



## 1. Project Data

<b>Project ID</b> P112838	<b>Project Name</b> CN-Wuhan Second Urban Transport	
<b>Country</b> China	<b>Practice Area(Lead)</b> Transport	
<b>L/C/TF Number(s)</b> IBRD-78640	<b>Closing Date (Original)</b> 31-Dec-2015	<b>Total Project Cost (USD)</b> 100,000,000.00
<b>Bank Approval Date</b> 30-Mar-2010	<b>Closing Date (Actual)</b> 31-Aug-2018	
	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>
Original Commitment	100,000,000.00	0.00
Revised Commitment	100,000,000.00	0.00
Actual	100,000,000.00	0.00

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## 2. Project Objectives and Components

### a. Objectives

The project development objective (PDO) was "to assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in an environmentally sustainable, integrated and safe manner" (Loan Agreement page 5, and PAD para 14).

### b. Were the project objectives/key associated outcome targets revised during implementation?



Yes

**Did the Board approve the revised objectives/key associated outcome targets?**

No

**c. Will a split evaluation be undertaken?**

No

**d. Components**

The project comprised five components.

**Component 1. Public Transport** (appraisal cost US\$44.9 million, actual cost US\$33.9 million). This component would finance activities to strength the route rationalization and operations of the public transport including providing on-street priority to buses on key selected road corridors in Wuhan Municipality. The component would also finance construction of public transport transfer terminals/interchanges to facilitate transfers from private to public transport modes and 'park and ride' for non-motorized vehicles and cars.

**Component 2. Road Safety** (appraisal cost US\$14.5 million, actual cost US\$10.1 million). This component would assist in improving traffic management, safety, and mobility through traffic enforcement, education campaigns, and engineering measures including installation of additional traffic signals for vehicles, mid-block traffic signals for pedestrians, facilities for pedestrians and cyclists, and signs and markings in selected road corridors and the area within the Second Ring Road.

**Component 3. Road Improvement** (appraisal cost US\$434.8 million, actual cost US\$874.1 million). This component would finance rehabilitation, upgrading, and construction of three key links of the urban road network of the Wuhan Municipality.

**Component 4. Travel Demand Management** (appraisal cost US\$4.9 million, actual cost US\$5.1 million). This component would support the improvement of travel demand management (TDM) through the procurement of equipment; carrying out studies, training and capacity-building measures for the agency managing Wuhan's road and bridges.

**Component 5. Institutional Development and capacity building** (appraisal cost US\$4.4 million, actual cost US\$3.7 million). This component would assist in strengthening the institutional capacity of Wuhan Municipality and development of an urban transport strategy, with particular focus on non-motorized transport (NMT), public transport integration, and transport issues related to urban-rural integration.

**Note.** The appraisal cost does not include contingencies of US\$51.8 million, interest during construction US\$55.1 million and front-end-fee US\$0.25 million.

### **Revised Components**

The two restructurings dropped some activities and added some new ones (ICR para 14):



- The Jiefang Avenue (in Hankou) public transport corridor was dropped because the municipality decided to turn the Avenue into a 15 km scenic road.
- The Xinhua Lu/Youyi Lu (in Hankou) public transport corridor was dropped due to a lack of space to add a bus lane for the construction of a viaduct at the same site.
- The Yingwu Avenue (in Hanyang) public transport corridor was dropped because it overlapped with the metro line.
- The Hanyang Avenue public transport corridor was redesigned to enhance integration with the metro line and was extended from 5.4 km to 11.4 km.
- Two public transport terminals were dropped (Gangdu Garden and the Jinyintan Park and Ride) due to land regulation issues and delays in counterpart funding for land acquisition and housing demolition.
- There were changes in the five road safety corridors planned at appraisal. Of the five, three were implemented (Hanyang, Xudong, and Heping), while one was replaced (Yanjiang by Baishazhou) and implemented. Two were dropped at the first restructuring (Jiefang and Longyang) because of being superseded by urban construction.
- Heping Avenue construction was reduced by 2.7 km due to the impact of the metro construction.

**e. Comments on Project Cost, Financing, Borrower Contribution, and Dates**

**Project Cost.** The actual project cost was US\$926.8 million, substantially higher than the appraisal estimate of US\$610.7 million. The actual construction costs of the road sections were higher than initially estimated due to higher land acquisition and resettlement costs (which increased by 183.6 percent), mostly because of the increase in real estate prices in Wuhan and in China in general. Land acquisition and resettlement costs for the road improvement and public transport components represent 82 percent of the total project cost increase.

**Financing.** The project was financed through an IBRD loan. The appraisal and actual loan amount was US\$100 million. The loan was fully disbursed.

