these factors could have a material impact on the profitability of the toll road. Furthermore, any major maintenance in the near future will also affect the traffic volume of Shenjiahuhang.

- **Traffic Forecast**

  The forecast traffic flow and revenue of Shenjiahuhang are affected by a number of statistical factors, including the selection of samples, variance of independent variables, stability of correlations, etc. Any development in the future which deviates from the historical trends may affect the value of Shenjiahuhang.

- **Uncertainty of Market Competition**

  The profitability of Shenjiahuhang may be affected by the existence of other means of transportation, including railways and planes and alternative routes to the toll roads. There can be no assurance that better quality competing roads which may allow for higher travelling speed and lower or even free tolls will not be built in the latter years of this projection.

- **Toll Rate Increase**

  The profitability of Shenjiahuhang is affected by the possibility of toll rate increases in the future. Any application for increase in the toll rate is required to be approved by local authorities. Any deviation from the estimated toll rate increase applied in this valuation will affect the resulting value.

OPINION OF VALUE

Based on the results of our investigation and analysis outlined in the report, we are of the opinion that as at 31 July 2018, the fair value of 100 percent equity interest in the Company is reasonably stated as follows:

Valuation Date	31 July 2018
Fair Value of 100% Shenjiahuhang Expressway (excluding Zhoushan Bridge)	RMB 1,788,376,000
Fair Value of 51% Zhoushan Bridge	RMB 1,181,177,000
Fair Value of Total 100% Equity Value of Shenjiahuhang Expressway	**RMB 2,969,552,000**

LIMITING CONDITIONS

This report and opinion of values are subject to our Limiting Conditions as included in Exhibit A of this report.

Yours faithfully,

For and on behalf of

Jones Lang LaSalle Corporate Appraisal and Advisory Limited

Simon M.K. Chan

Regional Director

EXHIBIT A – LIMITING CONDITIONS

1. In the preparation of our reports, we relied on the accuracy, completeness and reasonableness of the financial information, forecast, assumptions and other data provided to us by the Company/engagement parties and/or its representatives. We did not carry out any work in the nature of an audit and neither are we required to express an audit or viability opinion. We take no responsibility for the accuracy of such information. Our reports were used as part of the Company's/engagement parties' analysis in reaching their conclusion of value and due to the above reasons, the ultimate responsibility of the derived value of the subject property rests solely with the Company/engagement parties.

2. We have explained as part of our service engagement procedure that it is the director's responsibility to ensure proper books of accounts are maintained, and the financial information and forecast give a true and fair view and have been prepared in accordance with the relevant standards and companies ordinance.

3. Public information and industry and statistical information have been obtained from sources we deem to be reputable; however we make no representation as to the accuracy or completeness of such information, and have accepted the information without any verification.

4. The management and the Board of the Company/engagement parties have reviewed and agreed on the report and confirmed that the basis, assumptions, calculations and results are appropriate and reasonable.

5. Jones Lang LaSalle Corporate Appraisal and Advisory Limited shall not be required to give testimony or attendance in court or to any government agency by reason of this exercise, with reference to the project described herein. Should there be any kind of subsequent services required, the corresponding expenses and time costs will be reimbursed from you. Such kind of additional work may incur without prior notification to you.

6. No opinion is intended to be expressed for matters which require legal or other specialised expertise, which is out of valuers' capacity.

7. The use of and/or the validity of the report is subject to the terms of engagement letter/proposal and the full settlement of the fees and all the expenses.

8. Our conclusions assume continuation of prudent and effective management policies over whatever period of time that is considered to be necessary in order to maintain the character and integrity of the assets valued.

9. We assume that there are no hidden or unexpected conditions associated with the subject matter under review that might adversely affect the reported review result. Further, we assume no responsibility for changes in market conditions, government policy or other conditions after the Valuation/Reference Date. We cannot provide assurance on the achievability of the results

forecasted by the Company/engagement parties because events and circumstances frequently do not occur as expected; difference between actual and expected results may be material; and achievement of the forecasted results is dependent on actions, plans and assumptions of management.

10. This report has been prepared solely for internal use purpose. The report should not be otherwise referred to, in whole or in part, or quoted in any document, circular or statement in any manner, or distributed in whole or in part or copied to any their party without our prior written consent. We shall not under any circumstances whatsoever be liable to any third party.

11. This report is confidential to the client and the calculation of values expressed herein is valid only for the purpose stated in the engagement letter/or proposal as of the Valuation / Reference Date. In accordance with our standard practice, we must state that this report and exercise is for the use only by the party to whom it is addressed to and no responsibility is accepted with respect to any third party for the whole or any part of its contents.

12. Where a distinct and definite representation has been made to us by party/parties interested in the assets valued, we are entitled to rely on that representation without further investigation into the veracity of the representation.

13. You agree to indemnify and hold us and our personnel harmless against and from any and all losses, claims, actions, damages, expenses or liabilities, including reasonable attorney's fees, to which we may become subjects in connection with this engagement. Our maximum liability relating to services rendered under this engagement (regardless of form of action, whether in contract, negligence or otherwise) shall be limited to the fee paid to us for the portion of its services or work products giving rise to liability. In no event shall we be liable for consequential, special, incidental or punitive loss, damage or expense (including without limitation, lost profits, opportunity costs, etc.), even if it has been advised of their possible existence.

14. We are not environmental, structural or engineering consultants or auditors, and we take no responsibility for any related actual or potential liabilities exist, and the effect on the value of the asset is encouraged to obtain a professional assessment. We do not conduct or provide such kind of assessments and have not considered the potential impact to the subject property.

15. This exercise is premised in part on the historical financial information and future forecast provided by the management of the Company/engagement parties and/or its representatives. We have assumed the accuracy and reasonableness of the information provided and relied to a considerable extent on such information in our calculation of value. Since projections relate to the future, there will usually be differences between projections and actual results and in some cases, those variances may be material. Accordingly, to the extent any of the above mentioned information requires adjustments, the resulting value may differ significantly.

16. This report and the conclusion of values arrived at herein are for the exclusive use of our client for the sole and specific purposes as noted herein. Furthermore, the report and conclusion of values are not intended by the author, and should not be construed by the reader, to be investment advice or as financing or transaction reference in any manner whatsoever. The conclusion of values represents the consideration based on the information furnished by the Company/engagement parties and other sources. Actual transactions involving the subject assets / business might be concluded at a higher or lower value, depending upon the circumstances of the transaction and the business, and the knowledge and motivation of the buyers and sellers at that time.

17. The management or staff of the Company/engagement parties and/or its representatives have confirmed to us that the transaction or themselves or the parties involved in the pertained assets or transaction are independent to our firm and JLL in this valuation or calculation exercise. Should there be any conflict of interest or potential independence issue that may affect our independency in our work, the Company/engagement parties and/or its representatives should inform us immediately and we may need to discontinue our work and we may charge our fee to the extent of our work performed or our manpower withheld or engaged.

EXHIBIT B – VALUERS' PROFESSIONAL DECLARATION

The following valuers certify, to the best of their knowledge and belief, that:

- Information has been obtained from sources that are believed to be reliable. All facts which have a bearing on the value concluded have been considered by the valuers and no important facts have been intentionally disregarded.

- The reported analyses, opinions, and conclusions are subject to the assumptions as stated in the report and based on the valuers' personal, unbiased professional analyses, opinions, and conclusions. The valuation exercise is also bounded by the limiting conditions.

- The reported analyses, opinions, and conclusions are independent and objective.

- The valuers have no present or prospective interest in the asset that is the subject of this report, and have no personal interest or bias with respect to the parties involved.

- The valuers' compensation is not contingent upon the amount of the value estimate, the attainment of a stipulated result, the occurrence of a subsequent event, or the reporting of a predetermined value or direction in value that favours the cause of the client.

- The analyses, opinions, and conclusions were developed, and this report has been prepared, in accordance with the International Valuation Standards published by the International Valuation Standards Council.

- The under mentioned persons provided professional assistance in the compilation of this report.

Simon M. K. Chan
Regional Director

Michael Q. Ding
Local Director

Monica D.Y. Shen
Manager

Dorothy B.H. Zhang
Analyst

Jenna J.L. Wu
Analyst

EXHIBIT C – VALUATION MODEL

FCCF
Valuation Date 7/31/2018
CNY'000

	Note	2018.1-7A	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenue	1	401,631	308,583	769,699	760,223	779,709	825,874	895,990	928,282	974,146	980,592	1,024,126	1,065,320	1,099,252	1,136,039	1,170,544	1,208,689	753,621	730,204	113,388
Growth				*8%*	*-1%*	*3%*	*6%*	*8%*	*4%*	*5%*	*1%*	*4%*	*4%*	*3%*	*3%*	*3%*	*3%*	*-38%*	*-3%*	*-84%*
Business Tax	2	2,092	1,986	4,296	4,264	4,329	4,485	4,724	4,833	4,989	5,011	5,158	5,299	5,414	5,539	5,656	5,785	3,209	3,070	434
Business Tax Rate		*0.52%*	*0.64%*	*0.56%*	*0.56%*	*0.56%*	*0.54%*	*0.53%*	*0.52%*	*0.51%*	*0.51%*	*0.50%*	*0.50%*	*0.49%*	*0.49%*	*0.48%*	*0.48%*	*0.43%*	*0.42%*	*0.38%*
COGS	3	219,865	193,838	440,765	429,852	462,741	482,343	493,072	522,068	524,720	540,936	581,715	577,898	586,444	602,936	619,565	636,664	519,466	410,232	235,333
Gross Profit		179,673	112,759	324,638	326,108	312,639	339,046	398,194	401,380	444,437	434,646	437,252	482,123	507,395	527,564	545,323	566,240	230,946	316,902	(122,378)
GP Margin		*44.74%*	*36.54%*	*42.18%*	*42.90%*	*40.10%*	*41.05%*	*44.44%*	*43.24%*	*45.62%*	*44.32%*	*42.70%*	*45.26%*	*46.16%*	*46.44%*	*46.59%*	*46.85%*	*30.64%*	*43.40%*	*-107.93%*
Operating Expense	4	287	2,163	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	1,247	1,187	117
% of Revenue		*0.07%*	*0.70%*	*0.26%*	*0.26%*	*0.26%*	*0.24%*	*0.22%*	*0.22%*	*0.21%*	*0.20%*	*0.20%*	*0.19%*	*0.18%*	*0.18%*	*0.17%*	*0.17%*	*0.17%*	*0.16%*	*0.10%*
EBIT		179,386	110,596	322,638	324,108	310,639	337,046	396,194	399,380	442,437	432,646	435,252	480,123	505,395	525,564	543,323	564,240	229,699	315,715	(122,495)
EBIT Margin		*44.66%*	*35.84%*	*41.92%*	*42.63%*	*39.84%*	*40.81%*	*44.22%*	*43.02%*	*45.42%*	*44.12%*	*42.50%*	*45.07%*	*45.98%*	*46.26%*	*46.42%*	*46.68%*	*30.48%*	*43.24%*	*-108.03%*
Interest Expense		83,025	103,399	249,883	239,941	231,069	223,045	209,708	206,524	188,577	168,867	151,467	131,457	109,272	83,172	56,637	30,885	15,225	-	-
Other Operating Income	6	(821)	(1,778)	(2,685)	(2,748)	(3,083)	(3,224)	(3,166)	(3,428)	(3,492)	(3,554)	(3,817)	(3,745)	(3,808)	(4,071)	(4,134)	(4,197)	(2,604)	(2,465)	(318)
Non-Operating Income	7	280	225	560	553	567	601	652	675	709	714	745	775	800	827	852	879	548	531	83
EBT		95,821	5,643	70,630	81,972	77,055	111,377	183,973	190,104	251,077	260,938	280,713	345,697	393,115	439,148	483,404	530,038	212,419	313,781	(122,730)
Income Tax	0.25	23,955	1,411	17,657	20,493	19,264	27,844	45,993	47,526	62,769	65,234	70,178	86,424	98,279	109,787	120,851	132,510	53,105	78,445	-
Net Income		71,866	4,232	52,972	61,479	57,791	83,533	137,979	142,578	188,307	195,703	210,535	259,273	294,836	329,361	362,553	397,529	159,314	235,336	(122,730)
Net Profit Margin		*17.89%*	*1.37%*	*6.88%*	*8.09%*	*7.41%*	*10.11%*	*15.40%*	*15.36%*	*19.33%*	*19.96%*	*20.56%*	*24.34%*	*26.82%*	*28.99%*	*30.97%*	*32.89%*	*21.14%*	*32.23%*	*-108.24%*
Add: D&A	9		124,510	311,964	325,103	338,242	354,238	367,377	392,854	405,993	419,132	432,272	445,411	458,550	471,689	484,828	498,037	417,331	320,570	181,423
Add: Net Borrowing	10		(29,600)	(190,100)	(173,600)	(219,000)	(261,100)	(105,000)	(206,000)	(277,000)	(330,000)	(400,000)	(460,000)	(510,000)	(600,000)	(610,000)	(592,000)	(360,000)	(350,000)	-
Less: increase in NWC			(20,549)	12,351	1,139	(2,406)	(779)	587	(2,012)	1,062	(774)	(2,469)	1,637	455	(103)	(140)	(146)	3,624	10,031	-
Add: Collection of NWC																				(19,574)
Less: Capex			59,541	69	43,399	8,246	3,736	161,164	49,605	21,282	56,921	1,355	7,170	1,455	12,187	10,131	51,970	5,384	30,745	-
Capex / revenues (%)			*19.29%*	*0.01%*	*5.71%*	*1.06%*	*0.45%*	*17.99%*	*5.34%*	*2.18%*	*5.80%*	*0.13%*	*0.67%*	*0.13%*	*1.07%*	*0.87%*	*4.30%*	*0.71%*	*4.21%*	*0.00%*
Free Cash Flow to Equity			60,150	162,415	168,443	171,193	173,714	238,605	281,839	294,957	228,689	243,921	235,877	241,476	188,966	227,391	251,741	207,637	165,130	39,119
Date adjustment factor			0.21	0.92	1.92	2.92	3.92	4.92	5.92	6.92	7.92	8.92	9.92	10.92	11.92	12.92	13.92	14.92	15.92	16.92
Discount factor (mid-point)		11%	1.02	1.10	1.22	1.36	1.50	1.67	1.85	2.06	2.28	2.54	2.81	3.12	3.47	3.85	4.27	4.74	5.26	5.84
PV of FCFE			58,857	147,598	137,906	126,268	115,431	142,837	151,999	143,309	100,101	96,187	83,798	77,285	54,486	59,068	58,913	43,776	31,364	6,694

FCFE Valuation Summary

申嘉湖杭	(CNY 000')
PV of FCFE forecast	1,635,878
Net Excess Asset	152,497
100% Equity Value	**1,788,376**

Valuation Summary	(CNY 000')
100% 申嘉湖杭	1,788,376
51% 舟山跨海大桥	1,181,177
100%申嘉湖杭合并	2,969,552

FCCF
Valuation Date 7/31/2018
CNY'000

	Note	2018.1-7A	2018.8-12F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenue	1	476,946	384,423	943,806	976,243	1,074,476	1,214,204	1,312,408	1,418,485	1,520,670	1,620,650	1,634,252	1,739,029	1,836,515	1,263,058	1,329,049	1,399,670	1,463,330	1,506,204
Growth				*10%*	*3%*	*10%*	*13%*	*8%*	*8%*	*7%*	*7%*	*1%*	*6%*	*6%*	*-31%*	*5%*	*5%*	*5%*	*3%*
Business Tax	2	1,970	1,529	3,696	3,813	4,166	4,669	5,024	5,405	5,773	6,133	6,182	6,560	6,911	4,847	5,084	5,339	5,568	5,716
Business Tax Rate		*0.41%*	*0.40%*	*0.39%*	*0.39%*	*0.39%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*	*0.38%*
COGS	3	281,164	229,311	622,251	639,803	645,384	693,716	707,663	732,579	825,901	844,846	869,518	931,693	910,023	864,177	885,752	905,344	932,030	954,937
Gross Profit		193,812	153,583	317,859	332,627	424,926	515,819	599,721	680,501	688,995	769,671	758,552	800,776	919,581	394,035	438,212	488,988	525,732	545,551
GP Margin		*40.64%*	*39.95%*	*33.68%*	*34.07%*	*39.55%*	*42.48%*	*45.70%*	*47.97%*	*45.31%*	*47.49%*	*46.42%*	*46.05%*	*50.07%*	*31.20%*	*32.97%*	*34.94%*	*35.93%*	*36.22%*
Operating Expense	4	2,503	2,700	6,752	6,878	7,065	7,261	7,468	7,684	7,912	8,151	8,401	8,665	8,941	9,232	9,536	9,856	10,192	10,343
% of Revenue		*0.52%*	*0.70%*	*0.72%*	*0.70%*	*0.66%*	*0.60%*	*0.57%*	*0.54%*	*0.52%*	*0.50%*	*0.51%*	*0.50%*	*0.49%*	*0.73%*	*0.72%*	*0.70%*	*0.70%*	*0.69%*
EBIT		191,309	150,883	311,107	325,749	417,861	508,558	592,253	672,817	681,084	761,521	750,151	792,111	910,640	384,803	428,676	479,131	515,540	535,208
EBIT Margin		*40.11%*	*39.25%*	*32.96%*	*33.37%*	*38.89%*	*41.88%*	*45.13%*	*47.43%*	*44.79%*	*46.99%*	*45.90%*	*45.55%*	*49.59%*	*30.47%*	*32.25%*	*34.23%*	*35.23%*	*35.53%*
Interest Expense		194,899	138,434	309,644	314,214	256,310	224,037	225,050	174,738	144,846	105,972	76,646	41,763	13,892	-	-	-	-	-
Other Operating Income	6	(342)	734	1,067	1,067	1,067	1,067	1,182	1,182	1,182	1,182	1,182	1,299	1,299	1,299	1,299	1,299	1,325	1,280
Non-Operating Income	7	1,855	122	299	309	340	385	416	449	482	513	517	551	581	400	421	443	463	468
Impairment Loss		2,236																	
EBT		(4,312)	13,304	2,829	12,911	162,958	285,972	368,801	499,710	537,902	657,244	675,205	752,198	898,628	386,502	430,396	480,873	517,328	536,956
Income Tax	25%	-	-	-	-	-	71,493	92,200	124,928	134,475	164,311	168,801	188,049	224,657	96,625	107,599	120,218	129,332	134,239
Net Income		(4,312)	13,304	2,829	12,911	162,958	214,479	276,601	374,783	403,426	492,933	506,404	564,148	673,971	289,876	322,797	360,655	387,996	402,717
Net Profit Margin		*-0.90%*	*3.46%*	*0.30%*	*1.32%*	*15.17%*	*17.66%*	*21.08%*	*26.42%*	*26.53%*	*30.42%*	*30.99%*	*32.44%*	*36.70%*	*22.95%*	*24.29%*	*25.77%*	*26.51%*	*26.74%*
Add: D&A	9		182,774	458,481	480,733	500,583	546,498	565,109	584,960	604,810	624,660	644,510	664,361	684,211	704,061	723,912	743,762	763,612	782,701
Add: Net Borrowing	10		(199,750)	(177,000)	(295,000)	(450,000)	(540,000)	(622,000)	(665,000)	(630,000)	(760,000)	(665,000)	(791,000)	(632,000)	(315,000)	-	-	-	-
Less: increase in NWC			(98,485)	39,098	(3,265)	6,942	1,200	(1,595)	2,042	(15,047)	1,922	(1,735)	(7,746)	9,348	2,580	(3,615)	(3,117)	(4,749)	
Add: Collection of NWC																			(175,588)
Less: Capex			64,309	149,919	114,504	107,538	121,477	3,451	16,558	6,065	44,989	65	2,240	97,837	1,526	50	-	2,073	25,949
Capex / revenues (%)			16.73%	15.88%	11.73%	10.01%	10.00%	0.26%	1.17%	0.40%	2.78%	0.00%	0.13%	5.33%	0.12%	0.00%	0.00%	0.14%	1.72%
Free Cash Flow to Equity			30,504	95,293	87,405	99,061	98,300	217,854	276,143	387,218	310,683	487,583	443,016	618,997	674,832	1,050,274	1,107,534	1,154,285	983,880
Date adjustment factor			0.21	0.92	1.92	2.92	3.92	4.92	5.92	6.92	7.92	8.92	9.92	10.92	11.92	12.92	13.92	14.92	15.92
Discount factor (mid-point)		11%	1.02	1.10	1.22	1.36	1.50	1.67	1.85	2.06	2.28	2.54	2.81	3.12	3.47	3.85	4.27	4.74	5.26
PV of FCFE			29,848	86,600	71,559	73,065	65,319	130,415	148,927	188,136	135,991	192,273	157,386	198,113	194,579	272,823	259,187	243,358	186,875

FCFE Valuation Summary

舟山跨海大桥	(CNY 000')
PV of FCFE forecast	2,634,453
Net Excess Asset	(318,420)
100% Equity Value	**2,316,033**
51% Equity Value	**1,181,177**

EXHIBIT D – COMPARABLE COMPANY ANALYSIS & BETA CALCULATION

Comparable Company Analysis

Company Name	Ticker	Description	Principal Business Activity	Main Operation Area
Zhejiang Expressway Co., Ltd.	0576 HK	Zhejiang Expressway Co., Ltd., through its subsidiaries, designs, constructs, operates, and manages high grade roads, as well as develops and operates certain ancillary services, such as technical consultation, advertising, automobile servicing, and fuel facilities.	Toll Operation, Securities Broking Service, Ancillary Services	Zhejiang
Jiangsu Expressway Company Limited	0177 HK	Jiangsu Expressway Company Ltd. constructs, operates, manages and maintains expressways in China. The Company also provides passenger transportation and other ancillary services along including fueling stations, restaurants, car maintenance and repair and advertising.	Toll Highway, Bridge & Tunnel Operations, Ancillary Services	Jiangsu
Sichuan Expressway Company Limited	0107 HK	Sichuan Expressway Company Limited develops, invests in, and operates infrastructure projects including toll roads, bridges, tunnels, and ancillary facilities.	Toll Highway, Bridge & Tunnel Operations,	Sichuan, Chongqing
Anhui Expressway Company Limited	0995 HK	Anhui Expressway Co. Ltd. principally holds, operates and develops toll expressways and highways in Anhui province in China.	Toll Road Services	Anhui
Shenzhen Expressway Company Limited	0548 HK	Shenzhen Expressway Company Limited constructs, manages and operates toll highways and expressways in China.	Toll Road Services	Guangdong

Beta Calculation

Comparable Companies (HK)	Ticker	D/E	Levered Beta	Effective Tax Rate	Unlevered Beta	Weight
Sichuan Expressway Company Limited	107 HK	2.32	0.914	25.13%	0.334	20%
Jiangsu Expressway Company Limited	177 HK	0.31	0.743	21.83%	0.597	20%
Zhejiang Expressway Co., Ltd.	576 HK	1.20	0.842	23.00%	0.438	20%
Shenzhen Expressway Co., Ltd.	548 HK	0.99	0.664	19.30%	0.369	20%
Anhui Expressway Company Limited	995 HK	0.19	0.721	29.55%	0.635	20%

Equity Market	**HK Market**
Unlevered Beta	0.47
D/E Ratio	1.00
Tax Rate	25%
Levered Beta	**0.83**

EXHIBIT E – EXPERIENCE IN TOLL ROAD AND TOLL BRIDGE

Company Name and Services
Huayu Expressway Group Limited Valuation of toll road "South Section of Hunan Suiyue Expressway" in Wunan Province, the PRC for listing purpose Valuation of toll road "Shuiguan Expressway", "Shuiguan Expressway Extension Line", "Shenzhen Qingping Expressway", "Shenzhen Eastern Expressway" in Shenzhen, the PRC for circular purpose
Shenzhen Investment Limited Business valuation of toll road "Jingdong Expressway" in Hunan and Hubei Province, the PRC for circular purpose
Shenzhen International Holdings Limited Business valuation of a toll bridge in Shenzhen for circular purpose
China Merchants Holidngs (international) Company Limited Business valuation of 5 toll roads in Guangxi, Guangdong and Xinjiang Provinces, the PRC for circular purpose
Shangdong Infrastructure Business valuation of 3 toll roads and 4 toll bridges in Shandong Province, the PRC for listing purpose

Tianjin Development Holdings Limited Business valuation and property valuation of Eastern Outer Ring Road of Tianjin for listing purpose
Jiangsu Expressway Road Business valuation and property valuation of 4 toll roads in Jiangsu Province, the PRC for listing purpose
Chu Kong Shipping Business valuation of Guangfo Expressway in Guangdong Province, the PRC for listing purpose
Guangdong Provincial Expressway Development Shareholding Company Limited Business valuation and property valuation of 3 toll roads and toll bridges in Guangdong Province, the PRC for B-Share listing in Shenzhen Stock Exchange purpose
Shenzhen Expressway Company Limited Business valuation and property valuation of 5 toll roads in Shenzhen Province, the PRC for listing purpose
Zhejiang Expressway Company Limited Business valuation of Zhejiang Hanghui Expressway Commpany Limited for circular purpose
Qilu Expressway Company Limited Business valuation toll roads in Shandong Province, the PRC for listing purpose

China Resources and Transportation Group Limited

Business valuation of Inner Mongolia Zhunxing Heavy Haul Expressway Company Limited for circular purpose

Zhejiang Shenjiahuhang Expressway Traffic and Revenue Forecast Study

Final Report

施伟拔咨询（深圳）有限公司
WB Group International

Zhejiang Shenjiahuhang Expressway
Traffic and Revenue Forecasting Study

Final Report

November 2018

WB Group Consulting（Shenzhen）Limited

Edition	Report	Date	Prepared By	Review By	Approved By
01	Final	22nd November 2018	JZ/KL/TX	DL	SC
0A	Draft	28th August 2018	JZ/KL/TX	DL	SC

RT-181305-01/01

Table of Content

Table of Content（Continued）

Table Title **Page**

Table of Content（Continued）

Figure **Title** **Page**

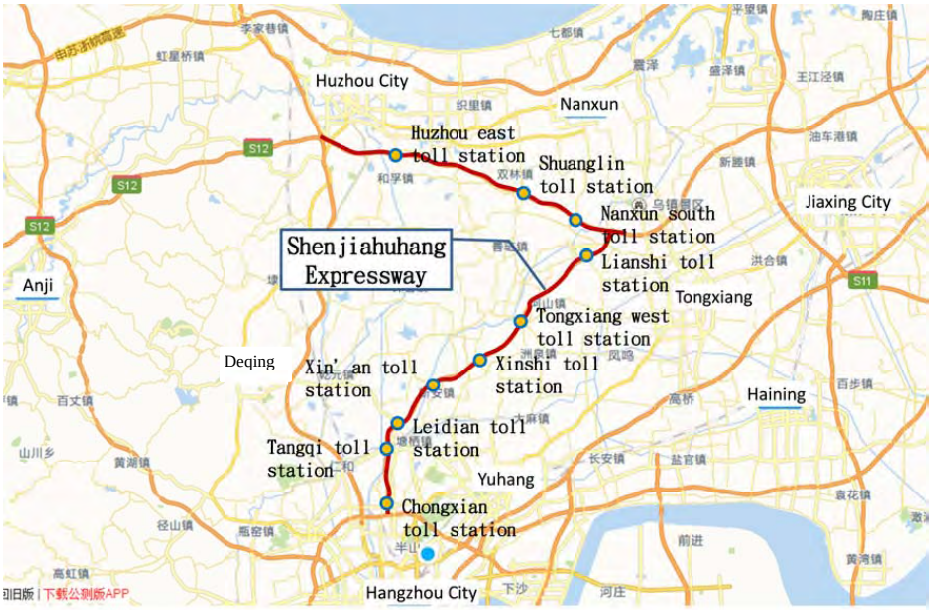
1 Introduction

1.1 Background

WB Group Consulting (Shenzhen) Limited (“the Consultant") was commissioned by Zhejiang Expressway Co., Ltd ("Zhejiang Expressway") in August 2018 to conduct an independent study on the traffic and toll revenue forecast for the Shenjiahuhang Expressway (Project Road) in the Zhejiang Province. The forecasting period is from 2018 to 2035. This is the Final report on the Traffic and Revenue Forecasting Results.

The Shenjiahuhang Expressway is divided into the Huzhou Section (S12) and the Lianhang Section (S13). The Huzhou section (S12) starts from Lianshi Town at the Nanxun District, Huzhou City, and ends at Wuxing District at the Huzhou City, for a total length of 41.978 kilometers. It intersects with the Lianhang section at the Lianshi hub and intersects with the Hangning Expressway (G25) at the Lushan hub. There are 3 ramp toll stations and 1 pair of service areas, which were completed and opened to traffic on January 28, 2008. The Lianhang section (S13) starts from Lianshi Town at the Nanxun District, Huzhou City, and ends at Chongxian Town, Yuhang District for a total length of 50.938 kilometers. It intersects with the Hangzhou Ring Road at the Chongxian hub. There are 7 ramp toll stations and 1 pair of service areas. It was completed and opened to traffic on February 6, 2010. The project location is shown in the Figure 1-1.v

Figure 1-1 Location of Project Road



Source: Consultant, 2018

1.2 Study Approach

Based on careful analysis on the characteristics of the project, the consultant completed the entire tasks through different stages of work such as data collection, base year traffic characteristics analysis, development of traffic model, socio-economic assessments, and traffic & toll revenue forecasting. The study approach consists of the following tasks.

Step1: Mobilization and Data Collection— It involved the collection of all available data and information of the project road and the socio-economic data of Zhejiang province, Hangzhou City, Huzhou City, Jiaxing City and Shanghai. These information included historical data and future goals regarding economic and transport development along the study corridor.

Step2: Base Year Traffic Condition Analysis— Using the data and information obtained, the consultant assessed the traffic conditions of the project road. Through the analyses of the differences between history traffic data and the current 24-hour traffic data on a typical day, the 2018 Annual Average Daily Traffic (AADT), the Value of Time and the average Operating Cost were evaluated in this step.

Step 3: Transport Network Coding — The consultant makes use of the traffic data, the EMME/3 model system and other information available to develop a transport model that could replicate the existing traffic pattern of project road. EMME/3 model would also be used to develop the road network as well as calibration and future assessment modules.

Step 4: Socio-economic Assessment — Socio-economic assessment of Zhejiang Province and adjacent cities would be another important element of the Study. The consultant conducted analysis and assessment on the latest and available government data. The purpose is to find the relationship between socio-economic statistics and historical traffic flow. The more and detailed data we can get, the better the relationship function is.

Step 5: Transport Model Development — Step 2 to 4 provided basic data to develop a transport model. The remaining jobs were to design a transport model to conduct typical toll road traffic diversion and assignment tasks. The calibrated model can generate traffic flows and conditions that are similar to the realistic traffic conditions. In the Study, the assignment of future traffic flows would be adjusted according to the results in Task 5.

Step 6: Traffic and Toll Revenue Analysis — When future year network assumptions, socio-economic conditions, economic development, inflations and toll strategies were developed, detailed traffic and toll revenue analyses can be conducted. The assumptions listed above were treated as the main model componentss after reaching consensus.

1.3 The Main References of this Study

The consultant received the station-to-station records, dated from 03 to 09 June 2018, of the Project Highway from the Zhejiang Expressway‘s toll clearing system. These data included the number of vehicles using the Shenjiahuhang Expressway in the period, their entry times, entry stations, exit times, exit stations, vehicle types, toll types, collection charge rates, passenger car or truck, weight and distances. These data show the latest traffic situations in a normal week and helped us to understand the traffic composition, the origins and destinations of the vehicles, the weekly traffic variations,

and distances travelled etc.

- Using station-to-station records for traffic flow analysis has the following advantages: The information was recorded by electronic equipment instead of field survey, which eliminated disturbance to normal traffic operation;
- The information was extracted directly from the expressway's toll clearing system which could avoid manual input error such as OD recording and coding errors. It enhanced data accuracy;
- The information was recorded at 24 hours per day (i.e. sampling rate was almost 100% excluding non-permit vehicles);
- It eliminated sampling bias. It was also not necessary to adjust for duplicated data caused by manual survey.

Besides the station-to-station flow records on the Shenjiahuhang Expressway, the consultant also collected the following data from the Zhejiang Expressway Co., Ltd, in order to analyze the historic traffic variations of the Project road.

1. The mileage of each section of the project road, the number of lanes, the number of entrance and exit lanes of the toll stations and the roads connecting them;
2. Project road toll standards, changes in charging policies and traffic management measures in recent years;
3. From January 2013 to July 2018, the monthly traffic volumes by vehicle types at the 10 toll stations of the project road;
4. From January 2013 to July 2018, the monthly traffic volumes by vehicle types and by directions on sections of the project road;
5. From January 2013 to July 2018, the monthly toll revenues before and after clearing generated by the toll clearing system for the Project road.

Although OD survey was not carried out in this study due to time and condition constraints, the station-to-station flow records of the Shenjiahuhang Expressway can be adopted as a reliable data source to accurately reflect the trip patterns. The elasticity ratios were also developed based on the historical traffic volumes of project road and the related economic growth in the study area. The traffic and revenue forecasting results from this model could be regarded as reliable.

1.4 Report Structure

This report presents the final forecast results of traffic and toll revenue of the Shenjiahuhang Expressway. The report structure is:

Chapter 1 is the introduction of the Project road. Chapter 2 describes the details of the economic and traffic development of the regions along the project corridor. Chapter 3 discusses the development of the transport model. Chapter 4 summarizes the results of future traffic and toll revenue forecasts.

2 Existing Condition of Project Road Affected Area

2.1 Existing Development Regions along Project Road

2.1.1 Socio-economic Development in Zhejiang Province

Zhejiang Province is located in the southern part of Yangtze River Delta of the southeast coast of China. It is bounded by East China Sea to the east, Fujian province to the south, Jiangxi and Anhui province to the west, and Shanghai and Jiangsu province to the north. Zhejiang Province is one of the greatest economic development vitality in China. Since the reform and opening up, people in Zhejiang province have been working hard to seize opportunities, deepen reform, expand opening up, and promote the development of the "Economic Province". The overall strength of Zhejiang province has increased dramatically. The main socio-economic data of Zhejiang Province were shown on Tables 2-1 to 2-5.

Population in Zhejiang Province

Table 2-1 Historical Resident Population in Zhejiang Province

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	5212.4	5275.5	5446.5	5463.0	5477.0	5498.0	5508.0	5539.0	5590.0	5567.0

Source: Zhejiang Province Statistical Yearbook 2017, Zhejiang Province Social and Economic Development Statistical Bulletin, 2017

Gross Domestic Product（GDP）in Zhejiang Province

Table 2-2 Historical GDP in Zhejiang Province (Unit: RMB)

Year	GDP (RMB 100 million)	Growth	Primary industry	Secondary industry	Tertiary industry	GDP Per Capita (RMB)
2008	21462.69	10.1%	1095.96	11567.42	8799.31	41405
2009	22998.24	8.9%	1163.08	11860.16	9975.01	43857
2010	27747.65	11.9%	1360.56	14187.36	12199.74	51758
2011	32363.38	9.0%	1583.04	16331.27	14449.07	59331
2012	34739.13	8.0%	1667.88	17000.09	16071.16	63508
2013	37756.58	8.2%	1760.34	18047.52	17948.72	68805
2014	40173.03	7.6%	1777.18	19175.06	19220.79	73002
2015	42886.49	8.0%	1832.91	19711.67	21341.91	77644

Year	GDP (RMB 100 million)	Growth	Primary industry	Secondary industry	Tertiary industry	GDP Per Capita (RMB)
2016	47251.36	7.6%	1965.18	21194.61	24091.57	84916
2017	51768.00	7.8%	2017.00	22472.00	27279.00	92057

Source: Zhejiang Province Statistical Yearbook 2017, Zhejiang Province Social and Economic Development Statistical Bulletin, 2017

Car Ownership in Zhejiang Province

Table 2-3 Historical Car Ownership in Zhejiang Province (Unit: Vehicle)

Year	Passenger Cars	Truck	Others	Total Vehicles
2008	2804070	669033	71947	3545050
2009	3514725	766460	51846	4333031
2010	4508344	872865	54509	5435718
2011	5555814	969984	56647	6582445
2012	6640840	1050189	58060	7749089
2013	7850003	1123643	59398	9033044
2014	8959921	1115620	56595	10132136
2015	10124578	1039966	51739	11216283
2016	11403051	1128714	51693	12583458
2017	--	--	--	13970000

Source: Zhejiang Province Statistical Yearbook (2009-2017), Zhejiang Province Social and Economic Development Statistical Bulletin, 2017

Highways Passenger and Cargo Volumes in Zhejiang Province

Table 2-4 Highway Passenger and Cargo Volumes in Zhejiang Province

Year	Passengers (10,000)	Passenger Turnover (100 million passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (100 million ton-km)
2008	206111	821.57	91625	1114.50
2009	210584	853.63	95802	1188.70
2010	215708	882.04	103394	1298.71

Year	Passengers (10,000)	Passenger Turnover (100 million passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (100 million ton-km)
2011	218415	908.15	108654	1434.82
2012	220517	921.18	113393	1525.59
2013	121185	582.99	107186	1322.13
2014	112915	558.06	117070	1419.43
2015	92304	544.76	122547	1513.92
2016	83033	465.12	133999	1626.78
2017	80579	431.56	151964	1821.21

Source: Zhejiang Province Statistical Yearbook 2017, Zhejiang Province Social and Economic Development Statistical Bulletin, 2017
Note：New statistical method were adopted since 2013

Port Cargo Throughput in Zhejiang Province

Table 2-5 Zhejiang Province Port Cargo Throughput

Year	Port (10,000 tons)	Inland Port (10,000 tons)	Container Throughput (10,000 standard units)
2008	64518	31120	1129.01
2009	71462	32282	1110.59
2010	78846	33941	1388.76
2011	86700	35673	1563.27
2012	92760	39171	1709.08
2013	100591	37459	1852.09
2014	108177	30894	2061.41
2015	109930	28206	2176.76
2016	114202	26664	2276.04
2017	130000	30000	2686.27

Source: Zhejiang Province Statistical Yearbook 2017, Zhejiang Province Social and Economic Development Statistical Bulletin, 2017
Note: Container throughput is based on the total container throughput of Ningbo-Zhoushan Port, Wenzhou Port, Taizhou Port and Jiaxing Port

2.1.2 Socio-economic Development in Hangzhou City

Hangzhou is located in the southeast sector of China, the northern part of Zhejiang Province, the northern bank of the lower reaches of the Qiantang River, the southern end of the Beijing-Hangzhou Grand Canal, and the provincial capital of Zhejiang Province. It occupies an area of 16,596 square kilometers. Hangzhou is a pivotal city for national communications, e-commerce, e-government and digital TV, as well as a national software and an integrated circuit design industrialization base. Hangzhou is committed to building a "Binjiang Paradise Silicon Valley". The high-tech industry, led by information on new medicine, environmental protection and new green materials, has generated a good momentum of development and has become a major advantage of Hangzhou. The main social-economic data of Hangzhou are shown in Table 2-6 to Table 2-9.

Population in Hangzhou City

Table 2-6 Historical Resident Population in Hangzhou City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	796.6	810.0	689.1	873.8	880.2	884.4	889.2	901.8	918.8	946.8

Source: Hangzhou City Social and Economic Development Statistical Bulletin, 2008-2017

Gross Domestic Product (GDP) in Hangzhou City

Table 2-7 Historical GDP in Hangzhou City (Unit：RMB)

Year	GDP (100 million RMB)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (RMB)
2008	4788.97	11.0%	179.83	2372.58	2236.56	58862
2009	5111.40	10.0%	190.51	2365.76	2555.13	61821
2010	5965.71	12.0%	208.41	2819.81	2937.49	70024
2011	7037.28	10.1%	236.77	3280.52	3519.99	80689
2012	7833.62	9.0%	255.11	3500.13	4078.37	89323
2013	8398.58	8.0%	261.60	3574.25	4562.73	95190
2014	9206.16	8.2%	274.35	3845.58	5086.24	103813
2015	10050.21	10.2%	287.95	3909.01	5853.25	112230
2016	11313.72	9.6%	304.21	4120.93	6888.59	124286
2017	12556.00	8.0%	312	4387	7857	134607

Source: Hangzhou City Statistical Yearbook 2017, Hangzhou City Social and Economic Development Statistical Bulletin, 2017

Car Ownership in Hangzhou City

Table 2-8 Historical Car Ownership in Hangzhou City (Unit: Vehicle)

Year	Passenger Car	Trucks	Others	Total Vehicles
2008	682806	126892	12979	822677
2009	842384	140624	10011	993019
2010	1076983	155546	10558	1243087
2011	1313307	171039	11157	1495503
2012	1570099	179399	11503	1761001
2013	1860794	173227	11597	2045618
2014	1992112	180475	11413	2184000
2015	2056143	177674	10950	2244767
2016	2127393	202775	11368	2341536
2017	--	--	--	2451200

Source: Hangzhou City Statistical Yearbook (2009-2017), Hangzhou City Social and Economic Development Statistical Bulletin, 2017

Highways Passenger and Cargo Volumes in Hangzhou City

Table 2-9 Highway Passenger and Cargo Volumes in Hangzhou City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	25630	1257231	16822	740699
2009	26454	1316143	16536	1389556
2010	29671	1416057	19148	2153961
2011	30305	1522055	21755	2451057
2012	31126	1590435	23243	2643428
2013	30994	1566046	23884	2719204
2014	17431	1143750	23202	2760873

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2015	16591	1078054	23800	3003728
2016	12282	936574	25194	3217983
2017	13019	--	29378	--

Source: Hangzhou City Statistical Yearbook 2017, Hangzhou City Social and Economic Development Statistical Bulletin, 2017;
Note: New statistical method was adopted since 2014.

2.1.3 Socio-economic Development in Huzhou City

Huzhou City is a local city under the jurisdiction of Zhejiang Province. It is a member of the Yangtze River Delta City Group, a core city in the Hangzhou Bay, and a central city of the G60 Science and Technology Corridor. It is located in the north of Zhejiang Province, adjacent to Jiaxing in the east and Hangzhou in the south. It is adjacent to Guangde and Ningguo counties in Anhui Province in the west and Yixing City and Taihu Lake in Jiangsu Province in the north. It faces Suzhou and Wuxi across the lake. Huzhou is located in the center of the Yangtze River Delta. It is the common hinterland of Shanghai, Hangzhou and Ningxia. It is a pivotal city connecting the north and south wings of the Yangtze River Delta as well as the eastern and central regions. It is 75 kilometers from Hangzhou, 130 kilometers from Shanghai and 220 kilometers from Nanjing. Huzhou faithfully follows the "eight-eighth strategy" instigated by the Provincial Party Committee and the provincial government. It insists on maintaining a blueprint to lead the way and to realize the concept of "five developments" for high-quality and modern ecological lakeside cities of a well-off society. The main social and economic data of Huzhou City were shown in Tables 2-10 to 2-13.

Population in Huzhou City

Table 2-10 Historical Resident Population in Huzhou City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	258.50	259.17	259.98	261.05	262.38	262.49	263.78	263.71	264.84	266.14

Source: Huzhou City Statistical Yearbook 2017, Huzhou City Statistical Bulletin, (2008-2017)

Gross Domestic Product (GDP) in Huzhou City

Table 2-11 Historical GDP in Huzhou City (Unit：RMB)

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (GMB)
2008	1034.89	10.6%	82.63	593.56	258.70	36764

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (GMB)
2009	1111.50	10.2%	89.74	617.76	404.00	39206
2010	1301.56	12.1%	104.61	714.61	482.34	50142
2011	1518.02	10.8%	116.02	824.55	578.26	58302
2012	1661.97	9.7%	123.31	888.20	650.46	57270
2013	1803.2	9.0%	125.6	953.2	724.4	61953
2014	1956.0	8.4%	121.0	1001.6	833.4	66916
2015	2084.3	8.3%	122.4	1026.7	935.1	70899
2016	2243.1	7.5%	127.8	1058.1	1057.2	75715
2017	2476.1	8.5%	127.3	1173.7	1175.1	82952

Source: Huzhou City Statistical Yearbook 2017, Huzhou City Social and Economic Development Statistical Bulletin, 2017

Car Ownership in Huzhou City

Table 2-12 Historical Car Ownership in Huzhou City (Unit: Vehicle)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Car Ownership for Civil Use	130,772	167,741	218,000	275,450	338,897	506,647	471,480	553,092	642,262	734,000

Source: Huzhou City Statistical Yearbook 2017, Huzhou City Social and Economic Development Statistical Bulletin, 2017

Highways Passenger and Cargo Volumes in Huzhou City

Table 2-13 Highways Passenger and Cargo Volumes in Huzhou City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	9260	353201	16604	1770031
2009	9752	324275	16353	1770031
2010	9964	332882	18108	2134620
2011	9996	338084	20103	2486469
2012	9476	218476	19467	2399366
2013	8363	283768	16628	2022005
2014	6307	221397	13202	1433247

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2015	6047	209079	13565	1467327
2016	5006	178259	14526	1527786
2017	5261	172000	16756	1763000

Source: Huzhou City Statistical Yearbook 2017, Huzhou City Social and Economic Development Statistical Bulletin, 2017
Note: New statistical method was adopted since 2014.

2.1.4 Socio-economic Development in Jiaxing City

Located in the northeastern part of Zhejiang Province and in the heart of the Hangjiahu Plain in the Yangtze River Delta, Jiaxing City is one of the important cities in the Yangtze River Delta. It faces the sea to the east, the Qiantang River to the south, the Taihu Lake to the north, and the Tianmu to the west. The Grand Canal runs through the territory. The city is located at the intersection of the various rivers and wayerways. It is regarded as the throat of the South Pacific Corridor of the Taihu Lake and is less than 100 kilometers away from Shanghai, Hangzhou, Suzhou and Hubei. The locational advantages are obvious under the jurisdiction of the cities and districts of Jiashan, Pinghu, Haiyan, Haining, Tongxiang, Xiucheng and Xiuzhou. The city has a total area of 3,915 square kilometers, of which the urban area is 968 square kilometers. It has a resident population of 3.49 million. The main social and economic data of Jiaxing City were shown in Tables 2-14 to 2-17.

Population in Jiaxing City

Table 2-14 Historical Resident Population in Jiaxing City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	424.3	431.8	450.2	453.1	454.4	455.8	457.0	458.5	461.4	465.6

Source: Jiaxing City Social and Economic Development Statistical Bulletin (2008-2017)

Gross Domestic Product (GDP) in Jiaxing City

Table 2-15 Historical GDP growth in Jiaxing City (Unit: RMB)

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (RMB)
2008	1819.78	10.7%	105.52	1081.21	633.06	43081
2009	1919.37	9.3%	107.51	1109.77	702.09	44842
2010	2315.46	13.7%	127.00	1337.15	851.30	52489

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (RMB)
2011	2703.90	10.6%	142.80	1532.89	1028.21	59850
2012	2914.40	8.7%	151.39	1598.34	1164.68	64229
2013	3163.05	9.3%	147.97	1708.86	1306.23	69502
2014	3352.60	7.5%	144.77	1813.67	1394.17	73458
2015	3517.81	7.0%	139.09	1850.68	1528.04	76850
2016	3760.12	7.0%	143.85	1911.57	1704.70	81751
2017	4355.24	7.8%	134.67	2309.3	1911.27	93964

Source: Jiaxing City Statistical Yearbook 2017, Jiaxing City Social and Economic Development Statistical Bulletin, 2017

Car Ownership in Jiaxing City

Table 2-16 Historical Civil-use Car Ownership in Jiaxing City (Unit: Vehicle)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Car Ownership	227,729	283,968	367,812	466,747	574,269	683,694	791,861	916,024	1,052,699	1,195,100

Source：Zhejiang Province Statistical Yearbook (2009-2017)

Highway Passenger Car and Truck Volumes in Jiaxing City

Table 2-17 Highway Passenger Car and Truck Volumes in Jiaxing City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	16596	560651	3535	214197
2009	11055	314102	7464	658116
2010	11298	347157	7919	737090
2011	11411	360297	8378	813270
2012	11469	364692	8432	861726
2013	11578	369602	8842	893918
2014	9594	316692	9861	1040555
2015	8822	304305	9933	1077812
2016	3000	210159	11306	1195865

Source: Jiaxing City Statistical Yearbook 2017
Note: New statistical method was adopted since 2014

2.1.5 Socio-economic Development in Shanghai

Shanghai is China's largest city, one of the four municipalities and a central city in China. It is also one of the largest economy, technology, industry, finance, trade, exhibition and shipping centers. Located in the middle of the Chinese mainland coastline, Shanghai has the largest foreign trade port and industrial base in China. It faces the island of Kyushu (Japan) across the sea, Hangzhou Bay to the south, and Jiangsu and Zhejiang provinces to the west. Shanghai is also a new tourist city with a profound cultural heritage of modern cities and numerous historical sites, and successfully hosted the 2010 World Expo. Today, Shanghai has developed into a global metropolis and is committed to becoming an international financial and shipping center by 2020. The main social and economic data of Shanghai were shown in Tables 2-18 to 2-22.

Population in Shanghai

Table 2-18 Historical Resident Population in Shanghai

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	2140.65	2210.28	2302.66	2347.46	2380.43	2415.15	2425.68	2415.27	2419.70	2418.33

Source: Shanghai Statistical Yearbook 2017, Shanghai National Economy and Social Development Statistical Bulletin, 2017

Gross Domestic Product (GDP) in Shanghai

Table 2-19 Historical GDP growth in Shanghai

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (RMB)
2008	14275.80	9.7%	111.80	6207.97	7956.03	67912
2009	15285.58	8.4%	113.82	6143.59	9028.17	70264
2010	17433.21	10.2%	114.15	7376.81	9942.25	77259
2011	19533.84	8.3%	124.94	8128.44	11280.46	84014
2012	20553.52	7.5%	127.8	8063.93	12361.79	86946
2013	22257.66	7.8%	124.89	8147.16	13985.61	92826
2014	24060.87	7.1%	124.26	8434.97	15501.64	99408
2015	25643.47	7.0%	109.82	8259.03	17274.62	105944
2016	28,178.65	6.9%	109.47	8,406.28	19,662.90	116,562
2017	30,133.86	6.9%	98.99	9,251.40	20,783.47	124,600

Source: Shanghai Statistical Yearbook 2017, Shanghai National Economy and Social Development Statistical Bulletin, 2017

Car Ownership in Shanghai

Table 2-20 Historical Car Ownership in Shanghai (Unit: 10,000 vehicles)

Year	Passenger Cars	Trucks	Others	Total Vehicles
2008	110.73	21.39	0.19	132.31
2009	124.90	22.19	0.20	147.30
2010	146.24	23.81	0.20	170.25
2011	163.91	24.83	6.21	194.96
2012	185.71	20.73	6.41	212.86
2013	207.99	20.14	6.97	235.10
2014	228.58	19.56	7.05	255.19
2015	256.26	19.49	6.57	282.32
2016	293.85	21.86	7.23	322.94
2017	--	--	--	361.02

Source: Shanghai Statistical Yearbook 2017, Shanghai National Economy and Social Development Statistical Bulletin, 2017

Highways Passenger and Cargo Volumes in Shanghai

Table 2-21 Highways Passenger and Cargo Volumes in Shanghai (Unit: Vehicle)

Year	Passengers (10,000)	Passenger Turnover (100 million passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (100 million ton-km)
2008	2934	94.07	40328	253
2009	2995	99.57	37745	244
2010	3634	115.44	40890	266
2011	3477	106.74	42685	284
2012	3748	112.72	42911	288
2013	3720	108.71	43809	299
2014	3754	124.34	42848	301
2015	3766	125.45	40627	290
2016	3402	114.98	39055	282
2017	3419	--	39743	--

Source: Shanghai Statistical Yearbook 2017, Shanghai National Economy and Social Development Statistical Bulletin, 2017

Port Cargo Throughput in Shanghai

Table 2-22 Port Cargo Throughput in Shanghai

Year	Port Cargo Throughput (10,000 tons)	Container Throughput (10,000 standard units)
2008	58170	2800.6
2009	59205	2500.2
2010	65339	2906.9
2011	72758	3173.9
2012	73559	3252.9
2013	77575	3361.7
2014	75529	3528.5
2015	71740	3653.7
2016	70177	3713.3
2017	75050.79	4023.31

Source: Shanghai Statistical Yearbook 2017, Shanghai National Economy and Social Development Statistical Bulletin, 2017

2.2 Historical Traffic Volumes and Toll Revenue

2.2.1 Historic Traffic Analysis on Project Road

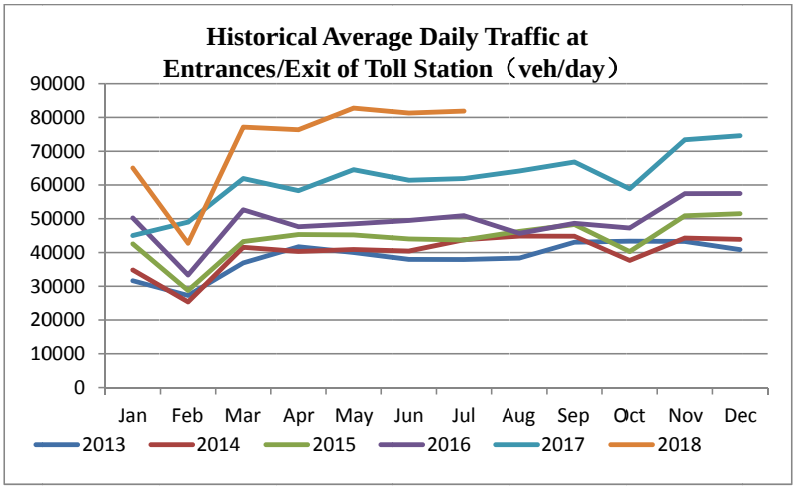
The Consultant collected the monthly classified traffic data from January 2013 to July 2018 from the Zhejiang Expressway Co. Ltd. Through analysis, it was found that the traffic volume of the project road has the following characteristics in the past five years:

- The traffic volume of the project road was mainly passenger cars, accounting for more than 65% of the total traffic usage. Of the passenger cars, Class 1 accounted for more than 60%. The other main users were Truck Classes 1 & 5.
- From August 2017, the National Highway G320 began construction. The traffic volumes at the entrances and exits of the Project Road (Lian Hang Section) began to increase significantly, especially after November. The Xinshi Station, the Xin'an Station, the Leidian Station, the Tangxi Station and the Chonyin Station exhibited traffic increases of 25% to 50%.
- In May 2018, the construction of Hangzhou-Nanjing Expressway widening began. At that time, the semi-trailer traffic was prohibited from using the Lijiaxiang hub to the Nanzhuangdou section. This resulted in a positive impact on the traffic volume and revenue of the project road, mainly for the Truck class 4, Truck Class 5 Containers.

The traffic growth at the 10 toll stations on the project road in the past years were shown in Figure 2-1.

Historic Traffic Volumes at Entrances and Exits of Toll Stations

Figure 2-1 Historical Average Daily Traffic at Entrances/Exits of Toll Station

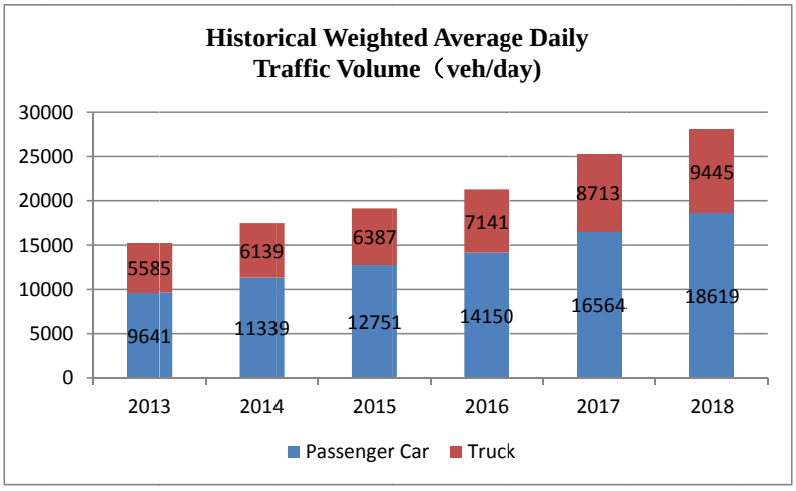


Source: Zhejiang Expressway Co. Ltd., 2018

Historic Section Traffic Volumes

According to the data collected from the Zhejiang Expressway Co. Ltd., the weighted average daily traffic volume of the project road from 2013 to 2017 was shown in Figure 2-2.

Figure 2-2 Historical Weighted Average Daily Traffic Volume

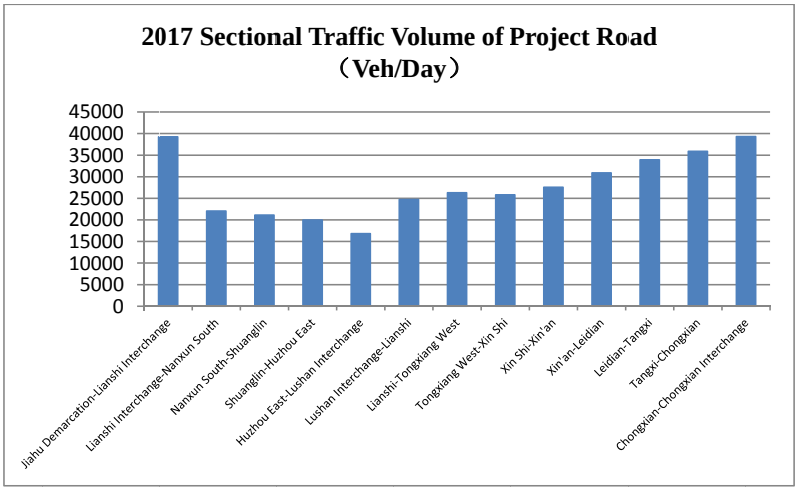


Source: Zhejiang Expressway Co. Ltd., 2018
Note; In 2018, weighted average daily traffic volume is presented between January and July

Basic Year Annual Traffic Volumes and Vehicle Classifications

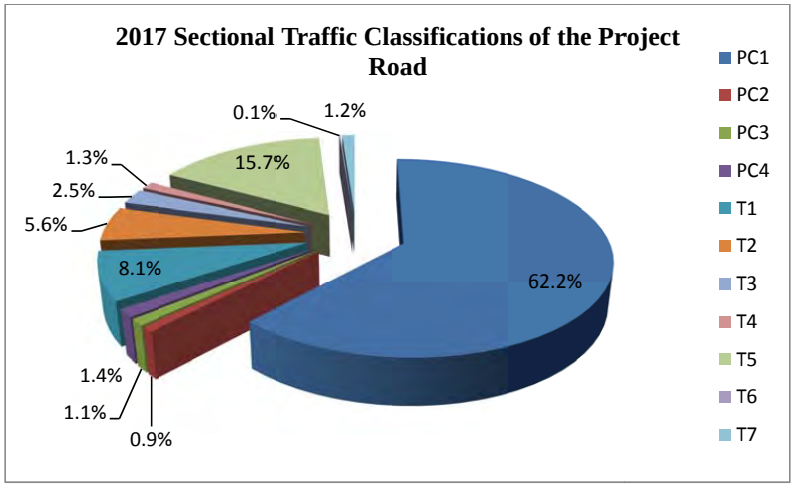
According to the data provided by Zhejiang Expressway Company, the classifications and weighted average traffic volumes of the project road in 2017 were shown in Figure 2-3 and Figure 2-4. From the distribution of traffic volumes on the project road, the closer to Hangzhou, the highest was the traffic demand. The second highest traffic volume was found on the Hujiajie-Lingshi Hub section after the intersecting sections of Huzhou and Lianhang. Judging from the vehicle classifications, the top three were Passenger Car Class 1, Truck Class 1 and Truck Class 5, accounting for 62.2%, 15.7% and 8.1% respectively

Figure 2-3 Sectional Traffic Volume of the Project Road in 2017



Source: Zhejiang Expressway Co. Ltd., 2018

Figure 2-4 Sectional Traffic Classifications of the Project Road in 2017



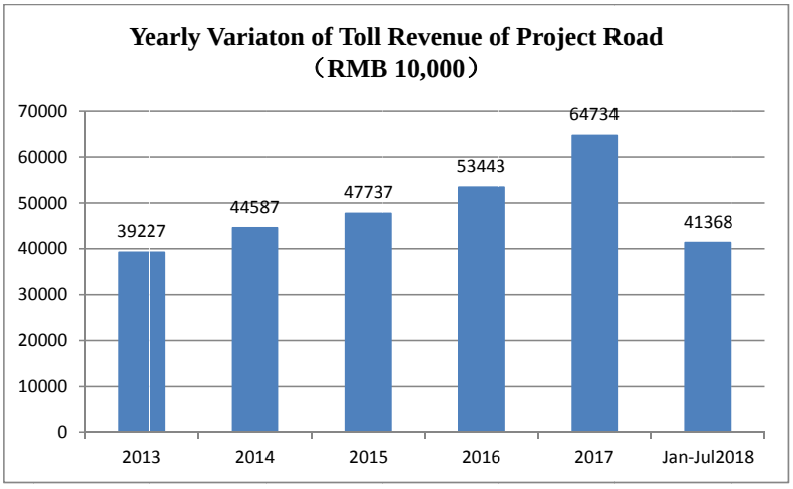
Source: Zhejiang Expressway Company, 2018

2.2.2 Project Toll Revenue

Yearly Variations of Toll Revenue

The tolls of the project roads have grown steadily over the past five years, with an average annual growth rate of 13.3% from 2013 to 2017 and an increase of 13.9% from January to July in 2018.