**Co-financing.** There was no co-financing.

**Borrower Contribution.** At appraisal, the Borrower was expected to contribute US\$510.7 million. The actual Borrower contribution was US\$826.8 million. As explained above, the construction cost of the road sections were higher than initially estimated, and the Borrower financed the cost overrun.

**Dates.** The project was approved on March 30, 2010 and became effective on September 7, 2010. The project was extended by 2 years and eight months and closed on August 31, 2018 compared to the original closing date of December 31, 2015. The first restructuring in 2015 extended the closing date to August 31, 2017, and increased the percentage financed by the loan for civil works to 90 percent, from the previous 50 percent. The loan agreement was amended to include the names of the public transport corridors, bus



terminals, and road safety corridors to be financed by the project. For the institutional development component, the names of the studies were adjusted according to new priorities, that aligned with the preparation of the Wuhan Integrated Transport Development Project. In August 2017, the second restructuring extended the closing date to August 31, 2018 to complete the project works.

The project team explained that the first extension of the closing date was because of the delays in securing enough counterpart funds to pay for the escalating resettlement costs and therefore the delay in resettlement and implementation of the Jiefang Avenue Extension. The second extension of closing date was due to the slow implementation of resettlement in Huangpi District as well as delayed land acquisition and resettlement for the two public transport terminals.

**Restructuring.** The project was restructured twice, the first on June 26, 2015 and second on August 30, 2017. Both restructurings involved (a) change in results framework, (b) change in components and cost, (c) change in loan closing date, (d) reallocation between disbursement categories, and (e) change in implementation schedule.

**Split assessment.** The PDOs remained unchanged, but there were changes to the outcome indicators as part of the restructurings (see section 9 below). However, a split assessment of the PDO will not be undertaken as the original outcome indicators were not measured during early implementation. The ICR reports (para 69) that some of the original monitoring indicators were not easily measurable and the project management office was not able to gather data to evaluate and report on implementation progress. As a result, reporting on this project was rather retrospective at the beginning. In addition, the values of corridor-specific indicators (especially ridership) for the original design and subsequent implementation were not comparable because of the changes in the corridors selected.

### 3. Relevance of Objectives

#### Rationale

#### Alignment with Strategy:

**National Strategy.** The PDO was aligned with China's 13th Five Year Plan (FYP 2016–2020), which prioritizes a modern, integrated transport system strategy while achieving low carbon development. The plan emphasizes the importance of building an efficient, intelligent, green, integrated, and interconnected infrastructure network to contribute to overall economic and social development (ICR para 20). The project objective of enhancing mobility for passenger trips within and to the central area of Wuhan in an environmentally sustainable, integrated and safe manner, is fully aligned with the 13th FYP and designed to help advance the national objectives through demonstration projects.

**Local Strategy.** The PDO was aligned with Wuhan Municipality's 13th FYP, which is in line with the national strategy and focuses on developing a modern, smart, livable, and eco-friendly city with the efficient provision of public services. The objectives are aligned with Wuhan Transport Strategy (2015), which seeks to increase a public transport modal split to at least 30%. The objective of the strategy is to establish a comprehensive transport system characterized by rapid, safe, and convenient movement of people and



goods to minimize travel time and pollution and promote coordinated urban and rural transport development (ICR para 21). The Wuhan City had put forth a strong public transport improvement plan through investments in bus priority and metro system, and in the case of Jiefang Avenue, particular attention was paid to the integration of the road with the future elevated metro line (extension of existing Line 1) (PAD paras 2 and 52). This integration of metro and bus would enhance mobility and therefore is fully aligned with the PDO.

**Bank Priorities.** The PDO remained relevant to the World Bank Group's China Country Partnership Strategy (CPS FY 13 - 16) during implementation, which focused on *inter alia* supporting greener growth. The project especially supported Outcome 1.3: Promoting Low-carbon Urban Transport by addressing the city's rapid motorization through shifting from cars to public transport and piloting of institutional and technological innovations such as traffic demand management and intelligent transport systems. The PDO is also aligned with the World Bank's Sustainable Mobility for All initiative that promotes equity, efficiency, safety, and green mobility.

There is no updated CPS at closure. The 2017 Systematic Country Diagnostic identifies green growth as one of the priorities and notes that reduction in air pollution from vehicle emissions has been hampered by capacity constraints and organizational fragmentation. Regarding public transportation, the SCD mentions that public transport's share of commuting in major cities is still low, at about 30 percent. Wuhan city is not explicitly mentioned.