Figure 2-5 Yearly Variations of Toll Revenue of Project Road (RMB 10,000)



Source: Zhejiang Expressway Co. Ltd., 2018

Average Toll Charges of Various Vehicle Classifications

Based on the two-week data collected on the project road, the Consultant summarized the average toll charges for each vehicle classification, based on the average of all toll vehicles, as shown in the table below:

Table 2-23 Average Charge of Vehicle Classification (RMB/km)

Class[1]	PC1	PC2	PC3	PC4	Truck1	Truck2	Truck3	Truck4	Truck5	Truck6	Truck7
Charge Rate	0.50	0.51	0.97	1.44	0.50	0.80	1.21	1.59	1.95	1.38	1.57

Source: Consultant, 2018

[1] PC is the abbreviation of passenger car.

3 Traffic Forecast Model

This forecast study employs the four-stage model, commonly used in inter-city traffic studies. Building this type of mathematical model needs a lot of data and time that a normal medium or small city would need about half a year to a year. The general process of the model development is as follows:

- Trip generation: The main goal of this stage is to estimate the total productions of every zone by population and trip rates, and the total attractions by the weight of employment figures;
- To build O-D matrices based on the distribution function received from resident trip survey or large-scale home interview survey;
- Mode split: Calculating modal splits using binary or multinomial logit model;
- Trip Assignment: Trip assignment using generalized cost.

The advantages of this kind of model is that it can accurately reflect the impacts of land use and population changes to travel needs. The limitation is usually insufficient modeling time and planning data, especially in China.

Considering the mentioned limitations and different forecasting needs, a simplified four-stage model, which is commonly used in inter-city traffic studies, was employed. The major difference is that this model establishes traffic patterns and flows with a traffic survey which covers the study and does not involve any modeling procedure or functions for mode split. Traffic surveys normally include OD survey and station to station data collection.。

In short, the simplified four-stage model generates trips and establishes trip distribution with reference to traffic surveys. It then forms several single-mode trip matrices which are used in trip assignment process with a computer road network. Because the data for trip generation and distribution are mainly obtained from OD surveys or station-to-station records, detailed data examination and expansion procedures are required. Also, the verification of the computerized assignment model is another important factor of the forecasting accuracy.

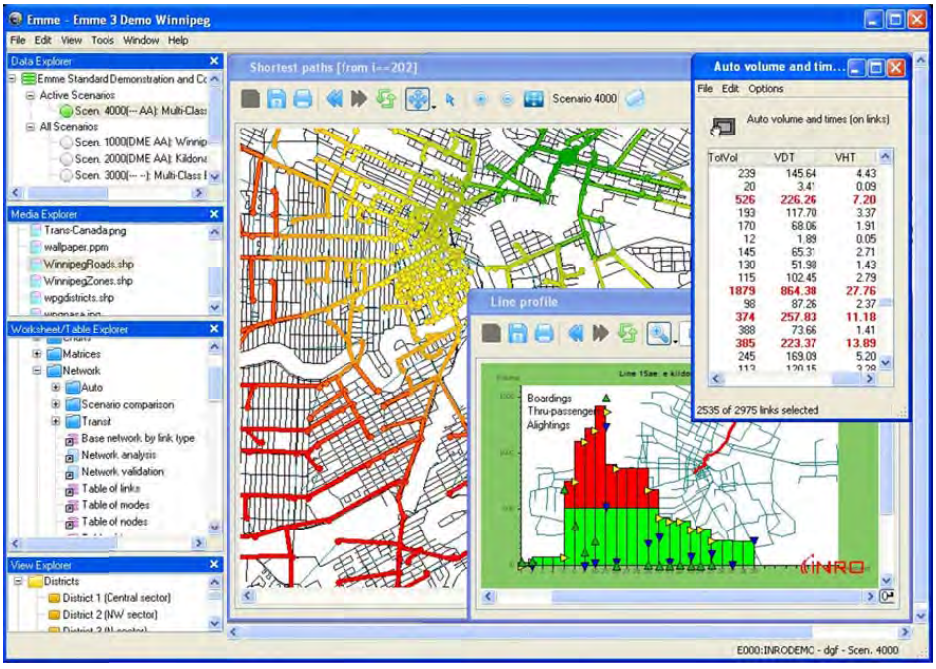
The consultant has already built the highway network model for Zhejiang Province and the adjacent areas of Shanghai, in order to analyze future traffic needs for project road. This chapter gives a brief introduction of the traffic model.

3.1 Traffic software—EMME/3

EMME/3 is used to simulate current road network. As a renowned urban and regional transportation planning software, it provides a complete and flexible platform for travel demand modeling, network analysis and evaluation works. It was first introduced in 1976 by INRO. INRO was formerly known as the transport research center of Canada Montreal University. Currently, EMME/3 is deemed to be the leading software in the industry with over 600 organization users worldwide.

One of the reasons for the popularity of EMME/3 is that it allows the user to set up its own database and support quantitative analysis and evaluation with preset variations. The input data includes transport infrastructure (e.g. road network), economic activity, social-economic characteristics, etc.

Figure 3-1 Model Components of EMME/3



Source: Consultant, 2018

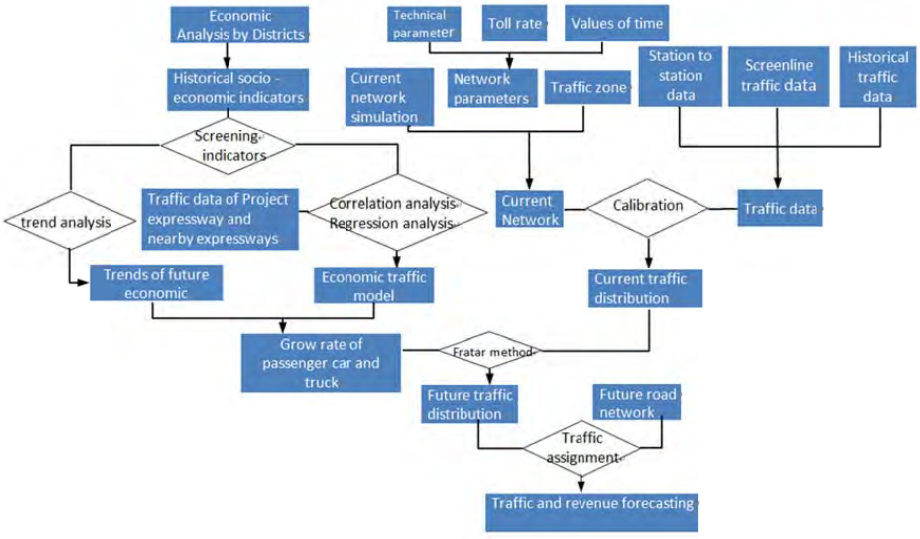
Once the database is set up, the user can perform transport planning by utilizing the strong capability of the software including interactive data input, visual presentation of assignment results and precise traffic engineering calculations. There are two main issues related to transport modeling: Transport demand and transport supply. Transport supply means the availability of road network. Transport demand is the quantity (i.e. OD matrices) determined by the demand module which is incorporated in the mentioned transport model. The "equilibrium" condition achieved during the modeling process means the demand side and the supply side are at the "balance" state that it can provide the traffic volume using the road facilities.

3.2 Technical Approach to Traffic Modeling

In order to accurately predict the future traffic volumes and revenue growth of the project highway, the Consultant established a complex socio-economic-traffic model, which can be divided into two interrelated sub-models. They are:

- Economic Analysis Model: the driving factor for determining traffic growth;
- Traffic Forecasting Model: used to check and distribute traffic flow, analyze traffic diversion and inducement.

Figure 3-2 The Technical Approach to Traffic Demand Forecast



Source: Consultant, 2018

3.3 Economic Traffic Model Analysis

3.3.1 Economic Analysis Districts

In this study, the Consultant compared a number of socio-economic drivers to establish a more comprehensive economic-traffic model. Therefore, in the economic analysis, it will mainly include the following parts:

- Selection of Socio-Economic Indicators Related to Transportation;
- Correlation Between Economic Indicators and Traffic Growth and Regression Analysis;
- Analysis of the Elasticity Coefficient of the Economic Indicators and Traffic Growth
- Analysis of future growth trend of Economic Indicators.

In the study, it is necessary to conduct economic analysis on each of the Economic Analysis Zone (TAZ), to establish a regression model of TAZ traffic production and economic indicators, and to apply it to each TAZ. In consideration of 436 TAZs, the amount of data and analysis would be extremely difficult and time consuming. Therefore, the Consultant have aggregated these TAZs into 16 Superzones (Economic Analysis Zones), and analyzed their respective economic indicators. The Consultant collected the historical traffic volumes of the Project road and the nearby expressways, and established a prediction model between traffic demands and the economic indicators of the areas closely related to the project highway, namely the economic-traffic model. By substituting each TAZ's economic indicator growth forecast into the economic-traffic model. With the future forecasts on the economic indicators, the Consultant can predict the traffic growth of each TAZ's. The 16 Economic Analysis Zones were shown in Figure 3-3 and Table 3-1:

Figure 3-3 Economic Analysis Zones

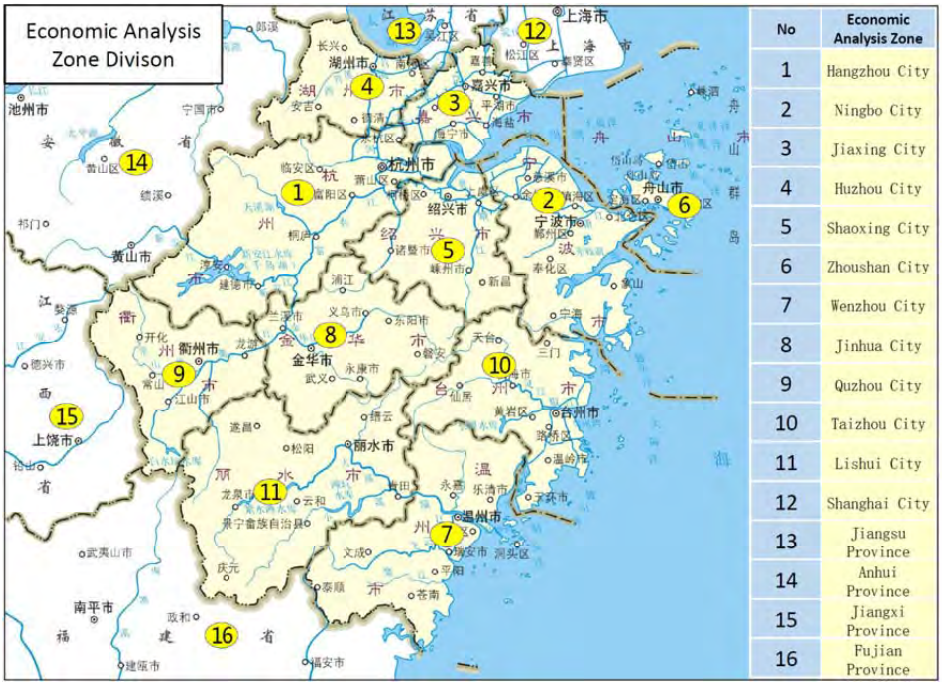


Table 3-1 Jurisdiction of Economic Analysis Zones

Superzone	Name	Jurisdiction
1	Hangzhou City	Hangzhou City and its counties
2	Ningbo City	Ningbo City and its counties
3	Jiaxing City	Jiaxing City and its counties
4	Huzhou City	Huzhou City and its counties
5	Shaoxing City	Shaoxing City and its counties
6	Zhoushan City	Zhoushan City and its counties
7	Wenzhou City	Wenzhou City and its counties
8	Jinhua City	Jinhua City and its counties
9	Quzhou City	Quzhou City and its counties
10	Taizhou City	Taizhou City and its counties
11	Lishui City	Lishui City and its counties
12	Shanghai City	Shanghai City and its counties
13	Jiangsu Province	Jiangsu Province and northern districts
14	Anhui Province	Anhui Province and northern districts

Superzone	Name	Jurisdiction
15	Jiangxi Province	Jiangxi Province and western districts
16	Fujian Province	Fujian Province and southern districts

Source: Consultant, 2018

3.3.2 Economic Indicators Analysis

The typical economic and traffic forecasting model uses the relationship developed between historic GDP and traffic demand to forecast future traffic generation. In order to be more comprehensive and scientific, the Consultant also investigated other economic parameters to develop more comprehensive economic-traffic correlations.

In order to investigate the impacts of different district economic parameters on traffic growth (passenger cars and trucks) of various vehicle types, the historic traffic data by vehicle types at the toll station locations and the historic variations of economic parameters were closely studied. The selected economic parameters were also prioritized before they were subjected to correlation and regression analyses (note: In the selection of the indicators, attention was also paid to the difficulty of obtaining the related data in each region):

- Passenger car Classes 1 & 2 were basically small vehicles that are owned by individuals or units. Finally, the most relevant indicator for their growth was selected: Passenger Car Ownership.
- Passenger car Classes 3 & 4 were basically for inter-city passenger travel or tourist trips. Finally, the most relevant indicator for their growth was selected: Road Passenger Travel
- Truck Classes 1-5 were basically self-used or for transport of bulk cargo goods. They have more relevant relationship with economic activities, product production and transport circulation. Finally, the most relevant indicator for their growth was selected: GDP.
- Truck Classes 6 & 7 are container trucks, which are mainly used for import and export trade transportation. Finally, the most relevant indicator for their growth was selected: Port Container Throughput.

After determining the relevant economic indicators for the growth of various vehicle classes, the elasticity analysis of passenger and freight demand against economic growth was carried out. Finally the economy-traffic growth model was developed.

$$Y_n = b \cdot (a \cdot X_1 + c)$$

Note: Dependent variable Y_n – traffic growths at different areas;

Independent variable X_1 - Historic growth pattern of socio-economic parameters at Project Road influenced areas;

a 、 c - regression coefficient;

b – correlation factor between time value and traffic volume.

Through the regression analysis, the values of various coefficients in the economic-traffic model were determined as follows:

Table 3-2 Traffic Model Growth Parameters

Vehicle Class	a	X_1	c	b
Passenger Car 1 - 2	0.914	Passenger Car Ownership	0.0176	0.85-0.90
Pass. Car 3 - 4	0.106	Road Passenger Travel	0.0092	0.85-0.90
Truck 1	0.525	GDP	0.0100	0.85-0.90
Truck 2 - 5	1.287	GDP	0.0007	0.85-0.90
Truck 6 - 7	0.910	Port Container Throughput	0.0011	0.85-0.90

Source: Consultant, 2018

3.3.3 *Future Time Elasticity Coefficient Assumptions*

Based on foreign and domestic experience, the time adjustment factors of economic and traffic parameters would remain relatively stable in the coming 3-5 years. When the economy of society is low, transportation demand would increase and hence economic growth would be more dependent on transportation services. Thus, the time adjustment factors would be relatively high. On the contrary, the time adjustment factors would diminish when the economy prospers to a certain level. The main reason for the decline is that rapid growth of high tech industries and tertiary industries would normally go hand in hand with overall economic growth, this would likely reduce the dependence on transportation needs. This will in turn result in a slower transport demand which offsets the persistent need for transport services.

Through more than ten years of relevant working experience in mainland China, the Consultant completed the traffic volume forecasting of many toll roads in provinces such as Zhejiang, Northeast, Tianjin, Hebei, Jiangsu, Jiangxi, Guangdong, Sichuan, Shanghai, Anhui, etc. In particular, the Consultant has been actively involved in traffic volume and revenue forecasting of numerous toll roads in the Zhejiang Province. From the completed toll road studies, the Consultant attained data on traffic growth rates and GDP growth. It can be concluded that the future time elasticity coefficient will be basically between “0.50-0.95”.

The time adjustment factors of the project road in the coming years were shown in Table 3-3.

Table 3-3 Future Time Adjustment Factors

Vehicle Classes	2018-2020	2021-2025	2026-2030	2031-2035
Passenger Car 1 - 2	0.90	0.90	0.85	0.85
Passenger Car 3 - 4	0.90	0.90	0.85	0.85
Truck 1	0.90	0.90	0.85	0.85
Truck 2 - 5	0.90	0.90	0.85	0.85

Vehicle Classes	2018-2020	2021-2025	2026-2030	2031-2035
Truck 6 - 7	0.90	0.90	0.85	0.85

Source: Consultant, 2018

3.3.4 Future Development and Trends of Economic Indicators

In general, it is difficult to predict the future growth pattern of economic parameters. It may be unreasonable to adopt a uniform trend for all the economic parameters. Consequently, we determined the future trends of the parameters based on the following considerations:

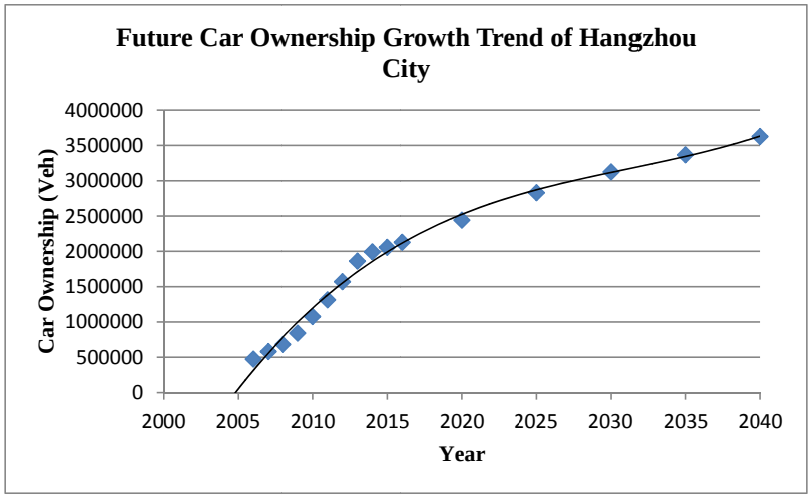
- Understand historic growth trend based on collection and assessment of historic data;
- "Thirteenth Five-Year Plan": Refer to the goals and requirements for future growth in the plan;
- Urban Master Plans: Refer to the goals and requirements for future growth in relevant Master Plans;
- Compare experience on international and domestic urban city development process around the world. Study the changes in the economic parameter values for various phases of successful cities in developing countries.
- Current and future planning guidelines of other industries were also referenced.

Future Trends of Selected Economic Indiators Analysis

The future trends of the selected economic indicators of each TAZ is mainly based on the economic development goals and objectives of the 13th Five-Year Plan. The future economic development trends are expected to reflect the economic growth patterns, development policies and the overall growth of the indicators in the next five years. In summary, the indicator growth rates are normally used as control points for future development trends.

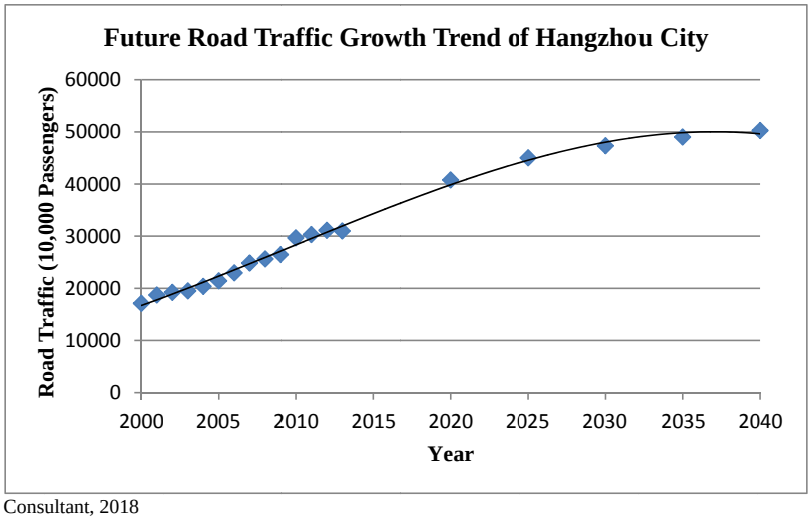
The understanding of the historic development, the future development patterns of each city based on the "13th Five-Year Plan", and the guidelines of local Master Plans, the annual average growth rates of the GDP could be predicted. In the Zhejiang Province for the next 5 years, the GDP growth is expected to be between 7%-10%. A more stable future economic development trend will likely replace the more rapid growth in the past. Figure 3-4 to Figure 3-7 present the economic indicators of Hangzhou and the growth trend of container throughput of the Ningbo-Zhoushan Port, respectively. The economic analysis of other sub-districts is quite similar. In the future forecasting of economic growth trends, the Consultant has considered the various domestic growth development patterns of individual districts in recent years.

Figure 3-4 Future Car Ownership Growth Trend of Hangzhou City



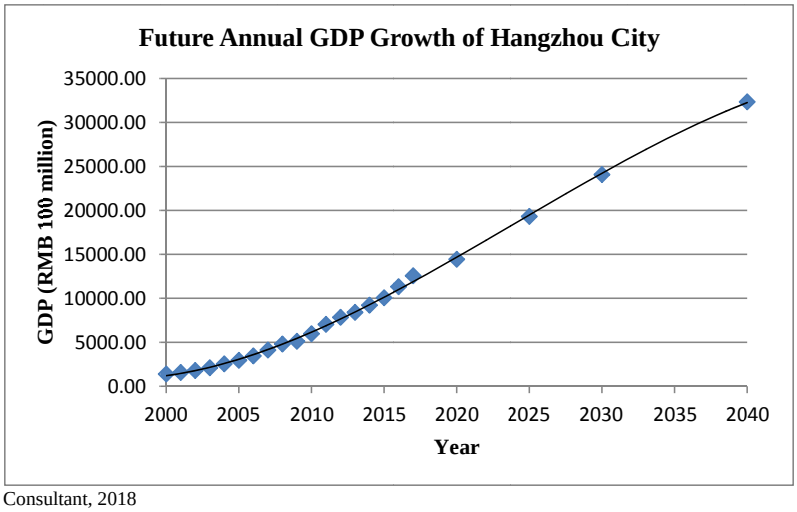
Source: Consultant, 2018

Figure 3-5 Future Road Traffic Growth Trend of Hangzhou City



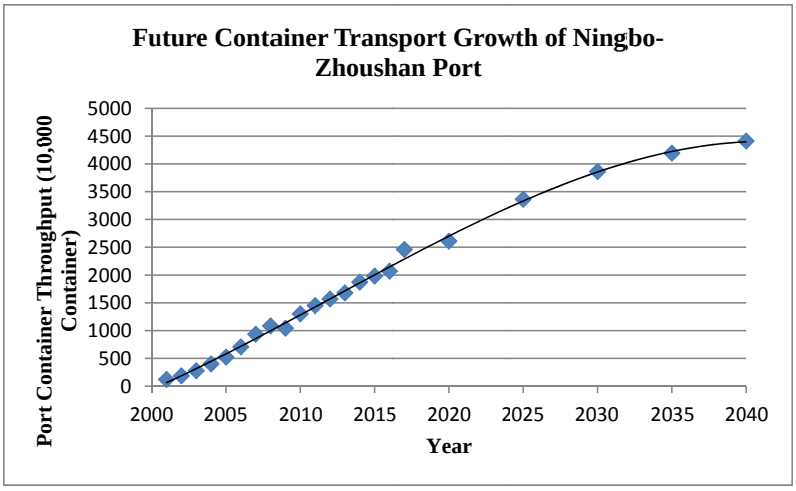
Source: Consultant, 2018

Figure 3-6 Future Annual GDP Growth of Hangzhou City



Source: Consultant, 2018

Figure 3-7 Future Container Transport Growth of Ningbo-Zhoushan Port



Source: Consultant, 2018

Through the above various planning and reference basis, the control values of the future growth trends of economic indicator values were determined, and combined with results of the regression analysis (trending curve) of the historical data of each economic analysis zone, the growths of future economic indicators of the 16 superzones were summarized in Table 3-4. Applying these increases to the previously developed economic-traffic model, the future annual traffic growth rates for each corresponding TAZ were calculated.

Table 3-4 Future Time Adjustment Factors

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	3.5%	3.0%	2.0%	1.5%
Ningbo City	9.0%	3.0%	2.0%	1.5%
Jiaxing City	9.0%	6.0%	4.0%	2.5%
Huzhou City	9.0%	5.5%	3.5%	2.5%
Shaoxing City	9.0%	5.5%	3.5%	2.5%
Shaoshan City	11.0%	8.0%	6.0%	4.0%
Wenzhou City	9.0%	6.0%	4.0%	3.0%
Jinhua City	9.0%	5.5%	3.5%	2.5%
Quzhou City	11.0%	8.0%	6.0%	4.0%
Taizhou City	9.0%	5.5%	3.5%	2.5%
Lishui City	9.0%	6.0%	4.0%	2.5%
Shanghai City	9.0%	6.0%	4.0%	2.5%
Jiansu Province	9.0%	6.0%	4.0%	2.5%
Anhui Province	14.0%	10.0%	7.0%	4.5%
Jianxi Province	13.0%	9.0%	6.0%	4.0%
Fujian Province	12.0%	8.0%	5.0%	3.5%

Source: Consultant, 2018

Note: With reference to the more developed cities in the world, the average passenger car per capita should not exceed 0.4 vehicles/person. Therefore, it is assumed that the growth will be limited to 0.3 vehicles/person, and the maximum is no more than 0.4 vehicles/person by the end of the forecast period.

Table 3-5 Future Road Traffic Growth Trends of Economic Analysis Zones

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	4.0%	2.0%	1.0%	0.5%
Ningbo City	9.0%	6.0%	3.0%	1.5%
Jiaxing City	4.0%	2.0%	1.0%	0.5%
Huzhou City	1.0%	0.0%	0.0%	0.0%
Shaoxing City	0.0%	0.0%	0.0%	0.0%
Zhoushan City	3.0%	2.0%	1.0%	0.5%
Wenzhou City	4.0%	3.0%	2.0%	1.0%
Jinhua City	4.0%	3.0%	2.0%	1.0%
Quzhou City	6.0%	4.0%	2.5%	1.5%
Taizhou City	4.0%	3.0%	2.0%	1.0%
Lishui City	1.0%	0.0%	0.0%	0.0%
Shanghai City	3.0%	2.0%	1.0%	0.5%

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Jiangsu Province	1.0%	0.0%	0.0%	0.0%
Anhui Province	2.0%	1.0%	0.0%	0.0%
Jianxi Province	4.0%	3.0%	2.0%	1.0%
Fujian Province	5.0%	3.5%	2.5%	1.5%

Source: Consultant, 2018

Table 3-6 Future GDP Growth Trends of Economic Analysis Zones

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	7.5%	6.0%	4.5%	3.5%
Ningbo City	7.5%	6.0%	4.5%	3.5%
Jiaxing City	7.0%	5.5%	4.0%	3.0%
Huzhou City	8.0%	6.5%	5.5%	4.0%
Shaoxing City	7.5%	6.0%	4.5%	3.5%
Zhoushan City	10.0%	8.0%	6.0%	4.5%
Wenzhou City	7.0%	5.5%	4.0%	3.0%
Jinhua city	7.5%	6.0%	4.5%	3.5%
Quzhou City	7.0%	5.5%	4.0%	3.0%
Taizhou City	7.0%	5.5%	4.0%	3.0%
Lishui City	7.5%	6.0%	4.5%	3.5%
Shanghai City	6.5%	5.0%	3.5%	3.0%
Jiangsu Province	7.5%	6.0%	4.5%	3.0%
Anhui Province	8.5%	6.5%	5.0%	3.5%
Jinagxi Province	8.5%	6.5%	5.0%	3.5%
Fujian Province	8.5%	6.5%	5.0%	3.5%

Source: Consultant, 2018

Table 3-7 Future Container Transport Growth Trends of Ports

Area	2018-2020	2021-2025	2026-2030	2031-2035
Ningbo Port	6.0%	4.0%	3.0%	2.0%
Wenzhou port	14.5%	8.0%	5.0%	3.0%
Taizhou Port	10.0%	6.5%	4.5%	2.5%
Jiaxing Port	8.0%	5.5%	3.5%	2.0%

Area	2018-2020	2021-2025	2026-2030	2031-2035
Shanghai Port	3.0%	2.0%	1.0%	0.5%
Zhoushan Port	10.0%	6.5%	4.5%	3.0%

Source: Consultant, 2018

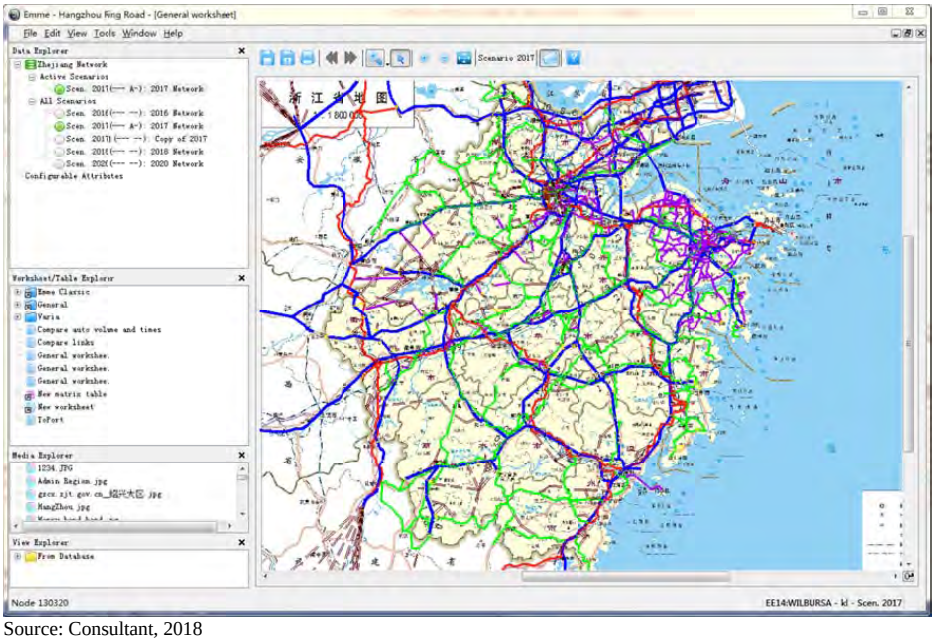
3.4 Traffic Forecasting Model Development

3.4.1 Road Network

In the base year road network development process, the Consultant made use of the existing Zhejiang road network data in the highway toll clearance system, the provincial expressway network map and the Zhejiang future expressway plan as building blocks to develop the highway supply model which was later coded into EMME/3. All major highway facilities were included in the EMME/3 network, including expressways and national highways.

All the major highways in the network would include characteristics such as speed, capacity, distance and levels of operation (expressed in delays and cost indices). The distances between stations in the road network were based on the data in the current toll system. As for the the locations and distances of the national and provincial roads, the Consultant referred to the 2017 Zhejiang Province Road Map for verification purposes. Figure 3-8 shows the EMME/3 Road Network for this Study.

Figure 3-8 Highway Network of Zhejiang Province



Source: Consultant, 2018

3.4.2 Volume Delay Functions

Travel time is usually derived directly from speed which in turn would be influenced by level of congestion on the road. As a popular expressway, the project highway has a relatively high degree of congestion. To estimate future travel speed under continuous traffic growth, the use of a "capacity constrained" assignment model would be necessary. The resultant travel volumes and levels of service were stored in the data bank. The Volume Delay Function (VDF) used in the study model could be represented as:

VDF = Len*[60/Sf+A*(V/C-R1)+B*(V/C-R2)]

Note: VDF = Volume Delay Functions

Len = Distance

Sf = Free Flow Speed

V/C = Volume to Capacity Ratio

R1，R2 = Volume to Capacity Ratio Coeff

A，B= Model Coefficient

3.4.3 Passenger Car Unit (PCU)

All types of vehicles were converted into equivalent "passenger car units (PCU)" before they were taken into account in the forecasting model. The PCU conversion factors used by the Consultant in this study were summarised in Table 3-8.

Table 3-8 Passenger Car Unit

Type	Number	Description	Conversion Factor
Passenger Car	1	Passenger Car 1	1.0
	2	Passenger Car 2	1.0
	3	Passenger Car 3	1.5
	4	Passenger Car 4	1.5
Truck	5	Truck 1	1.0
	6	Truck 2	1.5
	7	Truck 3	2.5
	8	Truck 4	2.5
	9	Truck 5	4.0
	10	Truck 6	2.5

Type	Number	Description	Conversion Factor
	11	Truck 7	4.0

Source：Highway Engineering Design Standards (JTG B01-2014)，2018

3.4.4 Toll Rates Assumptions

According to the "Notice on the provisional expressway toll charges on actual distances travelled in Zhejiang Province", the road users on the provincial expressways after May 15, 2012, will be charged according to the actual travelled distances. After May 15 2015, the provincial notice of "No-stop charging guidelines based on distance travelled on provincial expressways", vehicle with ETC have also been charged based on the travelled distances. In the Traffic Model of this study, the Consultant assumed that the future will retain the same charges as the latest rates in Zhejiang Province. The specific charging standards were shown in Tables 3-9 and 3-10 below.

Table 3-9 Toll Charge Rates by Vehicle Types

Class	Passenger Car	Veh Rate (RMB/veh)	Distance Rate (RMB/veh-km)	Truck	Veh Rate (RMB/veh)	Distance Rate (RMB/veh-km)
1	≤7 seats	5	0.4	≤2 ton	5	0.4
2	8-19seats	5	0.4	2-5 ton（include）	10	0.8
3	20-39seats	10	0.8	5-10 ton(include)	15	1.2
4	≥40seats	15	1.2	10-15 ton（include）	15	1.4
5				＞15 ton	20	1.6

Source: Zhejiang Expressway Co. Ltd, 2018

Table 3-10 Truck Toll Charge Rates by Vehicle Weight

Truck Loading		Tolling Charges
Legal Loading	less than 5ton （include）	0.09 RMB/ton-km (charged as 5 ton)
	5 ton to 15ton （include）	0.09 RMB/ton-km
	15 ton to 30 ton（include）	0.09 RMB/ton-kmlinear reduction up to 0.06 RMB/ton-km
	more than 30 ton	charged as 30 ton
Over-Loading	over-load less than 10%	charged as legal loading
	over-load less than 30% (include 30%）	the weight exceeding the 10% over-load will be charged at 0.09 RMB/ton-km ×1.2，the remaining weight will be charged as "over-load less than 10%"
	over-load between 30%-50%（include 50%）	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×2，the remaining weight will be charged as "over-load less than 30%"

Truck Loading		Tolling Charges
	over-load between 50%-100% （include 100%）	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×3，the remaining weight will be charged as “over-load less than 30%”
	over-load more than 100%	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×4，the remaining weight will be charged as “over-load less than 30%”

Source: Zhejiang Expressway Co. Ltd., 2018

According to the toll exemption scheme announced on 24 July 2012, small passenger vehicles with no more than 7 seats and motocycles are exempted from toll charges on four important public holidays (i.e. Spring Festival, Tomb-sweeping Day, Labor Day and National Day). The roads included in the scheme are all toll roads in accordance with the China Highway Law and Code of Toll Road Management. In this study, the consultant will consider the impact of this toll exemption scheme and make appropriate adjustments in order to reach reasonable traffic and revenue forecasting results.

The durations of exemption scheme are assumed as below:

- Spring Festival - 7 days
- Ching Ming Festival -3 days
- Labor Day -3 days
- National Day – 7days

There are totally 20 days for the four public holidays. This assumption was incorporated into the revenue calculations for the Project road.

Othan than the above, the current toll collection standards for over-loading trucks on expressways in Zhejiang Province are lower than those of the industry. Significant disparities are also observed in the permissible loading per axle on the Zhejiang expressways.

The Zhejiang Provincial Highway Bureau is planning to adjust the truck weight limit from 55 tons to 49 tons by the end of 2018. This will result in certain increase in number of trips by Truck Class 5.

3.4.5 Future Road Network Assumptions

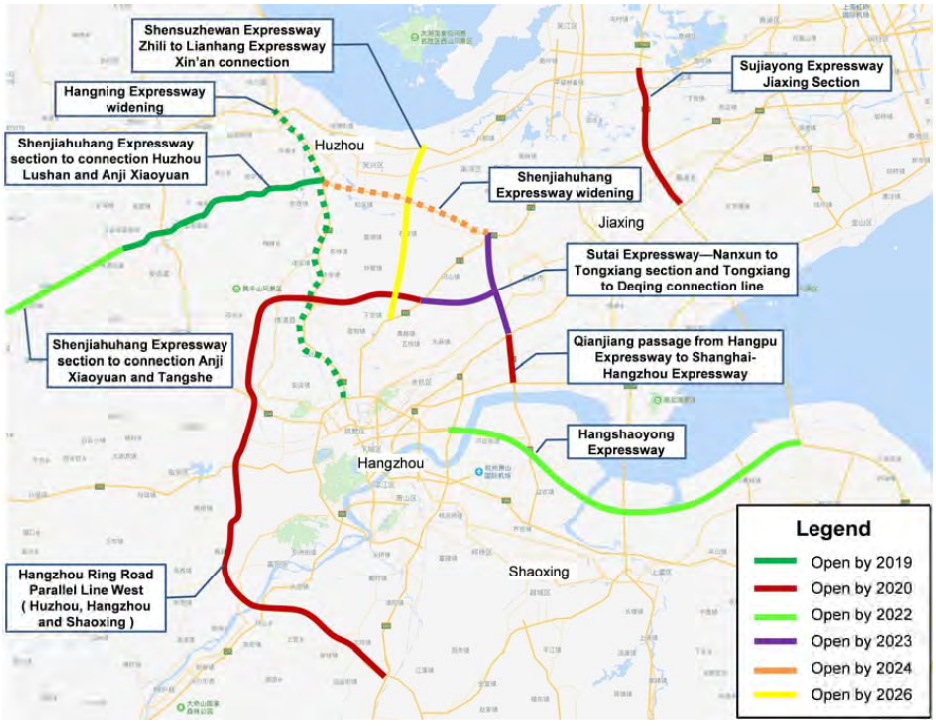
In order to analyze the impact of changes in the surrounding road network on the traffic flows of the Project road (induced or diverted), the Consultant collected the “13th Five-Year Plan” and the most recent expressway construction plans of the vicinity areas. The Consultant also reviewed the progress of the roads currently under construction and summarized the changes in the future road network in Zhejiang Province as shown in Table 3-11 and Figure 3-9.

Table 3-11 Future Road Network Construction Plan

No.	Company Name	Opening Year	Length (Km)	No. of Lanes	Design Speed (Km/h)
1	Shenjiahu Expressway section to connect Huzhou Lushan and Anji Xiaoyuan	June, 2019	48	4	120
2	Completed widening of Nanjing-Hangzhou Expressway	End of 2019	77	From 4 to 6	120
3	Qianjiang passage from Hangpu Expressway to Shanghai-Hangzhou Expressway	End of 2020	11.415	6	100
4	Hangzhou Ring Road Western Parallel Line (Huzhou, Hangzhou and Shaoxing)	December 2020	149	6	100
5	Sujiayong Expressway Jiaxing section	End of 2020	27.55	6	120
6	Hangshaoyong Expressway	End of 2022	137	6	Above 120
7	Sutai Expressway -- Nanxun to Tongxiang section and Tongxiang to Deqing connection line	End of 2023	40	6	100
8	Shenjiahu Expressway section between Anji Xiaoyuan and Tangshe	End of 2022	36	4	120
9	Huzhou-Suzhou-Shanghai Railway	Early of 2023	64.6	2 lines	200-350
10	Completed widening of section between Lianshi Interchange and Lushan Interchange of Shenjiahuhang Expressway	End of 2023	39.98	4 to 6	120
11	Shensuzhewan Expressway Zhili to Lianhang Expressway Xin'an Connection Line	Early of 2026	44	6	120

Source: Zhejiang Expressway, 2018

Figure 3-9 Future Highway Construction Plans



Source: Consultant, 2018

3.4.6 Road Capacity

Major factors that may affect the capacity of a highway include design standards (design speed), vehicle type composition, hourly distribution of daily traffic demands (peak hour factor) etc. The assumptions adopted for the planning and design of the Project road were: design speed of 120 km/hr, level of service C, capacity of 1650 pcu/lane/hr (Highway Engineering Technical Specifications – JTG B01-2014), peak hour factor of 6.15% (derived from survey data) and the average passenger car conversion factor of 1.627 pcu/veh (derived from survey data).

The capacity of the Project road could be estimated as:

1650 (pcu/lane/hr)×4 (lanes)÷1.627 (pcu/veh)÷6.35% = 63,883 (vehicles/day)

Table 3-12 Expressway Levels of service and Maximum Capacity

Level of Service	Volume/Capacity (V/C)	Design Speed		
		120	100	80
		Maximum Capcity [pcu/(h•ln)]	Maximum Capcity [pcu/(h•ln)]	Maximum Capcity [pcu/(h•ln)]
A	V/C≤0.35	750	730	700
B	0.35<V/C≤0.55	1200	1150	1100
C	0.55<V/C≤0.75	1650	1600	1500
D	0.75<V/C≤0.90	1980	1850	1800
E	0.90<V/C≤1.00	2200	2100	2000
F	V/C>1.00	0~2200	0~2100	0~2000

Source : Highway Engineering Technical Specifications – JTG B01-2014

3.4.7 Trip Distribution

This Study adopted "Generalized Cost" as the factor to influence the decisions to select travel paths by the trip makers. It will arrive at a balanced trip distribution on the road network within the study area. The "generalized cost" includes all elements and factors (such as travel time, travel distance, vehicle operation cost and toll costs etc) that may affect the choice of travel paths of the car drivers. The "generalized cost" of a road section can be estimated as:

$$GCij = Tij + [Cij + Tolij]/ VOT$$

Note: GC_{ij} = Travel Generalized Cost

T_{ij} = Travel Time between TAZ_i to TAZ_j

C_{ij} = Travel Cost between TAZ_i and TAZ_j , such as vehicle operating cost.

Tol_{ij} = Toll Cost from TAZ_i and TAZ_j

VOT = Value of Time for different vehicle types

The distribution model used by the Consultant has taken into consideration of road users' willingness to pay certain travel costs and travelling speed/congestion levels on the Project road in comparison to other competing toll roads. From the trip matrices, the trips between any two TAZs would be allocated to the path of the least generalized cost. Traffic assignment is an iterative process, in which every trip during an iteration would be assigned to the path of the least generalized cost. Generalized cost includes travel time, travel distance, toll charges and vehicle operation costs. For example: If there are 2 highways of the same class are included during certain iteration, the highway which carries the lower volume would be selected as the travel path. However, in subsequent iterations, these 2 highways may have different generalized costs which would then dictate which would be the more attractive path. This process will be repetitive until traffic volumes on the competing highway facilities would reach an equilibrium condition.

3.5 Project Road OD Travel by Modes

After the traffic distribution of the OD matrices in Zhejiang Province, the future traffic demands between each pair of traffic zones using the project road could be determined. To facilitate easier understanding and summarization, the Consultant also aggregated 436 traffic zones (OD) into 16 superzones (see economic analysis section).

According to the model allocation results, the Consultant discovered that the proportion of future passenger car travel and truck travel (related to Hangzhou, Huzhou and Jiaxing) on the Project road was more than 70% and 65% respectively. In summary, the total regional travel represents a significant proportion of the total traffic on the Project road.

Table 3-13 and Table 3-14 showed the future OD patterns of passenger cars and trucks on the Project road.

Table 3-13 Passenger Car OD Pattern on Project Road (%)

OD*	Hangzhou	Ningbo	Jiaxing	Huzhou	Shaoxing	Zhoushan	Wenzhou	Jinhua	Quzhou	Taizhou	Lishui	Shanghai	Jiangsu	Anhui	Jiangxi	Fujian	Total
Hangzhou	12.0%	0.1%	5.3%	9.4%	0.2%			0.1%				1.2%	2.7%	0.1%			31.2%
Ningbo	0.1%			0.5%									0.2%	0.2%			1.0%
Jiaxing	5.0%		1.5%	8.8%								0.2%	2.1%	1.2%			18.9%
Huzhou	10.2%	0.6%	8.6%	9.1%	0.5%	0.1%	0.1%	0.2%		0.1%		2.2%	1.1%	0.2%	0.1%		33.0%
Shaoxing	0.2%			0.4%													0.6%
Zhoushan																	0.1%
Wenzhou																	0.1%
Jinhua	0.1%			0.1%													0.2%
Quzhou													0.1%				0.2%
Taizhou				0.1%													0.1%
Lishui																	0.0%
Shanghai	1.0%		0.2%	2.6%									0.3%	0.7%			4.7%
Jiangsu	2.8%	0.3%	2.2%	1.3%					0.1%			0.2%		0.1%	0.2%		7.2%
Anhui	0.1%	0.2%	1.3%	0.3%								0.6%	0.1%				2.5%
Jiangxi			0.1%										0.2%				0.3%
Fujian																	0.0%
Total	31.5%	1.1%	19.2%	32.8%	0.7%	0.1%	0.1%	0.3%	0.2%	0.1%	0.1%	4.4%	6.7%	2.4%	0.4%	0.0%	100.0%

Note: ODs < .01% are not shown. Source: Consultant, 2018

Table 3-14 Truck OD Pattern on Project Road (%)

OD*	Hangzhou	Ningbo	Jiaxing	Huzhou	Shaoxing	Zhoushan	Wenzhou	Jinhua	Quzhou	Taizhou	Lishui	Shanghai	Jiangsu	Anhui	Jiangxi	Fujian	Total
Hangzhou	16.7%	0.5%	3.9%	9.5%	0.6%		0.1%	0.2%		0.1%		1.2%	2.2%	0.1%	0.1%		35.2%
Ningbo	0.5%			0.5%									0.1%				1.1%
Jiaxing	3.5%		2.3%	7.1%								0.5%	2.1%	0.7%	0.1%		16.5%
Huzhou	10.4%	0.9%	7.5%	5.8%	0.8%		0.2%	0.3%	0.1%	0.2%		2.2%	1.6%	0.1%	0.1%		30.3%
Shaoxing	0.9%			0.6%													1.5%
Zhoushan																	0.0%
Wenzhou	0.1%			0.1%													0.2%
Jinhua	0.2%			0.1%													0.3%
Quzhou												0.1%	0.2%				0.4%
Taizhou				0.1%													0.1%
Lishui																	0.0%
Shanghai	1.3%		0.4%	2.3%					0.1%				0.1%	0.3%	0.2%		4.8%
Jiangsu	2.2%	0.1%	1.5%	1.4%					0.2%						1.1%	0.1%	6.6%
Anhui	0.1%		0.8%	0.2%								0.3%					1.3%
Jiangxi	0.1%		0.2%	0.2%								0.1%	0.8%				1.4%
Fujian	0.0%												0.1%				0.2%
Total	36.1%	1.6%	16.6%	27.8%	1.4%	0.0%	0.3%	0.4%	0.5%	0.3%	0.1%	4.5%	7.2%	1.2%	1.6%	0.2%	100.0%

Note: ODs < .01% are not shown. Source: Consultant, 2018.

4 Traffic and Revenue Forecasting Result

4.1 Description of Forecasting Options

Based on the previous research and analysis and 2017 as the base year, the Consultant carried out traffic and revenue forecasts from 2018 to 2035, in which the concessions on the Huzhou section will end on January 27, 2033 and that for the Lianhang section on February 5, 2035. The traffic volumes in subsequent years were based on the traffic data of the base year and the predictions by the computer assignment model on the annual average daily traffic in the Study area. The toll revenue forecasts were based on the current year's price. Being a non-economic profession, the Consultant did not make assumptions on inflation rates in the future years.

Table 4-1 Description of Forecasting Option

Option	Assumptions
（1）Base Case	1. According to growth trends in the Economic-Traffic model； 2. Truck weight adjustment from 55 ton to 49 ton at end of 2018； 3. For legal loading, trucks using Zhejiang Province payment card charge vehicle tolls at 85% for the period between 1st January 2019 and 31st December2020； 4. Construction works on National highway G320 to be completed by end of 2018； 5. Shenjiahu Expressway Western extension from Lushan to Anji Xiaoyuan section to be opened by June 2019； 6. Widening of Hangzhou-Ningbo expressway to be completed by end of 2019； 7. Qianjiang passage from Hangpu Expressway to Shanghai-Hangzhou Expressway to be completed by end of 2020； 8. Opening of Hangzhou Ring Road Western Parallel Line (Huzhou, Hangzhou and Shaoxing) in December 2020； 9. The Jiaxing section of Sujiayong Expressway will be opened to traffic at end of 2020. 10. Hangshaoyu Expressway to be opened by end of 2022； 11. Sutai Expressway -- Nantun to Tongxiang section and Tongxiang to Deqing connection to be completed by end of 2023； 12. Shenjiahu expressway – Anjixiaoyuan to Tangshe section to be opened by end of 2022. 13. Lake Suhu Rail to be open early 2023 14. Completed widening of section lianshi Interchange and Lushan Interchange on Shenjiahuhang Expressway by end of 2023； 15. Shensuzhewan Expressway Zhili to Lianhang Expressway Xin’an Connection Line to be opened by end of 2026.

Source: Consultant, 2018

4.2 Traffic Impacts Caused by the New Highways

According to the model analysis, the coming years that would have greater impacts on the Shenjiahuhang Expressway are 2019, 2020, 2021, 2023 and 2026. The impacts of the newly opened highways on the Shenjiahuhang Expressway in the above years were shown in Table 4-2 below.

Table 4-2 Traffic Impacts of New Highways

Highway	Schedule	Diversion/Inducement Impacts on Project Road	Magnitude of Impacts
Truck weight adjustment from 55 ton to 49 ton	Start at end of 2018	Truck Class 5 traffic will increase	Traffic impacts：+0.7% Revenue impacts：+1.6%
For legal loading, trucks using Zhejiang Province payment card charge vehicle tolls at 85%	From 1st January 2019 and 31st December2020	For legal loading, trucks using Zhejiang Province payment card charge vehicle tolls at 85% affects Truck Classes 1 -7.	Traffic impacts：+0.7% Revenue impacts： -0.7%
Construction works on National highway G320	Completed in end of 2018	Part of traffic now using Lianxi hub to Xiaoyuan hub will be reverted to G320.	Traffic impacts： -1.8% Revenue impacts： -1.3%%
Widening of the Hangning Expressway	From May 2018 to end of 2019	Part of the medium to large trucks will be diverted onto Shenjiahuhang Expressway	Traffic impacts：+6.4% Revenue impacts：+7.3%
Completion of widening of the Hangning Expressway	End of 2019	After the completion widening of Hangning Exprressway, part of traffic will be reverted to Hangning Expressway	Traffic impacts： -6.4% Revenue impacts： -7.3%
Qianjiang passage from Hangpu Expressway to Shanghai-Hangzhou Expressway	Completed in end of 2020	Minimal impact.	--
Opening of Hangzhou Ring Road Western Parallel Line (Huzhou, Hangzhou and Shaoxing)	Completed in December of 2020	On the completion of works on the Hangzhou Ring Road, part of traffic between Tongxian West, Xin'an and Huzhou will use Hangzhou Ring Road Western Parallel Line and Hangning Expressway; part of traffic between Tongxiang, Linan and Tonglu will be diverted to the Hangzhou Ring Road Western Parallel Line	Traffic impacts： -3.9% Revenue impacts： -3.7%
the Jiaxing section of Sujiayong Expressway	Completed in end of 2020	Minimal impact.	--
Opening of Hangshaoyong Expressway	Completed in end of 2022	On the completion of Hangshaoyu Expressway, part of traffic between Jiangsu, Huzhou, Cixi and Ningbo New District will be diverted to Hangning Expressway and Hangshaoyu Expressway	Traffic impacts： -1.2% Revenue impacts： -1.0%
Sutai Expressway -- Nanxun to Tongxiang section and	Completed in end of 2023	Part of the traffic travelling between Dajing and the Lianxi will be diverted to the	Traffic impacts： -2.5% Revenue impacts：

Highway	Schedule	Diversion/Inducement Impacts on Project Road	Magnitude of Impacts
Tongxiang to Deqing connection		Shanghai-Hangzhou-Ningbo Expressway and the Sutai Expressway.	-2.1%
Shenjiahu Expressway -- Anji Xiaoyuan to Tangshe section	Completed in end of 2022	Some of the traffic from Jiaxing and Shanghai to Anhui will be attracted to the Shenjiahuhang Expressway	Traffic impacts：+4.6% Revenue impacts：+3.7%
Huzhou-Suzhou-Shanghai Railway	Completed in beginning of 2023	Minimal Impact.	--
Widening of Shenjiahu Expressway – Lianshi Interchange to Lushan Interchange	Completed in end of 2023	Minimal Impact	--
Shensuzhewan Expressway Zhili to Lianhang Expressway Xin'an Connection Line	Completed in 2026	Part of the traffic from Nanxun to Leidian will be diverted to the - Shensuzhewan Expressway Zhili to Lianhang Expressway Xin'an Connection Line	Traffic impacts：-4.1% Revenue impacts：-3.9%

Source: Consultant, 2018

4.3 Traffic and Revenue Forecasting (Base Option)

Based on the assumptions stipulated in Table 4-1 and the application of the traffic prediction model (see Chapter 3), the Consultant was able to develop the annual weighted average section flow data and revenue forecasts for the Base Case Scenario. The results were summarized in Tables 4-3 to 4-4.

Table 4-3 Annual Average Daily Traffic Flow by Vehicle Type on Project Road for Base Case (Vehicles/Day)

Year	PC 1	PC 2	PC 3	PC 4	Truck 1	Truck 2	Truck 3	Truck 4	Truck 5	Truck 6	Truck 7	Total	Annual Growth
2018	17,661	226	264	337	2,317	1,536	727	433	4,635	29	388	28,553	13.0%
2019(2)	18,872	229	274	343	2,413	1,556	812	485	5,321	32	401	30,738	7.7%
2020(3)	19,152	228	270	339	2,493	1,606	818	487	5,195	31	402	31,021	0.9%
2021(4)	19,423	221	256	303	2,420	1,555	822	492	5,226	31	402	31,151	0.4%
2022	20,496	223	259	306	2,511	1,613	879	526	5,594	32	425	32,864	5.5%
2023(5)	22,531	235	271	309	2,605	1,683	949	572	6,066	34	465	35,720	8.7%
2024(6)	23,014	230	263	302	2,630	1,709	990	602	6,374	35	481	36,630	2.5%
2025	24,160	232	266	305	2,718	1,766	1,049	638	6,759	37	503	38,433	4.9%
2026(7)	24,034	227	257	296	2,695	1,780	1,082	658	6,863	38	521	38,451	0.0%
2027	25,081	229	259	299	2,772	1,830	1,136	691	7,205	40	541	40,083	4.2%
2028	26,031	231	261	301	2,837	1,874	1,184	720	7,497	41	561	41,538	3.6%
2029	26,984	233	263	303	2,898	1,916	1,229	746	7,770	42	579	42,963	3.4%
2030	27,944	234	265	306	2,959	1,957	1,274	772	8,042	42	597	44,392	3.3%
2031	28,879	236	267	308	3,016	1,997	1,317	797	8,294	43	604	45,758	3.1%
2032	29,818	238	269	310	3,072	2,035	1,359	822	8,544	44	620	47,131	3.0%
2033	30,758	239	271	312	3,128	2,074	1,401	847	8,792	45	636	48,503	2.9%
2034	31,698	241	273	315	3,183	2,112	1,442	871	9,034	46	651	49,866	2.8%
2035	32,603	242	274	317	3,231	2,145	1,478	890	9,183	48	668	51,079	2.4%

Source: Consultant, 2018

(1) Traffic flow includes general toll-free vehicles, but not including non-toll vehicles during major festivities.

(2) Truck weight adjustment from 55 ton to 49 ton at 1st January 2019;Construction works on National highway G320 to be completed by end of 2018; Shenjiahu Expressway Western extension from Lushan to Anji Xiaoyuan section to be opened by June 2019; For legal loading, trucks using Zhejiang Province payment card charge vehicle tolls at 85% for the period between 1st January 2019 and 31st December 2020.

(3) Completion of Widening of Nanjing-Hangzhou Expressway.

(4) Opening of Hangzhou Ring Road Western Parallel Line (Huzhou, Hangzhou and Shaoxing), Qianjiang passage from Hangpu Expressway to Shanghai-Hangzhou Expressway, Sujiayong Expressway Jiaxing Section and.

(5) Opening of Hangshaoyong Expressway, Shenjiahu Expressway -- Anji Xiaoyuan to Tangshe section, Opening of Huzhou-Suzhou-Shanghai Railway.

(6) Opening of Sutai Expressway -- Nanxun to Tongxiang section/Tongxiang to Deqing connection line.

(7) Opening of Shensuzhewan Expressway Zhili to Lianhang Expressway Xin'an Connection Line.

(8) Average daily traffic volume is the weighted average daily traffic volume of the section: refers to the product of the daily average traffic volume and length of each section, divided by the total length of all sections.

Table 4-4 Annual Average Daily Traffic Flow by Road Section on Project Road for Base Case (Vehicles/Day)

Year	Jiahujie-Lianshi Hub	Lianshi Hub-South Weinan	South Weinan-Shuanglin	Shuanglin-Huzhou East	Huzhou East-Lusha n	Lianshi Hub-Lingshi	Lianshi-Tongxiang West	Tongxiang West-Xinshi	Xinshi-Xin'an	Xin'an-Leidian	Leidian-Tangxi	Tangqi-Chongxian	Chongxian-Chongxian Hub
2018	42,514	26,052	25,095	22,968	18,398	27,690	29,137	28,147	29,425	34,115	38,046	43,140	47,488
2019(2)	45,787	28,176	27,181	24,954	20,041	29,818	31,316	30,286	31,636	36,566	40,697	45,864	50,262
2020(3)	47,302	29,017	28,244	26,048	21,326	29,004	30,613	29,506	30,954	36,293	40,801	46,252	51,169
2021(4)	49,311	29,249	28,411	26,387	21,403	29,035	30,728	31,175	30,017	35,563	40,092	45,663	50,648
2022	51,924	30,925	30,114	28,060	22,803	30,487	32,278	32,770	31,547	37,422	42,188	47,946	53,111
2023(5)	56,888	35,015	34,234	32,166	26,737	31,951	33,841	34,424	33,143	39,390	44,399	50,356	55,712
2024(6)	58,739	37,546	36,792	34,699	27,926	31,954	33,302	34,127	33,142	39,596	44,461	50,399	55,937
2025	61,568	39,488	38,757	36,636	29,564	33,365	34,783	35,668	34,638	41,422	46,513	52,644	58,370
2026(7)	64,272	37,223	40,023	37,226	31,852	31,388	32,872	32,834	33,308	40,599	50,136	56,165	58,370
2027	66,988	38,923	41,889	39,043	33,487	32,598	34,151	34,123	34,628	42,249	52,174	58,370	58,370
2028	69,721	40,543	43,677	40,875	35,137	33,722	35,344	35,419	35,956	43,910	54,224	58,370	58,370
2029	72,462	42,257	45,563	42,717	36,798	34,937	36,629	36,719	37,289	45,573	55,210	58,370	58,370
2030	75,210	43,978	47,456	44,569	38,469	36,153	37,914	38,020	38,614	47,233	56,195	58,370	58,370
2031	77,958	45,701	49,353	46,424	40,144	37,367	39,199	39,321	39,873	48,813	56,195	58,370	58,370
2032	80,704	47,424	51,250	48,280	41,822	38,579	40,481	40,619	41,201	50,473	56,195	58,370	58,370
2033	83,444	49,144	53,143	50,132	43,497	39,787	41,759	41,914	42,525	52,130	56,195	58,370	58,370
2034	0	0	0	0	0	40,988	43,033	43,204	43,826	53,761	56,195	58,370	58,370
2035	0	0	0	0	0	42,134	44,411	44,565	43,993	53,953	56,195	58,370	58,370

Source: Consultant, 2018

(1) Traffic flow includes general toll-free vehicles, but not including non-toll vehicles during major festivities.