**Country Context:** Rapid urbanization in Chinese cities has resulted in traffic congestion, a higher level of traffic-related accidents and fatalities, and increasing air pollution and greenhouse gas emissions. To address these problems, in October 2005, the Chinese government declared urban public transport development as a national priority. The Wuhan Metropolitan Region is a city cluster formed by eight smaller cities within a 100 km radius of the core city. Wuhan is China's eighth largest city, with a population of over 8 million (at appraisal in 2010). Wuhan is also one of the pilot cities for the Transit Metropolis Demonstration Initiative by the Ministry of Transport (MOT) that promotes strategies on public and non motorized transport, travel demand management, and transit-oriented development (ICR para 2). The project design took these initiatives into account.

**Previous Sector Experience.** This project was the second urban transport project in Wuhan. The first project was approved in March 2004 and completed in December 2010 and comprised investments in road construction and maintenance, traffic management and bus priority measures, for promoting an integrated urban transport system. The project was expected to build on the achievements of the first project and continue to support Wuhan Municipality in implementing integrated public transport and road safety corridors with a package of intelligent transport system, road safety, traffic management, and road construction.

## Rating

Substantial

## 4. Achievement of Objectives (Efficacy)



## **OBJECTIVE 1**

### **Objective**

To assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan.

### **Rationale**

The **theory of change** for this objective is that the construction of public transport interchanges and bus terminals, rehabilitation and upgrading of key urban transport links in Wuhan, and the adoption of the Intelligent Transport System (ITS) innovations would enhance mobility within and to the central area of Wuhan.

### **Within Central Wuhan**

#### **Outputs**

Within Central Wuhan, the project installed on-street priority for buses on two corridors (Heping Avenue and Hanyang Avenue) and constructed sidewalks, bike lanes, and bus lanes within the same right-of-way.

The project procured and installed a state-of-art area traffic signal system, which improved traffic flows. Bus priority traffic signals reduced bus delays at the intersections, and the overhead cameras on bus priority lanes ensured buses' right-of-way during peak hours (ICR para 28). These ITS innovations contributed to the decrease in average bus travel times (see below in outcome section).

The two bus terminals, San Jin Tan and Tian Shun Yuan were completed in December 2018 as targeted. At the time of the writing of ICR, they were not operational. The team informed IEG that they became operational (transferred to the bus company) on May 23, 2019. The ICR reports that once these terminals become operational, they will serve eight bus routes with 194 buses thus improving service quality of bus transport (ICR para 27).

Average daily public transport trips rose to 7.3 million (4.1 million bus trips per day and 3.2 million metro trips per day), accounting for 61 percent of all motorized trips made by citizens in 2018, compared with 52.8 percent in 2011.

#### **Outcomes**

The project improved mobility within Wuhan's central area through better public transport. With the introduction of area traffic signal and bus priority signals and the separation of NMT, buses, and general traffic, buses are running faster (ICR para 27).

On the Heping Avenue Section, the average bus travel time during peak hours was reduced by 5.7%, from 35 to 33 minutes, which is less than the target of 14% (five-minute) reduction. On Hanyang Avenue, the target of a 16.7 percent (four-minute) reduction was achieved. The ICR notes (para 29) that this is a modest reduction, because the construction of metro stations is blocking several lanes of traffic, including the bus priority lanes, in most sections of Heping Avenue and parts of Hanyang Avenue. Once the metro stations are completed, a further reduction in travel times is expected.



## To central area of Wuhan

### Outputs

The project rehabilitated and upgraded three roads sections linking peripheral towns to the central area of Wuhan. A total of 13.3 km of roads were constructed, slightly less than the target of 13.65 km due to 360 m railway underpass on Jiefang Avenue. These roads are (a) Shuidong Road (3.4 km), Jiefang Avenue (Huangpu Road – Dijiao Garden Road) (9 km), and (c) Shuidong Section of the 2nd Ring Road (0.89 km).

The installation of river-crossing traffic monitoring systems on the Third Ring Road such as a video surveillance system, electronic information display boards, an automated weigh-in-motion system, and a trunk optical cable transmission system, supported the safety and smoothness of river-crossing traffic to central areas of Wuhan.

### Outcomes

Project interventions shortened the travel times (by car) of residents from peripheral towns to the central area of Wuhan.

- Average peak-hour travel time on Jiefang Avenue (Huangpu Road to Dibian Road) was reduced by 33.3% from 45 minutes (baseline) to 30 minutes in 2018 – exceeding the target of 35 minutes.
- Average peak-hour travel time on JAE (Dibian Road to the Third Ring Road) was reduced by 54.5% from 11 minutes (baseline) to 5 minutes in 2018, achieving the target. The construction of the JAE has enhanced traffic connection between the downtown area and the Second Ring Road, Third Ring Road, and Huangpi District, thus relieving the pressure on through traffic (ICR para 34).
- Average peak-hour travel time on Shuidong Section of the Second Ring Road was reduced by 77.3% from 22 minutes (baseline) to 5 minutes in 2018 – exceeding the target of 15 minutes. The construction of the Shuidong Road relieved the river-crossing traffic flow of the Erqi Yangtze River Bridge at the south bank and shortened travel times from Linjiang Avenue on the Second Ring Road to the Heping Avenue area (ICR para 34).