(2) Truck weight adjustment from 55 ton to 49 ton at 1st January 2019;Construction works on National highway G320 to be completed by end of 2018；Shenjiahu Expressway Western extension from Lushan to Anji Xiaoyuan section to be opened by June 2019； For legal loading, trucks using Zhejiang Province payment card charge vehicle tolls at 85% for the period between 1st January 2019 and 31st December 2020.

(3) Completion of Widening of Nanjing - Hangzhou Expressway.

(4) Opening of Hangzhou Ring Road Western Parallel Line (Huzhou, Hangzhou and Shaoxing), Qianjiang passage from Hangpu Expressway to Shanghai-Hangzhou Expressway, Sujiayong Expressway Jiaxing Section.

(5) Opening of Hangshaoyong Expressway, Shenjiahu Expressway -- Anji Xiaoyuan to Tangshe section, Opening of Huzhou-Suzhou-Shanghai Railway.

(6) Opening of Sutai Expressway -- Nantun to Tongxiang section/Tongxiang to Deqing connection line.

(7) Opening of Shensuzhewan Expressway Zhili to Lianhang Expressway Xin'an Connection Line.

Table 4-5 Annual Revenue Forecasts for Base Case on Project Road

Year	Average Daily Revenue (RMB)	Daily Growth	Annual Revenue (RMB 10,000)	Annual Growth
2018	¥2,004,153	13.0%	¥73,152	13.0%
2019	¥2,172,026	8.4%	¥79,279	8.4%
2020	¥2,139,415	-1.5%	¥78,303	-1.2%
2021	¥2,200,265	2.8%	¥80,310	2.6%
2022	¥2,330,551	5.9%	¥85,065	5.9%
2023	¥2,528,411	8.5%	¥92,287	8.5%
2024	¥2,612,376	3.3%	¥95,613	3.6%
2025	¥2,748,956	5.2%	¥100,337	4.9%
2026	¥2,767,154	0.7%	¥101,001	0.7%
2027	¥2,890,009	4.4%	¥105,485	4.4%
2028	¥2,998,031	3.7%	¥109,728	4.0%
2029	¥3,102,002	3.5%	¥113,223	3.2%
2030	¥3,205,812	3.3%	¥117,012	3.3%
2031	¥3,303,165	3.0%	¥120,566	3.0%
2032	¥3,401,514	3.0%	¥124,495	3.3%
2033	¥2,126,656	-37.5%	¥77,623	-37.6%
2034	¥2,060,569	-3.1%	¥75,211	-3.1%
2035	¥2,085,585	1.2%	¥11,679	-84.5%
Total	--	--	¥1,640,369	--

Source: Consultant, 2018

(1) Toll revenue estimations were based on base year value; Being a non-economic profession, the Consultant made no prediction on future inflation trend.

(2) Toll revenues excluded non toll paying vehicles.

(3) Toll revenue forecasting also considered the impacts of the four important public holidays (i.e. Spring Festival, Ching Ming Festival, Labor Day and National Day), during which small passenger vehicles with no more than 7 seats and motocycles are exempted from toll charges.

(4) From January 28, 2033, toll collection will end on the Huzhou section.

(5) All toll collection will cease on February 6, 2035.

5 Conclusion

The Shenjiahuhang Expressway is one of the five major thoroughfares from Zhejiang Province to Shanghai within the "Yangtze River Delta" economic zone. It is also one of the most important elements of the Zhejiang Expressway Network. The construction of this Project road will further strengthen the relationship between the northern part of Zhejiang and Shanghai, accelerate the integration of the region into the "Yangtze River Delta" concept, improve the highway network in the region, reduce the traffic pressure on the Shanghai-Hangzhou Expressway, and achieve the 3-hours travel circle of the Yangtze River Delta. These future highway planning projects will enhance and sustain the economic development and urbanization of the region.

The forecasting of future traffic volumes and toll revenues were for 2018 to 2035. This Study was based on the latest data collection, the expertise and years of toll highway experience of the Consultant. The prediction process of this study used the state-of-art technical methods and recognized industry practices. However, it should be noted that there is still uncertainties in the forecasting of future traffic volume and revenue for any toll road. As a result, there may be discrepancies between the predicted values and the actual results in the future. In addition, the traffic volume and revenue forecasts shown in this report represent the overall long-term trend. In any given year, the differences between predicted and actual results may also be caused by other factors. Therefore, although the Consultant endeavors to ensure the technicality of the information provided, it does not guarantee the accuracy or reliability of the data provided, and will not be held liable for any losses or damages caused by the forecasting results. The forecast results were summarized as follows:

1. From 2018 to 2035, the traffic volumes on the Project road would increase from 28,553 vehicles/day to 51,079 vehicles/day, an increase of 78.9%;
2. The toll revenue of the Project road will increase from RMB 0.732 billion/year in 2018 to RMB 1.245 billion/year in 2032, and the total revenue from 2018 to 2035 will reach RMB 16.404 billion.

Zhejiang Zhoushan Bridge
Traffic and Revenue Forecast Study

Final Report

施伟拔咨询（深圳）有限公司
WB Group International

Zhejiang Zhoushan Bridge
Traffic and Revenue Forecast Study

Final Report

November 2018

WBG Consulting (Shenzhen) Limited

Edition	Report	Date	Prepared By	Review By	Approved By
01	Final	23rd November 2018	KL\JZ\TX	DL	SC
0A	Draft	28th August 2018	KL\JZ\TX	DL	SC

RT-181305-02/01

Table of Content

Table of Content（Continued）

Table Title Page

Table of Content（Continued）

Figures Title Page

1 Introduction

1.1 Project Road Description

WB Group Consulting (Shenzhen) Limited (“the Consultant") was commissioned by Zhejiang Expressway Co., Ltd ("Zhejiang Expressway") in August 2018 to conduct an independent study on the traffic and toll revenue forecast for the Zhoushan Bridge (Project Road) in the Zhejiang Province. The forecasting period is from 2018 to 2034. This is the Final Report on the Traffic and Revenue Forecasting Results.

The Zhoushan Bridge, also known as the Zhoushan Continental Island Project, is a major component of the Yongzhou Expressway (G9211) of the National Highway Network. The Zhoushan Bridge starts from the roundabout of the Duck Egg Mountain on the 329 National Road of the Zhoushan Island. It is connected to the Ningbo Ring Road via Lidiao Island, Fuchi Island, Cezi Island, Jintang Island and the Ningbo Zhenhai District. The project is a dual 4 highway, has a design speed of 100 km/hr and a total length of 46.293 kilometers. There are 8 toll stations at Zhoushan, Cengang, Lidiao, Fuchi, Cezi, Jintang, Ligang and Jiaochuan. However, Lidiao and Fuchi have still not been opened to public use yet. The Zhoushan Bridge was officially opened to traffic on December 25, 2009.

After the completion of the Zhoushan Bridge, the driving distance between Zhoushan and Ningbo and Hangzhou will be greatly shortened. Together with the completed Hangzhou Bay Bridge, the travel time from Zhoushan via the south bank of Hangzhou Bay to Shanghai will be shortened to 3 hours, which will make Zhoushan more closely integrated with the Yangtze River Delta Economic Zone.

The project location is shown in the following Figure 1-1.

Figure 1-1 Location of Zhoushan Bridge

Source : Consultant, 2018

1.2 Study Approach

Based on careful analysis on the characteristics of the project, the consultant completed the entire tasks through different stages of work such as data collection, base year traffic characteristics analysis, development of traffic model, socio-economic assessments, and traffic & toll revenue forecasting. The study approach consists of the following tasks.

Step1: Mobilization and Data Collection— It involved the collection of all available data and information of the Zhoushan Bridge and the socio-economic and transportation data of Zhejiang Province, Hangzhou City, Ningbo City, Shaoxing City and Zhoushan City. This information also included future goals regarding economic and transport development along the study corridor.

Step2: Base Year Traffic Condition Analysis— Using the data and information obtained, the consultant assessed the traffic conditions of the Zhoushan Bridge. Through the analyses of the differences between history traffic data and the current 24-hour traffic data on a typical day, the 2018 Annual Average Daily Traffic (AADT), the Value of Time and the average Operating Cost were evaluated in this step.

Step 3: Transport Network Coding — The consultant makes use of the traffic data, the EMME/3 model system and other information available to develop a transport model that could replicate the existing traffic pattern of Zhoushan Bridge. EMME/3 model would also be used to develop the road network as well as calibration and future assessment modules.

Step 4: Economic Analysis —Socio-economic assessment of Zhejiang Province and adjacent cities would be another important element of the Study. The consultant

conducted analysis and assessment on the latest and available government data. The purpose is to find the relationship between socio-economic statistics and historical traffic flow. The more and detailed data we can get, the better the relationship function is.

Step 5: Transport Model Development — Step 2 to 4 provided basic data to develop a transport model. The remaining jobs were to design a transport model to conduct typical toll road traffic diversion and assignment tasks. The calibrated model can generate traffic flows and conditions that are similar to the realistic traffic conditions. In the Study, the assignment of future traffic flows would be adjusted according to the results in Task 5.

Step 6: Traffic and Toll Revenue Analysis — When future year network assumptions, socio-economic conditions, economic development, inflations and toll strategies were developed, detailed traffic and toll revenue analyses can be conducted. The assumptions listed above were treated as the main model componentss after reaching consensus.

1.3 Forecasting Guidelines and Assumptions

The consultant received the station-to-station records, dated from 03 to 09 June 2018, of the Zhoushan Bridge from the Zhejiang Expressway‘s toll clearing system. These data included the number of vehicles using the Zhoushan Bridge in the period, their entry times, entry stations, exit times, exit stations, vehicle types, toll types, collection charge rates, passenger car or truck, weight and distances. These data show the latest traffic situations in a normal week and helped the Consultant to understand the traffic composition, the origins and destinations of the vehicles, the weekly traffic variations, and distances travelled etc.

Using station-to-station records for traffic flow analysis has the following advantages:

- The information was recorded by electronic equipment instead of field survey, which eliminated disturbance to normal traffic operation;
- The information was extracted directly from the expressway’s toll clearing system which could avoid manual input error such as OD recording and coding errors. It enhanced data accuracy;
- The information was recorded at 24 hours per day (i.e. sampling rate was almost 100% excluding non-permit vehicles);
- It eliminated sampling bias. It was also not necessary to adjust for duplicated data caused by manual survey.

Besides the station-to-station flow records on the Zhoushan Bridge, the consultant also collected the following data from the Zhejiang Expressway Co., Ltd, in order to analyze the historic traffic variations of the Zhoushan Bridge.

1. The mileage of each section of the Zhoushan Bridge, the number of lanes, the number of entrance and exit lanes of the toll stations and the roads connecting them;

2. Zhoushan Bridge toll standards, changes in charging policies and traffic management measures in recent years;
3. From January 2013 to July 2018, the monthly traffic volumes by vehicle types at the 6 toll stations (not including the Lidiao and Fuchi stations) of the Zhoushan Bridge;
4. From January 2013 to July 2018, the monthly traffic volumes by vehicle types and by directions on sections of the Zhoushan Bridge;
5. From January 2013 to July 2018, the monthly toll revenues generated by the toll clearing system for the Zhoushan Bridge.

Although OD survey was not carried out in this study due to time and condition constraints, the station-to-station flow records of the Zhoushan Bridge can be regarded as a reliable data source to accurately reflect the trip patterns. The elasticity ratios were also developed based on the historical traffic volumes of Zhoushan Bridge and the related economic growth in the study area. The traffic and revenue forecasting results from this model could be regarded as reliable.

1.4 Report Structure

This report presents the preliminary forecast results of traffic and toll revenue of the Zhoushan Bridge. The report structure is:

Chapter 1 is the introduction of the Zhoushan Bridge. Chapter 2 describes the details of the economic and traffic development of the regions along the project corridor. Chapter 3 discusses the development of the transport model. Chapter 4 summarizes the results of future traffic and toll revenue forecasts.

2 Existing Condition of Project Road Corridor

2.1 Socio-economic Development along Project Corridor

2.1.1 Socio-economic Development in Zhejiang Province

Zhejiang Province is located in the southern part of Yangtze River Delta of the southeast coast of China. It is bounded by East China Sea to the east, Fujian Province to the south, Jiangxi and Anhui province to the west, and Shanghai and Jiangsu Province to the north. Zhejiang Province is one of the greatest economic development vitality in China. Since the reform and opening up, people in Zhejiang province have been working hard to seize opportunities, deepen reform, expand opening up, and promote the development of the "Economic Province". The overall strength of Zhejiang province has increased dramatically. The main socio-economic data of Zhejiang Province were shown on Tables 2-1 to 2-5.

Population in Zhejiang Province

Table 2-1 Historical Resident Population in Zhejiang Province

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	5212.4	5275.5	5446.5	5463.0	5477.0	5498.0	5508.0	5539.0	5590.0	5567.0

Source: Zhejiang province national economy and social development statistical bulletin, 2008-2017

Gross Domestic Product （GDP）in Zhejiang Province

Table 2-2 Historic GDP in Zhejiang Province

Year	GDP (RMB 100 million)	Growth	Primary industry	Secondary industry	Tertiary industry	GDP Per Capita (RMB)
2008	21462.69	10.1%	1095.96	11567.42	8799.31	41405
2009	22998.24	8.9%	1163.08	11860.16	9975.01	43857
2010	27747.65	11.9%	1360.56	14187.36	12199.74	51758
2011	32363.38	9.0%	1583.04	16331.27	14449.07	59331
2012	34739.13	8.0%	1667.88	17000.09	16071.16	63508
2013	37756.58	8.2%	1760.34	18047.52	17948.72	68805
2014	40173.03	7.6%	1777.18	19175.06	19220.79	73002
2015	42886.49	8.0%	1832.91	19711.67	21341.91	77644
2016	47251.36	7.6%	1965.18	21194.61	24091.57	84916
2017	51768.00	7.8%	2017.00	22472.00	27279.00	92057

Source：Zhejiang province statistical yearbook 2017, Zhejiang province national economy and social development statistical bulletin 2017

Car Ownership in Zhejiang Province

Table 2-3 Historical Car Ownership in Zhejiang Province (Unit: Vehicles)

Year	Passenger Cars	Trucks	Others	Total Vehicles
2008	2,804,070	669,033	71,947	3,545,050
2009	3,514,725	766,460	51,846	4,333,031
2010	4,508,344	872,865	54,509	5,435,718
2011	5,555,814	969,984	56,647	6,582,445
2012	6,640,840	1,050,189	58,060	7,749,089
2013	7,850,003	1,123,643	59,398	9,033,044
2014	8,959,921	1,115,620	56,595	10,132,136
2015	10,124,578	1,039,966	51,739	11,216,283
2016	11,403,051	1,128,714	51,693	12,583,458
2017	--	--	--	13,970,000

Source: Zhejiang province national economy and social development statistical bulletin, 2008-2017

Highways Passenger and Cargo Volumes

Table 2-4 Highways Passenger and Cargo Volumes in Zhejiang Province

Year	Passengers (10,000)	Passenger Turnover (100 million passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover （100 million ton-km）
2008	206111	821.57	91625	1114.50
2009	210584	853.63	95802	1188.70
2010	215708	882.04	103394	1298.71
2011	218415	908.15	108654	1434.82
2012	220517	921.18	113393	1525.59
2013	121185	582.99	107186	1322.13
2014	112915	558.06	117070	1419.43
2015	92304	544.76	122547	1513.92
2016	83033	465.12	133999	1626.78
2017	80579	431.56	151964	1821.21

Source：Zhejiang province statistical yearbook 2017, Zhejiang province national economy and social development statistical bulletin 2017

Note：2013 data based on new approach

Port Cargo Throughput in Zhejiang Province

Table 2-5 Port Cargo Throughput in Zhejiang Province

Year	Port (10,000 tons)	Inland Port (10,000 tons)	Container Throughput (10,000 standard units)
2008	64518	31120	1129.01
2009	71462	32282	1110.59
2010	78846	33941	1388.76
2011	86700	35673	1563.27
2012	92760	39171	1709.08
2013	100591	37459	1852.09
2014	108177	30894	2061.41
2015	109930	28206	2176.76
2016	114202	26664	2276.04
2017	130000	30000	2686.27

Source：Zhejiang province statistical yearbook 2017, Zhejiang province national economy and social development statistical bulletin 2017
Note: Container throughput is based on the total container throughput of Ningbo-Zhoushan Port, Wenzhou Port, Taizhou Port and Jiaxing Port

2.1.2 Socio-economic Development in Hangzhou City

Hangzhou is located in the southeast sector of China, the northern part of Zhejiang Province, the northern bank of the lower reaches of the Qiantang River, the southern end of the Beijing-Hangzhou Grand Canal, and the provincial capital of Zhejiang Province. It occupies an area of 16,596 square kilometers. Hangzhou is a pivotal city for national communications, e-commerce, e-government and digital TV, as well as a national software and an integrated circuit design industrialization base. Hangzhou is committed to building a "Binjiang Paradise Silicon Valley". The high-tech industry, led by information on new medicine, environmental protection and new green materials, has generated a good momentum of development and has become a major advantage of Hangzhou. The main social and economic data of Hangzhou are shown in Table 2-6 - Table 2-9.

Population in Hangzhou City

Table 2-6 Historical Resident Population in Hangzhou City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	796.60	810.00	689.12	873.80	880.20	884.40	889.20	901.80	918.80	946.80

Source: Hangzhou national economy and social development statistical bulletin, 2008-2017

Gross Domestic Product (GDP) in Hangzhou City

Table 2-7 Historical GDP in Hangzhou City

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP Per Capita (RMB)
2008	4788.97	11.0%	179.83	2372.58	2236.56	58862
2009	5111.40	10.0%	190.51	2365.76	2555.13	61821
2010	5965.71	12.0%	208.41	2819.81	2937.49	70024
2011	7037.28	10.1%	236.77	3280.52	3519.99	80689
2012	7833.62	9.0%	255.11	3500.13	4078.37	89323
2013	8398.58	8.0%	261.60	3574.25	4562.73	95190
2014	9206.16	8.2%	274.35	3845.58	5086.24	103813
2015	10050.21	10.2%	287.95	3909.01	5853.25	112230
2016	11313.72	9.6%	304.21	4120.93	6888.59	124286
2017	12556.00	8.0%	312.00	4387.00	7857.00	134607

Source：Hangzhou national economy and social development statistical bulletin, 2008-2017

Car Ownership in Hangzhou City

Table 2-8 Historical Car Ownership in Hangzhou City (Unit: Vehicles)

Year	Passenger Car	Trucks	Others	Total Vehicles
2008	682806	126892	12979	822677
2009	842384	140624	10011	993019
2010	1076983	155546	10558	1243087
2011	1313307	171039	11157	1495503
2012	1570099	179399	11503	1761001
2013	1860794	173227	11597	2045618
2014	1992112	180475	11413	2184000
2015	2056143	177674	10950	2244767
2016	2127393	202775	11368	2341536

Source：Hangzhou national economy and social development statistical bulletin, 2008-2017

Highways Passenger and Cargo Volumes in Hangzhou City

Table 2-9 Highways Passenger and Cargo Volumes in Hangzhou City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	25630	1257231	16822	740699
2009	26454	1316143	16536	1389556
2010	29671	1416057	19148	2153961
2011	30305	1522055	21755	2451057
2012	31126	1590435	23243	2643428
2013	30994	1566046	23884	2719204
2014	17431	1143750	23202	2760873
2015	16591	1078054	23800	3003728
2016	12282	936574	25194	3217983
2017	13019	--	29378	--

Source：Hangzhou national economy and social development statistical bulletin, 2008-2017
Note: 2014 data based on new approach.

2.1.3 Socio-economic Development in Ningbo City

Ningbo City is located in the middle section of China's coastline and the southern wing of the Yangtze River Delta. The Zhoushan Islands in the east are natural barriers, with Hangzhou Bay in the north, Shaoxing in the west (Zhangzhou, Xinchang and Shangyu), Sanmen Bay in the south. It also connects with Sanmen and Tiantai in Taizhou. It has jurisdiction over 5 districts including Haitang, Jiangbei, Zhenhai, Beilun and Zhangzhou, 2 counties in Ninghai and Xiangshan, and 3 county-level cities in Cixi, Yuyao and Fenghua. Ningbo is the economic center and chemical industrial base of the south sector of the Yangtze River Delta. It is an industrial and commercial city in East China and one of the economic centers of Zhejiang Province. Since the opening of economic developments in China, industry and commerce have always been the mainstray of Ningbo. Ningbo's economy has continued to develop rapidly, showing great vitality and potential, and has become one of the most active regions in the national economy. The main social and economic data of Ningbo City were shown in Table 2-10 to Table 2-13.

Population in Ningbo City

Table 2-10 Historical Resident Population in Ningbo City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	715.6	727.5	760.6	762.8	763.9	766.3	781.1	782.5	787.5	800.5

Source: Ningbo national economy and social development statistical bulletin, 2008-2017

Gross Domestic Product (GDP) in Ningbo City

Table 2-11 Historical GDP in Ningbo City

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP per Capita (RMB)
2008	3946.52	10.3%	166.85	2190.78	1588.89	55616
2009	4334.33	8.7%	183.53	2356.68	1794.12	60070
2010	5181.00	13.0%	219.13	2856.74	2105.13	69610
2011	6074.94	10.3%	255.23	3315.76	2503.95	79730
2012	6601.21	7.5%	268.51	3475.08	2857.62	86477
2013	7164.51	8.1%	272.06	3680.97	3211.48	93641
2014	7610.28	7.6%	275.7	3980.41	3354.17	98362
2015	8003.61	8.0%	284.68	4098.22	3620.71	102374
2016	8686.49	7.1%	302.06	4455.33	3929.1	110656
2017	9846.90	7.8%	314.1	5105.5	4427.3	124017

Source：Ningbo national economy and social development statistical bulletin, 2008-2017

Car Ownership in Ningbo City

Table 2-12 Historical Car Ownership in Ningbo City (Unit: Vehicles)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Car Ownership (veh)	578,539	655,113	877,434	1,058,900	1,232,485	1,420,578	1,597,218	1,803,652	2,379,915

Source: Zhejiang 2017 Census Statistics

Highways Passenger and Cargo Volumes

Table 2-13 Highways Passenger and Cargo Volumes in Ningbo City

Year	Passengers (10,000)	Passenger Turnover (100 million passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	30130	1232691	13550	856713
2009	31545	1242710	15594	1351300
2010	32340	1360600	16220	2465250
2011	25960	1382100	15280	2815110
2012	26285	1430930	16570	3025860
2013	22850	1242030	17790	3254460
2014	12144	779567	21918	3355532
2015	9430	649976	22906	3677986
2016	4813	552732	25635	3952549
2017	4302	--	29000	4317000

Source: Ningbo 2017 Census Statistics, Source：Ningbo national economy and social development statistical bulletin, 2008-2017
Note: 2014 data based on new approach.

2.1.4 Socio-economic Development in Shaoxing City

Shaoxing City is located in the north central part of Zhejiang Province and the southern bank of Hangzhou Bay. It is adjacent to Ningbo City in the east and Hangzhou City in the west. It faces the Jiaxing City across the Qiantang River and has a total area of 8,279 square kilometers. At the end of 2017, the city's permanent resident population was 5.01 million, and the per capita GDP was 102,200 RMB, ranking fourth in Zhejiang Province. The main social and economic data of Shaoxing City were shown in Tables 2-14 to 2-17.

Population in Shaoxing City

Table 2-14 Historical Population in Shaoxing City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	437.06	437.74	438.91	440.01	440.84	441.66	443.04	443.11	444.53	501.0

Source: 2017 Shaoxing Census Statistics, Shaoxing national economy and social development statistical bulletin, 2008-2017

Gross Domestic Product (GDP) in Shaoxing City

Table 2-15 Historical GDP in Shaoxing City

Year	GDP (RMB 100 million)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP per Capita (RMB)
2008	2230.20	12.7%	116.19	1310.84	803.17	51075
2009	2375.78	2.01%	124.46	1361.12	890.20	54316
2010	2800.40	17.8%	149.67	1570.38	1080.36	63889
2011	3336.06	19.1%	172.10	1834.25	1329.72	75913
2012	3660.40	9.72%	184.80	1963.11	1512.48	83111
2013	3987.13	8.92%	191.14	2097.58	1698.40	90361
2014	4265.88	6.99%	194.28	2213.48	1858.11	96437
2015	4465.97	4.69%	198.94	2252.87	2014.15	100796
2016	4789.03	7.23%	207.66	2398.27	2183.11	107905
2017	5108.00	7.10%	207.00	2491.00	2410.00	102200

Source: 2017 Shaoxing Census Statistics, Shaoxing national economy and social development statistical bulletin, 2008-2017

Car Ownership in Shaoxing City

Table 2-16 Historical Car Ownership in Shaoxing City (Unit: Vehicles)

Year	Passenger Cars	Trucks	Others	Total Vehicles
2008	234555	42066	3253	279874
2009	293009	47726	2723	343458
2010	375771	56172	2866	434809
2011	460365	62629	2920	525914
2012	555894	69107	3031	628032
2013	659548	77201	3213	739962
2014	774754	76861	3066	850681
2015	896990	70952	2892	970834
2016	1021947	78220	2741	1132908

Year	Passenger Cars	Trucks	Others	Total Vehicles
2017	--	--	--	1240000

Source: 2017 Shaoxing Census Statistics, Shaoxing national economy and social development statistical bulletin, 2008-2017

Highways Passenger and Cargo Volumes in Shaoxing City

Table 2-17 Highways Passenger and Cargo Volumes in Shaoxing City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	16279	549076	10235	361802
2009	17025	452445	7612	673793
2010	17314	458779	7890	707482
2011	17328	475100	7694	784353
2012	17414	479693	8051	819204
2013	17441	495573	8560	877218
2014	9721	368086	10091	818443
2015	9899	343888	10866	880876
2016	2957	307914	11134	878421
2017	2805	294600	12056	910000

Source: 2017 Shaoxing Census Statistics, Shaoxing national economy and social development statistical bulletin, 2008-2017
Note: The statistics of passenger traffic volume in 2009, 2014 and 2016 varied.

2.1.5 Socio-economic Development in Zhoushan City

Zhoushan City, a city under the Provincial jurisdiction, is located in the north-eastern part of Zhejiang Province, east to the East China Sea and west to Hangzhou Bay. It is the maritime gateway of the Yangtze River Delta and the core city of the Dawan District of Hangzhou Bay. The main social and economic data of Zhoushan City were shown in Table 2-18 to Table 2-22.

Population in Zhoushan City

Table 2-18 Historical Population in Zhoushan City

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population (10,000)	105.4	106.3	112.13	96.99	114.0	114.2`	114.6	115.2	115.8	116.8

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

Gross Domestic Product (GDP) in Zhoushan City

Table 2-19 Historical GDP in Zhoushan City

Year	GDP (RMB 10,000)	Growth	Primary Industry	Secondary Industry	Tertiary Industry	GDP per Capita (RMB)
2008	490.25	14.5%	49.18	225.44	214.63	46936
2009	536.35	11%	52.23	241.31	2427.93	55106
2010	645.10	11.1%	62.02	292.04	2910.30	65458
2011	773.79	11.3%	76.03	348.06	3496.86	67774
2012	855.47	10.2%	83.05	380.47	3919.44	74831
2013	933.52	8.5%	955.41	389.37	4487.37	81582
2014	1015.25	10.2%	100.89	425.26	4890.09	89306
2015	1092.84	9.2%	111.00	449.63	5322.07	95272
2016	1241.19	11.3%	126.70	510.04	604.44	106364
2017	1219	8.8%	143	444	632	103811

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

Car Ownership in Zhoushan City

Table 2-20 Historical Car Ownership in Zhoushan City

Year	Passenger Cars	Trucks	Others	Total Vehicles
2008	24895	8901	5682	39478
2009	32657	13051	3957	49665
2010	44150	15109	4698	63957
2011	56060	16442	4863	77365
2012	66787	17491	4993	89271
2013	79138	18371	3924	101433
2014	92524	15696	1832	110052
2015	107635	13204	985	121824

Year	Passenger Cars	Trucks	Others	Total Vehicles
2016	125546	13440	963	139949
2017	--	--	--	201000

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

Highway Passenger and Cargo Volumes

Table 2-21 Highway Passenger and Cargo Volumes in Zhoushan City

Year	Passengers (10,000)	Passenger Turnover (10,000 passenger-km)	Cargo Volume (10,000 tons)	Cargo Turnover (10,000 ton-km)
2008	7905	142539	2406	52121
2009	12715	183554	4115	847941
2010	12945	193671	4259	878467
2011	13299	200139	4417	968178
2012	13884	203011	4697	1055801
2013	3084	86155	5450	1091701
2014	2895	88987	5621	1120314
2015	2857	111164	6517	1193733
2016	2644	44914	7244	1305389
2017	2629	105000	8460	1501000

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

Port Cargo Throughput in Zhoushan City

Table 2-22 Zhoushan Port Cargo Throughput

Year	Port (10,000 tons)	Container Throughput (10,000 standard units)
2008	15862	8.7
2009	19300	8.0
2010	22084	14.3
2011	26054	20.7
2012	29099	50.3

Year	Port (10,000 tons)	Container Throughput (10,000 standard units)
2013	31387	57.7
2014	34700	74.9
2015	37925	80.2
2016	42590	87.0
2017	45782	104.1

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

Tourism Visitors in Zhoushan City

Table 2-23 Zhoushan Annual Tourism Visitors

Year	National Visitors (10,000 persons)	International Visitors (10,000 persons)	Total Visitors (10,000 persons)
2008	1495.28	21.20	1516.48
2009	1730.58	22.35	1752.93
2010	2113.32	25.68	2139.00
2011	2432.78	27.75	2460.53
2012	2739.97	31.05	2771.02
2013	3035.93	31.54	3067.47
2014	3366.38	31.58	3397.96
2015	3843.98	32.24	3876.22
2016	4576.69	33.92	4610.61
2017	5472.80	34.40	5507.20

Source: 2017 Zhoushan Census Statistics, Zhoushan national economy and social development statistical bulletin, 2008-2017

2.2 Historical Traffic Flow and Toll Revenue

2.2.1 Historic Traffic Analysis on Zhoushan Bridge

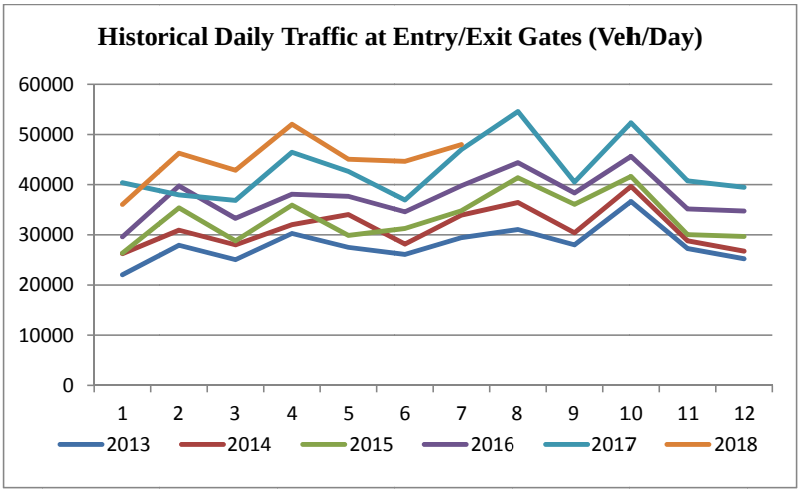
The Consultant collected the monthly traffic data for July 2013 to July 2018 from the Zhejiang Expressway Co. Ltd. Through analysis, it was found that the traffic volume of the project road has the following characteristics in the past five years:

- The traffic volume of the project road was mainly passenger cars, accounting for more than 80% of the total traffic usuage. Of the passenger cars, Class 1 accounted for more than 70%. This percentage of passenger cars is growing on a yearly basis. In terms of revenue, the most significant contributors (total of about 80%) were Passenger Car Class 1, Truck Class 1 and Truck Class 5.
- Based on the yearly distribution of traffic, it can be concluded that usage on the Zhoushan Bridge is seasonal, and the peak traffic usually occurs in August and October, of which most were tourism traffic. The prevailing government policy of eliminating tolls on public holidays has caused a significant loss of revenue for the Zhoushan Bridge.