### Rating

Substantial

## OBJECTIVE 2

### Objective

To assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in a safe manner.

### Rationale



The **theory of change** for this objective is that project activities supporting road safety infrastructure and equipment; education and awareness of road safety; and enforcement on the project corridors would make the corridors safer.

### Outputs

- Road safety improvements were undertaken on 28.4 km of road safety corridors. These included (a) 48 intersections with non-conflicting traffic signals for pedestrians (target was 38), (b) 17 unsignalized zebra crossings converted to signalize mid-block crossings (target was 9) (the project team explained that in China the cities are structured in large blocks with long distances between the intersections; pedestrians have a long walk to cross the street. The project introduced signalized crossings in the middle of the block to allow pedestrians to cross the street in a safe and efficient manner), (c) 13.3 km of roads (as targeted) were improved/constructed with physical separation between motorized and non-motorized vehicles;
- The project team informed IEG that the traffic safety education – termed the Road User Education (RUE) suffered from being too general during the project life cycle. RUE campaigns and messages were unfocused and generally of minimal value (such as “Drive Safely”, “Obey the Traffic Regulations”) and were not evaluated based on outcomes. The RUE activities supported by the project were: (i) Equipment to upgrade the Traffic Radio Media and Broadcasting Center, run by the Wuhan Traffic Police, (ii) the publication in 2012 of a special issue of “Traffic Management” magazine, the journal of the Wuhan Traffic Police, showcasing the project and highlighting the enhanced approach to RUE, and (iii) RUE campaigns along the public transport and road safety Corridors including activities, equipment, materials;
- The project developed Wuhan’s Intelligent Transport Systems (ITS) through the procurement of equipment for the traffic control center; signaling intersections, and mid-block pedestrian crossings; and
- The project financed the purchase of teaching materials for traffic safety and education and assisted in traffic safety education and awareness.
- Regarding the enforcement of traffic safety, the project financed a range of CCTV (Closed Circuit Television) Monitoring and Enforcement Cameras (called E-police cameras), which collect data on traffic flows, congestion, traffic crashes and incidents, weather conditions, and traffic violations

### Outcomes

The project team introduced the concept of physical channelization by the use of road markings, and mid-block signals over unsignalized zebra crossings, to enhance road safety. The ICR reports (para 35) that the integration of road safety and public transport measures on the corridors, through the monitoring of illegal occupancy of bus lanes, a bus priority signal control system, bus lane signs, and road safety education and public awareness campaigns, contributed to increased traffic safety. It should be noted that there was an increase in the fatality rate on two of the four corridors (Hanyang and Baishazhou Avenues) during the construction period (2015-17), but it had decreased substantially from 22 to 10 fatalities by the end of the project, exceeding the target of 18 (ICR para 36).





**Rating**  
Substantial

### **OBJECTIVE 3**

#### **Objective**

To assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in an environmentally sustainable manner.

#### **Rationale**

The **theory of change** for this objective is that development of a public transport system and the introduction of the Intelligent Transport Systems (ITS) such as Area Traffic Control as well as the development of a strategy for environmentally friendly construction, maintenance and operation of urban transport infrastructure, would contribute to an environmentally sustainable urban transport system.

#### **Outputs**

- The project assisted the Wuhan Municipality in developing a strategy for environmentally friendly construction, maintenance and operation of urban transport infrastructure. This manual was approved by the Project Management Office (PMO) in 2019.
- A feasibility study on 'traffic congestion charging' was carried out. The ICR notes (para 40) that this study lays the foundation for Wuhan Municipality to implement a traffic congestion charging policy, including measures and their possible impact on traffic congestion and the pricing policy for parking.
- A non-motorized vehicle study was also carried out. This study provided construction guidelines to standardize the planning, construction, and management of non-motorized vehicle transportation infrastructure in the main urban areas of Wuhan.

#### **Outcomes**

The introduction of the Intelligent Transport Systems (ITS) such as Area Traffic Control, which automatically adjusts traffic signal timings based on real-time traffic data in combination with real-time bus passenger information, improved the capacity and quality of existing bus services as well as vehicle flow. This in turn would reduce air pollution and cut GHG emissions (ICR para 38).

The improvement in project corridors increased the public transport modal share from 31% in 2008 to 35% in 2018 on Hanyang Avenue (as targeted) and from 27% in 2008 to 31% on Heping Avenue during project implementation (as targeted). This is an important achievement as during this period the total number of private motor vehicles in Wuhan increased 0.9 million to 3.12 million (ICR para 29 and 31).