The traffic growth at the 8 toll stations on the Zhoushan Bridge in the past years were shown in Figure 2-1.

Historical Traffic at Toll Entrances and Exits

Figure 2-1 Historical Daily Traffic at Entry/Exit Gates

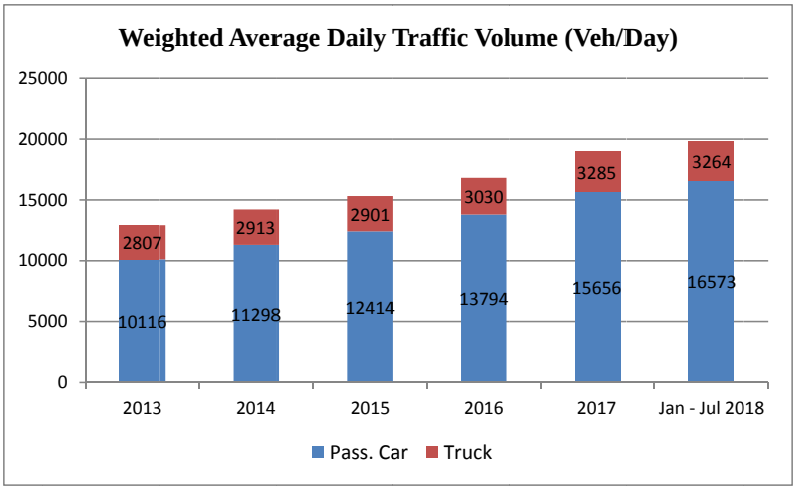


Source: Zhejiang Expressway Co. Ltd., 2018

Historical Section Traffic Volumes

According to the data collected from the Zhejiang Expressway Co. Ltd., the weighted average daily traffic volume of the project road from 2013 to 2018 was shown in Figure 2-2.

Figure 2-2 Weighted Average Daily Traffic Volume

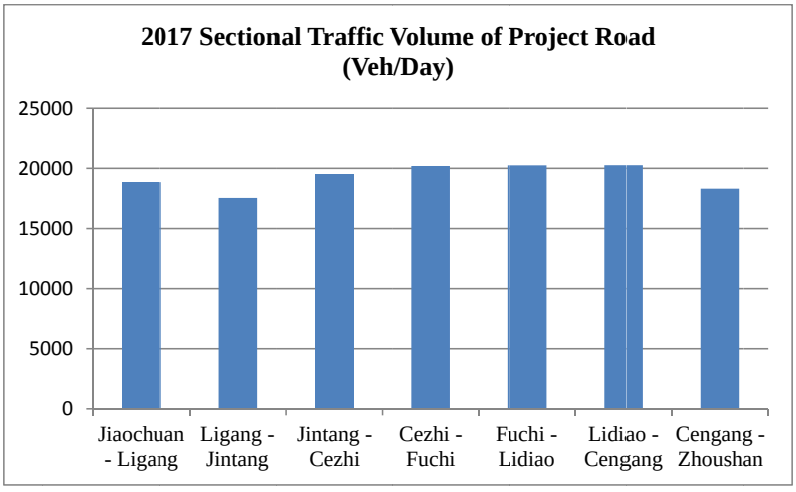


Source: Zhejiang Expressway Co. Ltd., 2018

Base Year Annual Traffic Volumes and Vehicle Classifications

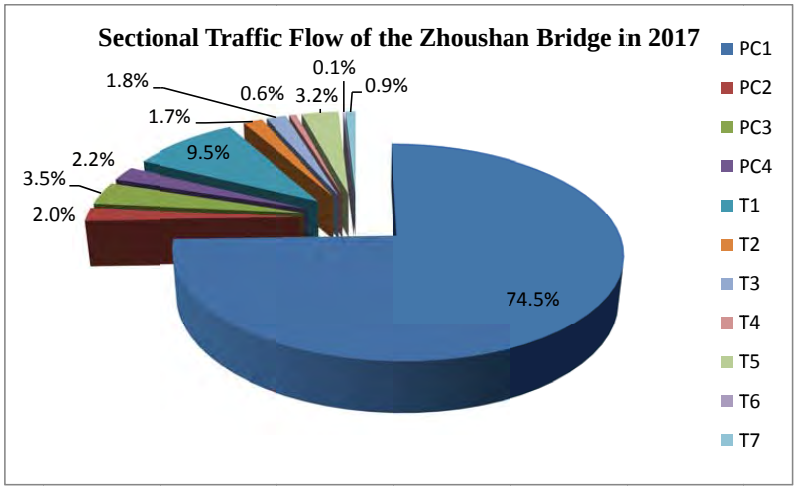
According to the data provided by Zhejiang Expressway Co. Ltd., the classifications and weighted average traffic volumes of the Zhoushan Bridge in 2017 were shown in Figure 2-3 and Figure 2-4. From the distribution of traffic volumes on the project road, the section traffic volumes were rather even. The maximum traffic volume happened on the section from Cezi to the port. The composition of the section traffic volume revealed that Passenger Car Class 1 (74.5%), Truck Class 5 (9.5%) and Bus Class 3 (3.5%) were the top 3 users.

Figure 2-3 Sectional Traffic volume of the Zhoushan Bridge in 2017



Source: Zhejiang Expressway Co. Ltd., 2018

Figure 2-4 Sectional Traffic Flow of the Zhoushan Bridge in 2017



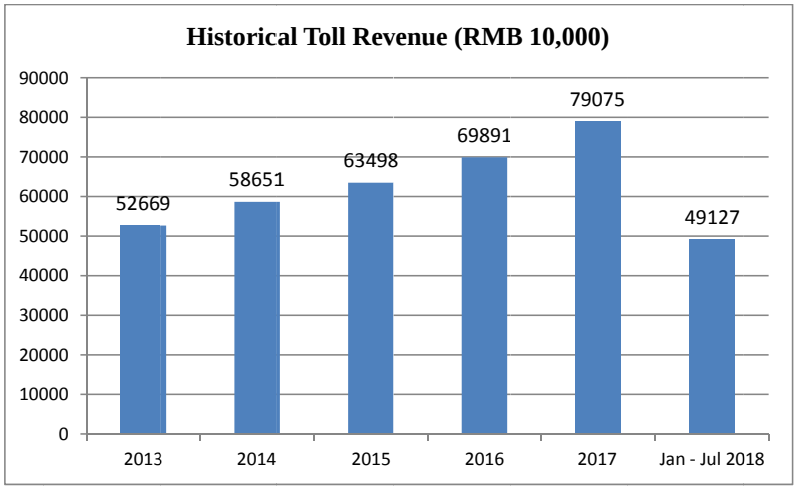
Source: Zhejiang Expressway Co. Ltd., 2018

2.2.2 Historical Toll Revenue Analysis for Zhoushan Bridge

Yearly Variations of Toll Revenue

The tolls of the Zhoushan Bridge have grown steadily over the past five years, with an average annual growth rate of 10.7% from 2013 to 2017 and an increase of 13.0% from January to July in 2018.

Figure 2-5 Yearly Variations of Toll Revenue of Zhoushan Bridge



Source: Zhejiang Expressway Co. Ltd., 2018

3 Socio-economic – Traffic Forecasting Model

This forecast study employs the four-stage model, commonly used in inter-city traffic studies. Building this type of mathematical model needs a lot of data and time that a normal medium or small city would need about half a year to a year. The general process of the model development is as follows:

- Trip generation: The main goal of this stage is to estimate the total productions of every zone by population and trip rates, and the total attractions by the weight of employment figures;
- To build O-D matrices based on the distribution function received from resident trip survey or large-scale home interview survey;
- Mode split: Calculating modal splits using binary or multinomial logit model;
- Trip Assignment: Trip assignment using generalized cost.

The advantages of this kind of model is that it can accurately reflect the impacts of land use and population changes to travel needs. The limitation is usually insufficient modeling time and planning data, especially in China.

Considering the mentioned limitations and different forecasting needs, a simplified four-stage model, which is commonly used in inter-city traffic studies, was employed. The major difference is that this model establishes traffic patterns and flows with a traffic survey which covers the study area and does not involve any modeling procedure or functions for mode split. Traffic surveys normally include OD survey and station to station data collection.

In short, the simplified four-stage model generates trips and establishes trip distribution with reference to traffic surveys. It then forms several single-mode trip matrices which are used in trip assignment process with a computer road network. Because the data for trip generation and distribution are mainly obtained from OD surveys or station-to-station records, detailed data examination and expansion procedures are required. Also, the verification of the computerized assignment model is another important factor of the forecasting accuracy.

The consultant has already built the highway network model for Zhejiang Province and the adjacent areas of Zhoushan City, in order to analyze future traffic needs for Zhoushan Bridge. This chapter gives a brief introduction of the traffic model.

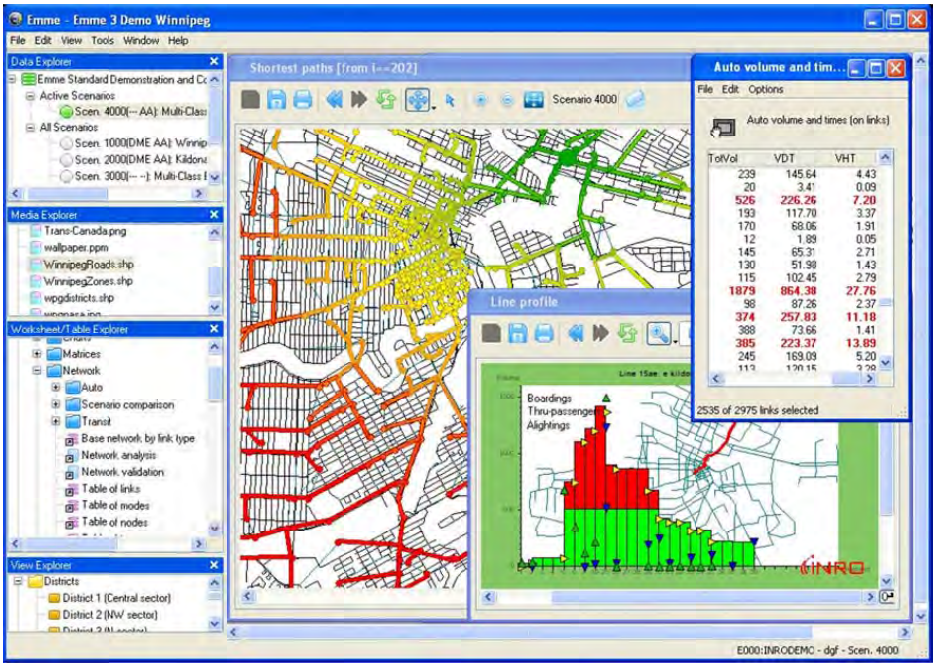
3.1 Traffic Software—EMME/3

EMME/3 is used to simulate current road network. As a renowned urban and regional transportation planning software, it provides a complete and flexible platform for travel demand modeling, network analysis and evaluation works. It was first introduced in 1976 by INRO. INRO was formerly known as the transport research center of Canada Montreal University. Currently, EMME/3 is deemed to be the leading software in the industry with over 600 organization users worldwide.

One of the reasons for the popularity of EMME/3 is that it allows the user to set up its own database and support quantitative analysis and evaluation with preset variations. The input data includes transport infrastructure (e.g. road network), economic activity,

social-economic characteristics, etc.

Figure 3-1 Model Components of EMME/3



Once the database is set up, the user can perform transport planning by utilizing the strong capability of the software including interactive data input, visual presentation of assignment results and precise traffic engineering calculations.

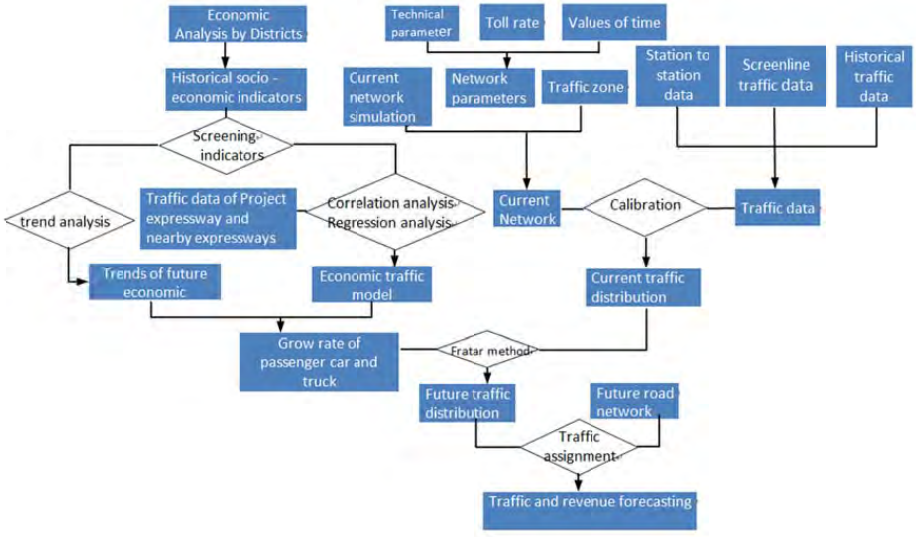
There are two main issues related to transport modeling: Transport demand and transport supply. Transport supply means the availability of road network. Transport demand is the quantity (i.e. OD matrices) determined by the demand module which is incorporated in the mentioned transport model. The “equilibrium” condition achieved during the modeling process means the demand side and the supply side are at the “balance” state that it can provide the traffic volume using the road facilities。

3.2 Technical Approach to Traffic Modeling

In order to accurately predict the future traffic volumes and revenue growth of the Zhoushan Bridge, the Consultant established a complex socio-economic-traffic model, which can be divided into two interrelated sub-models. They are:

- Economic Analysis Model: the driving factor for determining traffic growth;
- Traffic Forcasting Model: used to check and distribute traffic flow, analyze traffic diversion and inducement.

Figure 3-2 The Technical Approach to Traffic Demand Forecast



Source: Consultant, 2018

3.3 Economic Traffic Model Aanalysis

3.3.1 Economic Analysis Districts

In this study, the Consultant compared a number of socio-economic drivers to establish a more comprehensive economic-traffic model. Therefore, in the economic analysis, it will mainly include the following parts:

- Selection of Socio-Economic Indicators Related to Transportation;
- Correlation Between Economic Indicators and Traffic Growth and Regression Analysis;
- Analysis of the Elasticity Coefficient of the Economic Indicators and Traffic Growth
- Analysis of future growth trend of Economic Indicators.

In the study, it is necessary to conduct economic analysis on each of the Economic Analysis Zone (TAZ), to establish a regression model of TAZ traffic production and economic indicators, and to apply it to each TAZ. In consideration of 436 TAZs, the amount of data and analysis would be extremely difficult and time consuming. Therefore, the Consultant have aggregated these TAZs into 16 Superzones (Economic Analysis Zones), and analyzed their respective economic indicators. The Consultant collected the historical traffic volumes of the Zhoushan Bridge and the nearby expressways, and established a prediction model between traffic demands and the economic indicators of the areas closely related to the Zhoushan Bridge, namely the economic-traffic model. By substituting each TAZ's economic indicator growth forecast into the economic-traffic model. With the future forecasts on the economic indicators, the Consultant can predict the traffic growth of each TAZ's. The 16 Economic Analysis Zones were shown in Figure 3-3 and Table 3-1:

Figure 3-3 Economic Analysis Zones

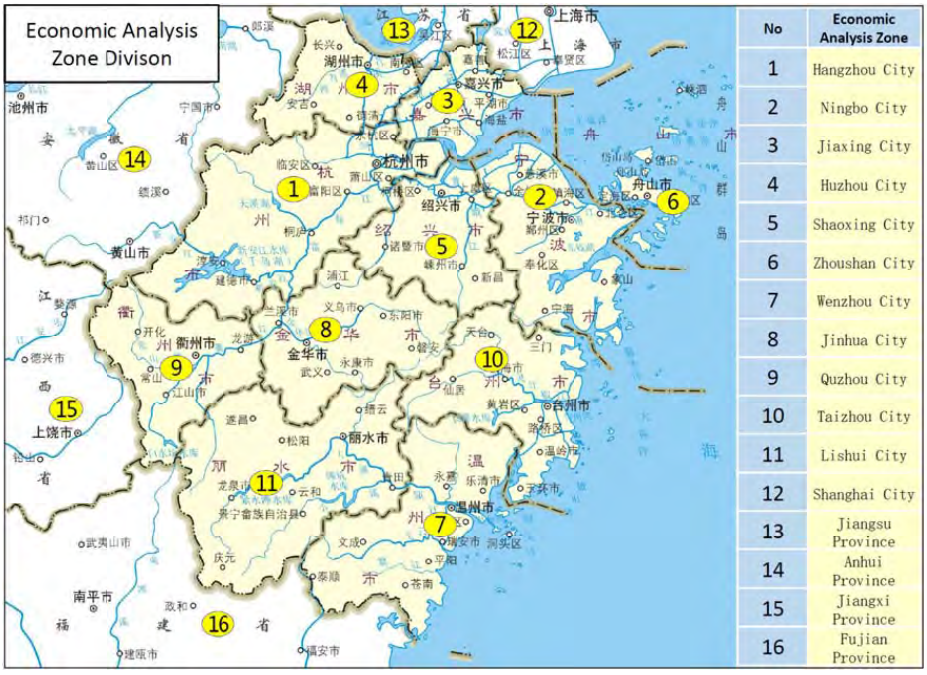


Table 3-1 Jurisdiction of Economic Analysis Zones

Superzone	Name	Jurisdiction
1	Hangzhou City	Hangzhou City and its counties
2	Ningbo City	Ningbo City and its counties
3	Jiaxing City	Jiaxing City and its counties
4	Huzhou City	Huzhou City and its counties
5	Shaoxing City	Shaoxing City and its counties
6	Zhoushan City	Zhoushan City and its counties
7	Wenzhou City	Wenzhou City and its counties
8	Jinhua City	Jinhua City and its counties
9	Quzhou City	Quzhou City and its counties
10	Taizhou City	Taizhou City and its counties
11	Lishui City	Lishui City and its counties
12	Shanghai City	Shanghai City and its counties
13	Jiangsu Province	Jiangsu Province and northern districts

Superzone	Name	Jurisdiction
14	Anhui Province	Anhui Province and northern districts
15	Jiangxi Province	Jiangxi Province and western districts
16	Fujian Province	Fujian Province and southern districts

Source: Consultant, 2018

3.3.2 Economic Indicators Analysis

The typical economic and traffic forecasting model uses the relationship developed between historic GDP and traffic demand to forecast future traffic generation. In order to be more comprehensive and scientific, the Consultant also investigated other economic parameters to develop more comprehensive economic-traffic correlations.

In order to investigate the impacts of different district economic parameters on traffic growth (passenger cars and trucks) of various vehicle types, the historic traffic data by vehicle types at the toll station locations and the historic variations of economic parameters were closely studied. The selected economic parameters were also prioritized before they were subjected to correlation and regression analyses (note: In the selection of the indicators, attention was also paid to the difficulty of obtaining the related data in each region):

- Passenger car Classes 1 & 2 were basically small vehicles that are owned by individuals or units. Finally, the most relevant indicator for their growth was selected: Passenger Car Ownership.
- Passenger car Classes 3 & 4 were basically for inter-city passenger travel or tourist trips. Finally, the most relevant indicator for their growth was selected: Road Passenger Travel
- Truck Classes 1-5 were basically self-used or for transport of bulk cargo goods. They have more relevant relationship with economic activities, product production and transport circulation. Finally, the most relevant indicator for their growth was selected: GDP.
- Truck Classes 6 & 7 are container trucks, which are mainly used for import and export trade transportation. Finally, the most relevant indicator for their growth was selected: Port Container Throughput.

After determining the relevant economic indicators for the growth of various vehicle classes, the elasticity analysis of passenger and freight demand against economic growth was carried out. Finally the economy-traffic growth model was developed.

$$Y_n = b \cdot (a \cdot X_1 + c)$$

Note: Dependent variable Y_n – traffic growths at different areas;

Independent variable X_1 - Historic growth pattern of socio-economic parameters at Project Road influenced areas;

a ,c - regression coefficient;

b – correlation factor between time value and traffic volume.

Through the regression analysis, the values of various coefficients in the economic-traffic model were determined as follows:

Table 3-2 Traffic Model Growth Parameters

Vehicle Class	a	X_1	c	b
Passenger Car 1 - 2	0.783, 0.25	Passenger Car Ownership, Tourism Visitors	0.0189	0.85-0.90
Passenger Car 3 - 4	0.1366	Road Passenger Travel	0.0119	0.85-0.90
Truck 1 - 2	0.675	GDP	0.0129	0.85-0.90
Truck 3 - 5	1.655	GDP	0.0009	0.85-0.90
Truck 6 - 7	1.017	Port Container Throughput	0.0014	0.85-0.90

Source: Consultant, 2018

3.3.3 Future Time Elasticity Coefficient Assumptions

Based on foreign and domestic experience, the time adjustment factors of economic and traffic parameters would remain relatively stable in the coming 3-5 years. When the economy of society is low, transportation demand would increase and hence economic growth would be more dependent on transportation services. Thus, the time adjustment factors would be relatively high. On the contrary, the time adjustment factors would diminish when the economy prospers to a certain level. The main reason for the decline is that rapid growth of high tech industries and tertiary industries would normally go hand in hand with overall economic growth, this would likely reduce the dependence on transportation needs. This will in turn result in a slower transport demand which offsets the persistent need for transport services.

Through more than ten years of relevant working experience in mainland China, the Consultant completed the traffic volume forecasting of many toll roads in provinces such as Zhejiang, Northeast, Tianjin, Hebei, Jiangsu, Jiangxi, Guangdong, Sichuan, Shanghai, Anhui, etc. In particular, the Consultant has been actively involved in traffic volume and revenue forecasting of numerous toll roads in the Zhejiang Province. From the completed toll road studies, the Consultant attained data on traffic growth rates and GDP growth. It can be concluded that the future time elasticity coefficient will be basically between "0.50-0.95".

The time adjustment factors of the Zhoushan Bridge in the coming years were shown in Table 3-3.

Table 3-3 Future Time Adjustment Factors

Vehicle Classes	2018-2020	2021-2025	2026-2030	2031-2035
Passenger Car 1 - 2	0.90	0.90	0.85	0.85
Passenger Car 3 - 4	0.90	0.90	0.85	0.85
Truck 1 - 2	0.90	0.90	0.85	0.85

Vehicle Classes	2018-2020	2021-2025	2026-2030	2031-2035
Truck 3 - 5	0.90	0.90	0.85	0.85
Truck 6 - 7	0.90	0.90	0.85	0.85

Source: Consultant, 2018

3.3.4 Future Development and Trends of Economic Indicators

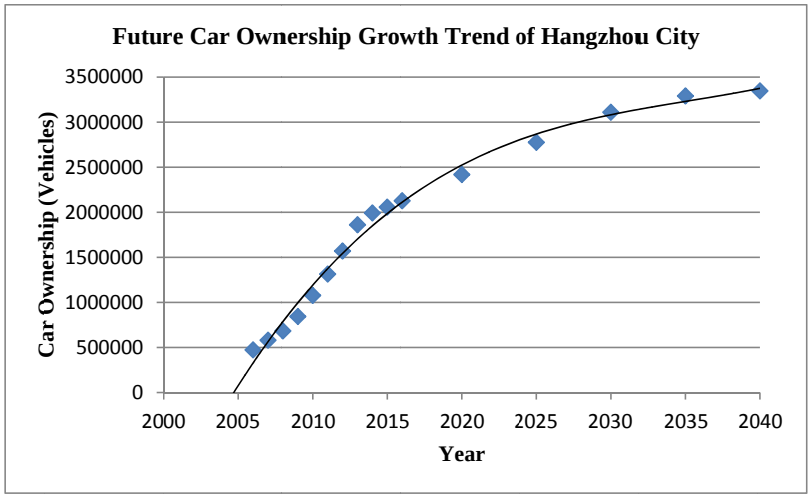
In general, it is difficult to predict the future growth pattern of economic parameters. It may be unreasonable to adopt a uniform trend for all the economic parameters. Consequently, we determined the future trends of the parameters based on the following considerations:

- Understand historic growth trend based on collection and assessment of historic data;
- "Thirteenth Five-Year Plan": Refer to the goals and requirements for future growth in the plan;
- Urban Master Plans: Refer to the goals and requirements for future growth in relevant Master Plans;
- Compare experience on international and domestic urban city development process around the world. Study the changes in the economic parameter values for various phases of successful cities in developing countries.
- Current and future planning guidelines of other industries were also referenced.

The future trends of the selected economic indicators of each TAZ is mainly based on the economic development goals and objectives of the 13th Five-Year Plan. The future economic development trends are expected to reflect the economic growth patterns, development policies and the overall growth of the indicators in the next five years. In summary, the indicator growth rates are normally used as control points for future development trends.

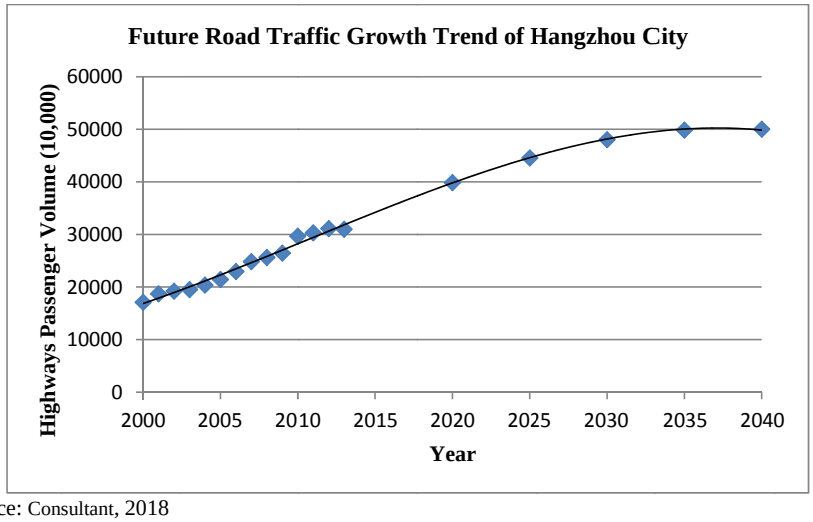
The understanding of the historic development, the future development patterns of each city based on the "13th Five-Year Plan", and the guidelines of local Master Plans, the annual average growth rates of the GDP could be predicted. In the Zhejiang Province for the next 5 years, the GDP growth is expected to be between 7%-10%. A more stable future economic development trend will likely replace the more rapid growth in the past. Figure 3-4 to Figure 3-7 present the economic indicators of Hangzhou and the growth trend of container throughput of the Ningbo-Zhoushan Port, respectively. The economic analysis of other sub-districts is quite similar. In the future forecasting of economic growth trends, the Consultant has considered the various domestic growth development patterns of individual districts in recent years.