The project had a strong demonstration effect. Wuhan Municipality took the learning experience from the two project-financed bus corridors and implemented it in other corridors. A total of 30 new bus lanes, for a total of 120 km, were opened to traffic in May 2016. By November 2018, the number of bus lanes increased to 50, for



a total of 430 km (ICR para 30). All this investment in public transport is expected to contribute to urban transport in an environmentally sustainable manner.

**Rating**

Substantial

**OBJECTIVE 4**

**Objective**

To assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in an integrated manner.

**Rationale**

The **theory of change** for this objective is that the physical integration of different modes of urban transport, such as metro, bus, and non-motorized transport would result in multi-modal integration.

- The project assisted Wuhan Municipality in preparing a bus route optimization strategy that offered guidance to Wuhan Municipality on integrating bus routes with metro lines. The strategy recommended placing bus stops close to metro stations to facilitate seamless transfers (ICR para 45).
- The project supported a series of workshops and seminars to bring together Chinese and international best practices related to public transport integration (ICR para 45). The ICR reports that on January 1, 2016, WMG formally implemented the 'implementation measures for preferential transfer of conventional public transportation' to reduce citizens' travel costs and introduce preferential fare payment methods (such as 20 percent discount for card transfer between modes, if paid by smart card).
- A study on the 'Institutional and Management Framework for Wuhan's Urban Transport Integration' was prepared, as targeted. The ICR (para 43) reports that the Bank's follow-up Wuhan Integrated Transport Development Project will carry out part of its recommendations to contribute to implementation readiness and enhanced capacity in Wuhan for the integration of different transport modes with the support of ITS.

**Rating**

Modest

**OVERALL EFFICACY**

**Rationale**



The project substantially achieved its objective 'to assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in an environmentally sustainable, integrated and safe manner'.

**Overall Efficacy Rating**

Substantial

**5. Efficiency**

**Economic Efficiency**

At appraisal, an economic analysis was conducted for physical investments. Standard assumption of 12% discount rate and 20 years life cycle was used. The benefits were (i) time savings for pedestrians, bicycle riders, and bus and car passengers; (ii) vehicle operating cost savings; (iii) savings in road accident costs; and (iv) avoided carbon emissions. Overall *ex-ante* Economic Rate of Return (ERR) was 15.3%. Table 1 shows ERR for each component. The *ex-post* ERR used the appraisal assumptions but accounted for the changes from two restructurings that changed the corridors; higher transaction costs of the project as well as current travel demand resulted in an *ex-post* ERR of 17.3%. The reason for the higher *ex-post* ERR is due to the road improvement component, which achieved better results compared to those anticipated at appraisal. For example, the peak-hour travel time along the project roads is shorter than the target value, especially for the Shuidong Section of the Second Ring Road (see section 4).

Table 1. Economic Rate of Return by Component

	<i>Ex-ante</i> ERR	<i>Ex-post</i> ERR
<b>Road Improvement</b>	14.8%	17.1%
<b>Road Safety</b>	25.0%	28.1%
<b>Public Transport</b>	15.6%	23.3%
<b>Overall</b>	<b>15.3%</b>	<b>17.3%</b>

As discussed in section 2 b, three public transport corridors were cancelled. These included (i) the Jiefang Avenue (in Hankou); (ii) the Xinhua Lu/Youyi Lu (in Hankou); (iii) the Yingwu Avenue (in Hanyang). Heping Avenue construction was reduced by 2.7 km due to the impact of the metro construction.

**Administrative Efficiency**

The road safety and traffic demand management components were completed on schedule. However, roads improvements and public transport components faced cost overruns. The construction cost of the road sections was significantly higher than initially estimated, due to higher land acquisition and resettlement costs (that increased by 183.6 percent) mostly because of the increase in real estate prices in Wuhan and in China in general. Land acquisition and resettlement costs for the road improvement and public transport components



represented 82 percent of the total project cost increase. The project closed two years and eight months behind schedule.

Overall, the project efficiency is rated **modest** because project implementation suffered from significant delays and cancellation of some activities.

### Efficiency Rating

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	15.30	81.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	17.30	95.00 <input type="checkbox"/> Not Applicable

\* Refers to percent of total project cost for which ERR/FRR was calculated.

### 6. Outcome

The project objectives were substantially relevant to the Bank strategy and country priorities. The project substantially achieved its objective 'to assist the Borrower's Municipality of Wuhan to enhance mobility for passenger trips within and to the central area of Wuhan in an environmentally sustainable, integrated and safe manner'. Efficiency was modest because project implementation suffered from significant delays and cancellation of some activities. Overall, the outcome of the project is rated moderately satisfactory.

#### a. Outcome Rating

Moderately Satisfactory

### 7. Risk to Development Outcome

**Government Ownership/ Commitment:** This risk to the development outcome is low. Wuhan Municipality is committed to a sustainable urban transport approach and this approach is being replicated in other corridors of the city. The only concern is that the recommendations of the congestion and parking pricing study may not be implemented in the short term (paras 92 and 93). The ICR does not discuss the reasons.

The ICR notes (para 89) that the cooperation between the Bank, Wuhan Municipality, and the Project Management Office led to the preparation of the follow-on Wuhan Integrated Transport Development Project (WITDP). The continuation of Bank's engagement in Wuhan through WITDP is expected to have a positive



impact as WITDP is planning to implement the recommendations of some studies financed under this project. For example, WITDP is supporting smart parking systems in Wuhan (ICR para 40) and is expected to further strengthen transport integration in Wuhan (ICR para 45). The WITDP will also support the improvement of municipal bus operations through the development of integrated ITS solutions (ICR para 93).

**Operations and Maintenance.** This risk to the development outcome is low. The ICR reports (para 88) that the project management office and the project agencies have appropriate arrangements in place for operation and maintenance (O&M) of project-financed assets. Wuhan Urban Management Committee is responsible for the maintenance and operation of the two public transport corridors: Heping Avenue and Hanyang Avenue. The two bus terminals would be maintained and operated by the Wuhan Public Transport Group. The Wuhan Traffic Management Bureau had formulated measures for maintenance and management of the electronic monitoring system and made specific provisions on the work content and examination of the results of electronic monitoring system maintenance.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The project design was based on the technical studies completed under the previous Wuhan Urban Transport Project. For example, the road safety component was the result of technical study that identified high risk corridors in and around the Second Ring Road. The project introduced Intelligent Transport System and Integrated Corridor Management approaches. The project preparation was highly participatory and enabled the city agencies to provide inputs in the project design. This was important for the project design to gain the acceptance of the city's leadership (ICR para 84).

However, there were some significant shortcomings: (a) there were weaknesses in M&E design (see section 9a); (b) the impact of metro expansion and resettlement requirement was not considered; and (c) at appraisal, the flooding risk relating to the breaching of the Zhanggong Dike by the Jiefang Avenue Extension was not anticipated (see section 10 a). Two restructurings were required, indicating several omissions during preparation, such as the impact of metro expansion and resettlement requirements. The project's Results Framework was almost entirely revised during implementation (ICR para 85).

### Quality-at-Entry Rating

Moderately Unsatisfactory

### b. Quality of supervision

The ICR reports (para 86) that during implementation, the Bank closely monitored implementation progress through frequent supervision missions (27 missions over the eight years). At the mid-term review (MTR), the project was rated moderately unsatisfactory and the World Bank and the PMO started a dialogue on restructuring the project (ICR para 87). The task team took appropriate and timely actions such



as (a) conducted detailed analysis of the factors leading to the risk posed by flooding due to the breaching of the Zhanggong Dike and drafted a strategy to address this issue (see section 10 a); (b) restructured the project after the mid-term review, which led to the revision of the results framework; integration between bus and metro; and addition of special facilities for persons with disabilities in the corridor design, such as tactile paths and audible signals.

In addition, the Country Management Unit (CMU) and the Bank team worked to make the project politically relevant with the Mayor of Wuhan. As a result, the mayor declared this project as one of his top three priorities and allocated sufficient counterpart funds. The Bank responded adequately to the expansion of the metro network and adapted to facilitate efficient integration between bus services and the metro, with bus services serving as feeders connecting key residential, commercial, and other areas of interest near Hanyang Avenue with the metro system.

For the JAE Section, resettlement is still outstanding. The Project Management Office and the World Bank agreed that resettlement monitoring will be undertaken every three months and that all families will be relocated to their new housing by June 2020. The World Bank will monitor the progress and compliance with the resettlement as part of the ongoing Wuhan Integrated Transport Development Project (ICR para 79).

The Bank team had good cooperation and working relationship with the project management office and Wuhan City authorities. This led to the development of a follow-on project - Wuhan Integrated Transport Development Project, to build on the achievements of this project. This project is currently under implementation.

### **Quality of Supervision Rating**

Satisfactory

### **Overall Bank Performance Rating**

Moderately Satisfactory

## **9. M&E Design, Implementation, & Utilization**

### **a. M&E Design**

The M&E framework was poorly designed. The indicator such as ‘average bus ridership along the public transport corridor’ for PDO element 1 “*enhance mobility within the central area of Wuhan*” suffered from poor attribution to the project. For example, bus ridership was negatively affected by the new metro construction, and thus did not serve as a good indicator for enhanced mobility. The indicator “municipal modal share of public transport” was mismatched with the scope of the project, which focused on key corridors and not the entire urban area of Wuhan. It was also not easily measurable by PMO.