Figure 3-4 Future Car Ownership Growth Trend of Hangzhou City



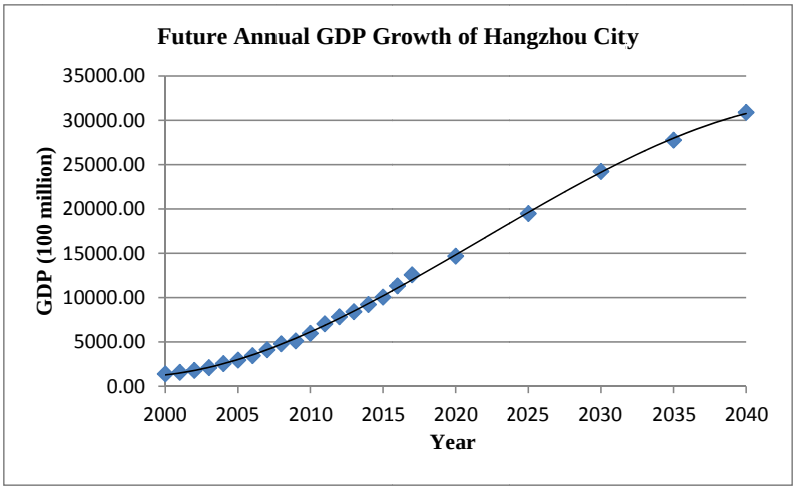
Source: Consultant, 2018

Figure 3-5 Future Road Traffic Growth Trend of Hangzhou City



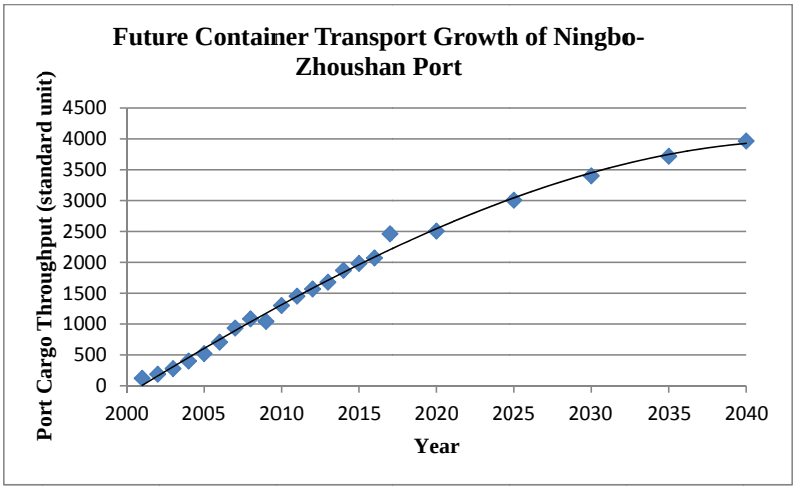
Source: Consultant, 2018

Figure 3-6 Future Annual GDP Growth of Hangzhou City



Source: Consultant, 2018

Figure 3-7 Future Container Transport Growth of Ningbo-Zhoushan Port



Source: Consultant, 2018

Through the above various planning and reference basis, the control values of the future growth trends of economic indicator values were determined, and combined with results of the regression analysis (trending curve) of the historical data of each economic analysis zone, the growths of future economic indicators of the 16 superzones were summarized in Table 3-4. Applying these increases to the previously developed economic-traffic model, the future annual traffic growth rates for each corresponding TAZ were calculated.

Table 3-4 Future Car Ownership Growth Trends of Economic Analysis Zones

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	3.5%	3.0%	2.0%	1.5%
Ningbo City	9.0%	3.0%	2.0%	1.5%
Jiaxing City	9.0%	6.0%	4.0%	2.5%
Huzhou City	9.0%	5.5%	3.5%	2.5%
Shaoxing City	9.0%	5.5%	3.5%	2.5%
Shaoshan City	11.0%	8.0%	6.0%	4.0%
Wenzhou City	9.0%	6.0%	4.0%	3.0%
Jinhua City	9.0%	5.5%	3.5%	2.5%
Quzhou City	11.0%	8.0%	6.0%	4.0%
Taizhou City	9.0%	5.5%	3.5%	2.5%
Lishui City	9.0%	6.0%	4.0%	2.5%
Shanghai City	9.0%	6.0%	4.0%	2.5%
Jiansu Province	9.0%	6.0%	4.0%	2.5%
Anhui Province	14.0%	10.0%	7.0%	4.5%
Jianxi Province	13.0%	9.0%	6.0%	4.0%
Fujian Province	12.0%	8.0%	5.0%	3.5%

Source: Consultant, 2018

Note: With reference to the more developed cities in the world, the average passenger car per capita should not exceed 0.4 vehicles/person. Therefore, it is assumed that the growth will be limited to 0.3 vehicles/person, and the maximum is no more than 0.4 vehicles/person by the end of the forecast period.

Table 3-5 Future Road Traffic Growth Trends of Economic Analysis Zones

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	4.0%	2.0%	1.0%	0.5%
Ningbo City	9.0%	6.0%	3.0%	1.5%
Jiaxing City	4.0%	2.0%	1.0%	0.5%
Huzhou City	1.0%	0.0%	0.0%	0.0%

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Shaoxing City	0.0%	0.0%	0.0%	0.0%
Zhoushan City	3.0%	2.0%	1.0%	0.5%
Wenzhou City	4.0%	3.0%	2.0%	1.0%
Jinhua City	4.0%	3.0%	2.0%	1.0%
Quzhou City	6.0%	4.0%	2.5%	1.5%
Taizhou City	4.0%	3.0%	2.0%	1.0%
Lishui City	1.0%	0.0%	0.0%	0.0%
Shanghai City	3.0%	2.0%	1.0%	0.5%
Jiangsu Province	1.0%	0.0%	0.0%	0.0%
Anhui Province	2.0%	1.0%	0.0%	0.0%
Jianxi Province	4.0%	3.0%	2.0%	1.0%
Fujian Province	5.0%	3.5%	2.5%	1.5%

Source: Consultant, 2018

Table 3-6 Future GDP Growth Trends of Economic Analysis Zones

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Hangzhou City	7.5%	6.0%	4.5%	3.5%
Ningbo City	7.5%	6.0%	4.5%	3.5%
Jiaxing City	7.0%	5.5%	4.0%	3.0%
Huzhou City	8.0%	6.5%	5.5%	4.0%
Shaoxing City	7.5%	6.0%	4.5%	3.5%
Zhoushan City	10.0%	8.0%	6.0%	4.5%
Wenzhou City	7.0%	5.5%	4.0%	3.0%
Jinhua city	7.5%	6.0%	4.5%	3.5%
Quzhou City	7.0%	5.5%	4.0%	3.0%
Taizhou City	7.0%	5.5%	4.0%	3.0%

Economic Analysis Zone	2018-2020	2021-2025	2026-2030	2031-2035
Lishui City	7.5%	6.0%	4.5%	3.5%
Shanghai City	6.5%	5.0%	3.5%	3.0%
Jiangsu Province	7.5%	6.0%	4.5%	3.0%
Anhui Province	8.5%	6.5%	5.0%	3.5%
Jinagxi Province	8.5%	6.5%	5.0%	3.5%
Fujian Province	8.5%	6.5%	5.0%	3.5%

Source: Consultant, 2018

Table 3-7 Future Container Transport Growth Trends of Ports

Area	2018-2020	2021-2025	2026-2030	2031-2035
Ningbo Port	6.0%	4.0%	3.0%	2.0%
Wenzhou port	14.5%	8.0%	5.0%	3.0%
Taizhou Port	10.0%	6.5%	4.5%	2.5%
Jiaxing Port	8.0%	5.5%	3.5%	2.0%
Shanghai Port	3.0%	2.0%	1.0%	0.5%
Zhoushan Port	10.0%	6.5%	4.5%	3.0%

Source: Consultant, 2018

In addition to the conventional economic factors, most of the Passenger Car Classes 1 & 2 traffic on the Zhoushan Bridge were tourist traffic. When considering the traffic growth in the coming years, it is necessary to consider the tourist traffic activities for the regional area where Zhoushan is located. According to the "13th Five-Year Plan" of tourism in Zhoushan City: By 2020, the number of domestic and foreign tourists will exceed 80 million, so the annual growth rate is expected to be 13.5% from 2018 to 2020, and every next 5 years will experience an reduction of 2%. Assuming an average of 5 people per vehicle, the growth rate of traffic volume will be about 1/5 of the growth rate of tourists.

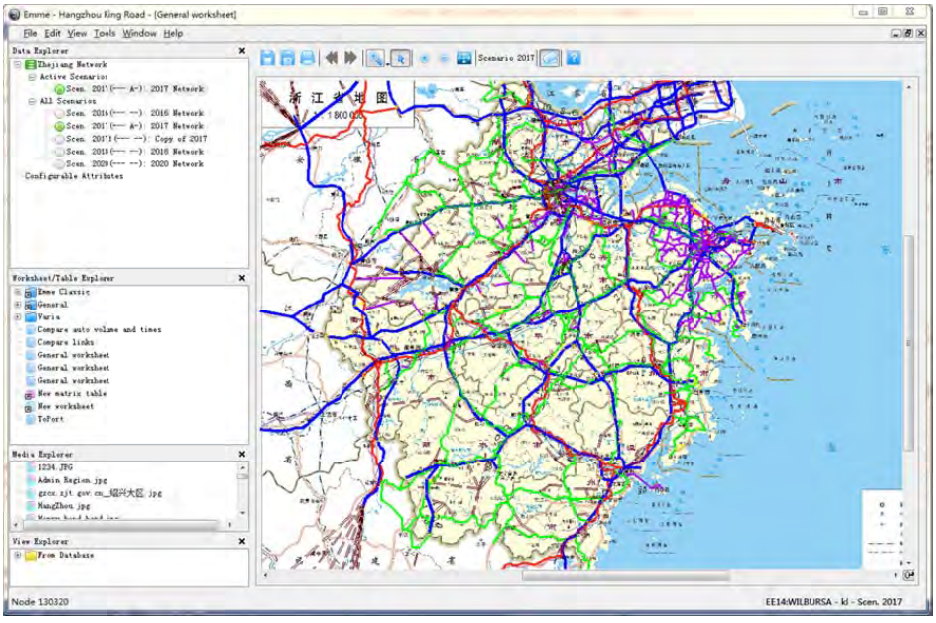
3.4 Traffic Forecasting Model Development

3.4.1 Road Network

In the base year road network development process, the Consultant made use of the existing Zhejiang road network data in the highway toll clearance system, the provincial expressway network map and the Zhejiang future expressway plan as building blocks to develop the highway supply model which was later coded into EMME/3. All major highway facilities were included in the EMME/3 network, including expressways and national highways.

All the major highways in the network would include characteristics such as speed, capacity, distance and levels of operation (expressed in delays and cost indices). The distances between stations in the road network were based on the data in the current toll system. As for the the locations and distances of the national and provincial roads, the Consultant referred to the 2017 Zhejiang Province Road Map for verification purposes. Figure 3-8 shows the EMME/3 Road Network for this Study.

Figure 3-8 Highway Network of Zhejiang Province



Source: Consultant, 2018

3.4.2 Volume Delay Functions

Travel time is usually derived directly from speed which in turn would be influenced by level of congestion on the road. As a popular expressway, the project highway has a relatively high degree of congestion. To estimate future travel speed under continuous traffic growth, the use of a "capacity constrained" assignment model would be necessary. The resultant travel volumes and levels of service were stored in the data bank. The Volume Delay Function (VDF) used in the study model could be represented as:

$$VDF = Len*[60/Sf+A*(V/C-R1)+B*(V/C-R2)]$$

Note： VDF = Volume Delay Functions
Len = Distance
Sf = Free Flow Speed
V/C = Volume to Capacity Ratio
R1，R2 = Volume to Capacity Ratio Coeff
A，B = Model Coefficient

3.4.3 Passenger Car Unit (PCU)

All types of vehicles were converted into equivalent “passenger car units (PCU)” before they were taken into account in the forecasting model. The PCU conversion factors used by the Consultant in this study were summarised in Table 3-8.

Table 3-8 Passenger Car Unit

Type	Number	Description	Conversion Factor
Passenger Car	1	Passenger Car 1	1.0
	2	Passenger Car 2	1.0
	3	Passenger Car 3	1.5
	4	Passenger Car 4	1.5
Truck	5	Truck 1	1.0
	6	Truck 2	1.5
	7	Truck 3	2.5
	8	Truck 4	2.5
	9	Truck 5	4.0
	10	Truck 6	2.5
	11	Truck 7	4.0

Source：Highway Engineering Design Standards (JTG B01-2014)，2018

3.4.4 Toll Rates Assumptions

According to the "Notice on the provisional expressway toll charges on actual distances travelled in Zhejiang Province", the road users on the provincial expressways after May 15, 2012, will be charged according to the actual travelled distances. After May 15 2015, the provincial notice of “No-stop charging guidelines based on distance travelled on provincial expressways”, vehicle with ETC have also been charged based

on the travelled distances. In the Traffic Model of this study, the Consultant assumed that the future will retain the same charges as the latest rates in Zhejiang Province. The specific charging standards were shown in Tables 3-9 and 3-10 below.

Table 3-9 Toll Charge Rates by Vehicle Types

Class	Passenger Car	Veh Rate (RMB/veh)	Distance Rate (RMB/veh-km)	Truck	Veh Rate (RMB/veh)	Distance Rate (RMB/veh-km)
1	≤7 seats	5	0.4	≤2 ton	5	0.4
2	8-19seats	5	0.4	2-5 ton（include）	10	0.8
3	20-39seats	10	0.8	5-10 ton（include）	15	1.2
4	≥40seats	15	1.2	10-15 ton（include）	15	1.4
5				＞15 ton	20	1.6

Source: Zhejiang Expressway Co. Ltd, 2018

Table 3-10 Truck Toll Charge Rates by Vehicle Weight

Truck Loading		Tolling Charges
Legal Loading	less than 5ton（include）	0.09 RMB/ton-km (charged as 5 ton)
	5 ton to 15ton（include）	0.09 RMB/ton-km
	15 ton to 30 ton（include）	0.09 RMB/ton-kmlinear reduction up to 0.06 RMB/ton-km
	more than 30 ton	charged as 30 ton
Over-Loading	over-load less than 10%	charged as legal loading
	over-load less than 30% (include 30%）	the weight exceeding the 10% over-load will be charged at 0.09 RMB/ton-km ×1.2，the remaining weight will be charged as “over-load less than 10%”
	over-load between 30%-50%（include 50%）	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×2，the remaining weight will be charged as “over-load less than 30%”
	over-load between 50%-100%（include 100%）	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×3，the remaining weight will be charged as “over-load less than 30%”
	over-load more than 100%	the weight exceeding the 30% over-load will be charged at 0.09 RMB/ton-km ×4，the remaining weight will be charged as “over-load less than 30%”

Source: Zhejiang Expressway Co. Ltd, 2018

In view of the special characteristics of the Zhoushan Bridge, the charging scheme is still based on the station – station rates by vehicle types as shown in Table 3-11 below.

Table 3-11 Zhoushan Bridge Station – Station Toll Rtaes (RMB)

Veh.Types 1 & 2	Jiaochuan	Lekgang	Jintang	Cezi	Fuchi	Lidiao	Cengang	Zhoushan
Jiaochuan		110	125	175	180	180	190	200
Lekgang	55							
Jintang	65			50	55	55	70	75
Cezi	90		25		5	5	20	25
Fuchi	90		30	5		5	5	20
Lidiao	90		30	5	5			
Cengang	95		35	10	5			
Zhoushan	100		35	10	10			

Veh.Types 3 & 4	Jiaochuan	Lekgang	Jintang	Cezi	Fuchi	Lidiao	Cengang	Zhoushan
Jiaochuan		195	215	305	315	315	335	345
Lekgang	165							
Jintang	185			90	95	100	125	130
Cezi	260		75		10	10	35	40
Fuchi	270		85	5		5	5	30
Lidiao	270		85	10	5			
Cengang	285		105	30	5			
Zhoushan	295		110	35	30			

Veh.Type 5	Jiaochuan	Lekgang	Jintang	Cezi	Fuchi	Lidiao	Cengang	Zhoushan
Jiaochuan								
Lekgang	225							
Jintang	250							
Cezi	350		100					
Fuchi	355		110	10				
Lidiao	360		115	10	5			
Cengang	380		145	40	5			
Zhoushan	395		145	45	40			

Toll Preferential Policies

- In line with the relevant provisions of the Road Traffic Safety Law and the rules for passengers not to stand, the tolls of public transport vehicles operated by the Zhoushan City and the rural passenger transport operators on the Zhoushan Bridge would be charged at 70% of the standard rates. This includes all vehicles travelling between Jintang, Cezi, Fuchi, Lidiao, Cengang and Zhoushan Districts.
- From January 1st, 2018 (tentatively set for one year), various time periods related concessions were imposed on the tolls of "unloaded" international standard container vehicles on the Jintang Bridge section, i.e.,Lekgang Toll Station and the Jintang Toll Station one-way to Jiaochuan Toll Station. The toll reduction is 50% of the standard toll charges and is applied to night time travel from 19:00 to 7:00 only. The exit time at the Jiaochuan Toll Station will prevail to determine the preferential treatment would be applicable.
- Vehicles, non-stopping with ETC device, will be charged at 97% of the standard rates;
- In accordance with the inspirations of the document "Zhejiang Jiaotong [2016] No. 411", the toll on the international standard container vehicles entering and leaving the Jintang and Lekgang toll stations on the Zhoushan Bridge are

charged at 25% of the standard rates. Similarily, the toll charges at the other 6 stations on the Zhoushan Bridge are discounted at 50% of the standard rates.

According to the toll exemption scheme announced on 24 July 2012, small passenger vehicles with no more than 7 seats and motocycles are exempted from toll charges on four important public holidays (i.e. Spring Festival, Tomb-sweeping Day, Labor Day and National Day). The roads included in the scheme are all toll roads in accordance with the China Highway Law and Code of Toll Road Management. In this study, the consultant will consider the impact of this toll exemption scheme and make appropriate adjustments in order to reach reasonable traffic and revenue forecasting results.

In order to assess the average number of days affected by this National holidays preferential scheme each year, the consultants referred to the "2012 Decision on Amending the National and Memorial Holidays" The durations of holidays are assumed as below:

- Spring Festival - 7 days
- Ching Ming Festival - 3 days
- Labor Day - 3 days
- National Day – 7days

There are totally 20 days for the four public holidays. This assumption was incorporated into the revenue calculations for the Zhoushan Bridge until the end of the toll concession period.

3.4.5 Future Road Network Assumptions

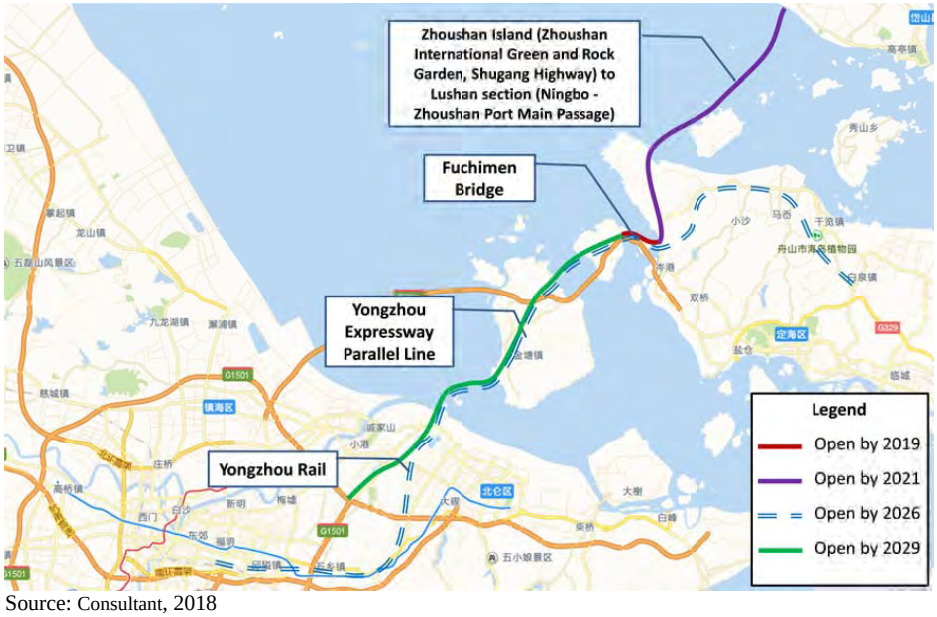
In order to analyze the impact of changes in the surrounding road network on the traffic flows of the Project road (induced or diverted), the Consultant collected the "13th Five-Year Plan" and the most recent expressway construction plans of the vicinity areas. The Consultant also reviewed the progress of the roads currently under construction and summarized the changes in the future road network in Zhejiang Province as shown in Table 3-12 and Figure 3-9.

Table 3-12 Future Road Network Construction Plan

No.	Expressway Description	Opening Year	Length (Km)	No. of Lanes	Design Speed (Km/h)
1	Fuchimen Bridge	End of 2019	2.01	4	80km/h
2	Zhoushan Island (Zhoushan International Green and Rock Garden, Shugang Highway) to Daishan section (Ningbo - Zhoushan Port Main Passage)	End of 2021	25.67	4	100km/h

No.	Expressway Description	Opening Year	Length (Km)	No. of Lanes	Design Speed (Km/h)
3	Yongzhou Bridge for Railway	End of 2026	80.805	Rail	250km/h
4	Yongzhou Expressway Parallel Line	End of 2029	37	4	100km/h

Figure 3-9 Future Highway Construction Plans



Source: Consultant, 2018

3.4.6 Road Capacity

Major factors that may affect the capacity of a highway include design standards (design speed), vehicle type composition, hourly distribution of daily traffic demands (peak hour factor) etc. The assumptions adopted for the planning and design of the Project road were: design speed of 100 km/hr, level of service C, capacity of 1600 pcu/lane/hr (Highway Engineering Technical Specifications – JTG B01-2014), peak hour factor of 6.15% (derived from survey data) and the average passenger car conversion factor of 1.627 pcu/veh (derived from survey data). The higher growth of the small passenger cars in the future in comparison to other vehicle types, will likely reduce the average conversion factor of the total traffic.

The capacity of the Project road could be estimated as:

$$1600 \text{ (pcu/lane/hr)} \times 4 \text{ (lanes)} \div 1.225 \text{ (pcu/veh)} \div 7.51\% = 69{,}567 \text{ (vehicles/day)}$$

Table 3-13 Expressway Levels of service and Maximum Capacity

Level of Service	Volume/Capacity (V/C)	Design Speed		
		120	100	80
		Maximum Capcity [pcu/(h•ln)]	Maximum Capcity [pcu/(h•ln)]	Maximum Capcity [pcu/(h•ln)]
A	V/C≤0.35	750	730	700
B	0.35<V/C≤0.55	1200	1150	1100
C	0.55<V/C≤0.75	1650	1600	1500
D	0.75<V/C≤0.90	1980	1850	1800
E	0.90<V/C≤1.00	2200	2100	2000
F	V/C>1.00	0~2200	0~2100	0~2000

Source : Highway Engineering Technical Specifications – JTG B01-2014

3.4.7 Trip Distribution

This Study adopted "Generalized Cost" as the factor to influence the decisions to select travel paths by the trip makers. It will arrive at a balanced trip distribution on the road network within the study area. The "generalized cost" includes all elements and factors (such as travel time, travel distance, vehicle operation cost and toll costs etc) that may affect the choice of travel paths of the car drivers. The "generalized cost" of a road section can be estimated as:

$$GCij = Tij + [Cij + Tolij]/ VOT$$

Note: GC_{ij} = Travel Generalized Cost

T_{ij} = Travel Time between TAZ_i to TAZ_j

C_{ij} = Travel Cost between TAZ_i and TAZ_j, such as vehicle operating cost.

Tol_{ij} = Toll Cost from TAZ_i and TAZ_j

VOT = Value of Time for different vehicle types

The distribution model used by the Consultant has taken into consideration of road users' willingness to pay certain travel costs and travelling speed/congestion levels on the Zhoushan Bridge in comparison to other competing toll roads. From the trip matrices, the trips between any two TAZs would be allocated to the path of the least generalized cost. Traffic assignment is an iterative process, in which every trip during an iteration would be assigned to the path of the least generalized cost. Generalized cost includes travel time, travel distance, toll charges and vehicle operation costs. For example: If there are 2 highways of the same class are included during certain iteration, the highway which carries the lower volume would be selected as the travel path. However, in subsequent iterations, these 2 highways may have different generalized costs which would then dictate which would be the more attractive path. This process

will be repetitive until traffic volumes on the competing highway facilities would reach an equilibrium condition.

3.5 Project Road OD Travel Pattern

After the traffic distribution of the OD matrices in Zhejiang Province, the future traffic demands between each pair of traffic zones using the Zhoushan Bridge could be determined. To facilitate easier understanding and summarization, the Consultant also aggregated 436 traffic zones (OD) into 16 superzones (see economic analysis section).

According to the model allocation results, the Consultant discovered that the proportion of future traffic demands related to Ningbo and Zhoushan, on the Zhoushan Bridge was more than 65% of the total. The remaining traffic related to other destinations in Zhejiang Province and to external provinces would make up 20% and 13% respectively.

Table 3-14 and Table 3-15 showed the future OD patterns of passenger cars and trucks on the Project road.

Table 3-14 Passenger Car OD Pattern on Project Road (%)

OD*	Hangzhou	Ningbo	Jiaxing	Huzhou	Shaoxing	Zhoushan	Wenzhou	Jinhua	Quzhou	Taizhou	Lishui	Shanghai	Jiangsu	Anhui	Jiangxi	Fujian	Total
Hangzhou						4.4%											4.4%
Ningbo						24.4%											24.4%
Jiaxing						1.6%											1.6%
Huzhou						0.3%											0.3%
Shaoxing						1.5%											1.5%
Zhoushan	4.4%	24.5%	1.6%	0.3%	1.5%	17.5%	0.5%	0.7%	0.1%	0.9%	0.1%	3.9%	2.2%	0.2%	0.2%	0.2%	58.8%
Wenzhou						0.5%											0.5%
Jinhua						0.7%											0.7%
Quzhou						0.1%											0.1%
Taizhou						0.9%											0.9%
Lishui						0.1%											0.1%
Shanghai						3.9%											3.9%
Jiangsu						2.2%											2.2%
Anhui						0.2%											0.2%
Jiangxi						0.2%											0.2%
Fujian						0.2%											0.2%
Total	4.4%	24.5%	1.6%	0.3%	1.5%	58.8%	0.5%	0.7%	0.1%	0.9%	0.1%	3.9%	2.2%	0.2%	0.2%	0.2%	100.0%

Note: OD < .01% are not shown. Source: Consultant, 2018

Table 3-15 Truck OD Pattern on Project Road (%)

OD*	Hangzhou	Ningbo	Jiaxing	Huzhou	Shaoxing	Zhoushan	Wenzhou	Jinhua	Quzhou	Taizhou	Lishui	Shanghai	Jiangsu	Anhui	Jiangxi	Fujian	Total
Hangzhou						2.4%											2.4%
Ningbo						28.2%											28.2%
Jiaxing						1.5%											1.5%
Huzhou						0.8%											0.8%
Shaoxing						1.1%											1.1%
Zhoushan	2.4%	28.3%	1.5%	0.8%	1.1%	18.0%	0.5%	0.5%	0.1%	1.0%	0.1%	1.3%	2.2%	0.3%	0.4%	0.3%	58.9%
Wenzhou						0.5%											0.5%
Jinhua						0.6%											0.6%
Quzhou						0.1%											0.1%
Taizhou						1.0%											1.0%
Lishui						0.1%											0.1%
Shanghai						1.4%											1.4%
Jiangsu						2.2%											2.2%
Anhui						0.3%											0.3%
Jiangxi						0.5%											0.5%
Fujian						0.3%											0.3%
Total	2.4%	28.3%	1.5%	0.8%	1.1%	59.1%	0.5%	0.5%	0.1%	1.0%	0.1%	1.3%	2.2%	0.3%	0.4%	0.3%	100.0%

Noete: OD < .01% are not shown. Source: Consultant, 2018

4 Traffic and Revenue Forecasting Result

4.1 Description of Forecasting Options

Based on the previous research and analysis and 2017 as the base year, the Consultant carried out traffic and revenue forecasts from 2018 to December 24, 2034 (total of 25 concession years). The traffic volumes in subsequent years were based on the traffic data of the base year and the predictions by the computer assignment model on the annual average daily traffic in the Study area. The toll revenue forecasts were based on the current year's price. Being a non-economic profession, the Consultant did not make assumptions on inflation rates in the future years.

Table 4-1 Description of Forecasting Option

Option	Assumptions
（1）Base Case	1、The growth rates to be determined based on the socio-economic-traffic model of Chapter 3; 2、From January 1, 2019, the truck weight limit will be adjusted from 55 tons to 49 tons; 3、From January 1, 2019 to December 31, 2020, the trucks that are legally loaded and use Zhejiang ETC cards will be charged at 85%. 4、In the end of 2019, the Fuchimen Bridge will be opened. At that time, the passenger car 1 which exits at Fuchimen Bridge will be charged RMB 90, and it is necessary to distribute the toll income to Fuchimen Bridge according to the mileage.; 5、the end of 2021, the Zhoushan Island (Zhoushan International Green and Rock Garden, Shugang Highway) to Lushan section (Ningbo - Zhoushan Port Main Passage)will be opened; 6、In the end of 2026, the YongZhou Rail Line will be opened. 7、In the end of 2029, the Yongzhou Expressway Parallel Line will be opened.

Source: Consultant, 2018

4.2 Traffic Impacts Caused by the New Highways

According to the model analysis, the coming years that would have greater impacts on the Zhoushan Bridge are 2019, 2022 and 2025. The impacts of the newly opened highways on the Zhoushan Bridge in the above years were shown in Table 4-5 below.

Table 4-2 Traffic Impacts of New Highways

Highway	Schedule	Diversion/Inducement Impacts on Zhoushan Bridge	Magnitude of Impacts
Truck weight adjustment from 55 ton to 49 ton	Start on 1st Jan 2019	Restriction on weight from 55 tons to 49 tons. Truck Class 5 traffic will increase	Traffic impacts：+0.13% Revenue impacts：+0.42%
15% discount for truck with legal loading using Zhejiang pay card.	1st Jan – 31st Dec 2019	15% discount for truck with legal loading using Zhejiang pay card.. As the discount for Class 6, 7 trucks are larger than	Traffic impacts：0% Revenue impacts：-1.1%

Highway	Schedule	Diversion/Inducement Impacts on Zhoushan Bridge	Magnitude of Impacts
		15%, it will mainly affect Class 1-5 trucks.	
Opening of Fuchimen Bridge	End of 2019	Part of traffic from Ningbo to Zhoushan will be diverted to the Fuchimen Bridge and part of the toll charges will be given to Fuchimen Bridge operator according to the mileage.	Traffic impacts: -5.6% Revenue impacts: -4.99%
Zhoushan Island (Zhoushan International Green and Rock Garden, Shugang Highway) to Daishan section (Ningbo - Zhoushan Port Main Passage)	End of 2021	Part of traffic from Ningbo to Daishan will be diverted to the Zhoushan Bridge	Traffic impacts: +4.6% Revenue impacts: +4.2%
Opening of the Yongzhou Rail Line	End of 2026	Part of the traffic between Hangzhou, Jinhua, Wenzhou and Jintan, Zhoushan Island will be diverted to the Yongzhou rail line.	Traffic impacts: -6.1% Revenue impacts: -5.2%
Opening of the Yongzhou Expressway Parallel Line	End of 2029	Traffic from the south of Ningbo will be diverted to the Yongzhou Expressway Parallel Line.	Traffic impacts: -29.6% Revenue impacts: -34.9%

Source: Consultant, 2018

4.3 Traffic and Revenue Forecasting (Base Case)

Based on the assumptions stipulated in Table 4-1 and the application of the traffic prediction model (see Chapter 3), the Consultant was able to develop the traffic and revenue forecasts for the Base Case Scenario as shown in Tables 4-2 to 4-4.