The indicator ‘fatality reduction’ for PDO element 3 “*in a safe manner*” was too broad. It should have included both the annual number of fatalities and the injuries on the corridors, to better evaluate road safety on the corridor.



There were no indicators to measure the achievement of PDO element 4 “environmental manner” and PDO element 5 “in an integrated manner”. Also, indicators on social aspects, such as the number of female beneficiaries or the presence of low-income groups along the corridors, were missing.

## **b. M&E Implementation**

The ICR reports that some of the original monitoring indicators were not easily measurable and the PMO was not able to gather data to evaluate and report on implementation progress. As a result, reporting on this project was rather retrospective at the beginning (ICR para 69).

Two project restructurings in 2015 and 2017 revised the M&E framework significantly. At the time of 2015 restructuring, two indicators were dropped:

- Average bus speed along public transport corridors was dropped because the majority of the public transport corridors were dropped or changed with respect to the original design and there was no record in the PAD or the project files on how exactly the original baselines were calculated (Project paper page 13).
- Average daily bus ridership along public transport corridors was dropped because the majority of the public transport corridors were dropped or changed with respect to the original design. The bus service to the public transport corridors that remained became feeders to the metro lines (Project paper page 13).

Two indicators were revised:

- The scope of a modal share indicator was changed from city wide to the targeted public transport corridors.
- Peak hour travel time (in minutes) between two pairs of origin-destination points on the Shuidong Section of the second ring road was revised to measure “average peak hour travel time on Jiefang Avenue (Huangpu Lu/Dibian Lu) and on the Shuidong Section of the second ring road.
- The indicator ‘average number of fatalities per year on four road safety corridors’ was revised because two road safety corridors were dropped, and one corridor was added, which meant that the baseline had to be recalculated.

At the time of 2017 restructuring, following indicators were added: (a) Wuhan city develops an integrated public transport strategy; and (b) Wuhan City develops a strategy for an environmentally friendly construction, maintenance, and operation of urban mobility infrastructure.

The two restructurings improved the results framework considerably.

A dedicated M&E specialist was contracted to support the PMO to regularly report on the indicators. In addition, Wuhan Urban Comprehensive Transport Planning and Design Research Institute was responsible for collecting and aggregating the results framework data for the project. It provided biannual updates.



### c. M&E Utilization

The ICR does not provide evidence on M&E utilization. It just mentions that the M&E system was used to track the progress of outputs and the achievement of outcomes (ICR para 70).

### M&E Quality Rating

Modest

## 10. Other Issues

### a. Safeguards

At appraisal, **the project was classified as environment category B** and two safeguards policies were triggered: environmental assessment OP/BP 4.01 and Involuntary Resettlement (OP/BP 4.12)

**Environmental assessment OP/BP 4.01.** The construction activities were expected to have temporary negative environmental impacts such as construction noise, air-borne dust, loss of surface vegetation, water pollution and soil erosion, solid waste/spoil disposal, disturbance of traffic and social activities of the local community. All relevant safeguards documents were prepared. These included (a) Environmental Impact Assessment Report; (b) Environmental Management Plan for the road improvement component; and (c) Environmental Management Plan for the public transport component. These documents adequately addressed these potential impacts and included mitigation measures (PAD paras 62 and 63).

In August 2015, the Bank learned of a possible flooding risk related to the breaching of the Zhanggong Dike by the Jiefang Avenue Extension (JAE). This was not anticipated at appraisal. Once the Bank was alerted, the Bank took appropriate actions and updated the Resettlement Action Plan (RAP), Environmental Impact Assessment, and Environmental Management Plan in 2016 (ICR para 73). The environmental safeguards monitoring was carried out by Wuhan Environmental Monitoring Center, which submitted 13 environmental monitoring reports to the World Bank.

**Involuntary Resettlement (OP/BP 4.12).** At appraisal, it was estimated that 34.5 hectares of collective land would be acquired from suburban villages and 13.7 hectares of state-owned land would be acquired in urban areas (a total of 48.2 hectares). Housing demolition would entail the relocation of 391 households with 1,486 people, 218 shops (with 556 employees), and 21 enterprises. A Resettlement Action Plan (RAP) was prepared.

The RAP's required independent monitoring of resettlement activities. This was carried out by Wuhan University's Center for Involuntary Resettlement Research and 16 external monitoring reports on resettlement were submitted to the Bank from January 2011 to July 2018. Overall, the project affected 1,055 families (with 3,265 people) and 40 enterprises. The project required 31 ha of land and nearly 300,000 m<sup>2</sup>





of structures. The ICR reports (para 78) that the Bank's grievance redress mechanism did not receive any complaints from citizens.

By project closure, following resettlement activities were completed:

- All displaced families from the **Shuidong Section** received full compensation.
- The resettlement works for **Jiefang Avenue Section** took over six years. All displaced families was relocated satisfactorily to their new apartments.

For the **JAE Section**, resettlement is still outstanding. The Project Management Office and the World Bank agreed that resettlement monitoring will be undertaken every three months and that all families will be relocated to their new housing by June 2020 (ICR para 79). The resettlement was delayed because the selected Nanhu Village resettlement site (in Huangpi District) was not only for the JAE section resettlement but also for the relocation of displaced families affected by the three large municipal-funded World Bank-supported projects in Huangpi District. The land approval, design, and urban planning of the resettlement site were delayed for over three years because the Nanhu Village area was part of a new city called Yangtze River Eco-city. The plant to treat wastewater from the new city was outstanding at project closure (ICR para 77).

## b. Fiduciary Compliance

**Financial Management.** The ICR reports (para 80) that the financial management was satisfactory. This project was the second urban transport project in Wuhan, and the Project Management Office (PMO) and the Project Implementation Units (PIUs) were familiar with the World Bank's general financial management requirements and disbursement procedures. There was some staff turnover in the financial team, but the key accountant remained the same throughout project implementation. The interim financial reports and audit reports were submitted on time. All audit reports were unqualified. However, the auditors detected some internal controls issues in contract management, project management, and resettlement.

**Procurement.** The ICR reports (para 82) that the procurement performance was satisfactory. To further strengthen the procurement capacity of the PMO, a number of training courses were conducted. Except for one contract, there were no procurement issues. The contract SRD2.4/SPT3.2D received complaint concerning several restrictions on bid participation. The Bank team explained that these were related to: (i) a website access card should be received from the Wuhan Construction Trading Construction website as a condition for registration of bidding; (ii) qualification and past experience review by the employer as a condition for registration of bidding; (iii) no detailed qualification requirements were provided in a published notice; (iv) a Bank guarantee is not an acceptable form of Bid security (cash only). The Bank found parts of this complaint to be valid and asked the PMO to modify the bidding documents, along with a bid opening extension. The complaint was resolved to the satisfaction of the Bank (ICR para 83).

## c. Unintended impacts (Positive or Negative)

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d. Other

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**11. Ratings**

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Modest	Modest	
Quality of ICR	---	Substantial	

**12. Lessons**

Following lessons are adapted from the ICR:

- **Traffic Demand Management (TDM) measures are necessary to accommodate rapidly urbanizing environments such as reducing traffic congestion and lowering emissions.** In the short term, public transport must be made more attractive through the implementation of bus priority schemes and better modal integration. However, in the longer term, more restrictive forms of TDM such as parking management, congestion charging, and driving restrictions that help reduce congestion need to be promoted.
- **An Integrated Corridor Management approach can improve service quality for all users in a selected corridor.** The project demonstrated that installing on-street priority for buses on two corridors and constructing sidewalks, bike lanes, and bus lanes within the same right-of-way improved mobility for citizens in Wuhan. With the separation of NMT, buses, and general traffic, buses run faster with more passengers.
- **Lack of adequate synchronization of resettlement activities with civil works can cause significant time and cost overruns.** The demolition work for the JAE was seriously delayed by a lack of counterpart funds and land acquisition problems that led to the project’s delay. A high level of institutional involvement was necessary to provide these funds, which were only provided after the Deputy Mayor assigned strategic importance to the project along the Jiefang Avenue. The PMO needs to have the experience and ability to deal with district governments, because close coordination with them and an explicit division of responsibilities is also necessary.

**13. Assessment Recommended?**

Yes



Please Explain

The Bank has been continuously engaged in the urban transport sector in Wuhan. The first project was approved in March 2004 and completed in December 2010; this project was approved in 2010, and the third project was approved in 2012. The field assessment of this and the other two projects can provide important lessons on city-wide engagement in the urban transport sector.

#### **14. Comments on Quality of ICR**

The ICR was thorough and provided evidence to support the narrative and the ratings. The report followed the OPCS guidelines and was internally consistent. The discussion on the theory of change was adequate. Economic analysis was detailed and clearly represented. The lessons were clear and based on evidence responding to specific experience and findings for the project.

There were some minor shortcomings. At 35 pages, the report is lengthy. The section on safeguards provided details but did not report whether the project was in compliance with the environmental and involuntary resettlement safeguards policies. The discussion of the risk to the development outcome was weak. For example, the section mentions that on the demand side, there is a risk that the recommendations of the congestion and parking pricing study may not be implemented in the short term (paras 92), however, the ICR does not provide the reasons. The arrangements for operations and maintenance are discussed under quality of supervision rather than in the risk to development outcome section.

##### **a. Quality of ICR Rating** Substantial