Table 4-3 Annual Average Daily Traffic Flow by Vehicle Type on Zhoushan Bridge for Base Case (Vehicles/Day)

Year	Pass. Car 1	Pass. Car 2	Pass. Car 3	Pass. Car 4	Truck 1	Truck 2	Truck 3	Truck 4	Truck 5	Truck 6	Truck 7	Total	Annual Growth
2018	15,867	421	698	411	1,996	295	398	145	889	9	204	21,333	12.1%
2019(2)	17,524	463	708	418	2,129	315	453	165	1,041	10	218	23,444	9.9%
2020(3)	18,189	478	671	396	2,150	315	478	175	1,101	11	231	24,195	3.2%
2021	19,816	517	681	402	2,279	334	535	195	1,235	12	247	26,253	8.5%
2022(4)	22,664	585	704	416	2,456	361	612	221	1,411	13	263	29,706	13.2%
2023	24,530	628	714	422	2,591	381	678	245	1,565	13	279	32,046	7.9%
2024	26,472	673	724	427	2,727	402	747	269	1,727	14	295	34,477	7.6%
2025	28,489	719	733	433	2,865	422	819	294	1,895	15	310	36,994	7.3%
2026	30,353	761	742	439	2,996	442	890	319	2,061	16	324	39,343	6.3%
2027(5)	29,897	747	681	402	3,128	461	963	344	2,232	16	336	39,207	-0.3%
2028	31,715	788	689	407	3,260	481	1,038	370	2,407	17	348	41,520	5.9%
2029	33,577	829	697	412	3,392	500	1,115	397	2,587	17	359	43,882	5.7%
2030(6)	24,973	638	493	291	2,534	357	815	306	1,885	14	285	32,591	-25.7%
2031	26,251	668	499	295	2,629	371	870	325	2,011	14	293	34,226	5.0%
2032	27,548	698	504	298	2,725	385	925	345	2,139	14	301	35,882	4.8%
2033	28,863	729	510	301	2,820	398	980	366	2,269	15	309	37,560	4.7%
2034	30,194	760	516	305	2,915	412	1,036	386	2,398	15	317	39,254	4.5%

Source: Consultant, 2018 Note:

（1） Traffic flow includes general toll-free vehicles (military, police, fire truck, ambulance, green vehicles etc), but not including non-toll vehicles during major festivities.

（2） Truck weight adjustment from 55 ton to 49 ton at end of 2018; after opening of the Fuchimen Bridge, part of the traffic will be diverted onto the expressway.

（3） Traffic diversion of the opening of Fuchimen Bridge.

（4） The opening of the the Zhoushan Island (Zhoushan International Green and Rock Garden, Shugang Highway) to Daishan section (Ningbo - Zhoushan Port Main Passage) will have

induced traffic.

（5） The opening of the Yongzhou rail line will result in traffic diversion from the Zhoushan Bridge.

（6） The opening of the Yongzhou Expressway Parallel Line will result in traffic diversion from the Zhoushan Bridge.

Table 4-4 Annual Average Daily Traffic Flow by Road Section on Project Road for Base Case (Vehicles/Day)

Year	Jiaochuan-Lekgang	Lekgang-Jintang	Jintang-Cezi	Cezi-Fuchi	Fuchi-Lidiao	Lidiao-Cenganf	Cengang-Zhoushan	Weight Average	Annual Growth
2018	21,163	19,731	21,801	22,583	22,790	22,789	20,338	21,333	12.1%
2019(2)	23,194	21,614	24,039	24,927	25,166	25,165	22,458	23,444	9.9%
2020(3)	25,278	23,545	26,359	27,364	17,789	17,789	14,811	24,195	3.2%
2021	27,372	25,483	28,694	29,817	19,403	19,402	16,152	26,253	8.5%
2022(4)	31,079	29,027	32,662	33,911	21,093	21,092	17,557	29,706	13.2%
2023	33,466	31,244	35,333	36,716	22,858	22,857	19,025	32,046	7.9%
2024	35,941	33,543	38,111	39,637	24,701	24,700	20,558	34,477	7.6%
2025	38,503	35,921	40,996	42,672	26,620	26,619	22,154	36,994	7.3%
2026	40,891	38,138	43,679	45,495	28,408	28,407	23,642	39,343	6.3%
2027(5)	40,486	37,727	43,837	45,808	28,933	28,932	24,114	39,207	-0.3%
2028	42,822	39,894	46,497	48,616	30,737	30,736	25,618	41,520	5.9%
2029	45,208	42,107	49,219	51,490	32,588	32,587	27,161	43,882	5.7%
2030(6)	31,116	28,834	37,020	39,524	34,482	34,481	28,739	32,591	-25.7%
2031	32,640	30,242	38,929	41,584	36,292	36,290	30,249	34,226	5.0%
2032	34,182	31,666	40,864	43,671	38,129	38,127	31,782	35,882	4.8%
2033	35,740	33,105	42,821	45,784	39,991	39,989	33,335	37,560	4.7%
2034	37,313	34,557	44,800	47,920	41,877	41,875	34,907	39,254	4.5%

Source: Consultant, 2018 Note:

（1） Traffic flow includes general toll-free vehicles (military, police, fire truck, ambulance, green vehicles etc), but not including non-toll vehicles during major festivities.

（2） Truck weight adjustment from 55 ton to 49 ton at end of 2018; after opening of the Fuchimen Bridge, part of the traffic will be diverted onto the expressway.

（3） Traffic diversion of the opening of Fuchimen Bridge.

（4） The opening of the the Zhoushan Island (Zhoushan International Green and Rock Garden, Shugang Highway) to Daishan section (Ningbo - Zhoushan Port Main Passage) will have induced traffic.

（5） The opening of the Yongzhou rail line will result in traffic diversion from the Zhoushan Bridge.
（6） The opening of the Yongzhou Expressway Parallel Line will result in traffic diversion from the Zhoushan Bridge

Table 4-5 Annual Revenue Forecasts for Base Case on Zhoushan Bridge (RMB)

Year	Average Daily Revenue (RMB)	Daily Growth	Annual Revenue (RMB 10,000)	Annual Growth
2018	2,430,718	12.2%	88,721	12.2%
2019	2,663,338	9.6%	97,212	9.6%
2020	2,747,362	3.2%	100,553	3.4%
2021	3,032,069	10.4%	110,671	10.1%
2022	3,426,388	13.0%	125,063	13.0%
2023	3,703,520	8.1%	135,178	8.1%
2024	3,991,914	7.8%	146,104	8.1%
2025	4,291,216	7.5%	156,629	7.2%
2026	4,573,353	6.6%	166,927	6.6%
2027	4,611,732	0.8%	168,328	0.8%
2028	4,893,980	6.1%	179,120	6.4%
2029	5,182,483	5.9%	189,161	5.6%
2030	3,564,241	-31.2%	130,095	-31.2%
2031	3,750,473	5.2%	136,892	5.2%
2032	3,938,958	5.0%	144,166	5.3%
2033	4,129,384	4.8%	150,723	4.5%
2034	4,321,433	4.7%	155,139	2.9%
Total	--	--	2,380,682	--

Source: Consultant, 2018

Note：

(1) Toll revenue estimations were based on base year value. Being a non-economic profession, the Consultant made no prediction on future inflation trend.

(2) Toll revenues excluded non toll paying vehicles.

(3) Toll revenue forecasting also considered the impacts of the four important public holidays (i.e. Spring Festival, Ching Ming Festival, Labor Day and National Day), during which small passenger vehicles with no more than 7 seats and motocycles are exempted from toll charges.

(4) The charging period will end on December 24, 2034.

5 Conclusion

The Zhoushan Bridge is an important economic connection between the Zhoushan Islands and the Mainland. It is an important bridge that will greatly enhance and realize the desires of Zhoushan residents to pursue opportunities on the other side of the islands.

The forecasting of future traffic volumes and toll revenues were for 2018 to 2034. This Study was based on the latest data collection, the expertise and years of toll highway experience of the Consultant. The prediction process of this study used the state-of-art technical methods and recognized industry practices. However, it should be noted that there is still uncertainties in the forecasting of future traffic volume and revenue for any toll road. As a result, there may be discrepancies between the predicted values and the actual results in the future. In addition, the traffic volume and revenue forecasts shown in this report represent the overall long-term trend. In any given year, the differences between predicted and actual results may also be caused by other factors. Therefore, although the Consultant endeavors to ensure the technicality of the information provided, it does not guarantee the accuracy or reliability of the data provided, and will not be held liable for any losses or damages caused by the forecasting results. The forecast results were summarized as follows:

1. From 2018 to December 24, 2034; the traffic volumes on the Zhoushan Bridge would increase from 21,333 vehicles/day to 39,254 vehicles/day, an increase of 84.01%;
2. The toll revenue of the Zhoushan Bridge will increase from RMB 0.887 billion/year in 2018 to RMB 1.551 billion/year in 2034, and the total revenue from 2018 to 2034 will reach RMB 23.807 billion.

Deloitte. 德勤

INDEPENDENT ASSURANCE REPORT ON CALCULATIONS OF DISCOUNTED FUTURE ESTIMATED CASH FLOWS IN CONNECTION WITH THE VALUATION OF THE ENTIRE EQUITY INTEREST IN ZHEJIANG SHENJIAHUHANG EXPRESSWAY CO., LTD. (THE "TARGET")

TO THE DIRECTORS OF ZHEJIANG EXPRESSWAY CO., LTD. (THE "COMPANY")

We have examined the calculations of the discounted future estimated cash flows on which the valuation prepared by Jones Lang LaSalle Corporate Appraisal and Advisory Limited dated November 30, 2018, of the entire equity interest in the Target as at July 31, 2018 (the ''Valuation'') is based. The Target is a company established in the People's Republic of China. The Target and its subsidiaries are principally engaged in the toll collection rights of Huzhou and Lianhang sections of Shenjiahuhang Expressway and the operation and management of Zhoushan Bridge. The Valuation based on the discounted future estimated cash flows is regarded as a profit forecast under Rule 14.61 of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited (the ''Listing Rules'') and will be included in an announcement dated December 13, 2018 to be issued by the Company in connection with the discloseable and connected transaction in relation to the proposed acquisition of the entire equity interest in the Target (the ''Announcement'').

Directors' Responsibility for the Discounted Future Estimated Cash Flows

The directors of the Company are responsible for the preparation of the discounted future estimated cash flows in accordance with the bases and assumptions determined by the directors and set out in ''Principal assumptions for the income approach adopted for the Valuation Report'' section of the Announcement (the ''Assumptions''). This responsibility includes carrying out appropriate procedures relevant to the preparation of the discounted future estimated cash flows for the Valuation and applying an appropriate basis of preparation; and making estimates that are reasonable in the circumstances.

Our Independence and Quality Control

We have complied with the independence and other ethical requirements of the ''Code of Ethics for Professional Accountants'' issued by the Hong Kong Institute of Certified Public Accountants (the ''HKICPA''), which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

Our firm applies Hong Kong Standard on Quality Control 1 ''Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements'' issued by the HKICPA and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Reporting Accountants' Responsibility

Our responsibility is to express an opinion on the arithmetical accuracy of the calculations of the discounted future estimated cash flows on which the Valuation is based and to report solely to you, as a body, as required by Rule 14.62(2) of the Listing Rules, and for no other purpose. We do not assume responsibility towards or accept liability to any other person for the contents of this report.

Our engagement was conducted in accordance with Hong Kong Standard on Assurance Engagements 3000 (Revised) "Assurance Engagements Other Than Audits or Reviews of Historical Financial Information" issued by the HKICPA. This standard requires that we comply with ethical requirements and plan and perform the assurance engagement to obtain reasonable assurance on whether the discounted future estimated cash flows, so far as the calculations are concerned, have been properly compiled in accordance with the Assumptions. Our work was limited primarily to making inquiries of the Company's management, considering the analyses and assumptions on which the discounted future estimated cash flows are based and checking the arithmetic accuracy of the compilation of the discounted future estimated cash flows. Our work does not constitute any valuation of the Target.

Because the Valuation relates to discounted future estimated cash flows, no accounting policies of the Company have been adopted in its preparation. The Assumptions include hypothetical assumptions about future events and management actions which cannot be confirmed and verified in the same way as past results and these may or may not occur. Even if the events and actions anticipated do occur, actual results are still likely to be different from the Valuation and the variation may be material. Accordingly, we have not reviewed, considered or conducted any work on the reasonableness and the validity of the Assumptions and do not express any opinion whatsoever thereon.

Opinion

Based on the foregoing, in our opinion, the discounted future estimated cash flows, so far as the calculations are concerned, have been properly compiled, in all material respects, in accordance with the Assumptions.

Deloitte Touche Tohmatsu
Certified Public Accountants
Hong Kong

December 13, 2018

China International Capital Corporation Hong Kong Securities Limited
29th Floor, One International Finance Centre
1 Harbour View Street
Central
Hong Kong

December 13, 2018

The Board of Directors
Zhejiang Expressway Co., Ltd.
5th Floor, No. 2 Mingzhu International Business Center,
199 Wuxing Road, Hangzhou,
Zhejiang 310020, the PRC

Dear Sirs,

We refer to the announcement of Zhejiang Expressway Co., Ltd. (the "**Company**") dated December 13, 2018 in relation to the proposed acquisition of 100% equity interest in Zhejiang Shenjiahuhang Expressway Co., Ltd. (the "**Target**") (the "**Announcement**") and also the asset valuation report dated November 30, 2018 prepared by Jones Lang LaSalle Corporate and Appraisal Advisory Limited, being the independent valuer of the Company (the "**Independent Valuer**"), in respect of the valuation of the Target (the "**Valuation Report**"). We understand that the Independent Valuer has prepared the Valuation Report based on the discounted cash flow method, which is regarded as profit forecast (the "**Forecast**") under Rule 14.61 of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited (the "**Hong Kong Listing Rules**"). Unless otherwise defined or if the context otherwise requires, all terms defined in the Announcement shall have the same meaning when used in this letter.

We have reviewed the Forecast included in the Valuation Report, for which you as the Directors are solely responsible. We have attended discussions involving the management of the Company, the management of the Target and the Independent Valuer where the historical performance of the Target, the calculations of the Forecast, the qualifications of the Independent Valuer, and the valuation method and bases and assumptions upon which the Forecast has been made set out in the Valuation Report have been fully discussed. We have also considered the report addressed solely to and for the sole benefit of the Directors from Deloitte Touche Tohmatsu dated December 13, 2018 set out in the announcement of the Company dated December 13, 2018 regarding calculation of discounted future estimated cash flow on which the Forecast is based. The Forecast is based on a number of bases and assumptions. As the relevant bases and assumptions are about future events which may or may not occur, the actual financial performance of the businesses of the Target may or may not achieve as expected and the variation may be material.

On the basis of the foregoing and without giving any opinion on the reasonableness of the valuation methods, bases and assumptions selected by the Independent Valuer, for which the Independent Valuer and the Company are responsible, we are satisfied that the Forecast included in the Valuation Report, for which you as the Directors are solely responsible, has been made after due and careful enquiry by you.

The work undertaken by us in giving the above view has been undertaken for the purpose of reporting solely to you under Rule 14.62(3) of the Hong Kong Listing Rules and for no other purpose. We accept no responsibility to any other person in respect of, arising out of or in connection with our work or this letter.

Yours faithfully,
For and on behalf of

China International Capital Corporation Hong Kong Securities Limited

Name: Barry Chan
Title: Managing Director
Head of Investment Banking, Hong Kong

1. RESPONSIBILITY STATEMENT

This circular, for which the Directors collectively and individually accept full responsibility, includes particulars given in compliance with the Listing Rules for the purpose of giving information with regard to the Group. The Directors, having made all reasonable enquiries, confirm that to the best of their knowledge and belief the information contained in this circular is accurate and complete in all material respects and not misleading or deceptive, and there are no other matters the omission of which would make any statement herein or this circular misleading.

2. DISCLOSURE OF INTERESTS

(a) Interests in the Company and its associated corporation

As at the Latest Practicable Date, none of the Directors, supervisors and chief executives of the Company had an interest or short position in any shares, underlying shares or equity derivatives or debentures of the Company or any associated corporations (within the meaning of Part XV of the SFO) which is required to be (i) notified to the Company and the Stock Exchange pursuant to Divisions 7 and 8 of Part XV of the SFO (including interests and short positions which the Directors, supervisors or chief executives of the Company was taken or deemed to have under such provisions of the SFO); or (ii) entered in the register kept by the Company pursuant to section 352 of the SFO; or (iii) notified to the Company and the Stock Exchange pursuant to the Model Code for Securities Transactions by Directors of Listed Companies.

As at the Latest Practicable Date, none of the Directors, supervisors or chief executives of the Company or their spouses or children under 18 years of age were granted or had exercised any right to subscribe for any equity or debt securities of the Company or any of its associated corporations (within the meaning of Part XV of the SFO).

(b) Substantial Shareholders

As at the Latest Practicable Date, so far as is known to the Directors and chief executives of the Company, persons (other than the Directors and the chief executives of the Company) who had interests and short positions in the Shares and underlying Shares of the Company (within the meaning of Part XV of the SFO) as recorded in the register required to be kept under section 336 of the SFO, or as otherwise notified to the Company and the Stock Exchange, were set out as follows:

Name of substantial shareholder	Capacity	Number of Shares	Percentage of the issued share capital of the Company (domestic shares)
Communications Group	Beneficial owner	2,909,260,000	100%

Name of the Shareholder	Capacity	Number of Shares	Percentage of the issued share capital of the Company (H shares)
JP Morgan Chase & Co.	Beneficial owner, investment manager and custodian corporation/ approved lending agent	159,925,446 (L) 2,908,345 (S) 61,980,136 (P)	11.01% 0.20% 4.32%
BlackRock, Inc.	Interest of controlled corporations	129,499,281 (L)	9.03%
The Bank of New York Mellon Corporation	Interest of controlled corporations	74,989,261 (L) 69,658,505 (P)	5.23% 4.86%

Notes:

(1) The letter "L" denotes the person's long position in such Shares.

(2) The letter "S" denotes the person's short position in such Shares.

(3) The letter "P" denotes the person's interests in a lending pool.

Save as disclosed above, as at the Latest Practicable Date, the Company had not been notified by any persons (other than the Directors and chief executives of the Company) who had interests or short positions in the Shares or underlying Shares of the Company which would fall to be disclosed to the Company under the provisions of Divisions 2 and 3 of Part XV of the SFO, or which were recorded in the register required to be kept by the Company under section 336 of the SFO.

3. OTHER INTERESTS OF DIRECTORS

As at the Latest Practicable Date,

(a) Interests in service contracts

None of the Directors had or was proposed to have a service contract with any member of the Group other than contracts expiring or determinable by the employer within one year without the payment of compensation other than the statutory compensation.

(b) Interests in assets

None of the Directors had any direct or indirect interest in any assets which have, since December 31, 2017, being the date to which the latest published audited consolidated accountants of the Group were made up, been acquired or disposed of by or leased to any member of the Group upon Completion or were proposed to be acquired or disposed of by or leased to, any member of the Group upon Completion; and

(c) Interests in contracts or arrangements

None of the Directors was materially interested in any contract or arrangement entered into with any member of the Group upon Completion, which contract or arrangement is subsisting as at the Latest Practicable Date and which is significant in relation to the business of the Group upon Completion taken as a whole.

4. DIRECTORS' COMPETING INTERESTS

As at the Latest Practicable Date, none of the Directors or their associates was interested in any business which competes or is likely to compete, either directly or indirectly, with the business of the Group other than those businesses to which the Directors and their associates were appointed to represent the interests of the Company and/or the Group.

5. LITIGATION

As at the Latest Practicable Date, so far as the Directors are aware, there was no litigation or claim of material importance was known to the Directors to be pending or threatened against any member of the Group.

6. EXPERT AND CONSENT

The following is the qualification of the expert who has provided its opinion or advice, which are contained in this circular:

Name	Qualification
China International Capital Corporation Hong Kong Securities Limited	a corporation licensed to carry on Type 1 (dealing in securities), Type 2 (dealing in futures contracts), Type 4 (advising on securities), Type 5 (advising on futures contracts) and Type 6 (advising on corporate finance) regulated activities as defined under the SFO
Octal Capital Limited	a licensed corporation licensed to conduct type 1 (dealing in securities) and type 6 (advising on corporate finance) regulated activities under the SFO
Deloitte Touche Tohmatsu	certified public accountants
Jones Lang LaSalle	a Hong Kong qualified independent valuer
WB Group Consulting (Shenzhen) Limited	traffic consultants

The above mentioned experts are third parties independent of the Company and its connected persons and are collectively referred to as the "**Experts**" hereinafter.

As at the Latest Practicable Date, to the best knowledge of the Company, none of the Experts has any shareholding in any member of the Group nor has any right, whether legally enforceable or not, to subscribe for or to nominate persons to subscribe for securities in any member of the Group.

Each of the Experts has given and has not withdrawn its written consent to the issue of this circular with the inclusion of its letter(s) or report(s) in the form and context in which they are included.

The letter and recommendation from Octal Capital Limited are set out on pages 24 to 48 of this circular and are given as at the date of this circular for incorporation herein.

The report from Jones Lang LaSalle is set out in Appendix I of this circular and is given as at the date of this circular for incorporation herein.

The report from WB Group Consulting (Shenzhen) Limited is set out in Appendix II of this circular and is given as at the date of this circular for incorporation herein.

The letter from Deloitte is set out in Appendix III of this circular and is given as at the date of this circular for incorporation herein.

The letter from the Financial Adviser is set out in Appendix IV of this circular and is given as at the date of this circular for incorporation herein.

None of the Experts has, or has had, direct or indirect interest in any assets which have been acquired or disposed of by, or leased to, any member of the Group or are proposed to be acquired or disposed of by, or leased to, any member of the Group since December 31, 2017, the date to which the latest published audited accounts of the Group was made up.

7. MATERIAL ADVERSE CHANGES

As at the Latest Practicable Date, the Directors were not aware of any material adverse change in the financial position or trading position of the Group since December 31, 2017, being the date to which the latest published audited financial statements of the Group were made up.

8. DOCUMENTS AVAILABLE FOR INSPECTION

Copies of the following documents are available for inspection during normal business hours at the office of Ashurst Hong Kong at 11/F, Jardine House, 1 Connaught Place, Central, Hong Kong for a period of 14 days from the date of this circular:

(a) the memorandum and articles of association of the Company;

(b) the audited consolidated accounts of the Group for each of the two financial years ended December 31, 2017;

(c) the Equity Purchase Agreement;

(d) the letter from the Independent Board Committee, as set out on page 23 of this circular;

(e) the letter from the Independent Financial Adviser, as set out on pages 24 to 48 of this circular;

(f) the Valuation Report, the text of which are set out in Appendix I to this circular;

(g) the Traffic Study Report, the text of which are set out in Appendix II to this circular;

(h) the letter from Deloitte on discounted future estimated cash flows in connection with the valuation of the entire equity interest in the Target which is set out in Appendix III to this circular;

(i) the letter from the Financial Adviser confirming that they are satisfied that the forecast has been made by the Directors after due and careful enquiry is set out in Appendix IV of this circular;

(j) the written consent of the Experts referred to in the paragraph headed "Expert and Consent" in this Appendix V; and

(k) this circular.

浙江滬杭甬高速公路股份有限公司
ZHEJIANG EXPRESSWAY CO., LTD.

(A joint stock limited company incorporated in the People's Republic of China with limited liability)

(Stock code: 0576)

NOTICE OF EXTRAORDINARY GENERAL MEETING

NOTICE IS HEREBY GIVEN that the extraordinary general meeting (the "**EGM**") of Zhejiang Expressway Co., Ltd. (the "**Company**") will be held at 10:00 a.m. on Monday, March 4, 2019 at 5/F, No. 2 Mingzhu International Business Center, 199 Wuxing Road, Hangzhou City, Zhejiang Province, the People's Republic of China (the "**PRC**"), for the purpose of considering and, if thought fit, passing with or without modification or amendment the following resolution:

AS ORDINARY RESOLUTIONS

1. To consider and approve the following resolutions as ordinary resolutions:

   (i) the agreement dated December 13, 2018 (the "**Equity Purchase Agreement**") entered into between the Company and Zhejiang Communications Investment Group Co., Ltd. (the "**Communications Group**") (a copy of which is produced to the EGM marked "A" and initialed by the chairman of the EGM for the purpose of identification), and the terms and conditions thereof and the transactions contemplated thereunder and the implementation thereof be and are hereby approved and confirmed; and

   (ii) the authorization to any one of the directors of the Company (the "**Directors**"), or any other person authorized by the board of the Directors (the "**Board**") from time to time, for and on behalf of the Company, among other matters, to sign, seal, execute, perfect, perform and deliver all such agreements, instruments, documents and deeds, and to do all such acts, matters and things and take all such steps as he or she or they may in his or her or their absolute discretion consider to be necessary, expedient, desirable or appropriate to give effect to and implement the Equity Purchase Agreement and the transactions contemplated thereunder and all matters incidental to, ancillary to or in connection thereto, including agreeing and making any modifications, amendments, waivers, variations or extensions of the Equity Purchase Agreement or the transactions contemplated thereunder be and are hereby approved, ratified and confirmed.

AS SPECIAL RESOLUTIONS

2. To consider and approve the following resolutions as special resolutions:

(i) upon approval by the National Association of Financial Market Institutional Investors, the issue of the mid-term notes by the Company of not more than RMB3,000,000,000 (the "**Mid-term Notes**"), on the conditions set forth below be and is hereby approved:

Issue size:	Not more than RMB3,000,000,000
Term:	According to the prevailing market circumstances as normally not more than five years from the date of issue
Manner of issue:	One-time registration with the relevant authorities. The Mid-term Notes will be issued in one tranche or tranches
Interest rate:	Prevailing market rate of mid-term notes of similar maturity
Use of Proceeds:	Equity acquisition, project investment and repayment of borrowings of the Group and replenish working capital of the Group

(ii) the general manager of the Company be and hereby authorised from the date when this special resolution is approved by the Shareholders, to determine in her absolute discretion and deal with matters in relation to the Mid-term Notes Issue, including but not limited to the following:

(a) to determine, to the extent permitted by laws and regulations and according to the Company's specific circumstances and the prevailing market conditions, the specific terms and arrangements of the Mid-term Note Issue and make any changes and adjustments to such types and terms of the Mid-term Notes Issue, including but not limited to, the types of issue, time of issue, manner of issue, size of issue, issue price, term of maturity, interest rates, tranches and any other matters in relation to the Mid-term Notes Issue;

(b) to appoint the relevant intermediaries in connection with the Mid-term Notes Issue and to deal with filing and submission matters;

(c) to enter into agreements, contracts and other legal documents relating to the Mid-term Notes Issue, and to disclose relevant information in accordance with the applicable laws and regulations; and

(d) to deal with any other the matters in relation to the Mid-term Notes Issue.

Yours faithfully
On behalf of the Board
Zhejiang Expressway Co., Ltd.
YU Zhihong
Chairman

Hangzhou, the PRC
January 15, 2019

Notes:

1. Registration procedures for attending the EGM

   (a) Holders of H shares of the Company (''H Shares'') and domestic shares of the Company (''Domestic Shares'') intending to attend the EGM should return the reply slip for attending the EGM to the Company by post or by facsimile (address and facsimile numbers are shown in paragraph 5(b) below) such that the same shall be received by the Company on or before February 11, 2019.

   (b) A shareholder or his/her/its proxy should produce proof of identity when attending the EGM. If a corporate shareholder appoints its legal representative to attend the meeting, such legal representative shall produce proof of identity and a copy of the resolution of the board of directors or other governing body of such shareholder appointing such legal representative to attend the meeting.

2. Proxy

   (a) A shareholder eligible to attend and vote at the EGM is entitled to appoint, in written form, one or more proxies to attend and vote at the EGM on behalf of him/her/it. A proxy need not be a shareholder of the Company.

   (b) A proxy shall be appointed by a written instrument signed by the appointor or an attorney authorized by him/her/it for such purpose. If the appointor is a corporation, the same shall be affixed with the seal of such corporation, or signed by its director(s) or duly authorized representative(s). If the instrument appointing a proxy is signed by a person authorized by the appointor, the power of attorney or other authorization document(s) shall be notarized.

   (c) To be valid, the power of attorney or other authorization document(s) (which have been notarized) together with the completed form of proxy must be delivered, in the case of holders of Domestic Shares, to the Company at the address shown in paragraph 5(b) below and, in the case of holders of H Shares, to Hong Kong Registrars Limited at 17M Floor, Hopewell Center, 183 Queen's Road East, Wanchai, Hong Kong by no later than 10 a.m. on March 1, 2019).

   (d) Any vote of the shareholders of the Company present in person or by proxy at the EGM must be taken by poll.

3. Book closing period

   For the purpose of the EGM, the register of members holding H Shares will be closed from February 2, 2019 to March 4, 2019 (both days inclusive).

4. Last Day of Transfer and Record Date

   Holders of H Shares who intend to attend the EGM must deliver all transfer instruments and the relevant shares certificates to Hong Kong Registrars Limited at Rooms 1712–1716, 17/F, Hopewell Center, 183 Queen's Road East, Hong Kong, at or before 4:30 p.m. on February 1, 2019.

   For the purpose of the EGM, the record date will be February 12, 2019.

5. Miscellaneous

(a) The EGM will not last for more than one day. Shareholders who attend shall bear their own traveling and accommodation expenses.

(b) The principal place of business of the Company in the PRC is:

5/F, No. 2 Mingzhu International Business Center
199 Wuxing Road
Hangzhou City, Zhejiang Province
People's Republic of China
310020
Telephone No.: (+86)-571–8798 7700
Facsimile No.: (+86)-571–8795 0329

As at the date of this announcement, the chairman of the Company is Mr. YU Zhihong; the executive Directors of the Company are: Mr. CHENG Tao and Ms. LUO Jianhu; the other non-executive Directors of the Company are: Mr. DAI Benmeng, Mr. YU Qunli and Mr. YU Ji; and the independent non-executive Directors of the Company are: Mr. PEI Ker-Wei, Ms. LEE Wai Tsang, Rosa and Mr. CHEN Bin.